WSR 23-17-159
PERMANENT RULES
DEPARTMENT OF ECOLOGY

[Order 18-09—Filed August 23, 2023, 8:50 a.m., effective January 1, 2024]

Effective Date of Rule: January 1, 2024.

Purpose: The department of ecology (ecology) is adopting amendments to chapter 173-340 WAC, the Model Toxics Control Act (MTCA) cleanup regulations, which governs the investigation and cleanup of sites in Washington state contaminated by the release of hazardous substances. As part of this rule making, ecology is not changing the cleanup standards in Parts 7 and 9 of the chapter. The purpose of the amendments is to:

- Strengthen environmental justice principles when prioritizing and cleaning up contaminated sites.
- Improve the site hazard assessment and ranking process.
- Require comprehensive program plans and performance assessments.
- Improve initial response to releases from regulated underground storage tanks.
- Update and clarify remedial investigation and remedy selection requirements.
- Clarify which requirements apply to independent remedial actions.
- Strengthen public participation and tribal engagement requirements for ecology-conducted or supervised cleanups.
- Make the rule easier to use and understand.

Citation of Rules Affected by this Order: Amending chapter 173-340 WAC.

Statutory Authority for Adoption: Chapter 70A.305 RCW, Model Toxics Control Act; chapter 70A.355 RCW, Underground storage tanks.

Adopted under notice filed as WSR 23-05-092 on February 15, 2023.

Changes Other than Editing from Proposed to Adopted Version: Ecology made the following changes, including editing, to chapter 173-340 WAC:

Throughout rule, except WAC 173-340-100: Added word "likely" in front of each usage of the defined terms "vulnerable population" and "overburdened community."

WAC 173-340-200, definition of "conceptual site model": Clarified that "sensitive environments" are one of the "physical and habitat features" that must be included as part of a conceptual site model. The term "sensitive environment" is currently defined in WAC 173-340-200, and such environments must be identified during initial site characterizations of underground storage tanks (UST) releases under WAC 173-340-450 and remedial investigations of all releases under WAC 173-340-350.

WAC 173-340-200, definition of "practicable": Corrected rule cross-reference.

WAC 173-340-320 (1)(b): Edited text to help clarify the purpose of site hazard assessments and rankings in relation to program planning and assessment in WAC 173-340-340.

WAC 173-340-320 (2)(a)(iii): Edited text to clarify the populations referenced are those that are "potentially exposed" to a release.

WAC 173-340-320 (2)(a)(iv): Added as a functional requirement of the site hazard assessment and ranking process to "identify the environmental health disparity ranking of the potentially exposed popula-

tion using the environmental health disparities map developed pursuant to RCW 43.70.815 or other readily available information."

WAC 173-340-340(1): Edited text to clarify that the strategic plan must prioritize contaminated sites that threaten likely vulnerable populations and overburdened communities.

WAC 173-340-350 (3)(a) and (b): Deleted duplicate timing and phasing requirement for feasibility studies. The timing and phasing requirements for feasibility studies are specified separately in WAC 173-340-351(3).

WAC 173-340-350 (3)(c): Edited text to clarify that a remedial investigation and a feasibility study may be conducted as a single step or as separate steps in the cleanup process.

WAC 173-340-350 (5)(g)(iii): Clarified that the remedial investigation report must separately include information on threats to likely vulnerable populations and overburdened communities. Also moved provision from subsection (g)(vii) of this subsection to make the list of what must be included in the remedial investigation report consistent with the steps for a remedial investigation.

WAC 173-340-350 (6)(a): Clarified that one must identify only the "estimated" quantity of "releases," consistent with other regulatory requirements.

WAC 173-340-350 (6)(g)(iii) and (iv): Added as a remedial investigation requirement that one must collect sufficient information on any "sensitive environments at the site" and "any habitat restoration or resource recovery goals for the site." The term "sensitive environment" is currently defined in WAC 173-340-200.

WAC 173-340-350 (6)(h)(iii): Clarified that one must collect sufficient information during a remedial investigation to determine "whether the receptors include likely vulnerable populations or overburdened communities."

WAC 173-340-350 (6)(j): Edited text to further clarify that sufficient information must be collected during the remedial investigation to determine whether a feasibility study is necessary.

WAC 173-340-350 (6)(k): Edited text to further clarify that, if a feasibility study is necessary, then sufficient information must be collected during the remedial investigation to develop and evaluate cleanup action alternatives in the feasibility study.

WAC 173-340-351 (2)(a)(i) and (ii): Corrected rule cross-references to WAC 173-340-350 (6)(g)(vii).

WAC 173-340-351 (3)(a) and (b): Deleted duplicate timing and phasing requirement for remedial investigations. The timing and phasing requirements for remedial investigations are specified separately in WAC 173-340-350(3).

WAC 173-340-351 (3)(c): Edited text to clarify that a remedial investigation and a feasibility study may be conducted as a single step or as separate steps in the cleanup process.

WAC 173-340-351 (6)(a): Emphasized that, when identifying goals for the cleanup action in the feasibility study, one must include "any habitat restoration or resource recovery goals for the site."

WAC 173-340-351 (6)(f)(v)(D) and (E): Clarified that the feasibility study report must include for each alternative studied the estimated "mass" of each hazardous substance to be removed or treated versus the "mass" remaining behind above proposed cleanup levels. Specifically, clarified that "amount" means "mass." Also clarified that ecology may require or allow "estimates of the volume of contaminated material in place of, or in addition to, estimates of mass of hazardous substances."

WAC 173-340-355(2): Edited text to clarify that remediation levels are specific to a hazardous substance.

WAC 173-340-355(5): Repeated current requirement in WAC 173-340-380 to emphasize that "the remediation levels selected as part of a cleanup action must be specified in the cleanup action plan."

WAC 173-340-360 (3)(c)(ii): Eliminated proposed rule requirement that a nonpermanent groundwater cleanup action must "provide an alternative water supply or treatment if the cleanup action does not protect an existing use of the groundwater."

WAC 173-340-360 (5)(c)(iii)(C): Corrected rule cross-reference to WAC 173-340-351 (6)(c).

WAC 173-340-360 (5)(c)(iv)(A)(I): Edited text to clarify that, in the disproportionate cost analysis, the baseline cleanup action alternative is only compared against the next most permanent alternative, not any of the other cleanup action alternatives.

WAC 173-340-360 (5)(d)(ii): Eliminated proposed rule amendment that defined the "permanence" criterion for a disproportionate cost analysis to include the degree to which the alternative permanently reduces the "exposure to" hazardous substances.

WAC 173-340-360 (5)(d)(vi)(B)(II): Eliminated proposed rule amendment that made discounting of post-construction costs optional instead of mandatory. Also changed how post-construction costs must be discounted. Specifically, compared to the proposed rule, ecology changed the inflation rate. Instead of using a construction cost index, the rule uses the United States Treasury nominal interest rate. This is accounted for by using constant dollars for future costs and discounting those costs using the United States Treasury real interest rate.

WAC 173-340-370(8): Eliminated the clarifying edit in the proposed rule, which had replaced the term "overall" with the term "long-term."

WAC 173-340-380 (5)(c): Added as required part of the cleanup action plan "a summary of how impacts on likely vulnerable populations and overburdened communities were considered when selecting the cleanup action and developing the plan."

WAC 173-340-380 (5)(l): Clarified that the cleanup action plan for a containment remedy must include the "estimated mass" of hazardous substances remaining on site. In particular, clarified that "amount" means "mass" and that only an "estimate" is needed. Also clarified that ecology may require or allow "estimates of the volume of contaminated material in place of, or in addition to, estimates of mass of hazardous substances."

WAC 173-340-390(4): Repeated the requirement in WAC 173-340-351 (2)(a)(ii) to emphasize that one must collect and document sufficient information during the remedial investigation to demonstrate that the contaminated site meets the conditions identified by ecology for using the model remedy.

WAC 173-340-440(5): Restored guidance eliminated in the proposed rule amendments advising that demonstrations of the ability of institutional controls to reduce risks "should be based on a quantitative, scientific analysis."

WAC 173-340-450 (5)(c)(iv): Changed proposed rule amendment to allow ecology to reduce the frequency of free product monitoring over time by UST owners and operators. Unless otherwise directed by ecology, free product must be monitored quarterly.

WAC 173-340-450 (6)(c)(vi): For interim action report, restored current requirement to include "sensitive environments" when describ-

ing the physical characteristics of the site. The proposed rule amendments mistakenly eliminated the requirement. The current rule defines the term "sensitive environments."

WAC 173-340-600 (5)(a): Added requirement for ecology to include on its web page for each contaminated site "the date ecology or PLIA discovered or received notice of the release or, if this date is not known, the earliest date of administrative activity in ecology's site database." This information is already tracked in ecology's site database.

WAC 173-340-600 (9)(e): Edited text to clarify that the plan referred to is the "public participation plan."

WAC 173-340-620 (3)(b): Clarified that ecology will not only seek to initiate, but also maintain meaningful engagement with Indian tribes throughout the cleanup process.

WAC 173-340-702 (12)(a), (b), and (c): Updated the regulatory requirements governing the applicability of new cleanup levels to reflect the removal from the rule of ecology-approved analytical methods in WAC 173-340-830. As under the current rule, the cleanup level that applies to a release will be based on the rules **and analytical methods** in effect at the times specified in this subsection. A release will not be subject to further cleanup action due solely to subsequent amendments to the rules governing cleanup levels **or the subsequent availability of more sensitive analytical methods.**

WAC 173-340-815 (3)(b): Edited text to clarify the applicability of the consultation and inadvertent discovery plan requirements.

A final cost-benefit analysis is available by contacting Clint Stanovsky, Department of Ecology, P.O. Box 47600, Olympia, WA 98504-7600, phone 360-742-9703, people with speech disability may call 877-833-6341, people with impaired hearing may call Washington relay service at 711, email MTCARule@ecy.wa.gov, website https://apps.ecology.wa.gov/publications/SummaryPages/2309075.html.

Number of Sections Adopted in Order to Comply with Federal Statute: New 0, Amended 0, Repealed 0; Federal Rules or Standards: New 0, Amended 1, Repealed 0; or Recently Enacted State Statutes: New 1, Amended 7, Repealed 1.

Number of Sections Adopted at the Request of a Nongovernmental Entity: New 2, Amended 12, Repealed 0.

Number of Sections Adopted on the Agency's own Initiative: New 4, Amended 49, Repealed 2.

Number of Sections Adopted in Order to Clarify, Streamline, or Reform Agency Procedures: New 4, Amended 49, Repealed 2.

Number of Sections Adopted using Negotiated Rule Making: New 0, Amended 0, Repealed 0; Pilot Rule Making: New 0, Amended 0, Repealed 0; or Other Alternative Rule Making: New 0, Amended 0, Repealed 0.

Date Adopted: August 23, 2023.

Laura J. Watson
Director

OTS-4222.6

Chapter 173-340 WAC
MODEL TOXICS CONTROL ACT((—))CLEANUP <u>REGULATIONS</u>

PART ((I)) 1 - OVERALL CLEANUP PROCESS

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-100 Purpose. This chapter is promulgated under chapter 70A.305 RCW, the Model Toxics Control Act. It establishes administrative processes and standards to identify, investigate, and clean up ((~~facilities~~)) sites where hazardous substances have come to be located. It defines the role of ((~~the department~~)) ecology and encourages public and tribal involvement in decision making at these ((~~facilities~~)) sites.

The goal of this chapter is to implement chapter ((~~70.105D~~)) 70A.305 RCW, the Model Toxics Control Act. This chapter provides a workable process to accomplish effective and expeditious cleanups in a manner that protects human health and the environment, including vulnerable populations and overburdened communities. This chapter is primarily intended to address releases of hazardous substances caused by past activities although its provisions may be applied to potential and ongoing releases of hazardous substances from current activities.

Note: All materials incorporated by reference in this chapter are available for inspection at the Department of Ecology's Toxics Cleanup Program, 300 Desmond Drive, Lacey, Washington, 98503.

AMENDATORY SECTION (Amending WSR 90-08-086, filed 4/3/90, effective 5/4/90)

WAC 173-340-110 Applicability. (1) This chapter ((~~shall apply~~)) applies to all ((~~facilities~~)) sites where there has been a release or threatened release of a hazardous substance that may pose a threat to human health or the environment. Under this chapter, ((~~the department~~)) ecology may require or take those actions necessary to investigate and ((~~remedy~~)) clean up these releases.

(2) ((~~Nothing herein shall be construed to diminish the department's~~)) Ecology retains all its authority to address a release or threatened release under other applicable laws or regulations. The cleanup process and procedures under this chapter and under other laws may be combined. ((~~The department~~)) Ecology may initiate a remedial action under this chapter and may upon further analysis determine that another law is more appropriate, or vice versa.

(3) If a hazardous substance remains at a ((~~facility~~)) site after actions have been completed under other applicable laws or regulations, ((~~the department~~)) ecology may apply this chapter to protect human health or the environment.

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-120 Overview. ((~~(1) Purpose.~~)) This section provides an overview of the cleanup process that typically ((~~will~~)) occurs at a site ((~~where~~)) following the discovery of a release or threatened release of a hazardous substance ((~~has been discovered with an emphasis on sites being cleaned up under order or consent decree~~)) to the environment. See WAC 173-340-510 for an overview of the administrative options for investigating and cleaning up a site. If there are any inconsistencies between this section and any specifically referenced sections, the referenced section ((~~shall~~)) governs.

((~~(2) Site discovery. Site discovery includes:~~

~~(a)~~)) (1) **Release reporting.** Within 90 days of discovering a hazardous substance release or threatened release that may pose a threat to human health or the environment, an owner or operator ((~~who knows of or discovers a release of a hazardous substance due to past activities~~)) must report the release to ((~~the department~~)) ecology as described in WAC 173-340-300. ((~~Most current releases of hazardous substances must be~~)) Other persons are encouraged to report such releases. Some releases are exempt from the release reporting requirements of this chapter, including those previously reported to ((~~the department~~)) ecology under the state's hazardous waste, underground storage tank, or water quality laws. The term "hazardous substance" includes a broad range of substances as defined ((~~by chapter 70.105D RCW~~)) in WAC 173-340-200.

((~~(b)~~)) (2) **Initial investigation.** Within ((~~ninety~~)) 90 days of learning of a hazardous substance release, ((~~the department will~~)) ecology conducts an initial investigation ((~~of the site~~)) under WAC 173-340-310((~~. For sites that may need further remedial action, the department will send an early notice letter to the owner, operator, and other potentially liable persons known to the department, informing them of the department's decision.~~

~~(3) Site priorities. Sites are prioritized for further remedial action by the following process:~~

~~(a) Site hazard assessment. Based on the results of the initial investigation, a site hazard assessment will be performed if necessary, as described in WAC 173-340-320. The purpose of the site hazard assessment is to gather information to confirm whether a release has occurred and to enable the department to evaluate the relative potential hazard posed by the release. If the department decides that no further action is required, it will notify the public of that decision through the *Site Register*.~~

~~(b) Hazardous sites list. The department will maintain a list of sites known as the "hazardous sites list" where further remedial action is required. The department will add sites to this list after the completion of a site hazard assessment. Sites placed on the list will be ranked using the department's hazard ranking method. The department will remove a site from the hazardous sites list if the site meets the requirements for removal described in WAC 173-340-330.~~

~~(c) Biennial program report. Every even-numbered year, the department will prepare a biennial program report for the legislature. The hazard ranking, along with other factors, will be used in this report to identify the projects and expenditures recommended for appropriation. See WAC 173-340-340.~~

~~(4) Detailed site investigations and cleanup decisions. The following steps will be taken to ensure that the proper method of cleanup is chosen for the site.~~

~~(a) Remedial investigation. A remedial investigation will be performed at ranked sites under WAC 173-340-350. The purpose of the remedial investigation is to collect data and information necessary to define the extent of contamination and to characterize the site.~~

~~(b) Feasibility study. A feasibility study will be conducted at ranked sites under WAC 173-340-350. The purpose of the feasibility study is to develop and evaluate alternative cleanup actions. The department will evaluate the remedial investigation/feasibility study, establish cleanup levels and the point or points at which they must be complied with in accordance with the procedures provided for in WAC 173-340-700 through 173-340-760 and select a cleanup action that protects human health and the environment and is based on the remedy selection criteria and requirements in WAC 173-340-350 through 173-340-390. WAC 173-340-440 sets forth the circumstances in which institutional controls will be required to ensure continued protection of human health and the environment.~~

~~(c) Cleanup action plan. The cleanup action will be set forth in a draft cleanup action plan that addresses cleanup requirements for hazardous substances at the site. After public comment on the draft plan, a final cleanup action plan will be issued by the department.~~

~~(5) Site cleanup. Once the appropriate cleanup action has been selected for the site, the actual cleanup will be performed.~~

~~(a) Cleanup actions. WAC 173-340-400 describes the design and construction requirements for implementing the cleanup action plan.~~

~~(b) Compliance monitoring and review. The cleanup action must include compliance monitoring under WAC 173-340-410 and in some cases periodic review under WAC 173-340-420 to ensure the long-term effectiveness of the cleanup action.~~

~~(6) Interim actions. Under certain conditions it may be appropriate to take early actions at a site before completing the process described in subsections (2) through (5) of this section. WAC 173-340-430 describes when it is appropriate to take these early or interim actions and the requirements for such actions.~~

~~(7) Leaking underground storage tanks. Underground storage tank (UST) owners and underground storage tank operators regulated under chapter 90.76 RCW are required to perform specific actions in addition to what other site owners and operators would do under this chapter. WAC 173-340-450 describes the requirements for leaking underground storage tanks.~~

~~(8) Procedures for conducting remedial actions.~~

~~(a) Remedial action agreements. The department has authority to take remedial actions or to order persons to conduct remedial actions under WAC 173-340-510 and 173-340-540. However, the department encourages agreements for investigations and cleanups in appropriate cases. These agreements can be agreed orders or consent decrees reached under the procedures of WAC 173-340-520 and 173-340-530.~~

~~(b) Independent remedial actions. Persons may conduct investigations and cleanups without department approval under this chapter. The department will use the appropriate requirements in this chapter when evaluating the adequacy of any independent remedial action. Except as limited by WAC 173-340-515(2), nothing in this chapter prohibits persons from conducting such actions before the department is ready to act at the site; however, all interim and cleanup actions must be reported to the department under WAC 173-340-515. Furthermore, independ-~~

~~ent remedial actions are conducted at the potentially liable person's own risk and the department may take or require additional remedial actions at these sites at any time. (See WAC 173-340-515 and 173-340-545.)~~

~~(9) Public participation. At sites where the department is conducting the cleanup or overseeing the cleanup under an order or decree, the public will receive notice and an opportunity to comment on most of the steps in the cleanup process. At many sites, a public participation plan will be prepared to provide opportunities for more extensive public involvement in the cleanup process.~~

~~These and other requirements are described in WAC 173-340-600.~~)) to confirm whether a release occurred that poses a threat and to determine whether further remedial action is necessary to confirm or address that threat. Ecology may extend an initial investigation when independent remedial actions are completed within 90 days of release discovery. Ecology notifies owners and operators in writing of its determination. For sites where remedial action is necessary, ecology also notifies the public in the *Contaminated Site Register* and provides information about the site on ecology's website under WAC 173-340-600.

(3) **Site hazard assessment and ranking.** Based on the results of the initial investigation, ecology assesses and ranks the threats to human health and the environment posed by the site under WAC 173-340-320. Ecology may update the site's hazard assessment and rankings during the cleanup process when new information becomes available or conditions change. Ecology uses the results to support decisions to add or remove sites from the contaminated sites list, prioritize remedial action and funding among and within sites, track cleanup progress, and communicate threats to the public.

(4) **Listing.** Ecology lists a site based on the results of the initial investigation and the site hazard assessment and ranking.

(a) **Contaminated sites list.** If further remedial action is necessary, ecology adds the site to the contaminated sites list under WAC 173-340-330. The list also identifies the site's remedial action status. Ecology updates the status during the cleanup process to reflect current conditions. The list is publicly available on ecology's website.

(b) **No further action sites list.** If no further remedial action is necessary, ecology adds the site to the no further action sites list under WAC 173-340-335. The list identifies whether institutional controls or periodic reviews remain necessary at the site. The list is publicly available on ecology's website.

(5) **Interim actions.** Under certain conditions it may be necessary or appropriate to conduct an early, interim action at a site before conducting a cleanup action.

(a) WAC 173-340-430 describes when interim actions are typically appropriate at a site and the requirements for such actions.

(b) WAC 173-340-450 describes specific interim actions that UST system owners and operators must perform immediately or shortly after confirming a release from a regulated UST system to reduce the threats posed by the release, prevent any further release, and characterize the nature and extent of the release. As specified in chapter 173-360A WAC, such releases must be cleaned up in accordance with this chapter.

(6) **Remedial investigation of site conditions.** After a detailed work plan is prepared, a remedial investigation is conducted at the site under WAC 173-340-350 to identify the sources of contamination; to characterize the nature, extent, and magnitude of contamination; and to assess the threats posed by the contamination to human health

and the environment. The results of the remedial investigation are used to establish cleanup standards and to develop and evaluate cleanup action alternatives in a feasibility study.

(7) **Feasibility study of cleanup action alternatives.** Based on the results of the remedial investigation, cleanup action alternatives for addressing the threats posed by the site are developed and evaluated in a feasibility study under WAC 173-340-351. The alternatives are evaluated against the requirements and expectations for cleanup actions in WAC 173-340-360 and 173-340-370. The results of the feasibility study are used to select the cleanup action for a site. A feasibility study is not required to select an applicable model remedy developed by ecology under WAC 173-340-390.

(8) **Cleanup action plan.** Based on the results of the remedial investigation/feasibility study, a cleanup action is selected and a cleanup action plan is prepared under WAC 173-340-380. The cleanup action plan documents the selected cleanup action and specifies the cleanup standards and other requirements the cleanup action must meet. Cleanup standards are established under Part 7 of this chapter and include the concentrations the cleanup action must meet (cleanup levels), the location where those concentrations must be met (points of compliance), and other regulatory requirements that apply to the cleanup action or site.

(9) **Cleanup.** After a cleanup action is selected, the cleanup is conducted under WAC 173-340-400 and 173-340-410. Cleanup includes design, construction, operation and maintenance, and monitoring of the cleanup action.

(a) **Design.** Before starting construction, plans are developed to detail the cleanup action. This includes engineering designs, construction plans and specifications, operation and maintenance plans, and compliance monitoring plans. Before or during this design phase, any permits or approvals needed to construct the cleanup action are identified and resolved.

(b) **Construction.** Construction of the cleanup action is conducted in accordance with the plans and specifications prepared during the design phase. Upon completion of construction, as-built reports are prepared to document all aspects of construction and compliance with plans and specifications. During and upon completion of construction, ecology may inspect the site and provide construction oversight.

(c) **Operation and maintenance.** After construction is complete, some cleanup actions need to be operated and maintained for a period of time to achieve cleanup standards. For example, a treatment system may be constructed and used to clean up contaminated groundwater. Operation and maintenance of such cleanup actions is conducted in accordance with a plan developed during the design phase.

(d) **Monitoring.** During the construction and the operation and maintenance of the cleanup action, the following types of compliance monitoring are conducted. Compliance monitoring is conducted in accordance with a plan developed during the design phase.

(i) Protection monitoring is conducted to confirm that human health and the environment are adequately protected.

(ii) Performance monitoring is conducted to confirm that the cleanup action is achieving or has attained cleanup standards and any other applicable performance standards, such as remediation levels or permit requirements.

(10) **Cleanup completion.** Ecology determines whether cleanup of the site is complete based on the criteria in WAC 173-340-330(5). Typically, a cleanup is complete if no further remedial action is neces-

sary to achieve cleanup standards at the site. For nonpermanent cleanup actions, such as those involving containment of contamination, post-cleanup controls and monitoring may be necessary as part of the cleanup action to maintain and periodically review compliance with cleanup standards.

(11) **Removal from contaminated sites list.** After determining the cleanup of the site is complete, ecology removes the site from the contaminated sites list under WAC 173-340-330 and adds the site to the no further action sites list under WAC 173-340-335. The no further action sites list identifies whether institutional controls or periodic reviews remain necessary at the site.

(12) **Post-cleanup controls and monitoring.** For nonpermanent cleanup actions, after the cleanup is completed and the site is delisted, one or more of the following post-cleanup remedial actions may be needed to control or monitor contamination remaining at the site.

(a) **Engineered controls.** Engineered controls are containment or treatment systems that prevent or limit movement of, or exposure to, contamination. For example, materials may be placed over contaminated soils to limit contact with contamination. For a cleanup action to remain protective, engineered controls must be operated and maintained in accordance with the plan required under WAC 173-340-400.

(b) **Institutional controls.** Institutional controls prohibit or limit activities or uses of real property that may interfere with the integrity of engineered controls or result in exposure to contamination remaining at the site. For example, a property may be restricted to industrial land use at sites where cleanup standards are based on such use. Institutional controls may also obligate a person to operate, maintain, or monitor engineered controls to ensure the integrity of the cleanup action. Typically, institutional controls are implemented by recording a restrictive covenant on the property. For a cleanup action to remain protective, institutional controls must be maintained and enforced. See WAC 173-340-440.

(c) **Confirmation monitoring.** Confirmation monitoring is a type of compliance monitoring used to confirm the long-term effectiveness of a cleanup action after the cleanup is completed. See WAC 173-340-410. For example, confirmation monitoring may be used to confirm that engineered controls are operating properly and effectively limiting the movement of contamination remaining at the site. For a cleanup action to remain protective, confirmation monitoring must be conducted in accordance with the plan required under WAC 173-340-400. Ecology relies on the monitoring data during periodic reviews of post-cleanup site conditions.

(d) **Financial assurances.** Financial assurances are assurances made to ecology by a person that sufficient financial resources are available to provide for the long-term operation, maintenance, and monitoring of a cleanup action relying on engineered or institutional controls, and for any needed corrective measures. Ecology may require financial assurances under WAC 173-340-440(11).

(e) **Periodic reviews.** Ecology conducts periodic reviews of post-cleanup site conditions at least once every five years to determine whether they remain protective of human health and the environment. If ecology determines that conditions are not protective and that substantial changes to the cleanup action are necessary, ecology may relist the site on the contaminated sites list and revise the cleanup action plan. See WAC 173-340-420.

(13) **Public notice and participation and tribal engagement.**

(a) **Site-specific information and alerts.** For all sites on the contaminated sites list and the no further action sites list, ecology will:

(i) Make key site information publicly available on ecology's website under WAC 173-340-600(5), including the site's listing, remedial action status, hazard rankings, and remedial action plans and reports;

(ii) If requested, notify a person electronically under WAC 173-340-600(6) when the site information specified on ecology's website is added or changed; and

(iii) Provide notice of proposed actions available for public comment in the *Contaminated Site Register*.

(b) **Ecology-conducted and ecology-supervised remedial actions.** For ecology-conducted and ecology-supervised remedial actions, ecology provides the public with notice and opportunity to comment and invites tribal engagement on most steps in the cleanup process. For such sites, ecology prepares or requires site-specific public participation and tribal engagement plans. These and other requirements are described in WAC 173-340-600 (8) through (19) and 173-340-620.

(c) **Independent remedial actions.** For independent remedial actions, ecology provides the public with notice of any reports of such actions received by ecology, the results of any ecology review of such actions, the results of any periodic review of the site, and any institutional controls at the site. These and other requirements are described in WAC 173-340-600(20).

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-130 Administrative principles. ((~~(1) Introduction. The department shall~~)) Ecology will conduct or require remedial actions, or provide technical assistance for independent remedial actions, consistent with the provisions of this section.

((~~(2) Information sharing. It is the policy of the department~~)) (1) **Sharing information.** Ecology's policy is to make information about releases or threatened releases available to owners, operators, or other persons with potential liability for a site in order to encourage them to conduct prompt remedial action. ((~~It is also the policy of the department~~)) Ecology's policy is also to make the same information available to interested members of the general public so they can follow the progress of site cleanup in the state.

((~~(3) Information exchange.~~)) (2) **Providing technical assistance.** All persons are encouraged to contact ((~~the department~~)) ecology and seek assistance on the general administrative and technical requirements of ((~~this chapter. Through its technical consultation program described in WAC 173-340-515, the department may also provide informal advice and assistance to persons conducting or proposing remedial actions at a specific site at any time. Unless the department is providing formal guidance for the implementation of an order or decree, any comments by the department or its agents are advisory and not commitments or approvals binding on the department. A person may not represent this advice as an approval of a remedial action. If the person requesting the advice is seeking binding commitments or approvals, then an order or consent decree shall be used.~~

~~(4) Scope of public participation. The department seeks to encourage public participation in all steps of the cleanup process. The department shall encourage a level of participation appropriate to the conditions at a facility and the level of the public's interest in the site.~~

~~(5) Scope of information. It is the department's intention~~)) the state cleanup law. Under ecology's voluntary cleanup program, persons planning or conducting independent remedial action may also request technical assistance on how to investigate and clean up a site and written opinions on whether a planned or completed remedial action meets the substantive requirements of the state cleanup law. Such technical assistance is advisory only and is not binding on ecology. Such technical assistance does not constitute, and may not be represented by a person as, an approval of a remedial action. See RCW 70A.305.170(1) and WAC 173-340-515(5). Ecology will only provide a binding commitment or approval under an order or decree.

(3) **Collecting adequate information.** Ecology intends that adequate information be gathered at a site to enable decisions on appropriate actions. ((~~It is also the department's intention~~)) Ecology also intends that decisions be made and cleanups proceed expeditiously once adequate information is obtained. Studies can be performed and submittals made at varying levels of detail appropriate to the conditions at the site. Also, steps in the cleanup process may be combined to facilitate quicker cleanups, where appropriate. Flexibility in the scope of investigations and in combining steps may be particularly appropriate for routine cleanup actions. Once adequate information has been obtained, ecology will make decisions ((~~shall be made~~)) within the framework provided ((~~in this chapter~~)) under the state cleanup law and in site-specific orders or decrees.

((~~(6) Preparation of~~)) (4) **Preparing documents.** Except for the initial investigation, any of the studies, reports, or plans used in the cleanup process can be prepared by either ((~~the department~~)) ecology or the potentially liable person. ((~~The department~~)) Ecology retains all authority to review and verify the documents submitted and to make decisions based on the documents and other relevant information.

(5) **Encouraging and facilitating public participation.** For ecology-conducted and ecology-supervised remedial actions, ecology seeks to encourage public participation and facilitate equitable participation in all steps of the cleanup process under WAC 173-340-600. Ecology will encourage a level of participation appropriate to the threats posed by a site and the level of the public's interest in the site. When assessing public participation needs at a site, ecology will consider the interests of likely vulnerable populations and overburdened communities.

(6) **Engaging and collaborating with Indian tribes.** For ecology-conducted and ecology-supervised remedial actions, ecology will seek to engage affected Indian tribes under WAC 173-340-620 by providing timely information, effective communication, continuous opportunities for collaboration and, when necessary, government-to-government consultation, as appropriate for each site.

(7) ((~~Interagency coordination.~~)) **Coordinating with agencies.**

(a) ((~~If the department is conducting remedial actions or requiring remedial actions under an order or decree, the department shall~~)) For ecology-conducted and ecology-supervised remedial actions, ecology will ensure appropriate local, state, and federal agencies ((~~and tribal governments~~)) are kept informed and, as appropriate, involved in

the development and implementation of remedial actions. ((~~The department~~)) Ecology may require a potentially liable person to undertake this responsibility. If the potentially liable person demonstrates that they are unable to obtain adequate involvement ((~~to allow the remedial action to proceed~~)) by a particular government agency ((~~or tribe, the department shall~~)) to allow the remedial action to proceed, ecology will request the involvement of the agency ((~~or tribe~~)).

(b) The nature and degree of coordination and consultation ((~~shall~~)) must be commensurate with the other agencies' ((~~and tribes'~~)) interests and needs at the site. Interested agencies ((~~and tribes shall also~~)) must be included in the ((~~mailing~~)) lists for public notices under WAC 173-340-600. To facilitate coordination, it is important that agencies ((~~and tribes~~)) provide specific comments, including the identification of other applicable state and federal laws and any additional information ((~~needed~~)) or mitigating measures that are necessary or desirable to satisfy their concerns.

(c) In order to provide for expeditious cleanup actions, all federal, state, and local agencies, ((~~and tribes~~)) are encouraged to coordinate with ecology when providing notices, holding meetings and hearings, and preparing documents. Whenever reasonable, ((~~the department shall~~)) ecology will coordinate and combine its activities with other agencies ((~~and tribes~~)) to minimize the duplication of notices, hearings and preparation of documents, unless otherwise prohibited.

(8) **Integrating State Environmental Policy Act.** See chapter 197-11 WAC for the State Environmental Policy Act requirements pertaining to the implementation of the ((~~Model Toxics Control Act~~)) state cleanup law.

(9) ((~~Appeals.~~)) **Ecology decisions.** Ecology retains all authority to determine compliance with state cleanup law requirements, including:

(a) Whether a remedial action is necessary under state cleanup law;

(b) Whether a remedial action meets the requirements in state cleanup law; and

(c) Whether a remedial action plan or report meets the requirements in state cleanup law.

(10) **Appealing ecology decisions.** Unless otherwise indicated, all ((~~department~~)) ecology decisions made under this chapter are remedial decisions and may be appealed only as provided for in RCW ((~~70.105D.060~~)) 70A.307.070.

PART ((~~II~~)) 2 - DEFINITIONS AND USAGE

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-200 Definitions. For the purpose of this chapter, the following definitions apply unless the context clearly requires otherwise:

"Acute toxicity" means the ability of a hazardous substance to cause injury or death to an organism as a result of a short-term exposure to a hazardous substance.

"Agreed order" means an order issued by ((~~the department~~)) ecology under WAC 173-340-530 with which the potentially liable person receiving the order agrees to comply. An agreed order may be used to require or approve any cleanup or other remedial actions, but it is not a settlement under RCW ((~~70.105D.040(4) and shall~~)) 70A.305.040(4) and does not contain a covenant not to sue, or provide protection from claims for contribution, or provide eligibility for public funding of remedial actions under RCW ((~~70.105D.070 (2)(d)(xi)~~)) 70A.305.190 (4)(a)(v) and (vi).

"Aliphatic hydrocarbons" or **"aliphatics"** means organic compounds that are characterized by a straight, branched, or cyclic (nonbenzene ring) arrangement of carbon atoms and that do not contain halogens (such as chlorine). See also "aromatic hydrocarbons."

"All practicable methods of treatment" means all technologies ((~~and/or~~)) or methods currently available and demonstrated to work under similar site circumstances or through pilot studies, and applicable to the site at reasonable cost. These include "all known available and reasonable methods of treatment" (AKART) for discharges or potential discharges to waters of the state, and "best available control technologies" (BACT) for releases of hazardous substances into the air resulting from cleanup actions.

"Applicable state and federal laws" means all legally applicable requirements specified in WAC 173-340-710(3) and those requirements that ((~~the department~~)) ecology determines, based on the criteria in WAC 173-340-710((~~(3)~~)) (4), are relevant and appropriate requirements.

"Area background" means the concentration((~~s~~)) of a hazardous substance((~~s that are~~)) consistently present in the environment in the vicinity of a site ((~~which are~~)) as the result of human activities unrelated to releases from that site. Compare "natural background."

"Aromatic hydrocarbons" or **"aromatics"** means organic compounds that are characterized by one or more benzene rings, with or without aliphatic hydrocarbon substitutions of hydrogen atoms on the rings, and that do not contain halogens (such as chlorine). See also "aliphatic hydrocarbons."

"Averaging time" means the time over which the exposure is averaged. For noncarcinogens, the averaging time typically equals the exposure duration. For carcinogens, the averaging time equals the life expectancy of a person.

"Bioconcentration factor" means the ratio of the concentration of a hazardous substance in the tissue of an aquatic organism divided by the hazardous substance concentration in the ambient water in which the organism resides.

"Carcinogen" means any substance or agent that produces or tends to produce cancer in humans. For implementation of this chapter, the term carcinogen applies to substances on the United States Environmental Protection Agency lists of A (known human) and B (probable human) carcinogens, and any substance that causes a significant increased incidence of benign or malignant tumors in a single, well conducted animal bioassay, consistent with the weight of evidence approach specified in the United States Environmental Protection Agency's Guidelines for Carcinogen Risk Assessment as set forth in 51 FR 33992 et seq.

"Carcinogenic potency factor" or **"CPF"** means the upper 95th percentile confidence limit of the slope of the dose-response curve and is expressed in units of (mg/kg-day)-1. When derived from human epide-

miological data, the carcinogenic potency factor may be a maximum likelihood estimate.

"Chronic reference dose" means an estimate (with an uncertainty spanning an order of magnitude or more) of a daily exposure level for the human population, including sensitive subpopulations, that is likely to be without an appreciable risk of adverse effects during a lifetime.

"Chronic toxicity" means the ability of a hazardous substance to cause injury or death to an organism resulting from repeated or constant exposure to the hazardous substance over an extended period of time.

"Cleanup" means the implementation of a cleanup action or interim action.

"Cleanup action" means any remedial action, except interim actions, taken at a site to eliminate, render less toxic, stabilize, contain, immobilize, isolate, treat, destroy, or remove a hazardous substance that complies with WAC 173-340-350 through 173-340-390.

"Cleanup action alternative" means one or more treatment technology, containment action, removal action, engineered control, institutional control or other type of remedial action ("cleanup action components") that, individually or, in combination, achieves a cleanup action at a site.

"Cleanup action plan" means the document prepared ((~~by the department~~)) under WAC 173-340-380 that ((~~selects~~)) documents the selected cleanup action and specifies the cleanup standards and other requirements ((~~for~~)) the cleanup action must meet.

"Cleanup level" means the concentration of a hazardous substance in soil, water, air, or sediment that is determined to be protective of human health and the environment under specified exposure conditions.

"Cleanup standards" means the standards adopted under RCW ((~~70.105D.030 (2)(d)~~)) 70A.305.030 (2)(e). Establishing cleanup standards requires specification of the following:

(a) Hazardous substance concentrations that protect human health and the environment ("cleanup levels");

(b) The location on the site where those cleanup levels must be attained ("points of compliance"); and

(c) Additional regulatory requirements that apply to a cleanup action because of the type of action and/or the location of the site. These requirements are specified in applicable state and federal laws and are generally established in conjunction with the selection of a specific cleanup action.

"Cohen's method" means the maximum likelihood estimate of the mean and standard deviation accounting for data below the method detection limit or practical quantitation limit using the method described in the following publications:

((~~•~~)) (a) Cohen, A.C., 1959. "Simplified estimators for the normal distribution when samples are singly censored or truncated." *Technometrics*. Volume 1, pages 217-237.

((~~•~~)) (b) Cohen, A.C., 1961. "Tables for maximum likelihood estimates: Singly truncated and singly censored samples." *Technometrics*. Volume 3, pages 535-541.

"Compliance monitoring" means a remedial action that consists of the monitoring ((~~as~~)) described in WAC 173-340-410, including protection monitoring, performance monitoring, and confirmation monitoring.

"Conceptual site model" means a conceptual understanding of a site that identifies ((~~potential or suspected sources of~~)) known or suspected:

(a) Hazardous ((~~substances,~~)) substance sources and release mechanisms;

(b) Hazardous substance types and concentrations ((~~of hazardous substances, potentially~~));

(c) Hazardous substance transport, including preferential pathways;

(d) Contaminated environmental media, ((~~and actual~~)) including the general extent and distribution of contamination within the media;

(e) Current and potential human and ecological receptors and exposure pathways ((~~and receptors~~)) (complete and incomplete); and

(f) Physical and habitat features, including current and potential future land and water uses and any sensitive environments.

This model is typically ((~~initially~~)) developed during the scoping of ((~~the~~)) a remedial investigation and further refined as additional information is collected ((~~on~~)) about the site during the remedial investigation. ((~~It~~)) The model is a tool used to assist in making decisions at a site.

"Conducting land use planning under chapter 36.70A RCW" as used in the definition of "industrial properties," means having adopted a comprehensive plan and development regulations for the site under chapter 36.70A RCW (Growth Management Act).

"Confirmation monitoring" means a type of compliance monitoring described in WAC 173-340-410.

"Containment" means a container, vessel, barrier, or structure, whether natural or constructed, that confines a hazardous substance within a defined boundary and prevents or minimizes its release into the environment.

"Contaminant" means any hazardous substance that does not occur naturally or occurs at greater than natural background levels.

"Contaminated site" means a site for which ecology or PLIA has determined further remedial action is necessary under the state cleanup law to:

(a) Confirm whether there is a threat to human health or the environment posed by a release or threatened release; or

(b) Address the threat posed by a release or threatened release, based on the criteria in WAC 173-340-330(5).

A contaminated site is referred to as hazardous waste site in chapter 70A.305 RCW.

"Contaminated sites list" means a list of contaminated sites maintained by ecology under WAC 173-340-330. For each listed site, the list also identifies the site's current remedial action status. This list is referred to as the hazardous sites list in chapter 70A.305 RCW.

"Curie" means the measure of radioactivity defined as that quantity of radioactive material which decays at the rate of 3.70×10^{10} transformations per second. This decay rate is nearly equivalent to that exhibited by 1 gram of radium in equilibrium with its disintegration products.

"Day" means calendar day; however, any document due on the weekend or a holiday may be submitted on the first working day after the weekend or holiday.

"Decree" means a consent decree issued under WAC 173-340-520. "Consent decree" is synonymous with decree.

"Degradation by-products" or **"decomposition by-products"** means the secondary product of biological or chemical processes that break down chemicals into other chemicals. The decomposition by-products may be more or less toxic than the parent compound.

((~~"Department" means the department of ecology.~~))

"Developmental reference dose" means an estimate (with an uncertainty of an order of magnitude or more) of an exposure level for the human population, including sensitive subgroups, that is likely to be without an appreciable risk of developmental effects.

"Direct contact" means exposure to hazardous substances through ingestion and/or dermal contact.

"Director" means the director of the department of ecology or the director's designee.

"Disposal" means the discharging, discarding, or abandoning of hazardous substances or the treatment, decontamination, or recycling of such substances once they have been discarded or abandoned. This includes the discharge, discard, or abandonment of any hazardous substances into or on any land, air, or water.

"Drinking water fraction" means the fraction of drinking water that is obtained or has the potential to be obtained from the site.

"Ecology" or **"department"** means the department of ecology.

"Ecology-conducted remedial action" means a remedial action conducted by ecology.

"Ecology-supervised remedial action" means a remedial action conducted by a potentially liable person or prospective purchaser and supervised by ecology under an order or decree.

"Engineered control((s))" means a containment ((~~and/or~~)) or treatment system((~~s~~)) that ((~~are~~)) is designed and constructed to prevent or limit the movement of, or the exposure to, a hazardous substance((~~s~~)). An engineered control is a type of remedial action. Examples of engineered controls include:

(a) A layer of clean soil, asphalt or concrete paving or other materials placed over contaminated soils to limit contact with contamination;

(b) A groundwater flow barrier such as a bentonite slurry trench;

(c) A groundwater gradient control system((~~s~~)) such as a French drain((~~s~~)) or a pump and treat system((~~s~~)); and

(d) A vapor control system((~~s~~)).

"Environment" means any plant, animal, natural resource, surface water (including underlying sediments), groundwater, drinking water supply, land surface (including tidelands and shorelands) or subsurface strata, or ambient air within the state of Washington or under the jurisdiction of the state of Washington.

"Equivalent carbon number" or **"EC"** means a value assigned to a fraction of a petroleum mixture, empirically derived from the boiling point of the fraction normalized to the boiling point of n-alkanes or the retention time of n-alkanes in a boiling point gas chromatography column.

"Exposure" means subjection of an organism to the action, influence, or effect of a hazardous substance (chemical agent) or physical agent.

"Exposure duration" means the period of exposure to a hazardous substance.

"Exposure frequency" means the portion of the exposure duration that an individual is exposed to a hazardous substance, expressed as a fraction. For example, if a person is exposed ((~~260~~)) 250 days (five

days per week for ((~~52~~)) 50 work weeks) over a year (365 days), the exposure frequency would be equal to: (5 x 50)/365 = 0.7.

"Exposure parameters" means those parameters used to derive an estimate of the exposure to a hazardous substance.

"Exposure pathway" means the path a hazardous substance takes or could take from a source to an exposed organism. An exposure pathway describes the mechanism by which an individual or population is exposed or has the potential to be exposed to hazardous substances at or originating from a site. Each exposure pathway includes an actual or potential source or release from a source, an exposure point, and an exposure route. If the exposure point differs from the source of the hazardous substance, the exposure pathway also includes a transport/exposure medium.

"Facility" means (a) any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, vessel, or aircraft((~~,~~)), or (b) any site or area where a hazardous substance, other than a consumer product in consumer use, has been deposited, stored, disposed of, or placed, or otherwise come to be located.

"Feasibility study" means a remedial action conducted under WAC 173-340-351 that consists of developing and evaluating cleanup action alternatives to enable selection of a cleanup action.

"Federal cleanup law" means the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended ((~~by the Superfund Amendments and Reauthorization Act of 1986,~~)) (42 U.S.C. 9601 et seq.).

"Financial assurance" means a remedial action that consists of an assurance provided to ecology under WAC 173-340-440(11) that sufficient financial resources are available to provide for the long-term effectiveness of engineered or institutional controls.

"Fish diet fraction" means the percentage of the total fish and/or shellfish in an individual's diet that is obtained or has the potential to be obtained from the site.

"Food crop" means any domestic plant that is produced for the purpose of, or may be used in whole or in part for, consumption by people or livestock. This ((~~shall~~)) includes nursery, root, or seedstock to be used for the production of food crops.

"Free product" means a nonaqueous phase liquid that is present in the soil, bedrock, groundwater or surface water as a ((~~district~~)) distinct separate layer. Under the right conditions, if sufficient free product is present, free product is capable of migrating independent of the direction of flow of the groundwater or surface water.

"Gastrointestinal absorption fraction" means the fraction of a substance transported across the gastrointestinal lining and taken up systemically into the body.

"Groundwater" means water in a saturated zone or stratum beneath the surface of land or below a surface water.

"Hazard index" means the sum of two or more hazard quotients for multiple hazardous substances and/or multiple exposure pathways.

((~~"Hazardous sites list" means the list of hazardous waste sites maintained under WAC 173-340-330.~~))

"Hazardous substance" means:

(a) Any dangerous or extremely hazardous waste as defined in RCW ((~~70.105.010 (5) and (6)~~)) 70A.300.010 (1) and (7), or any dangerous or extremely dangerous waste as designated by rule under chapter ((~~70.105~~)) 70A.300 RCW;

(b) Any hazardous substance as defined in RCW ((~~70.105.010(14)~~)) 70A.300.010(10) or any hazardous substance as defined by rule under chapter ((~~70.105~~)) 70A.300 RCW;

(c) Any substance that, on the effective date of this section, is a hazardous substance under section 101(14) of the federal cleanup law, 42 U.S.C.((~~,~~)) Sec. 9601(14);

(d) Petroleum or petroleum products; and

(e) Any substance or category of substances, including solid waste decomposition products, determined by the director by rule to present a threat to human health or the environment if released into the environment.

The term hazardous substance does not include any of the following when contained in an underground storage tank from which there is not a release: Crude oil or any fraction thereof or petroleum, if the tank is in compliance with all applicable federal, state, and local law.

((~~"Hazardous waste site" means any facility where there has been confirmation of a release or threatened release of a hazardous substance that requires remedial action.~~))

"Hazard quotient" or **"HQ"** means the ratio of the dose of a single hazardous substance over a specified time period to a reference dose for that hazardous substance derived for a similar exposure period.

"Health and safety plan" means a plan prepared under WAC 173-340-810.

"Health effects assessment summary tables" or **"HEAST"** means a database developed by the United States Environmental Protection Agency that provides a summary of information on the toxicity of hazardous substances.

"Henry's law constant" means the ratio of a hazardous substance's concentration in the air to its concentration in water. Henry's law constant can vary significantly with temperature for some hazardous substances. The dimensionless form of this constant is used in the default equations in this chapter.

"Highest beneficial use" means the beneficial use of a resource generally requiring the highest quality in the resource. For example, for many hazardous substances, providing protection for the beneficial use of drinking water will generally also provide protection for a great variety of other existing and future beneficial uses of groundwater.

"Inadvertent discovery plan" means a plan prepared under WAC 173-340-815 that describes procedures for responding to a discovery of archaeological materials or human remains in accordance with applicable state and federal laws.

"Independent remedial action((~~s~~))" means a remedial action((~~s~~)) conducted without ((~~department~~)) ecology oversight or approval and not under an order((~~, agreed order,~~)) or ((~~consent~~)) decree.

"Indian tribe" means the term as defined in RCW 43.376.010(1).

"Indicator hazardous substances" means the subset of hazardous substances present at a site selected under WAC 173-340-708 for monitoring and analysis during any phase of remedial action for the purpose of characterizing the site or establishing cleanup requirements for that site.

"Indigenous peoples" means individual members of Indian tribes; other individual Native Americans; individual Native Alaskans, Native Hawaiians, and Native Pacific Islanders; and indigenous and tribal community-based organizations.

"Industrial properties" means properties that are or have been characterized by, or are to be committed to, traditional industrial uses such as processing or manufacturing of materials, marine terminal and transportation areas and facilities, fabrication, assembly, treatment, or distribution of manufactured products, or storage of bulk materials, that are either:

((~~•~~)) (a) Zoned for industrial use by a city or county conducting land use planning under chapter 36.70A RCW (Growth Management Act); or

((~~•~~)) (b) For counties not planning under chapter 36.70A RCW (Growth Management Act) and the cities within them, zoned for industrial use and adjacent to properties currently used or designated for industrial purposes.

See WAC 173-340-745 for additional criteria to determine if a land use not specifically listed in this definition would meet the requirement of "traditional industrial use" and for evaluating if a land use zoning category meets the requirement of being "zoned for industrial use."

"Inhalation absorption fraction" means the percent of a hazardous substance (expressed as a fraction) that is absorbed through the respiratory system.

"Inhalation correction factor" means a multiplier that is used to adjust exposure estimates based on ingestion of drinking water to take into account exposure to hazardous substances that are volatilized and inhaled during use of the water.

"Initial investigation" means a remedial action that consists of an investigation conducted under WAC 173-340-310.

"Institutional control((~~s~~))" means a measure((~~s~~)) undertaken to limit or prohibit activities that may interfere with the integrity of an interim action or a cleanup action or result in exposure to hazardous substances at the site. An institutional control is a type of remedial action. For examples of institutional controls, see WAC 173-340-440(1).

"Integrated risk information system" or **"IRIS"** means a database developed by the United States Environmental Protection Agency that provides a summary of information on hazard identification and dose-response assessment for specific hazardous substances.

"Interim action" means a remedial action conducted under WAC 173-340-430.

"Interspecies scaling factor" means the conversion factor used to take into account differences between animals and humans.

"Land's method" means the method for calculating an upper confidence limit for the mean of a lognormal distribution, described in the following publications:

((~~•~~)) (a) Land, C.E., 1971. "Confidence intervals for linear functions of the normal mean and variance." *Annals of Mathematics and Statistics*. Volume 42, pages 1187-1205.

((~~•~~)) (b) Land, C.E., 1975. "Tables of confidence limits for linear functions of the normal mean and variance." In: *Selected Tables in Mathematical Statistics*, Volume III, pages 385-419. American Mathematical Society, Providence, Rhode Island.

"Legally applicable requirements" means those cleanup standards, standards of control, and other human health and environmental protection requirements, criteria, or limitations adopted under state or federal law that specifically address a hazardous substance, cleanup action, location, or other circumstances at the site.

"Lowest observed adverse effect level" or **"LOAEL"** means the lowest concentration of a hazardous substance at which there is a statis-

tically or biologically significant increase in the frequency or severity of an adverse effect between an exposed population and a control group.

((~~"Mail" means delivery through the United States Postal Service or an equivalent method of delivery or transmittal, including private mail carriers, or personal delivery.~~))

"Maximum contaminant level" or **"MCL"** means the maximum concentration of a contaminant established by either the Washington state board of health or the United States Environmental Protection Agency under the ((~~Federal~~)) Safe Drinking Water Act (42 U.S.C. 300f et seq.) and published in chapter ((~~248-54~~)) 246-290 WAC or 40 C.F.R. Part 141.

"Maximum contaminant level goal" or **"MCLG"** means the maximum concentration of a contaminant established by either the Washington state board of health or the United States Environmental Protection Agency under the ((~~Federal~~)) Safe Drinking Water Act (42 U.S.C. 300f et seq.) and published in chapter ((~~248-54~~)) 246-290 WAC or 40 C.F.R. Part 141 for which no known or anticipated adverse effects on human health occur, including an adequate margin of safety.

"Method detection limit" or **"MDL"** means the minimum concentration of a compound that can be measured and reported with ((~~ninety-nine~~)) 99 percent ((~~(99%)~~)) confidence that the value is greater than zero.

"Millirem" or **"mrem"** means the measure of the dose of any radiation to body tissue in terms of its estimated biological effect relative to a dose received from an exposure to one roentgen (R) of X-rays. One millirem equals 0.001 rem.

"Mixed funding" means any funding provided to a potentially liable person((~~s~~)) from the ((~~state~~)) model toxics control capital account under WAC 173-340-560.

"Model remedy" means a set of technologies, procedures, and monitoring protocols identified by ecology for use in routine types of cleanup projects at facilities that have common features and lower risk to human health and the environment.

"Model Toxics Control Act" or **"act"** means chapter ((~~70.105D~~)) 70A.305 RCW, first passed by the voters in the November 1988 general election as Initiative 97 and as since amended by the legislature.

"National priorities list" or **"NPL"** means the list of sites designated as a national priority by the United States Environmental Protection Agency under Section 105(a)(8)(B) of the federal cleanup law, 42 U.S.C. 9605(a)(8)(B).

"Natural attenuation" means a variety of physical, chemical or biological processes that, under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of hazardous substances in the environment. These in situ processes include: Natural biodegradation; dispersion; dilution; sorption; volatilization; and((~~,~~)) chemical or biological stabilization, transformation, or destruction of hazardous substances. See WAC 173-340-370(7) for a description of the expected role of natural attenuation in site cleanup. A cleanup action that includes natural attenuation and conforms to the expectation in WAC 173-340-370(7) can be considered an active remedial measure.

"Natural background" means the concentration of a hazardous substance consistently present in the environment that has not been influenced by localized human activities. For example, several metals and radionuclides naturally occur in the bedrock, sediments, and soils of Washington state due solely to the geologic processes that formed these materials ((~~and~~)). The concentration of these hazardous substances would be considered natural background. Also, low concentrations

of some particularly persistent organic compounds such as polychlorinated biphenyls (PCBs) can be found in surficial soils and sediment throughout much of the state due to global distribution of these hazardous substances. These low concentrations would be considered natural background. Similarly, concentrations of various radionuclides that are present at low concentrations throughout the state due to global distribution of fallout from bomb testing and nuclear accidents would be considered natural background. Compare "area background."

"Natural biodegradation" means ((~~in-situ~~)) in situ biological processes such as aerobic respiration, anaerobic respiration, and cometabolism, that occur without human intervention and that break down hazardous substances into other compounds or elements. The process is typically a multiple step process and may or may not result in organic compounds being completely broken down or mineralized to carbon dioxide and water.

"Natural person" means any unincorporated individual or group of individuals. The term "individual" is synonymous with "natural person."

"Nonaqueous phase liquid" or **"NAPL"** means a hazardous substance that is present in the soil, bedrock, groundwater, or surface water as a liquid not dissolved in water. The term includes both light nonaqueous phase liquid (LNAPL) and dense nonaqueous phase liquid (DNAPL).

"No further action sites list" means a list of sites for which ecology or PLIA has determined no further remedial action is necessary under state cleanup law to meet the criteria in WAC 173-340-330(5). For each listed site, the list also identifies whether institutional controls or periodic reviews remain necessary at the site. Ecology maintains the list under WAC 173-340-335.

"No observed adverse effect level" or **"NOAEL"** means the exposure level at which there are no statistically or biologically significant increases in frequency or severity of adverse effects between the exposed population and its appropriate control((~~,~~)). Some effects may be produced at this level, but they are not considered to be adverse, nor precursors to specific adverse effects.

"Nonpotable" means not a current or potential source of drinking water. See WAC 173-340-720 and 173-340-730 for criteria for determining if groundwater or surface water is a current or potential source of drinking water.

"Null hypothesis" means an assumption about hazardous substance concentrations at a site when evaluating compliance with cleanup levels established under this chapter. The null hypothesis is that the site is contaminated at concentrations that exceed cleanup levels. This ((~~shall~~)) does not apply to cleanup levels based on background concentrations where other appropriate statistical methods supported by a power analysis would be more appropriate to use.

"Oral RFD conversion factor" means the conversion factor used to adjust an oral reference dose (which is typically based on an administered dose) to a dermal reference dose (which is based on an absorbed dose).

"Order" means an enforcement order issued under WAC 173-340-540 or an agreed order issued under WAC 173-340-530.

"Overburdened community" means the term as defined in RCW 70A.02.010(11).

"Owner or operator" means any person that meets the definition of this term in RCW ((~~70.105D.020(12)~~)) 70A.305.020(22).

"PAHs (carcinogenic)" or **"cPAHs"** means those polycyclic aromatic hydrocarbons substances, PAHs, identified as A (known human) or B

(probable human) carcinogens by the United States Environmental Protection Agency. These include benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene.

"**Performance monitoring**" means a type of compliance monitoring described in WAC 173-340-410.

"**Periodic review**" means a remedial action that consists of a review conducted by ecology under WAC 173-340-420.

"**Permanent solution**" or "**permanent cleanup action**" means a cleanup action in which cleanup standards of ((~~WAC 173-340-700 through 173-340-760~~)) Part 7 of this chapter can be met without further action being required at the site being cleaned up or any other site involved with the cleanup action, other than the approved disposal of any residue from the treatment of hazardous substances.

"**Person**" means an individual, firm, corporation, association, partnership, consortium, joint venture, commercial entity, state government agency, unit of local government, federal government agency, or Indian tribe.

"**Picocurie**" or "**pCi**" means 10^{-12} curie.

"**PLIA**" means the pollution liability insurance agency.

"**Point of compliance**" means the point or points where cleanup levels established in accordance with WAC 173-340-720 through 173-340-760 ((~~shall~~)) must be attained. This term includes both standard and conditional points of compliance. A conditional point of compliance for particular environmental media is only available as provided in WAC 173-340-720 through 173-340-760.

"**Polychlorinated biphenyls**" or "**PCB mixtures**" means those aromatic compounds containing two benzene nuclei with two or more substituted chlorine atoms. For the purposes of this chapter, PCB includes those congeners which are identified using the appropriate analytical methods as specified ((~~in~~)) by ecology under WAC 173-340-830.

"**Polycyclic aromatic hydrocarbons**" or "**PAH**" means those hydrocarbon molecules composed of two or more fused benzene rings. For the purpose of this chapter, PAH includes those compounds which are identified and quantified using the appropriate analytical methods ((~~as~~)) specified ((~~in~~)) by ecology under WAC 173-340-830. The specific compounds generally included are acenaphthene, acenaphthylene, fluorene, naphthalene, anthracene, fluoranthene, phenanthrene, benzo[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene, pyrene, chrysene, benzo[a]pyrene, dibenzo[a,h]anthracene, indeno[1,2,3-cd]pyrene, and benzo[ghi]perylene.

"**Potentially liable person**" means any person who ((~~the department~~)) ecology finds, based on credible evidence, to be liable under RCW ((~~70.105D.040~~)) 70A.305.040.

"**Practicable**" means capable of being designed, constructed, and implemented in a reliable and effective manner including consideration of cost. ((~~When considering cost under this analysis,~~)) An alternative ((~~shall~~)) is not ((~~be considered~~)) practicable if ((~~the~~)) its incremental costs ((~~of the alternative~~)) are disproportionate to ((~~the~~)) its incremental degree of benefits ((~~provided by the alternative over other lower cost~~)), compared to another alternative((~~s~~)). Whether a cleanup action uses permanent solutions to the maximum extent practicable is determined using the procedures in WAC 173-340-360(5).

"**Practical quantitation limit**" or "**PQL**" means the lowest concentration that can be reliably measured within specified limits of precision, accuracy, representativeness, completeness, and comparability

during routine laboratory operating conditions, using ((~~department~~)) ecology approved methods.

"Probabilistic risk assessment" means a mathematical technique for assessing the variability and uncertainty in risk calculations. This is done by using distributions for model input parameters, rather than point values, where sufficient data exists to justify the distribution. These distributions are then used to compute various simulations using tools such as Monte Carlo analysis to examine the probability that a given outcome will result (such as a level of risk being exceeded). When using probabilistic techniques under this chapter for human health risk assessment, distributions ((~~shall~~)) may not be used to represent dose response relationships (reference dose, reference concentration, cancer potency factor).

"Prospective purchaser" means a person who is not currently liable for remedial action at a site and who proposes to purchase, redevelop, or reuse the site.

"Protection monitoring" means a type of compliance monitoring described in WAC 173-340-410.

"Public notice" means((~~, at a minimum, adequate notice mailed to all persons who have made a timely request of the department and to persons residing in the potentially affected vicinity of the proposed action; mailed to appropriate news media; published in the newspaper of largest circulation in the city or county of the proposed action; and opportunity for interested persons to comment~~)) the notice and opportunity to comment required under WAC 173-340-600(2).

"Public participation plan" means a plan prepared under WAC 173-340-600 to encourage coordinated and effective public involvement tailored to the public's needs at a particular site.

"Rad" means that quantity of ionizing radiation that results in the absorption of 100 ergs of energy per gram of irradiated material, regardless of the source of radiation.

"Radionuclide" means a type of atom that spontaneously undergoes radioactive decay. Radionuclides are hazardous substances under the act.

"Reasonable maximum exposure" means the highest exposure that can be reasonably expected to occur for a human or other living organisms, including a likely vulnerable population or overburdened community, at a site under current and potential future site use.

"Reference dose" or **"RFD"** means a benchmark dose, derived from the NOAEL or LOAEL for a hazardous substance by consistent application of uncertainty factors used to estimate acceptable daily intake doses and an additional modifying factor, which is based on professional judgment when considering all available data about a substance, expressed in units of milligrams per kilogram body weight per day. This includes chronic reference doses, subchronic reference doses, and developmental reference doses.

"Regulated substance" means the term as defined in chapter 173-360A WAC. All regulated substances are hazardous substances, as defined in this chapter.

"Release" means any intentional or unintentional entry of any hazardous substance into the environment, including but not limited to the abandonment or disposal of containers of hazardous substances.

"Relevant and appropriate requirements" means those cleanup standards, standards of control, and other human health and environmental requirements, criteria, or limitations established under state and federal law that, while not legally applicable to the hazardous substance, cleanup action, location, or other circumstance at a site,

((~~the department~~)) ecology determines address problems or situations sufficiently similar to those encountered at the site that their use is well suited to the particular site. The criteria specified in WAC 173-340-710((~~(3) shall be~~)) (4) are used to determine if a requirement is relevant and appropriate.

"Rem" means the unit of radiation dose equivalent that is the dosage in rads multiplied by a factor representing the different biological effects of various types of radiation.

"Remedial investigation" means a remedial action conducted under WAC 173-340-350 that consists of collecting and evaluating sufficient information about a site, including the distribution of hazardous substances and the threat they pose to human health and the environment, to enable:

(a) Cleanup standards to be established under Part 7 of this chapter; and

(b) Cleanup action alternatives to be developed and evaluated in a feasibility study under WAC 173-340-351.

"Remedial investigation/feasibility study" means a remedial action that consists of ((~~activities conducted under WAC 173-340-350 to collect, develop, and evaluate sufficient information regarding a site to select a cleanup action under WAC 173-340-360 through 173-340-390~~)) both a remedial investigation and a feasibility study.

"Remediation level (REL)" means a concentration (or other method of identification) of a hazardous substance in soil, water, air, or sediment ((~~above which~~)) used to identify where a particular cleanup action component ((~~will be~~)) is required as part of a cleanup action at a site. Other methods of identification include physical appearance or location. A cleanup action selected in accordance with WAC 173-340-350 through 173-340-390 that includes remediation levels constitutes a cleanup action which is protective of human health and the environment. See WAC 173-340-355 for a description of the purpose of remediation levels and the requirements and procedures for developing a cleanup action alternative that includes remediation levels.

"Remedy" or **"remedial action"** means any action or expenditure consistent with the purposes of chapter ((~~70.105D~~)) 70A.305 RCW to identify, eliminate, or minimize any threat posed by hazardous substances to human health or the environment including any investigative and monitoring activities with respect to any release or threatened release of a hazardous substance and any health assessments or health effects studies conducted in order to determine the risk or potential risk to human health.

"Restoration time frame" means the period of time needed to achieve the required cleanup levels at the points of compliance established for the site.

"Risk" means the probability that a hazardous substance, when released into the environment, will cause an adverse effect in exposed humans or other living organisms.

"Routine cleanup action" means a remedial action meeting all of the following criteria:

- Cleanup standards for each hazardous substance addressed by the cleanup are obvious and undisputed, and allow for an adequate margin of safety for protection of human health and the environment;
- It involves an obvious and limited choice among cleanup action alternatives and uses an alternative that is reliable,

has proven capable of accomplishing cleanup standards, and with which ((~~the department~~)) ecology has experience;
- The cleanup action does not require preparation of an environmental impact statement; and
- The site qualifies under WAC 173-340-7491 for an exclusion from conducting a simplified or site-specific terrestrial ecological evaluation, or if the site qualifies for a simplified ecological evaluation, the evaluation is ended under WAC 173-340-7492(2) or the values in Table 749-2 are used.

Routine cleanup actions consist of, or are comparable to, one or more of the following remedial actions:

- Cleanup of above-ground structures;
- Cleanup of below-ground structures;
- Cleanup of contaminated soils where the action would restore the site to cleanup levels; or
- Cleanup of solid wastes, including containers.

((~~"Safety and health plan" means a plan prepared under WAC 173-340-810.~~))

"Sampling and analysis plan" means a plan prepared under WAC 173-340-820.

"Saturated zone" means the area below the water table in which all interstices are filled with water.

"Schools" means preschools, elementary schools, middle schools, high schools, and similar facilities, both public and private, used primarily for the instruction of minors.

((~~"Science advisory board" means the advisory board established by the department under RCW 70.105D.030(4).~~

~~"Secondary maximum contaminant level" means the maximum concentration of a secondary contaminant in water established by the United States Environmental Protection Agency under the Federal Safe Drinking Water Act (42 U.S.C. 300f et seq.) and published in 40 C.F.R. 143.~~))

"Sediment" means the term as defined in WAC 173-204-505.

"Sensitive environment" means an area of particular environmental value, where a release could pose a greater threat than in other areas including: Wetlands; critical habitat for endangered or threatened species; national or state wildlife refuge; critical habitat, breeding or feeding area for fish or shellfish; wild or scenic river; rookery; riparian area; big game winter range.

"Site" means the same as "facility."

"Site hazard assessment and ranking" means a remedial action that consists of an ((~~investigation performed~~)) assessment and ranking conducted under WAC 173-340-320.

"Soil" means a mixture of organic and inorganic solids, air, water, and biota that exists on the earth's surface above bedrock, including materials of anthropogenic sources such as slag, sludge, etc.

"Soil biota" means invertebrate multicellular animals that live in the soil or in close contact with the soil.

"State cleanup law" means the Model Toxics Control Act, chapter 70A.305 RCW, and the cleanup regulations adopted under that act, chapters 173-340 and 173-204 WAC.

"Subchronic reference dose" means an estimate (with an uncertainty of an order of magnitude or more) of a daily exposure level for the human population, including sensitive subgroups, that is likely to be without appreciable risk of adverse effects during a portion of a lifetime.

"Surface water" means lakes, rivers, ponds, streams, inland waters, salt waters, and all other surface waters and water courses within the state of Washington or under the jurisdiction of the state of Washington.

"Technically possible" means capable of being designed, constructed, and implemented in a reliable and effective manner, regardless of cost.

"Terrestrial ecological receptors" means plants and animals that live primarily or entirely on land.

"Threatened or endangered species" means species listed as threatened or endangered under the federal Endangered Species Act 16 U.S.C. Section 1533, or classified as threatened or endangered by the state fish and wildlife commission under WAC ((~~232-12-011(1) and 232-12-014~~)) 220-200-100 or 220-610-010.

"Total excess cancer risk" means the upper bound on the estimated excess cancer risk associated with exposure to multiple hazardous substances and multiple exposure pathways.

"Total petroleum hydrocarbons" or **"TPH"** means any fraction of crude oil that is contained in plant condensate, crankcase motor oil, gasoline, aviation fuels, kerosene, diesel motor fuel, benzol, fuel oil, and other products derived from the refining of crude oil. For the purposes of this chapter, TPH ((~~will~~)) generally means those fractions of the above products that are the total of all hydrocarbons quantified by analytical methods NWTPH-Gx; NWTPH-Dx; volatile petroleum hydrocarbons (VPH) for volatile aliphatic and volatile aromatic petroleum fractions; and extractable petroleum hydrocarbons (EPH) for nonvolatile aliphatic and nonvolatile aromatic petroleum fractions, as appropriate, or other test methods approved by ((~~the department~~)) ecology.

"Type I error" means the error made when it is concluded that an area of a site is below cleanup levels when it actually exceeds cleanup levels. This is the rejection of a true null hypothesis.

"Underground storage tank" or **"UST"** means ((~~an underground storage tank and connected underground piping as defined in the rules adopted under chapter 90.76 RCW~~)) the term as defined in chapter 173-360A WAC.

"Unrestricted site use conditions" means restrictions on the use of the site or natural resources affected by releases of hazardous substances from the site are not required to ensure continued protection of human health and the environment.

"Upper bound on the estimated excess cancer risk of one in ((~~one hundred thousand~~)) 100,000" means the upper ((~~ninety-fifth~~)) 95th percent confidence limit on the estimated risk of one additional cancer above the background cancer rate per ((~~one hundred thousand~~)) 100,000 individuals.

"Upper bound on the estimated excess cancer risk of one in ((~~one million~~)) 1,000,000" means the upper ((~~ninety-fifth~~)) 95th percent confidence limit on the estimated risk of one additional cancer above the background cancer rate per ((~~one million~~)) 1,000,000 individuals.

"UST system" means the term as defined in chapter 173-360A WAC.

"UST system operator" means the same as "operator" in chapter 173-360A WAC.

"UST system owner" means the same as "owner" in chapter 173-360A WAC.

"Volatile organic compound" means those carbon-based compounds listed in ((~~EPA~~)) United States Environmental Protection Agency methods 502.2, 524.2, 551, 601, 602, 603, 624, 1624C, 1666, 1671, 8011,

8015B, 8021B, 8031, 8032A, 8033, 8260B, and those with similar vapor pressures or boiling points. ((~~See WAC 173-340-830(3) for references describing these methods.~~)) For petroleum, volatile means aliphatic and aromatic constituents up to and including EC12, plus naphthalene, 1-methylnaphthalene and 2-methylnaphthalene.

"**Vulnerable population**" means the term as defined in RCW 70A.02.010(14).

"**Wastewater facility**" means all structures and equipment required to collect, transport, treat, reclaim, or dispose of domestic, industrial, or combined domestic/industrial wastewaters.

"**Wetlands**" means ((~~lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For the purposes of this classification, wetlands must have one or more of the following attributes at least periodically, the land supports predominantly hydrophytes; the substrate is predominately undrained hydric soil; and the substrate is nonsoil and saturated with water or covered by shallow water at some time during the growing season each year~~)) the term as defined in WAC 173-201A-020.

"**Wildlife**" means any nonhuman vertebrate animal other than fish.

"**Zoned for (a specified) use**" means the use is allowed as a permitted or conditional use under the local jurisdiction's land use zoning ordinances. A land use that is inconsistent with the current zoning but allowed to continue as a nonconforming use or through a comparable designation is not considered to be zoned for that use.

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-210 Usage. For the purposes of this chapter, the following ((~~shall~~)) apply:

(1) Unless the context clearly requires otherwise, the use of the singular ((~~shall~~)) includes the plural and conversely.

(2) The terms "**applicable**," "**appropriate**," "**relevant**," "**unless otherwise directed by ((~~the department~~)) ecology**" and similar terms implying discretion mean as determined by ((~~the department~~)) ecology, with the burden of proof on other persons to demonstrate that the requirements are or are not necessary.

(3) "**Approved**" means for ((~~department conducted or ordered remedial actions, or for potentially liable person conducted cleanups agreed to by the department in an agreed order or decree governing remedial actions at the site~~)) ecology-conducted or ecology-supervised remedial actions.

(4) "**Conduct**" means to perform or undertake whether directly or through an agent or contractor, unless this chapter expressly provides otherwise.

(5) "**Include**" means included, but not limited to.

(6) "**May**" or "**should**" means the provision is optional and permissive, and does not impose a requirement.

(7) "**Shall**," "**must**," or "**will**" means the provision is mandatory.

(8) "**Threat**" means threat or potential threat.

(9) "**Under**" means pursuant to, subject to, required by, established by, in accordance with, and similar expressions of legislative or administrative authorization or direction.

PART ((~~III~~)) 3 - SITE REPORTS AND CLEANUP DECISIONS

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-300 Site discovery and reporting. (1) **Purpose.** ((~~As part of a program to identify hazardous waste sites,~~)) This section sets forth the requirements for reporting a release or threatened release of a hazardous substance ((~~due to past activities, whether discovered before or after the effective date of this regulation. It also sets forth the requirements for reporting independent remedial actions. The department may take any other actions it deems appropriate to identify potential hazardous waste sites consistent with chapter 70.105D RCW.~~

~~(2) Release report.~~

~~(a) Any owner or operator who has information that a hazardous substance has been released to the environment at the owner or operator's facility and may be a threat to human health or the environment shall report such information to the department within ninety days of discovery. Releases from underground storage tanks shall be reported by the owner or operator of the underground storage tank within twenty-four hours of release confirmation, in accordance with WAC 173-340-450. To the extent known, the report shall include:~~

~~(i) The identification and location of the hazardous substance;~~

~~(ii) Circumstances of the release and the discovery; and~~

~~(iii) Any remedial actions planned, completed, or underway. All other persons are encouraged to report such information to the department.~~)) to the environment that may pose a threat to human health or the environment.

(2) **Applicability and timing.** Except as provided under (a) of this subsection, within 90 days of discovering a release or threatened release of a hazardous substance to the environment that may pose a threat to human health or the environment, an owner or operator must report the release to ecology. All other persons are encouraged to report such a release to ecology.

(a) **Exemptions.** An owner or operator does not need to report the following releases under this section:

(i) A release previously reported to ecology in fulfillment of a reporting requirement in this chapter or in another law or regulation, including a release previously reported to ecology under chapter 173-360A WAC;

(ii) A release from a heating oil tank previously reported to PLIA under WAC 374-45-030;

(iii) A release previously reported to the United States Environmental Protection Agency under CERCLA, Section 103(c) (42 U.S.C. Sec. 9603(c));

(iv) A release previously reported to the state division of emergency management under RCW 90.56.280;

(v) Application of pesticides and fertilizers for their intended purposes and according to label instructions;

(vi) Lawful and nonnegligent use of hazardous substances by a natural person for personal or domestic purposes;

(vii) A release in accordance with a permit that authorizes the release;

(viii) Except for a release specified under (b)(iii) of this subsection, a release to the air;

(ix) A release discovered in a public water system regulated by the department of health; or

(x) A release to a permitted wastewater facility.

An exemption from the reporting requirements in this section does not imply a release from liability under the state cleanup law.

(b) ((~~Persons~~)) **Examples.** An owner or operator should use best professional judgment in deciding whether a release or threatened release of a hazardous substance to the environment may ((~~be~~)) pose a threat ((~~or potential threat~~)) to human health or the environment. The following, which is not an exhaustive list, are examples of situations that an owner or operator should generally ((~~should be reported~~)) report under this section:

(i) Contamination in a water supply well((~~.~~));

(ii) Contaminated seeps, sediment or surface water((~~.~~));

(iii) Vapors in a building, utility vault or other structure that appear to be entering the structure from nearby contaminated soil or groundwater((~~.~~));

(iv) ((~~Free product~~)) Nonaqueous phase liquid, such as a petroleum product or ((~~other organic liquids~~)) chlorinated solvent, on the surface of the ground or in the groundwater((~~.~~)) (free product);

(v) Any contaminated soil or unpermitted disposal of waste materials that would be classified as a hazardous waste under federal or state law((~~.~~));

(vi) Any abandoned containers such as drums or tanks, above ground or buried, still containing more than trace residuals of hazardous substances((~~.~~));

(vii) Sites where unpermitted industrial waste disposal has occurred((~~.~~));

(viii) Sites where hazardous substances have leaked or been dumped on the ground((~~.~~)); and

(ix) Leaking underground petroleum storage tanks not already reported under ((~~WAC 173-340-450~~)) chapter 173-360A WAC.

((~~(3) Exemptions. The following releases are exempt from these notification requirements:~~

~~(a) Application of pesticides and fertilizers for their intended purposes and according to label instructions;~~

~~(b) Lawful and nonnegligent use of hazardous substances by a natural person for personal or domestic purposes;~~

~~(c) A release in accordance with a permit that authorizes the release;~~

~~(d) A release previously reported to the department in fulfillment of a reporting requirement in this chapter or in another law or regulation;~~

~~(e) A release previously reported to the United States Environmental Protection Agency under CERCLA, Section 103(c) (42 U.S.C. Sec. 9603(c));~~

~~(f) Except for releases under subsection (2)(b)(iii) of this section, a release to the air;~~

~~(g) Releases discovered in public water systems regulated by the department of health; or~~

~~(h) A release to a permitted wastewater facility.~~

~~An exemption from the notification requirements in this section does not imply a release from liability under this chapter.~~

~~(4) Report of independent remedial actions.~~

~~See WAC 173-340-515 for additional reporting requirements for independent remedial actions. See WAC 173-340-450 for reporting requirements for independent remedial actions for releases from underground storage tanks.~~

~~(5) Department response. Within ninety days of receiving information under this section, the department shall conduct an initial investigation in accordance with WAC 173-340-310. For sites on the hazardous sites list, the department shall, as resources permit, review reports that document independent cleanup actions. The review shall include an evaluation of whether the site qualifies for removal from the hazardous sites list or whether further remedial action is required.~~

~~(6)~~)) (3) **Content of release report.** An owner or operator must include the following information in a release report, to the extent known:

(a) The identity and location of the hazardous substance;

(b) The circumstances of the hazardous substance release and its discovery; and

(c) Any planned, ongoing, or completed independent remedial actions to investigate or clean up the release.

(i) See WAC 173-340-515(4) and 173-340-450 for additional reporting requirements for independent remedial actions.

(ii) See WAC 173-340-310(5) for ecology's authority to defer completing an initial investigation of a release to review independent remedial actions completed within 90 days of release discovery.

(4) **Other** ((~~obligations~~)) **release reporting requirements.** Nothing in this section ((~~shall~~)) eliminates any obligations to comply with reporting requirements ((~~that may exist in a permit or under~~)) in other laws or permits including, but not limited to, the following:

(a) **Releases from regulated UST systems.** Under chapter 173-360A WAC, UST system owners and operators and regulated service providers must report a confirmed release of a regulated substance from an UST system to ecology within 24 hours. As specified in subsection (2)(a)(i) of this section, a release previously reported to ecology under chapter 173-360A WAC is exempt from the release reporting requirements in this section; however, the release must still be investigated and cleaned up in accordance with the state cleanup law. WAC 173-340-450 specifies interim actions that UST system owners and operators must perform immediately or shortly after confirming a release to reduce the threats posed by the release, prevent any further release, and characterize the nature and extent of the release;

(b) **Releases from heating oil tanks.** Under chapter 374-45 WAC, owners and operators of a heating oil tank and owners of the property where the tank is located must report a suspected or confirmed release from the tank to PLIA within 90 days. As specified in subsection (2)(a)(ii) of this section, a release previously reported to ecology under chapter 374-45 WAC is exempt from the release reporting requirements in this section; however, the release must still be investigated and cleaned up in accordance with the state cleanup law.

(5) **Reservation of rights.** Nothing in this section precludes ecology from taking any actions it deems appropriate to identify contaminated sites consistent with chapter 70A.305 RCW.

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-310 Initial investigation. (1) **Purpose.** ((~~An initial investigation is an inspection of a suspected site by the department and documentation of conditions observed during that site inspection.~~)) The purpose of the initial investigation is to determine ((~~whether a release or threatened release of a hazardous substance may have occurred that warrants further action under this chapter.~~

~~(2) Applicability and timing. Whenever the department receives information and has a reasonable basis to believe that there may be a release or a threatened release of a hazardous substance that may pose a threat to human health or the environment, the department shall conduct an initial investigation within ninety days.~~

~~(3) Exemptions. The department shall not be required to conduct an initial investigation when~~)):

(a) Whether there has been a release or threatened release of a hazardous substance to the environment;

(b) Whether the release or threatened release may pose a threat to human health or the environment;

(c) Whether the population that may be threatened includes a likely vulnerable population or overburdened community;

(d) Whether further remedial action is necessary under state cleanup law to confirm whether there has been a release or threatened release that poses a threat to human health or the environment;

(e) Whether further remedial action is necessary under state cleanup law to address the threat to human health and the environment posed by the release or threatened release. This determination is based on the criteria in WAC 173-340-330(5);

(f) Whether an emergency remedial action or an interim action is necessary under state cleanup law to address the threat, and whether persons in the potentially affected vicinity need to be notified of such action;

(g) Whether action under another state or federal law is appropriate; and

(h) The current owners and operators of the site.

(2) **Applicability.** Ecology will complete an initial investigation unless:

(a) The release is exempt from reporting under WAC 173-340-300(2)(a);

(b) The circumstances associated with the release or threatened release are known to ((~~the department~~)) ecology and have previously been or currently are being evaluated by ((~~the department~~)) ecology or ((~~other~~)) another government agency; or

((~~(b) The release is permitted; or~~

~~(c) The release is exempt from reporting under WAC 173-340-300(3).~~)) (c) Ecology does not have a reasonable basis to believe that there has been a release or threatened release of a hazardous substance that may pose a threat to human health or the environment.

(3) **Performance.** To make the determinations specified in subsection (1) of this section, ecology will review readily available information and may collect, or request other persons to collect, additional information.

(4) ((~~Department deferral to~~)) **Reliance on others.** ((~~The department~~)) Ecology may rely on another government agency or a contractor

to ((~~the department~~)) ecology to conduct an initial investigation on its behalf, provided ((~~the department determines such an~~)):

(a) The agency or contractor is not suspected ((~~to have~~)) of having contributed to the release or threatened release ((~~of a hazardous substance~~)); and ((~~that~~))

(b) The agency or contractor has no conflict of interest ((~~exists~~)).

(5) ((~~Department decision. Based on the information obtained about the site, the department shall within thirty days of completion of the initial investigation make one or more of the following decisions:~~

~~(a) A site hazard assessment is required;~~

~~(b) Emergency remedial action is required;~~

~~(c) Interim action is required; or~~

~~(d) The site requires no further action under this chapter at this time because either:~~

~~(i) There has been no release or threatened release of a hazardous substance; or~~

~~(ii) A release or threatened release of a hazardous substance has occurred, but in the department's judgment, does not pose a threat to human health or the environment; or~~

~~(iii) Action under another authority is appropriate.~~

~~A decision for a particular follow-up action does not preclude the department from requiring some other action in the future based on reevaluation of the site or additional information.~~

~~(6) Notification.~~

~~(a) Sites requiring an emergency remedial action or interim action. If the department determines that an emergency remedial action or interim action is required, then notification of the threat to the potentially affected vicinity may be required by the department. The method and nature of the notification shall be determined on a case-by-case basis using the methods specified in WAC 173-340-600. Such notification shall be the responsibility of the site owner or operator if required in writing by the department.~~

~~(b) Sites requiring further remedial action. For sites requiring further remedial action under chapter 70.105D RCW, the department shall notify the owner, operator, and any potentially liable person known to the department of its decision. This notification shall be a letter ("Early Notice Letter") mailed to the person which includes:~~

~~(i) The basis for the department's decision;~~

~~(ii) Information on the cleanup process provided for in this chapter;~~

~~(iii) A statement that it is the department's policy to work cooperatively with persons to accomplish prompt and effective cleanups;~~

~~(iv) A person or office of the department to contact regarding the contents of the letter; and~~

~~(v) A statement that the letter is not a determination of liability and that cooperating with the department in planning or conducting a remedial action is not an admission of guilt or liability.~~

~~(c) Sites not requiring further remedial action. For sites requiring no further remedial action under chapter 70.105D RCW, if requested by the owner or operator, the department shall notify the owner or operator of the department's conclusion. This notification shall be in writing and may be combined with the determination of status letter in WAC 173-340-500.~~)) **Timing.**

(a) Except as provided under (b) of this subsection, ecology will complete an initial investigation within 90 days of discovering a re-

lease or threatened release or receiving a release report under WAC 173-340-300.

(b) If an independent investigation, interim action, or cleanup action is completed within 90 days of the discovery of a release or threatened release, ecology will complete an initial investigation by the earlier of the following:

(i) Ninety days after receiving the independent remedial action report required under WAC 173-340-515(4); or

(ii) One hundred eighty days after discovering a release or threatened release or receiving a release report.

(6) **Determinations and next steps.** Within 30 days of completing the initial investigation, ecology will make one of the following determinations and take the applicable steps:

(a) No release or threatened release occurred. In this case, ecology will notify the owner and operator in writing of its determination;

(b) A release or threatened release occurred, but does not pose a threat to human health or the environment that requires remedial action under state cleanup law. This determination must be based on factors other than performance of remedial action. In this case, ecology will notify the owner and operator in writing of its determination;

(c) A release or threatened release occurred that posed a threat to human health or the environment, but no further remedial action is necessary under state cleanup law to address that threat based on the criteria in WAC 173-340-330(5). In this case, ecology will take the following steps:

(i) Perform a site hazard assessment and ranking in accordance with WAC 173-340-320;

(ii) List the site on ecology's no further action sites list in accordance with WAC 173-340-335(2);

(iii) Make any initial investigation report publicly available on ecology's website;

(iv) Notify the owner and operator in writing of ecology's determination; and

(v) Notify the public of ecology's determination in the *Contaminated Site Register* under WAC 173-340-600(7). The notice must include instructions on how to sign up for the site-specific electronic alerts provided by ecology under WAC 173-340-600(6);

(d) A release or threatened release may have occurred that poses a threat to human health or the environment, and further remedial action is necessary under state cleanup law to confirm the threat. In this case, ecology will take the steps specified under (e) of this subsection;

(e) A release or threatened release occurred that poses a threat to human health or the environment, and further remedial action is necessary under state cleanup law to address the threat based on the criteria in WAC 173-340-330(5). In this case, ecology will take the following steps:

(i) Perform a site hazard assessment and ranking in accordance with WAC 173-340-320;

(ii) List the site on the contaminated sites list in accordance with WAC 173-340-330(2);

(iii) Make any initial investigation report publicly available on ecology's website;

(iv) Notify the owner and operator, and any person who ecology has preliminarily determined to be liable under WAC 173-340-500(1), in writing of ecology's determination. The notice may be combined with

the potentially liable person status letter in WAC 173-340-500. The notice must include:

(A) The basis for ecology's determination;

(B) The site's hazard rankings;

(C) Information on the cleanup process provided for in this chapter;

(D) A statement that it is ecology's policy to work cooperatively with persons to accomplish prompt and effective cleanups;

(E) A statement that the notice is not a determination of liability and that cooperating with ecology in planning or conducting a remedial action is not an admission of guilt or liability;

(F) An ecology website where information about the site is publicly available, and instructions on how to sign up for the site-specific electronic alerts provided by ecology under WAC 173-340-600(6); and

(G) An ecology staff or office to contact about the contents of the notice;

(v) Notify the public of ecology's determination in the *Contaminated Site Register* under WAC 173-340-600(7). The notice must include instructions on how to sign up for the site-specific electronic alerts provided by ecology under WAC 173-340-600(6);

(vi) Notify persons within the potentially affected vicinity of the threat, if ecology determines that an emergency remedial action or an interim action is necessary under state cleanup law and that such notice is needed.

(A) Ecology may require the owner or operator to provide the notice on ecology's behalf. If required in writing by ecology, the owner or operator must provide the notice.

(B) Ecology will determine the method and nature of the notice on a case-by-case basis using the methods specified in WAC 173-340-600.

(f) A release or threatened release occurred that poses a threat to human health or the environment, but action under another state or federal law is appropriate. The steps ecology will take depend on the other authority identified by ecology.

(i) For all sites where ecology determines action is appropriate under another state or federal law, ecology will:

(A) Refer the site to the applicable government agency or program; and

(B) Notify the owner and operator in writing of its determination.

(ii) For sites where ecology determines action is appropriate under the federal cleanup law, the federal Solid Waste Disposal Act (42 U.S.C. 6901 et seq.), the state Hazardous Waste Management Act (chapter 70A.300 RCW), the state Solid Waste Management Act (chapter 70A.205 RCW), or the state Pollution Liability Protection Act (chapter 70A.330 RCW), ecology will also:

(A) Perform a site hazard assessment and ranking in accordance with WAC 173-340-320;

(B) List the site on ecology's contaminated sites list in accordance with WAC 173-340-330(2);

(C) Make any initial investigation report publicly available on ecology's website; and

(D) Notify the public of ecology's determination in the *Contaminated Site Register* under WAC 173-340-600(7). The notice must include instructions on how to sign up for the site-specific electronic alerts provided by ecology under WAC 173-340-600(6).

(7) **Reservation of rights.** Nothing in this section ((~~shall~~)) precludes ((~~the department~~)) ecology from taking or requiring appropriate remedial action at any time.

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-320 Site hazard assessment and ranking. ((~~(1) Purpose. The purpose of the site hazard assessment is to provide sufficient sampling data and other information for the department to:~~

~~(a) Confirm or rule out that a release or threatened release of a hazardous substance has occurred;~~

~~(b) Identify the hazardous substance and provide some information regarding the extent and concentration of the substance;~~

~~(c) Identify site characteristics that could result in the hazardous substance entering and moving through the environment;~~

~~(d) Evaluate the potential for the threat to human health and the environment; and~~

~~(e) Determine the hazard ranking of the site under WAC 173-340-330, if appropriate.~~

~~(2) Timing. Generally, a site hazard assessment shall be completed before proceeding to any subsequent phase of remedial action, other than an emergency or interim action.~~

~~(3) Administrative options. The site hazard assessment may be conducted under any of the procedures described in WAC 173-340-510. The department may rely on another government agency or a contractor to the department to conduct a site hazard assessment on its behalf, provided the department determines such an agency or contractor is not suspected to have contributed to the release or threatened release of a hazardous substance and that no conflict of interest exists.~~

~~(4) Scope and content. A site hazard assessment is an early study to provide preliminary data regarding the relative potential hazard of the site. A site hazard assessment is not intended to be a detailed site characterization; however, it shall include sufficient sampling, site observations, maps, and other information needed to meet the purposes specified in subsection (1) of this section. To fulfill this requirement, a site hazard assessment shall include, as appropriate, the following information:~~

~~(a) Identification of hazardous substances, including what was released and is threatened to be released and/or, if known, what products of decomposition, recombination, or chemical reaction are currently present on site, and an estimate of their quantities and concentrations;~~

~~(b) Evidence confirming a release or threatened release of hazardous substances to the environment;~~

~~(c) Description of facilities containing releases, if any, and their condition;~~

~~(d) Identification of the location of all areas where a hazardous substance is known or suspected to be, indicated on a site map;~~

~~(e) Consideration of surface water run-on and runoff and the hazardous substances leaching potential;~~

~~(f) Preliminary characterization of the subsurface and groundwater actually or potentially affected by the release, including vertical depth to groundwater and distance to nearby wells, bodies of surface water, and drinking water intakes;~~

~~(g) Preliminary evaluation of receptors, including: Human population, food crops, recreation areas, parks, sensitive environments, irrigated areas, and aquatic resources currently or potentially affected by groundwater, air, or surface water containing the release of hazardous substances at the site, including distances to these receptors; and~~

~~(h) Any other physical factors which may be significant in estimating the potential or current exposure to sensitive biota.~~

~~(5) Guidance. The department shall make available guidance for how to conduct a site hazard assessment to meet the requirements of this section. Persons are encouraged to contact the department to obtain a copy of the latest guidance.~~

~~(6) Department decision. Based on the results of the site hazard assessment and other available information about the site, the department shall either determine the site warrants no further action using the criteria in WAC 173-340-310 (5)(d) or proceed with ranking and placing the site on the hazardous sites list under WAC 173-340-330.~~

~~(7) Notification. The department shall make available the results of the site hazard assessment to the site's owner and operator and any person who has received a potentially liable person status letter under WAC 173-340-500 regarding the site. If the department finds after a site hazard assessment that the site requires no further action, it shall publish this decision in the *Site Register*.~~)) (1) **Purpose.** The site hazard assessment and ranking process provides a method for ecology to assess and rank threats to human health and the environment posed by a site based on information readily available at the time of assessment. The site hazard assessment and ranking process satisfies the requirements of RCW 70A.305.030 (2)(b), and is not a substitute for a remedial investigation. Ecology uses site hazard assessments and rankings to:

(a) Support decisions to add or remove sites from the contaminated sites list under WAC 173-340-330 or the no further action sites list under WAC 173-340-335;

(b) Prioritize remedial actions and allocate agency resources among and within sites as part of program planning and assessment under WAC 173-340-340;

(c) Inform the public and the legislature about the threats posed by contaminated sites;

(d) Reflect changes in threats posed by a site based on new information or changes in site conditions; and

(e) Identify whether the population threatened includes a likely vulnerable population or overburdened community.

(2) **Development.** Ecology will establish and maintain a site hazard assessment and ranking process.

(a) **Functional requirements.** The site hazard assessment and ranking process must enable ecology to use readily available information to:

(i) Rank the potential exposure of human and environmental receptors to confirmed or suspected releases of hazardous substances through each environmental medium;

(ii) Rank the severity of such exposures to human health and the environment;

(iii) Identify whether the potentially exposed population includes a likely vulnerable population or overburdened community;

(iv) Identify the environmental health disparity ranking of the potentially exposed population using the environmental health dispari-

ties map developed pursuant to RCW 43.70.815 or other readily available information; and

(v) Report the assessor's level of confidence in the information used for the assessment.

(b) **Performance standards.** Ecology will establish performance standards for assessing the technical validity, efficiency, consistency, and practical utility of the site hazard assessment and ranking process.

(c) **Quality assurance.** Ecology will periodically assess whether the site hazard assessment and ranking process meets the performance standards established under (b) of this subsection, and update the process as appropriate.

(d) **Public participation.** When establishing the site hazard assessment and ranking process or making any change to the process that could affect hazard rankings, ecology will provide the public with notice and an opportunity to comment. The public comment period must be at least 30 days.

(3) **Implementation.**

(a) **Applicability and timing.**

(i) Ecology will perform a site hazard assessment and ranking before adding or removing a site from the contaminated sites list under WAC 173-340-330 or the no further action sites list under WAC 173-340-335.

(ii) For sites on the contaminated sites list on the effective date of this section, ecology will conduct a site hazard assessment and ranking as resources permit. As part of the strategic plan required under WAC 173-340-340, ecology will develop goals and strategies for completing a site hazard assessment and ranking of such sites.

(iii) Ecology may also conduct a site hazard assessment and ranking when new information becomes available or when site conditions change.

(b) **Performance.** Ecology will review readily available information when conducting a site hazard assessment and ranking.

(c) **Reliance on others.** Ecology may rely on another government agency or a contractor to ecology to perform a site hazard assessment and ranking on its behalf, provided:

(i) The agency or contractor is not suspected of having contributed to the release or threatened release; and

(ii) The agency or contractor has no conflict of interest.

(d) **Notification.** Upon completing a site hazard assessment and ranking, ecology will:

(i) Make the site's current hazard rankings publicly available on ecology's website under WAC 173-340-600(5). The hazard rankings will include the results specified in subsection (2)(a) of this section; and

(ii) If requested, notify a person electronically under WAC 173-340-600(6).

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-330 ((~~Hazard ranking and the hazardous~~)) Contaminated sites list. (1) **Purpose.** ((~~The department shall maintain a list of sites where remedial action has been determined by the department~~

~~to be necessary. This list, called the hazardous sites list, shall fulfill the department's responsibilities under RCW 70.105D.030 (2)(b) and (3). From this list, the department shall select those sites where action is anticipated and include those in the biennial program report under WAC 173-340-340.~~

~~(2) Hazard ranking.~~

~~(a) The department shall give a hazard ranking to sites placed on the list. The purpose of hazard ranking is to estimate, based on the information compiled during the site hazard assessment, the relative potential risk posed by the site to human health and the environment. This assessment considers air, groundwater, and surface water migration pathways, human and nonhuman exposure targets, properties of the substances present, and the interaction of these variables.~~

~~(b) The department shall evaluate each site on a consistent basis using the procedure described in the "*Washington Ranking Method Scoring Manual*," publication number 90-14, dated April 1992. The sediment component of a site shall be scored using the procedures described in "*Sediment Ranking System*," publication number 97-106, dated January 1990, and *"Status Report: Technical Basis for SEDRANK Modifications*," publication number 97-107, dated June 1991. The ranking procedure and major amendments to the manual shall be reviewed by the science advisory board established under chapter 70.105D RCW. Information obtained in the site hazard assessment, plus any additional data specified in these publications, shall be included in the hazard ranking evaluation.~~

~~(3) *Site Register*. The department shall periodically provide notification of the results of hazard ranking in the *Site Register*. The department shall make available hazard ranking results for each site to the site owner and operator and any potentially liable person known to the department before publication in the *Site Register*.~~

~~(4) Reranking. The department may at its discretion re-rank a site if, before the initiation of state action at the site, the department receives additional information within the scope of the evaluation criteria which indicates that a significant change in rank may result.~~

~~(5) Listing.~~

~~Sites shall be ranked and placed on the hazardous sites list if, after the completion of a site hazard assessment, the department determines that further action is required at the site. The list shall be updated at least once per year. Placement of a site on the hazardous sites list does not, by itself, imply that persons associated with the site are liable under chapter 70.105D RCW.~~

~~(6) Site status. The hazardous sites list shall reflect the current status of remedial action at each site. The department may change a site's status to reflect current conditions. The status for each site shall be identified as one of the following:~~

~~(a) Sites awaiting further remedial action;~~

~~(b) Sites with remedial action in progress;~~

~~(c) Sites where a cleanup action has been conducted but confirmational monitoring is underway;~~

~~(d) Sites with independent remedial actions; or~~

~~(e) Other categories established by the department.~~

~~(7) Removing sites from the list.~~

~~(a) The department may remove a site from the list only after it has determined that:~~

~~(i)~~)) The purpose of the contaminated sites list is to identify:

(a) All sites for which ecology or PLIA has determined further remedial action is necessary under state cleanup law to:

(i) Confirm whether there is a threat to human health or the environment posed by a release or threatened release; or

(ii) Address the threat posed by a release or threatened release, based on the criteria in subsection (5) of this section; and

(b) For each listed site, the site's current remedial action status.

(2) **Adding a site to the list.** After an initial investigation under WAC 173-340-310 or 374-45-040, ecology will add a site to the contaminated sites list if ecology or PLIA determines further remedial action is necessary under state cleanup law to:

(a) Confirm whether there is a threat to human health or the environment posed by a release or threatened release; or

(b) Address the threat posed by a release or threatened release, based on the criteria in subsection (5) of this section.

(3) **Tracking the remedial action status of a site.** For each site on the contaminated sites list, ecology will track and include on the list the site's remedial action status. Ecology may change the remedial action status of a site to reflect current conditions.

(4) **Splitting or combining sites on the list.** Ecology may split or combine sites on the contaminated sites list consistent with its authority under chapter 70A.305 RCW.

(5) **Removing a site from the list.** Ecology will remove a site from the contaminated sites list if, and only if, ecology or PLIA determines that the listing is erroneous or that the site meets the applicable criteria in this subsection. A person does not need to submit a petition under subsection (6) of this section for ecology to remove a site from the contaminated sites list.

(a) **Permanent cleanup action.** For sites where the selected cleanup action is permanent, a site must meet the following criteria to be removed from the list:

(i) All cleanup standards have been achieved; and

(ii) All necessary remedial actions under state cleanup law have been completed.

(b) **Nonpermanent cleanup action without containment.** For sites where the selected cleanup action is not permanent and does not include containment, a site must meet the following criteria to be removed from the list:

(i) All cleanup standards have been achieved; and

(ii) All remedial actions under state cleanup law, except ((~~confirmational~~)) confirmation monitoring and periodic reviews, have been completed ((~~and compliance with the cleanup standards has been achieved at the site;~~

~~(ii) The listing was erroneous; or~~

~~(iii)~~)).

(c) **Nonpermanent cleanup action with containment.** For sites where the selected cleanup action is not permanent and includes containment((~~, if all of the following conditions have been met:~~

~~(A) All construction and operation of remedial actions~~)), a site must meet the following criteria to be removed from the list:

(i) All cleanup standards have been achieved;

(ii) All necessary construction has been completed;

(iii) All necessary operation and maintenance activities have been ((~~adequately~~)) completed ((~~and~~)), except for the following:

((~~(I) Only~~)) (A) Passive maintenance activities, such as monitoring, inspections ((~~and~~)), or periodic repairs ((~~remain~~)); or

((~~(II)~~)) (B) For ((~~municipal~~)) solid waste landfills ((~~only, a closure plan meeting the substantive requirements in chapter 173-351 WAC has been approved by the department as part of a remedial action under this chapter and the only remaining active maintenance activities are methane gas control, the operation of leachate collection and treatment systems, and/or surface water diversion;~~

~~(B)~~)) permitted under chapter 173-340, 173-350, or 173-351 WAC, any operation or maintenance activities of systems for explosive gas control, leachate collection, or surface water run-on or runoff management;

(iv) All necessary performance monitoring has been completed;

(v) Sufficient ((~~confirmational~~)) confirmation monitoring has been ((~~done~~)) completed to demonstrate that the ((~~remedy has~~)) cleanup action effectively ((~~contained~~)) contains the hazardous substances of concern at the site;

((~~(C) All required performance monitoring has been completed;~~

~~(D)~~)) (vi) Any required institutional controls are in place and have been demonstrated to be effective in protecting public health and the environment ((~~from exposure to hazardous substances~~)) and ((~~protecting~~)) the integrity of the cleanup action;

((~~(E)~~)) (vii) Any required financial assurances are in place; and

(viii) Written documentation is present in ((~~the department~~)) ecology files that describes what hazardous substances ((~~have been left~~)) remain on site, where they are located, and the ((~~long term~~)) long-term monitoring and maintenance obligations at the site((~~;~~

~~(F) When required under WAC 173-340-440, financial assurances are in place; and~~

~~(G) For sites with releases to groundwater, it has been demonstrated the site meets groundwater cleanup levels at the designated point of compliance.~~

~~(b) A site owner, operator, or potentially liable person may request that a site be removed from the list by submitting a petition to the department. The petition shall include thorough documentation of all investigations performed, all cleanup actions taken, and adequate compliance monitoring to demonstrate to the department's satisfaction that one of the conditions in (a) of this subsection has been met. The department may require payment of costs incurred, including an advance deposit, for review and verification of the work performed. The department shall review such petitions; however, the timing of the review shall be at its discretion and as resources may allow.~~

~~(8) Record of sites. The department shall maintain a record of sites that have been removed from the list under subsection (7) of this section. The record shall identify which sites have institutional controls under WAC 173-340-440 and which sites are subject to periodic review under WAC 173-340-420. This record will be made available to the public upon request.~~

~~(9) Relisting of sites. The department may relist a site that has previously been removed if it determines that the site requires further remedial action.~~

~~(10) Notice. The department shall provide public notice and an opportunity to comment when the department proposes to remove a site from the list. Additions to the list, changes in site status, and removal from the list shall be published in the *Site Register*~~)).

(6) **Petitions for removing a site from the list.** A site owner, operator, or potentially liable person may petition ecology to remove a site from the contaminated sites list if ecology has not removed the site from the list under subsection (5) of this section.

(a) **Content.** A petition must be in writing and include the following:

(i) For claims the listing of the site is erroneous, sufficient documentation of investigations to demonstrate to ecology's satisfaction that the listing is erroneous;

(ii) For claims based on independent remedial action, a written opinion from ecology or PLIA that no further remedial action is necessary at the site to meet the criteria in subsection (5)(b) of this section. A person may request such an opinion from ecology under WAC 173-340-515(5) or from PLIA under chapter 374-80 WAC, as applicable; or

(iii) For claims based on ecology-supervised or ecology-conducted remedial action, sufficient documentation of remedial actions, including investigations, feasibility studies, interim actions, cleanup actions, and compliance monitoring, to demonstrate to ecology's satisfaction that no further remedial action is necessary at the site to meet the criteria in subsection (5) of this section.

(b) **Response.** Ecology will review the petition as resources permit. Unless ecology determines that the listing is erroneous or that the site meets the criteria in subsection (5) of this section, ecology may collect from the petitioner all costs incurred by ecology in reviewing the petition. Ecology may require a deposit in advance of reviewing the petition.

(7) **Public participation when removing a site from the list.** For an ecology-conducted or ecology-supervised remedial action, ecology will provide public notice in accordance with WAC 173-340-600(17) before removing a site from the contaminated sites list. Ecology may recover the costs of providing such public participation in accordance with WAC 173-340-550.

(8) **Relisting of sites.** Ecology may relist a site on the contaminated sites list that it previously removed from the list if ecology or PLIA determines further remedial action is necessary at the site to meet the criteria in subsection (5) of this section.

(9) **Notification.**

(a) Ecology will make the contaminated sites list and the current list of remedial action status categories publicly available on ecology's website.

(b) Ecology will make a site's current listing and remedial action status publicly available on ecology's website under WAC 173-340-600(5).

(c) If requested, ecology will notify a person electronically under WAC 173-340-600(6) upon:

(i) Any change in a site's remedial action status;

(ii) Splitting or combining a site on the contaminated sites list; or

(iii) Removing or relisting a site on the contaminated sites list.

(10) **Liability.** Placement of a site on the contaminated sites list does not, by itself, imply that persons associated with the site are liable under chapter 70A.305 RCW.

NEW SECTION

WAC 173-340-335 No further action sites list. (1) **Purpose.** The purpose of the no further action sites list is to identify:

(a) All sites where ecology or PLIA has determined no further remedial action is necessary under state cleanup law to meet the criteria in WAC 173-340-330(5); and

(b) For each listed site, whether institutional controls or periodic reviews remain necessary at the site.

(2) **Adding a site to the list.** Ecology will add a site to the no further action sites list if, and only if:

(a) After completing an initial investigation, ecology or PLIA determines that no further remedial action is necessary under state cleanup law to meet the criteria in WAC 173-340-330(5); or

(b) Ecology removes the site from the contaminated sites list based on the criteria in WAC 173-340-330(5).

(3) **Tracking institutional controls and periodic reviews.** For each site on the no further action sites list, ecology will identify on the list whether the site requires:

(a) Institutional controls under WAC 173-340-440; or

(b) Periodic reviews under WAC 173-340-420.

(4) **Removing a site from the list.** If ecology relists a site on the contaminated sites list under WAC 173-340-330(8), ecology will remove the site from the no further action sites list.

(5) **Notification.**

(a) Ecology will make the no further action sites list publicly available on ecology's website.

(b) If requested, ecology will notify a person electronically under WAC 173-340-600(6) upon adding or removing a site on the no further action sites list.

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-340 ((~~Biennial program report.~~)) Program planning and assessment. ((~~(1) Timing. Before November 1 of each even-numbered year, the department shall prepare a biennial program report for the legislature containing its plan for conducting remedial actions for the following two fiscal years. This report shall identify the projects and expenditures recommended for appropriation from both the state and local toxics control accounts. In determining which sites the department shall consider for planned action, emphasis shall be given to sites posing the highest risk to human health and the environment, as indicated by a site's hazard ranking. The department may also consider other factors in setting site priorities. After legislative action and any revisions, this report shall become the department's biennial program plan.~~

~~(2) Public notice. The department shall provide public notice and a hearing on the proposed plan. For purposes of this subsection only, public notice shall consist of mailings to all persons who have made a timely request and to the appropriate news media, and publication in the state register. Notice shall also be provided in the *Site Register*. The public comment period on the proposed plan shall run for at least thirty days from the date of the publication in the *Site Register.*~~)) (1) **Strategic plan.** Ecology will develop and periodically update a comprehensive and integrated strategic plan for cleaning up contaminated sites. The strategic plan must prioritize contaminated sites that threaten likely vulnerable populations and overburdened

communities, and consider the resource allocation factors in subsection (2) of this section. The strategic plan must include:

(a) Goals and strategies for all core program functions and major initiatives;

(b) Metrics to track and measure progress in accomplishing the goals and implementing the strategies; and

(c) Staffing and capital funds needed to accomplish the goals and implement the strategies.

(2) **Resource allocation.** In fulfilling the objectives of this chapter, ecology will allocate staffing and capital funds based on the following factors:

(a) The threats posed by a contaminated site to human health and the environment;

(b) Whether the population threatened by a contaminated site includes a likely vulnerable population or overburdened community;

(c) The land reuse potential and planning for a contaminated site; and

(d) Other factors specified by the legislature or ecology.

(3) **Performance assessment.** Ecology will periodically assess its progress in accomplishing its goals and implementing its strategies for cleaning up contaminated sites, including its progress in cleaning up sites that threaten likely vulnerable populations and overburdened communities, using the metrics established under subsection (1)(b) of this section.

(4) **Notification.**

(a) Ecology will make the strategic plans and performance assessments required under subsections (1) and (3) of this section publicly available on ecology's website.

(b) Ecology will provide notice in the *Contaminated Site Register* of the following:

(i) Any update to the strategic plans or performance assessments required under subsections (1) and (3) of this section; and

(ii) Any additional resource allocation factors specified by the legislature or ecology under subsection (2)(d) of this section.

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-350 Remedial investigation ((~~and feasibility study~~)). ((~~(1) **Purpose.** The purpose of a remedial investigation/feasibility study is to collect, develop, and evaluate sufficient information regarding a site to select a cleanup action under WAC 173-340-360 through 173-340-390.~~

~~(2) Timing. Unless otherwise directed by the department, a remedial investigation/feasibility study shall be completed before selecting a cleanup action under WAC 173-340-360 through 173-340-390, except for an emergency or interim action.~~

~~(3) Administrative options. A remedial investigation/feasibility study may be conducted under any of the procedures described in WAC 173-340-510 and 173-340-515.~~

~~(4) Submittal requirements. For a remedial action conducted by the department or under a decree or order, a report shall be prepared at the completion of the remedial investigation/feasibility study. Additionally, the department may require reports to be submitted for discrete elements of the remedial investigation/feasibility study. Re-~~

~~ports prepared under this section and under an order or decree shall be submitted to the department for review and approval. See also subsection (7)(c)(iv) of this section for information on the sampling and analysis plan and the safety and health plan. See WAC 173-340-515(4) for submittal requirements for independent remedial actions.~~

~~(5) Public participation. Public participation will be accomplished in a manner consistent with WAC 173-340-600.~~

~~(6) Scope. The scope of a remedial investigation/feasibility study varies from site to site, depending on the informational and analytical needs of the specific facility. This requires that the process remain flexible and be streamlined when possible to avoid the collection and evaluation of unnecessary information so that the cleanup can proceed in a timely manner. Where information required in subsections (7)(c) and (8)(c) of this section is available in other documents for the site, that information may be incorporated by reference to avoid unnecessary duplication. However, in all cases sufficient information must be collected, developed, and evaluated to enable the selection of a cleanup action under WAC 173-340-360 through 173-340-390. In addition, for facilities on the federal national priorities list, a remedial investigation/feasibility study shall comply with federal requirements.~~

~~(7) Procedures for conducting a remedial investigation.~~

~~(a) Purpose. The purpose of the remedial investigation is to collect data necessary to adequately characterize the site for the purpose of developing and evaluating cleanup action alternatives. Site characterization may be conducted in one or more phases to focus sampling efforts and increase the efficiency of the remedial investigation. Site characterization activities may be integrated with the development and evaluation of alternatives in the feasibility study, as appropriate.~~

~~(b) Scoping activities. To focus the collection of data and to assist the department in making the preliminary evaluation required under the State Environmental Policy Act (see WAC 197-11-256), the following scoping activities may be taken before conducting a remedial investigation:~~

~~(i) Assemble and evaluate existing data on the site, including the results of any interim or emergency actions, initial investigations, site hazard assessments, and other site inspections;~~

~~(ii) Develop a preliminary conceptual site model as defined in WAC 173-340-200;~~

~~(iii) Begin to identify likely cleanup levels for the site;~~

~~(iv) Begin to identify likely cleanup action components that may address the releases at the site;~~

~~(v) Consider the type, quality and quantity of data necessary to support selection of a cleanup action; and~~

~~(vi) Begin to identify likely applicable state and federal laws under WAC 173-340-710.~~

~~(c) Content. A remedial investigation shall include the following information as appropriate:~~

~~(i) General facility information. General information, including: Project title; name, address, and phone number of project coordinator; legal description of the facility location; dimensions of the facility; present owner and operator; chronological listing of past owners and operators and operational history; and other pertinent information.~~

~~(ii) Site conditions map. An existing site conditions map that illustrates relevant current site features such as property bounda-~~

~~ries, proposed facility boundaries, surface topography, surface and subsurface structures, utility lines, well locations, and other pertinent information.~~

~~(iii) Field investigations. Sufficient investigations to characterize the distribution of hazardous substances present at the site, and threat to human health and the environment. Where applicable to the site, these investigations shall address the following:~~

~~(A) Surface water and sediments. Investigations of surface water and sediments to characterize significant hydrologic features such as: Surface drainage patterns and quantities, areas of erosion and sediment deposition, surface waters, floodplains, and actual or potential hazardous substance migration routes towards and within these features. Sufficient surface water and sediment sampling shall be performed to adequately characterize the areal and vertical distribution and concentrations of hazardous substances. Properties of surface and subsurface sediments that are likely to influence the type and rate of hazardous substance migration, or are likely to affect the ability to implement alternative cleanup actions shall be characterized.~~

~~(B) Soils. Investigations to adequately characterize the areal and vertical distribution and concentrations of hazardous substances in the soil due to the release. Properties of surface and subsurface soils that are likely to influence the type and rate of hazardous substance migration, or which are likely to affect the ability to implement alternative cleanup actions shall be characterized.~~

~~(C) Geology and groundwater system characteristics. Investigations of site geology and hydrogeology to adequately characterize the areal and vertical distribution and concentrations of hazardous substances in the groundwater and those features which affect the fate and transport of these hazardous substances. This shall include, as appropriate, the description, physical properties and distribution of bedrock and unconsolidated materials; groundwater flow rate and gradient for affected and potentially affected groundwaters; groundwater divides; areas of groundwater recharge and discharge; location of public and private production wells; and groundwater quality data.~~

~~(D) Air. An evaluation of air quality impacts, including sampling, where appropriate, and information regarding local and regional climatological characteristics which are likely to affect the hazardous substance migration such as seasonal patterns of rainfall, the magnitude and frequency of significant storm events, temperature extremes, prevailing wind direction, variations in barometric pressure, and wind velocity.~~

~~(E) Land use. Information regarding present and proposed land and resource uses and zoning for the site and potentially affected areas and information characterizing human and ecological populations that are reasonably likely to be exposed or potentially exposed to the release based on such use.~~

~~(F) Natural resources and ecological receptors.~~

~~(I) Information to determine the impact or potential impact of the hazardous substance from the facility on natural resources and ecological receptors, including any information needed to conduct a terrestrial ecological evaluation, under WAC 173-340-7492 or 173-340-7493, or to establish an exclusion under WAC 173-340-7491.~~

~~(II) Where appropriate, a terrestrial ecological evaluation may be conducted so as to avoid duplicative studies of soil contamination that will be remediated to address other concerns, such as protection of human health. This may be accomplished by evaluating residual threats to the environment after cleanup action alternatives for human~~

~~health protection have been developed. If this approach is used, the remedial investigation may be phased. Examples of sites where this approach may not be appropriate include: A site contaminated with a hazardous substance that is primarily an ecological concern and will not obviously be addressed by the cleanup action for the protection of human health, such as zinc; or a site where the development of a human health based remedy is expected to be a lengthy process, and postponing the terrestrial ecological evaluation would cause further harm to the environment.~~

~~(III) If it is determined that a simplified or site-specific terrestrial ecological evaluation is not required under WAC 173-340-7491, the basis for this determination shall be included in the remedial investigation report.~~

~~(G) Hazardous substance sources. A description of and sufficient sampling to define the location, quantity, areal and vertical extent, concentration within and sources of releases. Where relevant, information on the physical and chemical characteristics, and the biological effects of hazardous substances shall be provided.~~

~~(H) Regulatory classifications. Regulatory designations classifying affected air, surface water and groundwater, if any.~~

~~(iv) Workplans. A safety and health plan and a sampling and analysis plan shall be prepared as part of the remedial investigation/feasibility study. These plans shall conform to the requirements specified in WAC 173-340-810 and 173-340-820.~~

~~(v) Other information. Other information may be required by the department.~~

~~(8) Procedures for conducting a feasibility study.~~

~~(a) Purpose. The purpose of the feasibility study is to develop and evaluate cleanup action alternatives to enable a cleanup action to be selected for the site. If concentrations of hazardous substances do not exceed the cleanup level at a standard point of compliance, no further action is necessary.~~

~~(b) Screening of alternatives. An initial screening of alternatives to reduce the number of alternatives for the final detailed evaluation may be appropriate. The person conducting the feasibility study may initially propose cleanup action alternatives or components to be screened from detailed evaluation. The department shall make the final determination of which alternatives must be evaluated in the feasibility study. The following cleanup action alternatives or components may be eliminated from the feasibility study:~~

~~(i) Alternatives that, based on a preliminary analysis, the department determines so clearly do not meet the minimum requirements specified in WAC 173-340-360 that a more detailed analysis is unnecessary. This includes those alternatives for which costs are clearly disproportionate under WAC 173-340-360 (3)(e); and~~

~~(ii) Alternatives or components that are not technically possible at the site.~~

~~(c) Content. A feasibility study shall include the following information as appropriate.~~

~~(i) General requirements.~~

~~(A) The feasibility study shall include cleanup action alternatives that protect human health and the environment (including, as appropriate, aquatic and terrestrial ecological receptors) by eliminating, reducing, or otherwise controlling risks posed through each exposure pathway and migration route.~~

~~(B) A reasonable number and type of alternatives shall be evaluated, taking into account the characteristics and complexity of the facility, including current site conditions and physical constraints.~~

~~(C) Each alternative may consist of one or more cleanup action components, including, but not limited to, components that reuse or recycle the hazardous substances, destroy or detoxify the hazardous substances, immobilize or solidify the hazardous substances, provide for on-site or offsite disposal of the hazardous substances in an engineered, lined and monitored facility, on-site isolation or containment of the hazardous substances with attendant engineering controls, and institutional controls and monitoring.~~

~~(D) Alternatives may, as appropriate, include remediation levels to define when particular cleanup action components will be used. Alternatives may also include different remediation levels for the same component. For example, alternatives that excavate and treat soils at varying concentrations may be appropriate to evaluate. See WAC 173-340-355 for detailed information on establishing potential remediation levels to be evaluated in the feasibility study.~~

~~(E) If necessary, evaluate the residual threats that would accompany each alternative and determine if remedies that are protective of human health will also be protective of ecological receptors. See subsection (7)(c)(iii)(F) of this section.~~

~~(F) The feasibility study shall include alternatives with the standard point of compliance for each environmental media containing hazardous substances, unless those alternatives have been eliminated under (b) of this subsection, and may include, as appropriate, alternatives with conditional points of compliance.~~

~~(G) Each alternative shall be evaluated on the basis of the requirements and the criteria specified in WAC 173-340-360.~~

~~(H) A preferred cleanup action may be identified in the feasibility study, where appropriate.~~

~~(I) Other information may be required by the department.~~

~~(ii) Permanent alternatives.~~

~~(A) Except as provided in (c)(ii)(B) of this subsection, the feasibility study shall include at least one permanent cleanup action alternative, as defined in WAC 173-340-200, to serve as a baseline against which other alternatives shall be evaluated for the purpose of determining whether the cleanup action selected is permanent to the maximum extent practicable. The most practicable permanent cleanup action alternative shall be included.~~

~~(B) The feasibility study does not need to include a permanent cleanup action alternative under any of the following circumstances:~~

~~(I) Where a model remedy is the selected cleanup action;~~

~~(II) Where a permanent cleanup action alternative is not technically possible; or~~

~~(III) Where the cost of the most practicable permanent cleanup action alternative is so clearly disproportionate that a more detailed analysis is not necessary, as determined through the screening process in (b)(i) of this subsection.~~

~~(9) Additional requirements.~~

~~(a) Cleanup levels. Unless otherwise specified under this chapter, cleanup levels shall be established for hazardous substances in each medium and for each pathway where a release has occurred, using WAC 173-340-700 through 173-340-760. These are typically initially established during the scoping of the remedial investigation and may be further refined during the remedial investigation and/or feasibility study.~~

~~(b) Compliance with other laws. The department may require that a remedial investigation/feasibility study include additional information or analyses to comply with the State Environmental Policy Act or other applicable laws. This includes information necessary to make a threshold determination (see WAC 197-11-335(1)), or information necessary to integrate the remedial investigation/feasibility study with an environmental impact statement (see WAC 197-11-262).~~

~~(c) Treatability studies. The department may require treatability studies as necessary to provide sufficient information to develop and evaluate cleanup action alternatives for a site.~~

~~(d) Other information. Other information may be required by the department.~~)) (1) **Purpose.** The purpose of a remedial investigation is to adequately characterize a contaminated site, including the distribution of hazardous substances and the threat they pose to human health and the environment, to enable:

(a) Cleanup standards to be established under Part 7 of this chapter; and

(b) Cleanup action alternatives to be developed and evaluated in a feasibility study under WAC 173-340-351.

(2) **Applicability.**

(a) **Whether required.** A remedial investigation of a contaminated site must be conducted regardless of which administrative option in WAC 173-340-510 is used to conduct remedial action at the site.

(b) **Requirements.** A remedial investigation must comply with the requirements in this section and, as applicable, the following:

(i) For sites where there is a release or threatened release to sediment, the applicable requirements in WAC 173-204-550.

(ii) For sites on the national priorities list, the applicable requirements under the federal cleanup law.

(3) **Timing and phasing.**

(a) Except as otherwise directed by ecology, a remedial investigation must be completed before cleanup standards are established and a cleanup action is selected. An emergency remedial action or an interim action may be conducted before a remedial investigation/feasibility study is completed.

(b) A remedial investigation may be conducted, or required by ecology to be conducted, for the entire site or for separate parts of a site, such as a sediment cleanup unit as defined in WAC 173-204-505.

(c) A remedial investigation and a feasibility study may be conducted, or required by ecology to be conducted, as a single step or as separate steps in the cleanup process.

(d) A remedial investigation may be conducted, or required by ecology to be conducted, in phases. For example, additional remedial investigation may be necessary to fill data gaps identified in earlier investigations or to determine the applicability of a model remedy at a site.

(4) **Administrative options and requirements.** A remedial investigation may be conducted under any of the administrative options for remedial action described in WAC 173-340-510. Reporting and public participation requirements depend on the administrative option used to conduct remedial action.

(a) **Ecology-conducted or ecology-supervised remedial actions.** For an ecology-conducted or ecology-supervised remedial investigation, ecology will provide or require:

(i) A remedial investigation work plan that complies with the requirements in subsection (5)(b) of this section and WAC 173-340-840.

For ecology-supervised remedial actions, ecology may require submittal of a work plan for its review and approval;

(ii) A remedial investigation report that complies with the requirements in subsection (5)(g) of this section and WAC 173-340-840. For ecology-supervised remedial actions, ecology may require submittal of a report for its review and approval; and

(iii) Public notice of a remedial investigation report in accordance with WAC 173-340-600(13).

(b) **Independent remedial actions.**

(i) Independent investigations of a site must be reported to ecology in accordance with WAC 173-340-515. Such investigations may need to be reported separately upon completion (see WAC 173-340-515 (4)(a)). Reports must include, as appropriate, the information specified in subsection (5)(g) of this section.

(ii) Ecology will notify the public of an independent investigation report in accordance with WAC 173-340-600(20).

(5) **Steps.** Except as otherwise directed by ecology, a remedial investigation must be conducted in accordance with the following steps.

(a) **Step 1: Identify scope.** Identify the scope of the remedial investigation. The scope depends on many factors, including the nature and extent of contamination, the exposure pathways of concern, the human and ecological receptors potentially impacted by the contamination, the characteristics of the site, the type of cleanup action alternatives likely to be evaluated, and information previously obtained about the site. To determine the scope, do the following:

(i) Identify what information is needed about the site to comply with the requirements in (c) of this subsection and chapter 197-11 WAC, the State Environmental Policy Act rules (see WAC 197-11-250);

(ii) Assemble and evaluate relevant information collected during any prior remedial actions at the site, such as an initial investigation or an interim action. Previously collected information may be relied upon in the investigation to avoid duplication; and

(iii) Identify what additional information needs to be collected during the investigation.

(b) **Step 2: Develop work plan.** Develop a remedial investigation work plan to collect and evaluate the information identified in Step 1. If required by ecology under subsection (4)(a)(i) of this section, submit the work plan for ecology's review and approval.

(i) **Content.** Except as otherwise directed by ecology, include the following in the work plan:

(A) The scope of the investigation identified in Step 1, including a summary of available information about the site and data gaps needing to be addressed by the investigation;

(B) A preliminary conceptual site model, as defined in WAC 173-340-200;

(C) A target concentration for each hazardous substance in each contaminated environmental medium identified in the preliminary conceptual site model under (b)(i)(B) of this subsection;

(D) A sampling and analysis plan meeting the requirements in WAC 173-340-820, including the analytical methods that enable detection of the target concentrations identified in (b)(i)(C) of this subsection;

(E) A health and safety plan meeting the requirements in WAC 173-340-810;

(F) An inadvertent discovery plan meetings the requirements in WAC 173-340-815;

(G) Cleanup action alternatives likely to be considered in the feasibility study, based on available information;

(H) Any studies needed to develop or evaluate cleanup action alternatives in the feasibility study, such as treatability or pilot studies;

(I) A proposed schedule for completing the remedial investigation/feasibility study and, if required, submittal of a report for ecology review and approval; and

(J) Any other information required by ecology.

(ii) **Flexibility.** The work plan should remain flexible and be streamlined when possible to avoid collection and evaluation of unnecessary information. While it may be appropriate to phase investigations at some sites, ecology encourages expedited investigations. For example, using field screening methods to guide investigations and fast turnaround laboratory analyses to provide real-time feedback may be appropriate at some sites. However, in all cases, sufficient information must be collected and evaluated to meet the purposes in subsection (1) of this section.

(c) **Step 3: Conduct investigation.** Conduct the remedial investigation in accordance with the work plan developed in Step 2.

(d) **Step 4: Complete conceptual site model.** Based on the results of the remedial investigation conducted in Step 3 and any previously obtained information about the site, complete the development of a conceptual site model, as defined in WAC 173-340-200.

(e) **Step 5: Develop proposed cleanup levels.** Based on the conceptual site model completed in Step 4, develop a proposed cleanup level for each hazardous substance within each affected environmental medium at the site in accordance with Part 7 of this chapter.

(f) **Step 6: Determine whether feasibility study is necessary.** Based on the results of the remedial investigation conducted in Step 3 and any previously obtained information about the site, determine whether a feasibility study is necessary under WAC 173-340-351 (2)(a), including:

(i) Whether prior remedial actions conducted at the site constitute a permanent cleanup action; and

(ii) Whether a model remedy may be used as a cleanup action or a cleanup action component at the site.

(g) **Step 7: Report results.** Report the results of the remedial investigation in accordance with subsection (4) of this section. Include the following information in the report:

(i) General information about the site, including:

(A) Project title;

(B) Name, address, and phone number of project coordinator;

(C) Legal description and dimensions of the site;

(D) Current owners and operators; and

(E) Chronological listing of past owners and operators and operational history;

(ii) Maps, figures, or diagrams illustrating relevant existing and historic site features, including:

(A) Sources of releases;

(B) Property boundaries;

(C) Proposed site boundaries, as defined by where hazardous substances exceed the proposed cleanup levels identified in (d)(iv) of this subsection;

(D) Surface topography;

(E) Surface and subsurface structures;

(F) Surface water, wetlands, and undeveloped areas; and

(G) Utility lines and well locations;

(iii) The information collected in Step 3, and any information obtained from prior remedial actions relied on during the investigation. Separately include information on threats to likely vulnerable populations and overburdened communities. Previously obtained information may be summarized and referenced to avoid unnecessary duplication;

(iv) The conceptual site model completed in Step 4;

(v) The proposed cleanup levels developed in Step 5, including:

(A) The basis for the proposed cleanup levels; and

(B) Any regulatory classifications for, or laws applicable to, each environmental medium (see WAC 173-340-710);

(vi) A comparison of the proposed cleanup levels developed in Step 5 to the hazardous substance concentrations in each environmental medium;

(vii) If a feasibility study is determined not to be necessary in Step 6, sufficient documentation to demonstrate the basis of the determination;

(viii) Documentation of the proper management and disposal of any waste materials generated as a result of the remedial investigations in accordance with applicable state and federal laws; and

(ix) Any other information required by ecology.

(6) **Investigations.** A remedial investigation must collect and evaluate sufficient information about a site and the surrounding area to meet the purposes in subsection (1) of this section, including the following as applicable to the site.

(a) **Hazardous substance sources.** Confirmed and suspected releases must be investigated to define the location, estimated quantity, areal and vertical extent, concentration within, and sources of releases. Where relevant, information on the physical and chemical characteristics and the biological effects of hazardous substances must be collected.

(b) **Soils.** Soils must be investigated to adequately characterize:

(i) The areal and vertical distribution and concentrations of hazardous substances in soils; and

(ii) The properties of surface and subsurface soils that are likely to influence the type and rate of hazardous substance migration or to affect the ability to implement cleanup action alternatives.

(c) **Groundwater, geology, and hydrogeology.** Groundwater, geology, and hydrogeology must be investigated to adequately characterize:

(i) The areal and vertical distribution and concentrations of hazardous substances in the groundwater;

(ii) The geologic features affecting the fate and transport of hazardous substances, such as the type, physical properties (such as permeability, density, and fracture characteristics), and distribution of bedrock and unconsolidated materials;

(iii) The hydrogeological features affecting the fate and transport of hazardous substances, such as:

(A) Groundwater flow direction, rate, and vertical and horizontal gradients for affected and potentially affected groundwater;

(B) Groundwater divides;

(C) Areas of groundwater recharge and discharge;

(D) Areas where groundwater interfaces with surface water;

(E) Location of public and private water supply wells; and

(F) Groundwater quality data; and

(iv) The geologic and hydrogeologic features that are likely to affect the ability to implement cleanup action alternatives.

(d) **Surface water, sediments, and hydrology.** Surface water, sediments, and hydrology must be investigated to adequately characterize:

(i) The areal and vertical distribution and concentrations of hazardous substances in surface water and sediments;

(ii) Significant hydrologic features, such as:

(A) Surface drainage patterns and quantities;

(B) Areas of erosion and sediment deposition, including estimates of sedimentation rates;

(C) Surface waters, including flow rates;

(D) Floodplains; and

(E) Actual or potential hazardous substance migration routes towards and within these features; and

(iii) The properties of surface and subsurface sediments that are likely to affect the type and rate of hazardous substance migration, the potential for recontamination, or the ability to implement cleanup action alternatives.

(e) **Air and soil vapor.** The air and soil vapor must be evaluated and, where appropriate, sampled to adequately characterize the potential impacts of vapor migration on subsurface soil gas, on air quality within current and future buildings or other structures, and on outdoor ambient air. Based on contaminant concentrations in soil gas or groundwater, ecology may require expedited sampling of indoor air quality to assess the threat to human health. If the measured indoor air concentrations are higher than applicable cleanup levels, ecology may require an emergency action or an interim action to mitigate the threat to human health.

(f) **Climate.** Sufficient information, based on best available science, must be collected on current and projected local and regional climatological characteristics to determine which could affect the migration of hazardous substances or the resilience of cleanup action alternatives. Relevant characteristics can include temperature extremes, sea level, seasonal patterns of rainfall, the magnitude and frequency of extreme storm events (such as flooding), the potential for landslides, prevailing wind direction and velocity, variations in barometric pressure, and the potential for wildfires.

(g) **Land and resource use.** To determine the exposure or potential exposure of human and ecological receptors, including likely vulnerable populations and overburdened communities, to hazardous substances at the site, sufficient information must be collected on the following:

(i) The present and proposed land and resource uses of the site;

(ii) The comprehensive plan and zoning for the site;

(iii) Any sensitive environments at the site; and

(iv) Any habitat restoration or resource recovery goals for the site.

(h) **Human receptors.** Sufficient information must be collected on human receptors to determine:

(i) Whether the receptors are reasonably likely to be exposed or potentially exposed to hazardous substances based on the land and resource uses identified in (g) of this subsection;

(ii) The impact or potential impact of such exposure; and

(iii) Whether the receptors include likely vulnerable populations or overburdened communities.

(i) **Natural resources and ecological receptors.** Sufficient information must be collected on natural resources and ecological receptors that are reasonably likely to be exposed or potentially exposed to hazardous substances based on the land and resource uses identified in

(g) of this subsection to determine the impact or potential impact of such exposure. This includes any information needed to conduct a sediment evaluation under chapter 173-204 WAC and any information needed to conduct a terrestrial ecological evaluation or establish an exclusion under WAC 173-340-7490 through 173-340-7494.

(i) Where appropriate, a terrestrial ecological evaluation may be conducted so as to avoid duplicative studies of soil contamination that will be remediated to address other concerns, such as protection of human health or aquatic ecological receptors. This may be accomplished by evaluating residual threats to the environment after cleanup action alternatives for human health or aquatic ecological protection have been developed. If this approach is used, the remedial investigation may be phased. This approach may not be appropriate at a site where a hazardous substance is primarily an ecological concern and will not obviously be addressed by the cleanup action for the protection of human health, such as zinc; or at a site where the development of a human health based cleanup action is expected to be a lengthy process, and postponing the terrestrial ecological evaluation would cause further harm to the environment.

(ii) If a simplified or site-specific terrestrial ecological evaluation is not required under WAC 173-340-7491, the basis for the determination must be included in the remedial investigation report.

(j) **Feasibility study applicability.** To determine whether a feasibility study must be conducted under WAC 173-340-351, sufficient information must be collected during the remedial investigation to determine whether:

(i) Prior remedial actions at the site constitute a permanent cleanup action and meet the criteria in WAC 173-340-330 (5)(a); and

(ii) A model remedy established by ecology may be used as a cleanup action or a cleanup action component at the site under WAC 173-340-390.

(k) **Cleanup action alternatives.** If a feasibility study must be conducted under WAC 173-340-351, sufficient information must be collected during the remedial investigation to develop and evaluate cleanup action alternatives in the feasibility study, such as treatability or pilot studies.

NEW SECTION

WAC 173-340-351 Feasibility study. (1) **Purpose.** The purpose of the feasibility study is to develop and evaluate cleanup action alternatives to enable the selection of a cleanup action that meets the requirements in WAC 173-340-360 and conforms, as appropriate, to the expectations in WAC 173-340-370.

(2) **Applicability.**

(a) **Whether required.** A feasibility study of cleanup action alternatives must be conducted, regardless of which administrative option in WAC 173-340-510 is used to conduct remedial action, except in the following circumstances.

(i) **Permanent cleanup action completed.** A feasibility study is not required if prior remedial actions at the site constitute a permanent cleanup action and meet the criteria in WAC 173-340-330 (5)(a). To qualify for this exemption, sufficient information must be collected and included in the remedial investigation report to demonstrate

that the site meets the criteria (see WAC 173-340-350 (6)(j)(i) and (5)(f)(i) and (g)(vii)).

(ii) **Model remedy selected.** A feasibility study is not required to select a model remedy as the cleanup action or as a component of the cleanup action for a site (see WAC 173-340-390). However, a feasibility study is still required to select any remaining cleanup action components for the site. To qualify for this exemption or partial exemption, sufficient information must be collected and included in the remedial investigation report to demonstrate that the site meets the conditions established by ecology for using the model remedy (see WAC 173-340-350 (6)(j)(ii) and (5)(f)(ii) and (g)(vii)).

(b) **Requirements.** A feasibility study must comply with the requirements in this section and, as applicable, the following:

(i) For sites where there is a release or threatened release to sediment, the applicable requirements in WAC 173-204-550; and

(ii) For sites on the national priorities list, the applicable requirements under the federal cleanup law.

(3) **Timing and phasing.**

(a) Except as otherwise directed by ecology, a feasibility study must be completed before cleanup standards are established and a cleanup action is selected. An emergency remedial action or an interim action may be conducted before a remedial investigation/feasibility study is completed.

(b) A feasibility study may be conducted, or required by ecology to be conducted, for the entire site or for separate parts of a site, such as a sediment cleanup unit as defined in WAC 173-204-505.

(c) A remedial investigation and a feasibility study may be conducted, or required by ecology to be conducted, as a single step or as separate steps in the cleanup process.

(d) A feasibility study may be conducted, or required by ecology to be conducted, in phases. For example, additional study may be necessary to evaluate the feasibility of a cleanup action alternative.

(4) **Administrative options and requirements.** A feasibility study may be conducted under any of the administrative options for remedial action described in WAC 173-340-510. Reporting and public participation requirements depend on the administrative option used to conduct remedial action.

(a) **Ecology-conducted or ecology-supervised remedial actions.** For an ecology-conducted or ecology-supervised feasibility study, ecology will provide or require:

(i) A feasibility study report that complies with the requirements in subsection (6)(f) of this section and WAC 173-340-840. For ecology-supervised remedial actions, ecology may require submittal of a report for its review and approval; and

(ii) Public notice of a feasibility study report in accordance with WAC 173-340-600(13).

(b) **Independent remedial actions.** Independent feasibility studies must be reported to ecology in accordance with WAC 173-340-515. Unlike for investigations conducted under WAC 173-340-350, such studies do not need to be reported separately upon completion (see WAC 173-340-515 (4)(a)). Reports must include, as appropriate, the information specified in subsection (6)(f) of this section.

(5) **Scope.** A feasibility study must adequately evaluate a reasonable number and type of cleanup action alternatives to meet the purposes in subsection (1) of this section.

(a) The scope of the study depends on many factors, including the nature and extent of contamination, the exposure pathways of concern,

the human and ecological receptors potentially impacted by the contamination, the characteristics of the site, the type of cleanup action alternatives being evaluated, and any previous evaluations of cleanup action alternatives.

(b) The study may rely on previously collected information about the site and previous evaluations of cleanup action alternatives, such as treatability or pilot studies. Such information may be summarized and incorporated by reference in the feasibility study report to avoid unnecessary duplication.

(6) **Steps.** Except as otherwise directed by ecology, a feasibility study of cleanup action alternatives must be conducted in accordance with the following steps. The study should remain flexible to avoid collecting unnecessary information or conducting unnecessary evaluations.

(a) **Step 1: Identify cleanup goals.** Identify the goals for the cleanup action, in addition to compliance with the requirements in WAC 173-340-360. Include any planned future uses of the site and any habitat restoration or resource recovery goals for the site.

(b) **Step 2: Identify alternatives.** Identify cleanup action alternatives for evaluation in the study. The alternatives must achieve the goals identified in Step 1 and comply with the requirements in WAC 173-340-360. Include:

(i) A reasonable number and type of alternatives, taking into account:

(A) The characteristics and complexity of the site, including current site conditions and physical constraints; and

(B) The threats posed by the site to human health and the environment, including likely vulnerable populations and overburdened communities;

(ii) At least one permanent cleanup action alternative;

(iii) For each environmental medium, at least one alternative with a standard point of compliance (see Part 7 of this chapter);

(iv) As appropriate, alternatives with a conditional point of compliance for one or more environmental media (see Part 7 of this chapter); and

(v) As appropriate, alternatives relying on a combination of cleanup action components for an environmental medium (such as treatment of some soil contamination and containment of the remainder). The alternatives must specify remediation levels for each component (see WAC 173-340-355).

(c) **Step 3: Screen alternatives and components.** Based on a preliminary analysis, eliminate from further evaluation the following cleanup action alternatives or components identified in Step 2:

(i) Alternatives that clearly do not meet the requirements for a cleanup action in WAC 173-340-360, including alternatives for which costs are clearly disproportionate to benefits under WAC 173-340-360(5);

(ii) Alternatives or components that are not technically possible at the site.

(d) **Step 4: Evaluate remaining alternatives.** Conduct a detailed evaluation of each remaining cleanup action alternative to determine whether it meets the requirements in WAC 173-340-360 and conforms to the expectations in WAC 173-340-370. If necessary, conduct additional remedial investigations under WAC 173-340-350 to complete the evaluation, including any investigations needed to complete a terrestrial ecological evaluation;

(e) **Step 5: Select preferred alternative.** Based on the detailed evaluation in Step 4, select a preferred cleanup action alternative that meets the requirements in WAC 173-340-360 and conforms, as appropriate, to the expectations in WAC 173-340-370.

(f) **Step 6: Report results.** Report the results of the feasibility study in accordance with subsection (4) of this section. Include the following information in the report:

(i) If the remedial investigation report is not combined with the feasibility study report, a summary of remedial investigation results, including:

(A) The conceptual site model used to develop and evaluate cleanup action alternatives;

(B) The proposed cleanup level for each hazardous substance within each affected environmental medium at the site, and the basis for the cleanup level; and

(C) Maps, cross-sections, and calculations illustrating the location, estimated amount, and concentration distribution of hazardous substances above the proposed cleanup levels for each affected environmental medium at the site;

(ii) Results of any additional investigations conducted after completing the remedial investigation report;

(iii) Results of any treatability or pilot studies needed to develop or evaluate cleanup action alternatives;

(iv) The cleanup goals identified in Step 1 of the feasibility study;

(v) The cleanup action alternatives identified in Step 2 of the feasibility study. For each alternative, include:

(A) The cleanup action components relied on to clean up each affected environmental medium;

(B) For alternatives relying on a combination of cleanup action components to clean up an environmental medium, the proposed remediation levels and the basis for those levels;

(C) The proposed point of compliance for each hazardous substance within each affected environmental medium at the site, and the basis for any conditional points of compliance (see Part 7 of this chapter);

(D) The location and estimated mass of each hazardous substance to be removed or treated by the alternative and the estimated time frame in which removal or treatment will occur. Ecology may require or allow estimates of the volume of contaminated material in place of, or in addition to, estimates of the mass of hazardous substances; and

(E) The location, estimated mass, and projected concentration distribution of each hazardous substance remaining above proposed cleanup levels after implementing the alternative. Ecology may require or allow estimates of the volume of contaminated material in place of, or in addition to, estimates of the mass of hazardous substances;

(vi) The cleanup action alternatives eliminated from further evaluation during the screening process in Step 3 of the feasibility study, and the basis for elimination;

(vii) Documentation of the detailed evaluation process in Step 4 of the feasibility study, including how impacts on likely vulnerable populations and overburdened communities were considered in the evaluation, and the basis for eliminating any alternative from further evaluation;

(viii) The preferred cleanup action alternative selected in Step 5 of the feasibility study, including:

(A) The basis for selecting the alternative and for any nonconformance to the expectations in WAC 173-340-370;

(B) Any local, state, or federal laws applicable to the alternative, including any known permits or approval conditions (see WAC 173-340-710);

(C) As appropriate, proposed indicator hazardous substances for the alternative (see WAC 173-340-703); and

(D) Sufficient information about the alternative to enable ecology to conduct the evaluations and make the determinations required under chapter 43.21C RCW, the State Environmental Policy Act, and chapter 197-11 WAC, the State Environmental Policy Act Rules;

(ix) Documentation of the proper management and disposal of any waste materials generated as a result of the feasibility study in accordance with applicable state and federal laws; and

(x) Any other information required by ecology.

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-355 Development of cleanup action alternatives that include remediation levels. (1) **Purpose.** A cleanup action ((~~selected for a site will~~)) often ((~~involve~~)) relies on a combination of cleanup action components((~~, such as~~)) to remediate an environmental medium. For example, to remediate soil, a cleanup action may rely on treatment of some soil contamination and containment of the remainder. ((~~Remediation levels are used to identify the concentrations (or other methods of identification) of hazardous substances at which different cleanup action components will be used. (See the definition of remediation level in WAC 173-340-200.) Remediation levels may be used at sites where a combination of cleanup actions components are used to achieve cleanup levels at the point of compliance (see the examples in subsection (3)(a) and (c) of this section). Remediation levels may also be used at sites where the cleanup action involves the containment of soils as provided under WAC 173-340-740 (6)(f) and at sites conducting interim actions (see the examples in subsection (3)(b) and (d) of this section).~~)) The purpose of a remediation level is to specify when the various components are used as part of a cleanup action.

(2) **Applicability.** Remediation levels must be established as part of a cleanup action if the cleanup action relies on a combination of cleanup action components to remediate a hazardous substance in an environmental medium.

(3) **Types.** Remediation levels may be based on a concentration (e.g., all soil above a specified concentration will be treated), or other method of identification, such as the physical appearance or location of the contamination (e.g., all of the green sludge will be removed from the northwest quadrant of the site).

(4) **Development.** Remediation levels must be developed and evaluated as part of a cleanup action alternative during the feasibility study conducted under WAC 173-340-351. Quantitative or qualitative methods may be used to develop remediation levels. The methods may include a human health or ecological risk assessment. The methods may also consider fate and transport issues. The methods may be simple or complex, as appropriate to the site. Where a quantitative risk assessment is used, see WAC 173-340-357.

(5) **Selection.** The remediation levels selected as part of a cleanup action must be specified in the cleanup action plan under WAC 173-340-380(5).

(6) **Relationship to cleanup levels and cleanup standards.** Remediation levels are not the same as cleanup levels or cleanup standards.

(a) A cleanup level defines the concentration of a hazardous substance((~~s~~)) above which a contaminated environmental medium (((~~e.g.,~~)) such as soil) must be remediated in some manner (((~~e.g.,~~)) such as treatment, containment, or institutional controls). A remediation level, on the other hand, defines the concentration (or other method of identification) of a hazardous substance in ((~~a particular~~)) an environmental medium ((~~above or below~~)) at which a particular cleanup action component (((~~e.g.,~~)) such as soil treatment ((~~or~~)) versus containment) will be used. Remediation levels, by definition, exceed cleanup levels.

(b) Cleanup levels must be established for every site. Remediation levels, on the other hand, ((~~may not be necessary at a site. Whether remediation levels are necessary depends on the cleanup action selected. For example, remediation levels would not be necessary if the selected cleanup action removes for offsite disposal all soil that exceeds the cleanup level at the applicable points of compliance~~)) must be established only if a cleanup action relies on a combination of cleanup action components to remediate an environmental medium.

((~~A~~)) (c) Cleanup ((~~action that uses remediation levels~~)) actions, including those relying on a combination of cleanup action components to remediate an environmental medium, must meet each of the ((~~minimum~~)) requirements ((~~specified~~)) in WAC 173-340-360, including ((~~the requirement that all cleanup actions must comply~~)) compliance with cleanup standards. ((~~Compliance with cleanup standards requires, in part, that cleanup levels are met at the applicable points of compliance. If the~~)) If a remedial action does not comply with cleanup standards, the remedial action is an interim action, not a cleanup action. ((~~Where a cleanup action involves containment of soils with hazardous substance concentrations exceeding cleanup levels at the point of compliance, the cleanup action may be determined to comply with cleanup standards, provided the requirements specified in WAC 173-340-740 (6)(f) are met.~~

~~(3)~~)) (7) **Examples.** The following examples of cleanup actions that use remediation levels are for illustrative purposes only. All cleanup action alternatives in a feasibility study, including those ((~~with proposed~~)) using remediation levels, must be evaluated to determine whether they meet each of the ((~~minimum~~)) requirements ((~~specified~~)) in WAC 173-340-360 ((~~(see WAC 173-340-360 (2)(h)). This evaluation requires, in part, a determination that a more permanent cleanup action is not practicable, based on the disproportionate cost analysis in WAC 173-340-360 (3)(e)~~)).

(a) **Example of a site meeting soil cleanup levels at the point of compliance.** Assume ((~~that~~)) the soil cleanup level for a hazardous substance at a site is 20 ppm. This means any soil exceeding 20 ppm at the applicable point of compliance must be remediated. Further assume ((~~that~~)) the cleanup action ((~~alternative determined to comply with the minimum requirements in WAC 173-340-360 and selected for the site~~)) consists of ((~~soil treatment and removal and a remediation level of 100 ppm to define when those two components are used. Under the cleanup standard, any soil that exceeds the 20 ppm cleanup level at the applicable point of compliance must be remediated in some manner. Under the selected cleanup action, any soil that exceeds the 100 ppm remediation level must be removed and treated. Any soil that does not exceed the 100 ppm remediation level, but exceeds the 20 ppm cleanup~~

~~level, must be removed and landfilled.~~)) treating soil above 100 ppm and removing to an offsite landfill soil between 100 and 20 ppm. In this case, 100 ppm is a remediation level that defines which soil will be treated and which soil will be removed from the site. The cleanup action may be determined to comply with the cleanup standard because the 20 ppm soil cleanup level is met at the applicable point of compliance.

(b) **Example of a site not meeting soil cleanup levels at the point of compliance.** Assume ((~~that~~)) the soil cleanup level for a hazardous substance at a site is 20 ppm. This means any soil exceeding 20 ppm at the applicable point of compliance must be remediated. Further assume ((~~that~~)) the cleanup action ((~~alternative determined to comply with the minimum requirements in WAC 173-340-360 and selected for the site~~)) consists of ((~~soil treatment and containment and a remediation level of 100 ppm to define when those two components are used. Under the cleanup standard, any soil that exceeds the 20 ppm cleanup level at the applicable point of compliance must be remediated in some manner. Under the selected cleanup action, any soil that exceeds the 100 ppm remediation level must be treated. Any soil that does not exceed the 100 ppm remediation level, but exceeds the 20 ppm cleanup level, must be contained. Residual contamination above the cleanup level will remain at the site. However, assuming~~)) treating soil above 100 ppm and containing soil between 100 and 20 ppm. The 100 ppm concentration is a remediation level that defines which soil will be treated and which soil will be contained at the site. Even though contamination above the 20 ppm cleanup level remains at the site, if the cleanup action meets the requirements specified in WAC 173-340-740 (6)(f) for soil containment actions, the cleanup action may be determined to comply with cleanup standards.

(c) **Example of site meeting groundwater cleanup levels at the point of compliance.** Assume ((~~that~~)) the groundwater cleanup level for a hazardous substance at a site is 500 ug/l and ((~~that~~)) a conditional point of compliance is established at the property boundary. This means any groundwater exceeding 500 ug/l at the point of compliance must be remediated. Further assume ((~~that~~)) the cleanup action ((~~alternative determined to comply with the minimum requirements in WAC 173-340-360 and selected for the site~~)) consists of: Removing the source of the groundwater contamination (((~~e.g., removal of~~)) such as removing a leaking tank and associated soil contamination above the water table); extracting free product and any groundwater exceeding a concentration of 2,000 ug/l; and utilizing natural attenuation to restore the groundwater to 500 ug/l before it arrives at the property boundary. The ((~~groundwater concentration of~~)) 2,000 ug/l ((~~constitutes~~)) concentration is a remediation level ((~~because it~~)) that defines ((~~the concentration of a hazardous substance at which different cleanup action components are used~~)) which groundwater will be actively treated and which groundwater will be naturally attenuated at the site. As long as the groundwater meets the 500 ug/l cleanup level at the conditional point of compliance ((~~(the property boundary)~~)), the cleanup action may be determined to comply with cleanup standards.

(d) **Example of a site not meeting groundwater cleanup levels at the point of compliance.** Assume ((~~that~~)) the groundwater cleanup level at a site is 5 ug/l and ((~~that~~)) a conditional point of compliance is established at the property boundary. This means any groundwater exceeding 5 ug/l at the point of compliance must be remediated. Further assume ((~~that~~)) the remedial action selected for the site consists of: Vapor extraction of the soil to nondetectable concentrations (to pre-

vent further groundwater contamination); extraction and treatment of groundwater with concentrations in excess of 100 ug/l; and installation of an air stripping system to treat groundwater at a water supply well beyond the property boundary to less than 5 ug/l. Further assume ((~~that~~)) the groundwater cleanup level will not be met at the conditional point of compliance (the property boundary). The ((~~groundwater~~)) concentration of 100 ug/l ((~~constitutes~~)) is a remediation level ((~~because it~~)) that defines ((~~the concentration of a hazardous substance at which different cleanup action components are used. However, in this example, the remedial action does not constitute a cleanup action because it does not comply with cleanup standards, one of the minimum requirements for cleanup actions in WAC 173-340-360. Consequently,~~)) which groundwater will be treated on site. In this example, the remedial action is ((~~considered~~)) an interim action ((~~until~~)), not a cleanup action, because it does not comply with cleanup standards (that is, it does not achieve the 5 ug/l cleanup level ((~~is attained~~)) at the conditional point of compliance ((~~(the property boundary~~))).

((~~(4) General requirements. Potential remediation levels may be developed as part of the cleanup action alternatives to be considered during the feasibility study (see WAC 173-340-350 (8)(c)(i)(D)). These potential remediation levels may be defined as either a concentration or other method of identification of a hazardous substance. Other methods of identification include physical appearance or location (e.g., all of the green sludge will be removed from the northern area of the site). Quantitative or qualitative methods may be used to develop these potential remediation levels. These methods may include a human health risk assessment or an ecological risk assessment. These methods may also consider fate and transport issues. These methods may be simple or complex, as appropriate to the site. Where a quantitative risk assessment is used, see WAC 173-340-357. All cleanup action alternatives in a feasibility study, including those with proposed remediation levels, must still be evaluated to determine whether they meet each of the minimum requirements specified in WAC 173-340-360 (see WAC 173-340-360 (2)(h)).~~))

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-357 Quantitative risk assessment of cleanup action alternatives. (1) **Purpose.** A cleanup action must protect human health and the environment, including likely vulnerable populations and overburdened communities (see WAC 173-340-360 (3)(a)(i)). A quantitative site-specific risk assessment may be conducted to help determine whether cleanup action alternatives, including those ((~~using a remediation level,~~)) relying on engineered ((~~control and/or~~)) or institutional ((~~control, are protective of~~)) controls to limit exposure to contamination remaining at a site, protect human health and the environment. ((~~If a quantitative site-specific risk assessment is used, then other considerations may also be needed in evaluating the protectiveness of the overall cleanup action. Methods other than a quantitative site-specific risk assessment~~)) Other methods may ((~~also~~)) be used in addition to, or instead of, a quantitative site-specific risk assessment to determine ((~~if~~)) whether a cleanup action alternative is protective ((~~of human health and the environment.~~

~~(2) Relationship to selection of cleanup actions. Selecting a cleanup action requires a determination that each of the requirements specified in WAC 173-340-360 is met, including the requirement that the cleanup action is protective of human health and the environment. A quantitative risk assessment conducted under this section may be used to help determine whether a particular cleanup action alternative meets this requirement. A determination that a cleanup action alternative evaluated is protective of human health and the environment does not mean that the other minimum requirements specified in WAC 173-340-360 have been met~~)).

((~~(3) Protection of~~)) (2) **Human health risk assessment.** A quantitative site-specific human health risk assessment may be conducted to help determine whether cleanup action alternatives, including those ((~~using a remediation level,~~)) relying on engineered ((~~control and/or~~)) or institutional ((~~control, are protective of~~)) controls to limit exposure, protect human health. ((~~For the purpose of this assessment, the default assumptions in the standard Method B and C equations in WAC 173-340-720 through 173-340-750 may be modified as provided for under modified Method B and C. In addition to those modifications, adjustments to the reasonable maximum exposure scenario or default exposure assumptions may also be made. See WAC 173-340-708 (3)(d) and (10)(b).~~)) This subsection defines the framework for assessing cleanup action alternatives relying on engineered or institutional controls to limit exposure. References to Method C in this subsection apply to ((~~a~~)) an environmental medium only if the ((~~particular~~)) medium ((~~the~~)) for which a remediation level is being established ((~~for~~)) qualifies for a Method C cleanup level under WAC 173-340-706.

(a) **Reasonable maximum exposure.** Standard reasonable maximum exposures and corresponding Method B and C equations in WAC 173-340-720 through 173-340-750 may be modified as provided under WAC 173-340-708 (3)(d). For example, land uses other than residential and industrial may be used as the basis for an alternative reasonable maximum exposure scenario for the purpose of assessing the protectiveness of a cleanup action alternative that ((~~uses a remediation level,~~)) relies on engineered ((~~control, and/or~~)) or institutional controls (such as containment) to limit exposure to contaminated soil.

(b) **Exposure parameters.** Exposure parameters for the standard Method B and C equations in WAC 173-340-720 through 173-340-750 may be modified as provided in WAC 173-340-708(10).

(c) **Acceptable risk level.** The acceptable risk level ((~~for~~)) used to establish a remediation ((~~levels shall~~)) level for a hazardous substance must be the same as that used ((~~for~~)) to establish the cleanup level for the substance.

(d) **Soil to groundwater pathway.** The methods specified in WAC 173-340-747 to develop soil concentrations that are protective of groundwater beneficial uses may also be used ((~~during remedy selection~~)) to help assess ((~~the protectiveness to human health of~~)) whether a cleanup action alternative that ((~~uses a remediation level,~~)) relies on engineered ((~~control, and/or~~)) or institutional controls (such as containment) will protect groundwater.

(e) **Burden of proof, new science, and quality of information.** Any modification of the default assumptions in the standard Method B and C equations, including modification of the standard reasonable maximum exposures and exposure parameters, or any modification of default assumptions or methods specified in WAC 173-340-747 requires compliance with WAC 173-340-702 (14), (15) and (16).

(f) **Commercial gas station scenario.** At active commercial gas stations, where there are retail sales of gasoline or diesel, one of the following may be done to demonstrate when a cap is protective of the soil ingestion and dermal pathways:

(i) ((~~At active commercial gas stations, where there are retail sales of gasoline and/or diesel,~~)) Equations 740-3 and 740-5 may be ((~~used with~~)) modified by reducing the exposure frequency ((~~reduced~~)) to 0.25 ((~~to demonstrate when a cap is protective of the soil ingestion and dermal pathways~~)). This ((~~scenario~~)) exposure frequency is intended to be a conservative estimate of a child trespasser scenario at a commercial gas station where contaminated soil has been excavated and stockpiled or soil is otherwise accessible. ((~~Sites using remediation levels~~)) To rely on this exposure frequency:

(A) The cleanup action must ((~~also use~~)) include institutional controls ((~~to~~)) that prevent uses that could result in a higher level of exposure; and ((~~assess the protectiveness for~~))

(B) Other exposure pathways (e.g., soil vapors and soil to groundwater)((~~.~~)) must be assessed to determine whether they are protective; or

(ii) Equations 740-3 and 740-5 may ((~~also~~)) be modified on a site-specific basis as described in WAC 173-340-740 (3)(c).

((~~(4) Protection of the environment.~~)) (3) **Ecological risk assessment.** A quantitative site-specific ecological risk assessment may be ((~~conducted~~)) used to help determine whether cleanup action alternatives, including those ((~~using a remediation level,~~)) relying on engineered ((~~control and/or~~)) or institutional controls to limit exposure, ((~~are protective of~~)) protect the environment.

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-360 ((~~Selection of~~)) Cleanup action((~~s~~)) requirements. (1) **Purpose.**

This section ((~~describes the minimum requirements and procedures for selecting cleanup actions. This section is intended to be used in conjunction with the administrative principles for the overall cleanup process in WAC 173-340-130; the requirements and procedures in WAC 173-340-350 through 173-340-357 and WAC 173-340-370 through 173-340-390; and the cleanup standards defined in WAC 173-340-700 through 173-340-760.~~

~~(2) Minimum requirements for cleanup actions. All~~)) specifies requirements for cleanup actions and the procedures for determining whether a cleanup action alternative meets those requirements.

(2) **Applicability.** A cleanup action at a contaminated site must comply with the requirements in this section, regardless of which administrative option in WAC 173-340-510 is used to conduct remedial action at the site.

(a) **Sediment sites and sediment cleanup units.** For sites where there is a release or threatened release to sediment, a cleanup action must also comply with the applicable requirements in WAC 173-204-570.

(b) **National priorities list sites.** For sites on the national priorities list, a cleanup action must also comply with applicable requirements under the federal cleanup law.

(3) **Requirements.** A cleanup ((~~actions shall~~)) action must meet all of the ((~~following~~)) requirements in this subsection. ((~~Because~~))

When a cleanup ((~~actions will often involve the use of several~~)) action includes more than one cleanup action ((~~components at a single site~~)) component, the overall cleanup action ((~~shall~~)) must meet the requirements ((~~of this section. The department~~)) in this subsection. Ecology recognizes that some of the requirements contain flexibility and ((~~will~~)) require the use of professional judgment in determining how to apply them at a particular ((~~sites~~)) site.

((~~(a) Threshold requirements. The cleanup action shall:~~

~~(i) Protect human health and the environment;~~

~~(ii) Comply with cleanup standards (see WAC 173-340-700 through 173-340-760);~~

~~(iii) Comply with applicable state and federal laws (see WAC 173-340-710); and~~

~~(iv) Provide for compliance monitoring (see WAC 173-340-410 and 173-340-720 through 173-340-760).~~

~~(b) Other requirements. When selecting from cleanup action alternatives that fulfill the threshold requirements, the selected action shall:~~

~~(i) Use permanent solutions to the maximum extent practicable (see subsection (3) of this section);~~

~~(ii) Provide for a reasonable restoration time frame (see subsection (4) of this section); and~~

~~(iii) Consider public concerns (see WAC 173-340-600).~~

~~(c) Groundwater cleanup actions.~~

~~(i) Permanent groundwater cleanup actions. A permanent cleanup action shall be used to achieve the cleanup levels for groundwater in WAC 173-340-720 at the standard point(s) of compliance (see WAC 173-340-720(8)) where a permanent cleanup action is practicable or determined by the department to be in the public interest.~~

~~(ii) Nonpermanent groundwater cleanup actions. Where a permanent cleanup action is not required under (c)(i) of this subsection, the following measures shall be taken:~~

~~(A) Treatment or removal of the source of the release shall be conducted for liquid wastes, areas contaminated with high concentrations of hazardous substances, highly mobile hazardous substances, or hazardous substances that cannot be reliably contained. This includes removal free product consisting of petroleum and other light nonaqueous phase liquid (LNAPL) from the groundwater using normally accepted engineering practices. Source containment may be appropriate when the free product consists of a dense nonaqueous phase liquid (DNAPL) that cannot be recovered after reasonable efforts have been made.~~

~~(B) Groundwater containment, including barriers or hydraulic control through groundwater pumping, or both, shall be implemented to the maximum extent practicable to avoid lateral and vertical expansion of the groundwater volume affected by the hazardous substance.~~

~~(d) Cleanup actions for soils at current or potential future residential areas and for soils at schools and child care centers. For current or potential future residential areas and for schools and child care centers, soils with hazardous substance concentrations that exceed soil cleanup levels must be treated, removed, or contained. Property qualifies as a current or potential residential area if:~~

~~(i) The property is currently used for residential use; or~~

~~(ii) The property has a potential to serve as a future residential area based on the consideration of zoning, statutory and regulatory restrictions, comprehensive plans, historical use, adjacent land uses, and other relevant factors.~~

~~(e) Institutional controls.~~

~~(i) Cleanup actions shall use institutional controls and financial assurances when required under WAC 173-340-440.~~

~~(ii) Cleanup actions that use institutional controls shall meet each of the minimum requirements specified in this section, just as any other cleanup action. Institutional controls should demonstrably reduce risks to ensure a protective remedy. This demonstration should be based on a quantitative scientific analysis where appropriate.~~

~~(iii) In addition to meeting each of the minimum requirements specified in this section, cleanup actions shall not rely primarily on institutional controls and monitoring where it is technically possible to implement a more permanent cleanup action for all or a portion of the site.~~

~~(f) Releases and migration. Cleanup actions shall prevent or minimize present and future releases and migration of hazardous substances in the environment.~~

~~(g) Dilution and dispersion. Cleanup actions shall not rely primarily on dilution and dispersion unless the incremental costs of any active remedial measures over the costs of dilution and dispersion grossly exceed the incremental degree of benefits of active remedial measures over the benefits of dilution and dispersion.~~

~~(h) Remediation levels. Cleanup actions that use remediation levels shall meet each of the minimum requirements specified in this section, just as any other cleanup action.~~

~~(i) Selection of a cleanup action alternative that uses remediation levels requires, in part, a determination that a more permanent cleanup action is not practicable, based on the disproportionate cost analysis (see subsections (2)(b)(i) and (3) of this section).~~

~~(ii) Selection of a cleanup action alternative that uses remediation levels also requires a determination that the alternative meets each of the other minimum requirements specified in this section, including a determination that the alternative is protective of human health and the environment.~~

~~(3) Determining whether a cleanup action uses permanent solutions to the maximum extent practicable.~~

~~(a) Purpose. This subsection describes the requirements and procedures for determining whether a cleanup action uses permanent solutions to the maximum extent practicable, as required under subsection (2)(b)(i) of this section. A determination that a cleanup action meets this one requirement does not mean that the other minimum requirements specified in subsection (2) of this section have been met. To select a cleanup action for a site, a cleanup action must meet each of the minimum requirements specified in subsection (2) of this section.~~

~~(b) General requirements. When selecting a cleanup action, preference shall be given to permanent solutions to the maximum extent practicable. To determine whether a cleanup action uses permanent solutions to the maximum extent practicable, the disproportionate cost analysis specified in (c) of this subsection shall be used. The analysis shall compare the costs and benefits of the cleanup action alternatives evaluated in the feasibility study. The costs and benefits to be compared are the evaluation criteria identified in (f) of this subsection.~~

~~(c) Permanent cleanup action defined. A permanent cleanup action or permanent solution is defined in WAC 173-340-200.~~

~~(d) Selection of a permanent cleanup action. A disproportionate cost analysis shall not be required if the department and the potentially liable persons agree to a permanent cleanup action that will be~~

~~identified by the department as the proposed cleanup action in the draft cleanup action plan.~~

~~(e) Disproportionate cost analysis.~~

~~(i) Test. Costs are disproportionate to benefits if the incremental costs of the alternative over that of a lower cost alternative exceed the incremental degree of benefits achieved by the alternative over that of the other lower cost alternative.~~

~~(ii) Procedure.~~

~~(A) The alternatives evaluated in the feasibility study shall be ranked from most to least permanent, based on the evaluation of the alternatives under (f) of this subsection and the definition of permanent solution in (c) of this subsection.~~

~~(B) The most practicable permanent solution evaluated in the feasibility study shall be the baseline cleanup action alternative against which cleanup action alternatives are compared. If no permanent solution has been evaluated in the feasibility study, the cleanup action alternative evaluated in the feasibility study that provides the greatest degree of permanence shall be the baseline cleanup action alternative.~~

~~(C) The comparison of benefits and costs may be quantitative, but will often be qualitative and require the use of best professional judgment. In particular, the department has the discretion to favor or disfavor qualitative benefits and use that information in selecting a cleanup action. Where two or more alternatives are equal in benefits, the department shall select the less costly alternative provided the requirements of subsection (2) of this section are met.~~

~~(f) Evaluation criteria. The following criteria shall be used to evaluate and compare each cleanup action alternative when conducting a disproportionate cost analysis under (e) of this subsection to determine whether a cleanup action is permanent to the maximum extent practicable.~~

~~(i) Protectiveness. Overall protectiveness of human health and the environment, including the degree to which existing risks are reduced, time required to reduce risk at the facility and attain cleanup standards, on-site and offsite risks resulting from implementing the alternative, and improvement of the overall environmental quality.~~

~~(ii) Permanence. The degree to which the alternative permanently reduces the toxicity, mobility or volume of hazardous substances, including the adequacy of the alternative in destroying the hazardous substances, the reduction or elimination of hazardous substance releases and sources of releases, the degree of irreversibility of waste treatment process, and the characteristics and quantity of treatment residuals generated.~~

~~(iii) Cost. The cost to implement the alternative, including the cost of construction, the net present value of any long-term costs, and agency oversight costs that are cost recoverable. Long-term costs include operation and maintenance costs, monitoring costs, equipment replacement costs, and the cost of maintaining institutional controls. Cost estimates for treatment technologies shall describe pretreatment, analytical, labor, and waste management costs. The design life of the cleanup action shall be estimated and the cost of replacement or repair of major elements shall be included in the cost estimate.~~

~~(iv) Effectiveness over the long term. Long-term effectiveness includes the degree of certainty that the alternative will be successful, the reliability of the alternative during the period of time hazardous substances are expected to remain on-site at concentrations that exceed cleanup levels, the magnitude of residual risk with the~~

~~alternative in place, and the effectiveness of controls required to manage treatment residues or remaining wastes. The following types of cleanup action components may be used as a guide, in descending order, when assessing the relative degree of long-term effectiveness: Reuse or recycling; destruction or detoxification; immobilization or solidification; on-site or offsite disposal in an engineered, lined and monitored facility; on-site isolation or containment with attendant engineering controls; and institutional controls and monitoring.~~

~~(v) Management of short-term risks. The risk to human health and the environment associated with the alternative during construction and implementation, and the effectiveness of measures that will be taken to manage such risks.~~

~~(vi) Technical and administrative implementability. Ability to be implemented including consideration of whether the alternative is technically possible, availability of necessary offsite facilities, services and materials, administrative and regulatory requirements, scheduling, size, complexity, monitoring requirements, access for construction operations and monitoring, and integration with existing facility operations and other current or potential remedial actions.~~

~~(vii) Consideration of public concerns. Whether the community has concerns regarding the alternative and, if so, the extent to which the alternative addresses those concerns. This process includes concerns from individuals, community groups, local governments, tribes, federal and state agencies, or any other organization that may have an interest in or knowledge of the site.~~))

(a) **General requirements.** A cleanup action must:

(i) Protect human health and the environment, including likely vulnerable populations and overburdened communities;

(ii) Comply with cleanup standards (see Part 7 of this chapter);

(iii) Comply with applicable state and federal laws (see WAC 173-340-710);

(iv) Prevent or minimize present and future releases and migration of hazardous substances in the environment;

(v) Provide resilience to climate change impacts that have a high likelihood of occurring and severely compromising its long-term effectiveness;

(vi) Provide for compliance monitoring (see WAC 173-340-410 and Part 7 of this chapter);

(vii) Not rely primarily on institutional controls and monitoring at a site, or portion thereof, if it is technically possible to implement a more permanent cleanup action;

(viii) Not rely primarily on dilution and dispersion unless the incremental costs of any active remedial measures over the costs of dilution and dispersion grossly exceed the incremental degree of benefits of active remedial measures over the benefits of dilution and dispersion. Determine the benefits and costs using the criteria in subsection (5)(d) of this section;

(ix) Provide for a reasonable restoration time frame (see subsection (4) of this section); and

(x) Use permanent solutions to the maximum extent practicable (see subsection (5) of this section).

(b) **Action-specific requirements.** As applicable, a cleanup action must:

(i) Use remediation levels in accordance with WAC 173-340-355;

(ii) Use institutional controls in accordance with WAC 173-340-440;

(iii) Provide financial assurances in accordance with WAC 173-340-440(11); and

(iv) Provide for periodic reviews in accordance with WAC 173-340-420(2).

(c) **Media-specific requirements.**

(i) A soil cleanup action must treat, remove, or contain contaminated soils located on properties:

(A) Where a school or child care center is located;

(B) That qualify as a residential area based on current use; or

(C) That qualify as a potential future residential area based on zoning, statutory and regulatory restrictions, comprehensive plans, historical use, adjacent land uses, and other relevant factors.

(ii) A groundwater cleanup action must be permanent (achieve groundwater cleanup levels at the standard point of compliance without further remedial action being required) if:

(A) Such an action is practicable; or

(B) Ecology determines such an action is in the public interest.

(iii) A nonpermanent groundwater cleanup action must:

(A) Treat or remove the source of groundwater contamination at sites where there are liquid wastes, areas contaminated with high concentrations of hazardous substances, highly mobile hazardous substances, or hazardous substances that cannot be reliably contained. This includes removal of free product consisting of petroleum and other light nonaqueous phase liquid (LNAPL) from the groundwater using normally accepted engineering practices. Source containment may be appropriate when the free product consists of a dense nonaqueous phase liquid (DNAPL) that cannot be recovered after reasonable efforts have been made; and

(B) Contain contaminated groundwater to the maximum extent practicable to prevent lateral and vertical expansion of the groundwater volume affected by the hazardous substances and to prevent the migration of the hazardous substances. This includes barriers or hydraulic control through groundwater pumping, or both.

(d) **Public concerns and tribal rights and interests.** For ecology-conducted or ecology-supervised remedial actions, ecology will consider the following when selecting a cleanup action:

(i) Public concerns, including the concerns of likely vulnerable populations and overburdened communities, identified under WAC 173-340-600 (13) and (14); and

(ii) Indian tribes' rights and interests identified under WAC 173-340-620.

(4) **Determining whether a cleanup action provides for a reasonable restoration time frame.**

(a) **Purpose.** The restoration time frame is the period of time needed for a cleanup action to achieve cleanup levels at the point of compliance (see WAC 173-340-200). This subsection ((~~describes~~)) specifies the requirements and procedures for determining whether a cleanup action alternative provides for a reasonable restoration time frame, as required under subsection ((~~(2)(b)(ii)~~)) (3)(a)(ix) of this section. ((~~A determination that a cleanup action meets this one requirement does not mean that the other minimum requirements specified in subsection (2) of this section have been met. To select a cleanup action for a site, a cleanup action must meet each of the minimum requirements specified in subsection (2) of this section.~~))

(b) ((~~Factors.~~)) **Applicability.**

(i) **Whether evaluation required.** An evaluation of whether a cleanup action alternative provides a reasonable restoration time

frame must be conducted unless a model remedy is selected as the cleanup action. The evaluation must be conducted regardless of which administrative option in WAC 173-340-510 is used to conduct remedial action at the site.

(ii) **Evaluation requirements.**

(A) For restoration of environmental media other than sediment, the evaluation must be conducted in accordance with this subsection;

(B) For restoration of sediment, the evaluation must be conducted in accordance with WAC 173-204-570(5).

(c) **Evaluation.** To determine whether a cleanup action alternative provides for a reasonable restoration time frame, the following factors ((~~to~~)) must be considered ((~~include the following~~)) at a minimum:

(i) Potential risks posed by the site to human health and the environment, including likely vulnerable populations and overburdened communities;

(ii) Practicability of achieving a shorter restoration time frame. A restoration time frame is not reasonable if an active remedial measure with a shorter restoration time frame is practicable;

(iii) Long-term effectiveness of the alternative. A longer restoration time frame may be reasonable if the alternative has a greater degree of long-term effectiveness than one that primarily relies on on-site or offsite disposal, isolation, or containment;

(iv) Current use of the site, surrounding areas, and associated resources that are, or may be, affected by releases from the site;

((~~(iv)~~)) (v) Potential future use of the site, surrounding areas, and associated resources that are, or may be, affected by releases from the site;

((~~(v)~~)) (vi) Availability of alternative water supplies;

((~~(vi)~~)) (vii) Likely effectiveness and reliability of institutional controls;

((~~(vii)~~)) (viii) Ability to control and monitor migration of hazardous substances from the site;

((~~(viii)~~)) (ix) Toxicity of the hazardous substances at the site;

((~~and~~

~~(ix)~~)) (x) Natural processes that reduce concentrations of hazardous substances and have been documented to occur at the site or under similar site conditions((~~.~~

~~(c) A longer period of time may be used for the restoration time frame for a site to achieve cleanup levels at the point of compliance if the cleanup action selected has a greater degree of long-term effectiveness than on-site or offsite disposal, isolation, or containment options~~)); and

(xi) For ecology-conducted or ecology-supervised remedial actions, public concerns identified under WAC 173-340-600 (13) and (14) and Indian tribes' rights and interests identified under WAC 173-340-620.

(d) ((~~When~~)) **Cleanup levels below area background concentrations.** At sites where area background concentrations ((~~(see~~)), as defined in WAC 173-340-200 ((~~for definition)~~)), would result in recontamination of the site to levels that exceed cleanup levels((~~, that portion of the cleanup action which addresses cleanup~~)):

(i) The remedial action must achieve area background concentrations within a reasonable restoration time frame, as determined under (c) of this subsection;

(ii) Cleaning up the site below area background concentrations may be delayed until the offsite sources of hazardous substances are controlled((~~. In these cases~~)); and

(iii) The remedial action ((~~shall be considered~~)) is an interim action until cleanup levels are attained.

(e) **Cleanup levels below technically possible concentrations.** At sites where cleanup levels determined under Method C in WAC 173-340-706 are below concentrations that are technically possible ((~~concentrations,~~)) to achieve:

(i) The remedial action must achieve concentrations that are technically possible to achieve ((~~shall be met~~)) within a reasonable restoration time frame ((~~considering the factors in subsection (b) of this section. In these cases~~)), as determined under (c) of this subsection; and

(ii) The remedial action ((~~shall be considered~~)) is an interim action until cleanup levels are attained.

((~~(f) Extending the restoration time frame shall not be used as a substitute for active remedial measures, when such actions are practicable.~~))

(5) **Determining whether a cleanup action uses permanent solutions to the maximum extent practicable.**

(a) **Purpose.** This subsection specifies the requirements and procedures for determining whether a cleanup action uses permanent solutions to the maximum extent practicable, as required under RCW 70A.305.030(1) and subsection (3)(a)(x) of this section. A permanent cleanup action or permanent solution is defined in WAC 173-340-200.

(b) **Applicability.** The evaluation required under this subsection must be conducted unless a permanent cleanup action alternative or a model remedy is selected as the cleanup action. The evaluation must be conducted regardless of which administrative option in WAC 173-340-510 is used to conduct the cleanup action.

(c) **Procedure.** To determine which cleanup action alternative included in the feasibility study uses permanent solutions to the maximum extent practicable, do the following:

(i) **Step 1:** Determine the benefits and costs of each cleanup action alternative using the criteria in (d) of this subsection.

(A) The estimation and comparison of benefits and costs may be quantitative, but will often be qualitative and require the use of best professional judgment.

(B) On a site-specific basis, ecology may weight the criteria in (d) of this subsection and favor or disfavor qualitative benefit and cost estimates in the analysis.

(C) For ecology-conducted or ecology-supervised remedial actions, when determining or weighting the benefits in (d) of this subsection, ecology will also consider:

(I) Public concerns identified under WAC 173-340-600 (13) and (14); and

(II) Indian tribes' rights and interests identified under WAC 173-340-620.

(ii) **Step 2:** Rank the cleanup action alternatives by degree of permanence. To determine the relative permanence of an alternative, consider the definition of a permanent cleanup action in WAC 173-340-200 and the criteria in (d)(ii) of this subsection.

(iii) **Step 3:** Identify the initial baseline alternative for use in the disproportionate cost analysis in Step 4.

(A) If the feasibility study includes only one permanent cleanup action alternative, use that alternative as the initial baseline.

(B) If the feasibility study includes more than one permanent cleanup action alternative, determine which permanent cleanup action alternative is the most cost-effective (that is, the alternative with

the lowest cost per degree of benefit) and use it as the initial baseline. Eliminate from further evaluation the less cost-effective permanent cleanup action alternatives.

(C) If all permanent cleanup action alternatives are eliminated from evaluation in the feasibility study during the screening process in WAC 173-340-351 (6)(c), use the most permanent cleanup action alternative identified in Step 2 as the initial baseline.

(iv) **Step 4:** Conduct a disproportionate cost analysis of the ranked list of cleanup action alternatives identified in Step 2. Use the cleanup action alternative identified in Step 3 as the initial baseline for the analysis.

(A) **Analysis.** To conduct the analysis, do the following:

(I) First, compare the costs and benefits of the baseline alternative with the costs and benefits of only the next most permanent alternative (not any of the other alternatives); and

(II) Second, determine whether the incremental costs of the baseline alternative over the next most permanent alternative are disproportionate to the incremental degree of benefits of the baseline alternative over the next most permanent alternative.

(B) **Decision.** Based on the results of the analysis, do the following:

(I) If the incremental costs are not disproportionate to the incremental degree of benefits, then the baseline alternative uses permanent solutions to the maximum extent practicable and the analysis under this subsection is complete.

(II) If the benefits of the two alternatives are the same or similar, then the lower cost alternative uses permanent solutions to the maximum extent practicable and the analysis under this subsection is complete.

(III) If the incremental costs are disproportionate to the incremental degree of benefits, then eliminate the baseline alternative from further analysis and make the next most permanent alternative the baseline for further analysis. Repeat Step 4. However, if the new baseline is the least permanent alternative on the ranked list of alternatives identified in Step 2, that alternative uses permanent solutions to the maximum extent practicable and the analysis under this subsection is complete.

(d) **Criteria.** When conducting a disproportionate cost analysis under this subsection, use the following criteria to evaluate and compare the costs and benefits of each cleanup action alternative:

(i) **Protectiveness.** The degree to which the alternative protects human health and the environment, including likely vulnerable populations and overburdened communities. When assessing protectiveness, consider at least the following:

(A) The degree to which the alternative reduces existing risks;

(B) The time required for the alternative to reduce risks at the site and attain cleanup standards;

(C) The on-site and offsite risks remaining after implementing the alternative; and

(D) Improvement of the overall environmental quality;

(ii) **Permanence.** The degree to which the alternative permanently reduces the toxicity, mobility, or mass of hazardous substances, including:

(A) The adequacy of the alternative in destroying the hazardous substances;

(B) The reduction or elimination of hazardous substance releases and sources of releases;

(C) The degree of irreversibility of waste treatment process; and

(D) The characteristics and quantity of treatment residuals generated;

(iii) **Effectiveness over the long term.** The degree to which the alternative is likely to be effective over the long term, including for likely vulnerable populations and overburdened communities.

(A) **Factors.** When assessing the long-term effectiveness of the alternative, consider at least the following:

(I) The degree of certainty that the alternative will be successful;

(II) The reliability of the alternative during the period of time hazardous substances are expected to remain on-site at concentrations that exceed cleanup levels;

(III) The resilience of the alternative to climate change impacts;

(IV) The magnitude of residual risk with the alternative in place; and

(V) The effectiveness of controls required to manage treatment residues or remaining wastes.

(B) **Hierarchy.** Except as provided for sediment sites and cleanup units in WAC 173-204-570(4), when assessing the relative degree of long-term effectiveness of cleanup action components, the following types of components may be used as a guide, in descending order:

(I) Reuse or recycling;

(II) Destruction or detoxification;

(III) Immobilization or solidification;

(IV) On-site or offsite disposal in an engineered, lined and monitored facility;

(V) On-site isolation or containment with attendant engineering controls; and

(VI) Institutional controls and monitoring;

(iv) **Management of implementation risks.** The risks to human health and the environment, including likely vulnerable populations and overburdened communities, associated with the alternative during construction and implementation, and the effectiveness of the alternative to manage such risks;

(v) **Technical and administrative implementability.** The ability to implement the alternative, including consideration of:

(A) The technical difficulty of designing, constructing, and otherwise implementing the alternative in a reliable and effective manner, regardless of cost;

(B) The availability of necessary offsite facilities, services, and materials;

(C) Administrative and regulatory requirements;

(D) Scheduling, size, and complexity;

(E) Monitoring requirements;

(F) Access for construction operations and monitoring; and

(G) Integration with existing facility operations and other current or potential remedial actions; and

(vi) **Costs.** The costs of remedial actions necessary to implement the alternative, including:

(A) **Construction costs**, such as preconstruction engineering design and permitting, physical construction (including labor, equipment, materials, and contingencies), waste management and disposal, compliance monitoring during construction (including sampling and analysis), construction management, establishment of institutional

controls, regulatory oversight, and quality assurance and quality control; and

(B) **Postconstruction costs,** such as operation and maintenance activities necessary to maintain the effectiveness of a constructed cleanup action component, waste management and disposal, replacement or repair of equipment (including labor, equipment, and materials), permit renewal, compliance monitoring (including sampling and analysis), maintaining institutional controls, financial assurances, periodic reviews, postconstruction management, and regulatory oversight.

(I) **Design life.** Estimate the design life of cleanup action components, including engineered controls. If the period of time in which a component is needed exceeds the design life of the component, include the cost of replacing or repairing the component in the cost estimate.

(II) **Future costs.** Discount postconstruction costs using present worth analysis doing the following:

• Estimate future costs using constant-year dollars; and

• Discount future costs using the current U.S. Treasury real interest rate for bonds of comparable maturity to the period of analysis. If project costs exceed 30 years, use the current U.S. Treasury 30-year real interest rate.

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-370 Cleanup action expectations ((~~for cleanup action alternatives~~)). ((~~The department has the following expectations for the development of cleanup action alternatives under WAC 173-340-350 and the selection of cleanup actions under WAC 173-340-360. These expectations represent the types of cleanup actions the department considers likely results of the remedy selection process described in WAC 173-340-350 through 173-340-360; however, the department recognizes that there may be some sites where cleanup actions conforming to these expectations are not appropriate. Also, selecting a cleanup action that meets these expectations shall not be used as a substitute for selecting a cleanup action under the remedy selection process described in WAC 173-340-350 through 173-340-360.~~)) Ecology has the following expectations for cleanup actions. The expectations represent the likely results of the cleanup action selection process described in WAC 173-340-350 through 173-340-390. Ecology recognizes that conformance with the expectations may not be appropriate at some sites. Selecting a cleanup action conforming to the expectations is not a substitute for conducting a feasibility study. The expectations must be considered when evaluating cleanup action alternatives in the feasibility study. Any nonconformance of the preferred cleanup action alternative to the expectations must be documented and explained in the feasibility study report.

(1) ((~~The department~~)) Ecology expects that treatment technologies will be emphasized at sites containing liquid wastes, areas contaminated with high concentrations of hazardous substances, highly mobile materials, and/or discrete areas of hazardous substances that lend themselves to treatment.

(2) To minimize the need for long-term management of contaminated materials, ((~~the department~~)) ecology expects that all hazardous substances will be destroyed, detoxified, and/or removed to concentra-

tions below cleanup levels throughout sites containing small volumes of hazardous substances.

(3) ((~~The department~~)) Ecology recognizes the need to use engineering controls, such as containment, for sites or portions of sites that contain large volumes of materials with relatively low levels of hazardous substances where treatment is impracticable.

(4) ((~~In order to~~)) To minimize the potential for migration of hazardous substances, ((~~the department~~)) ecology expects that active measures will be taken to prevent precipitation and subsequent runoff from coming into contact with contaminated soils and waste materials. When such measures are impracticable, such as during active cleanup, ((~~the department~~)) ecology expects that site runoff will be contained and treated prior to release from the site.

(5) ((~~The department~~)) Ecology expects that when hazardous substances remain on-site at concentrations ((~~which exceed~~)) exceeding cleanup levels, those hazardous substances will be consolidated to the maximum extent practicable where needed to minimize the potential for direct contact and migration of hazardous substances((~~,~~)).

(6) ((~~The department~~)) Ecology expects that((~~, for facilities adjacent to a surface water body,~~)) active measures will be taken to prevent/minimize releases to surface water or sediment via surface runoff and groundwater discharges in excess of cleanup levels. ((~~The department~~)) Ecology expects that dilution will not be the sole method for demonstrating compliance with cleanup standards in these instances.

(7) ((~~The department~~)) Ecology expects that natural attenuation of hazardous substances may be appropriate at sites where:

(a) Source control (including removal and/or treatment of hazardous substances) has been conducted to the maximum extent practicable;

(b) Leaving contaminants on-site during the restoration time frame does not pose an unacceptable threat to human health or the environment;

(c) There is evidence that natural biodegradation or chemical degradation is occurring and will continue to occur at a reasonable rate at the site; and

(d) Appropriate monitoring requirements are conducted to ensure that the natural attenuation process is taking place and that human health and the environment are protected.

(8) ((~~The department~~)) Ecology expects that cleanup actions conducted under this chapter will not result in a significantly greater overall threat to human health and the environment from hazardous substances, either at the site being cleaned up or at another site involved with the cleanup action, than other cleanup action alternatives.

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-380 Cleanup action plan. (1) ((**~~Draft~~**)) **Purpose.** The purpose of a cleanup action plan is to document the selected cleanup action and to specify the cleanup standards and other requirements the cleanup action must meet.

(2) **Applicability.**

(a) Whether required. A cleanup action must be selected and a cleanup action plan must be developed regardless of which administra-

tive option in WAC 173-340-510 is used to conduct remedial action at the site.

(b) **Requirements.** A cleanup action plan must comply with the requirements in this section. For sites where there is a release or threatened release to sediment, a cleanup action plan must also comply with the applicable requirements in WAC 173-204-575.

(3) **Timing.** Except as otherwise directed by ecology, a remedial investigation/feasibility study must be completed before cleanup standards are established and a cleanup action is selected. An emergency remedial action or an interim action may be conducted before a cleanup action is selected.

(4) **Administrative options and requirements.** A cleanup action may be selected and a cleanup action plan may be developed under any of the administrative options for remedial action described in WAC 173-340-510. Reporting and public participation requirements depend on the administrative option used to conduct remedial action.

(a) **Ecology-conducted or ecology-supervised remedial actions.** For an ecology-conducted or ecology-supervised cleanup action, ecology will:

(i) Select the cleanup action and establish the cleanup standards and other requirements that the cleanup action must meet;

(ii) Issue a draft cleanup action plan that includes the information required in subsection (5) of this section. For routine actions, ecology may include the draft cleanup action plan in an order or decree instead of in a separate document;

(iii) Provide or require public notice of the draft cleanup action plan in accordance with WAC 173-340-600(14);

(iv) After review and consideration of public comments, issue a final cleanup action plan. For routine actions, ecology may include the final cleanup action plan in an order or decree instead of in a separate document; and

(v) Provide notice of the final cleanup action plan in accordance with WAC 173-340-600(14).

(b) **Independent remedial actions.** Independent cleanup action plans must be reported to ecology in accordance with WAC 173-340-515. Plans must include, as appropriate, the information specified in subsection (5) of this section.

(5) **Content of cleanup action plan.** ((~~The department shall issue a draft cleanup action plan for a cleanup action to be conducted by the department or by a potentially liable person under an order or decree. The~~)) A cleanup action plan must include the following information and provide a level of detail ((~~in the draft cleanup action plan shall be~~)) commensurate with the complexity of the site and ((~~proposed~~)) cleanup action((~~.~~

~~(a) The draft cleanup action plan shall include the following:~~

~~(i)~~)):

(a) A general description of the ((~~proposed~~)) cleanup action ((~~developed~~)) selected in accordance with WAC 173-340-350 through 173-340-390((~~.~~

~~(ii)~~)), including any model remedy;

(b) A summary of the rationale for selecting the ((~~proposed alternative.~~

~~(iii)~~)) cleanup action, including any model remedy;

(c) A summary of how impacts on likely vulnerable populations and overburdened communities were considered when selecting the cleanup action and developing the plan;

(d) For ecology-conducted or ecology-supervised remedial actions, a brief summary of how ecology considered the following when selecting the cleanup action:

(i) Public concerns identified under WAC 173-340-600 (13) and (14); and

(ii) Indian tribes' rights and interests identified under WAC 173-340-620;

(e) A brief summary of the other cleanup action alternatives evaluated in the remedial investigation/feasibility study((~~.~~

~~(iv)~~));

(f) Cleanup standards and, where applicable, remediation levels, for each hazardous substance and for each environmental medium of concern at the site((~~.~~

~~(v)~~));

(g) Any changes to the default assumptions or reasonable maximum exposure scenarios used to establish cleanup standards or to demonstrate the protectiveness of the cleanup action;

(h) The schedule for ((~~implementation of~~)) implementing the cleanup action plan including, if known, the restoration time frame((~~.~~

~~(vi)~~));

(i) Any institutional controls((~~, if any,~~)) required as part of the ((~~proposed~~)) cleanup action((~~.~~

~~(vii)~~));

(j) Any applicable state and federal laws((~~, if any,~~)) for the ((~~proposed~~)) cleanup action((~~, when these are~~)) known at this step in the cleanup process ((~~(~~)). This does not preclude subsequent identification of applicable state and federal laws((~~).~~

~~(viii)~~));

(k) A preliminary determination by ((~~the department~~)) ecology that the ((~~proposed~~)) cleanup action will comply with WAC 173-340-360((~~.~~

~~(ix) Where~~)); and

(l) If the cleanup action involves on-site containment, specification of the types, ((~~levels~~)) concentrations, and ((~~amounts~~)) estimated mass of hazardous substances remaining on site and the measures that will be used to prevent migration of and ((~~contact with those~~)) exposure to the substances. Ecology may require or allow estimates of the volume of contaminated material in place of, or in addition to, estimates of the mass of hazardous substances.

((~~(b) For routine actions the department may use an order or decree to fulfill the requirements of a cleanup action plan, provided that the information in (a) of this subsection is included in an order or decree. The scope of detail for the required information shall be commensurate with the complexity of the site and proposed cleanup action.~~

~~(2) **Public participation.** The department will provide public notice and opportunity for comment on the draft cleanup plan, as required in WAC 173-340-600(13).~~

~~(3) **Final cleanup action plan.** After review and consideration of the comments received during the public comment period, the department shall issue a final cleanup action plan and publish its availability in the *Site Register* and by other appropriate methods. If the department determines, following the implementation of the preferred alternative, that the cleanup standards or, where applicable, remediation levels established in the cleanup action plan cannot be achieved, the department shall issue public notice of this determination.~~

~~(4) **Federal cleanup**~~)) (6) **National priorities list sites.** For ((~~federal cleanup~~)) sites on the national priorities list, ecology may use a record of decision or an order or consent decree prepared under the federal cleanup law ((~~may be used by the department~~)) to meet the requirements of this section, provided that:

(a) The cleanup action meets the requirements ((~~under~~)) in WAC 173-340-360;

(b) The state ((~~has concurred~~)) concurs with the cleanup action; and

(c) ((~~An opportunity~~)) The public was provided ((~~for the public~~)) an opportunity to comment on the cleanup action.

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-390 Model remedies. (1) **Purpose.** The purpose of model remedies is to streamline and accelerate the selection of a cleanup ((~~actions that protect human health and the environment, with a preference for permanent solutions to the maximum extent practicable~~)) action for routine types of cleanup projects at sites with common features and lower risk to human health and the environment.

(2) **Development of model remedies.** ((~~The department may, from time to time, identify~~)) Ecology may establish model remedies for common categories of ((~~facilities~~)) sites, types of ((~~contamination~~)) hazardous substances, types of media, and geographic areas. ((~~In identifying a model remedy, the department shall identify the circumstances for which application of the model remedy meets the requirements under WAC 173-340-360. The department shall provide an opportunity for the public to review and comment on any proposed model remedies.~~

~~(3) **Applicability and effect of model remedies.** Where a site meets the circumstances identified by the department under subsection (2) of this section, the components of the model remedy may be selected as the cleanup action, or as a portion of the cleanup action. At such sites, it shall not be necessary to conduct a feasibility study under WAC 173-340-350(8) or a disproportionate cost analysis under WAC 173-340-360(3) for those components of a cleanup action to which a model remedy applies.~~

~~(4) **Public notice and participation.** Where a model remedy is proposed as the cleanup action or as a portion of the cleanup action, the cleanup action plan is still subject to the same public notice and participation requirements in this chapter as any other cleanup action.~~)) When establishing a model remedy, ecology will:

(a) Identify the applicability of the model remedy for use at a site, the site characterization required under WAC 173-340-350 to select the model remedy, and the compliance monitoring required under WAC 173-340-410 to implement the model remedy;

(b) Describe how the model remedy meets the cleanup standards established under Part 7 of this chapter and the requirements for cleanup actions in WAC 173-340-360; and

(c) Provide the public with notice and an opportunity to comment on the proposed model remedy and the conditions under which it may be used at a site. The public comment period must be at least 30 days.

(3) **Soliciting proposals.** When developing model remedies, ecology will solicit and consider proposals from qualified persons. The pro-

posals must, in addition to describing the model remedy, provide the information required under subsection (2)(a) and (b) of this section.

(4) **Selection.** A model remedy may be selected as a cleanup action, or as a component of a cleanup action, at a site without conducting a feasibility study under WAC 173-340-351, provided that:

(a) The site meets the conditions for using the model remedy identified by ecology under subsection (2)(a) of this section. To make this demonstration, sufficient information must be collected and documented during the remedial investigation (see WAC 173-340-350 (6)(j)(ii) and (5)(f)(ii) and (g)(vii)); and

(b) For ecology-conducted and ecology-supervised remedial actions, ecology provides or requires public notice of the proposed use of the model remedy in the draft cleanup action plan under WAC 173-340-380.

PART ((~~IV~~)) 4 - SITE CLEANUP AND MONITORING

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-400 ((~~Implementation of the~~)) Cleanup action implementation. (1) **Purpose.** Unless otherwise directed by the department, cleanup actions shall comply with this section except for emergencies or interim actions. The purpose of this section is to ensure that the cleanup action is designed, constructed, and operated in a manner that is consistent with:

(a) The cleanup action plan;

(b) Accepted engineering practices; and

(c) The requirements specified in WAC 173-340-360.

(2) **Administrative options.** A cleanup action may be conducted under any of the ((~~procedures~~)) administrative options for remedial action described in WAC 173-340-510 ((~~and 173-340-515~~)).

(3) **Public participation.** During cleanup action implementation, public participation shall be accomplished in a manner consistent with the requirements of WAC 173-340-600.

(4) **Plans describing the cleanup action.** Design, construction, and operation of the cleanup action shall be consistent with the purposes of this section and shall consider relevant information provided by the remedial investigation/feasibility study. For most cleanups, to ensure this is done it will be necessary to prepare the engineering documents described in this section. The scope and level of detail in these documents may vary from site to site depending on the site-specific conditions and nature and complexity of the proposed cleanup action. In many cases, such as routine cleanups and cleanups at leaking underground storage tanks, it is appropriate to combine the information in these various documents into one report to avoid unnecessary duplication. Where the information is contained in other documents it may be appropriate to incorporate those documents by reference to avoid duplication. Any document prepared in order to implement a

cleanup may be used to satisfy these requirements provided they contain the required information. In addition, for facilities on the national priorities list the plans prepared for the cleanup action shall also comply with federal requirements.

(a) **Engineering design report.** The engineering design report shall include sufficient information for the development and review of construction plans and specifications. It shall document engineering concepts and design criteria used for design of the cleanup action. The following information shall be included in the engineering design report, as appropriate:

(i) Goals of the cleanup action including specific cleanup or performance requirements;

(ii) General information on the facility including a summary of information in the remedial investigation/feasibility study updated as necessary to reflect the current conditions;

(iii) Identification of who will own, operate, and maintain the cleanup action during and following construction;

(iv) Facility maps showing existing site conditions and proposed location of the cleanup action;

(v) Characteristics, quantity, and location of materials to be treated or otherwise managed, including groundwater containing hazardous substances;

(vi) A schedule for final design and construction;

(vii) A description and conceptual plan of the actions, treatment units, facilities, and processes required to implement the cleanup action including flow diagrams;

(viii) Engineering justification for design and operation parameters, including:

(A) Design criteria, assumptions and calculations for all components of the cleanup action;

(B) Expected treatment, destruction, immobilization, or containment efficiencies and documentation on how that degree of effectiveness is determined; and

(C) Demonstration that the cleanup action will achieve compliance with cleanup requirements by citing pilot or treatability test data, results from similar operations, or scientific evidence from the literature;

(ix) Design features for control of hazardous materials spills and accidental discharges (for example, containment structures, leak detection devices, run-on and runoff controls);

(x) Design features to assure long-term safety of workers and local residences (for example, hazardous substances monitoring devices, pressure valves, bypass systems, safety cutoffs);

(xi) A discussion of methods for management or disposal of any treatment residual and other waste materials containing hazardous substances generated as a result of the cleanup action;

(xii) Facility specific characteristics that may affect design, construction, or operation of the selected cleanup action, including:

(A) Relationship of the proposed cleanup action to existing facility operations;

(B) Probability of flooding, probability of seismic activity, temperature extremes, local planning and development issues; and

(C) Soil characteristics and groundwater system characteristics;

(xiii) A general description of construction testing that will be used to demonstrate adequate quality control;

(xiv) A general description of compliance monitoring that will be performed during and after construction to meet the requirements of WAC 173-340-410;

(xv) A general description of construction procedures proposed to assure that the safety and health requirements of WAC 173-340-810 are met;

(xvi) Any information not provided in the remedial investigation/feasibility study needed to fulfill the applicable requirements of the State Environmental Policy Act (chapter 43.21C RCW);

(xvii) Any additional information needed to address the applicable state, federal and local requirements including the substantive requirements for any exempted permits; and property access issues which need to be resolved to implement the cleanup action;

(xviii) For sites requiring financial assurance and where not already incorporated into the order or decree or other previously submitted document, preliminary cost calculations and financial information describing the basis for the amount and form of financial assurance and, a draft financial assurance document;

(xix) For sites using institutional controls as part of the cleanup action and where not already incorporated into the order or decree or other previously submitted documents, copies of draft restrictive covenants and/or other draft documents establishing these institutional controls; and

(xx) Other information as required by the department.

(b) **Construction plans and specifications.** Construction plans and specifications shall detail the cleanup actions to be performed. The plans and specifications shall be prepared in conformance with currently accepted engineering practices and techniques and shall include the following information as applicable:

(i) A general description of the work to be performed and a summary of the engineering design criteria from the engineering design report;

(ii) General location map and existing facility conditions map;

(iii) A copy of any permits and approvals;

(iv) Detailed plans, procedures and material specifications necessary for construction of the cleanup action;

(v) Specific quality control tests to be performed to document the construction, including specifications for the testing or reference to specific testing methods, frequency of testing, acceptable results, and other documentation methods;

(vi) Startup procedures and criteria to demonstrate the cleanup action is prepared for routine operation;

(vii) Additional information to address applicable state, federal, and local requirements including the substantive requirements for any exempted permits;

(viii) A compliance monitoring plan prepared under WAC 173-340-410 describing monitoring to be performed during construction, and a sampling and analysis plan meeting the requirements of WAC 173-340-820;

(ix) Provisions to assure safety and health requirements of WAC 173-340-810 are met; ((~~and~~))

(x) An inadvertent discovery plan meeting the requirements in WAC 173-340-815; and

(xi) Other information as required by the department.

(c) **Operation and maintenance plan.** An operation and maintenance plan that presents technical guidance and regulatory requirements to assure effective operations under both normal and emergency condi-

tions. The operation and maintenance plan shall include the following elements, as appropriate:

(i) Name and phone number of the responsible individuals;

(ii) Process description and operating principles;

(iii) Design criteria and operating parameters and limits;

(iv) General operating procedures, including startup, normal operations, operation at less than design loading, shutdown, and emergency or contingency procedures;

(v) A discussion of the detailed operation of individual treatment units, including a description of various controls, recommended operating parameters, safety features, and any other relevant information;

(vi) Procedures and sample forms for collection and management of operating and maintenance records;

(vii) Spare part inventory, addresses of suppliers of spare parts, equipment warranties, and appropriate equipment catalogues;

(viii) Equipment maintenance schedules incorporating manufacturers recommendations;

(ix) Contingency procedures for spills, releases, and personnel accidents;

(x) A compliance monitoring plan prepared under WAC 173-340-410 describing monitoring to be performed during operation and maintenance, and a sampling and analysis plan meeting the requirements of WAC 173-340-820;

(xi) Description of procedures which ensure that the safety and health requirements of WAC 173-340-810 are met, including specification of contaminant action levels and contingency plans, as appropriate;

(xii) An inadvertent discovery plan meeting the requirements in WAC 173-340-815;

(xiii) Procedures for the maintenance of the facility after completion of the cleanup action, including provisions for removal of unneeded appurtenances, and the maintenance of covers, caps, containment structures, and monitoring devices; and

((~~(xiii)~~)) (xiv) Other information as required by the department.

(5) **Permits.** Permits and approvals and any substantive requirements for exempted permits, if required for construction or to otherwise implement the cleanup action, shall be identified and where possible, resolved before, or during, the design phase to avoid delays during construction and implementation of the cleanup action.

(6) **Construction.** Construction of the cleanup action shall be conducted in accordance with the construction plans and specifications, and other plans prepared under this section.

(a) **Department inspections.**

(i) The department may perform site inspections and construction oversight. The department may require that construction activities be halted at a site if construction or any supporting activities are not consistent with approved plans; are not in compliance with environmental regulations or accepted construction procedures; or endanger human health or the environment.

(ii) The department may conduct a formal inspection of the site following construction and an initial operational shake down period to ensure satisfactory completion of the construction. If such an inspection is performed, the construction documentation report and engineer's opinion specified in (b)(ii) of this subsection shall be available before the inspection.

(b) **Construction documentation.**

(i) Except as provided for in (b)(iii) of this subsection, all aspects of construction shall be performed under the oversight of a professional engineer registered in the state of Washington or a qualified technician under the direct supervision of a professional engineer registered in the state of Washington or as otherwise provided for in RCW 18.43.130. During construction, detailed records shall be kept of all aspects of the work performed including construction techniques and materials used, items installed, and tests and measurements performed.

(ii) As built reports. At the completion of construction the engineer responsible for the oversight of construction shall prepare as built drawings and a report documenting all aspects of facility construction. The report shall also contain an opinion from the engineer, based on testing results and inspections, as to whether the cleanup action has been constructed in substantial compliance with the plans and specifications and related documents.

(iii) For leaking underground storage tanks, the construction oversight and documentation report may be conducted by an underground storage tank provider certified under chapter ((~~173-360~~)) 173-360A WAC. Removal of above ground abandoned drums, tanks and similar above ground containers and associated minor soil contamination may be overseen and documented by an experienced environmental professional. In other appropriate cases the department may authorize departure from the requirements of this subsection.

(c) **Financial assurance and institutional control documentation.** As part of the as-built documentation for the site cleanup, where the following information has not already been submitted under an order or decree or as part of another previously submitted document, the following information shall be included in the as-built report:

(i) For sites requiring financial assurance, a copy of the financial assurance document and any procedures for periodic adjustment to the value of the financial assurance mechanism;

(ii) For sites using institutional controls as part of the cleanup action, copies of recorded deed restrictions (with proof of recording) and other documents establishing these institutional controls.

(d) **Plan modifications.** Changes in the design or construction of the cleanup action performed under an order or decree shall be approved by the department.

(7) ((~~**Opportunity for public comment.** If the department determines that any plans prepared under this section represent a substantial change from the cleanup action plan, the department shall provide public notice and opportunity for comment under WAC 173-340-600.~~)) **Public participation.**

(a) For an ecology-conducted remedial action, the department will provide public notice of an engineering design report in accordance with WAC 173-340-600 (15)(a).

(b) For an ecology-conducted or an ecology-supervised remedial action, the department will provide or require public notice of any plan prepared under this section that represents a substantial change from the cleanup action plan in accordance with WAC 173-340-600 (15)(b).

(8) **Plans and reports.** Plans or reports prepared under this section and under an order or decree shall be submitted to the department for review and approval. For independent remedial actions, the plans and reports shall be submitted as required under WAC 173-340-515.

(9) **Requirements for managing waste generated by site cleanup.** Any waste contaminated by a hazardous substance generated during

cleanup activities and requiring offsite treatment, storage or disposal, shall be transported to a facility permitted or approved to handle these wastes.

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-410 Compliance monitoring ((~~requirements~~)). (1) **Purpose.** There are three types of compliance monitoring: Protection, performance, and ((~~confirmational~~)) confirmation monitoring. The purposes of these three types of compliance monitoring and evaluation of the data are to:

(a) **Protection monitoring.** Confirm that human health and the environment are adequately protected during construction and the operation and maintenance period of an interim action or cleanup action as described in the health and safety ((~~and health~~)) plan;

(b) **Performance monitoring.** Confirm that the interim action or cleanup action has attained cleanup standards and, if appropriate, remediation levels or other performance standards such as construction quality control measurements or monitoring necessary to demonstrate compliance with a permit or, where a permit exemption applies, the substantive requirements of other laws;

(c) ((~~Confirmational~~)) **Confirmation monitoring.** Confirm the long-term effectiveness of the interim action or cleanup action once cleanup standards and, if appropriate, remediation levels or other performance standards have been attained.

(2) **General requirements.** Compliance monitoring shall be required for all cleanup actions, and may be required for interim and emergency actions conducted under this chapter. Unless otherwise directed by the department, a compliance monitoring plan shall be prepared.

Plans prepared under this section and under an order or decree shall be submitted to the department for review and approval. Protection monitoring may be addressed in the health and safety ((~~and health~~)) plan. Performance and ((~~confirmational~~)) confirmation monitoring may be addressed in separate plans or may be combined with other plans or submittals, such as those in WAC 173-340-400 and 173-340-820.

(3) **Contents of a monitoring plan.** Compliance monitoring plans may include monitoring for chemical constituents, biological testing, and physical parameters as appropriate for the site. Where the cleanup action includes engineered controls or institutional controls, the monitoring may need to include not only measurements but also documentation of observations on the performance of these controls. Long-term monitoring shall be required if on-site disposal, isolation, or containment is the selected cleanup action for a site or a portion of a site. Such measures shall be required until residual hazardous substance concentrations no longer exceed site cleanup levels established under ((~~WAC 173-340-700 through 173-340-760~~)) Part 7 of this chapter. Compliance monitoring plans shall be specific for the media being tested and shall contain the following elements:

(a) A sampling and analysis plan meeting the requirements of WAC 173-340-820 which shall explain in the statement of objectives how the purposes of subsection (1) of this section are met;

(b) Data analysis and evaluation procedures used, to demonstrate and confirm compliance and justification for these procedures, including:

(i) A description of any statistical method to be employed; or

(ii) If sufficient data is not available before writing the plan to propose a reliable statistical method to demonstrate and confirm compliance, a contingency plan proposing one or more reliable statistical methods to demonstrate and confirm compliance, and the conditions under which the methods would be used at the facility; and

(c) Other information as required by the department.

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-420 Periodic review. (1) **Purpose.** A periodic review consists of a review by the department of post-cleanup site conditions and monitoring data to assure that human health and the environment are being protected.

(2) **Applicability.** The department shall conduct periodic reviews of a site whenever the department conducts a cleanup action; whenever the department approves a cleanup action under an order, agreed order or consent decree; or, as resources permit, whenever the department issues a no further action opinion; and one of the following conditions exists, at the site:

(a) Where an institutional control and/or financial assurance is required as part of the cleanup action;

(b) Where the cleanup level is based on a practical quantitation limit as provided for under WAC 173-340-707; and

(c) Where, in the department's judgment, modifications to the default equations or assumptions using site-specific information would significantly increase the concentration of hazardous substances remaining at the site after cleanup or the uncertainty in the ecological evaluation or the reliability of the cleanup action is such that additional review is necessary to assure long-term protection of human health and the environment.

(3) **General requirements.** If a periodic review is required under subsection (2) of this section, a review shall be conducted by the department at least every five years after the initiation of a cleanup action. The department may require potentially liable persons to submit information required by the department to conduct a periodic review.

(4) **Review criteria.** When evaluating whether human health and the environment are being protected, the factors the department shall consider include:

(a) The effectiveness of ongoing or completed cleanup actions, including the effectiveness of engineered controls and institutional controls in limiting exposure to hazardous substances remaining at the site;

(b) New scientific information for individual hazardous substances or mixtures present at the site;

(c) New applicable state and federal laws for hazardous substances present at the site;

(d) Current and projected site and resource uses;

(e) The availability and practicability of more permanent remedies; and

(f) The availability of improved analytical techniques to evaluate compliance with cleanup levels.

(5) ((~~Notice and public comment. The department shall publish a notice of all periodic reviews in the *Site Register* and provide an opportunity for public comment. The department shall also notify all potentially liable persons known to the department of the results of the periodic review.~~)) **Public participation or notification.**

(a) For an ecology-conducted or an ecology-supervised remedial action, the department will:

(i) Provide public notice of a draft periodic review report in accordance with WAC 173-340-600(18); and

(ii) Notify all potentially liable persons known to the department of the results of the periodic review.

(b) For an independent remedial action, the department will notify the public of a periodic review report in accordance with WAC 173-340-600(20).

(6) **Determination of whether amendment of the cleanup action plan required.** For an ecology-conducted or an ecology-supervised remedial action, when the department determines that substantial changes in the cleanup action are necessary to protect human health and the environment at the site, a revised cleanup action plan shall be prepared. The department shall provide ((~~opportunities for public review and comment on~~)) or require public notice of the draft cleanup action plan in accordance with WAC 173-340-380 and 173-340-600(14).

(7) **Determination of whether future periodic reviews required.** In conducting a periodic review under this section, the department shall determine whether additional reviews are necessary, taking into consideration the factors in subsection (4) of this section. Sites with institutional controls shall remain subject to periodic reviews as long as the institutional controls are required under this chapter.

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-430 Interim actions. (1) **Purpose.** An interim action is distinguished from a cleanup action in that an interim action only partially addresses the cleanup of a site. (Note: An interim action may constitute the cleanup action for a site if the interim action is subsequently shown to comply with WAC 173-340-350 through 173-340-390.) An interim action is:

(a) A remedial action that is technically necessary to reduce a threat to human health or the environment by eliminating or substantially reducing one or more pathways for exposure to a hazardous substance at a facility;

(b) A remedial action that corrects a problem that may become substantially worse or cost substantially more to address if the remedial action is delayed; or

(c) A remedial action needed to provide for completion of a site hazard assessment, remedial investigation/feasibility study or design of a cleanup action.

Example. A site is identified where oil-based wood preservative has leaked from a tank and is puddled on the ground and is floating on the water table. Runoff from adjacent properties passes through the site. Neighborhood children have been seen on the site. In this case, several interim actions would be appropriate before fully defining the

extent of the distribution of hazardous substances at the site and selecting a cleanup action. These interim actions might consist of removing the tank, fencing the site, rerouting runoff, and removing the product puddled on the ground and floating on the water table. Further studies would then determine what additional soil and groundwater cleanup would be needed.

(2) **General requirements.**

Interim actions may:

(a) Achieve cleanup standards for a portion of the site;

(b) Provide a partial cleanup, that is, clean up hazardous substances from all or part of the site, but not achieve cleanup standards; or

(c) Provide a partial cleanup of hazardous substances and not achieve cleanup standards, but provide information on how to achieve cleanup standards for a cleanup. For example, demonstration of an unproven cleanup technology.

(3) **Relationship to the cleanup action.**

(a) If the cleanup action is known, the interim action shall be consistent with the cleanup action.

(b) If the cleanup action is not known, the interim action shall not foreclose reasonable alternatives for the cleanup action. This is not meant to preclude the destruction or removal of hazardous substances.

(4) **Timing.**

(a) Interim actions may occur anytime during the cleanup process. Interim actions shall not be used to delay or supplant the cleanup process. An interim action may be done before or in conjunction with a site hazard assessment and hazard ranking. However, sufficient technical information must be available regarding the facility to ensure the interim action is appropriate and warranted.

(b) Interim actions shall be followed by additional remedial actions unless compliance with cleanup standards has been confirmed at the site.

(c) The department shall set appropriate deadlines commensurate with the actions taken for completion of the interim action.

(5) **Administrative options.** Interim cleanup actions may be conducted under any of the ((~~procedures~~)) administrative options for remedial action described in WAC 173-340-510 ((~~and 173-340-515~~)).

(6) **Public participation or notification.** ((~~Public participation will be accomplished in a manner consistent with WAC 173-340-600.~~))

(a) For an ecology-conducted or an ecology-supervised remedial action, the department will provide or require public notice of a draft interim action plan prepared under this section in accordance with WAC 173-340-600(18).

(b) For an independent remedial action, the department will notify the public of an interim action report in accordance with WAC 173-340-600(20).

(7) **Submittal requirements.** Unless otherwise directed by the department and except for independent remedial actions, emergency remedial actions, and underground storage tank releases being addressed under WAC 173-340-450, a report shall be prepared before conducting an interim action. Reports prepared under an order or decree shall be submitted to the department for review and approval. Reports for independent remedial actions shall be submitted as required by WAC 173-340-515. Reports shall be of a scope and detail commensurate with the work performed and site-specific characteristics, and shall include, as appropriate:

(a) A description of the interim action and how it will meet the criteria identified in subsections (1), (2) and (3) of this section;

(b) Information from the applicable subsections of the remedial investigation/feasibility study of WAC 173-340-350 and 173-340-351, including at a minimum:

(i) A description of existing site conditions and a summary of all available data related to the interim action; and

(ii) Alternative interim actions considered and an explanation why the proposed alternative was selected;

(c) Information from the applicable subsections of the design and construction requirements of WAC 173-340-400; and

(d) A compliance monitoring plan meeting the applicable requirements of WAC 173-340-410;

(e) A ((~~safety and~~)) health and safety plan meeting the requirements of WAC 173-340-810; ((~~and~~))

(f) An inadvertent discovery plan meeting the requirements in WAC 173-340-815; and

(g) A sampling and analysis plan meeting the requirements of WAC 173-340-820.

(8) **Construction.** Construction of the interim action shall be in conformance with WAC 173-340-400(7).

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-440 Institutional controls. (1) **Purpose.** Institutional controls are measures undertaken to limit or prohibit activities that may interfere with the integrity of an interim action or cleanup action or that may result in exposure to hazardous substances at a site. Institutional controls may include:

(a) Physical measures such as fences;

(b) Use restrictions such as limitations on the use of property or resources; or requirements that cleanup action occur if existing structures or pavement are disturbed or removed;

(c) Maintenance requirements for engineered controls such as the inspection and repair of monitoring wells, treatment systems, caps or groundwater barrier systems;

(d) Educational programs such as signs, postings, public notices, health advisories, mailings, and similar measures that educate the public and/or employees about site contamination and ways to limit exposure; and

(e) Financial assurances (see subsection (11) of this section).

(2) **Relationship to engineered controls.** The term institutional controls refers to nonengineered measures while the term engineered controls means containment and/or treatment systems that are designed and constructed to prevent or limit the movement of, or the exposure to, hazardous substances. See the definition of engineered controls in WAC 173-340-200 for examples of engineered controls.

(3) **Applicability.** This section applies to remedial actions being conducted at sites under any of the administrative options for remedial action described in WAC 173-340-510 ((~~and 173-340-515~~)).

(4) **Circumstances required.** Institutional controls shall be required to assure both the continued protection of human health and the environment and the integrity of an interim action or cleanup action in the following circumstances:

(a) The cleanup level is established using Method A or B and hazardous substances remain at the site at concentrations that exceed the applicable cleanup level;

(b) The cleanup level is established using Method C;

(c) An industrial soil cleanup level is established under WAC 173-340-745;

(d) A groundwater cleanup level that exceeds the potable groundwater cleanup level is established using a site-specific risk assessment under WAC 173-340-720 (6)(c) and institutional controls are required under WAC 173-340-720 (6)(c)(iii);

(e) A conditional point of compliance is established as the basis for measuring compliance at the site;

(f) Any time an institutional control is required under WAC 173-340-7490 through 173-340-7494; or

(g) Where the department determines such controls are required to assure the continued protection of human health and the environment or the integrity of the interim or cleanup action.

(5) **Minimum requirements.** A cleanup ((~~actions that use~~)) action relying on institutional controls ((~~shall~~)) must meet ((~~each of~~)) the ((~~minimum~~)) requirements specified in WAC 173-340-360, just as any other cleanup action. To ensure a cleanup action relying on institutional controls is protective, institutional controls should demonstrably reduce risks ((~~to ensure a protective remedy~~)). This demonstration should be based on a quantitative, scientific analysis where appropriate.

(6) **Requirement for primary reliance.** ((~~In addition to meeting each of the minimum requirements~~)) As specified in WAC 173-340-360 (3)(a)(vii), a cleanup ((~~actions shall~~)) action must not rely primarily on institutional controls and monitoring ((~~where~~)) at a site, or portion thereof, if it is technically possible to implement a more permanent cleanup action ((~~for all or a portion of the site~~)).

(7) **Periodic review.** The department shall review compliance with institutional control requirements as part of periodic reviews under WAC 173-340-420.

(8) **Format.**

(a) For properties owned by a person who has been named as a potentially liable person or who has not been named a potentially liable person by the department but meets the criteria in RCW ((~~70.105D.040~~)) 70A.305.040 for being named a potentially liable person, appropriate institutional controls shall be described in a restrictive covenant on the property. The covenant shall be executed by the property owner and recorded with the register of deeds for the county in which the site is located. This restrictive covenant shall run with the land, and be binding on the owner's successors and assigns.

(b) For properties owned by a local, state, or federal government entity, a restrictive covenant may not be required if that entity demonstrates to the department that:

(i) It does not routinely file with the county recording officer records relating to the type of interest in real property that it has in the site; and

(ii) It will implement an effective alternative system to meet the requirements of subsection (9) of this section.

The department shall require the government entity to implement the alternative system as part of the cleanup action plan. If a government entity meets these criteria, and if it subsequently transfers its ownership in any portion of the property, then the government en-

tity must file a restrictive covenant upon transfer if any of the conditions in subsection (4) of this section still exist.

(c) For properties containing hazardous substances where the owner does not meet the criteria in RCW ((~~70.105D.040~~)) 70A.305.040 for being a potentially liable person, the department may approve cleanup actions that include restrictive covenants or other legal and/or administrative mechanisms. The use of legal or administrative mechanisms that do not include restrictive covenants is intended to apply to situations where the release has affected properties near the source of the release not owned by a person potentially liable under the act. A potentially liable person must make a good faith effort to obtain a restrictive covenant before using other legal or administrative mechanisms. Examples of such mechanisms include zoning overlays, placing notices in local zoning or building department records or state lands records, public notices and educational mailings.

(9) **Restrictive covenants.** Where required, the restrictive covenant shall:

(a) Prohibit activities on the site that may interfere with a cleanup action, operation and maintenance, monitoring, or other measures necessary to assure the integrity of the cleanup action and continued protection of human health and the environment;

(b) Prohibit activities that may result in the release of a hazardous substance that was contained as a part of the cleanup action;

(c) Require notice to the department of the owner's intent to convey any interest in the site. No conveyance of title, easement, lease, or other interest in the property shall be consummated by the property owner without adequate and complete provision for the continued operation, maintenance and monitoring of the cleanup action, and for continued compliance with this subsection;

(d) Require the land owner to restrict leases to uses and activities consistent with the restrictive covenant and notify all lessees of the restrictions on the use of the property. This requirement applies only to restrictive covenants imposed after February 1, 1996;

(e) Require the owner to include in any instrument conveying any interest in any portion of the property, notice of the restrictive covenant under this section;

(f) Require notice and approval by the department of any proposal to use the site in a manner that is inconsistent with the restrictive covenant. If the department, after public notice and comment approves the proposed change, the restrictive covenant shall be amended to reflect the change; and

(g) Grant the department and its designated representatives the right to enter the property at reasonable times for the purpose of evaluating compliance with the cleanup action plan and other required plans, including the right to take samples, inspect any remedial actions taken at the site, and to inspect records.

(10) **Local government notification.** Before a restrictive covenant being established under this chapter, the department shall notify and seek comment from a city or county department with land use planning authority for real property subject to the restrictive covenant. Once a restrictive covenant has been executed, this same department shall be notified and sent a copy of the restrictive covenant. For independent cleanups reviewed by the department under WAC 173-340-515 that use restrictive covenants, the person conducting the cleanup shall be responsible for these notifications.

(11) **Financial assurances.** The department shall, as appropriate, require financial assurance mechanisms at sites where the cleanup ac-

tion selected includes engineered and/or institutional controls. It is presumed that financial assurance mechanisms will be required unless the PLP can demonstrate that sufficient financial resources are available and in place to provide for the long-term effectiveness of engineered and institutional controls adopted. Financial assurances shall be of sufficient amount to cover all costs associated with the operation and maintenance of the cleanup action, including institutional controls, compliance monitoring, and corrective measures.

(a) **Mechanisms.** Financial assurance mechanisms may include one or more of the following: A trust fund, a surety bond, a letter of credit, financial test, guarantee, standby trust fund, government bond rating test, government financial test, government guarantee, government fund, or financial assurance mechanisms required under another law (for example, requirements for solid waste landfills or treatment, storage, and disposal facilities) that meets the requirements of this section.

(b) **Exemption from requirement.** The department shall not require financial assurances if persons conducting the cleanup can demonstrate that requiring financial assurances will result in the PLPs for the site having insufficient funds to conduct the cleanup or being forced into bankruptcy or similar financial hardship.

(12) ((~~Removal of restrictions. If the conditions at the site requiring an institutional control under subsection (4) of this section no longer exist, then the owner may submit a request to the department that the restrictive covenant or other restrictions be eliminated. The restrictive covenant or other restrictions shall be removed, if the department, after public notice and opportunity for comment, concurs.~~)) **Amendment or removal of institutional controls.**

(a) **Request.** Any person who has an interest in the real property subject to an institutional control may submit a request to the department that the control be amended or removed if the conditions at the site requiring the control under subsection (4) of this section have changed or no longer exist. The request must be in writing.

(b) **Determination.** If the department determines that the conditions requiring an institutional control under subsection (4) of this section have changed or no longer exist, then the institutional control must be amended or removed.

(c) **Public participation or notification.**

(i) For ecology-conducted or ecology-supervised remedial actions, the department will provide or require public notice of any proposal to amend or remove an institutional control in accordance with WAC 173-340-600(19).

(ii) For independent remedial actions, the department will notify the public of any amendment or removal of an institutional control in accordance with WAC 173-340-600(20).

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-450 Releases from regulated underground storage ((~~tanks~~)) tank systems. ((~~(1) Purpose. The purpose of this section is to set forth the requirements for addressing releases that may pose a threat to human health or the environment from an underground storage tank (UST) regulated under chapter 90.76 RCW.~~

~~(a) Releases from USTs exempted under chapter 90.76 RCW and rules adopted therein are still subject to all other requirements of this chapter.~~

~~(b) Unless the department requires otherwise, UST owners and UST operators regulated under chapter 90.76 RCW shall comply with the requirements in this section after confirmation of an UST release that may pose a threat to human health or the environment.~~

~~(2) Initial response. Within twenty-four hours of confirmation of an UST release, the UST owner or the UST operator shall perform the following actions:~~

~~(a) Report the UST release to the department and other authorities with jurisdiction, in accordance with rules adopted under chapter 90.76 RCW and any other applicable law;~~

~~(b) Remove as much of the hazardous substance from the UST as is possible and necessary to prevent further release to the environment;~~

~~(c) Eliminate or reduce any fire, explosion or vapor hazards in such a way as to minimize any release of hazardous substances to surface water and groundwater; and~~

~~(d) Visually inspect any aboveground releases or exposed belowground releases and prevent the hazardous substance from spreading into surrounding soils, groundwater and surface water.~~

~~(3) Interim actions.~~

~~(a) As soon as possible but no later than twenty days following confirmation of an UST release, the UST owner or the UST operator shall perform the following interim actions:~~

~~(i) Continue to monitor and mitigate any additional fire and safety hazards posed by vapors or free product that may have migrated from the UST into structures in the vicinity of the site, such as sewers or basements;~~

~~(ii) Reduce the threat to human health and the environment posed by contaminated soils that are excavated or discovered as a result of investigation or cleanup activities. Treatment, storage and disposal of soils must be carried out in compliance with all applicable federal, state and local requirements;~~

~~(iii) Test for hazardous substances in the environment where they are most likely to be present. Such testing shall be done in accordance with a sampling and analysis plan prepared under WAC 173-340-820. The sample types, sample locations, and measurement methods shall be based on the nature of the stored substance, type of subsurface soils, depth to groundwater and other factors as appropriate for identifying the presence and source of the release. If contaminated soil is found in contact with the groundwater or soil contamination appears to extend below the lowest soil sampling depth, then testing shall include the installation of groundwater monitoring wells to test for the presence of possible groundwater contamination. Information gathered for the site check or closure site assessment conducted under rules adopted under chapter 90.76 RCW, which sufficiently characterizes the releases at the site, may be substituted for the testing required under this paragraph;~~

~~(iv) The testing performed under (a)(iii) of this subsection shall use the analytical methods specified in WAC 173-340-830 and include, at a minimum, the following:~~

~~(A) For petroleum product releases, the concentration(s) of hazardous substances potentially present at the site, as appropriate for the type of petroleum product(s) released. The minimum testing requirements are specified in Table 830-1.~~

~~(B) The hazardous substance stored and any likely decomposition by-products where a hazardous substance other than petroleum may be present; and~~

~~(C) Any other tests required by the department; and~~

~~(v) Investigate for the presence of free product.~~

~~(4) Free product removal. At sites where investigations indicate free product is present, the UST owner or the UST operator shall conduct, as soon as possible after discovery, an interim action to remove the free product while continuing, as necessary, any other actions required under this section. To accomplish this the UST owner or UST operator shall:~~

~~(a) Conduct free product removal to the maximum extent practicable and in a manner that minimizes the spread of hazardous substances, by using recovery and disposal techniques appropriate to the hydrogeologic conditions at the site. The objective of free product removal system must be, at a minimum, to stop the free product migration;~~

~~(b) Properly treat, discharge, or dispose of any hazardous substance, water, sludge or any other materials collected in the free product removal process in compliance with all applicable local, state, and federal regulations and permits; and~~

~~(c) Handle all flammable products safely to prevent fires and explosions.~~

~~(5) Reporting requirements. The following reports are required to be submitted to the department:~~

~~(a) Status report. Within twenty days after an UST release, the UST owner or UST operator shall submit a status report to the department. The status report shall identify if known, the types, amounts, and locations of hazardous substances released, how the release occurred, evidence confirming the release, actions taken under subsections (2) and (3) of this section, any planned remedial actions, and any results of work done up to the time of the report. This report may be provided verbally to the department.~~

~~(b) Site characterization reports. Within ninety days after release confirmation, unless directed to do otherwise by the department, the UST owner or UST operator shall submit a report to the department about the site and nature of the release. This report shall be submitted to the department in writing and may be combined with the twenty-day status report, if the information required is available at that time. The site characterization report shall include, at a minimum, the following information:~~

~~(i) The information required for the status report under (a) of this subsection;~~

~~(ii) A site conditions map indicating approximate boundaries of the property, all areas where hazardous substances are known or suspected to be located, and sampling locations. This map may consist of a sketch of the site at a scale sufficient to illustrate this information;~~

~~(iii) Available data regarding surrounding populations, surface and groundwater quality, use and approximate location of wells potentially affected by the release, subsurface soil conditions, depth to groundwater, direction of groundwater flow, proximity to and potential for affecting surface water, locations of sewers and other potential conduits for vapor or free product migration, surrounding land use, and proximity to sensitive environments;~~

~~(iv) Results of tests for hazardous substances performed under subsection (3)(a)(iii) and (iv) of this section;~~

~~(v) Results of the free product investigation required under subsection (3)(a)(v) of this section;~~

~~(vi) Results of all completed site investigations, interim actions and cleanup actions and a description of any remaining investigations, cleanup actions and compliance monitoring that are planned or underway; and~~

~~(vii) Information on the free product removal efforts at sites where investigations indicate free product is present. This shall include, at a minimum, the following information:~~

~~(A) Name of the person responsible for implementing the free product removal measures;~~

~~(B) The estimated quantity, type, and thickness of free product observed or measured in wells, boreholes and excavations;~~

~~(C) The type of free product recovery system used;~~

~~(D) The location of any on-site or offsite discharge during the recovery operation;~~

~~(E) The type of treatment applied to, and the effluent quality expected from, any discharge;~~

~~(F) The steps taken and planned to obtain necessary permits for any discharge;~~

~~(G) Disposition of recovered free product; and~~

~~(viii) Any other information required by the department.~~

~~(6) Remedial investigation and feasibility study.~~

~~(a) If the initial cleanup actions taken at an UST site do not achieve cleanup levels throughout the site, a remedial investigation and feasibility study may need to be conducted in accordance with WAC 173-340-350. The scope of a remedial investigation and feasibility study will depend on the informational needs at the site. UST owners and operators shall conduct a remedial investigation and feasibility study for sites where the following conditions exist:~~

~~(i) There is evidence that the release has caused hazardous substances to be present in the groundwater in excess of the groundwater standards adopted under chapter 90.48 RCW or cleanup levels in WAC 173-340-720 (Table 720-1);~~

~~(ii) Free product is found; or~~

~~(iii) Where otherwise required by the department.~~

~~(b) UST owners and UST operators shall submit the information collected for the remedial investigation/feasibility study to the department as soon as practicable. The information may be included with other reports submitted under this section.~~

~~(c) If the department determines, based on the results of the remedial investigation/feasibility study or other information, that additional remedial action is required, the department may require the UST owner or the UST operator to submit engineering documents as described in WAC 173-340-400.~~

~~(7) Cleanup actions. Unless directed to do otherwise by the department, cleanup actions performed by UST owners or UST operators shall comply with the cleanup standards described in WAC 173-340-700 through 173-340-760 and the requirements for the selection of cleanup actions in WAC 173-340-350 through 173-340-390.~~

~~(8) Independent cleanup actions. In addition to work performed under subsections (2) through (5), and (7) of this section, UST owners or UST operators performing independent cleanup actions shall:~~

~~(a) Notify the department of their intention to begin cleanup. This can be included with other reports under this section;~~

~~(b) Comply with any conditions imposed by the department to assure adequate protection of human health and the environment; and~~

~~(c) Within ninety days of completion of the cleanup action, submit the results of all investigations, interim and cleanup actions and compliance monitoring not previously submitted to the department.~~))

(1) **Applicability.**

(a) **Releases.** This section applies only to underground storage tank (UST) systems regulated under chapter 173-360A WAC from which there has been a confirmed release of a regulated substance that may pose a threat to human health or the environment. Under chapter 173-360A WAC, UST system owners and operators and regulated service providers must report such a release to ecology within 24 hours.

(b) **Persons.** This section applies only to UST system owners and operators. UST system owners and operators must comply with the requirements in this section in addition to the other requirements in this chapter.

(c) **Other requirements.** This section does not alter the applicability of requirements in other sections in this chapter.

(2) **Purpose.** Under chapter 173-360A WAC, UST system owners and operators must investigate and clean up confirmed releases in accordance with the requirements of this chapter. This section specifies interim actions that UST system owners and operators must perform immediately or shortly after confirming a release to reduce threats posed by the release, prevent any further release, and characterize the nature and extent of the release. If the interim actions are insufficient to meet the criteria in WAC 173-340-330(5), UST system owners and operators must conduct further remedial action under the state cleanup law to investigate and clean up the release. WAC 173-340-120 provides an overview of the cleanup process under the state cleanup law.

(3) **Enforcement.** UST system owners and operators who violate any requirement in this chapter are subject to enforcement, including civil penalties and orders, under:

(a) Chapter 70A.305 RCW and this chapter; or

(b) Chapters 70A.355 RCW and 173-360A WAC.

(4) **Administrative options.** The interim actions specified in this section may be conducted under any of the administrative options for remedial action described in WAC 173-340-510.

(5) **Interim actions.** UST owners and operators must perform the following interim actions after confirming a release.

(a) **Initial response.** Within 24 hours of release confirmation, UST system owners and operators must:

(i) Remove as much of the hazardous substance from the UST system as is possible and necessary to prevent further release to the environment;

(ii) Eliminate or reduce any fire, explosion, or vapor hazards and do so in a manner that minimizes any release of hazardous substances to surface water and groundwater; and

(iii) Visually inspect any aboveground releases or exposed belowground releases and prevent further migration of released hazardous substances into surrounding soils, groundwater, and surface water.

(b) **Initial site characterization.** Within 30 days of release confirmation, UST system owners and operators must investigate the site to identify the hazardous substances released, the source of the release, the media impacted by the release, and the potential for vapors from contaminated soil or groundwater to enter building, utility vaults, or other structures. At a minimum, UST system owners and operators must:

(i) Develop a sampling and analysis plan meeting the requirements of WAC 173-340-820. The sampling and analysis plan must be based on the substances currently or previously stored in the UST system, type of subsurface soils, depth to groundwater, vapor intrusion pathways, and other factors as appropriate for identifying the presence and source of the release;

(ii) Collect, handle, and analyze samples in accordance with the requirements in WAC 173-340-830;

(iii) Collect samples in the environment where hazardous substances are most likely to be present;

(iv) Investigate groundwater for the presence of hazardous substances and free product if there is evidence of any of the following conditions at the site:

(A) Contaminated soil is in contact with the groundwater;

(B) Contaminated soil extends below the lowest soil sampling depth;

(C) Groundwater contamination has been detected or observed;

(D) The release has migrated to surface water or wetlands; or

(E) There is no evidence of the conditions in (b)(iv)(A) through (D) of this subsection, but UST owners and operators cannot demonstrate to ecology's satisfaction that the release does not pose a threat to groundwater;

(v) Analyze collected samples for the hazardous substances released from the UST system, including:

(A) For petroleum, the substances specified in Table 830-1 based on the product stored; and

(B) For other hazardous substances, the substance stored and any likely decomposition by-products;

(vi) Conduct any other investigations required by ecology; and

(vii) Properly manage and dispose any waste materials, including contaminated soil and water, generated as a result of the initial site characterization in accordance with applicable state and federal laws. See WAC 173-340-710.

(c) **Free product removal.** If free product is discovered at the site, as soon as possible but no later than 30 days after release confirmation, UST system owners and operators must initiate actions to remove the free product while continuing, as necessary, any other actions required under this section. At a minimum, UST system owners and operators must:

(i) Conduct free product removal to the maximum extent practicable and in a manner that minimizes the spread of hazardous substances by using recovery and disposal techniques appropriate to the hydrogeologic conditions at the site. At a minimum, the free product removal system must be designed and operated to stop the free product migration;

(ii) Properly treat, discharge, or dispose of any hazardous substance, water, sludge or any other materials collected in the free product removal process in accordance with applicable state and federal laws. See WAC 173-340-710;

(iii) Handle all flammable products safely to prevent fires and explosions;

(iv) Unless otherwise directed by ecology, monitor in accordance with WAC 173-360A-0665(4) for the presence of free product at least quarterly; and

(v) Unless otherwise directed by ecology, submit to ecology written quarterly progress reports describing the results of the monitoring and free product removal actions. The first report may be combined

with the interim action report required under subsection (6) of this section.

(d) **Continuing obligations.** UST system owners and operators must continue to conduct the following measures to abate hazards at the site while continuing, as necessary, any other remedial action required under the state cleanup law:

(i) Monitor and mitigate any additional fire and safety hazards posed by vapors or free product that may have migrated from the UST system into nearby buildings or other structures, such as underground utilities;

(ii) Reduce the threat to human health and the environment posed by contaminated soils excavated or discovered as a result of any remedial action; and

(iii) Properly manage and dispose any waste materials, including contaminated soil and water, generated as a result of any remedial action in accordance with applicable state and federal laws. See WAC 173-340-710.

(6) **Interim action report.** Within 90 days of release confirmation, UST system owners and operators must submit an interim action report to ecology about the site and nature of the release. This report must comply with the submittal requirements in WAC 173-340-840 and include, at a minimum, the following information:

(a) A summary of the initial response actions required under subsection (5)(a) of this section, and any resulting information and data;

(b) The results of the initial site characterization required under subsection (5)(b) of this section, and any other investigations conducted at the site, including:

(i) The source(s) of the releases;

(ii) An explanation of how the releases occurred;

(iii) The hazardous substances released, and the estimated quantity of hazardous substances released;

(iv) The media contaminated by those releases and, to the extent known, the nature and extent of contamination within those media, and sample locations.

(A) If groundwater has not been tested, UST system owners and operators must include a demonstration that the release does not pose a threat to groundwater.

(B) If no potential vapor intrusion pathways have been identified, UST system owners and operators must include a demonstration that there is no potential for vapors from contaminated soil or groundwater to enter buildings, utility vaults, or other structures;

(v) The results of the free product investigation, if applicable; and

(vi) To the extent known, the pathways of exposure at the site and the human or ecological receptors affected by the releases;

(c) The physical characteristics of the site, including:

(i) The location of tax parcels, property boundaries, right-of-ways, and above and below-ground structures;

(ii) The geology of the site, including subsurface soil conditions;

(iii) The hydrology of the site, including depth to groundwater, direction of groundwater flow, approximate location of wells potentially affected by the release, proximity of the release to and potential for affecting surface water and wetlands, the quality and use of groundwater and surface water;

(iv) The location of underground utilities and other potential conduits for vapor or free product migration;

(v) The population and uses of the site and surrounding area; and

(vi) The proximity of the release to sensitive environments;

(d) Diagrams and cross-sections of the site, as appropriate, reflecting the information required in (b) and (c) of this subsection;

(e) At sites where investigations indicate free product is present, information on the free product removal efforts, including:

(i) Name of the person responsible for implementing the free product removal measures;

(ii) The estimated quantity, type, and thickness of free product observed or measured in wells, boreholes, and excavations;

(iii) The type of free product recovery system used;

(iv) If the recovery or monitoring of free product results in any discharges, then:

(A) The location of such discharges;

(B) The type of treatment applied to, and the effluent quality expected from such discharges; and

(C) The steps taken and planned to obtain necessary permits for such discharges; and

(v) Disposition of recovered free product and other contaminated materials generated by site investigations and cleanup;

(f) A description of any other on-going or completed remedial actions, and the results of such actions;

(g) A description of any planned remedial actions;

(h) The type of mechanism used to meet the financial responsibility requirements of WAC 173-360A-1045 (2)(a), and if the mechanism is an insurance policy, then:

(i) Whether a claim has been made on the policy; and

(ii) Whether the insurer has accepted or denied the claim; and

(i) Any other information required by ecology.

(7) **Further remedial action.** If the interim actions required under this section are insufficient to meet the criteria in WAC 173-340-330(5), UST system owners and operators must conduct further remedial action under the state cleanup law to investigate and clean up the release. WAC 173-340-120 provides an overview of the cleanup process under the state cleanup law.

(8) **Periodic updates on remedial actions.** At least every three years after release confirmation or more frequently as directed by ecology, UST system owners and operators must update the interim action report required under subsection (6) of this section and submit it to ecology unless:

(a) The site has been removed from the contaminated sites list under WAC 173-340-330;

(b) Ecology is conducting remedial actions at the site or is supervising remedial actions at the site under an order or decree; or

(c) The site is enrolled in a technical assistance program under WAC 173-340-515(5) or chapter 374-80 WAC.

PART ((V)) 5 - ADMINISTRATIVE PROCEDURES FOR REMEDIAL ACTIONS

AMENDATORY SECTION (Amending WSR 90-08-086, filed 4/3/90, effective 5/4/90)

WAC 173-340-500 Determination of status as a potentially liable person. (1) **Status letter.** The department shall issue a potentially liable person status letter to any person it believes to be potentially liable as provided for in RCW ((~~70.105D.020(8)~~)) 70A.305.020(26), unless an emergency requires otherwise. Persons will be notified when the department has credible evidence of their potential liability under RCW ((~~70.105D.040~~)) 70A.305.040 and when the department is ready to proceed with remedial action except for emergencies and initial investigations. The status letter shall be sent by certified mail, return receipt requested, or by personal service.

(2) **Contents of letter.** The status letter shall provide:

(a) The name of the person the department believes to be potentially liable;

(b) A general description of the location of the facility;

(c) The basis for the department's belief that the person has a relationship to the facility;

(d) The basis for the department's belief that a release or threatened release of a hazardous substance has occurred at the facility and that the release or threatened release poses a threat to human health or the environment;

(e) An indication of the department's intentions regarding enforcement or other actions at the facility; and

(f) The names of other persons to whom the department has sent a status letter.

(3) **Opportunity to comment.** Any comments shall be submitted in writing to the department within ((~~thirty~~)) 30 days from the date of receipt by the potentially liable person of the status letter unless the department provides an extension.

(4) **Determination of status.** If after reviewing any comments submitted, the department concludes that credible evidence supports a finding of potential liability, then the department shall issue a determination of potentially liable person status.

(5) **Voluntary waiver.** Persons may accept status as a potentially liable person at any time through a voluntary waiver of their right to notice and comment.

(6) **Additional potentially liable persons.** The department reserves the right to notify additional potentially liable persons at any time, and as resources permit, will facilitate potentially liable persons' efforts to identify additional potentially liable persons. The department shall notify in writing, all persons who previously received a status letter for the facility whenever additional status letters have been sent.

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-510 Administrative options for remedial actions.

((~~(1) Policy. It is the responsibility of each and every liable person to conduct remedial action so that sites are cleaned up well and expeditiously where a release or threatened release of a hazardous substance requires remedial action. Potentially liable persons are encouraged to initiate discussions and negotiations with the department and the office of the attorney general that may lead to an agreement on the remedial action to be conducted with the state of Washington. The department may provide informal advice and assistance on the development of proposals for remedial action, as provided by WAC 173-340-515. Any approval by the department or the state of remedial action shall occur by one of the means described in subsections (2) and (3) of this section.~~

~~(2) Actions initiated by the potentially liable person. Potentially liable persons may initiate a remedial action, as follows:~~

~~(a) A person may initiate negotiations for a consent decree by submitting a letter under WAC 173-340-520(1).~~

~~(b) A person may request an agreed order by submitting a letter under WAC 173-340-530.~~

~~(3) Action initiated by the department. The department may initiate remedial action by:~~

~~(a) Issuing a letter inviting negotiations on a consent decree under WAC 173-340-520(2); or~~

~~(b) Requesting an agreed order under WAC 173-340-530; or~~

~~(c) Issuing an enforcement order under WAC 173-340-540.~~

~~(4) Department remedial action. Nothing in this chapter shall preclude the department from taking appropriate remedial action on its own at any time. Except for emergency actions and initial investigations, reasonable effort will be made to notify potentially liable persons before the department takes remedial actions for which the recovery of public funds can be sought under RCW 70.105D.050(3).~~))

At sites where ecology has determined remedial action is necessary under the state cleanup law, it is the responsibility of each and every liable person to conduct remedial action so that the sites are cleaned up well and expeditiously. This section provides an overview of the administrative options for remedial action and the process for initiating remedial action. If there are any inconsistencies between this section and any specifically referenced sections, the referenced section governs.

(1) **Independent remedial action.** A person may investigate or clean up a site independently, without ecology supervision or approval, except as provided under WAC 173-340-515(2).

(a) **Standards.** When reviewing an independent remedial action, ecology determines whether it complies with the substantive requirements of the state cleanup law. Persons conducting an independent remedial action do so at their own risk. Ecology may require additional remedial action if it determines that such action is necessary under the state cleanup law. See WAC 173-340-515(3).

(b) **Reports.** Persons conducting independent remedial action must report all investigations, interim actions, and cleanup actions to ecology. Reports must include sufficient information for ecology to determine whether the remedial action meets the substantive requirements of the state cleanup law. See WAC 173-340-515(4).

(c) **Technical assistance.** Persons planning or conducting independent remedial action may request technical assistance from ecology, including advice on how to investigate and clean up a site and written opinions on whether a planned or completed remedial action meets the substantive requirements of the state cleanup law. Ecology may charge a fee for providing requested technical assistance. PLIA may also provide technical assistance for certain sites under RCW 70A.330.040(7) and chapter 374-80 WAC.

(2) **Ecology-supervised remedial action.** Ecology may supervise the investigation or cleanup of a site by a potentially liable person or a prospective purchaser under an order or decree. Such persons are encouraged to initiate discussions and negotiations with ecology and the attorney general that may lead to an agreement with the state of Washington on the remedial action to be conducted at a site. Ecology and the state will only approve of remedial action if it is an ecology-supervised remedial action.

(a) **Consent decree.** Ecology and the attorney general may require remedial action as part of a settlement agreement with a potentially liable person or a prospective purchaser. A settlement agreement must be entered as a consent decree issued by a court of competent jurisdiction. See RCW 70A.305.040 (4) and (5), and WAC 173-340-520.

(i) **Settlement.** A consent decree may contain a covenant not to sue and provide protection from contribution claims.

(ii) **Initiation.** Negotiations for a consent decree may be initiated by a potentially liable person, a prospective purchaser, or ecology.

(b) **Agreed order.** Ecology may issue an order requiring remedial action with which a potentially liable person or a prospective purchaser agrees to comply. See RCW 70A.305.020(1), 70A.305.050(1), and 70A.305.040(6) and WAC 173-340-530.

(i) **No settlement.** An agreed order is not a settlement agreement and does not contain a covenant not to sue or provide protection from contributions claims.

(ii) **Initiation.** Discussions for an agreed order may be initiated by a potentially liable person, a prospective purchaser, or ecology.

(c) **Enforcement order.** Ecology may issue an enforcement order requiring a potentially liable person to conduct remedial action. See RCW 70A.305.050(1) and WAC 173-340-540.

(3) **Ecology-conducted remedial action.** Ecology may take appropriate remedial action to investigate or clean up a site at any time. Ecology typically conducts remedial action when a potentially liable person cannot be identified or when such persons are technically or financially unable to conduct remedial action. Ecology may seek to recover its remedial action costs from potentially liable persons. Except for emergency actions and initial investigations, ecology will make a reasonable effort to notify potentially liable persons before conducting remedial action. See RCW 70A.305.030(1) and 70A.305.050(3).

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-515 Independent remedial actions. (1) **Purpose.** An independent remedial action is a remedial action conducted without department oversight or approval and not under an order, agreed order or consent decree. This section describes the procedures and requirements

for independent remedial actions. See WAC 173-340-545 for additional requirements pertaining to independent remedial actions anticipated to be part of a private right of action.

(2) **Applicability.** Nothing in this chapter shall preclude potentially liable persons from conducting independent remedial actions at sites not in discussions or negotiations for, or under, an order or decree. However, a potentially liable person may not conduct independent remedial actions after commencing discussions or negotiations for an agreed order or consent decree unless:

(a) Such action does not foreclose or preempt the remedial actions under discussion or negotiation and such action does not foreclose the selection of a cleanup action; or

(b) The potentially liable person has provided reasonable notice to the department and the department does not object to such action.

(3) **Standards.**

(a) In reviewing independent remedial actions, the department shall determine whether the remedial actions meet the substantive requirements of ((~~this chapter~~)) the state cleanup law and/or whether further remedial action is necessary at the site. Persons conducting independent remedial actions do so at their own risk, and may be required to take additional remedial actions if the department determines such actions are necessary. In such circumstances, the department reserves all of its rights to take actions authorized by law.

(b) When this chapter requires a consultation with, or an approval or determination by the department, such a consultation, approval or determination is not necessary in order to conduct an independent remedial action. However, independent remedial actions must still meet the substantive requirements of ((~~this chapter~~)) the state cleanup law.

(c) Except for the requirement of a restrictive covenant under WAC 173-340-440, where documents are required under ((~~this chapter~~)) the state cleanup law, the documents prepared need not be the same in title or format; however, the documents must still contain sufficient information to serve the same purpose. The scope and level of detail in these documents may vary from site to site depending on the site-specific conditions and the complexity of the remedial action.

(4) **Reports to the department.**

(a) **Applicability and timing.**

(i) **Investigations.** Any person who conducts an independent investigation of a release required to be reported under WAC 173-340-300 must submit a written report to the department within 90 days of the completion of the investigation. For the purposes of this subsection:

(A) An investigation is any remedial action conducted as part of a remedial investigation of the site under WAC 173-340-350; and

(B) An investigation is complete if no remedial action other than compliance monitoring has occurred at the site for 90 days. This means that an investigation may need to be reported separately from an interim action or cleanup action and that an individual investigation may need to be reported separately from other investigations of the site.

(ii) **Interim actions and cleanup actions.** Any person who conducts an independent interim action or cleanup action for a release ((~~that is~~)) required to be reported under WAC 173-340-300 ((~~shall~~)) must submit a written report to the department within ((~~ninety~~)) 90 days of the completion of the action. For the purposes of this ((~~section, the department will consider~~)) subsection, an interim action or cleanup action is complete if no remedial action other than compliance moni-

toring has occurred at the site for ((~~ninety~~)) 90 days. ((~~This does not preclude earlier reporting of such actions or reporting of site investigations.~~))

(iii) **Releases from regulated UST systems.** For releases from UST systems regulated under chapter 173-360A WAC, see WAC 173-340-450 for additional requirements for reporting independent remedial actions ((~~for releases from underground storage tanks~~)).

(b) ((~~The~~)) **Content.** An independent remedial action report ((~~shall~~)) must include the information in WAC 173-340-300((~~(2)~~)) (3) if not already reported, and enough information to determine if the ((~~independent~~)) remedial action meets the substantive requirements of ((~~this chapter~~)) the state cleanup law, including((~~,~~)) the results of all site investigations, feasibility studies, interim actions, cleanup actions, and compliance monitoring planned or ((~~under-way~~)) under way. Previously reported information may be summarized and referenced to avoid unnecessary duplication. The report must comply with the requirements in WAC 173-340-840. If a restrictive covenant is used, it must be included in the report and it must meet the requirements specified in WAC 173-340-440(9). The department may require additional reports on the work conducted.

(c) **Initial investigation.** If the independent investigation, interim action, or cleanup action is completed within ((~~ninety~~)) 90 days of release discovery, ((~~a single written report may be submitted on both the release and the action taken. The report shall contain the information specified in provision (b) of this subsection and shall be submitted within ninety days of completion of the remedial action~~)) the department may defer completing any needed initial investigation of the release to enable review of the independent remedial action and report in accordance with WAC 173-340-310 (5)(b).

(d) **Notification.** The department ((~~shall publish in the *Site Register* a notice of all reports on~~)) will notify the public of an independent investigation, interim ((~~actions and~~)) action, or cleanup ((~~actions~~)) action report received under this section((~~. If deemed necessary, the department shall also conduct an initial investigation under WAC 173-340-310~~)) in accordance with WAC 173-340-600(20).

(e) **Liability.** Neither submission of information on an independent remedial action nor any response by the department shall release the person submitting the report or any other person from liability. The department reserves all rights to pursue any subsequent action it deems appropriate.

(5) **Technical consultations.** The department may provide informal advice and assistance (technical consultations) on the administrative and technical requirements of ((~~this chapter~~)) the state cleanup law to persons conducting or otherwise interested in an independent remedial action. Such advice or assistance is advisory only and not binding on the department. This advice may include written opinions. These written opinions shall be limited to whether the independent remedial actions or proposals for those actions meet the substantive requirements of ((~~this chapter~~)) the state cleanup law and/or whether the department believes further remedial action is necessary at the ((~~facility~~)) site.

(a) Upon completing the review of an independent remedial action report or proposal that is voluntarily submitted for the department's review and opinion, the department will:

((~~(a)~~)) (i) Provide a written opinion regarding the remedial actions performed or proposed at the site;

((~~(b)~~)) (ii) Provide a written opinion regarding the remedial actions performed at the site and remove the site ((~~or a portion of the site~~)) from the ((~~hazardous~~)) contaminated sites list if the department has sufficient information to show that the independent remedial actions are appropriate to characterize and address contamination at the site, as ((~~provided for~~)) specified in WAC 173-340-330 ((~~(4)(b)~~)) (5); or

((~~(c)~~)) (iii) Provide a written opinion describing the deficiencies with the remedial action or proposal for a remedial action at the site.

(b) It is the department's policy, in conducting reviews under this subsection, to promote independent remedial actions by delisting sites ((~~or portions of sites~~)) whenever petitions and supporting documents show that the actions taken are appropriate to characterize and address the contamination at the site.

(c) The department will notify the public of a written opinion issued under this subsection in accordance with WAC 173-340-600(20).

(6) **Cost of technical consultations.** For information on the payment of remedial action costs, see WAC 173-340-550(6).

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-520 Consent decrees. (1) **Procedures for consent decrees initiated by potentially liable persons.** To request a consent decree a person shall submit a letter to the department and office of the attorney general via certified mail, return receipt requested, or by personal delivery.

(a) Request. The letter shall describe, based on available information:

(i) The proposed remedial action, including the schedule for the work;

(ii) Information which demonstrates that the settlement will lead to a more expeditious cleanup, be consistent with cleanup standards if the remedial action is a cleanup action, and be consistent with any previous orders;

(iii) The facility, including location and boundaries;

(iv) The environmental problems to be addressed including a description of the releases at the facility and the potential impact of those releases to human health and the environment;

(v) A summary of the relevant historical use or conditions at the facility;

(vi) The date on which the potentially liable person will be ready to submit a detailed proposal;

(vii) Any special scheduling considerations for implementing the remedial actions;

(viii) Names of other persons who the person has reason to believe may be potentially liable persons at the facility; and

(ix) A proposed public participation plan. This proposed plan shall be commensurate with the nature of the proposal and site and shall include the elements listed in WAC 173-340-600(8).

(b) The letter may include:

(i) A waiver of the procedural requirements of WAC 173-340-500 and acceptance, for purposes of settlement, of potentially liable person status.

(ii) The contents of detailed proposal under (g) of this subsection.

(c) A prospective purchaser consent decree is a particular type of consent decree entered into with a person not currently liable for remedial action at the site who proposes to purchase, redevelop, or reuse the site. RCW ((~~70.105D.040~~)) 70A.305.040(5) contains specific statutory requirements for this type of decree. In addition to the information in (a) and (b) of this subsection, a request for a prospective purchaser consent decree shall include:

(i) Identification of all persons proposing to enter into the consent decree and information which demonstrates that those persons are not currently liable for remedial action at the site;

(ii) Information which demonstrates that the settlement will yield substantial new resources to facilitate cleanup;

(iii) A general description of the proposed continued use or redevelopment or reuse of the site, including the proposed schedule for purchase, redevelopment, or reuse; and

(iv) Information describing whether and how the proposed settlement will provide a substantial public benefit.

(d) Recognizing that the steps of the cleanup process may be combined and may vary by site, the information in the request shall be at the level of detail appropriate to the steps in the process for which the consent decree is requested. For example, a request for a consent decree for a remedial investigation/feasibility study should generally include the level of information needed for a site hazard assessment, if not already done by the department, so that the department and the public can evaluate the proposed scope of work and relative priority of the site.

(e) The department may waive part of the letter requirements of (a) of this subsection if the requirements have already been met.

(f) Response. The department shall respond to the request within ((~~sixty~~)) 60 days, unless the department needs additional time to determine potentially liable person status under WAC 173-340-500. This determination will be based in part on a preliminary finding by the department that any resulting consent decree would be in accordance with RCW ((~~70.105D.040~~)) 70A.305.040 (4)(a). The department may:

(i) Request additional information;

(ii) Accept the request and require the person to submit a detailed written proposal by a specified date; or

(iii) Provide written reasons for denying the request.

(g) Contents of detailed proposal. The proposal shall contain:

(i) A proposed technical scope of work describing the remedial action to be conducted;

(ii) The data, studies, or any other information upon which the settlement proposal is based;

(iii) A statement describing the potentially liable person's ability to conduct or finance the remedial action as described in the proposed scope of work;

(iv) A schedule for proposed negotiations and implementation of the proposed remedial actions; and

(v) Any additional information requested by the department.

(h) In addition to the information in (g) of this subsection, the detailed proposal for a prospective purchaser consent decree shall include the following:

(i) Information showing a legal commitment to purchase, redevelop or reuse the site;

(ii) A detailed description including a plan of the proposed continued use, redevelopment, or reuse of the site, including, if necessary, an updated schedule for purchase, redevelopment or reuse;

(iii) Information which demonstrates that the redevelopment or reuse of the site is not likely to contribute to the existing or threatened releases at the site, interfere with remedial actions that may be needed at the site, or increase health risks to persons at or in the vicinity of the site; and

(iv) If the requestor does not propose to conduct the entire cleanup of the site, available information about potentially liable persons who are expected to conduct the remainder of the cleanup.

(i) The department and the office of the attorney general shall determine whether the proposal provides a sufficient basis for negotiations, and shall deliver to the potentially liable person within ((~~sixty~~)) 60 days following receipt of their proposal a written notice indicating whether or not the proposal is sufficient to proceed with negotiations.

(j) Prepayment agreement. Unless otherwise determined by the department, any person who requests a prospective purchaser agreement and receives a notice accepting the request under (f) of this subsection shall enter into a prepayment agreement with the department consistent with WAC 173-340-550(7) before negotiations will begin.

(k) Time limits for negotiations. The department shall set the time period and starting date for negotiations. The department and the office of the attorney general shall then negotiate with those potentially liable persons who have received a notice under (f) of this subsection that their proposal was sufficient to proceed with negotiations. Negotiations may address one or more phases of remedial action. ((~~The length of the negotiation period specified by the department shall be no less than that proposed by the potentially liable person provided it does not conflict with the deadlines established under WAC 173-340-140.~~))

(l) Enforcement stay. For consent decrees that are not prospective purchaser agreements, unless an emergency exists, the department will stay any enforcement action under chapter ((~~70.105D~~)) 70A.305 RCW, but the duration of such stay shall not exceed ((~~one hundred twenty~~)) 120 days from the date negotiations begin. The department can withdraw from negotiations if it determines that:

(i) Reasonable progress is not being made toward a consent decree acceptable to the department; or

(ii) The proposal is inappropriate based on new information or changed circumstances.

The department may begin an enforcement action after notifying the potentially liable person, in writing, of its intent to withdraw from negotiations.

(2) **Procedures for consent decrees initiated by the department.** When the department believes that a consent decree will be a more expeditious method to achieve remedial action at a facility, it may initiate the procedures set forth in this subsection by sending a letter to the potentially liable person. The letter shall be sent via certified mail, return receipt requested, or by personal service.

(a) The letters may be delivered with potentially liable person status letters issued under WAC 173-340-500. The period for negotiation shall not commence until the ((~~thirty-day~~)) 30-day comment period required by WAC 173-340-500 has expired or the person expressly waives the procedural requirements of WAC 173-340-500.

(b) Contents of letter. The letter shall:

(i) Inform potentially liable person(s) that the department and the attorney general want to begin negotiations which may lead to a consent decree providing for remedial action;

(ii) Propose a draft consent decree and scope of work;

(iii) Define the negotiation process and schedule which shall not exceed ((~~ninety~~)) 90 days;

(iv) Reference the department's finding under WAC 173-340-500;

(v) Request a written statement of the potentially liable person's willingness to proceed with the negotiation process defined in the letter; and

(vi) Request the names of other persons whom the person has reason to believe may be potentially liable persons at the facility.

(c) The letter may request the potentially liable person to respond, in writing, to the proposed draft consent decree and scope of work before beginning the negotiation phase.

(d) Negotiations. The department and the office of the attorney general shall negotiate with potentially liable persons who have indicated to the department a willingness to proceed with the negotiations. The negotiation time frame shall begin from the date the potentially liable person receives the letter under (a) of this subsection unless modified by the department. Negotiations may address one or more phases of remedial action.

(e) Enforcement stay. Unless an emergency exists, the department will stay any enforcement action under chapter ((~~70.105D~~)) 70A.305 RCW, but the duration of the stay shall not exceed ((~~ninety~~)) 90 days from the date negotiations begin. The department can withdraw from negotiations if it determines that:

(i) Reasonable progress is not being made toward a consent decree acceptable to the department; or

(ii) The proposal is inappropriate based on new information or changed circumstances. The department may commence with enforcement action after notifying the potentially liable person, in writing, of its intent to withdraw from negotiations.

(f) Deadline extensions. The department may, at its discretion, extend the deadline for negotiations established in (b) of this subsection, provided the extension does not exceed ((~~thirty~~)) 30 days.

(3) **Filing a decree.** After satisfying the public comment and hearing requirements, the department shall determine whether the proposed settlement negotiated under subsection (1) or (2) of this section, is more expeditious and consistent with cleanup standards established and in compliance with any order issued by the department relevant to the remedial action. After making the requisite findings, the department shall forward the proposed consent decree with the findings required by RCW ((~~70.105D.040~~)) 70A.305.040(4), to the office of the attorney general. If agreed to by the office of the attorney general, the consent decree will be filed by that office with the appropriate superior court or the federal court having jurisdiction over the matter.

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-530 Agreed orders. (1) **Purpose.** Agreed orders may be used for all remedial actions. An agreed order means that the potentially liable person agrees to perform remedial actions at the site

in accordance with the provisions of the agreed order and that the department will not take additional enforcement action against the potentially liable person to require those remedial actions specified in the agreed order so long as the potentially liable person complies with the provisions of the order. Since an agreed order is not a settlement, an agreed order shall not provide for mixed funding, a covenant not to sue, or protection from claims for contribution. The department may require additional remedial actions should it deem such actions necessary.

(2) **Procedures for agreed orders initiated by a potentially liable person.**

(a) To request an agreed order, a person shall submit a letter to the department based on available information, describing:

(i) The proposed remedial action including a schedule for the work;

(ii) The facility, including location and boundaries;

(iii) The environmental problems to be addressed, including the releases at the facility and the potential impact of those releases to human health and the environment;

(iv) A summary of the relevant historical use or conditions at the facility;

(v) Names of other persons whom the person has reason to believe may be potentially liable persons at the facility; and

(vi) A proposed public participation plan. This proposed plan shall be commensurate with the nature of the proposal and site and shall include, at a minimum, the elements listed in WAC 173-340-600(8).

(b) The letter may include a waiver of the procedural requirements of WAC 173-340-500, and acceptance, for purposes of the agreed order, of potentially liable person status.

(c) Recognizing that the basic steps of the cleanup process may be combined and may vary by site, the information in the request shall be at the level of detail appropriate to the step in the process for which the order is requested. For example, a request for an agreed order for a remedial investigation/feasibility study should generally include the level of information needed for a site hazard assessment, so that the department and the public can evaluate the proposed scope of work and relative priority of the site.

(d) The department may waive part of the letter requirements of (a) of this subsection if the requirements have already been met.

(3) **Department response to PLP-initiated request.** The department shall respond to the request within ((~~sixty~~)) 60 days, unless the department needs additional time to determine potentially liable person status under WAC 173-340-500. The department may:

(a) Request additional information;

(b) Proceed with discussions, if the department believes it is in the public interest to do so; or

(c) Provide written reasons for denying the request.

(4) **Procedures for agreed orders initiated by the department.** When the department believes that an agreed order is an appropriate method to achieve remedial action at a facility, it may initiate the request for an agreed order.

(5) **Duration of discussions.** Discussions on the agreed order shall not exceed ((~~sixty~~)) 60 days unless the department decides continued discussions are in the public interest.

(6) **Enforcement.** Unless an emergency exists, the department will stay any enforcement action under chapter ((~~70.105D~~)) 70A.305 RCW;

however, the duration of such stay shall not exceed ((~~sixty~~)) 60 days from the date discussions begin. Furthermore, the department can withdraw from discussions if it determines that:

(a) Reasonable progress is not being made toward an agreed order acceptable to the department; or

(b) The agreed order is inappropriate based on new information or changed circumstances.

The department may begin an enforcement action after notifying the potentially liable person in writing of its intent to withdraw from discussions.

(7) **Focus of discussions.** The focus of discussions for the agreed order shall ordinarily be the technical scope of work and work schedule. This subsection is not intended to preclude discussion on any item. It is intended to convey the expectation that the scope of work and work schedule will be the primary topics of discussion in developing agreed orders.

(8) **Public participation.**

(a) When issuing an agreed order, the department shall provide ((~~appropriate public participation opportunities under~~)) or require public notice in accordance with WAC 173-340-600(11).

(b) If the department and the potentially liable person signing the order agree to substantial changes in the order, the department shall provide ((~~appropriate~~)) or require additional public notice ((~~and opportunity to comment~~)) in accordance with WAC 173-340-600(11).

AMENDATORY SECTION (Amending WSR 90-08-086, filed 4/3/90, effective 5/4/90)

WAC 173-340-540 Enforcement orders. The department may issue an enforcement order requiring remedial action after issuing a notice of potentially liable person status letter under WAC 173-340-500. In emergencies, the notice of potentially liable person status may occur concurrently with the issuance of the order. Unless an emergency requires otherwise, the issuance of a potentially liable person status letter shall precede or take place concurrently with the issuance of an enforcement order. Furthermore, except in an emergency, the department shall issue its determination under WAC 173-340-500(4) before an enforcement order can become effective. Failure to comply with an enforcement order may result in substantial liability for costs and penalties as specified in RCW ((~~70.105D.050~~)) 70A.305.050.

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-545 Private rights of action. (1) **Purpose.** A private right of action is a legal claim authorized by RCW ((~~70.105D.080~~)) 70A.305.080 under which a person may recover costs of remedial action from other persons liable under the act. RCW ((~~70.105D.080~~)) 70A.305.080 limits recovery of remedial action costs to those remedial actions that, when evaluated as a whole, are the substantial equivalent of a department-conducted or department-supervised remedial action. The purpose of this section is to facilitate private rights of action and minimize department staff involvement in

these actions by providing guidance to potentially liable persons and the court on what remedial actions the department would consider the substantial equivalent of a department-conducted or department-supervised remedial action. In determining substantial equivalence, the department anticipates the requirements in this section will be evaluated as a whole and that a claim would not be disallowed due to omissions that do not diminish the overall effectiveness of the remedial action.

(2) **Substantial equivalent.** For the purposes of this section, the department considers the following remedial actions to be the substantial equivalent of a department-conducted or department-supervised remedial action.

(a) A remedial action conducted by the department;

(b) A remedial action that has been or is being conducted under an order or decree and the remedial requirements of the order or decree have been satisfied for those portions of the remedial action for which the private right of action is being sought; or

(c) A remedial action that has been conducted as an independent remedial action that includes the following elements:

(i) Information on the site and remedial actions conducted has been reported to the department in accordance with WAC 173-340-300, 173-340-450 and 173-340-515, as applicable;

(ii) The department has not objected to the remedial action being conducted or any such objection has been cured as determined by the court;

(iii) Except for emergency remedial actions, before conducting an interim action or cleanup action, reasonable steps have been taken to provide advance public notice;

(iv) The remedial actions have been conducted substantially equivalent with the technical standards and evaluation criteria described in subsection (4) of this section; and

(v) For facilities where hazardous substances have been disposed of as part of the remedial action, documentation is available indicating where these substances were disposed of and that this disposal was in compliance with applicable state and federal laws. It is not the intent of this provision to require extensive documentation. For example, if the remedial action results in solid wastes being transported offsite for disposal, it would be sufficient to have records indicating the wastes have been disposed of at a permitted solid waste or hazardous waste landfill.

(3) **Public notice requirements.** This subsection shall be used to determine if reasonable steps have been taken to provide advance public notice under subsection (2)(c)(iii) of this section. These public notice procedures apply only to interim actions or cleanup actions conducted as independent remedial actions after December 25, 1993. The notice may be combined with any notices under another law. For interim actions or cleanup actions conducted as independent remedial actions before December 25, 1993, the department recognizes little or no public notification typically occurred because there were no department-specified requirements other than the reporting requirements in this chapter. For these actions, this chapter contains no other specific public notice requirements or guidance, and the court will need to determine such requirements, if any, on a case-by-case basis. For independent remedial actions consisting of site investigations and studies, it is anticipated that public notice would not normally be done since often these early phases of work are to determine if a release even requires an interim action or cleanup action. For the purposes of

this section only, unless the court determines other notice procedures are adequate for the site-specific circumstances, the following constitutes adequate public notice for independent remedial actions and supersedes the requirements in WAC 173-340-600:

(a) Except for emergency remedial actions, written notification has been ((~~mailed~~)) provided at least ((~~fifteen~~)) 15 days before beginning construction of the interim action or cleanup action to the last known address of the following persons:

(i) The department (which shall publish a summary of the notice in the *Contaminated Site Register*);

(ii) The local jurisdictional health department/district;

(iii) The town, city or county with land use jurisdiction;

(iv) The land owners identified by the tax assessor at the time the action is begun for that portion of the facility where the interim action or cleanup action is being conducted; and

(v) Persons potentially liable under RCW ((~~70.105D.040~~)) 70A.305.040 known to the person conducting the interim action or cleanup action. In identifying persons potentially liable under RCW ((~~70.105D.040~~)) 70A.305.040 who are to be noticed under this provision, the person conducting the remedial action need only make a reasonable effort to review information currently readily available. Where the interim action or cleanup action is complex, written notification before beginning detailed design is recommended but not required. For emergency remedial actions, written notice should be provided as soon as practicable;

(b) The written notification includes: A brief statement describing the releases being remedied and the interim actions or cleanup actions expected to be conducted; the schedule for these interim actions or cleanup actions; and, for persons potentially liable under RCW ((~~70.105D.040~~)) 70A.305.040 known to the person conducting the interim actions or cleanup actions, a statement that they could be held liable for the costs of remedial actions being conducted; and

(c) Posting a sign at the site at a location visible to the general public indicating what interim actions or cleanup actions are being conducted and identifying a person to contact for more information. Except for emergency remedial actions this sign should be posted not later than the beginning of construction of any interim action or cleanup action and should remain posted for the duration of the construction. For emergency remedial actions posting of a sign should be done as soon as practicable;

(4) **Technical standards and evaluation criteria.** This subsection shall be used to determine if the remedial actions have been conducted substantially equivalent with the technical standards and evaluation criteria contained in this chapter. For the purposes of this section, remedial actions shall be deemed to comply with subsection (2)(c)(iv) of this section if they have been conducted substantially equivalent with the technical standards and evaluation criteria contained in the following sections, where applicable. Except for a restrictive covenant under WAC 173-340-440, where documents are required by the following sections, the documents prepared need not be the same in title or format. Other documents can be used in place of the documents specified in these sections as long as sufficient information is included in the record to serve the same purpose. When using the following sections to determine substantial equivalence it should be recognized that there are often many alternative methods for cleanup of a facility that would comply with these provisions. When this chapter requires a consultation with, or an approval or determination by the

department, such a consultation, approval or determination is not necessary for remedial actions to meet the substantial equivalence requirement under this section; however, the remedial action must still be conducted substantially equivalent with the substantive requirements of those provisions. In applying these sections, reference should be made to the other applicable sections of this chapter, with particular attention to WAC 173-340-130 (Administrative principles), WAC 173-340-200 (Definitions), and WAC 173-340-210 (Usage).

(a) WAC 173-340-350 (Remedial ((~~investigation/feasibility study~~)) investigation);

(b) WAC 173-340-351 (Feasibility study);

(c) WAC 173-340-355 (Development of cleanup action alternatives that include remediation levels);

((~~(c)~~)) (d) WAC 173-340-357 (Quantitative risk assessment of cleanup action alternatives);

((~~(d)~~)) (e) WAC 173-340-360 (((~~Selection of~~)) Cleanup ((~~actions~~)) action requirements);

((~~(e)~~)) (f) WAC 173-340-370 (Cleanup action expectations);

(g) WAC 173-340-380 (Cleanup action plan);

((~~(f)~~)) (h) WAC 173-340-400 (Cleanup action((~~s~~)) implementation);

((~~(g)~~)) (i) WAC 173-340-410 (Compliance monitoring requirements);

((~~(h)~~)) (j) WAC 173-340-430 (Interim actions);

((~~(i)~~)) (k) WAC 173-340-440 (Institutional controls);

((~~(j)~~)) (l) WAC 173-340-450 (Releases from regulated underground storage ((~~tanks~~)) tank systems);

((~~(k)~~)) (m) WAC 173-340-700 through 173-340-760 (Cleanup standards); and

((~~(l)~~)) (n) WAC 173-340-810 through 173-340-850 (General provisions).

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-550 Payment of remedial action costs. (1) **Policy.** RCW ((~~70.105D.050~~)) 70A.305.050(3) requires that the state seek to recover the amounts spent by the department for investigative and remedial actions and orders. It is the department's intention to recover those costs which are reasonably attributable to individual sites. Timing of cost recovery for individual sites will be considered on a case-by-case basis, however, the department may demand, and generally requires, payment of costs as they are incurred.

(2) **Costs.** Each person who is liable under chapter ((~~70.105D~~)) 70A.305 RCW is liable for remedial action costs incurred by the department. Remedial action costs are costs reasonably attributable to the site and may include costs of direct activities, support costs of direct activities, and interest charges for delayed payments. The department may send its request for payment to all potentially liable persons who are under an order or decree for the remedial action costs at the site. The department shall charge an hourly rate based on direct staff costs plus support costs. It is the department's intention that the resulting hourly rate charged be less than the hourly rate typically charged by a comparably sized consulting firm providing similar services. The department shall use the following formula for computing hourly rates:

Hourly Rate = DSC + DSC(ASCM) + DSC(PSCM), where:

DSC = Direct Staff Costs defined in (a) of this subsection.

ASCM = Agency Support Cost Multiplier defined in (b) of this subsection.

PSCM = Program Support Cost Multiplier defined in (c) of this subsection.

(a) Costs of direct activities are direct staff costs and other direct costs. Direct staff costs (DSC) are the costs of hours worked directly on a contaminated site, including salaries, retirement plan benefits, Social Security benefits, health care benefits, leave and holiday benefits, and other benefits required by law to be paid to, or on behalf of, employees. Other direct costs are costs incurred as a direct result of department staff working on a contaminated site including, for example, costs of: Travel related to the site, printing and publishing of documents about the site, purchase or rental of equipment used for the site, and contracted work for the site.

(b) Agency support costs are the costs of facilities, communications, personnel, fiscal, and other statewide and agency-wide services. The agency support cost multiplier (ASCM) used shall be the agency indirect rate approved by the agency's federal cognizant agency (which, as of July 1, 1993, was the United States Department of the Interior) for each fiscal year.

(c) Program support costs are the costs of administrative time spent by site managers and other staff who work directly on sites and a portion of the cost of management, clerical, policy, computer, financial, ((~~citizen technical advisor,~~)) and other support provided by other program staff to site managers and other staff who work directly on sites. Other activities of the toxics cleanup program not included in program support costs include, for example, community relations not related to a specific site, policy development, and a portion of the cost of nonsite management, clerical, policy, computer, financial, and other support staff. The program support cost multiplier (PSCM) used shall be calculated by dividing actual program support costs by the direct staff costs of all hours charged to site related work. This multiplier shall be evaluated at least biennially and any changes published in at least two publications of the *Contaminated Site Register*. The calculation and source documents used in any revision shall be audited by either the state auditor's office or a private accounting firm. Audit results shall be available for public review. This multiplier shall not exceed 1.0 (one).

(3) **Request for payment.** When the department requests payment of remedial action costs it shall provide an itemized statement documenting the costs incurred.

(4) **Interest charges.** A charge of ((~~twelve~~)) 12 percent interest (annual percentage rate, compounded monthly) shall accrue on all remedial action costs not paid within ((~~ninety~~)) 90 days of the billing date, or within another longer time period designated by the department.

(5) **Natural resource damages.** Nothing in this section shall affect the authority of the department and the office of attorney general to recover natural resource damages.

(6) **Independent remedial actions.**

(a) The department may collect, from persons requesting a site-specific technical consultation under WAC 173-340-515, the costs incurred by the department in providing such advice and assistance.

(b) For situations where the department has decided to collect its costs, a refundable deposit of a reasonable amount will be re-

quired. The department's hourly costs shall be determined based on the method in ((~~WAC 173-340-550(2)~~)) subsection (2) of this section.

(c) The department's Toxics Cleanup Program manager or designee may make a discretionary, nonappealable decision on whether a person is eligible for a waiver of fees based on that person's ability to pay.

(d) The department shall waive collection of its costs, where appropriate, in providing technical assistance in support of an appropriate level of public participation or where the department's time in responding to the request is de minimis.

(7) **Prepayment of costs.**

(a) Persons potentially liable under this chapter or seeking a prospective purchaser agreement may request the department's oversight of remedial actions through a prepayment agreement. The purpose of such an agreement is to enable department oversight of remedial actions at lower priority sites. The department shall make a determination that such an agreement is in the public interest. A prepayment agreement requires a person to pay the department's remedial action costs, in advance, allowing the department to increase staff for the unanticipated workload. Agreements may cover one or more facilities. Whether the department can respond favorably to a request for a prepayment agreement will depend, in part, on the department and attorney general receiving authorization for the staffing necessary to implement the agreement. Persons interested in such an agreement are encouraged to contact the department early on to informally discuss the potential for using such an agreement at a facility.

(b) Prepayment agreements do not replace an order or decree but are preliminary to or work in conjunction with such documents. Persons entering into a prepayment agreement shall enter into good faith negotiations on an agreed order or consent decree governing remedial actions at the facility in accordance with the procedures described in WAC 173-340-520(1) or 173-340-530(2). Failure to successfully conclude such negotiations may result in the department withdrawing from the prepayment agreement or initiating enforcement action.

AMENDATORY SECTION (Amending WSR 90-08-086, filed 4/3/90, effective 5/4/90)

WAC 173-340-560 Mixed funding. (1) **Introduction.** Under RCW ((~~70.105D.070 (2)(d)(xi)~~)) 70A.305.190 (4)(a)(v), the department may provide public funds from the ((~~state~~)) model toxics control capital account to a potentially liable person for the purpose of assisting with the payment of remedial action costs regardless of when incurred. This assistance can be provided in the form of a loan or a contribution, in cash or in kind. Any funding decision under this section is solely the responsibility of the director.

(2) **Applicability and request.**

(a) Mixed funding shall be provided only to potentially liable persons whom the department has found to be eligible and who have entered into a consent decree with the department under the requirements of this chapter.

(b) The consent decree shall identify remedial action tasks to be addressed by the mixed funding, costs to be borne by the potentially liable person, costs to be borne by the ((~~state~~)) model toxics control capital account and terms of the agreement. In the case of loans, the

consent decree shall also define any terms and conditions under which the potentially liable person receiving mixed funding has agreed to reimburse the ((~~state~~)) model toxics control capital account.

(c) The potentially liable person shall submit sufficient documentation to support its request for mixed funding.

(3) **Eligibility and mixed funding criteria.** The director shall make a determination, based upon specific criteria whether a proposal is eligible for funding. The only circumstances under which mixed funding can be approved by the department are when the funding will achieve both:

(a) A substantially more expeditious or enhanced cleanup than would otherwise occur; and

(b) The prevention or mitigation of unfair economic hardship. In considering this criterion the department shall consider the extent to which mixed funding will either:

(i) Prevent or mitigate unfair economic hardship faced by the potentially liable person if the remedial action plan were to be implemented without public funding; or

(ii) Achieve greater fairness with respect to the payment of remedial action costs between the potentially liable person entering into a consent decree with the department and any nonsettling potentially liable persons.

(4) **Funding decision.** The department may have informal discussions on mixed funding. If a potentially liable person is found to be eligible for mixed funding, the director shall make a determination regarding the amount of funding to be provided, if any. This shall be determined at the discretion of the director and is not subject to review. A determination of eligibility is not a funding commitment. Actual funding will depend on the availability of funds.

(5) The department may recover the amount of public funding spent on investigations and remedial actions from potentially liable persons who have not entered into a consent decree under this chapter. For purposes of such cost recovery action, the amount in mixed funding attributed to the site shall be considered as remedial action costs paid by the department.

PART ((~~VI~~)) 6 - PUBLIC PARTICIPATION AND TRIBAL ENGAGEMENT

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-600 Public ((~~notice~~)) notification and participation. (1) **Purpose.** Public participation is an integral part of ((~~the department's~~)) ecology's responsibilities under chapter 70A.305 RCW, the Model Toxics Control Act. ((~~The department's~~)) Ecology's goal is to provide the public with timely information and meaningful opportunities for participation that are commensurate with each site. ((~~The department~~)) Ecology will meet this goal through a public participation program that includes:

((~~The~~)) (a) Site-specific information on ecology's website;

(b) A *Contaminated Site Register* and, if requested, site-specific electronic alerts of changes to site information; and

(c) For ecology-conducted and ecology-supervised remedial actions, early planning and development of ((~~a~~)) site-specific public participation ((~~plan; the provision of~~)) plans, public ((~~notices; a site register;~~)) notice of proposed actions, and public meetings or hearings((~~; and the participation of regional citizens' advisory committees.~~

~~(2) **Other requirements.** In addition to the requirements in this section, other sections of this chapter contain specific notice requirements that must also be followed. See WAC 173-340-720 for notice requirements on an off-property conditional point of compliance and cleanup levels for groundwater flowing into nearby surface water; WAC 173-340-545 for public notice requirements for private rights of action; WAC 173-340-440 for local government notification requirements for restrictive covenants; and WAC 173-340-310 for public notice requirements for emergency or interim actions required by the department as a result of an initial investigation~~)).

(2) **Public notice.** Whenever public notice of a proposed action is required under this chapter, ecology will provide or require at least the following notice and opportunity to comment.

(a) **Notification methods.**

(i) **Website.** Ecology will make the proposed action publicly available on ecology's website under subsection (5) of this section;

(ii) **Electronic alert.** If requested, ecology will alert a person electronically of the proposed action's availability under subsection (6) of this section;

(iii) ***Contaminated Site Register.*** Ecology will provide notice of the proposed action's availability in the *Contaminated Site Register* under subsection (7) of this section.

(iv) **Persons requesting notice.** Written notice must be sent to persons who have made a timely request of ecology. A request for notice is timely if received before or during the public comment period for the current phase of remedial action at the site. However, the receipt of a request for notice does not require ecology to extend the comment period associated with the notice. Ecology may use an electronic alert under subsection (6) of this section to satisfy this requirement.

(v) **Persons residing within potentially affected vicinity.** Written notice must be sent to persons residing within the potentially affected vicinity of the proposed action. The potentially affected vicinity includes all property within and contiguous to the site and any other area that ecology determines to be directly affected by the proposed action.

(vi) **Appropriate news media.** Written notice of the proposed action must be sent to any news media that ecology determines to be appropriate. Ecology may consider how a news medium compares with the newspaper of largest circulation in terms of: Audience reached; timeliness; adequacy in conveying the particular information in the notice; cost; or other relevant factors.

(vii) **Newspaper publication.** If required under chapter 70A.305 RCW or by ecology, written notice of the proposed action must be published in the newspaper of largest circulation in the city or county of the proposed action, by one or more of the following methods: Display ad; legal notice; or any other appropriate format, as determined by ecology.

(b) **Comment opportunity.**

(i) **Comment periods.** A public notice must indicate the public comment period on the proposed action. Unless otherwise specified in this chapter, the public comment period must be at least 30 days. Ecology may extend the public comment period, as appropriate.

(ii) **Public meetings.** During any comment period announced by a public notice issued under this chapter, if 10 or more persons request a public meeting on the subject of the public notice, ecology will hold a public meeting for the purpose of receiving comments.

(c) **Consolidating notice and comment opportunities.** Whenever reasonable, ecology will consolidate public notice required under this chapter with notice and comment opportunities required under other laws and regulations.

(d) **Site-specific risk assessment.** For public notices describing cleanup plans that use site-specific risk assessment or would restrict future site or resource use, the public notice must specifically identify the restrictions and invite comments on these elements of the cleanup plan. This notice must also include a statement indicating the availability of public participation grants.

(3) ((**Criteria.** ~~In order~~)) **Additional opportunities.** To promote effective and meaningful public participation, ((~~the department may determine that~~)) ecology may provide or require public participation opportunities in addition to those specifically required ((~~by chapter 70.105D RCW, or~~)) under this chapter((~~, are appropriate and should be provided~~)). In making this determination, ((~~the department~~)) ecology may consider:

(a) Known or potential risks to human health and the environment that could be avoided or reduced by providing information to the public;

(b) Public concerns about the ((~~facility~~)) site;

(c) The need to contact the public in order to gather information about the ((~~facility~~)) site;

(d) The extent to which the public's opportunity to affect subsequent ((~~departmental~~)) ecology decisions at the ((~~facility~~)) site may be limited or foreclosed ((~~in the future~~));

(e) The need to prevent disclosure of confidential, unverified, or enforcement-sensitive information;

(f) The routine nature of the contemplated remedial action; ((~~and~~))

(g) Interest in expediting remedial action at the site; and

(h) Any other factors as determined by ((~~the department~~)) ecology.

(4) ((**Public notice.** ~~Whenever public notice is required by chapter 70.105D RCW, the department shall, at a minimum, provide or require notice as described in this section except as specified for the biennial report in WAC 173-340-340.~~

~~(a) Request for notice. Notice shall be mailed to persons who have made a timely request. A request for notice is timely if received before or during the public comment period for the current phase of remedial action at the facility. However, the receipt of a request for notice shall not require the department to extend the comment period associated with the notice.~~

~~(b) Mail. Notice shall be mailed to persons who reside within the potentially affected vicinity of the proposed action. The potentially affected vicinity shall include all property within and contiguous to the site and any other area that the department determines to be directly affected by the proposed action.~~

~~(c) Newspaper publication. Notice of the proposed action shall be published in the newspaper of largest circulation in the city or county of the proposed action, by one or more of the following methods: Display ad; legal notice; or any other appropriate format, as determined by the department.~~

~~(d) Other news media. Notice of the proposed action shall be mailed to any other news media that the department determines to be appropriate. The department may consider how a medium compares with the newspaper of largest circulation in terms of: Audience reached; timeliness; adequacy in conveying the particular information in the notice; cost; or other relevant factors.~~

~~(e) Comment periods. All public notices shall indicate the public comment period on the proposed action. Unless stated otherwise, comment periods shall be for thirty days at a minimum. The department may extend the public comment period, as appropriate.~~

~~(f) Combining public comment requirements. Whenever reasonable, the department shall consolidate public notice and opportunities for public comment under this chapter with public notice and comment requirements under other laws and regulations.~~

~~(g) Site-specific risk assessment. For public notices describing cleanup plans that use site-specific risk assessment or would restrict future site or resource use, the public notice shall specifically identify the restrictions and invite comments on these elements of the cleanup plan. This notice shall also include a statement indicating the availability of public participation grants and of the department's citizen technical advisor for providing technical assistance to citizens on site-specific risk assessment and other issues related to site remediation.~~

~~(5) **Public meetings.** During any comment period announced by a public notice issued under this chapter, if ten or more persons request a public meeting on the subject of the public notice, the department shall hold a public meeting for the purpose of receiving comments.~~

~~(6)~~)) **Additional methods.** ((~~In addition to "public notice" required by chapter 70.105D RCW, or this chapter, the department may use any of the following methods~~)) To provide information to the public, ecology may use or require any of the following methods in addition to those specifically required under this chapter:

(a) Press releases;
(b) Fact sheets;
(c) Public meetings and transcription of such meetings;
(d) Publications;
(e) Personal contact by ((~~department~~)) ecology employees;
(f) Posting signs at the ((~~facility~~)) site;
(g) Notice in the *Contaminated Site Register*;
(h) Notice through the internet;
(i) Any other methods as determined by ((~~the department~~)) ecology.

(5) **Site-specific information on website.** For sites on the contaminated sites list and the no further action sites list, ecology will make at least the following site-specific information publicly available on ecology's website:

(a) The date ecology or PLIA discovered or received notice of the release or, if this date is not known, the earliest date of administrative activity in ecology's site database;

(b) The site's current listing and remedial action status identified under WAC 173-340-330;

(c) The site's current hazard rankings identified under WAC 173-340-320;

(d) Any initial investigation report prepared under WAC 173-340-310;

(e) For ecology-conducted or ecology-supervised remedial actions:

(i) Any proposed action requiring public notice under this chapter; and

(ii) Any final cleanup action plan issued under WAC 173-340-380;

(f) For independent remedial actions:

(i) Any independent investigation, interim action, or cleanup action report required under WAC 173-340-515(4) and received by ecology; and

(ii) The results of any ecology review of an independent remedial action, including any written opinion issued by ecology under WAC 173-340-515(5);

(g) Whether institutional controls are currently required, and any document implementing, amending, or removing an institutional control under WAC 173-340-440;

(h) Whether periodic reviews are currently required, and any periodic review report prepared under WAC 173-340-420;

(i) Instructions on how to sign up for the site-specific electronic alerts provided by ecology under subsection (6) of this section; and

(j) Any other information ecology considers appropriate for inclusion.

(6) **Site-specific electronic alerts.** For sites on the contaminated sites list and the no further action sites list, ecology will provide a person, if requested, a site-specific electronic alert when the site information specified in subsection (5) of this section is added or changed on ecology's website.

(a) **Method.** Ecology will establish the means for providing the site-specific electronic alerts.

(b) **Instructions.** Ecology will provide instructions on how to sign up for the site-specific electronic alerts on ecology's website under subsection (5) of this section and in any public notice required under this chapter.

(7) ***Contaminated Site Register.*** ((~~The department shall regularly publish, make available electronically, and maintain a publication called the *Site Register*, which provides notice of the following:~~

~~(a) Determinations of no further action under WAC 173-340-320;~~

~~(b) Results of site hazard rankings;~~

~~(c) Availability of annual and biennial reports;~~

~~(d) Issuance of enforcement orders, agreed orders, or proposed consent decrees;~~

~~(e) Public meetings or hearings;~~

~~(f) Scoping notice of department-conducted remedial investigation/feasibility study;~~

~~(g) Availability of remedial investigation/feasibility study reports and draft and final cleanup plans;~~

~~(h) Change in site status or placing sites on or removing sites from the hazardous sites list under WAC 173-340-330;~~

~~(i) Availability of engineering design reports under WAC 173-340-400;~~

~~(j) Schedules developed under WAC 173-340-140;~~

~~(k) Reports of independent cleanup actions received under WAC 173-340-300;~~

~~(l) Beginning of negotiations or discussions under WAC 173-340-520 and 173-340-530;~~

~~(m) Deadline extensions or missed deadlines under WAC 173-340-140;~~

~~(n) A summary of any notices received under WAC 173-340-545 for cleanup actions and interim actions being conducted where a private right of action is anticipated;~~

~~(o) A list of available department publications, including guidance, technical reports and policies pertinent to remedial actions;~~

~~(p) The results of department review of reports on independent remedial actions submitted under WAC 173-340-515; and~~

~~(q) Any other notice that the department considers appropriate for inclusion.~~)) Ecology will maintain and regularly publish a *Contaminated Site Register*.

(a) **Publication.** Ecology will establish the method for publishing the *Contaminated Site Register*, which may include making it publicly available on ecology's website, electronically distributing it to interested persons, or any other method deemed appropriate by ecology.

(b) **Content.** Ecology will include notice of the following in the *Contaminated Site Register*:

(i) The availability of any legislative report required under chapter 70A.305 RCW related to remedial action;

(ii) Any rule-making notice requiring publication in the *Washington State Register* under chapter 34.05 RCW related to remedial action;

(iii) The availability of any ecology publication related to remedial action, including any new, revised, or rescinded interpretive or policy statement requiring notice in the *Washington State Register* under RCW 34.05.230;

(iv) Any proposed substantive change to the site hazard assessment and ranking process developed under WAC 173-340-320(2);

(v) Any update to ecology's strategic plans or performance assessments required under WAC 173-340-340 (1) and (3);

(vi) Any additional resource allocation factors specified by the legislature or ecology under WAC 173-340-340 (2)(d);

(vii) Any proposed model remedy developed under WAC 173-340-390(2);

(viii) Any change to the program support cost multiplier calculated under WAC 173-340-550 (2)(c);

(ix) Any change to the list of ecology-approved sampling and analysis methods maintained under WAC 173-340-830 (4)(a);

(x) Any initial investigation determination under WAC 173-340-310(6) resulting in the listing of a site on either the contaminated sites list or the no further action sites list. The notice must include instructions on how to sign up for electronic alerts about the site under subsection (6) of this section;

(xi) For ecology-conducted or ecology-supervised remedial actions:

(A) Any initiation of a negotiation for a consent decree under WAC 173-340-520 or a discussion for an agreed order under WAC 173-340-530;

(B) Any proposed action requiring public notice under this chapter, including any related public meeting or hearing; and

(C) Any issuance of a final cleanup action plan under WAC 173-340-380;

(xii) For independent remedial actions:

(A) Any notice of a planned independent interim action or cleanup action submitted to ecology in anticipation of a private right of action under WAC 173-340-545 (3)(a); and

(B) Any proposed area-wide groundwater conditional point of compliance under WAC 173-340-720 (8)(d)(iii)(D); and

(xiii) Any other notice that ecology considers appropriate for inclusion.

(8) **Evaluation of public participation needs.** ((~~As part of requiring or conducting a remedial action at any facility, the department shall~~)) For ecology-conducted and ecology-supervised remedial actions, ecology will evaluate public participation needs at the ((~~facility~~)) site. The evaluation ((~~shall~~)) must include an identification of the potentially affected vicinity for the remedial action. For sites where site-specific risk assessment is used, ((~~the department shall~~)) ecology will also evaluate public interest in the site, significant public concerns regarding future site use, and public values to be addressed through the public participation plan.

(9) **Public participation plans.** For ecology-conducted and ecology-supervised remedial actions, except emergency remedial actions, ecology will ensure that a public participation plan is developed and implemented.

(a) **Purpose and scope.** ((~~The~~)) A public participation ((~~plans required by this section are~~)) plan is intended to encourage a coordinated and effective public involvement tailored to the public's needs at a ((~~particular facility~~)) site, and facilitate equitable participation by the public. The scope of ((~~a~~)) the plan ((~~shall~~)) must be commensurate with ((~~the nature of the proposed remedial actions; the level of public concern; and the risks posed by the facility~~)):

(i) The threats posed by the site to human health and the environment, including likely vulnerable populations and overburdened communities;

(ii) The level of public concern regarding the threats; and

(iii) The nature of the proposed remedial actions to address the threats.

(b) **Early planning encouraged.** In order to develop an appropriate plan, ((~~the department~~)) ecology or a potentially liable person or prospective purchaser (if submitting a plan to ((~~the department~~)) ecology) should engage in an early planning process to assess the public participation needs at the ((~~facility~~)) site, including the needs of likely vulnerable populations and overburdened communities. This process may include identifying and conferring with individuals, community groups, indigenous peoples, local governments, ((~~tribes,~~)) public agencies, or any other organizations that may have an interest in or knowledge of the ((~~facility~~)) site.

(c) **((~~Plan~~)) Development.** ((~~The department shall~~)) Ecology will develop the plan, or work with ((~~the~~)) a potentially liable person or prospective purchaser to develop the plan.

(i) If a plan already exists for ((~~a facility, the department shall~~)) the site, ecology will consider whether the existing plan is still appropriate or whether the plan should be amended. For example, a plan originally developed to address a remedial investigation/feasibility study may need to be amended to address implementation phases.

((~~(d) Plans required. As part of requiring or conducting a remedial action, except emergency actions, at any site that has been assigned a hazard ranking score, the department shall ensure that a public participation plan is developed and implemented. The department may also require the development of a public participation plan as~~

~~part of an agreed order (see WAC 173-340-530) or consent decree (see WAC 173-340-520) for facilities that have not been assigned a hazard ranking score.~~

~~(e) If the variables proposed to be modified in a site-specific risk assessment or alternative reasonable maximum exposure scenario may affect the significant public concerns regarding future land uses and exposure scenarios, then the department shall assure appropriate public involvement and comment opportunities will occur as identified in the public participation plan.~~

~~(f) Plan as part of order or decree.~~)) (ii) Unless otherwise directed by ecology, a potentially liable person ((~~will ordinarily be required to~~)) or prospective purchaser requesting an agreed order under WAC 173-340-530 or a consent decree under WAC 173-340-520 must submit a proposed ((~~public participation~~)) plan as part of its request ((~~for an agreed order or a consent decree~~)). If a plan already exists for the ((~~facility~~)) site, the potentially liable person or prospective purchaser may either resubmit the existing plan with any proposed amendments or submit an entirely new proposed plan. The proposed plan may be revised during the course of discussions ((~~or negotiations~~)) on the agreed order ((~~(see WAC 173-340-530)~~)) or negotiations on the consent decree ((~~(see WAC 173-340-520)~~)). The final ((~~public participation~~)) plan may become part of the agreed order or consent decree.

((~~(g)~~)) (d) **Contents.** ((~~The~~)) A public participation plan ((~~shall~~)) must include the following:

(i) Applicable public notice requirements and how these will be met, including:

(A) When public notice will occur;

(B) The length of the comment periods accompanying each notice; and

(C) The potentially affected vicinity and any other areas to be provided notice, to the extent known((~~.~~));

(ii) Information repositories. The plan should identify at least one location where the public can review information about the remedial action. Multiple locations may be appropriate((~~.~~));

(iii) Methods of identifying the public's concerns. Such methods may include((~~:~~)) interviews((~~:~~)), questionnaires((~~:~~)), meetings((~~:~~)), contacts with community groups or other organizations that have an interest in the site((~~:~~)), or establishing citizen advisory groups for sites; ((~~or obtaining advice from the appropriate regional citizens' advisory committee.~~))

(iv) Methods of addressing the public's concerns and conveying information to the public. These may include any of the methods listed in subsection ((~~(6)~~)) (4) of this section((~~.~~));

(v) Coordination of public participation requirements. The plan should identify any public participation requirements of other applicable federal, state or local laws, and address how such requirements can be coordinated. For example, if ((~~Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)~~)) the federal cleanup law applies to the proposed action, the plan should explain how ((~~CERCLA~~)) the federal cleanup law and this chapter's public comment periods will be coordinated((~~.~~));

(vi) Amendments to the plan. The plan should outline the process for amending the plan. Any amendments must be approved by ((~~the department.~~

~~(vii) Citizen technical advisor: A statement indicating the availability of the department's citizen technical advisor for provid-~~

~~ing technical assistance to citizens on issues related to the investigation and cleanup of the site.~~

~~(viii)~~)) ecology; and

(vii) Any other elements that ((~~the department~~)) ecology determines to be appropriate for inclusion in the final public participation plan.

((~~(h)~~)) (e) **Site-specific risk assessment.** If the variables proposed to be modified in a site-specific risk assessment or alternative reasonable maximum exposure scenario may affect the significant public concerns regarding future land uses and exposure scenarios, then ecology will assure appropriate public involvement and comment opportunities will occur as identified in the public participation plan.

(f) **Implementation.** ((~~The department shall~~)) Ecology retains approval authority over the actions taken by a potentially liable person or prospective purchaser to implement the plan.

(10) **Consent decrees.** ((~~In addition to any other applicable public participation requirements, the following shall be required for consent decrees.~~)) Ecology will provide or require the following notice and comment opportunities when negotiating a consent decree under WAC 173-340-520.

(a) **Public participation plan.** ((~~A plan meeting the requirements of subsection (9) of this section shall be developed when required by~~)) Ecology will develop, or require the development of, a public participation plan in accordance with subsection (9)((~~(d)~~)) of this section.

(b) **Notice of negotiations.** When ((~~the department~~)) ecology decides to proceed with negotiations ((~~it shall place a notice~~)) for a consent decree, ecology will notify the public in the *Contaminated Site Register* ((~~advising the public that negotiations have begun~~)). This notice ((~~shall~~)) must include the name of the ((~~facility~~)) site, a general description of the subject of the ((~~consent~~)) decree, and the deadlines for negotiations.

(c) **Public notice of proposed decree.** ((~~The department shall~~)) Ecology will provide or require public notice of a proposed consent decree in accordance with subsection (2) of this section. The public notice may be ((~~combined~~)) consolidated with public notice of other documents under this chapter, such as a cleanup action plan, or notice required under other laws.

((~~The~~)) (i) **Timing.** The public must be provided with notice and an opportunity to comment on a proposed consent decree before ecology agrees to a settlement.

(ii) **Content.** Notice ((~~shall~~)) of a proposed consent decree must briefly:

((~~(i)~~)) (A) Identify and generally describe the ((~~facility~~)) site;

((~~(ii)~~)) (B) Identify the ((~~person(s)~~)) persons who are parties to the consent decree;

((~~(iii)~~)) (C) Generally describe the remedial action proposed in the proposed consent decree, including institutional controls and permit exemptions authorized under RCW ((~~70.105D.090~~)) 70A.305.090;

((~~(iv)~~)) (D) Indicate the ((~~date,~~)) place, date, and time of ((~~the~~)) any planned public hearing on the proposed consent decree. ((~~Where~~)) If a public hearing is not planned, specify the procedures for requesting one and indicate that ecology will only hold a public hearing ((~~will only be held~~)) if at least ((~~ten~~)) 10 persons request one ((~~and the procedures for requesting a public hearing~~)); and

((~~(v)~~)) (E) Invite the public to comment at ((~~the~~)) a public hearing (if applicable) or in writing.

((~~The public comment period shall run for~~)) (iii) **Comment opportunity.** Ecology will provide the public at least ((~~thirty~~)) 30 days from the date ((~~of the issuance of~~)) the notice is issued to comment on the proposed consent decree.

((~~(d)~~)) (iv) **Public hearing.** ((~~The department shall~~)) Ecology will hold a public hearing on the proposed consent decree for the purpose of providing the public with an opportunity to comment whenever ((~~ten~~)) 10 or more persons request a public hearing or whenever ((~~the department~~)) ecology determines a public hearing is necessary.

((~~(e) Revisions.~~)) (d) **Public notice of substantial changes to proposed decree.** If the state and the potentially liable person or prospective purchaser agree to substantial changes to ((~~the~~)) a proposed consent decree, ((~~the department shall~~)) ecology will provide or require additional public notice ((~~and opportunity to comment~~)) of the proposed changes in accordance with subsection (2) of this section.

((~~(f) Extensions. The department shall publish in the next *Site Register* the extension of deadlines for designated high priority sites.~~))

(11) **Agreed orders.** ((~~In addition to any other applicable public participation requirements, the following shall be required for~~)) Ecology will provide or require the following notice and comment opportunities for an agreed order((~~s~~)) under WAC 173-340-530.

(a) **Public participation plan.** ((~~A plan meeting the requirements of subsection (9) of this section shall be developed when required by~~)) Ecology will develop, or require the development of, a public participation plan in accordance with subsection (9)((~~(d)~~)) of this section.

(b) **Notice of discussions.** When ((~~the department~~)) ecology decides to proceed with discussions ((~~it shall place a notice~~)) for an agreed order, ecology will notify the public in the *Contaminated Site Register* ((~~advising the public that discussions have commenced~~)). This notice ((~~shall~~)) must include the name of the ((~~facility~~)) site, a general description of the subject of the order, and the deadlines for discussions.

(c) **Public notice of ((~~agreed orders~~)) proposed order.** ((~~Public notice shall be provided by the department for any agreed order. For all agreed orders, notice shall be mailed~~)) Ecology will provide or require public notice of a proposed agreed order in accordance with subsection (2) of this section. The public notice may be consolidated with public notice of other documents under this chapter, such as a cleanup action plan, or notice required under other laws.

(i) **Timing.** Ecology will provide or require notice of a proposed agreed order before or concurrent with the issuance of the agreed order. The notice must be provided no later than three days after ((~~the issuance of~~)) ecology issues the agreed order. ((~~For all agreed orders, the comment period shall be at least thirty days. The~~)) Unless ecology determines that it is not in the public interest, an agreed order may ((~~be~~)) become effective before the comment period ((~~is over, unless the department determines it is in the public interest to complete the public comment period before the effective date of the agreed order. The department may determine that it is in the public interest to provide public notice before the effective date of any agreed order or to hold a public meeting or hearing on the agreed order~~)) ends.

(ii) **Content.** Notice of a proposed agreed ((~~orders shall~~)) order must briefly:

((~~(i)~~)) (A) Identify and generally describe the ((~~facility~~)) site;

((~~(ii)~~)) (B) Identify the ((~~person(s)~~)) persons who are parties to the agreed order;

((~~(iii)~~)) (C) Generally describe the remedial action proposed in the proposed agreed order, including institutional controls and permit exemptions authorized under RCW ((~~70.105D.090~~)) 70A.305.090; and

((~~(iv)~~)) (D) Invite the public to comment on the proposed agreed order.

(iii) **Comment opportunity.** Ecology will provide the public at least 30 days from the date the notice is issued to comment on a proposed agreed order.

(iv) **Public hearing.** Ecology may hold a public meeting or hearing on a proposed agreed order if it determines that it is in the public interest.

(d) **((~~Revisions.~~)) Public notice of substantial changes to proposed order.** If ((~~the department~~)) ecology and the potentially liable person or prospective purchaser agree to substantial changes to ((~~the~~)) a proposed agreed order, ((~~the department shall~~)) ecology will provide or require additional public notice ((~~and opportunity to comment~~)) of the proposed changes in accordance with subsection (2) of this section.

((~~(e) Extensions. The department shall publish in the next *Site Register* the extension of deadlines for designated high priority sites.~~))

(12) **Enforcement orders.** ((~~In addition to any other applicable public participation requirements, the department shall provide public notice of all enforcement orders.~~)) Ecology will provide the public with the following notice and comment opportunities when preparing an enforcement order under WAC 173-340-540.

(a) **Public participation plan.** Ecology will develop a public participation plan in accordance with subsection (9) of this section.

(b) **Public notice of proposed order.** Ecology will provide public notice of a proposed enforcement order in accordance with subsection (2) of this section. The public notice may be consolidated with notice of other documents under this chapter, such as a cleanup action plan, or under other laws.

(i) **Timing.** Ecology will provide notice of a proposed enforcement order before or concurrent with the issuance of the order.

(A) Except in ((~~the case of~~)) emergencies, ecology will provide the notice ((~~shall be mailed~~)) no later than three days after ((~~the date of the issuance of~~)) ecology issues the enforcement order.

(B) In emergencies, ecology will provide the notice ((~~shall be mailed~~)) no later than ((~~ten~~)) 10 days after ((~~the issuance of~~)) ecology issues the enforcement order.

((~~(a)~~)) (ii) **Contents ((~~of notice~~)).** ((~~All notices shall~~)) Notice of a proposed enforcement order must briefly:

((~~(i)~~)) (A) Identify and generally describe the ((~~facility~~)) site;

((~~(ii)~~)) (B) Identify the ((~~person(s)~~)) persons who are parties to the enforcement order;

((~~(iii)~~)) (C) Generally describe the terms of the proposed enforcement order, including institutional controls and permit exemptions authorized under RCW ((~~70.105D.090~~)) 70A.305.090; and

((~~(iv)~~)) (D) Invite the public to comment on the proposed enforcement order.

(iii) **Comment opportunity.** Ecology will provide the public at least 30 days from the date ecology issues the notice to comment on a proposed enforcement order.

((~~(b) The department~~)) (c) **Public notice of substantial changes to proposed order.** Ecology may amend the enforcement order ((~~on the basis of~~)) based on public comments. ((~~The department shall provide additional public notice and opportunity to comment if the order is substantially changed.~~)) If ecology substantially changes the enforcement order, ecology will provide additional public notice of the proposed changes in accordance with subsection (2) of this section.

(13) **Remedial investigation/feasibility study.** ((~~In addition to any other applicable public participation requirements, the following shall be required during a remedial investigation/feasibility study.~~)) For ecology-conducted and ecology-supervised remedial actions, ecology will require or provide the public with the following notice and comment opportunities during a remedial investigation and/or feasibility study conducted under WAC 173-340-350 and/or 173-340-351.

(a) ((~~Scoping. When the department elects to perform a remedial investigation/feasibility study, the department shall provide public notice and an opportunity to comment on the scope of the remedial investigation/feasibility study.~~)) **Public notice of work plan.** For ecology-conducted remedial actions, ecology will provide public notice of a remedial investigation work plan in accordance with subsection (2) of this section. Ecology will provide the public at least 30 days from the date ecology issues the notice to comment on the plan.

(b) ((~~Extensions. The department shall publish in the next *Site Register* the extension of deadlines for designated high priority sites.~~

~~(c)~~)) **Public notice of report.** ((~~The department shall~~)) Ecology will provide or require public notice of a remedial ((~~investigation/feasibility study reports prepared under WAC 173-340-350. This~~)) investigation and/or feasibility study report in accordance with subsection (2) of this section. The public notice may be ((~~combined~~)) consolidated with public notice of ((~~the~~)) a draft cleanup action plan. ((~~At a minimum, public notice shall~~)) When deciding whether to consolidate public notice, ecology will consider the factors in subsection (3) of this section.

(i) **Content.** Notice of a remedial investigation and/or feasibility study report must briefly:

((~~(i)~~)) (A) Describe the site ((~~and~~));

(B) Describe the remedial ((~~investigation/feasibility~~)) investigation and/or feasibility study results;

((~~(ii)~~)) (C) If available, identify ((~~the department's~~)) ecology's proposed cleanup action and provide an explanation for its selection; and

((~~(iii)~~)) (D) Invite public comment on the report.

((~~The public comment period shall extend for~~)) (ii) **Comment opportunity.** Ecology will provide the public at least ((~~thirty~~)) 30 days from the date ((~~of mailing of~~)) the notice is issued to comment on a remedial investigation and/or feasibility study report.

(14) **Selection of cleanup actions.** ((~~In addition to any other applicable public participation requirements, the department shall:~~

~~(a) Provide a notice of availability of draft or final cleanup action plans and a brief description of the proposed or selected alternative in the *Site Register*;~~

~~(b) Provide public notice of the draft cleanup action plan. A notice of a draft cleanup plan may be combined with notice on the remedial investigation/feasibility study. Notice of a draft cleanup action plan may be combined with notice on a draft consent decree or on an order. At a minimum, public notice shall~~)) For ecology-conducted and ecology-supervised remedial actions, ecology will require or provide the public with the following notice and comment opportunities when selecting a cleanup action under WAC 173-340-380.

(a) **Public notice of draft cleanup action plan.** When issuing a draft cleanup action plan, ecology will provide or require public notice of the plan in accordance with subsection (2) of this section. The public notice may be consolidated with public notice of a remedial investigation/feasibility study report or a proposed order or decree.

(i) **Content.** Notice of a draft cleanup action plan must briefly:

((~~(i)~~)) (A) Describe the site;

((~~(ii)~~)) (B) Identify ((~~the department's~~)) ecology's proposed cleanup action, including any model remedy, and provide an explanation for its selection; and

((~~(iii)~~)) (C) Invite public comment on the ((~~draft~~)) proposed cleanup action ((~~plan~~)).

((~~The public comment period shall run for~~)) (ii) **Comment opportunity.** Ecology will provide the public at least ((~~thirty~~)) 30 days from the date ((~~of publication of the public notice.~~

~~(c) Whenever the cleanup action plan proposes a restrictive covenant as part of the draft cleanup plan, provide notice to and seek comments from the city or county department with land use planning authority for real property subject to the restrictive covenant. The purpose of this notification is to solicit comment on whether the proposed restrictive covenant is consistent with any current or proposed land use plans~~)) the notice is issued to comment on a proposed cleanup action.

(b) **Notice of final cleanup action plan.** When issuing a final cleanup action plan, ecology will:

(i) Make the plan publicly available on ecology's website under subsection (5) of this section;

(ii) If requested, notify a person electronically of the plan's availability under subsection (6) of this section; and

(iii) Provide notice of the plan's availability and a brief description of the selected cleanup action in the *Contaminated Site Register* under subsection (7) of this section.

(15) **Cleanup action implementation.** ((~~In addition to any other applicable public participation requirements, the following shall be required during cleanup action implementation.~~

~~(a)~~)) For ecology-conducted and ecology-supervised remedial actions, ecology will require or provide the public with the following notice and comment opportunities during cleanup action implementation under WAC 173-340-400.

(a) **Public notice of engineering design report.** For ecology-conducted remedial actions, ecology will provide public notice of an engineering design report in accordance with subsection (2) of this section. Ecology will provide the public at least 30 days from the date ecology issues the notice to comment on the report.

(b) **Public notice of plans implementing cleanup action.** Ecology will provide or require public notice ((~~and opportunity to comment~~)) on any plans prepared under WAC 173-340-400 that represent a substantial change from the cleanup action plan. The public notice must be provided in accordance with subsection (2) of this section. Ecology

will provide the public at least 30 days from the date the notice is issued to comment on the plan.

((~~(b) When the department conducts a cleanup action, public notice and an opportunity to comment shall be provided on the engineering design report and notice shall be given in the *Site Register*.~~))

(16) **((~~Routine cleanup and~~)) Interim actions.** ((~~In addition to any other applicable public participation requirements, the following will be required for routine cleanup actions and interim actions.~~

~~(a) Public notice shall be provided for any proposed routine cleanup or interim actions. This public notice shall be combined with public notice of an order or settlement whenever practicable.~~

~~(b) At a minimum, public notice shall~~)) For ecology-conducted and ecology-supervised remedial actions, ecology will provide or require public notice of a draft interim action plan prepared under WAC 173-340-430. The public notice must be provided in accordance with subsection (2) of this section. The public notice may be consolidated with public notice of a proposed order or decree.

(a) **Content.** Notice of a draft interim action plan must briefly:

(i) Describe the site;

(ii) Identify the proposed interim action, including institutional controls and the permit exemptions authorized under RCW ((~~70.105D.090~~)) 70A.305.090;

(iii) Identify the likely or planned schedule for the proposed interim action;

(iv) Reference any planning documents prepared for the proposed interim action;

(v) Identify ((~~department~~)) ecology staff who may be contacted for further information; and

(vi) Invite public comment on the ((~~routine cleanup or~~)) proposed interim action.

((~~The public comment period shall extend for~~)) (b) **Comment opportunity.** Ecology will provide the public at least ((~~thirty~~)) 30 days from the date ((~~of the mailing of~~)) the notice is issued to comment on a proposed interim action.

(17) **Removing sites from contaminated sites list.** For ecology-conducted and ecology-supervised remedial actions, ecology will provide public notice before removing a site from the contaminated sites list under WAC 173-340-330. The public notice must be provided in accordance with subsection (2) of this section. Ecology will provide the public at least 30 days from the date ecology issues the notice to comment on the proposed removal from the contaminated sites list.

(18) **Periodic reviews.** For ecology-conducted and ecology-supervised remedial actions, ecology will provide public notice of a periodic review report prepared under WAC 173-340-420. The public notice must be provided in accordance with subsection (2) of this section. Ecology will provide the public at least 30 days from the date ecology issues the notice to comment on a periodic review.

(19) **Institutional controls.** For ecology-conducted and ecology-supervised remedial actions, before amending or removing an institutional control required under WAC 173-340-440, ecology will provide or require public notice on the proposal in accordance with subsection (2) of this section. Ecology will provide the public at least 30 days from the date the notice is issued to comment on the proposal.

(20) **Independent remedial actions.**

(a) For independent remedial actions, ecology will notify the public of the following using the methods specified in subsections (5) and (6) of this section:

(i) Any change to the site's listing or remedial action status identified under WAC 173-340-330;

(ii) Any change to the site's hazard rankings identified under WAC 173-340-320;

(iii) Any initial investigation report prepared under WAC 173-340-310;

(iv) Any independent investigation, interim action, or cleanup action report required under WAC 173-340-515(4) and received by ecology;

(v) The results of any ecology review of an independent remedial action, including any written opinion issued by ecology under WAC 173-340-515(5);

(vi) Any periodic review report prepared under WAC 173-340-420; and

(vii) Any document implementing, amending, or removing an institutional control under WAC 173-340-440.

(b) Ecology will provide notice of the following independent remedial actions in the *Contaminated Site Register* under subsection (7) of this section:

(i) Any notice of a planned independent interim action or cleanup action submitted to ecology in anticipation of a private right of action under WAC 173-340-545 (3)(a); and

(ii) Any proposed area-wide groundwater conditional point of compliance under WAC 173-340-720 (8)(d)(iii)(D).

(c) For independent remedial actions, ecology may provide public notice of any proposed action for which public notice is required under this chapter for an ecology-conducted or ecology-supervised remedial action.

(21) **Public participation grants.** RCW ((~~70.105D.070(4)~~)) 70A.305.180(4) requires funds be allocated for public participation grants to persons, including groups who may be adversely affected by a release or threatened release of a hazardous substance. Persons interested in applying for such grants are encouraged to contact ((~~the department~~)) ecology to learn about available funding, grant application procedures and deadlines. See chapter 173-321 WAC for additional information on public participation grants.

((~~(18) **Technical assistance.** There is created within the department a citizen technical advisor office to provide independent technical assistance to citizens concerning the Model Toxics Control Act and remedial actions occurring under the act. This office will be established upon the effective date of this rule revision and continue for three years. Before the end of the three-year period, the department will work with citizen and business representatives to evaluate the effectiveness of this office and to determine whether the office should continue. The costs of this office shall be recovered by the department as provided for in WAC 173-340-550.~~)) (22) **Other requirements.** The following sections of this chapter specify additional requirements for providing notice or opportunity to comment.

(a) WAC 173-340-310 (6)(e)(vi) contains focused notice requirements for emergency or interim actions required by ecology as a result of an initial investigation.

(b) WAC 173-340-320 (2)(b) contains notice and comment requirements for developing and updating the site hazard assessment and ranking process.

(c) WAC 173-340-330 (9)(a) and 173-340-335 (5)(a) contain requirements for making the contaminated sites list and the no further action sites list publicly available.

(d) WAC 173-340-340 (4)(a) contains requirements for making ecology's strategic plans and performance assessments publicly available.

(e) WAC 173-340-390 (2)(c) contains notice and comment requirements for developing model remedies.

(f) WAC 173-340-440(10) contains local government consultation requirements for proposing institutional controls.

(g) WAC 173-340-545(3) contains public notice requirements for private rights of action.

(h) WAC 173-340-720 (6)(c)(A) contains focused notice and comment requirements for establishing site-specific nonpotable groundwater cleanup levels.

(i) WAC 173-340-720 (8)(d) contains focused notice and comment requirements for establishing off-property conditional points of compliance.

NEW SECTION

WAC 173-340-620 Tribal engagement. (1) **Purpose.** Tribal engagement is an integral part of ecology's responsibilities under chapter 70A.305 RCW, the Model Toxics Control Act. Ecology's goal is to provide Indian tribes with timely information, effective communication, continuous opportunities for collaboration and, when necessary, government-to-government consultation, as appropriate for each site.

(2) **Applicability.** This section applies to ecology-conducted and ecology-supervised remedial actions affecting Indian tribes' rights or interests.

(3) **Tribal engagement plan.**

(a) Ecology will develop a site tribal engagement plan that identifies Indian tribes that may be adversely affected by the site, opportunities for government-to-government collaboration and consultation, and protocols for communication.

(b) Ecology will seek to initiate meaningful engagement with affected Indian tribes before initiating a remedial investigation or an interim action at a site. Ecology will maintain meaningful engagement with Indian tribes throughout the cleanup process.

(4) **Relationship with public participation.** Engagement of Indian tribes under this section must be in addition to and independent of any public participation process under this chapter or applicable laws.

PART ((~~VII~~)) 7 - CLEANUP STANDARDS

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-700 Overview of cleanup standards. (1) **Purpose.** This section provides an overview of the methods for establishing

cleanup standards that apply to a release or threatened release of a hazardous substance at a site. If there are any inconsistencies between this section and any specifically referenced section, the referenced section shall govern.

(2) **Explanation of term "cleanup level."** A cleanup level is the concentration of a hazardous substance in soil, water, air or sediment that is determined to be protective of human health and the environment under specified exposure conditions. Cleanup levels, in combination with points of compliance, typically define the area or volume of soil, water, air or sediment at a site that must be addressed by the cleanup action.

(3) **Explanation of term "cleanup standards."** Cleanup standards consist of the following:

(a) Cleanup levels for hazardous substances present at the site;

(b) The location where these cleanup levels must be met (point of compliance); and

(c) Other regulatory requirements that apply to the site because of the type of action and/or location of the site ("applicable state and federal laws").

(4) **Relationship between cleanup standards and cleanup actions.**

(a) Cleanup standards are identified for the particular hazardous substances at a site and the specific areas or pathways, such as land or water, where humans and the environment can become exposed to these substances. ((~~This~~)) Part 7 of this chapter provides uniform methods statewide for identifying cleanup standards and requires that all cleanups under the act meet these standards. The actual degree of cleanup may vary from site to site and will be determined by the cleanup action alternative selected under WAC 173-340-350 through 173-340-390.

(b) For most sites, there are several cleanup technologies or combinations of cleanup technologies ("cleanup action alternatives") that may be used to comply with cleanup standards at individual sites. Other parts of this ((~~rule~~)) chapter govern the process for planning and deciding on the cleanup action to be taken at a site. This may include establishing "remediation levels," or the concentrations of hazardous substances above which a particular cleanup technology will be applied. See WAC 173-340-350 through 173-340-390. WAC 173-340-355 contains detailed information on establishing remediation levels. WAC 173-340-410 specifies the monitoring required to ensure that the remedy is effective.

(c) Where a cleanup action involves containment of soils with hazardous substances above cleanup levels, the cleanup action may be determined to comply with cleanup standards, provided the compliance monitoring program is designed to ensure the long-term integrity of the containment system, and the other requirements for containment in this chapter are met.

(5) **Methods for setting cleanup levels.** The first step in setting cleanup levels is to identify the nature of the contamination, the potentially contaminated media, the current and potential pathways of exposure, the current and potential receptors, and the current and potential land and resource uses. A conceptual site model may be developed as part of this scoping process. Cleanup levels may then be established for each media. Both the conceptual site model and cleanup levels may be refined as additional information is collected during the remedial investigation/feasibility study. See WAC 173-340-708(3) for additional information on how to determine current and potential

future land and resource uses for the conceptual site model. These rules provide three approaches for establishing cleanup levels:

(a) **Method A: ARARs and Tables.** On some sites, the cleanup action may be routine (WAC 173-340-200) or may involve relatively few hazardous substances. Under Method A, cleanup levels at these sites are set at concentrations at least as stringent as concentrations specified in applicable state and federal laws (ARARs) and Tables 720-1, 740-1, and 745-1 of this chapter.

Method A cleanup levels for hazardous substances that are deemed indicator hazardous substances at the site under WAC 173-340-708(2) and are not addressed under applicable state and federal laws or Tables 720-1, 740-1, and 745-1 must be established at concentrations which do not exceed the natural background concentration or the practical quantitation limit, whichever is higher.

For soil contamination, the potential impact of hazardous substances on terrestrial ecological receptors must be evaluated under WAC 173-340-7490 through 173-340-7494. Specifically, either an exclusion must be established for the site under WAC 173-340-7491 or a terrestrial ecological evaluation must be conducted under WAC 173-340-7492 or 173-340-7493. The terrestrial ecological evaluation may result in a more stringent Method A soil cleanup level than is required to protect human health.

Except where institutional controls are required by WAC 173-340-440(4), site cleanups that achieve Method A cleanup levels may be used without future restrictions on the property due to residual levels of contamination.

(b) **Method B: Universal method.** Method B is the universal method for determining cleanup levels for all media at all sites. Under Method B, cleanup levels for individual hazardous substances are established using applicable state and federal laws and the risk equations and other requirements specified in WAC 173-340-720 through 173-340-760.

Method B is divided into two tiers: Standard and modified. Standard Method B uses generic default assumptions to calculate cleanup levels. Modified Method B provides for the use of chemical-specific or site-specific information to change selected default assumptions, within the limitations allowed in WAC 173-340-708. Modified Method B may be used to establish cleanup levels.

Modified Method B may also be used in a quantitative risk assessment to help assess the protectiveness of a remedy by modifying input parameters as described in WAC 173-340-720 through 173-340-750 or by using other modifications that meet the requirements of WAC 173-340-702 and 173-340-708. See WAC 173-340-355 and 173-340-357 for more information on remediation levels and quantitative risk assessment.

For individual carcinogens, both standard and modified Method B cleanup levels are based upon the upper bound of the estimated excess lifetime cancer risk of one in ((~~one million~~)) 1,000,000 (1×10^{-6}).

For individual noncarcinogenic substances, both standard and modified Method B cleanup levels are set at concentrations which are anticipated to result in no acute or chronic toxic effects on human health (that is, hazard quotient of one ((~~(1)~~)) or less) and no significant adverse effects on the propagation of aquatic and terrestrial organisms.

Where a ((~~hazardous waste~~)) site involves multiple hazardous substances and/or multiple pathways of exposure, then standard and modi-

fied Method B cleanup levels for individual substances must be adjusted downward for additive health effects in accordance with the procedures in WAC 173-340-708 if the total excess lifetime cancer risk for a site exceeds one in ((~~one hundred thousand~~)) 100,000 (1×10^{-5}) or the hazard index for substances with similar noncarcinogenic toxic effects exceeds one ((~~(1)~~)).

For soil contamination, the potential impact of hazardous substances on terrestrial ecological receptors must be evaluated under WAC 173-340-7490 through 173-340-7494. Specifically, either an exclusion must be established for the site under WAC 173-340-7491 or a terrestrial ecological evaluation must be conducted under WAC 173-340-7492 or 173-340-7493. The terrestrial ecological evaluation may result in a more stringent Method B soil cleanup level for the site than is required to protect human health.

Except where institutional controls are required by WAC 173-340-440(4), site cleanups that achieve Method B cleanup levels may be used without future restrictions on the property due to residual levels of contamination.

(c) **Method C: Conditional method.** Compliance with cleanup levels developed under Method A or B may be impossible to achieve or may cause greater environmental harm. In those situations, Method C cleanup levels for individual hazardous substances may be established for surface water, groundwater, and air. Method C industrial soil and air cleanup levels may also be established at industrial properties that meet the criteria in WAC 173-340-745.

Under Method C, cleanup levels for individual hazardous substances are established using applicable state and federal laws and the risk equations and other requirements specified in WAC 173-340-720 through 173-340-760. Method C is divided into two tiers: Standard and modified. Standard Method C uses generic default assumptions to calculate cleanup levels. Modified Method C provides for the use of chemical-specific or site-specific information to change selected default assumptions, within the limitations allowed in WAC 173-340-708. Modified Method C may be used to establish cleanup levels.

Modified Method C may also be used in a quantitative risk assessment to help assess the protectiveness of a remedy by modifying input parameters as described in WAC 173-340-720 through 173-340-750 or by using other modifications that meet the requirements of WAC 173-340-702 and 173-340-708. See WAC 173-340-355 and 173-340-357 for more information on remediation levels and quantitative risk assessment.

For individual carcinogens, both standard and modified Method C cleanup levels are based upon the upper bound of the estimated lifetime cancer risk of one in ((~~one hundred thousand~~)) 100,000 (1×10^{-5}).

For individual noncarcinogenic substances, both standard and modified Method C cleanup levels are set at concentrations which are anticipated to result in no acute or chronic toxic effects on human health (that is, hazard quotient of one ((~~(1)~~)) or less) and no significant adverse effects on the protection and propagation of aquatic and terrestrial organisms.

Where a ((~~hazardous waste~~)) site involves multiple hazardous substances and/or multiple pathways of exposure, then both standard and modified Method C cleanup levels for individual substances must be adjusted downward for additive health effects in accordance with the procedures in WAC 173-340-708 if the total excess lifetime cancer risk

for a site exceeds one in ((~~one hundred thousand~~)) 100,000 (1×10^{-5}) or the hazard index for substances with similar noncarcinogenic toxic effects exceeds one ((~~(1)~~)).

For soil contamination, the potential impact of hazardous substances on terrestrial ecological receptors must be evaluated under WAC 173-340-7490 through 173-340-7494. Specifically, either an exclusion must be established for the site under WAC 173-340-7491 or a terrestrial ecological evaluation must be conducted under WAC 173-340-7492 or 173-340-7493. The terrestrial ecological evaluation may result in a more stringent Method C soil cleanup level for the site than is required to protect human health.

Site cleanups establishing Method C cleanup levels must have restrictions placed on the property (institutional controls) to ensure future protection of human health and the environment.

(6) **Requirements for setting cleanup levels.** Several requirements apply to cleanups under any of the three methods. Some of these requirements, such as the identification of applicable state and federal laws, describe analyses used along with Methods A, B or C in order to set cleanup levels for particular substances at a site. Others describe the technical procedures to be used.

(a) **Applicable state and federal laws.** RCW ((~~70.105D.030 (2)(d)~~)) 70A.305.030 (2)(e) requires the cleanup standards in these rules to be "at least as stringent as all applicable state and federal laws." In addition to establishing minimum requirements for cleanup standards, applicable state and federal laws may also impose certain technical and procedural requirements for performing cleanup actions. These requirements are described in WAC 173-340-710 and are similar to the "ARAR" (applicable, relevant and appropriate requirements) approach of the federal superfund law. Sites that are cleaned up under an order or decree may be exempt from obtaining a permit under certain other laws but they must still meet the substantive requirements of these other laws. (See WAC 173-340-710(9).)

(b) **Cross-media contamination.** In some situations, migration of hazardous substances from one medium may cause contamination in a second media. For example, the release of hazardous substances in soil may cause groundwater contamination. Under Methods A, B, and C, cleanup levels must be established at concentrations that prevent violations of cleanup levels for other media.

(c) **Risk assessment procedures.** The analyses performed under Methods B and C use several default assumptions for defining cleanup levels for carcinogens and noncarcinogens. The individual default assumptions and procedures for modifying these assumptions based on site-specific information are specified in WAC 173-340-708 and 173-340-720 through 173-340-750. WAC 173-340-708 also provides rules for use of indicator hazardous substances. The standards for review of new scientific information are described in WAC 173-340-702 (14), (15) and (16).

(d) **Natural background and analytical considerations.** In some cases, cleanup levels calculated using the methods specified in this chapter are less than natural background levels or levels that can be reliably measured. In those situations, the cleanup level shall be established at a concentration equal to the practical quantitation limit or natural background concentration, whichever is higher. See WAC 173-340-707 and 173-340-709 for additional information.

(7) **Procedures for demonstrating compliance with cleanup standards.** Setting cleanup standards also involves being able to demon-

strate that they have been met. This involves specifying where on the site the cleanup levels must be met ("points of compliance"), how long it takes for a site to meet cleanup levels ("restoration time frame"), and conducting sufficient monitoring to demonstrate that the cleanup standards have been met and will continue to be met in the future. The provisions for establishing points of compliance are in WAC 173-340-720 through 173-340-750. The provisions for establishing restoration time frames are in WAC 173-340-360. The compliance monitoring plan prepared under WAC 173-340-410 specifies precisely how these are measured for each site. At sites where remediation levels are used, the compliance monitoring plan will also need to describe the performance monitoring to be conducted to demonstrate the remediation levels have been achieved.

(8) **Specific procedures for setting cleanup levels at petroleum contaminated sites.** In addition to the other requirements in this section, this chapter provides for the following specific procedures to establish cleanup levels at sites where there has been a release of total petroleum hydrocarbons (TPH) and hazardous substances associated with a release of TPH.

(a) For soil contamination, the potential impact of TPH on terrestrial ecological receptors must be evaluated under WAC 173-340-7490 through 173-340-7494. Specifically, either an exclusion must be established for the site under WAC 173-340-7491 or a terrestrial ecological evaluation must be conducted under WAC 173-340-7492 or 173-340-7493. The terrestrial ecological evaluation may result in a more stringent soil cleanup level than is required to protect human health.

(b) It is necessary to analyze for and evaluate certain carcinogenic and noncarcinogenic hazardous substances that may be associated with a release of TPH. These are identified in Table 830-1. In cases where the cleanup level for one or more of these associated hazardous substances is exceeded but the TPH cleanup level is not, the cleanup level shall be based on the associated hazardous substance.

(i) **Method A.** Method A may be used to establish cleanup levels for TPH and associated hazardous substances at qualifying sites (see WAC 173-340-704). At these sites, the presence, location and concentration of TPH may be established by using the NWTPH method described ((~~under Method 6 (see WAC 173-340-830 (3)(a)(vi))~~)) in the "*Analytical Methods for Petroleum Hydrocarbons*," publication number 97-602, dated June 1997. The NWTPH method is a simplified, and relatively inexpensive, analytical method for evaluating TPH. Method A cleanup levels have been determined for four common petroleum mixtures: Gasoline range organics (GRO), diesel range organics (DRO), heavy oils, and electrical insulating mineral oil, as well as many hazardous substances that may be associated with the TPH. A site owner may decide to use Method A for some substances or media and Method B or C for others, depending upon site conditions and qualifications.

(ii) **Method B and Method C tiered approach.** This chapter provides for a three-tiered approach for establishing Method B and Method C cleanup levels at sites that involve a release of TPH. These tiers are not required to be approached sequentially (that is, the process may be started at any tier). The tiered process allows one to calculate different cleanup levels for TPH and associated hazardous substances using progressively more complex and site-specific information, and also allows for basing the cleanup levels on the presence or absence of exposure pathways, determined as part of the conceptual site model. In establishing a TPH cleanup level using the tiered process, it is

still necessary to comply with other requirements and procedures under WAC 173-340-700 through 173-340-750.

(A) **Conceptual site model.** The first step in setting Method B or C cleanup levels for TPH is to identify the nature of the contamination, the potentially contaminated media, the current and potential pathways of exposure, the current and potential receptors, and the current and potential land and resource uses. A conceptual site model should be developed as part of this scoping process. See WAC 173-340-708(3) for additional information on how to determine current and potential future land and resource uses for the conceptual site model.

(B) **General description of the three tiers.**

(I) Tier 1 consists of the standard Method B and Method C formulas and requirements under WAC 173-340-720 through 173-340-750 for each applicable pathway identified by the conceptual site model, including specific requirements set forth in those sections for petroleum mixtures.

(II) Tier 2 consists of the site-specific use of modified Method B and Method C formulas and requirements under WAC 173-340-720 through 173-340-750 for each applicable exposure pathway identified by the conceptual site model; and inclusion and development of additional, site-specific exposure pathways not addressed in Method A or Tier 1.

(III) Tier 3 consists of the site-specific use of standard or modified Method B and Method C formulas and requirements for each applicable exposure pathway identified by the conceptual site model and the use of new scientific information to establish a cleanup level as provided under WAC 173-340-702 (14), (15) and (16). It is considered a more complex evaluation in terms of technical sophistication (such as the use of new fate and transport models), data needs, cost and time.

(IV) A single tier may be used for all exposure pathways or more than one tier may be used when there are multiple exposure pathways.

(C) **Fractionated approach.** Method B and Method C cleanup levels for TPH are determined using the fractionated analytical approach for petroleum as described ((~~under Method 6 (see WAC 173-340-830 (3)(a)(vi))~~)) in the "*Analytical Methods for Petroleum Hydrocarbons*," publication number 97-602, dated June 1997. This approach divides the TPH mixture into equivalent carbon numbers. Use of the fractionated approach requires testing or knowledge to define product composition as described under subsection (8)(b)(ii)(D) of this section ("Determination of product composition"). Cleanup levels are then calculated using reference doses that have been determined by the department for each fraction. Cleanup levels also need to consider the measured or predicted ability of the fractions to migrate from one medium to other media. Where multiple pathways of exposure for a particular medium are identified in the conceptual site model, the most stringent of the concentrations calculated for the various pathways becomes the cleanup level. For example, for soil contamination, if the direct contact and leaching pathways are potential exposure pathways, then a soil concentration would be calculated for each pathway and the lowest calculated concentration would become the cleanup level.

(D) **Determination of product composition.** Product composition may be determined by analyzing each sample in accordance with the VPH/EPH method described ((~~under Method 6 (see WAC 173-340-830 (3)(a)(vi))~~)) in the "*Analytical Methods for Petroleum Hydrocarbons*," publication number 97-602, dated June 1997. Alternatively, product composition may be determined by one of the following methods:

(I) Correlation. Where WTPH or NWTPH methods described in Method 6 are used to collect and analyze the presence, location and concentration of TPH, knowledge of the fraction-specific composition of the petroleum released at the site may be based on analysis and correlation of a portion of the site samples with both the VPH/EPH and WTPH/NWTPH methods.

(II) Retrofitting. Where WTPH or NWTPH methods were used to collect and analyze the presence, location and concentration of TPH before the effective date of this provision, knowledge of the fraction-specific composition of the petroleum released at the site may be based on the fraction-specific composition assumptions used by the department to calculate Method A cleanup levels, which the department shall publish in guidance. If the identity of the petroleum product released at the site is not known, or is a mixture of products, retrofitting under this provision shall be based on the composition that yields the lowest TPH cleanup level.

(E) **Consultation with the department.** Because of the complexity of the development of site-specific Method B and Method C petroleum cleanup levels using the second or third tiers described above, or the use of correlated or retrofitted data, persons planning on using these methods are encouraged to contact the department to obtain appropriate technical guidance.

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-702 General policies. (1) **Purpose.** This section defines the general policies and principles that shall be followed when establishing and implementing cleanup standards. This section shall be used in combination with other sections of this chapter.

(2) **Policy on expediting cleanups.** Establishing cleanup standards and selecting an appropriate cleanup action involves many technical and public policy decisions. This chapter is intended to constrain the range of decisions made on individual sites to promote expeditious cleanups.

(3) **Goal for cleanups.** The Model Toxics Control Act contains policies that state, in part, each person has a fundamental and inalienable right to a healthful environment and it is essential that sites be cleaned up well. Consistent with these policies, cleanup standards and cleanup actions selected under this chapter shall be established that provide conservative estimates of human health and environmental risks that protect susceptible individuals as well as the general population.

(4) **Current and potential site and resource uses.** Cleanup standards and cleanup actions selected under this chapter shall be established that protect human health and the environment for current and potential future site and resource uses.

(5) **Presumption for cleanup actions.** Cleanup actions that achieve cleanup levels at the applicable point of compliance under Methods A, B, or C (as applicable) and comply with applicable state and federal laws shall be presumed to be protective of human health and the environment.

(6) **Cost considerations.** Except as provided for in applicable state and federal laws, cost shall not be a factor in determining what cleanup level is protective of human health and the environment. In

addition, where specifically provided for in this chapter, cost may be appropriate for certain other determinations related to cleanup standards such as point of compliance. Cost shall, however, be considered when selecting an appropriate cleanup action.

(7) **Cleanup action alternatives.** At most sites, there is more than one hazardous substance and more than one pathway for hazardous substances to get into the environment. For many sites there is more than one method of cleanup (cleanup action component) that could address each of these. When evaluating cleanup action alternatives it is appropriate to consider a representative range of cleanup action components that could address each of these as well as different combinations of these components to accomplish the overall site cleanup.

(8) **Cross-media impacts.** The cleanup of a particular medium at a site will often affect other media at the site. These cross-media impacts shall be considered when establishing cleanup standards and selecting a cleanup action. Cleanup actions conducted under this chapter shall use appropriate engineering controls or other measures to minimize these cross-media impacts.

(9) **Relationship between cleanup levels and cleanup actions.** In general, cleanup levels must be met throughout a site before the site will be considered clean. A cleanup action that leaves hazardous substances on a site in excess of cleanup levels may be acceptable as long as the cleanup action complies with WAC 173-340-350 through 173-340-390. However, these rules are intended to promote thorough cleanups rather than long-term partial cleanups or containment measures.

(10) **Relationship to federal cleanup law.** When evaluating cleanup actions performed under the federal cleanup law, the department shall consider WAC 173-340-350, 173-340-351, 173-340-355, 173-340-357, 173-340-360, 173-340-370, 173-340-410, 173-340-420, 173-340-440, 173-340-450, 173-340-700 through 173-340-760, and 173-340-830 to be legally applicable requirements under Section 121(d) of the federal cleanup law.

(11) **Reviewing and updating cleanup standards.** The department shall review and, as appropriate, update ((~~WAC 173-340-700 through 173-340-760~~)) Part 7 of this chapter at least once every five years.

(12) **Applicability of new cleanup levels.**

(a) For cleanup actions conducted by the department, or under an order or decree, the department shall determine the cleanup level that applies to a release based on the rules and analytical methods in effect under this chapter at the time the department issues a final cleanup action plan for that release.

(b) In reviewing the adequacy of independent remedial actions, the department shall determine the cleanup level that applies to a release based on the rules and analytical methods in effect at the time the final cleanup action for that release began or in effect when the department reviews the cleanup action, whichever is less stringent.

(c) A release cleaned up under the cleanup levels determined in (a) or (b) of this subsection shall not be subject to further cleanup action due solely to subsequent amendments to the provisions in this chapter on cleanup levels or subsequent availability of more sensitive analytical methods, unless the department determines, on a case-by-case basis, that the previous cleanup action is no longer sufficiently protective of human health and the environment.

(d) Nothing in this subsection constitutes a settlement or release of liability under the Model Toxics Control Act.

(13) **Institutional controls.** Institutional controls shall be required whenever any of the circumstances identified in WAC 173-340-440(4) are present at a site.

(14) **Burden of proof.** Any person responsible for undertaking a cleanup action under this chapter who proposes to:

(a) Use a reasonable maximum exposure scenario other than the default provided for each medium;

(b) Use assumptions other than the default values provided for in this chapter;

(c) Establish a cleanup level under Method C; or

(d) Use a conditional point of compliance, shall have the burden of demonstrating to the department that requirements in this chapter have been met to ensure protection of human health and the environment. The department shall only approve of such proposals when it determines that this burden of proof is met.

(15) **New scientific information.** The department shall consider new scientific information when establishing cleanup levels and remediation levels for individual sites. In making a determination on how to use this new information, the department shall, as appropriate, consult with the science advisory board, the department of health, and the United States Environmental Protection Agency. Any proposal to use new scientific information shall meet the quality of information requirements in subsection (16) of this section. To minimize delay in cleanups, any proposal to use new scientific information should be introduced as early in the cleanup process as possible. Proposals to use new scientific information may be considered up to the time of issuance of the final cleanup action plan governing the cleanup action for a site unless triggered as part of a periodic review under WAC 173-340-420 or through a reopener under RCW ((~~70.105D.040~~)) 70A.305.040 (4)(c).

(16) **Criteria for quality of information.**

(a) The intent of this subsection is to establish minimum criteria to be considered when evaluating information used by or submitted to the department proposing to modify the default methods or assumptions specified in this chapter or proposing methods or assumptions not specified in this chapter for calculating cleanup levels and remediation levels. This subsection does not establish a burden of proof or alter the burden of proof provided for elsewhere in this chapter.

(b) When deciding whether to approve or require modifications to the default methods or assumptions specified in this chapter for establishing cleanup levels and remediation levels or when deciding whether to approve or require alternative or additional methods or assumptions, the department shall consider information submitted by all interested persons and the quality of that information. When evaluating the quality of the information the department shall consider the following factors, as appropriate for the type of information submitted:

(i) Whether the information is based on a theory or technique that has widespread acceptance within the relevant scientific community;

(ii) Whether the information was derived using standard testing methods or other widely accepted scientific methods;

(iii) Whether a review of relevant available information, both in support of and not in support of the proposed modification, has been provided along with the rationale explaining the reasons for the proposed modification;

(iv) Whether the assumptions used in applying the information to the facility are valid and would ensure the proposed modification would err on behalf of protection of human health and the environment;

(v) Whether the information adequately addresses populations that are more highly exposed than the population as a whole and are reasonably likely to be present at the site; and

(vi) Whether adequate quality assurance and quality control procedures have been used, any significant anomalies are adequately explained, the limitations of the information are identified, and the known or potential rate of error is acceptable.

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-704 Use of Method A. (1) **Applicability.** Method A may be used to establish cleanup levels at sites that have few hazardous substances and that meet one of the following criteria:

(a) Sites undergoing a routine cleanup action as defined in WAC 173-340-200; or

(b) Sites where numerical standards are available in this chapter or applicable state and federal laws for all indicator hazardous substances in the media for which the Method A cleanup level is being used.

(2) **Procedures.** Method A cleanup levels shall be established in accordance with the procedures in WAC 173-340-720 through 173-340-760. Method A cleanup levels shall be at least as stringent as all of the following:

(a) Concentrations of individual hazardous substances listed in Tables 720-1, 740-1, or 745-1 in this chapter;

(b) Concentrations of individual hazardous substances established under applicable state and federal laws;

(c) Concentrations that result in no significant adverse effects on the protection and propagation of terrestrial ecological receptors using the procedures specified in WAC 173-340-7490 through ((~~173-340-7493~~)) 173-340-7494, unless it is demonstrated under those sections that establishing a soil concentration is unnecessary; and

(d) For individual hazardous substances deemed indicator hazardous substances for the medium of concern under WAC 173-340-708(2) and not addressed under (a) and (b) of this subsection, concentrations that do not exceed natural background levels or the practical quantitation limit, whichever is higher, for the substance in question.

(3) **More stringent cleanup levels.** The department may establish Method A cleanup levels more stringent than those required by subsection (2) of this section, when based on a site-specific evaluation, the department determines that such levels are necessary to protect human health and the environment. Any imposition of more stringent requirements under this provision shall comply with WAC 173-340-702 and 173-340-708.

(4) **Remediation levels.** Under Method A, the Method B formulas may be modified for the purpose of using a human health risk assessment to evaluate the protectiveness of a remedy. WAC 173-340-708 (3) and (10) describe the adjustments that can be made to the Method B formulas. Also see WAC 173-340-355 and 173-340-357 for more detailed information on remediation levels and quantitative risk assessment.

(5) **Inconsistencies.** If there are any inconsistencies between this section and any specifically referenced sections, the referenced section shall govern.

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-710 Applicable local, state and federal laws. (1) **Applicable state and federal laws.**

All cleanup actions conducted under this chapter shall comply with applicable state and federal laws. For purposes of this chapter, the term "applicable state and federal laws" shall include legally applicable requirements and those requirements that the department determines, based on consideration of the criteria in subsection (4) of this section, are relevant and appropriate requirements.

(2) **Department determination.** The person conducting a cleanup action shall identify all applicable state and federal laws. The department shall make the final interpretation on whether these requirements have been correctly identified and are legally applicable or relevant and appropriate.

(3) **Legally applicable requirements.** Legally applicable requirements include those cleanup standards, standards of control, and other environmental protection requirements, criteria, or limitations adopted under state or federal law that specifically address a hazardous substance, cleanup action, location or other circumstances at the site.

(4) **Relevant and appropriate requirements.** Relevant and appropriate requirements include those cleanup standards, standards of control, and other environmental requirements, criteria, or limitations established under state or federal law that, while not legally applicable to the hazardous substance, cleanup action, location, or other circumstance at a site, address problems or situations sufficiently similar to those encountered at the site that their use is well suited to the particular site. WAC 173-340-710 through 173-340-760 identifies several requirements the department shall consider relevant and appropriate for establishing cleanup standards. For other regulatory requirements, the following criteria shall be evaluated, where pertinent, to determine whether such requirements are relevant and appropriate for a particular hazardous substance, remedial action, or site:

(a) Whether the purpose for which the statute or regulations under which the requirement was created is similar to the purpose of the cleanup action;

(b) Whether the media regulated or affected by the requirement is similar to the media contaminated or affected at the site;

(c) Whether the hazardous substance regulated by the requirement is similar to the hazardous substance found at the site;

(d) Whether the entities or interests affected or protected by the requirement are similar to the entities or interests affected by the site;

(e) Whether the actions or activities regulated by the requirement are similar to the cleanup action contemplated at the site;

(f) Whether any variance, waiver, or exemption to the requirements are available for the circumstances of the site;

(g) Whether the type of place regulated is similar to the site;

(h) Whether the type and size of structure or site regulated is similar to the type and size of structure or site affected by the release or contemplated by the cleanup action; and

(i) Whether any consideration of use or potential use of affected resources in the requirement is similar to the use or potential use of the resources affected by the site or contemplated cleanup action.

(5) **Variances.** For purposes of this chapter, a regulatory variance or waiver provision included in an applicable state and federal law shall be considered potentially applicable to interim actions and cleanup actions and the department may determine that a particular regulatory variance or waiver is appropriate if the substantive conditions for such a regulatory variance or waiver are met. In all such cases, interim actions and cleanup actions shall be protective of human health and the environment.

(6) **New requirements.** The department shall consider new applicable state and federal laws as part of the periodic review under WAC 173-340-420. Cleanup actions shall be evaluated in light of these new requirements to determine whether the cleanup action is still protective of human health and the environment.

(7) **Selection of cleanup actions.** To demonstrate compliance with WAC 173-340-350 through 173-340-390, cleanup actions shall comply with all applicable state and federal laws in addition to the other requirements of this chapter. The following, which is not a complete list, are selected applications of specific applicable state and federal laws to cleanup actions.

(a) **Water discharge requirements.** Hazardous substances that are directly or indirectly released or proposed to be released to waters of the state shall be provided with all known, available and reasonable methods of treatment consistent with the requirements of chapters 90.48 and 90.54 RCW and the regulations that implement those statutes.

(b) **Air emission requirements.** Best available control technologies consistent with the requirements of chapter 70.94 RCW and the regulations that implement this statute shall be applied to releases of hazardous substances to the air resulting from cleanup actions at a site.

(c) **Solid waste landfill closure requirements.** For solid waste landfills, the solid waste closure requirements in chapter 173-304 WAC shall be minimum requirements for cleanup actions conducted under this chapter. In addition, when the department determines that the closure requirements in chapters 173-351 or 173-303 WAC are legally applicable or relevant and appropriate requirements, the more stringent closure requirements under those laws shall also apply to cleanup actions conducted under this chapter.

(d) **Sediment management requirements.** Sediment cleanup actions conducted under this chapter shall comply with the sediment cleanup standards in chapter 173-204 WAC. In addition, a remedial investigation/feasibility study conducted under WAC 173-340-350 and 173-340-351 shall also comply with the cleanup study plan requirements under chapter 173-204 WAC. The process for selecting sediment cleanup actions under this chapter shall comply with the requirements in WAC 173-340-350 through 173-340-390.

(8) **Interim actions.** Interim actions conducted under this chapter shall comply with legally applicable requirements. The department may also determine, based on the criteria in subsection (3) of this section, that other requirements, criteria, or limitations are relevant and appropriate for interim actions.

(9) **Permits and exemptions.**

(a) Independent remedial actions must obtain permits required by other federal, state and local laws.

(b) Under RCW ((~~70.105D.090~~)) 70A.305.090, remedial actions conducted under a consent decree, order, or agreed order, and the department when it conducts a remedial action are exempt from the procedural requirements of certain laws. This exemption shall not apply if the department determines that the exemption would result in loss of approval from a federal agency necessary for the state to administer any federal law. This exemption applies to the following laws:

(i) Chapter ((~~70.94~~)) 70A.15 RCW;

(ii) Chapter ((~~70.95~~)) 70A.205 RCW;

(iii) Chapter ((~~70.105~~)) 70A.300 RCW;

(iv) Chapter ((~~75.20~~)) 77.55 RCW;

(v) Chapter 90.48 RCW;

(vi) Chapter 90.58 RCW; and

(vii) Any laws requiring or authorizing local government permits or approvals for the remedial action.

(c) Remedial actions exempt from procedural requirements under (a) and (b) of this subsection still must comply with the substantive requirements of these laws.

(d) The department shall ensure compliance with substantive requirements and provide an opportunity for comment by the public and by the state agencies and local governments that would otherwise implement these laws as follows:

(i) Before proposing any substantive requirements, the department or potentially liable persons, if directed to do so by the department, shall consult with the state agencies and local governments to identify potential permits and to obtain written documentation from the consulted agencies regarding the substantive requirements for permits exempted under RCW ((~~70.105D.090~~)) 70A.305.090.

(ii) The permit exemptions and the substantive requirements, to the extent they are known, shall be identified by the department in the order, decree, or if the cleanup is being conducted by the department, in the work plan prepared by the department.

(iii) A public notice of the order, decree or work plan shall be issued in accordance with WAC 173-340-600. The notice shall specifically identify the permits exempted under RCW ((~~70.105D.090~~)) 70A.305.090 and seek comment on the substantive requirements proposed to be applied to the remedial action. This notice shall be ((~~mailed~~)) provided to the state agencies and local governments that would otherwise implement these permits. This notice shall also be ((~~mailed~~)) provided to the same individuals that the state agencies and local government have identified that would normally be ((~~mailed~~)) provided notice to if a permit was being issued.

(iv) Substantive requirements, to the extent known and identified by the state agencies and local governments before issuing the order, decree or work plan and those identified by the state agencies and local government during the public comment period shall be incorporated into the order, decree or work plan if approved by the department.

(e) It shall be the continuing obligation of persons conducting remedial actions to determine whether additional permits or approvals or substantive requirements are required. In the event that either the person conducting the remedial action or the department becomes aware of additional permits or approvals or substantive requirements that apply to the remedial action, they shall promptly notify the other party of this knowledge. The department, or the potentially liable person at the department's request, shall consult with the state or

local agency on these additional requirements. The department shall make the final determination on the application of any additional substantive requirements at the site.

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-720 Groundwater cleanup standards. (1) **General considerations.**

(a) Groundwater cleanup levels shall be based on estimates of the highest beneficial use and the reasonable maximum exposure expected to occur under both current and potential future site use conditions. The department has determined that at most sites use of groundwater as a source of drinking water is the beneficial use requiring the highest quality of groundwater and that exposure to hazardous substances through ingestion of drinking water and other domestic uses represents the reasonable maximum exposure. Unless a site qualifies under subsection (2) of this section for a different groundwater beneficial use, groundwater cleanup levels shall be established using this presumed exposure scenario and be established in accordance with subsection (3), (4) or (5) of this section. If the site qualifies for a different groundwater beneficial use, groundwater cleanup levels shall be established under subsection (6) of this section.

(b) In the event of a release of a hazardous substance at a site, a cleanup action complying with this chapter shall be conducted to address all areas where the concentration of the hazardous substance in groundwater exceeds cleanup levels.

(c) Groundwater cleanup levels shall be established at concentrations that do not directly or indirectly cause violations of surface water, sediments, soil, or air cleanup standards established under this chapter or other applicable state and federal laws. A site that qualifies for a Method C groundwater cleanup level under this section does not necessarily qualify for a Method C cleanup level in other media. Each medium must be evaluated separately using the criteria applicable to that medium.

(d) The department may require more stringent cleanup levels than specified in this section where necessary to protect other beneficial uses or otherwise protect human health and the environment. Any imposition of more stringent requirements under this provision shall comply with WAC 173-340-702 and 173-340-708. The following are examples of situations that may require more stringent cleanup levels:

(i) Concentrations that are necessary to protect sensitive subgroups;

(ii) Concentrations that eliminate or minimize the potential for food chain contamination;

(iii) Concentrations that eliminate or minimize the potential for damage to soils or biota in the soils which could impair the use of the soil for agricultural or silvicultural purposes;

(iv) Concentrations that eliminate or minimize the potential for the accumulation of vapors in buildings or other structures to concentrations which pose a threat to human health or the environment; and

(v) Concentrations that protect nearby surface waters.

(2) **Potable groundwater defined.** Groundwater shall be classified as potable to protect drinking water beneficial uses unless the following can be demonstrated:

(a) The groundwater does not serve as a current source of drinking water;

(b) The groundwater is not a potential future source of drinking water for any of the following reasons:

(i) The groundwater is present in insufficient quantity to yield greater than 0.5 gallon per minute on a sustainable basis to a well constructed in compliance with chapter 173-160 WAC and in accordance with normal domestic water well construction practices for the area in which the site is located;

(ii) The groundwater contains natural background concentrations of organic or inorganic constituents that make use of the water as a drinking water source not practicable. Groundwater containing total dissolved solids at concentrations greater than 10,000 mg/l shall normally be considered to have fulfilled this requirement; *(NOTE: The total dissolved solids concentration provided here is an example. There may be other situations where high natural background levels also meet this requirement.)* or

(iii) The groundwater is situated at a great depth or location that makes recovery of water for drinking water purposes technically impossible; and

(c) The department determines it is unlikely that hazardous substances will be transported from the contaminated groundwater to groundwater that is a current or potential future source of drinking water, as defined in (a) and (b) of this subsection, at concentrations which exceed groundwater quality criteria published in chapter 173-200 WAC.

In making a determination under this provision, the department shall consider site-specific factors including:

(i) The extent of affected groundwater;

(ii) The distance to existing water supply wells;

(iii) The likelihood of interconnection between the contaminated groundwater and groundwater that is a current or potential future source of drinking water due to well construction practices in the area of the state where the site is located;

(iv) The physical and chemical characteristics of the hazardous substance;

(v) The hydrogeologic characteristics of the site;

(vi) The presence of discontinuities in the affected geologic stratum; and

(vii) The degree of confidence in any predictive modeling performed.

(d) Even if groundwater is classified as a potential future source of drinking water under (b) of this subsection, the department recognizes that there may be sites where there is an extremely low probability that the groundwater will be used for that purpose because of the site's proximity to surface water that is not suitable as a domestic water supply. An example of this situation would be shallow groundwaters in close proximity to marine waters such as on Harbor Island in Seattle. At such sites, the department may allow groundwater to be classified as nonpotable for the purposes of this section if each of the following conditions can be demonstrated. These determinations must be for reasons other than that the groundwater or surface water has been contaminated by a release of a hazardous substance at the site.

(i) The conditions specified in (a) and (c) of this subsection are met;

(ii) There are known or projected points of entry of the groundwater into the surface water;

(iii) The surface water is not classified as a suitable domestic water supply source under chapter 173-201A WAC; and

(iv) The groundwater is sufficiently hydraulically connected to the surface water that the groundwater is not practicable to use as a drinking water source.

(3) **Method A cleanup levels for potable groundwater.**

(a) **Applicability.** Method A groundwater cleanup levels may only be used at sites qualifying under WAC 173-340-704(1).

(b) **General requirements.** Method A cleanup levels shall be at least as stringent as all of the following:

(i) Concentrations listed in Table 720-1 and compliance with the corresponding footnotes;

(ii) Concentrations established under applicable state and federal laws, including the following requirements:

(A) Maximum contaminant levels established under the Safe Drinking Water Act and published in 40 C.F.R. 141;

(B) Maximum contaminant level goals for noncarcinogens established under the Safe Drinking Water Act and published in 40 C.F.R. 141;

(C) Maximum contaminant levels established by the state board of health and published in chapter 246-290 WAC.

(iii) For hazardous substances deemed indicator hazardous substances for groundwater under WAC 173-340-708(2) and for which there is no value in Table 720-1 or applicable state and federal laws, concentrations that do not exceed natural background or the practical quantitation limit, subject to the limitations in this chapter.

(iv) **Protection of surface water beneficial uses.** Concentrations established in accordance with the methods specified in WAC 173-340-730 for protecting surface water beneficial uses, unless it can be demonstrated that the hazardous substances are not likely to reach surface water. This demonstration must be based on factors other than implementation of a cleanup action at the site.

(4) **Method B cleanup levels for potable groundwater.**

(a) **Applicability.** Method B potable groundwater cleanup levels consist of standard and modified cleanup levels determined using the procedures in this subsection. Either standard or modified Method B groundwater cleanup levels based on drinking water beneficial uses may be used at any site.

(b) **Standard Method B potable groundwater cleanup levels.** Where the groundwater cleanup level is based on a drinking water beneficial use, standard Method B cleanup levels shall be at least as stringent as all of the following:

(i) **Applicable state and federal laws.** Concentrations established under applicable state and federal laws, including the requirements in subsection (3)(b)(ii) of this section;

(ii) **Protection of surface water beneficial uses.** Concentrations established in accordance with the methods specified in WAC 173-340-730 for protecting surface water beneficial uses, unless it can be demonstrated that the hazardous substances are not likely to reach surface water. This demonstration must be based on factors other than implementation of a cleanup action at the site.

(iii) **Human health protection.** For hazardous substances for which sufficiently protective, health-based criteria or standards have not been established under applicable state and federal laws, those concentrations which protect human health as determined by the following methods:

(A) **Noncarcinogens.** Concentrations that are estimated to result in no acute or chronic toxic effects on human health as determined using Equation 720-1.

[Equation 720-1]

$$\text{Groundwater cleanup level (ug/l)} = \frac{RfD \times ABW \times UCF \times HQ \times AT}{DWIR \times INH \times DWF \times ED}$$

Where:

RfD	=	Reference dose as specified in WAC 173-340-708(7) (mg/kg-day)
ABW	=	Average body weight during the exposure duration (16 kg)
UCF	=	Unit conversion factor (1,000 ug/mg)
HQ	=	Hazard quotient (1) (unitless)
AT	=	Averaging time (6 years)
DWIR	=	Drinking water ingestion rate (1.0 liter/day)
INH	=	Inhalation correction factor (use value of 2 for volatile organic compounds and 1 for all other substances [unitless])
DWF	=	Drinking water fraction (1.0) (unitless)
ED	=	Exposure duration ((~~(1.0)~~)) (6 years)

(B) **Carcinogens.** For known or suspected carcinogens, concentrations for which the upper bound on the estimated excess cancer risk is less than or equal to one in ((~~one million~~)) 1,000,000 (1×10^{-6}) as determined using Equation 720-2.

[Equation 720-2]

$$\text{Groundwater cleanup level (ug/l)} = \frac{RISK \times ABW \times AT \times UCF}{CPF \times DWIR \times ED \times INH \times DWF}$$

Where:

RISK	=	Acceptable cancer risk level (1 in 1,000,000) (unitless)
ABW	=	Average body weight during the exposure duration (70 kg)
AT	=	Averaging time (75 years)
UCF	=	Unit conversion factor (1,000 ug/mg)
CPF	=	Carcinogenic potency factor as specified in WAC 173-340-708(8) (kg-day/mg)
DWIR	=	Drinking water ingestion rate (2.0 liters/day)
ED	=	Exposure duration (30 years)
INH	=	Inhalation correction factor (use value of 2 for volatile organic compounds and 1 for all other substances [unitless])
DWF	=	Drinking water fraction (1.0) (unitless)

(C) **Petroleum mixtures.** For noncarcinogenic effects of petroleum mixtures, a total petroleum hydrocarbon cleanup level shall be calculated taking into account the additive effects of the petroleum fractions and volatile organic compounds present in the petroleum mixture. Equation 720-3 shall be used for this calculation. Cleanup levels for other noncarcinogens and known or suspected carcinogens within the petroleum mixture shall be calculated using Equations 720-1 and 720-2. See Table 830-1 for the analyses required for various petroleum products to use this method. A total petroleum hydrocarbon cleanup level for petroleum mixtures derived using Equation 720-3 shall be adjusted when necessary so that biological degradation of the petroleum does not result in exceedances of the maximum contaminant levels in chapter 246-290 WAC or natural background, whichever is higher.

[Equation 720-3]

$$C_w = \frac{HI \times AT}{\left[\frac{DWIR \times DWF \times ED}{ABW \times UCF}\right] \times \sum_{i=1}^{n} \frac{F(i) \times INH(i)}{RfD(i)}}$$

AT and ED added to above equation

Where:

C_w	=	TPH groundwater cleanup level (ug/l)
HI	=	Hazard index (1) (unitless)
AT	=	Averaging time (6 years)
DWIR	=	Drinking water intake rate (1.0 liter/day)
DWF	=	Drinking water fraction (1.0) (unitless)
ED	=	Exposure duration (6 years)
ABW	=	Average body weight during the exposure duration (16 kg)
UCF	=	Unit conversion factor (1,000 ug/mg)
F(i)	=	Fraction by weight of petroleum component (i). (Unitless) (Use site specific groundwater composition data, provided the data is representative of present and future conditions at the site, or use the groundwater composition predicted under WAC 173-340-747((~~(4)~~))
INH(i)	=	Inhalation correction ((~~fraction~~)) factor for petroleum component (i) (use value of 2 for volatile organic compounds and 1 for all other components [unitless])
RfD(i)	=	Reference dose of petroleum component (i) as specified in WAC 173-340-708(7) (mg/kg day)
n	=	The number of petroleum components (petroleum fractions plus volatile organic compounds with an RfD) present in the petroleum mixture. (See Table 830-1.)

(c) **Modified Method B potable groundwater cleanup levels.** Modified Method B groundwater cleanup levels for drinking water beneficial uses are standard Method B groundwater cleanup levels modified with chemical-specific or site-specific data. When making these adjustments, the resultant cleanup levels shall meet applicable state and federal laws and health risk levels for standard Method B groundwater cleanup levels. Changes to exposure assumptions must comply with WAC 173-340-708(10). The following adjustments may be made to the default assumptions in the standard Method B equations to derive modified Method B groundwater cleanup levels for drinking water beneficial uses:

(i) The inhalation correction factor is an adjustment factor that takes into account exposure to hazardous substances that are volatilized and inhaled during showering and other domestic activities. When available, hazardous substance-specific information may be used to estimate this factor;

(ii) Where separate toxicity factors (reference doses and carcinogenic potency factors) are available for inhalation and oral exposures, the health hazards associated with the inhalation of hazardous substances in groundwater during showering and other domestic activities may be evaluated separately from the health hazards associated with ingestion of drinking water. In these cases, the groundwater cleanup level based on ingestion of drinking water shall be modified

to take into account multiple exposure pathways in accordance with WAC 173-340-708(6);

(iii) The toxicity equivalency factor procedures described in WAC 173-340-708(8) may be used for assessing the potential carcinogenic risk of mixtures of chlorinated dibenzo-p-dioxins, chlorinated dibenzofurans and polycyclic aromatic hydrocarbons;

(iv) Adjustments to the reference dose and cancer potency factor may be made if the requirements in WAC 173-340-708 (7) and (8) are met; and

(v) Modifications incorporating new science as provided for in WAC 173-340-702 (14), (15) and (16).

(d) **Using modified Method B to evaluate groundwater remediation levels.** In addition to the adjustments allowed under (c) of this subsection, other adjustments to the reasonable maximum exposure scenario or default exposure assumptions are allowed when using a quantitative site-specific risk assessment to evaluate the protectiveness of a remedy. See WAC 173-340-355, 173-340-357, and 173-340-708 (3)(d) and (10)(b).

(5) **Method C cleanup levels for potable groundwater.**

(a) **Applicability.** Method C potable groundwater cleanup levels consist of standard and modified cleanup levels as described in this subsection.

The department may approve of both standard and modified Method C groundwater cleanup levels based on drinking water beneficial uses only at sites qualifying under WAC 173-340-706(1).

(b) **Standard Method C potable groundwater cleanup levels.** Where the groundwater cleanup level is based on a drinking water beneficial use and the site qualifies for a Method C groundwater cleanup level, the standard Method C cleanup levels for groundwater shall be at least as stringent as all of the following:

(i) **Applicable state and federal laws.** Concentrations established under applicable state and federal laws, including the requirements in subsection (3)(b)(ii) of this section;

(ii) **Protection of surface water beneficial uses.** Concentrations established in accordance with the methods specified in WAC 173-340-730 for protecting surface water beneficial uses, unless it can be demonstrated that the hazardous substances are not likely to reach surface water. This demonstration must be based on factors other than implementation of a cleanup action at the site.

(iii) **Human health protection.** For hazardous substances for which sufficiently protective, health-based standards or criteria have not been established under applicable state and federal laws, those concentrations that protect human health as determined using the following methods:

(A) **Noncarcinogens.** Concentrations that are estimated to result in no significant acute or chronic toxic effects on human health and are estimated using Equation 720-1, except that the average body weight shall be 70 kg and the drinking water intake rate shall be ((~~2~~)) two liters/day;

(B) **Carcinogens.** Concentrations for which the upper bound on the estimated excess cancer risk is less than or equal to one in ((~~one hundred thousand~~)) 100,000 (1×10^{-5}), using Equation 720-2;

(C) **Petroleum mixtures.** Cleanup levels for petroleum mixtures shall be determined as specified in subsection (4)(b)(iii)(C) of this section except that the average body weight shall be 70 kg and the drinking water rate shall be ((~~2~~)) two liters/day.

(c) **Modified Method C potable groundwater cleanup levels.** Modified Method C groundwater cleanup levels for drinking water beneficial uses are standard Method C groundwater cleanup levels modified with chemical-specific or site-specific data. The same limitations and adjustments specified for modified Method B in subsection (4)(c) of this section apply to modified Method C groundwater cleanup levels.

(d) **Using Modified Method C to evaluate groundwater remediation levels.** In addition to the adjustments allowed under (c) of this subsection, other adjustments to the reasonable maximum exposure scenario or default exposure assumptions are allowed when using a quantitative site-specific risk assessment to evaluate the protectiveness of a remedy. See WAC 173-340-355, 173-340-357, and 173-340-708 (3)(d) and (10)(b).

(6) **Cleanup levels for nonpotable groundwater.**

(a) **Applicability.** Groundwater cleanup levels may be established under this subsection only if the contaminated groundwater is not classified as potable under subsection (2) of this section.

(b) **Requirements.** Cleanup levels shall be established in accordance with either of the following:

(i) The methods specified in subsections (3), (4) or (5) of this section, as applicable, for protection of drinking water beneficial uses; or

(ii) A site-specific risk assessment as provided for under (c) of this subsection for protection of other groundwater beneficial uses.

(c) **Site-specific risk assessment.**

(i) **Method B site-specific groundwater cleanup levels.** Where a site-specific risk assessment is used to establish a Method B groundwater cleanup level under (b)(ii) of this subsection, the risk assessment shall conform to the requirements in WAC 173-340-702 and 173-340-708. The risk assessment shall evaluate all potential exposure pathways and groundwater uses at the site, including potential impacts to persons engaged in site development or utility construction and maintenance activities. The risk assessment shall demonstrate the following:

(A) The cleanup levels will meet any applicable state and federal laws (drinking water standards are not applicable to these sites);

(B) The cleanup levels will result in no significant acute or chronic toxic effects on human health as demonstrated by not exceeding a hazard quotient of one ((~~(1)~~)) for individual hazardous substances;

(C) The cleanup levels will result in an upper bound on the estimated excess cancer risk that is less than or equal to one in ((~~one million~~)) 1,000,000 (1×10^{-6}) for individual hazardous substances;

(D) For organic hazardous substances and petroleum products, the cleanup levels comply with the limitation on free product in subsection (7)(d) of this section;

(E) The cleanup levels will not exceed the surface water cleanup levels derived under WAC 173-340-730 at the groundwater point of compliance or exceed the surface water or sediment quality standards at any point downstream, unless it can be demonstrated that the hazardous substances are not likely to reach surface water. This demonstration must be based on factors other than implementation of a cleanup action at the site; and

(F) Where it is demonstrated that hazardous substances are not likely to reach surface water, the use of a groundwater cleanup level less stringent than a surface water cleanup level will not pose a threat to surface water through pathways that could result in ground-

water affected by the site entering surface water (such as use of the water for irrigation or discharges from foundation drains or utility corridors).

(ii) **Method C site-specific groundwater cleanup levels.**

(A) **Applicability.** The department may approve of a site-specific Method C groundwater cleanup level derived under (b)(ii) of this subsection only at sites qualifying under WAC 173-340-706(1).

(B) **Requirements.** Where a site-specific risk assessment is used to establish a Method C groundwater cleanup level under (b)(ii) of this subsection, the site-specific risk assessment shall comply with the requirements in (c)(i) of this subsection except that the level of risk for individual carcinogens shall be one in ((~~one hundred thousand~~)) 100,000 (1×10^{-5}).

(iii) **Limitations on the use of site-specific risk assessment.** If the site-specific risk assessment results in a Method B or Method C groundwater cleanup level that exceeds the applicable potable groundwater cleanup level derived under (b)(i) of this subsection, then the potable groundwater cleanup level shall be used unless the following conditions are met:

(A) All potentially affected property owners, local governments, Indian tribes and water purveyors with jurisdiction in the area potentially affected by the groundwater contamination have been ((~~mailed~~)) provided a notice of the proposal and provided an opportunity to comment. The notice shall specifically ask for information on existing and planned uses of the groundwater. The notice shall be in addition to any notice provided under WAC 173-340-600. In determining whether it is appropriate to use a cleanup level less stringent than the potable groundwater cleanup level, the department will give greater weight to information based on an adopted or pending plan or similar preexisting document.

(B) For sites where the groundwater is classified as nonpotable under WAC 173-340-720 (2)(d), the cleanup action includes institutional controls complying with WAC 173-340-440 that will prevent the use of contaminated groundwater for drinking water purposes at any point between the source of hazardous substances and the point(s) of entry of groundwater into the surface water.

(C) For sites where the risk assessment includes assumptions of restricted use or contact with the groundwater (other than for the reason of being nonpotable), or restricted use of the land above the groundwater, the cleanup action includes institutional controls complying with WAC 173-340-440 that will implement the restrictions.

(7) **Adjustments to cleanup levels.**

(a) **Total site risk adjustments.** Groundwater cleanup levels for individual hazardous substances developed in accordance with subsection (4), (5) or (6) of this section, including those based on applicable state and federal laws, shall be adjusted downward to take into account exposure to multiple hazardous substances and/or exposure resulting from more than one pathway of exposure. These adjustments need to be made only if, without these adjustments, the hazard index would exceed one ((~~(1)~~)) or the total excess cancer risk would exceed one in ((~~one hundred thousand~~)) 100,000 (1×10^{-5}). These adjustments shall be made in accordance with the procedures in WAC 173-340-708 (5) and (6). In making these adjustments, the hazard index shall not exceed one ((~~(1)~~)) and the total excess cancer risk shall not exceed one in ((~~one hundred thousand~~)) 100,000 (1×10^{-5}).

(b) **Adjustments to applicable state and federal laws.** Where a cleanup level developed under subsection (3), (4), (5), or (6) of this section is based on an applicable state or federal law and the level of risk upon which the standard is based exceeds an excess cancer risk of one in ((~~one hundred thousand~~)) 100,000 (1×10^{-5}) or a hazard index of one ((~~(1)~~)), the cleanup level shall be adjusted downward so that the total excess cancer risk does not exceed one in ((~~one hundred thousand~~)) 100,000 (1×10^{-5}) and the hazard index does not exceed one ((~~(1)~~)) at the site.

(c) **Natural background and PQL considerations.** Cleanup levels determined under subsection (3), (4), (5), or (6) of this section, including cleanup levels adjusted under subsection (7)(a) and (b) of this section, shall not be set at levels below the practical quantitation limit or natural background concentrations, whichever is higher. See WAC 173-340-707 and 173-340-709 for additional requirements pertaining to practical quantitation limits and natural background.

(d) **Nonaqueous phase liquid limitation.** For organic hazardous substances and total petroleum hydrocarbons, the cleanup level determined under subsection (3), (4), (5), or (6) shall not exceed a concentration that would result in nonaqueous phase liquid being present in or on the groundwater. Physical observations of groundwater at or above the cleanup level, such as the lack of a film, sheen, or discoloration of the groundwater or lack of sludge or emulsion in the groundwater, may be used to determine compliance with this requirement.

(8) **Point of compliance.**

(a) **Point of compliance defined.** For groundwater, the point of compliance is the point or points where the groundwater cleanup levels established under subsection (3), (4), (5), or (6) of this section must be attained for a site to be in compliance with the cleanup standards. Groundwater cleanup levels shall be attained in all groundwaters from the point of compliance to the outer boundary of the hazardous substance plume.

(b) **Standard point of compliance for all sites.** The standard point of compliance shall be established throughout the site from the uppermost level of the saturated zone extending vertically to the lowest most depth which could potentially be affected by the site.

(c) **Conditional point of compliance.** Where it can be demonstrated under WAC 173-340-350 through 173-340-390 that it is not practicable to meet the cleanup level throughout the site within a reasonable restoration time frame, the department may approve a conditional point of compliance that shall be as close as practicable to the source of hazardous substances, and except as provided under (d) of this subsection, not to exceed the property boundary. Where a conditional point of compliance is proposed, the person responsible for undertaking the cleanup action shall demonstrate that all practicable methods of treatment are to be used in the site cleanup.

(d) **Off-property conditional point of compliance.** A conditional point of compliance shall not exceed the property boundary except in the three situations described below. In each of these three situations the person responsible for undertaking the cleanup action shall demonstrate that, in addition to making the demonstration required by (c) of this subsection, the following requirements are met:

(i) **Properties abutting surface water.** Where the groundwater cleanup level is based on protection of surface water beneficial uses under subsection (3), (4), (5), or (6) of this section, and the prop-

erty containing the source of contamination directly abuts the surface water, the department may approve a conditional point of compliance that is located within the surface water as close as technically possible to the point or points where groundwater flows into the surface water subject to the following conditions:

(A) It has been demonstrated that the contaminated groundwater is entering the surface water and will continue to enter the surface water even after implementation of the selected cleanup action;

(B) It has been demonstrated under WAC 173-340-350 through 173-340-390 that it is not practicable to meet the cleanup level at a point within the groundwater before entering the surface water, within a reasonable restoration time frame;

(C) Use of a mixing zone under WAC 173-201A-100 to demonstrate compliance with surface water cleanup levels shall not be allowed;

(D) Groundwater discharges shall be provided with all known available and reasonable methods of treatment before being released into surface waters;

(E) Groundwater discharges shall not result in violations of sediment quality values published in chapter 173-204 WAC;

(F) Groundwater and surface water monitoring shall be conducted to assess the long-term performance of the selected cleanup action including potential bioaccumulation problems resulting from surface water concentrations below method detection limits; and

(G) Before approving the conditional point of compliance, a notice of the proposal shall be ((~~mailed~~)) provided to the natural resource trustees, the Washington state department of natural resources and the United States Army Corps of Engineers. The notice shall be in addition to any notice provided under WAC 173-340-600 and invite comments on the proposal.

(ii) **Properties near, but not abutting, surface water.** Where the groundwater cleanup level is based on protection of surface water beneficial uses under subsection (3), (4), (5), or (6) of this section and the property that is the source of the contamination is located near, but does not directly abut, a surface water body, the department may approve a conditional point of compliance that is located as close as practicable to the source, not to exceed the point or points where the groundwater flows into the surface water.

For a conditional point of compliance to be approved under this provision the conditions specified in (d)(i) of this section must be met and the affected property owners between the source of contamination and the surface water body must agree in writing to the use of the conditional point of compliance. Also, if the groundwater cleanup level is not exceeded in the groundwater prior to its entry into the surface water, the conditional point of compliance cannot extend beyond the extent of groundwater contamination above the cleanup level at the time the department approves the conditional point of compliance.

(iii) **Area-wide conditional point of compliance.** As part of remedy selection, the department may approve an area-wide conditional point of compliance to address an area-wide groundwater contamination problem. The area-wide conditional point(s) of compliance shall be as close as practicable to each source of hazardous substances, not to exceed the extent of groundwater contamination at the time the department approves an area-wide conditional point of compliance.

This provision may be applied only at areas that are affected by hazardous substances released from multiple sources that have resulted in commingled plumes of contaminated groundwater that are not practi-

cable to address separately. A site may have more than one area-wide conditional point of compliance to address multiple sources and types of contaminants. An area-wide conditional point of compliance may be approved under this provision only if all of the following conditions have been met:

(A) The person conducting the cleanup action has complied with WAC 173-340-350 through 173-340-390, including a demonstration that it is not practicable to meet a point of compliance throughout the groundwater contamination within a reasonable restoration time frame;

(B) A plan has been developed for implementation of the cleanup action, including a description of how any necessary access to the affected properties will be obtained;

(C) If the contaminated groundwater is considered to be potable under WAC 173-340-720(2), current developments in the area encompassed by the area-wide conditional point of compliance and any other areas potentially affected by the groundwater contamination are served by a public water system that obtains its water from an offsite source and it can be demonstrated that the water system has sufficient capacity to serve future development in these areas. This demonstration may be made by obtaining a written statement to this effect from the water system operator;

(D) All property owners, Indian tribes, local governments, and water purveyors with jurisdiction in the area potentially affected by the groundwater contamination, have been ((~~mailed~~)) provided a notice of the proposal to establish an area-wide conditional point of compliance and provided an opportunity to comment. The notice shall specifically ask for information on existing and planned uses of the groundwater. The notice shall be in addition to any notice provided under WAC 173-340-600. The department will give greater weight to information based on an adopted or pending plan or similar preexisting document. When the department is providing technical assistance under WAC 173-340-515, the department shall also provide an opportunity to comment to the public through the *Contaminated Site Register* before issuing a written opinion.

(E) Other conditions as determined by the department on a case-by-case basis.

(e) **Monitoring wells and surface water compliance.**

(i) The department may require or approve the use of upland monitoring wells located between the surface water and the source of contamination to establish compliance where a conditional point of compliance has been established under subsection (8)(d)(i) or (ii) of this section.

(ii) Where such monitoring wells are used, the department should consider an estimate of natural attenuation between the monitoring well and the point or points where groundwater flows into the surface water in evaluating whether compliance has been achieved.

(iii) When evaluating how much, if any, natural attenuation will occur, the department shall consider site-specific factors including:

(A) Whether the groundwater could reach the surface water in ways that would not provide for natural attenuation within the groundwater flow system (such as short circuiting through high permeability zones, utility corridors or foundation drains); and

(B) Whether changes to the groundwater chemistry due to natural attenuation processes would cause an exceedance of surface water or sediment quality standards.

(9) **Compliance monitoring.**

(a) When groundwater cleanup levels have been established at a site, sampling of the groundwater shall be conducted to determine if compliance with the groundwater cleanup levels has been achieved. Compliance with groundwater cleanup levels shall be determined by analysis of groundwater samples representative of the groundwater. Surface water analysis, bioassays or other biomonitoring methods may also be required where the groundwater cleanup level is based on protection of surface water. Sampling and analytical procedures shall be defined in a compliance monitoring plan prepared under WAC 173-340-410. The sample design shall provide data that are representative of the site.

(b) Analyses shall be conducted on unfiltered groundwater samples, unless it can be demonstrated that a filtered sample provides a more representative measure of groundwater quality. The department expects that filtering will generally be acceptable for iron and manganese and other naturally occurring inorganic substances where:

(i) A properly constructed monitoring well cannot be sufficiently developed to provide low turbidity water samples;

(ii) Due to the natural background concentration of hazardous substances in the aquifer material, unfiltered samples would not provide a representative measure of groundwater quality; and

(iii) Filtering is performed in the field with all practicable measures taken to avoid exposing the groundwater sample to the ambient air before filtering.

(c) The data analysis and evaluation procedures used to evaluate compliance with groundwater cleanup levels shall be defined in a compliance monitoring plan prepared under WAC 173-340-410. These procedures shall meet the following general requirements:

(i) Methods of data analysis shall be consistent with the sampling design;

(ii) When cleanup levels are based on requirements specified in applicable state and federal laws, the procedures for evaluating compliance that are specified in those requirements shall be used to evaluate compliance with cleanup levels unless those procedures conflict with the intent of this section;

(iii) Where procedures for evaluating compliance are not specified in an applicable state and federal law, statistical methods used shall be appropriate for the distribution of sampling data for each hazardous substance. If the distributions for hazardous substances differ, more than one statistical method may be required;

(iv) Compliance with groundwater cleanup levels shall be determined for each groundwater monitoring well or other monitoring points such as a spring;

(v) The data analysis procedures identified in the compliance monitoring plan shall specify the statistical parameters to be used to determine compliance with groundwater cleanup levels.

(A) For cleanup levels based on short-term or acute toxic effects on human health or the environment, an upper percentile concentration shall be used to evaluate compliance with groundwater cleanup levels.

(B) For cleanup levels based on chronic or carcinogenic threats, the true mean concentration shall be used to evaluate compliance with groundwater cleanup levels.

(vi) When active groundwater restoration is performed, or containment technologies are used that incorporate active pumping of groundwater, compliance with groundwater cleanup levels shall be determined when the groundwater characteristics at the site are no longer influenced by the cleanup action.

(d) When data analysis procedures for evaluating compliance are not specified in an applicable state or federal law, the following procedures shall be used:

(i) A confidence interval approach that meets the following requirements:

(A) The upper one-sided ((~~ninety-five~~)) 95 percent confidence limit on the true mean groundwater concentration shall be less than the groundwater cleanup level. For lognormally distributed data, the upper one-sided ((~~ninety-five~~)) 95 percent confidence limit shall be calculated using Land's method; and

(B) Data shall be assumed to be lognormally distributed unless this assumption is rejected by a statistical test. If a lognormal distribution is inappropriate, data shall be assumed to be normally distributed unless this assumption is rejected by a statistical test. The W test, D'Agostino's test, or, censored probability plots, as appropriate for the data, shall be the statistical methods used to determine whether the data is lognormally or normally distributed.

(ii) Evaluations conducted under subsection (9)(c)(v)(A) of this subsection may use a parametric test for percentiles based on tolerance intervals to test the proportion of groundwater samples having concentrations less than the groundwater cleanup level. When using this method, the true proportion of samples that do not exceed the groundwater cleanup level shall not be less than ((~~ninety~~)) 90 percent. Statistical tests shall be performed with a Type I error level of 0.05; or

(iii) Other statistical methods approved by the department.

(e) All data analysis methods used, including those specified in state or federal law, must meet the following requirements:

(i) No single sample concentration shall be greater than two times the groundwater cleanup level. Higher exceedances to control false positive error rates at five percent may be approved by the department when the cleanup level is based on background concentrations; and

(ii) Less than ((~~ten~~)) 10 percent of the sample concentrations shall exceed the groundwater cleanup level during a representative sampling period. Higher exceedances to control false positive error rates at five percent may be approved by the department when the cleanup level is based on background concentrations; and

(f) When using statistical methods to demonstrate compliance with groundwater cleanup levels, the following procedures shall be used for measurements below the practical quantitation limit:

(i) Measurements below the method detection limit shall be assigned a value equal to one-half the method detection limit when not more than ((~~fifteen~~)) 15 percent of the measurements are below the practical quantitation limit.

(ii) Measurements above the method detection limit but below the practical quantitation limit shall be assigned a value equal to the method detection limit when not more than ((~~fifteen~~)) 15 percent of the measurements are below the practical quantitation limit.

(iii) When between ((~~fifteen and fifty~~)) 15 and 50 percent of the measurements are below the practical quantitation limit and the data are assumed to be lognormally or normally distributed, Cohen's method shall be used to calculate a corrected mean and standard deviation for use in calculating an upper confidence limit on the true mean groundwater concentration.

(iv) If more than ((~~fifty~~)) 50 percent of the measurements are below the practical quantitation limit, the largest value in the data

set shall be used in place of an upper confidence limit on the true mean groundwater calculation.

(v) If a hazardous substance or petroleum fraction has never been detected in any sample at a site and these substances are not suspected of being present at the site based on site history and other knowledge, that hazardous substance or petroleum fraction may be excluded from the statistical analysis.

(vi) The department may approve alternate statistical procedures for handling nondetected values or values below the practical quantitation limit.

Reviser's note: The brackets and enclosed material in the text of the above section occurred in the copy filed by the agency and appear in the Register pursuant to the requirements of RCW 34.08.040.

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-730 Surface water cleanup standards. (1) **General considerations.**

(a) Surface water cleanup levels shall be based on estimates of the highest beneficial use and the reasonable maximum exposure expected to occur under both current and potential future site use conditions. The classification and the highest beneficial use of a surface water body, determined in accordance with chapter 173-201A WAC, shall be used to establish the reasonable maximum exposure for that water body. Surface water cleanup levels shall use this presumed exposure scenario and shall be established in accordance with this section.

(b) In the event of a release of a hazardous substance to surface water from a site, a cleanup action that complies with this chapter shall be conducted to address all areas of the site where the concentration of the hazardous substances in the surface water exceeds cleanup levels.

(c) Surface water cleanup levels established under this section apply to those surface waters of the state affected or potentially affected by releases of hazardous substances from sites addressed under this chapter. The department does not expect that cleanup standards will be applied to stormwater runoff that is in the process of being conveyed to a treatment system.

(d) Surface water cleanup levels shall be established at concentrations that do not directly or indirectly cause violations of groundwater, soil, sediment, or air cleanup standards established under this chapter or other applicable state and federal laws. A site that qualifies for a Method C surface water cleanup level under this section does not necessarily qualify for a Method C cleanup level in other media. Each medium must be evaluated separately using the criteria applicable to that medium.

(e) The department may require more stringent cleanup levels than specified in this section where necessary to protect other beneficial uses or otherwise protect human health and the environment. Any imposition of more stringent requirements under this provision shall comply with WAC 173-340-702 and 173-340-708.

(2) **Method A surface water cleanup levels.**

(a) **Applicability.** Method A surface water cleanup levels may only be used at sites that qualify under WAC 173-340-704(1).

(b) **General requirements.** Method A surface water cleanup levels shall be at least as stringent as all of the following:

(i) Concentrations established under applicable state and federal laws, including the following requirements:

(A) All water quality criteria published in the water quality standards for surface waters of the state of Washington, chapter 173-201A WAC, as amended;

(B) Water quality criteria based on the protection of aquatic organisms (acute and chronic criteria) and human health published under section 304 of the Clean Water Act((.)); and

(C) National toxics rule (40 C.F.R. Part 131);

(ii) For surface waters that are classified as suitable for use as a domestic water supply under chapter 173-201A (excluding marine waters), concentrations derived using the methods specified in WAC 173-340-720 for drinking water beneficial uses; and

(iii) For a hazardous substance deemed an indicator hazardous substance for surface water under WAC 173-340-708(2) and for which there is no value in applicable state and federal laws, a concentration that does not exceed the natural background concentration or the practical quantitation limit, subject to the limitations in this chapter.

(3) **Method B surface water cleanup levels.**

(a) **Applicability.** Method B surface water cleanup levels consist of standard and modified cleanup levels as described in this subsection. Either standard or modified Method B surface water cleanup levels may be used at any site.

(b) **Standard Method B surface water cleanup levels.** Standard Method B cleanup levels for surface waters shall be at least as stringent as all of the following:

(i) **Applicable state and federal laws.** Concentrations established under applicable state and federal laws, including the following requirements:

(A) All water quality criteria published in the water quality standards for surface waters of the state of Washington, chapter 173-201A WAC;

(B) Water quality criteria based on the protection of aquatic organisms (acute and chronic criteria) and human health published under section 304 of the Clean Water Act unless it can be demonstrated that such criteria are not relevant and appropriate for a specific surface water body or hazardous substance; and

(C) National toxics rule (40 C.F.R. Part 131);

(ii) **Environmental effects.** For hazardous substances for which environmental effects-based concentrations have not been established under applicable state or federal laws, concentrations that are estimated to result in no adverse effects on the protection and propagation of wildlife, fish, and other aquatic life. Whole effluent toxicity testing using the protocols described in chapter 173-205 WAC may be used to make this demonstration for fish and aquatic life;

(iii) **Human health protection.** For hazardous substances for which sufficiently protective, health-based criteria or standards have not been established under applicable state and federal laws, those concentrations that protect human health as determined by the following methods:

(A) **Noncarcinogens.** For surface waters that support or have the potential to support fish or shellfish populations, concentrations which are estimated to result in no acute or chronic toxic effects on human health as determined using Equation 730-1.

[Equation 730-1]

$$\text{Surface water cleanup level (ug/l)} = \frac{RfD \times ABW \times UCF1 \times UCF2 \times HQ \times AT}{BCF \times FCR \times FDF \times ED}$$

Where:

RfD	=	Reference dose as specified in WAC 173-340-708(7) (mg/kg-day)
ABW	=	Average body weight during the exposure duration (70 kg)
UCF1	=	Unit conversion factor (1,000 ug/mg)
UCF2	=	Unit conversion factor (1,000 ((~~grams/liter~~)) grams/kg)
BCF	=	Bioconcentration factor as defined in WAC 173-340-708(9) (liters/kilogram)
FCR	=	Fish consumption rate (54 grams/day)
FDF	=	Fish diet fraction (0.5) (unitless)
HQ	=	Hazard quotient (1) (unitless)
AT	=	Averaging time (30 years)
ED	=	Exposure duration (30 years)

(B) **Carcinogens.** For surface waters which support or have the potential to support fish or shellfish populations, concentrations that are estimated to result in an excess cancer risk less than or equal to one in ((~~one million~~)) 1,000,000 (1×10^{-6}) as determined using Equation 730-2.

[Equation 730-2]

$$\text{Surface water cleanup level (ug/l)} = \frac{RISK \times ABW \times AT \times UCF1 \times UCF2}{CPF \times BCF \times FCR \times FDF \times ED}$$

Where:

CPF	=	Carcinogenic potency factor as specified in WAC 173-340-708(8) (kg-day/mg)
RISK	=	Acceptable cancer risk level (1 in 1,000,000) (unitless)
ABW	=	Average body weight during the exposure duration (70 kg)
AT	=	Averaging time (75 years)
UCF1	=	Unit conversion factor (1,000 ug/mg)
UCF2	=	Unit conversion factor (1,000 ((~~grams/liter~~)) grams/kg)
BCF	=	Bioconcentration factor as defined in WAC 173-340-708(9) (liters/kilogram)
FCR	=	Fish consumption rate (54 grams/day)
FDF	=	Fish diet fraction (0.5) (unitless)
ED	=	Exposure duration (30 years)

(C) **Petroleum mixtures.** For noncarcinogenic effects of petroleum mixtures, a total petroleum hydrocarbon cleanup level shall be calculated using Equation 730-1 and by taking into account the additive effects of the petroleum fractions and volatile hazardous substances present in the petroleum mixture. As an alternative to this calculation, the total petroleum hydrocarbon cleanup levels in Table 720-1 may be used. Cleanup levels for other noncarcinogens and known or suspected carcinogens within the petroleum mixture shall be calculated using Equations 730-1 and 730-2. See Table 830-1 for the analyses required for various petroleum products to use this method; and

(iv) **Drinking water considerations.** For surface waters that are classified as suitable for use as a domestic water supply under chapter 173-201A WAC, concentrations derived using the methods specified in WAC 173-340-720 for drinking water beneficial uses.

(c) **Modified Method B surface water cleanup levels.** Modified Method B surface water cleanup levels are standard Method B surface water cleanup levels modified with chemical-specific or site-specific data. When making these adjustments, the resultant cleanup levels shall meet applicable state and federal laws and health risk levels required for standard Method B surface water cleanup levels. Changes to exposure assumptions must comply with WAC 173-340-708(10). The following adjustments may be made to the default assumptions in the standard Method B equations to derive modified Method B surface water cleanup levels:

(i) Adjustments to the reference dose and cancer potency factor may be made if the requirements in WAC 173-340-708 (7) and (8) are met;

(ii) Adjustments to the bioconcentration factor may be made if the requirements in WAC 173-340-708(9) are met;

(iii) Where a numeric environmental effects-based water quality standard does not exist, bioassays that use methods other than those specified in chapter 173-205 WAC may be approved by the department to establish concentrations for the protection of fish and other aquatic life;

(iv) The toxicity equivalency factor procedures described in WAC 173-340-708(8) may be used for assessing the potential carcinogenic risk of mixtures of chlorinated dibenzo-p-dioxins, chlorinated dibenzofurans and polycyclic aromatic hydrocarbons; and

(v) Modifications incorporating new science as provided for in WAC 173-340-702 (14), (15) and (16).

(d) **Using modified Method B to evaluate surface water remediation levels.** In addition to the adjustments allowed under subsection (3)(c) of this section, adjustments to the reasonable maximum exposure scenario or default exposure assumptions are allowed when using a quantitative site-specific risk assessment to evaluate the protectiveness of a remedy. See WAC 173-340-355, 173-340-357, and 173-340-708 (3)(d) and (10)(b).

(4) **Method C surface water cleanup levels.**

(a) **Applicability.** Method C surface water cleanup levels consist of standard and modified cleanup levels as described in this subsection. Either standard or modified Method C cleanup levels may be approved by the department if the person undertaking the cleanup action can demonstrate that such levels are consistent with applicable state and federal laws, that all practicable methods of treatment have been used, that institutional controls are implemented in accordance with WAC 173-340-440, and that one or more of the conditions in WAC 173-340-706(1) exist.

(b) **Standard Method C surface water cleanup levels.** Method C cleanup levels for surface waters shall be at least as stringent as all of the following:

(i) **Applicable state and federal laws.** Concentrations established under applicable state and federal laws, including the requirements identified in subsection (3)(b)(i) of this section;

(ii) **Environmental effects.** For hazardous substances for which an environmental effects based concentration has not been established under applicable state or federal laws, those concentrations which are estimated to result in no significant adverse effects on the protection and propagation of wildlife, fish and other aquatic life. Whole effluent toxicity testing using the protocols described in chapter 173-205 WAC may be used to make this demonstration for fish and aquatic life;

(iii) **Human health protection.** For hazardous substances for which sufficiently protective, health-based criteria or standards have not been established under applicable state and federal laws, those concentrations which protect human health as determined by the following methods:

(A) **Noncarcinogens.** For surface waters that support or have the potential to support fish or shellfish populations, concentrations that are estimated to result in no significant acute or chronic toxic effects on human health and are estimated in accordance with Equation 730-1 except that the fish diet fraction shall be ((~~twenty~~)) 20 percent (0.2);

(B) **Carcinogens.** For surface waters that support or have the potential to support fish or shellfish populations, concentrations for which the upper bound on the estimated excess cancer risk is less than or equal to one in ((~~one hundred thousand~~)) 100,000 (1×10^{-5}) and are estimated in accordance with Equation 730-2 except that the fish diet fraction shall be ((~~twenty~~)) 20 percent (0.2);

(C) **Petroleum mixtures.** Cleanup levels for petroleum mixtures shall be calculated as specified in subsection (3)(b)(iii)(C) of this section, except that the fish diet fraction shall be ((~~twenty~~)) 20 percent (0.2); and

(iv) **Drinking water considerations.** For surface waters that are classified as suitable for use as a domestic water supply under chapter 173-201A WAC, concentrations derived using the methods specified for drinking water beneficial uses in WAC 173-340-720.

(c) **Modified Method C surface water cleanup levels.** Modified Method C surface water cleanup levels are standard Method C surface water cleanup levels modified with chemical-specific or site-specific data. The same limitations and adjustments specified for modified Method B in subsection (3)(c) of this section apply to modified Method C surface water cleanup levels.

(d) **Using modified Method C to evaluate surface water remediation levels.** In addition to the adjustments allowed under subsection (4)(c) of this section, adjustments to the reasonable maximum exposure scenario or default exposure assumptions are allowed when using a quantitative site-specific risk assessment to evaluate the protectiveness of a remedy. See WAC 173-340-355, 173-340-357, and 173-340-708 (3)(d) and (10)(b).

(5) **Adjustments to cleanup levels.**

(a) **Total site risk adjustments.** Surface water cleanup levels for individual hazardous substances developed in accordance with subsections (3) and (4) of this section, including those based on applicable state and federal laws, shall be adjusted downward to take into account exposure to multiple hazardous substances and/or exposure resulting from more than one pathway of exposure. These adjustments need to be made only if, without these adjustments, the hazard index would exceed one ((~~(1)~~)) and the total excess cancer risk would exceed one in ((~~one hundred thousand~~)) 100,000 (1×10^{-5}). These adjustments shall be made in accordance with the procedures specified in WAC 173-340-708 (5) and (6). In making these adjustments, the hazard index shall not exceed one ((~~(1)~~)) and the total excess cancer risk shall not exceed one in ((~~one hundred thousand~~)) 100,000 (1×10^{-5}).

(b) **Adjustments to applicable state and federal laws.** Where a cleanup level developed under subsection (2), (3) or (4) of this section is based on an applicable state or federal law and the level of risk upon which the standard is based exceeds an excess cancer risk of

one in ((~~one hundred thousand~~)) 100,000 (1×10^{-5}) or a hazard index of one ((~~(1)~~)), the cleanup level shall be adjusted downward so that the total excess cancer risk does not exceed one in ((~~one hundred thousand~~)) 100,000 (1×10^{-5}) and the hazard index does not exceed one ((~~(1)~~)) at the site.

(c) **Natural background and PQL considerations.** Cleanup levels determined under subsections (2), (3) and (4) of this section, including cleanup levels adjusted under subsection (5)(a) and (b) of this subsection, shall not be set at levels below the practical quantitation limit or natural background concentration, whichever is higher. See WAC 173-340-707 and 173-340-709 for additional requirements pertaining to practical quantitation limits and natural background concentrations.

(d) **Nonaqueous phase liquid limitation.** For organic hazardous substances and petroleum hydrocarbons, the cleanup level shall not exceed a concentration that would result in nonaqueous phase liquid being present in or on the surface water. Physical observations of surface water at or above the cleanup level, such as the lack of a film, sheen, discoloration, sludge or emulsion in the surface water or adjoining shoreline, may be used to determine compliance with this requirement.

(6) **Point of compliance.**

(a) The point of compliance for the surface water cleanup levels shall be the point or points at which hazardous substances are released to surface waters of the state unless the department has authorized a mixing zone in accordance with chapter 173-201A WAC.

(b) Where hazardous substances are released to the surface water as a result of groundwater flows, no mixing zone shall be allowed to demonstrate compliance with surface water cleanup levels. See WAC 173-340-720 (8)(d) for additional requirements for sites where contaminated groundwater is flowing into surface water.

(c) As used in this subsection, "mixing zone" means that portion of a surface water body adjacent to an effluent outfall where mixing results in dilution of the effluent with the receiving water. See chapter 173-201A WAC for additional information on mixing zones.

(7) **Compliance monitoring.**

(a) When surface water cleanup levels have been established at a site, sampling of the surface water shall be conducted to determine if compliance with the surface water cleanup levels has been achieved. Sampling and analytical procedures shall be defined in a compliance monitoring plan prepared under WAC 173-340-410. The sample design shall provide data that are representative of the site.

(b) The data analysis and evaluation procedures used to evaluate compliance with surface water cleanup levels shall be defined in a compliance monitoring plan prepared under WAC 173-340-410.

(c) Compliance with surface water cleanup standards shall be determined by analyses of unfiltered surface water samples, unless it can be demonstrated that a filtered sample provides a more representative measure of surface water quality.

(d) When surface water cleanup levels are based on requirements specified in applicable state and federal laws, the procedures for evaluating compliance that are specified in those requirements shall be used to evaluate compliance with surface water cleanup levels unless those procedures conflict with the intent of this section.

(e) Where procedures for evaluating compliance are not specified in an applicable state and federal law, compliance with surface water

cleanup levels shall be evaluated using procedures approved by the department. Where statistical methods are used to evaluate compliance, the statistical methods shall be appropriate for the distribution of the hazardous substance sampling data. If the distribution of the hazardous substance sampling data is inappropriate for statistical methods based on a normal distribution, then the data may be transformed. If the distributions of individual hazardous substances differ, more than one statistical method may be required.

(f) Sampling and analysis of fish tissue, shellfish, or other aquatic organisms and sediments may be required to supplement water column sampling during compliance monitoring.

AMENDATORY SECTION (Amending WSR 07-21-065, filed 10/12/07, effective 11/12/07)

WAC 173-340-740 Unrestricted land use soil cleanup standards.

(1) **General considerations.**

(a) Presumed exposure scenario soil cleanup levels shall be based on estimates of the reasonable maximum exposure expected to occur under both current and future site use conditions. The department has determined that residential land use is generally the site use requiring the most protective cleanup levels and that exposure to hazardous substances under residential land use conditions represents the reasonable maximum exposure scenario. Unless a site qualifies for use of an industrial soil cleanup level under WAC 173-340-745, soil cleanup levels shall use this presumed exposure scenario and be established in accordance with this section.

(b) In the event of a release of a hazardous substance to the soil at a site, a cleanup action complying with this chapter shall be conducted to address all areas where the concentration of hazardous substances in the soil exceeds cleanup levels at the relevant point of compliance.

(c) The department may require more stringent soil cleanup standards than required by this section where, based on a site-specific evaluation, the department determines that this is necessary to protect human health and the environment. Any imposition of more stringent requirements under this provision shall comply with WAC 173-340-702 and 173-340-708. The following are examples of situations that may require more stringent cleanup levels.

(i) Concentrations that eliminate or substantially reduce the potential for food chain contamination;

(ii) Concentrations that 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 necessary to address the potential health risk posed by dust at a site;

(iv) Concentrations necessary to protect the groundwater at a particular site;

(v) Concentrations necessary to protect nearby surface waters from hazardous substances in runoff from the site; and

(vi) Concentrations that eliminate or minimize the potential for the accumulation of vapors in buildings or other structures.

(d) Relationship between soil cleanup levels and other cleanup standards. Soil cleanup levels shall be established at concentrations that do not directly or indirectly cause violations of groundwater,

surface water, sediment, or air cleanup standards established under this chapter or applicable state and federal laws. A property that qualifies for a Method C soil cleanup level under WAC 173-340-745 does not necessarily qualify for a Method C cleanup level in other media. Each medium must be evaluated separately using the criteria applicable to that medium.

(2) **Method A soil cleanup levels for unrestricted land use.**

(a) **Applicability.** Method A soil cleanup levels may only be used at sites qualifying under WAC 173-340-704(1).

(b) **General requirements.** Method A soil cleanup levels shall be at least as stringent as all of the following:

(i) Concentrations in Table 740-1 and compliance with the corresponding footnotes;

(ii) Concentrations established under applicable state and federal laws;

(iii) Concentrations that result in no significant adverse effects on the protection and propagation of terrestrial ecological receptors using the procedures specified in WAC 173-340-7490 through 173-340-7493, unless it is demonstrated under those sections that establishing a soil concentration is unnecessary; and

(iv) For a hazardous substance that is deemed an indicator hazardous substance under WAC 173-340-708(2) and for which there is no value in Table 740-1 or applicable state and federal laws, a concentration that does not exceed the natural background concentration or the practical quantification limit, subject to the limitations in this chapter.

(3) **Method B soil cleanup levels for unrestricted land use.**

(a) **Applicability.** Method B soil cleanup levels consist of standard and modified cleanup levels determined using the procedures in this subsection. Either standard or modified Method B soil cleanup levels may be used at any site.

(b) **Standard Method B soil cleanup levels.** Standard Method B cleanup levels for soils shall be at least as stringent as all of the following:

(i) **Applicable state and federal laws.** Concentrations established under applicable state and federal laws;

(ii) **Environmental protection.** Concentrations that result in no significant adverse effects on the protection and propagation of terrestrial ecological receptors established using the procedures specified in WAC 173-340-7490 through 173-340-7494 unless it is demonstrated under those sections that establishing a soil concentration is unnecessary.

(iii) **Human health protection.** For hazardous substances for which sufficiently protective, health-based criteria or standards have not been established under applicable state and federal laws, those concentrations that protect human health as determined by evaluating the following exposure pathways:

(A) **Groundwater protection.** Concentrations that will not cause contamination of groundwater at levels which exceed groundwater cleanup levels established under WAC 173-340-720 as determined using the methods described in WAC 173-340-747.

(B) **Soil direct contact.** Concentrations that, due to direct contact with contaminated soil, are estimated to result in no acute or chronic noncarcinogenic toxic effects on human health using a hazard quotient of one ((~~(1)~~)) and concentrations for which the upper bound on the estimated excess cancer risk is less than or equal to one in

((~~one million~~)) 1,000,000 (1×10^{-6}). Equations 740-1 and 740-2 and the associated default assumptions shall be used to calculate the concentration for direct contact with contaminated soil.

(I) **Noncarcinogens.** For noncarcinogenic toxic effects of hazardous substances due to soil ingestion, concentrations shall be determined using Equation 740-1. For petroleum mixtures and components of such mixtures, see (b)(iii)(B)(III) of this subsection.

[Equation 740-1]

$$\text{Soil Cleanup Level (mg/kg)} = \frac{\text{RfD x ABW x UCF x HQ x AT}}{\text{SIR x AB1 x EF x ED}}$$

Where:

RfD	=	Reference dose as defined in WAC 173-340-708(7) (mg/kg-day)
ABW	=	Average body weight over the exposure duration (16 kg)
UCF	=	Unit conversion factor (1,000,000 mg/kg)
SIR	=	Soil ingestion rate (200 mg/day)
AB1	=	Gastrointestinal absorption fraction (1.0) (unitless)
EF	=	Exposure frequency (1.0) (unitless)
HQ	=	Hazard quotient (1) (unitless)
AT	=	Averaging time (6 years)
ED	=	Exposure duration (6 years)

(II) **Carcinogens.** For carcinogenic effects of hazardous substances due to soil ingestion, concentrations shall be determined using Equation 740-2. For petroleum mixtures and components of such mixtures, see (b)(iii)(B)(III) of this subsection.

[Equation 740-2]

$$\text{Soil Cleanup Level (mg/kg)} = \frac{\text{RISK x ABW x AT x UCF}}{\text{CPF x SIR x AB1 x ED x EF}}$$

Where:

RISK	=	Acceptable cancer risk level (1 in 1,000,000) (unitless)
ABW	=	Average body weight over the exposure duration (16 kg)
AT	=	Averaging time (75 years)
UCF	=	Unit conversion factor (1,000,000 mg/kg)
CPF	=	Carcinogenic potency factor as defined in WAC 173-340-708(8) (kg-day/mg)
SIR	=	Soil ingestion rate (200 mg/day)
AB1	=	Gastrointestinal absorption fraction (1.0) (unitless). May use 0.6 for mixtures of dioxins and/or furans
ED	=	Exposure duration (6 years)
EF	=	Exposure frequency (1.0) (unitless)

(III) **Petroleum mixtures.** For noncarcinogenic effects of petroleum mixtures, a total petroleum hydrocarbon cleanup level shall be calculated taking into account the additive effects of the petroleum fractions and volatile organic compounds substances present in the petroleum mixture. Equation 740-3 shall be used for this calculation. This equation takes into account concurrent exposure due to ingestion and dermal contact with petroleum contaminated soils. Cleanup levels for other noncarcinogens and known or suspected carcinogens within the petroleum mixture shall be calculated using Equations 740-4 and 740-5. See Table 830-1 for the analyses required for various petroleum products to use this method.

[Equation 740-3]

$$C_{soil} = \frac{HI \times ABW \times AT}{EF \times ED \left[\left(\frac{SIR \times AB1}{10^6 mg/kg} \sum_{i=1}^{n} \frac{F(i)}{RfDo(i)} \right) + \left(\frac{SA \times AF}{10^6 mg/kg} \sum_{i=1}^{n} \frac{F(i) \times ABS(i)}{RfDd(i)} \right) \right]}$$

Where:

C_{soil}	=	TPH soil cleanup level (mg/kg)
HI	=	Hazard index (1) (unitless)
ABW	=	Average body weight over the exposure duration (16 kg)
AT	=	Averaging time (6 years)
EF	=	Exposure frequency (1.0) (unitless)
ED	=	Exposure duration (6 years)
SIR	=	Soil ingestion rate (200 mg/day)
AB1	=	Gastrointestinal absorption fraction (1.0) (unitless)
F(i)	=	Fraction (by weight) of petroleum component (i) (unitless)
SA	=	Dermal surface area (2,200 cm^2)
AF	=	Adherence factor (0.2 mg/cm^2-day)
ABS	=	Dermal absorption fraction for petroleum component (i) (unitless). May use chemical-specific values or the following defaults:
		• 0.0005 for volatile petroleum components with vapor ((~~press~~)) pressure > = benzene
		• 0.03 for volatile petroleum components with vapor ((~~press~~)) pressure < benzene
		• 0.1 for other petroleum components
RfDo(i)	=	Oral reference dose of petroleum component (i) as defined in WAC 173-340-708(7) (mg/kg-day)
RfDd(i)	=	Dermal reference dose for petroleum component (i) (mg/kg-day) derived by RfDo x GI
GI	=	Gastrointestinal absorption conversion factor (unitless). May use chemical-specific values or the following defaults:
		• 0.8 for volatile petroleum components
		• 0.5 for other petroleum components
n	=	The number of petroleum components (petroleum fractions plus volatile organic compounds with an RfD) present in the petroleum mixture. (See Table 830-1.)

(C) **Soil vapors.** 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 groundwater for drinking water beneficial use under WAC 173-340-747(6) using the 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 groundwater for drinking water beneficial use under WAC 173-340-747(4).

See subsection (3)(c)(iv)(B) of this section for methods that may be used to evaluate the soil to vapor pathway.

(c) **Modified Method B soil cleanup levels.**

(i) **General.** Modified Method B soil cleanup levels are standard Method B soil cleanup levels, modified with chemical-specific or site-

specific data. When making these modifications, the resultant cleanup levels shall meet applicable state and federal laws, meet health risk levels for standard Method B soil cleanup levels, and be demonstrated to be environmentally protective using the procedures specified in WAC 173-340-7490 through 173-340-7494. Changes to exposure assumptions must comply with WAC 173-340-708(10).

(ii) **Allowable modifications.** The following modifications can be made to the default assumptions in the standard Method B equations to derive modified Method B soil cleanup levels:

(A) For the protection of groundwater, see WAC 173-340-747;

(B) For soil ingestion, the gastrointestinal absorption fraction, may be modified if the requirements of WAC 173-340-702 (14), (15), (16), and 173-340-708(10) are met;

(C) For dermal contact, the adherence factor, dermal absorption fraction and gastrointestinal absorption conversion factor may be modified if the requirements of WAC 173-340-702 (14), (15), (16), and 173-340-708(10) are met;

(D) The toxicity equivalent factors provided in WAC 173-340-708 (8)(d), (e), and (f), may be modified if the requirements of WAC 173-340-708 (8)(g) and (h) are met;

(E) The reference dose and cancer potency factor may be modified if the requirements in WAC 173-340-708 (7) and (8) are met; and

(F) Other modifications incorporating new science as provided for in WAC 173-340-702 (14), (15) and (16).

(iii) **Dermal contact.** For hazardous substances other than petroleum mixtures, dermal contact with the soil shall be evaluated whenever the proposed changes to Equations 740-1 or 740-2 would result in a significantly higher soil cleanup level than would be calculated without the proposed changes. When conducting this evaluation, the following equations and default assumptions shall be used.

(A) For noncarcinogens use Equation 740-4. This equation takes into account concurrent exposure due to ingestion and dermal contact with soil.

[Equation 740-4]

$$C_{soil} = \frac{HQ \times ABW \times AT}{EF \times ED\left[\left(\frac{1}{RfDo} \times \frac{SIR \times AB1}{10^6 mg/kg}\right) + \left(\frac{1}{RfDd} \times \frac{SA \times AF \times ABS}{10^6 mg/kg}\right)\right]}$$

Where:

C_{soil}	=	Soil cleanup level (mg/kg)
HQ	=	Hazard quotient (unitless)
ABW	=	Average body weight over the exposure duration (16 kg)
AT	=	Averaging time (6 years)
EF	=	Exposure frequency (1.0) (unitless)
ED	=	Exposure duration (6 years)
SIR	=	Soil ingestion rate (200 mg/day)
AB1	=	Gastrointestinal absorption fraction (1.0) (unitless)
SA	=	Dermal surface area (2,200 cm^2)
AF	=	Adherence factor (0.2 mg/cm^2-day)
ABS	=	Dermal absorption fraction (unitless). May use chemical-specific values or the following defaults: • 0.01 for inorganic hazardous substances

- 0.0005 for volatile organic compounds with vapor ((~~press~~)) pressure > = benzene
- 0.03 for volatile organic compounds with vapor ((~~press~~)) pressure < benzene
- 0.1 for other organic hazardous substances

RfDo = Oral reference dose as defined in WAC 173-340-708(7) (mg/kg-day)

RfDd = Dermal reference dose (mg/kg-day) derived by RfDo x GI

GI = Gastrointestinal absorption conversion factor (unitless).

May use chemical specific values or the following defaults:

- 0.2 for inorganic hazardous substances
- 0.8 for volatile organic compounds
- 0.5 for other organic hazardous substances

(B) For carcinogens use Equation 740-5. This equation takes into account concurrent exposure due to ingestion and dermal contact with soil.

[Equation 740-5]

$$C_{soil} = \frac{RISK \times ABW \times AT}{EF \times ED\left[\left(\frac{SIR \times AB1 \times CPFo}{10^6 mg/kg}\right)+\left(\frac{SA \times AF \times ABS \times CPFd}{10^6 mg/kg}\right)\right]}$$

Where:

C_{soil} = Soil cleanup level (mg/kg)

RISK = Acceptable cancer risk (1 in 1,000,000) (unitless)

ABW = Average body weight over the exposure duration (16 kg)

AT = Averaging time (75 years)

EF = Exposure frequency (1.0) (unitless)

ED = Exposure duration (6 years)

SIR = Soil ingestion rate (200 mg/day)

AB1 = Gastrointestinal absorption fraction (1.0) (unitless). May use 0.6 for mixtures of dioxins and/or furans

CPFo = Oral cancer potency factor as defined in WAC 173-340-708(8) (kg-day/mg)

CPFd = Dermal cancer potency factor (kg-day/mg) derived by CPFo/GI

GI = Gastrointestinal absorption conversion factor (unitless).

May use chemical-specific values or the following defaults:

- 0.2 for inorganic hazardous substances
- 0.8 for volatile organic compounds and for mixtures of dioxins and/or furans
- 0.5 for other organic hazardous substances

SA = Dermal surface area (2,200 cm^2)

AF = Adherence factor (0.2 mg/cm^2-day)

ABS = Dermal absorption fraction (unitless). May use chemical-specific values or the following defaults:

- 0.01 for inorganic hazardous substances
- 0.0005 for volatile organic compounds with vapor ((~~press~~)) pressure > = benzene
- 0.03 for volatile organic compounds with vapor ((~~press~~)) pressure < benzene and for mixtures of dioxins and/or furans

- 0.1 for other organic hazardous substances

(C) Modifications may be made to Equations 740-4 and 740-5 as provided for in subsection (3)(c)(ii) of this section.

(iv) **Soil vapors.**

(A) **Applicability.** 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 Method B equations (Equations 740-1 and 740-2) 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 Method B equations (Equations 740-3, 740-4 and 740-5) 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 groundwater for drinking water beneficial use under WAC 173-340-747(6) using the 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 groundwater for drinking water beneficial use under WAC 173-340-747(4).

(B) **Evaluation methods.** Soil cleanup levels that are protective of the indoor and ambient air shall be determined on a site-specific basis. Soil cleanup levels may be evaluated as being protective of air pathways using any of the following methods:

(I) Measurements of the soil vapor concentrations, using methods approved by the department, demonstrating vapors in the soil would not exceed air cleanup levels established under WAC 173-340-750.

(II) Measurements of ambient air concentrations and/or indoor air vapor concentrations throughout buildings, using methods approved by the department, demonstrating air does not exceed cleanup levels established under WAC 173-340-750. Such measurements must be representative of current and future site conditions when vapors are likely to enter and accumulate in structures. Measurement of ambient air may be excluded if it can be shown that indoor air is the most protective point of exposure.

(III) Use of modeling methods approved by the department to demonstrate the air cleanup standards established under WAC 173-340-750 will not be exceeded. When this method is used, the department may require soil vapor and/or air monitoring to be conducted to verify the calculations and compliance with air cleanup standards.

(IV) Other methods as approved by the department demonstrating the air cleanup standards established under WAC 173-340-750 will not be exceeded.

(d) **Using modified Method B to evaluate soil remediation levels.** In addition to the adjustments allowed under subsection (3)(c) of this section, adjustments to the reasonable maximum exposure scenario or default exposure assumptions are allowed when using a quantitative site-specific risk assessment to evaluate the protectiveness of a remedy. See WAC 173-340-355, 173-340-357, and 173-340-708 (3)(d) and (10)(b).

(4) **Method C soil cleanup levels.** This section does not provide procedures for establishing Method C soil cleanup levels. Except for qualifying industrial properties, Method A and Method B, as described in this section, are the only methods available for establishing soil cleanup levels at sites. See WAC 173-340-745 for use of Method C soil cleanup levels at qualifying industrial properties. See also WAC 173-340-357 and 173-340-708 (3)(d) for how land use may be considered when selecting a cleanup action at a site.

(5) **Adjustments to cleanup levels.**

(a) **Total site risk adjustments.** Soil cleanup levels for individual hazardous substances developed in accordance with subsection (3) of this section, including cleanup levels based on applicable state and federal laws, shall be adjusted downward to take into account exposure to multiple hazardous substances and/or exposure resulting from more than one pathway of exposure. These adjustments need to be made only if, without these adjustments, the hazard index would exceed one ((~~(1)~~)) or the total excess cancer risk would exceed one in ((~~one hundred thousand~~)) 100,000 (1×10^{-5}). These adjustments shall be made in accordance with the procedures specified in WAC 173-340-708 (5) and (6). In making these adjustments, the hazard index shall not exceed one ((~~(1)~~)) and the total excess cancer risk shall not exceed one in ((~~one hundred thousand~~)) 100,000 (1×10^{-5}).

(b) **Adjustments to applicable state and federal laws.** Where a cleanup level developed under subsection (2) or (3) of this section is based on an applicable state or federal law and the level of risk upon which the standard is based exceeds an excess cancer risk of one in ((~~one hundred thousand~~)) 100,000 (1×10^{-5}) or a hazard index of one ((~~(1)~~)), the cleanup level must be adjusted downward so that the total excess cancer risk does not exceed one in ((~~one hundred thousand~~)) 100,000 (1×10^{-5}) and the hazard index does not exceed one ((~~(1)~~)) at the site.

(c) **Natural background and PQL considerations.** Cleanup levels determined under subsection (2) or (3) of this section, including cleanup levels adjusted under subsection (5)(a) and (b) of this section, shall not be set at levels below the practical quantitation limit or natural background, whichever is higher. See WAC 173-340-707 and 173-340-709 for additional requirements pertaining to practical quantitation limits and natural background.

(6) **Point of compliance.**

(a) The point of compliance is the point or points where the soil cleanup levels established under subsection (2) or (3) of this section shall be attained.

(b) For soil cleanup levels based on the protection of groundwater, the point of compliance shall be established in the soils throughout the site.

(c) For soil cleanup levels based on protection from vapors, the point of compliance shall be established in the soils throughout the site from the ground surface to the uppermost groundwater saturated zone (e.g., from the ground surface to the uppermost water table).

(d) For soil cleanup levels based on human exposure via direct contact or other exposure pathways where contact with the soil is required to complete the pathway, the point of compliance shall be established in the soils throughout the site from the ground surface to ((~~fifteen~~)) 15 feet below the ground surface. This represents a reasonable estimate of the depth of soil that could be excavated and dis-

tributed at the soil surface as a result of site development activities.

(e) For soil cleanup levels based on ecological considerations, see WAC 173-340-7490 for the point of compliance.

(f) The department recognizes that, for those cleanup actions selected under this chapter that involve containment of hazardous substances, the soil cleanup levels will typically not be met at the points of compliance specified in (b) through (e) of this subsection. In these cases, the cleanup action may be determined to comply with cleanup standards, provided:

(i) The selected remedy is permanent to the maximum extent practicable using the procedures in WAC 173-340-360;

(ii) The cleanup action is protective of human health. The department may require a site-specific human health risk assessment conforming to the requirements of this chapter to demonstrate that the cleanup action is protective of human health;

(iii) The cleanup action is demonstrated to be protective of terrestrial ecological receptors under WAC 173-340-7490 through 173-340-7494;

(iv) Institutional controls are put in place under WAC 173-340-440 that prohibit or limit activities that could interfere with the long-term integrity of the containment system;

(v) Compliance monitoring under WAC 173-340-410 and periodic reviews under WAC 173-340-430 are designed to ensure the long-term integrity of the containment system; and

(vi) The types, levels and amount of hazardous substances remaining on-site and the measures that will be used to prevent migration and contact with those substances are specified in the draft cleanup action plan.

(7) **Compliance monitoring.**

(a) Compliance with soil cleanup levels shall be based on total analyses of the soil fraction less than two millimeters in size. When it is reasonable to expect that larger soil particles could be reduced to two millimeters or less during current or future site use and this reduction could cause an increase in the concentrations of hazardous substances in the soil, soil cleanup levels shall also apply to these larger soil particles. Compliance with soil cleanup levels shall be based on dry weight concentrations. The department may approve the use of alternate procedures for stabilized soils.

(b) When soil levels have been established at a site, sampling of the soil shall be conducted to determine if compliance with the soil cleanup levels has been achieved. Sampling and analytical procedures shall be defined in a compliance monitoring plan prepared under WAC 173-340-410. The sample design shall provide data that are representative of the area where exposure to hazardous substances may occur.

(c) The data analysis and evaluation procedures used to evaluate compliance with soil cleanup levels shall be defined in a compliance monitoring plan prepared under WAC 173-340-410. These procedures shall meet the following general requirements:

(i) Methods of data analysis shall be consistent with the sampling design. Separate methods may be specified for surface soils and deeper soils;

(ii) When cleanup levels are based on requirements specified in applicable state and federal laws, the procedures for evaluating compliance that are specified in those requirements shall be used to evaluate compliance with cleanup levels unless those procedures conflict with the intent of this section;

(iii) Where procedures for evaluating compliance are not specified in an applicable state and federal law, statistical methods shall be appropriate for the distribution of sampling data for each hazardous substance. If the distributions for hazardous substances differ, more than one statistical method may be required; and

(iv) The data analysis plan shall specify which parameters are to be used to determine compliance with soil cleanup levels.

(A) For cleanup levels based on short-term or acute toxic effects on human health or the environment, an upper percentile soil concentration shall be used to evaluate compliance with cleanup levels.

(B) For cleanup levels based on chronic or carcinogenic threats, the true mean soil concentration shall be used to evaluate compliance with cleanup levels.

(d) When data analysis procedures for evaluating compliance are not specified in an applicable state or federal law the following procedures shall be used:

(i) A confidence interval approach that meets the following requirements:

(A) The upper one sided ((~~ninety-five~~)) 95 percent confidence limit on the true mean soil concentration shall be less than the soil cleanup level. For lognormally distributed data, the upper one-sided ((~~ninety-five~~)) 95 percent confidence limit shall be calculated using Land's method; and

(B) Data shall be assumed to be lognormally distributed unless this assumption is rejected by a statistical test. If a lognormal distribution is inappropriate, data shall be assumed to be normally distributed unless this assumption is rejected by a statistical test. The W test, D'Agostino's test, or, censored probability plots, as appropriate for the data, shall be the statistical methods used to determine whether the data are lognormally or normally distributed;

(ii) For an evaluation conducted under (c)(iv)(A) of this subsection, a parametric test for percentiles based on tolerance intervals to test the proportion of soil samples having concentrations less than the soil cleanup level. When using this method, the true proportion of samples that do not exceed the soil cleanup level shall not be less than ((~~ninety~~)) 90 percent. Statistical tests shall be performed with a Type I error level of 0.05;

(iii) Direct comparison of soil sample concentrations with cleanup levels may be used to evaluate compliance with cleanup levels where selective sampling of soil can be reliably expected to find suspected soil contamination. There must be documented, reliable information that the soil samples have been taken from the appropriate locations. Persons using this method must demonstrate that the basis used for selecting the soil sample locations provides a high probability that any existing areas of soil contamination have been found; or

(iv) Other statistical methods approved by the department.

(e) All data analysis methods used, including those specified in state and federal law, must meet the following requirements:

(i) No single sample concentration shall be greater than two times the soil cleanup level. Higher exceedances to control false positive error rates at five percent may be approved by the department when the cleanup level is based on background concentrations; and

(ii) Less than ((~~ten~~)) 10 percent of the sample concentrations shall exceed the soil cleanup level. Higher exceedances to control false positive error rates at five percent may be approved by the department when the cleanup level is based on background concentrations.

(f) When using statistical methods to demonstrate compliance with soil cleanup levels, the following procedures shall be used for measurements below the practical quantitation limit:

(i) Measurements below the method detection limit shall be assigned a value equal to one-half the method detection limit when not more than ((~~fifteen~~)) 15 percent of the measurements are below the practical quantitation limit.

(ii) Measurements above the method detection limit but below the practical quantitation limit shall be assigned a value equal to the method detection limit when not more than ((~~fifteen~~)) 15 percent of the measurements are below the practical quantitation limit.

(iii) When between ((~~fifteen and fifty~~)) 15 and 50 percent of the measurements are below the practical quantitation limit and the data are assumed to be lognormally or normally distributed, Cohen's method shall be used to calculate a corrected mean and standard deviation for use in calculating an upper confidence limit on the true mean soil concentration.

(iv) If more than ((~~fifty~~)) 50 percent of the measurements are below the practical quantitation limit, the largest value in the data set shall be used in place of an upper confidence limit on the true mean soil concentration.

(v) The department may approve alternate statistical procedures for handling nondetected values or values below the practical quantitation limit.

(vi) If a hazardous substance or petroleum fraction has never been detected in any sample at a site and these substances are not suspected of being present at the site based on site history and other knowledge, that hazardous substance or petroleum fraction may be excluded from the statistical analysis.

Reviser's note: The brackets and enclosed material in the text of the above section occurred in the copy filed by the agency and appear in the Register pursuant to the requirements of RCW 34.08.040.

AMENDATORY SECTION (Amending WSR 07-21-065, filed 10/12/07, effective 11/12/07)

WAC 173-340-745 Soil cleanup standards for industrial properties. (1) **Applicability.**

(a) Criteria. This section shall be used to establish soil cleanup levels where the department has determined that industrial land use represents the reasonable maximum exposure. Soil cleanup levels for this presumed exposure scenario shall be established in accordance with this section. To qualify as an industrial land use and to use an industrial soil cleanup level a site must meet the following criteria:

(i) The area of the site where industrial property soil cleanup levels are proposed must meet the definition of an industrial property under WAC 173-340-200;

Industrial soil cleanup levels are based on an adult worker exposure scenario. It is essential to evaluate land uses and zoning for compliance with this definition in the context of this exposure scenario. Local governments use a variety of zoning categories for industrial land uses so a property does not necessarily have to be in a zone called "industrial" to meet the definition of "industrial property." Also, there are land uses allowed in industrial zones that are actually commercial or residential, rather than industrial, land uses. Thus, an evaluation to determine compliance with this definition

should include a review of the actual text in the comprehensive plan and zoning ordinance pertaining to the site and a visit to the site to observe land uses in the zone. When evaluating land uses to determine if a property use not specifically listed in the definition is a "traditional industrial use" or to determine if the property is "zoned for industrial use," the following characteristics shall be considered:

(A) People do not normally live on industrial property. The primary potential exposure is to adult employees of businesses located on the industrial property;

(B) Access to industrial property by the general public is generally not allowed. If access is allowed, it is highly limited and controlled due to safety or security considerations;

(C) Food is not normally grown/raised on industrial property. (However, food processing operations are commonly considered industrial facilities);

(D) Operations at industrial properties are often (but not always) characterized by use and storage of chemicals, noise, odors and truck traffic;

(E) The surface of the land at industrial properties is often (but not always) mostly covered by buildings or other structures, paved parking lots, paved access roads and material storage areas—minimizing potential exposure to the soil; and

(F) Industrial properties may have support facilities consisting of offices, restaurants, and other facilities that are commercial in nature but are primarily devoted to administrative functions necessary for the industrial use and/or are primarily intended to serve the industrial facility employees and not the general public.

(ii) The cleanup action provides for appropriate institutional controls implemented in accordance with WAC 173-340-440 to limit potential exposure to residual hazardous substances. This shall include, at a minimum, placement of a covenant on the property restricting use of the area of the site where industrial soil cleanup levels are proposed to industrial property uses; and

(iii) Hazardous substances remaining at the property after remedial action would not pose a threat to human health or the environment at the site or in adjacent nonindustrial areas. In evaluating compliance with this criterion, at a minimum the following factors shall be considered:

(A) The potential for access to the industrial property by the general public, especially children. The proximity of the industrial property to residential areas, schools or childcare facilities shall be considered when evaluating access. In addition, the presence of natural features, manmade structures, arterial streets or intervening land uses that would limit or encourage access to the industrial property shall be considered. Fencing shall not be considered sufficient to limit access to an industrial property since this is insufficient to assure long term protection;

(B) The degree of reduction of potential exposure to residual hazardous substances by the selected remedy. Where the residual hazardous substances are to be capped to reduce exposure, consideration shall be given to the thickness of the cap and the likelihood of future site maintenance activities, utility and drainage work, or building construction reexposing residual hazardous substances;

(C) The potential for transport of residual hazardous substances to off-property areas, especially residential areas, schools and childcare facilities;

(D) The potential for significant adverse effects on wildlife caused by residual hazardous substances using the procedures in WAC 173-340-7490 through 173-340-7494; and

(E) The likelihood that these factors would not change for the foreseeable future.

(b) **Expectations.** In applying the criteria in (a) of this subsection, the department expects the following results:

(i) The department expects that properties zoned for heavy industrial or high intensity industrial use and located within a city or county that has completed a comprehensive plan and adopted implementing zoning regulations under the Growth Management Act (chapter 36.70A RCW) will meet the definition of industrial property. For cities and counties not planning under the Growth Management Act, the department expects that spot zoned industrial properties will not meet the definition of industrial property but that properties that are part of a larger area zoned for heavy industrial or high intensity industrial use will meet the definition of an industrial property;

(ii) For both GMA and non-GMA cities and counties, the department expects that light industrial and commercial zones and uses should meet the definition of industrial property where the land uses are comparable to those cited in the definition of industrial property or the land uses are an integral part of a qualifying industrial use (such as, ancillary or support facilities). This will require a site-by-site evaluation of the zoning text and land uses;

(iii) The department expects that for portions of industrial properties in close proximity to (generally, within a few hundred feet) residential areas, schools or childcare facilities, residential soil cleanup levels will be used unless:

(A) Access to the industrial property is very unlikely or, the hazardous substances that are not treated or removed are contained under a cap of clean soil (or other materials) of substantial thickness so that it is very unlikely the hazardous substances would be disturbed by future site maintenance and construction activities (depths of even shallow footings, utilities and drainage structures in industrial areas are typically three to six feet); and

(B) The hazardous substances are relatively immobile (or have other characteristics) or have been otherwise contained so that subsurface lateral migration or surficial transport via dust or runoff to these nearby areas or facilities is highly unlikely; and

(iv) Note that a change in the reasonable maximum exposure to industrial site use primarily affects the direct contact exposure pathway. Thus, for example, for sites where the soil cleanup level is based primarily on the potential for the hazardous substance to leach and cause groundwater contamination, it is the department's expectation that an industrial land use will not affect the soil cleanup level. Similarly, where the soil cleanup level is based primarily on surface water protection or other pathways other than direct human contact, land use is not expected to affect the soil cleanup level.

(2) **General considerations.**

(a) In the event of a release of a hazardous substance at a site qualifying as industrial property, a cleanup action that complies with this chapter shall be conducted to address those soils with hazardous substance concentrations which exceed industrial soil cleanup levels at the relevant point of compliance.

(b) Soil cleanup levels for areas beyond the industrial property boundary that do not qualify for industrial soil cleanup levels under this section (including implementation of institutional controls and a

covenant restricting use of the property to industrial property uses) shall be established in accordance with WAC 173-340-740.

(c) Industrial soil cleanup levels shall be established at concentrations that do not directly or indirectly cause violations of groundwater, surface water, sediment or air cleanup standards established under this chapter or under applicable state and federal laws. A property that qualifies for an industrial soil cleanup level under this section does not necessarily qualify for a Method C cleanup level in other media. Each medium must be evaluated separately using the criteria applicable to that medium.

(d) The department may require more stringent soil cleanup standards than required by this section when, based on a site-specific evaluation, the department determines that this is necessary to protect human health and the environment, including consideration of the factors in WAC 173-340-740 (1)(c). Any imposition of more stringent requirements under this provision shall comply with WAC 173-340-702 and 173-340-708.

(3) **Method A industrial soil cleanup levels.**

(a) **Applicability.** Method A industrial soil cleanup levels may be used only at any industrial property qualifying under WAC 173-340-704(1).

(b) **General requirements.** Method A industrial soil cleanup levels shall be at least as stringent as all of the following:

(i) Concentrations in Table 745-1 and compliance with the corresponding footnotes;

(ii) Concentrations established under applicable state and federal laws;

(iii) Concentrations that result in no significant adverse effects on the protection and propagation of terrestrial ecological receptors using the procedures specified in WAC 173-340-7490 through ((~~173-340-7493~~)) 173-340-7494, unless it is demonstrated under those sections that establishing a soil concentration is unnecessary; and

(iv) For a hazardous substance that is deemed an indicator hazardous substance under WAC 173-340-708(2) and for which there is no value in Table 745-1 or applicable state and federal laws, a concentration that does not exceed the natural background concentration or the practical quantification limit, subject to the limitations in this chapter.

(4) **Method B industrial soil cleanup levels.** This section does not provide procedures for establishing Method B industrial soil cleanup levels. Method C is the standard method for establishing soil cleanup levels at industrial sites and its use is conditioned upon the continued use of the site for industrial purposes. The person conducting the cleanup action also has the option of establishing unrestricted land use soil cleanup levels under WAC 173-340-740 for qualifying industrial properties. This option may be desirable when the person wants to avoid restrictions on the future use of the property. When a site does not qualify for a Method A or Method C industrial soil cleanup level under this section, or the user chooses to establish unrestricted land use soil cleanup levels at a site, soil cleanup levels must be established using Methods A or B under WAC 173-340-740.

(5) **Method C industrial soil cleanup levels.**

(a) **Applicability.** Method C industrial soil cleanup levels consist of standard and modified cleanup levels as described in this subsection. Either standard or modified Method C soil cleanup levels may be used at any industrial property qualifying under subsection (1) of this section.

(b) **Standard Method C industrial soil cleanup levels.** Standard Method C industrial soil cleanup levels for industrial properties shall be at least as stringent as all of the following:

(i) **Applicable state and federal laws.** Concentrations established under applicable state and federal laws;

(ii) **Environmental protection.** Concentrations that result in no significant adverse effects on the protection and propagation of wildlife established using the procedures specified in WAC 173-340-7490 through 173-340-7494, unless it is demonstrated under those sections that establishing a soil concentration is unnecessary.

(iii) **Human health protection.** For hazardous substances for which sufficiently protective, health-based criteria or standards have not been established under applicable state and federal laws, those concentrations that protect human health as determined by evaluating the following exposure pathways:

(A) **Groundwater protection.** Concentrations that will not cause contamination of groundwater to concentrations which exceed groundwater cleanup levels established under WAC 173-340-720 as determined using the methods described in WAC 173-340-747.

(B) **Soil direct contact.** Concentrations that, due to direct contact with contaminated soil, are estimated to result in no acute or chronic noncarcinogenic toxic effects on human health using a hazardous quotient of one ((~~(1)~~)) and concentrations for which the upper bound on the estimated excess cancer risk is less than or equal to one in ((~~one hundred thousand~~)) 100,000 (1×10^{-5}). Equations 745-1 and 745-2 and the associated default assumptions shall be used to conduct this calculation.

(I) **Noncarcinogens.** For noncarcinogenic toxic effects of hazardous substances due to soil ingestion, concentrations shall be determined using Equation 745-1. For petroleum mixtures and components of such mixtures, see (b)(iii)(B)(III) of this subsection.

[Equation 745-1]

$$\text{Soil Cleanup Level (mg/kg)} = \frac{\text{RfD x ABW x UCF x HQ x AT}}{\text{SIR x AB1 x EF x ED}}$$

Where:

RfD	=	Reference dose as specified in WAC 173-340-708(7) (mg/kg-day)
ABW	=	Average body weight over the exposure duration (70 kg)
UCF	=	Unit conversion factor (1,000,000 mg/kg)
SIR	=	Soil ingestion rate (50 mg/day)
AB1	=	Gastrointestinal absorption fraction (1.0) (unitless)
EF	=	Exposure frequency (0.4) (unitless)
HQ	=	Hazard quotient (1) (unitless)
AT	=	Averaging time (20 years)
ED	=	Exposure duration (20 years)

(II) **Carcinogens.** For carcinogenic effects of hazardous substances due to soil ingestion, concentrations shall be determined using Equation 745-2. For petroleum mixtures and components of such mixtures, see (b)(iii)(B)(III) of this subsection.

[Equation 745-2]

$$\text{Soil Cleanup Level (mg/kg)} = \frac{\text{RISK x ABW x AT x UCF}}{\text{CPF x SIR x AB1 x ED x EF}}$$

Where:

RISK	=	Acceptable cancer risk level (1 in 100,000) (unitless)
ABW	=	Average body weight over the exposure duration (70 kg)
AT	=	Averaging time (75 years)
UCF	=	Unit conversion factor (1,000,000 mg/kg)
CPF	=	Carcinogenic Potency Factor as specified in WAC 173-340-708(8) (kg-day/mg)
SIR	=	Soil ingestion rate (50 mg/day)
AB1	=	Gastrointestinal absorption fraction (1.0) (unitless). May use 0.6 for mixtures of dioxins and/or furans
ED	=	Exposure duration (20 years)
EF	=	Exposure frequency (0.4) (unitless)

(III) **Petroleum mixtures.** For noncarcinogenic effects of petroleum mixtures, a total petroleum hydrocarbon cleanup level shall be calculated taking into account the additive effects of the petroleum fractions and volatile organic compounds present in the petroleum mixture. Equation 745-3 shall be used for this calculation. This equation takes into account concurrent exposure due to ingestion and dermal contact with petroleum contaminated soils. Cleanup levels for other noncarcinogens and known or suspected carcinogens within the petroleum mixture shall be calculated using Equations 745-4 and 745-5. See Table 830-1 for the analyses required for various petroleum products to use this method.

[Equation 745-3]

$$C_{soil} = \frac{HI \times ABW \times AT}{EF \times ED \left[\left(\frac{SIR \times AB1}{10^6 mg/kg} \sum_{i=1}^{n} \frac{F(i)}{RfDo(i)} \right) + \left(\frac{SA \times AF}{10^6 mg/kg} \sum_{i=1}^{n} \frac{F(i) \times ABS(i)}{RfDd(i)} \right) \right]}$$

Where:

C_{soil}	=	TPH soil cleanup level (mg/kg)
HI	=	Hazard index (1) (unitless)
ABW	=	Average body weight over the exposure duration (70 kg)
AT	=	Averaging time (20 years)
EF	=	Exposure frequency (0.7) (unitless)
ED	=	Exposure duration (20 years)
SIR	=	Soil ingestion rate (50 mg/day)
AB1	=	Gastrointestinal absorption fraction (1.0) (unitless)
F(i)	=	Fraction (by weight) of petroleum component (i) (unitless)
SA	=	Dermal surface area (2,500 cm^2)
AF	=	Adherence factor (0.2 mg/cm^2-day)
ABS	=	Dermal absorption fraction for petroleum component (i) (unitless). May use chemical-specific values or the following defaults:
	•	0.0005 for volatile petroleum components with vapor ((~~press~~)) pressure > = benzene
	•	0.03 for volatile petroleum components with vapor ((~~press~~)) pressure < benzene
	•	0.1 for other petroleum components
RfDo(i)	=	Oral reference dose of petroleum component (i) as defined in WAC 173-340-708(7) (mg/kg-day)
RfDd(i)	=	Dermal reference dose for petroleum component (i) (mg/kg-day) derived by RfDo x GI

GI = Gastrointestinal absorption conversion factor (unitless). May use chemical-specific values or the following defaults:
- 0.8 for volatile petroleum components
- 0.5 for other petroleum components

n = The number of petroleum components (petroleum fractions plus volatile organic compounds with an RfD) present in the petroleum mixture. (See Table 830-1.)

(C) **Soil vapors.** 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 groundwater for drinking water beneficial use under WAC 173-340-747(6) using the 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 groundwater for drinking water beneficial use under WAC 173-340-747(4).

See subsection (5)(c)(iv)(B) of this section for methods that may be used to evaluate the soil to vapor pathway.

(c) **Modified Method C soil cleanup levels.**

(i) **General.** Modified Method C soil cleanup levels are standard Method C soil cleanup levels modified with chemical-specific or site-specific data. When making these adjustments, the resultant cleanup levels shall meet applicable state and federal laws, meet health risk levels for standard Method C soil cleanup levels, and be demonstrated to be environmentally protective using the procedures specified in WAC 173-340-7490 through 173-340-7494. Changes to exposure assumptions must comply with WAC 173-340-708(10).

(ii) **Allowable modifications.** The following modifications may be made to the default assumptions in the standard Method C equations to derive modified Method C soil cleanup levels:

(A) For the protection of groundwater see WAC 173-340-747;

(B) For soil ingestion, the gastrointestinal absorption fraction may be modified if the requirements of WAC 173-340-702 (14), (15), (16), and 173-340-708(10) are met;

(C) For dermal contact, the adherence factor, dermal absorption fraction and gastrointestinal absorption conversion factor may be modified if the requirements of WAC 173-340-702 (14), (15), (16), and 173-340-708(10) are met;

(D) The toxicity equivalent factors provided in WAC 173-340-708 (8)(d), (e) and (f), may be modified provided the requirements of WAC 173-340-708 (8)(g) and (h) are met;

(E) The reference dose and cancer potency factor may be modified if the requirements in WAC 173-340-708 (7) and (8) are met; and

(F) Modifications incorporating new science as provided for in WAC 173-340-702 (14), (15) and (16).

(iii) **Dermal contact.** For hazardous substances other than petroleum mixtures, dermal contact with the soil shall be evaluated whenever the proposed changes to Equations 745-1 and 745-2 would result in a significantly higher soil cleanup level than would be calculated without the proposed changes. When conducting this evaluation, the following equations and default assumptions shall be used:

(A) For noncarcinogens use Equation 745-4. This equation takes into account concurrent exposure due to ingestion and dermal contact with soil.

[Equation 745-4]

$$C_{soil} = \frac{HQ \times ABW \times AT}{EF \times ED\left[\left(\frac{1}{RfDo} \times \frac{SIR \times AB1}{10^6 mg/kg}\right) + \left(\frac{1}{RfDd} \times \frac{SA \times AF \times ABS}{10^6 mg/kg}\right)\right]}$$

Where:

C_{soil}	=	Soil cleanup level (mg/kg)
HQ	=	Hazard quotient (unitless)
ABW	=	Average body weight over the exposure duration (70 kg)
AT	=	Averaging time (20 years)
EF	=	Exposure frequency (0.7) (unitless)
ED	=	Exposure duration (20 years)
SIR	=	Soil ingestion rate (50 mg/day)
AB1	=	Gastrointestinal absorption fraction (1.0) (unitless)
SA	=	Dermal surface area (2,500 mg/cm^2)
AF	=	Adherence factor (0.2 mg/cm^2-day)
ABS	=	Dermal absorption fraction (unitless). May use chemical-specific values or the following defaults:
		• 0.01 for inorganic hazardous substances
		• 0.0005 for volatile organic compounds with vapor ((~~press~~)) pressure > = benzene
		• 0.03 for volatile organic compounds with vapor ((~~press~~)) pressure < benzene
		• 0.1 for other organic hazardous substances
RfDo	=	Oral reference dose as defined in WAC 173-340-708(7) (mg/kg-day)
RfDd	=	Dermal reference dose (mg/kg-day) derived by RfDo x GI
GI	=	Gastrointestinal absorption conversion factor (unitless). May use chemical-specific values or the following defaults:
		• 0.2 for inorganic hazardous substances
		• 0.8 for volatile organic compounds
		• 0.5 for other organic hazardous substances

(B) For carcinogens use Equation 745-5. This equation takes into account concurrent exposure due to ingestion and dermal contact with soil.

[Equation 745-5]

$$C_{soil} = \frac{RISK \times ABW \times AT}{EF \times ED\left[\left(\frac{SIR \times AB1 \times CPFo}{10^6 mg/kg}\right) + \left(\frac{SA \times AF \times ABS \times CPFd}{10^6 mg/kg}\right)\right]}$$

Where:

C_{soil}	=	Soil cleanup level (mg/kg)
RISK	=	Acceptable cancer risk (1 in 100,000) (unitless)
ABW	=	Average body weight over the exposure duration (70 kg)

AT	=	Averaging time (75 years)
EF	=	Exposure frequency (0.7) (unitless)
ED	=	Exposure duration (20 years)
SIR	=	Soil ingestion rate (50 mg/day)
AB1	=	Gastrointestinal absorption fraction (1.0) (unitless). May use 0.6 for mixtures of dioxins and/or furans
CPFo	=	Oral cancer potency factor as defined in WAC 173-340-708(8) (kg-day/mg)
CPFd	=	Dermal cancer potency factor (kg-day/mg) derived by CPFo/GI
GI	=	Gastrointestinal absorption conversion factor (unitless). May use chemical-specific values or the following defaults: • 0.2 for inorganic hazardous substances • 0.8 for volatile organic compounds and mixtures of dioxins and/or furans • 0.5 for other organic hazardous substances
SA	=	Dermal surface area (2,500 cm^2)
AF	=	Adherence factor (0.2 mg/cm^2-day)
ABS	=	Dermal absorption fraction (unitless). May use chemical-specific values or the following defaults: • 0.01 for inorganic hazardous substances • 0.0005 for volatile organic compounds with vapor ((~~press~~)) pressure > = benzene • 0.03 for volatile organic compounds ((~~substances~~)) with vapor ((~~press~~)) pressure < benzene and for mixtures of dioxins and/or furans • 0.1 for other organic hazardous substances

(C) Modifications may be made to Equations 745-4 and 745-5 as provided for in subsection (5)(c)(ii) of this section.

(iv) **Soil vapors.**

(A) **Applicability.** 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 Method C equations (Equations 745-1 and 745-2) 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 Method C equations (Equations 745-3, 745-4 and 745-5) 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 groundwater for drinking water beneficial use under WAC 173-340-747(6) using the 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 groundwater for drinking water beneficial use under WAC 173-340-747(4).

(B) **Evaluation methods.** Soil cleanup levels that are protective of the indoor and ambient air shall be determined on a site-specific basis. Soil cleanup levels may be evaluated as being protective of air pathways using any of the following methods:

(I) Measurements of the soil vapor concentrations, using methods approved by the department, demonstrating vapors in the soil would not exceed air cleanup levels established under WAC 173-340-750.

(II) Measurements of ambient air concentrations and/or indoor air vapor concentrations throughout buildings, using methods approved by the department, demonstrating air does not exceed cleanup levels established under WAC 173-340-750. Such measurements must be representative of current and future site conditions when vapors are likely to enter and accumulate in structures. Measurement of ambient air may be excluded if it can be shown that indoor air is the most protective point of exposure.

(III) Use of modeling methods approved by the department to demonstrate the air cleanup standards established under WAC 173-340-750 will not be exceeded. When this method is used, the department may require soil vapor and/or air monitoring to be conducted to verify the calculations and compliance with air cleanup standards.

(IV) Other methods as approved by the department demonstrating the air cleanup standards established under WAC 173-340-750 will not be exceeded.

(d) **Using modified Method C to evaluate industrial soil remediation levels.** In addition to the adjustments allowed under subsection (5)(c) of this section,other adjustmentsto the reasonable maximum exposure scenario or default exposure assumptions are allowed when using a quantitative site-specific risk assessment to evaluate the protectiveness of a remedy. See WAC 173-340-355, 173-340-357, and 173-340-708 (3)(d) and (10)(b).

(6) **Adjustments to industrial soil cleanup levels.**

(a) **Total site risk adjustments.** Soil cleanup levels for individual hazardous substances developed in accordance with subsection (5) of this section, including cleanup levels based on state and federal laws, shall be adjusted downward to take into account exposure to multiple hazardous substances and/or exposure resulting from more than one pathway of exposure. These adjustments need to be made only if, without these adjustments, the hazard index would exceed one ((~~(1)~~)) or the total excess cancer risk would exceed one in ((~~one hundred thousand~~)) 100,000 (1×10^{-5}). These adjustments shall be made in accordance with the procedures specified in WAC 173-340-708 (5) and (6). In making these adjustments, the hazard index shall not exceed one ((~~(1)~~)) and the total excess cancer risk shall not exceed one in ((~~one hundred thousand~~)) 100,000 (1×10^{-5}).

(b) **Adjustments to applicable state and federal laws.** Where a cleanup level developed under subsection (3) or (5) of this section is based on an applicable state or federal law and the level of risk upon which the standard is based exceeds an excess cancer risk of one in ((~~one hundred thousand~~)) 100,000 (1×10^{-5}) or a hazard index of one ((~~(1)~~)), the cleanup level shall be adjusted downward so that total excess cancer risk does not exceed one in ((~~one hundred thousand~~)) 100,000 (1×10^{-5}) and the hazard index does not exceed one ((~~(1)~~)) at the site.

(c) **Natural background and analytical considerations.** Cleanup levels determined under subsection (3) or (5) of this section, including cleanup levels adjusted under subsection (6)(a) and (b) of this section, shall not be set at levels below the practical quantitation limit or natural background concentration, whichever is higher. See WAC 173-340-707 and 173-340-709 for additional requirements pertaining to practical quantitation limits and natural background.

(7) **Point of compliance.** The point of compliance for industrial property soil cleanup levels shall be established in accordance with WAC 173-340-740(6).

(8) **Compliance monitoring.** Compliance monitoring and data analysis and evaluation for industrial property soil cleanup levels shall be performed in accordance with WAC 173-340-410 and 173-340-740(7).

Reviser's note: The brackets and enclosed material in the text of the above section occurred in the copy filed by the agency and appear in the Register pursuant to the requirements of RCW 34.08.040.

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-747 Deriving soil concentrations for groundwater protection. (1) **Purpose.** The purpose of this section is to establish soil concentrations that will not cause contamination of groundwater at levels that exceed the groundwater cleanup levels established under WAC 173-340-720. Soil concentrations established under this section are used to establish either Method B soil cleanup levels (see WAC 173-340-740 (3)(b)(iii)(A)) or Method C soil cleanup levels (see WAC 173-340-745 (5)(b)(iii)(A)).

For the purposes of this section, "soil concentration" means the concentration in the soil that will not cause an exceedance of the groundwater cleanup level established under WAC 173-340-720.

(2) **General requirements.** The soil concentration established under this section for each hazardous substance shall meet the following two criteria:

(a) The soil concentration shall not cause an exceedance of the groundwater cleanup level established under WAC 173-340-720. To determine if this criterion is met, one of the methodologies specified in subsections (4) through (9) of this section shall be used; and

(b) To ensure that the criterion in (a) of this subsection is met, the soil concentration shall not result in the accumulation of nonaqueous phase liquid on or in groundwater. To determine if this criterion is met, one of the methodologies specified in subsection (10) of this section shall be used.

(3) **Overview of methods.** This subsection provides an overview of the methods specified in subsections (4) through (10) of this section for deriving soil concentrations that meet the criteria specified in subsection (2) of this section. 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.

(a) **Fixed parameter three-phase partitioning model.** The three-phase partitioning model with fixed input parameters may be used to establish a soil concentration for any hazardous substance. Site-specific data are not required for use of this model. See subsection (4) of this section.

(b) **Variable parameter three-phase partitioning model.** The three-phase partitioning model with variable input parameters may be used to establish a soil concentration for any hazardous substance. Site-specific data are required for use of this model. See subsection (5) of this section.

(c) **Four-phase partitioning model.** The four-phase partitioning model may be used to derive soil concentrations for any site where hazardous substances are present in the soil as a nonaqueous phase liquid (NAPL). The department expects that this model will be used at

sites contaminated with petroleum hydrocarbons. Site-specific data are required for use of this model. See subsection (6) of this section.

(d) **Leaching tests.** Leaching tests may be used to establish soil concentrations for certain metals. Leaching tests may also be used to establish soil concentrations for other hazardous substances, including petroleum hydrocarbons, provided sufficient information is available to demonstrate that the leaching test can accurately predict groundwater impacts. Testing of soil samples from the site is required for use of this method. See subsection (7) of this section.

(e) **Alternative fate and transport models.** Fate and transport models other than those specified in subsections (4) through (6) of this section may be used to establish a soil concentration for any hazardous substance. Site-specific data are required for use of such models. See subsection (8) of this section.

(f) **Empirical demonstration.** An empirical demonstration may be used to show that measured soil concentrations will not cause an exceedance of the applicable groundwater cleanup levels established under WAC 173-340-720. This empirical demonstration may be used for any hazardous substance. Site-specific data (e.g., groundwater samples and soil samples) are required under this method. If the required demonstrations cannot be made, then a protective soil concentration shall be established under one of the methods specified in subsections (4) through (8) of this section. See subsection (9) of this section.

(g) **Residual saturation.** To ensure that the soil concentration established under one of the methods specified in subsections (4) through (9) of this section will not cause an exceedance of the groundwater cleanup level established under WAC 173-340-720, the soil concentration must not result in the accumulation of nonaqueous phase liquid (NAPL) on or in groundwater. The methodologies and procedures specified in subsection (10) of this section shall be used to determine if this criterion is met.

(4) **Fixed parameter three-phase partitioning model.**

(a) **Overview.** This subsection specifies the procedures and requirements for establishing soil concentrations through the use of the fixed parameter three-phase partitioning model. The model may be used to establish soil concentrations for any hazardous substance. The model may be used to calculate both unsaturated and saturated zone soil concentrations.

This method provides default or fixed input parameters for the three-phase partitioning model that are intended to be protective under most circumstances and conditions; site-specific measurements are not required. In some cases it may be appropriate to use site-specific measurements for the input parameters. Subsection (5) of this section specifies the procedures and requirements to establish site-specific input parameters for use in the three-phase partitioning model.

(b) **Description of the model.** The three-phase partitioning model is described by the following equation:

[Equation 747-1]

$$C_s = C_w (UCF) DF \left[K_d + \frac{(\theta_w + \theta_a H_{cc})}{\rho_b} \right]$$

Where:

C_s	=	Soil concentration (mg/kg)
C_w	=	Groundwater cleanup level established under WAC 173-340-720 (ug/l)
UCF	=	Unit conversion factor (1mg/1,000 ug)
DF	=	Dilution factor (dimensionless: 20 for unsaturated zone soil; see (e) of this subsection for saturated zone soil)
K_d	=	Distribution coefficient (L/kg; see (c) of this subsection)
θ_w	=	Water-filled soil porosity (ml water/ml soil: 0.3 for unsaturated zone soil; see (e) of this subsection for saturated zone soil)
θ_a	=	Air-filled soil porosity (ml air/ml soil: 0.13 for unsaturated zone soil; see (e) of this subsection for saturated zone soil)
H_{cc}	=	Henry's law constant (dimensionless; see (d) of this subsection)
ρ_b	=	Dry soil bulk density (1.5 kg/L)

(c) **Distribution coefficient (K_d).** The default K_d values for organics and metals used in Equation 747-1 are as follows:

(i) **Organics.** For organic hazardous substances, the K_d value shall be derived using Equation 747-2. The K_{OC} (soil organic carbon-water partition coefficient) parameter specified in Equation 747-2 shall be derived as follows:

(A) **Nonionic organics.** For individual nonionic hydrophobic organic hazardous substances (e.g., benzene and naphthalene), the K_{OC} values in Table 747-1 shall be used. For hazardous substances not listed in Table 747-1, K_d values may be developed as provided in subsection (5) of this section (variable three-phase partitioning model).

(B) **Ionizing organics.** For ionizing organic hazardous substances (e.g., pentachlorophenol and benzoic acid), the K_{OC} values in Table 747-2 shall be used. Table 747-2 provides K_{OC} values for three different pHs. To select the appropriate K_{OC} value, the soil pH must be measured. The K_{OC} value for the corresponding soil pH shall be used. If the soil pH falls between the pH values provided, an appropriate K_{OC} value shall be selected by interpolation between the listed K_{OC} values.

[Equation 747-2]

$K_d = K_{oc} \times f_{oc}$

Where:

K_d	=	Distribution coefficient (L/kg)
K_{oc}	=	Soil organic carbon-water partitioning coefficient ((~~(ml/g)~~)) (L/kg). See (c)(i) of this subsection.
f_{oc}	=	Soil fraction of organic carbon (0.1% or 0.001 g/g)

(ii) **Metals.** For metals, the K_d values in Table 747-3 shall be used. For metals not listed in Table 747-3, K_d values may be developed as provided in subsection (5) of this section (variable three-phase partitioning model).

(d) **Henry's law constant.** For petroleum fractions, the values for Henry's law constant in Table 747-4 shall be used in Equation 747-1. For individual organic hazardous substances, the value shall be based on values in the scientific literature. For all metals present as inorganic compounds except mercury, zero shall be used. For mercury, either 0.47 or a value derived from the scientific literature shall be

used. Derivation of Henry's law constant from the scientific literature shall comply with WAC 173-340-702 (14), (15) and (16).

(e) **Saturated zone soil concentrations.** Equation 747-1 may also be used to derive concentrations for soil that is located at or below the groundwater table (the saturated zone). The following input parameters shall be changed if Equation 747-1 is used to derive saturated zone soil concentrations:

(i) The dilution factor shall be changed from 20 to 1;

(ii) The water-filled soil porosity value shall be changed from 0.3 ml water/ml soil to 0.43 ml water/ml soil; and

(iii) The air-filled soil porosity value shall be changed from 0.13 ml air/ml soil to zero.

(5) **Variable parameter three-phase partitioning model.**

(a) **Overview.** This section specifies the procedures and requirements to derive site-specific input parameters for use in the three-phase partitioning model. This method may be used to establish soil concentrations for any hazardous substance. This method may be used to calculate both unsaturated and saturated zone soil concentrations.

This method allows for the substitution of site-specific values for the default values in Equation 747-1 for one or more of the following five input parameters: Distribution coefficient, soil bulk density, soil volumetric water content, soil air content, and dilution factor. The methods that may be used and the requirements that shall be met to derive site-specific values for each of the five input parameters are specified in (b) through (f) of this subsection.

(b) **Methods for deriving a distribution coefficient (K_d).** To derive a site-specific distribution coefficient, one of the following methods shall be used:

(i) **Deriving K_d from soil fraction of organic carbon (foc) measurements.** Site-specific measurements of soil organic carbon may be used to derive distribution coefficients for nonionic hydrophobic organics using Equation 747-2. Soil organic carbon measurements shall be based on uncontaminated soil below the root zone (i.e., soil greater than one meter in depth) that is representative of site conditions or in areas through which contaminants are likely to migrate.

The laboratory protocols for measuring soil organic carbon in the Puget Sound Estuary Program (March, 1986) may be used. Other methods may also be used if approved by the department. All laboratory measurements of soil organic carbon shall be based on methods that do not include inorganic carbon in the measurements.

(ii) **Deriving K_d from site data.** Site-specific measurements of the hazardous substance concentrations in the soil and the soil pore water or groundwater may be used, subject to department approval, to derive a distribution coefficient. Distribution coefficients that have been derived from site data shall be based on measurements of soil and groundwater hazardous substance concentrations from the same depth and location. Soil and groundwater samples that have hazardous substances present as a nonaqueous phase liquid (NAPL) shall not be used to derive a distribution coefficient and measures shall be taken to minimize biodegradation and volatilization during sampling, transport and analysis of these samples.

(iii) **Deriving K_d from batch tests.** A site-specific distribution coefficient may be derived by using batch equilibrium tests, subject to department approval, to measure hazardous substance adsorption and desorption. The results from the batch test may be used to derive K_d from the sorption/desorption relationship between hazardous substance

concentrations in the soil and water. Samples that have hazardous substances present as a nonaqueous phase liquid (NAPL) shall not be used to derive a distribution coefficient and measures shall be taken to minimize biodegradation and volatilization during testing.

(iv) **Deriving K_d from the scientific literature.** The scientific literature may be used to derive a site-specific distribution coefficient (K_d) for any hazardous substance, provided the requirements in WAC 173-340-702 (14), (15) and (16) are met.

(c) **Deriving soil bulk density.** ASTM Method 2049 or other methods approved by the department may be used to derive soil bulk density values.

(d) **Deriving soil volumetric water content using laboratory methods.** ASTM Method 2216 or other methods approved by the department may be used to derive soil volumetric water content values.

(e) **Estimating soil air content.** An estimate of soil air content may be determined by calculating soil porosity and subtracting the volumetric water content.

(f) **Deriving a dilution factor from site-specific estimates of infiltration and groundwater flow volume.** Site-specific estimates of infiltration and groundwater flow volume may be used in the following equation to derive a site-specific dilution factor:

[Equation 747-3]

$$DF = (Q_p + Q_a)/Q_p$$

Where:

DF	=	Dilution factor (dimensionless)
Q_p	=	Volume of water infiltrating (m^3/yr)
Q_a	=	Groundwater flow (m^3/yr)

(i) **Calculating groundwater flow volume.** The following equation shall be used under this method to calculate the volume of groundwater flow (Q_a):

[Equation 747-4]

$$Q_a = K \times A \times I$$

Where:

Q_a	=	Groundwater flow volume (m^3/year)
K	=	Hydraulic conductivity (m/year). Site-specific measurements shall be used to derive this parameter.
A	=	Aquifer mixing zone (m^2). The aquifer mixing zone thickness shall not exceed 5 meters in depth and be equal to a unit width of 1 meter, unless it can be demonstrated empirically that the mixing zone thickness exceeds 5 meters.
I	=	Gradient (m/m). Site-specific measurements shall be used to derive this parameter.

(A) Equation 747-4 assumes the groundwater concentrations of hazardous substances of concern upgradient of the site are not detectable. If this assumption is not true, the dilution factor may need to be adjusted downward in proportion to the upgradient concentration.

(B) Direct measurement of the flow velocity of groundwater using methods approved by the department may be used as a substitute for measuring the groundwater hydraulic conductivity and gradient.

(ii) **Calculating or estimating infiltration.** The following equation shall be used under this method to calculate the volume of water infiltrating (Q_p):

[Equation 747-5]

$Q_p = L \times W \times Inf$

Where:

Q_p = Volume of water infiltrating (m^3/year)

L = Estimated length of contaminant source area parallel to groundwater flow (m)

W = Unit width of contaminant source area (1 meter)

Inf = Infiltration (m/year)

(A) If a default annual infiltration value (Inf) is used, the value shall meet the following requirements. For sites west of the Cascade Mountains, the default annual infiltration value shall be 70 percent of the average annual precipitation amount. For sites east of the Cascade Mountains, the default annual infiltration value shall be 25 percent of the average annual precipitation amount.

(B) If a site-specific measurement or estimate of infiltration (Inf) is made, it shall be based on site conditions without surface caps (e.g., pavement) or other structures that would control or impede infiltration. The presence of a cover or cap may be considered when evaluating the protectiveness of a remedy under WAC 173-340-350 through 173-340-360. If a site-specific measurement or estimate of infiltration is made, then it must comply with WAC 173-340-702 (14), (15) and (16).

(6) **Four-phase partitioning model.**

(a) **Overview.** This subsection specifies the procedures and requirements for establishing soil concentrations through the use of the four-phase partitioning model. This model may be used to derive soil concentrations for any site where hazardous substances are present in the soil as a nonaqueous phase liquid (NAPL). The model is described in (c) of this subsection. Instructions on how to use the model to establish protective soil concentrations are provided in (d) of this subsection.

(b) **Restrictions on use of the model for alcohol enhanced fuels.** The four-phase partitioning model may be used on a case-by-case basis for soil containing fuels (e.g., gasoline) that have been enhanced with alcohol. If the model is used for alcohol enhanced fuels, then it shall be demonstrated that the effects of cosolvency have been adequately considered and, where necessary, taken into account when applying the model. Use of the model for alcohol enhanced fuels without considering the effects of cosolvency and increased groundwater contamination is prohibited.

(c) **Description of the model.** The four-phase partitioning model is based on the following three equations:

(i) **Conservation of volume equation.**

[Equation 747-6]

$n = \theta_w + \theta_a + \theta_{NAPL}$

Where:

n = Total soil porosity (ml total pore space/ml total soil volume). Use a default value of 0.43 ml/ml or use a value determined from site-specific measurements.

θ_w = Volumetric water content (ml water/ml soil). For unsaturated soil use a default value of 0.3 or a value determined from site-specific measurements. For saturated soil this value is unknown and must be solved for. Volumetric water content equals the total soil porosity minus volume occupied by the NAPL.

θ_a = Volumetric air content (ml air volume/ml total soil volume). For unsaturated soil this value is unknown and must be solved for. Volumetric air content equals the total soil porosity minus the volume occupied by the water and NAPL. For saturated soil this value is zero.

θ_{NAPL} = Volumetric NAPL content (ml NAPL volume/ml total soil volume). For both unsaturated and saturated soil this value is unknown and must be solved for.

(ii) **Four-phase partitioning equation.**

[Equation 747-7]

$$\frac{M^i_T}{m_{soil}} = \frac{x_i S_i}{\rho_b}\left[\theta_w + K^i_{oc} f_{oc} \rho_b + H^i_{cc}\theta_a + \frac{GFW_i}{S_i}\rho_{NAPL}\theta_{NAPL}\right]$$

Where:

M^i_T = Total mass of each component in the system (mg). This value is derived from site-specific measurements.

m_{soil} = Total soil mass (kg).

x_i = Mole fraction (at equilibrium) of each component (dimensionless). This value is unknown and must be solved for.

S_i = Solubility of each component (mg/l). See Table 747-4 for petroleum hydrocarbons; see the scientific literature for other hazardous substances.

P_b = Dry soil bulk density (1.5 kg/l).

K^i_{oc} = Soil organic carbon-water partitioning coefficient for each component (l/kg). See Table 747-4 for petroleum hydrocarbons; see subsection (4)(b) of this section for other hazardous substances.

f_{oc} = Mass fraction of soil natural organic carbon (0.001 g soil organic/g soil).

H^i_{cc} = Henry's law constant for each component (dimensionless). See Table 747-4 for petroleum hydrocarbons; see subsection (4)(c) of this section for other hazardous substances.

GFW_i = Gram formula weight, or molecular weight of each component (mg/mol). See Table 747-4 for petroleum hydrocarbons; see the scientific literature for other hazardous substances.

$\rho NAPL$ = Molar density of the mixture (mol/l). See Equation 747-8.

Component = For petroleum mixtures, this means the petroleum fractions, and organic hazardous substances with a reference dose; for other hazardous substances, this means each organic hazardous substance that is found in the NAPL.

(iii) **Molar density equation.**

[Equation 747-8]

$$\rho_{NAPL} = \frac{\left[\sum x_i GFW_i \Big/ \left(\sum x_i GFW_i/\rho_i\right)\right]}{\sum x_i GFW_i} = \frac{1}{\sum\left(x_i GFW_i/\rho_i\right)}$$

Where:

GFW_i = Gram formula weight, or molecular weight of each component (mg/mol). See Table 747-4 for petroleum hydrocarbons; see the scientific literature for other hazardous substances.

x_i	=	Mole fraction (at equilibrium) of each component (dimensionless). This value is unknown and must be solved for.
ρ_i	=	Density of each component (mg/l). See Table 747-4 for petroleum hydrocarbons; see the scientific literature for other hazardous substances.
Component	=	For petroleum mixtures, this means the petroleum fractions plus organic hazardous substances with a reference dose; for other hazardous substances, this means each organic hazardous substance that is found in the NAPL.

(d) **Instructions for using the model.** This subsection provides instructions for using the four-phase partitioning model to predict groundwater concentrations and to establish protective soil concentrations. The model uses an iterative process to simultaneously solve multiple equations for several unknowns (see step 4 for the number of equations). To predict a groundwater concentration, the mole fraction of each component (at equilibrium) must be known. The predicted groundwater concentration is obtained by multiplying the water solubility of each component by the equilibrated mole fraction (Equation 747-7).

(i) **Step 1: Measure hazardous substance soil concentrations.** Collect and analyze soil samples and, if appropriate, samples of the product released, for each component. For petroleum hydrocarbons, see Table 830-1 for a description of what to analyze for.

(ii) **Step 2: Derive physical/chemical data.** For each of the components, determine the Henry's law constant, water solubility, soil organic carbon-water partitioning coefficient, density and molecular weight values. For petroleum hydrocarbons, see Table 747-4.

(iii) **Step 3: Derive soil parameters.** Derive a value for each of the following soil parameters as follows:

(A) **Soil organic carbon content.** Use the default value (0.001 g soil organic/g soil) or a site-specific value derived under subsection (5)(b)(i) of this section.

(B) **Soil volumetric water content.** Use the default value (0.43 minus the volume of NAPL and air) or a site-specific value derived under subsection (5)(d) of this section.

(C) **Soil volumetric air content.** Use the default value (0.13 ml/ml for unsaturated zone soil; zero for saturated zone soil) or a site-specific value derived under subsection (5)(e) of this section.

(D) **Soil bulk density and porosity.** Use the default values of 1.5 kg/l for soil bulk density and 0.43 for soil porosity or use site-specific values. If a site-specific value for bulk density is used, the method specified in subsection (5)(c) of this subsection shall be used. If a site-specific bulk density value is used, a site-specific porosity value shall also be used. The site-specific soil porosity value may be calculated using a default soil specific gravity of 2.65 g/ml or measuring the soil specific gravity using ASTM Method D 854.

(iv) **Step 4: Predict a soil pore water concentration.** Equation 747-7 shall be used to predict the soil pore water concentration for each component. To do this, multiple versions of Equation 747-7 shall be constructed, one for each of the components using the associated parameter inputs for K_{OC}, H_{CC}, GFW, and S. These equations shall then be combined with Equations 747-6 and 747-8 and the condition that $\Sigma x_i = 1$ and solved simultaneously for the unknowns in the equations (mole fraction of each component (X_i), volumetric NAPL content (θ_{NAPL}), and either the volumetric water content (θ_w) or the volumetric air content (θ_a).

(v) **Step 5: Derive a dilution factor.** Derive a dilution factor using one of the following two methods:

(A) Use the default value of 20 for unsaturated soils and ((~~1~~)) one for saturated soils); or

(B) Derive a site-specific value using site-specific estimates of infiltration and groundwater flow volume under subsection (5)(f) of this section.

(vi) **Step 6: Calculate a predicted groundwater concentration.** Calculate a predicted groundwater concentration for each component by dividing the predicted soil pore water concentration for each component by a dilution factor to account for the dilution that occurs once the component enters groundwater.

(vii) **Step 7: Establishing protective soil concentrations.**

(A) **Petroleum mixtures.** For petroleum mixtures, compare the predicted groundwater concentration for each component and for the total petroleum hydrocarbon mixture (sum of the petroleum components in the NAPL) with the applicable groundwater cleanup level established under WAC 173-340-720.

(I) If the predicted groundwater concentration for each of the components and for the total petroleum hydrocarbon mixture is less than or equal to the applicable groundwater cleanup level, then the soil concentrations measured at the site are protective.

(II) If the condition in (d)(vii)(A)(I) of this subsection is not met, then the soil concentrations measured at the site are not protective. In this situation, the four-phase partitioning model can be used in an iterative process to calculate protective soil concentrations.

(B) **Other mixtures.** For mixtures that do not include petroleum hydrocarbons, compare the predicted groundwater concentration for each hazardous substance in the mixture with the applicable groundwater cleanup level established under WAC 173-340-720.

(I) If the predicted groundwater concentration for each of the hazardous substances in the mixture is less than or equal to the applicable groundwater cleanup level, then the soil concentrations measured at the site are protective.

(II) If the condition in (d)(vii)(B)(I) of this subsection is not met, then the soil concentrations measured at the site are not protective. In this situation, the four-phase partitioning model can be used in an iterative process to calculate protective soil concentrations.

(7) **Leaching tests.**

(a) **Overview.** This subsection specifies the procedures and requirements for deriving soil concentrations through the use of leaching tests. Leaching tests may be used to establish soil concentrations for the following specified metals: Arsenic, cadmium, total chromium, hexavalent chromium, copper, lead, mercury, nickel, selenium, and zinc (see (b) and (c) of this subsection). Leaching tests may also be used to establish soil concentrations for other hazardous substances, including petroleum hydrocarbons, provided sufficient information is available to correlate leaching test results with groundwater impacts (see (d) of this subsection). Testing of soil samples from the site is required for use of this method.

(b) **Leaching tests for specified metals.** If leaching tests are used to establish soil concentrations for the specified metals, the following two leaching tests may be used:

(i) EPA Method 1312, Synthetic Precipitation Leaching Procedure (SPLP). Fluid #3 (pH = 5.0), representing acid rain in the western United States, shall be used when conducting this test. This test may underestimate groundwater impacts when acidic conditions exist due to

significant biological degradation or for other reasons. Underestimation of groundwater impacts may occur, for example, when soils contaminated with metals are located in wood waste, in municipal solid waste landfills, in high sulfur content mining wastes, or in other situations with a pH < 6. Consequently, this test shall not be used in these situations and the TCLP test should be used instead.

(ii) **EPA Method 1311, Toxicity Characteristic Leaching Procedure (TCLP).** Fluid #1 (pH = 4.93), representing organic acids generated by biological degradation processes, shall be used when conducting this test. This test is intended to represent situations where acidic conditions are present due to biological degradation such as in municipal solid waste landfills. Thus, it may underestimate groundwater impacts where this is not the case and the metals of interest are more soluble under alkaline conditions. An example of this would be arsenic occurring in alkaline (pH > 8) waste or soils. Consequently, this test shall not be used in these situations and the SPLP test should be used instead.

(c) **Criteria for specified metals.** When using either EPA Method 1312 or 1311, the analytical methods used for analysis of the leaching test effluent shall be sufficiently sensitive to quantify hazardous substances at concentrations at the groundwater cleanup level established under WAC 173-340-720. For a soil metals concentration derived under (b) of this subsection to be considered protective of groundwater, the leaching test effluent concentration shall meet the following criteria:

(i) For cadmium, lead and zinc, the leaching test effluent concentration shall be less than or equal to ((~~ten~~)) 10 times the applicable groundwater cleanup level established under WAC 173-340-720.

(ii) For arsenic, total chromium, hexavalent chromium, copper, mercury, nickel and selenium, the leaching test effluent concentration shall be less than or equal to the applicable groundwater cleanup level established under WAC 173-340-720.

(d) **Leaching tests for other hazardous substances.** Leaching tests using the methods specified in this subsection may also be used for hazardous substances other than the metals specifically identified in this subsection, including petroleum hydrocarbons. Alternative leaching test methods may also be used for any hazardous substance, including the metals specifically identified in this subsection. Use of the leaching tests specified in (b) and (c) of this subsection for other hazardous substances or in a manner not specified in (b) and (c) of this subsection, or use of alternative leaching tests for any hazardous substance, is subject to department approval and the user must demonstrate with site-specific field or laboratory data or other empirical data that the leaching test can accurately predict groundwater impacts. The department will use the criteria in WAC 173-340-702 (14), (15) and (16) to evaluate the appropriateness of these alternative methods under WAC 173-340-702 (14), (15) and (16).

(8) **Alternative fate and transport models.**

(a) **Overview.** This subsection specifies the procedures and requirements for establishing soil concentrations through the use of fate and transport models other than those specified in subsections (4) through (6) of this section. These alternative models may be used to establish a soil concentration for any hazardous substance. Site-specific data are required for use of these models.

(b) **Assumptions.** When using alternative models, chemical partitioning and advective flow may be coupled with other processes to pre-

dict contaminant fate and transport, provided the following conditions are met:

(i) **Sorption.** Sorption values shall be derived in accordance with either subsection (4)(c) of this section or the methods specified in subsection (5)(b) of this section.

(ii) **Vapor phase partitioning.** If Henry's law constant is used to establish vapor phase partitioning, then the constant shall be derived in accordance with subsection (4)(d) of this section.

(iii) **Natural biodegradation.** Rates of natural biodegradation shall be derived from site-specific measurements.

(iv) **Dispersion.** Estimates of dispersion shall be derived from either site-specific measurements or literature values.

(v) **Decaying source.** Fate and transport algorithms may be used that account for decay over time.

(vi) **Dilution.** Dilution shall be based on site-specific measurements or estimated using a model incorporating site-specific characteristics. If detectable concentrations of hazardous substances are present in upgradient groundwater, then the dilution factor may need to be adjusted downward in proportion to the background (upgradient) concentration.

(vii) **Infiltration.** Infiltration shall be derived in accordance with subsection (5)(f)(ii)(A) or (B) of this section.

(c) **Evaluation criteria.** Proposed fate and transport models, input parameters, and assumptions shall comply with WAC 173-340-702 (14), (15) and (16).

(9) **Empirical demonstration.**

(a) **Overview.** This subsection specifies the procedures and requirements for demonstrating empirically that soil concentrations measured at the site will not cause an exceedance of the applicable groundwater cleanup levels established under WAC 173-340-720. This empirical demonstration may be used for any hazardous substance. Site-specific data (e.g., groundwater and soil samples) are required under this method. If the demonstrations required under (b) of this subsection cannot be made, then a protective soil concentration shall be established under one of the methods specified in subsections (4) through (8) of this section.

(b) **Requirements.** To demonstrate empirically that measured soil concentrations will not cause an exceedance of the applicable groundwater cleanup levels established under WAC 173-340-720, the following shall be demonstrated:

(i) The measured groundwater concentration is less than or equal to the applicable groundwater cleanup level established under WAC 173-340-720; and

(ii) The measured soil concentration will not cause an exceedance of the applicable groundwater cleanup level established under WAC 173-340-720 at any time in the future. Specifically, it must be demonstrated that a sufficient amount of time has elapsed for migration of hazardous substances from soil into groundwater to occur and that the characteristics of the site (e.g., depth to groundwater and infiltration) are representative of future site conditions. This demonstration may also include a measurement or calculation of the attenuating capacity of soil between the source of the hazardous substance and the groundwater table using site-specific data.

(c) **Evaluation criteria.** Empirical demonstrations shall be based on methods approved by the department. Those methods shall comply with WAC 173-340-702 (14), (15) and (16).

(10) **Residual saturation.**

(a) **Overview.** To ensure the soil concentrations established under one of the methods specified in subsections (4) through (9) of this section will not cause an exceedance of the groundwater cleanup level established under WAC 173-340-720, the soil concentrations must not result in the accumulation of nonaqueous phase liquid on or in groundwater (see subsection (2)(b) of this section). To determine if this criterion is met, either an empirical demonstration must be made (see (c) of this subsection) or residual saturation screening levels must be established and compared with the soil concentrations established under one of the methods specified in subsections (4) through (9) of this section (see (d) and (e) of this subsection). This subsection applies to any site where hazardous substances are present as a nonaqueous phase liquid (NAPL), including sites contaminated with petroleum hydrocarbons.

(b) **Definition of residual saturation.** When a nonaqueous phase liquid (NAPL) is released to the soil, some of the NAPL will be held in the soil pores or void spaces by capillary force. For the purpose of this subsection, the concentration of hazardous substances in the soil at equilibrium conditions is called residual saturation. At concentrations above residual saturation, the NAPL will continue to migrate due to gravimetric and capillary forces and may eventually reach the groundwater, provided a sufficient volume of NAPL is released.

(c) **Empirical demonstration.** An empirical demonstration may be used to show that soil concentrations measured at the site will not result in the accumulation of nonaqueous phase liquid on or in groundwater. An empirical demonstration may be used for any hazardous substance. Site-specific data (e.g., groundwater and soil samples) are required under this method. If the demonstrations required under (c)(i) of this subsection cannot be made, then a protective soil concentration shall be established under (d) and (e) of this subsection.

(i) **Requirements.** To demonstrate empirically that measured soil concentrations will not result in the accumulation of nonaqueous phase liquid on or in groundwater, the following shall be demonstrated:

(A) Nonaqueous phase liquid has not accumulated on or in groundwater; and

(B) The measured soil concentration will not result in nonaqueous phase liquid accumulating on or in groundwater at any time in the future. Specifically, it must be demonstrated that a sufficient amount of time has elapsed for migration of hazardous substances from soil into groundwater to occur and that the characteristics of the site (e.g., depth to groundwater and infiltration) are representative of future site conditions. This demonstration may also include a measurement or calculation of the attenuating capacity of soil between the source of the hazardous substance and the groundwater table using site-specific data.

(iii) **Evaluation criteria.** Empirical demonstrations shall be based on methods approved by the department. Those methods shall comply with WAC 173-340-702 (14), (15) and (16).

(d) **Deriving residual saturation screening levels.** Unless an empirical demonstration is made under (c) of this subsection, residual saturation screening levels shall be derived and compared with the soil concentrations derived under the methods specified in subsections (4) through (9) of this subsection to ensure that those soil concentrations will not result in the accumulation of nonaqueous phase liquid on or in groundwater. Residual saturation screening levels shall be derived using one of the following methods.

(i) **Default screening levels for petroleum hydrocarbons.** Residual saturation screening levels for petroleum hydrocarbons may be obtained from the values specified in Table 747-5.

(ii) **Site-specific screening levels.** Residual saturation screening levels for petroleum hydrocarbons and other hazardous substances may be derived from site-specific measurements. Site-specific measurements of residual saturation shall be based on methods approved by the department. Laboratory measurements or theoretical estimates (i.e., those that are not based on site-specific measurements) of residual saturation shall be supported and verified by site data. This may include an assessment of groundwater monitoring data and soil concentration data with depth and an analysis of the soil's texture (grain size), porosity and volumetric water content.

(e) **Adjustment to the derived soil concentrations.** After residual saturation screening levels have been derived under (d) of this subsection, the screening levels shall be compared with the soil concentrations derived under one of the methods specified in subsections (4) through (9) of this subsection. If the residual saturation screening level is greater than or equal to the soil concentration derived using these methods, then no adjustment for residual saturation is necessary. If the residual saturation screening level is less than the soil concentration derived using these methods, then the soil concentration shall be adjusted downward to the residual saturation screening level.

(11) **Groundwater monitoring requirements.** The department may, on a case-by-case basis, require groundwater monitoring to confirm that hazardous substance soil concentrations derived under this section meet the criterion specified in subsection (2) of this section.

Reviser's note: The brackets and enclosed material in the text of the above section occurred in the copy filed by the agency and appear in the Register pursuant to the requirements of RCW 34.08.040.

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-7490 Terrestrial ecological evaluation procedures.

(1) **Purpose.**

(a) WAC 173-340-7490 through 173-340-7494 define the goals and procedures the department will use for:

(i) Determining whether a release of hazardous substances to soil may pose a threat to the terrestrial environment;

(ii) Characterizing ((~~existing or potential~~)) threats to terrestrial plants or animals exposed to hazardous substances in soil; and

(iii) Establishing site-specific cleanup standards for the protection of terrestrial plants and animals.

(b) Information collected during a terrestrial ecological evaluation shall also be used in developing and evaluating cleanup action alternatives and in selecting a cleanup action under WAC 173-340-350 through 173-340-390. WAC 173-340-7490 through 173-340-7494 do not necessarily require a cleanup action for terrestrial ecological protection separate from a human health-based cleanup action. Where appropriate, a terrestrial ecological evaluation may be conducted so as to avoid duplicative studies of soil contamination that will be remediated to address other concerns, as provided in WAC 173-340-350 ((~~(7)(c)(iii)(F)(II)~~)) (6)(i).

(c) These procedures are not intended to be used to evaluate ((~~potential~~)) threats to ecological receptors in sediments, surface

water, or wetlands. Procedures for sediment evaluations are described in WAC 173-340-760, and for surface water evaluations in WAC 173-340-730. Procedures for wetland evaluations shall be determined by the department on a case-by-case basis.

(2) **Requirements.** In the event of a release of a hazardous substance to the soil at a site, one of the following actions shall be taken:

(a) Document an exclusion from any further terrestrial ecological evaluation using the criteria in WAC 173-340-7491;

(b) Conduct a simplified terrestrial ecological evaluation as set forth in WAC 173-340-7492; or

(c) Conduct a site-specific terrestrial ecological evaluation as set forth in WAC 173-340-7493.

(3) **Goal.** The goal of the terrestrial ecological evaluation process is the protection of terrestrial ecological receptors from exposure to contaminated soil with the potential to cause significant adverse effects. For species protected under the Endangered Species Act or other applicable laws that extend protection to individuals of a species, a significant adverse effect means an impact that would significantly disrupt normal behavior patterns that include, but are not limited to, breeding, feeding, or sheltering. For all other species, significant adverse effects are effects that impair reproduction, growth or survival.

(a) The simplified terrestrial ecological evaluation process has been developed to be protective of terrestrial ecological receptors at most qualifying sites, while the site-specific terrestrial ecological evaluation process is intended to be highly likely to be protective at any site.

(b) The following policy on terrestrial ecological receptors to be protected applies to all terrestrial ecological evaluations. For land uses other than industrial or commercial, protectiveness is evaluated relative to terrestrial plants, wildlife, and ecologically important functions of soil biota that affect plants or wildlife.

For industrial or commercial properties, current or future potential for exposure to soil contamination need only be evaluated for terrestrial wildlife protection. Plants and soil biota need not be considered unless:

(i) The species is protected under the federal Endangered Species Act; or

(ii) The soil contamination is located on an area of an industrial or commercial property where vegetation must be maintained to comply with local government land use regulations.

(c) For the purposes of this section, "industrial property" means properties meeting the definition in WAC 173-340-200. "Commercial property" means properties that are currently zoned for commercial or industrial property use and that are characterized by or are committed to traditional commercial uses such as offices, retail and wholesale sales, professional services, consumer services, and, warehousing.

(d) Any terrestrial remedy, including exclusions, based at least in part on future land use assumptions shall include a completion date for such future development acceptable to the department.

(4) **Point of compliance.**

(a) **Conditional point of compliance.** For sites with institutional controls to prevent excavation of deeper soil, a conditional point of compliance may be set at the biologically active soil zone. This zone is assumed to extend to a depth of six feet. The department may approve a site-specific depth based on a demonstration that an alterna-

tive depth is more appropriate for the site. In making this demonstration, the following shall be considered:

(i) Depth to which soil macro-invertebrates are likely to occur;

(ii) Depth to which soil turnover (bioturbation) is likely to occur due to the activities of soil invertebrates;

(iii) Depth to which animals likely to occur at the site are expected to burrow; and

(iv) Depth to which plant roots are likely to extend.

(b) **Standard point of compliance.** An institutional control is not required for soil contamination that is at least ((~~fifteen~~)) 15 feet below the ground surface. This represents a reasonable estimate of the depth of soil that could be excavated and distributed at the soil surface as a result of site development activities, resulting in exposure by ecological receptors.

(5) **Additional measures.** The department may require additional measures to evaluate ((~~potential~~)) threats to terrestrial ecological receptors notwithstanding the provisions in this and the following sections, when based upon a site-specific review, the department determines that such measures are necessary to protect the environment.

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-7493 Site-specific terrestrial ecological evaluation procedures. (1) **Purpose.**

(a) This section sets forth the procedures for conducting a site-specific terrestrial ecological evaluation if any of the conditions specified in WAC 173-340-7491 (2)(a) apply to the site, or if the person conducting the evaluation elects to conduct a site-specific terrestrial ecological evaluation under this section, whether or not a simplified terrestrial ecological evaluation has been conducted under WAC 173-340-7492.

(b) In addition to the purposes specified in WAC 173-340-7490 (1)(a), the site-specific terrestrial ecological evaluation is intended to facilitate selection of a cleanup action by developing information necessary to conduct evaluations of cleanup action alternatives in the feasibility study.

(c) There are two elements in planning a site-specific terrestrial ecological evaluation. Both elements shall be done in consultation with the department and must be approved by the department. The two elements are:

(i) Completing the problem formulation step as required under subsection (2) of this section; and

(ii) Selecting one or more methods under subsection (3) of this section for addressing issues identified in the problem formulation step.

(d) After reviewing information developed in the problem formulation step, the department may at its discretion determine that selection of one or more methods for proceeding with the evaluation is not necessary by making either of the following decisions:

(i) No further site-specific terrestrial ecological evaluation is necessary because the cleanup action plans developed for the protection of human health will eliminate exposure pathways of concern to all of the soil contamination.

(ii) A simplified terrestrial ecological evaluation may be conducted under WAC 173-340-7492 because this evaluation will adequately identify and address any ((~~existing or potential~~)) threats to ecological receptors.

(2) **Problem formulation step.**

(a) To define the focus of the site-specific terrestrial ecological evaluation, identify issues to be addressed in the evaluation, specifying:

(i) **The chemicals of ecological concern.** The person conducting the evaluation may eliminate hazardous substances from further consideration where the maximum or the upper ((~~ninety-five~~)) 95 percent confidence limit soil concentration found at the site does not exceed ecological indicator concentrations described in Table 749-3. For industrial or commercial land uses, only the wildlife values need to be considered. Any chemical that exceeds the ecological indicator concentrations shall be included as a chemical of ecological concern in the evaluation unless it can be eliminated based on the factors listed in WAC ((~~173-340-708~~)) 173-340-703 (2)(b). *(Caution on the use of ecological indicator concentrations: These numbers are not cleanup levels, and concentrations that exceed the number do not necessarily require remediation.)*

(ii) **Exposure pathways.** Identify any complete potential pathways for exposure of plants or animals to the chemicals of concern. If there are no complete exposure pathways then no further evaluation is necessary. Incomplete pathways may be due to the presence of man-made physical barriers, either currently existing or to be placed (within a time frame acceptable to the department) as part of a remedy or land use.

To ensure that such man-made barriers are maintained, a restrictive covenant shall be required by the department under WAC 173-340-440 under a consent decree, agreed order or enforcement order, or as a condition to a written opinion regarding the adequacy of an independent remedial action under WAC 173-340-515(3).

(iii) **Terrestrial ecological receptors of concern.** Identify current or potential future terrestrial species groups reasonably likely to live or feed at the site. Groupings should represent taxonomically related species with similar exposure characteristics. Examples of potential terrestrial species groups include: Vascular plants, ground-feeding birds, ground-feeding small mammal predators, and herbivorous small mammals.

(A) From these terrestrial species groups, select those groups to be included in the evaluation. If appropriate, individual terrestrial receptor species may also be included. In selecting species groups or individual species, the following shall be considered:

(I) Receptors that may be most at risk for significant adverse effects based on the toxicological characteristics of the chemicals of concern, the sensitivity of the receptor, and on the likely degree of exposure.

(II) Public comments.

(III) Species protected under applicable state or federal laws that may potentially be exposed to soil contaminants at the site.

(IV) Receptors to be considered under different land uses, described under WAC 173-340-7490 (3)(b).

(B) Surrogate species for which greater information is available, or that are more suitable for site-specific studies, may be used in the analysis when appropriate for addressing issues raised in the problem formulation step.

(iv) **Toxicological assessment.** Identify significant adverse effects in the receptors of concern that may result from exposure to the chemicals of concern, based on information from the toxicological literature.

(b) The following is an example of a site-specific issue developed in this step: Is dieldrin contamination a ((~~potential~~)) threat to reproduction in birds feeding on invertebrates and ingesting soil at the site? If so, what measures will eliminate any significant adverse effects?

(c) If there are identified information needs for remedy selection or remedial design, these should also be developed as issues for the problem formulation process.

(d) The use of assessment and measurement endpoints, as defined in USEPA *Ecological Risk Assessment Guidance for Superfund*, 1997, should be considered to clarify the logical structure of the site-specific terrestrial ecological evaluation under this chapter. Assessment endpoints shall be consistent with the policy objectives described in WAC 173-340-7490 (3)(b).

(3) **Selection of appropriate terrestrial ecological evaluation methods.** If it is determined during the problem formulation step that further evaluation is necessary, the soil concentrations listed in Table 749-3 may be used as the cleanup level at the discretion of the person conducting the evaluation. Alternatively, one or more of the following methods listed in (a) through (g) of this subsection that are relevant to the issues identified in the problem formulation step and that meet the requirements of WAC 173-340-7490 (1)(a) shall be conducted. The alternative methods available for conducting a site-specific terrestrial ecological evaluation include the following:

(a) **Literature survey.** An analysis based on a literature survey shall be conducted in accordance with subsection (4) of this section and may be used for purposes including the following:

(i) Developing a soil concentration for chemicals not listed in Table 749-3.

(ii) Identifying a soil concentration for the protection of plants or soil biota more relevant to site-specific conditions than the value listed in Table 749-3.

(iii) Obtaining a value for any of the wildlife exposure model variables listed in Table 749-5 to calculate a soil concentration for the protection of wildlife more relevant to site-specific conditions than the values listed in Table 749-3.

(b) **Soil bioassays.**

(i) Bioassays may use sensitive surrogate organisms not necessarily found at the site provided that the test adequately addresses the issues raised in the problem formulation step. For issues where ((~~existing or potential~~)) threats to plant life are a concern, the test described in *Early Seedling Growth Protocol for Soil Toxicity Screening*. Ecology Publication No. 96-324 may be used. For sites where risks to soil biota are a concern, the test described in *Earthworm Bioassay Protocol for Soil Toxicity Screening*. Ecology Publication No. 96-327 may be used. Other bioassay tests approved by the department may also be used.

(ii) Soil concentrations protective of soil biota or plants may also be established with soil bioassays that use species ecologically relevant to the site rather than standard test species. Species that do or could occur at the site are considered ecologically relevant.

(c) **Wildlife exposure model.** Equations and exposure parameters to be used in calculating soil concentrations protective of terrestrial

wildlife are provided in Tables 749-4 and 749-5. Changes to this model may be approved by the department under the following conditions:

(i) Alternative values for parameters listed in Table 749-5 may be used if they can be demonstrated to be more relevant to site-specific conditions (for example, the value is based on a chemical form of a hazardous substance actually present at the site). An alternative value obtained from the literature shall be supported by a literature survey conducted in accordance with subsection (4) of this section.

(ii) Receptor species of concern or exposure pathways identified in the problem formulation step may be added to the model if appropriate on a site-specific basis.

(iii) A substitution for one or more of the receptor species listed in Table 749-4 may be made under subsection (7) of this section.

(d) **Biomarkers.** Biomarker methods may be used if the measurements have clear relevance to issues raised in the problem formulation and the approach has a high probability of detecting a significant adverse effect if it is occurring at the site. The person conducting the evaluation may elect to use criteria such as biomarker effects that serve as a sensitive surrogate for significant adverse effects.

(e) **Site-specific field studies.** Site-specific empirical studies that involve hypothesis testing should use a conventional "no difference" null hypothesis (e.g., H_0: Earthworm densities are the same in the contaminated area and the reference (control) area. H_A: Earthworm densities are higher in the reference area than in the contaminated area). In preparing a work plan, consideration shall be given to the adequacy of the proposed study to detect an ongoing adverse effect and this issue shall be addressed in reporting results from the study.

(f) **Weight of evidence.** A weight of evidence approach shall include a balance in the application of literature, field, and laboratory data, recognizing that each has particular strengths and weaknesses. Site-specific data shall be given greater weight than default values or assumptions where appropriate.

(g) **Other methods approved by the department.** This may include a qualitative evaluation if relevant toxicological data are not available and cannot be otherwise developed (e.g., through soil bioassay testing).

(4) **Literature surveys.**

(a) Toxicity reference values or soil concentrations established from the literature shall represent the lowest relevant LOAEL found in the literature. Bioaccumulation factor values shall represent a reasonable maximum value from relevant information found in the literature. In assessing relevance, the following principles shall be considered:

(i) Literature benchmark values should be obtained from studies that have test conditions as similar as possible to site conditions.

(ii) The literature benchmark values or toxicity reference values should correspond to the exposure route being assessed.

(iii) The toxicity reference value or bioaccumulation factor value shall be as appropriate as possible for the receptor being assessed. The toxicity reference value should be based on a significant endpoint, as described in subsection (2) of this section.

(iv) The literature benchmark value or toxicity reference value should preferably be based on chronic exposure.

(v) The literature benchmark value, toxicity reference value, or bioaccumulation factor should preferably correspond to the chemical form being assessed. Exceptions may apply for toxicity reference val-

ues where documented biological transformations occur following uptake of the chemical or where chemical transformations are known to occur in the environment under conditions appropriate to the site.

(b) A list of relevant journals and other literature consulted in the survey shall be provided to the department. A table summarizing information from all relevant studies shall be provided to the department in a report, and the studies used to select a proposed value shall be identified. Copies of literature cited in the table that are not in the possession of the department shall be provided with the report. The department may identify relevant articles, books or other documents that shall be included in the survey.

(5) **Uncertainty analysis.** If a site-specific terrestrial ecological evaluation includes an uncertainty analysis, the discussion of uncertainty shall identify and differentiate between uncertainties that can and cannot be quantified, and natural variability. The discussion shall describe the range of potential ecological risks from the hazardous substances present at the site, based on the toxicological characteristics of the hazardous substances present, and evaluate the uncertainty regarding these risks. Potential methods for reducing uncertainty shall also be discussed, such as additional studies or post-remedial monitoring. If multiple lines of independent evidence have been developed, a weight of evidence approach may be used in characterizing uncertainty.

(6) **New scientific information.** The department shall consider proposals for modifications to default values provided in this section based on new scientific information in accordance with WAC 173-340-702 (14), (15) and (16).

(7) **Substitute receptor species.** Substitutions of receptor species and the associated values in the wildlife exposure model described in Table 749-4 may be made subject to the following conditions:

(a) There is scientifically supportable evidence that a receptor identified in Table 749-4 is not characteristic or a reasonable surrogate for a receptor that is characteristic of the ecoregion where the site is located. "Ecoregions" are defined using EPA's *Ecoregions of the Pacific Northwest* Document No. 600/3-86/033 July 1986 by Omernik and Gallant.

(b) The proposed substitute receptor is characteristic of the ecoregion where the site is located and will serve as a surrogate for wildlife species that are, or may become exposed to soil contaminants at the site. The selected surrogate shall be a species that is expected to be vulnerable to the effects of soil contamination relative to the current default species because of high exposure or known sensitivity to hazardous substances found in soil at the site.

(c) Scientific studies concerning the proposed substitute receptor species are available in the literature to select reasonable maximum exposure estimates for variables listed in Table 749-4.

(d) In choosing among potential substitute receptor species that meet the criteria in (b) and (c) of this subsection, preference shall be given to the species most ecologically similar to the default receptor being replaced.

(e) Unless there is clear and convincing evidence that they are not characteristic of the ecoregion where the site is located, the following groups shall be included in the wildlife exposure model: A small mammalian predator on soil-associated invertebrates, a small avian predator on soil-associated invertebrates, and a small mammalian herbivore.

(f) To account for uncertainties in the level of protection provided to substitute receptor species and toxicologically sensitive species, the department may require any of the following:

(i) Use of toxicity reference values based on no observed adverse effects levels.

(ii) Use of uncertainty factors to account for extrapolations between species in toxicity or exposure parameter values; or

(iii) Use of a hazard index approach for multiple contaminants to account for additive toxic effects.

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-750 Cleanup standards to protect air quality. (1) General considerations.

(a) This section applies whenever it is necessary to establish air cleanup standards to determine if air emissions at a site pose a threat to human health or the environment. It applies to ambient (outdoor) air and air within any building, utility vault, manhole or other structure large enough for a person to fit into. This section does not apply to concentrations of hazardous substances in the air originating from an industrial or commercial process or operation or to hazardous substances in the air originating from an offsite source. This section does apply to concentrations of hazardous substances in the air originating from other contaminated media or a remedial action at the site. Air cleanup standards shall be established at the following sites:

(i) Where a nonpotable groundwater cleanup level is being established for volatile organic compounds using a site-specific risk assessment under WAC 173-340-720(6).

(ii) Where a soil cleanup level that addresses vapors or dust is being established under WAC 173-340-740 or 173-340-745.

(iii) Where it is necessary to establish air emission limits for a remedial action.

(iv) At other sites as determined by the department.

(b) Cleanup levels to protect air quality shall be based on estimates of the reasonable maximum exposure expected to occur under both current and future site use conditions. The department has determined that residential site use will generally require the most protective air cleanup levels and that exposure to hazardous substances under these conditions represents the reasonable maximum exposure. Air cleanup levels shall use this presumed exposure scenario and be established in accordance with subsection (3) of this section unless the site qualifies for a Method C air cleanup level. If a site qualifies for a Method C air cleanup level, subsection (4) of this section shall be used to establish air cleanup levels.

(c) In the event of a release or potential release of hazardous substances into the air at a site at which this section applies under (a) of this subsection, a cleanup action that complies with this chapter shall be conducted to address all areas of the site where the concentration of the hazardous substances in the air exceeds cleanup levels.

(d) Air cleanup levels shall be established at concentrations that do not directly or indirectly cause violations of groundwater, surface water, or soil cleanup standards established under this chap-

ter or applicable state and federal laws. A site that qualifies for a Method C air cleanup level under this section does not necessarily qualify for a Method C cleanup level in other media. Each medium must be evaluated separately using the criteria applicable to that medium.

(e) The department may require more stringent air cleanup standards than required by this section where, based on a site-specific evaluation, the department determines that this is necessary to protect human health and the environment. Any imposition of more stringent requirements under this provision shall comply with WAC 173-340-702 and 173-340-708.

(2) Method A air cleanup levels.

This section does not provide procedures for establishing Method A cleanup levels. Method B or C, as appropriate, shall be used to establish air cleanup levels.

(3) Method B air cleanup levels.

(a) Applicability. Method B air cleanup levels consist of standard and modified cleanup levels as described in this subsection. Either standard or modified Method B air cleanup levels may be used at any site.

(b) Standard Method B air cleanup levels. Standard Method B cleanup levels for air shall be at least as stringent as all of the following:

(i) Applicable state and federal laws. Concentrations established under applicable state and federal laws; and

(ii) Human health protection. For hazardous substances for which sufficiently protective health-based criteria or standards have not been established under applicable state and federal laws, those concentrations which protect human health and the environment as determined by the following methods:

(A) Noncarcinogens. Concentrations that are estimated to result in no acute or chronic toxic effects on human health and are determined using the following equation and standard exposure assumptions:

[Equation 750-1]

$$\text{Air cleanup level } (\text{ug/m}^3) = \frac{\text{RfD x ABW x UCF x HQ x AT}}{\text{BR x ABS x ED x EF}}$$

Where:

RfD	=	Reference dose as specified in WAC 173-340-708(7) (mg/kg-day)
ABW	=	Average body weight over the exposure duration (16 kg)
UCF	=	Unit conversion factor (1,000 ug/mg)
BR	=	Breathing rate (10 m^3/day)
ABS	=	Inhalation absorption fraction (1.0) (unitless)
HQ	=	Hazard quotient (1) (unitless)
AT	=	Averaging time (6 years)
ED	=	Exposure duration (6 years)
EF	=	Exposure frequency (1.0) (unitless)

(B) Carcinogens. For known or suspected carcinogens, concentrations for which the upper bound on the estimated excess cancer risk is less than or equal to one in ((~~one million~~)) 1,000,000 (1×10^{-6}) and are determined using the following equation and standard exposure assumptions:

[Equation 750-2]

$$\text{Air cleanup level } (\text{ug/m}^3) = \frac{\text{RISK x ABW x AT x UCF}}{\text{CPF x BR x ABS x ED x EF}}$$

Where:

RISK	=	Acceptable cancer risk level (1 in 1,000,000) (unitless)
ABW	=	Average body weight over the exposure duration (70 kg)
AT	=	Averaging time (75 years)
UCF	=	Unit conversion factor (1,000 ug/mg)
CPF	=	Carcinogenic potency factor as specified in WAC 173-340-708(8) (kg-day/mg)
BR	=	Breathing rate (20 m^3/day)
ABS	=	Inhalation absorption fraction (1.0) (unitless)
ED	=	Exposure duration (30 years)
EF	=	Exposure frequency (1.0) (unitless)

(C) Petroleum mixtures. For noncarcinogenic effects of petroleum mixtures, a total petroleum hydrocarbon cleanup level shall be calculated using Equation 750-1 and by taking into account the additive effects of the petroleum fractions and volatile organic compounds present in the petroleum mixture. Cleanup levels for other noncarcinogens and known or suspected carcinogens within the petroleum mixture shall be calculated using Equations 750-1 and 750-2. See Table 830-1 for the analyses required for various petroleum products to use this method.

(iii) Lower explosive limit limitation. Standard Method B air cleanup levels shall not exceed ((~~ten~~)) 10 percent ((~~(10%)~~)) of the lower explosive limit for any hazardous substance or mixture of hazardous substances.

(c) Modified Method B air cleanup levels. Modified Method B air cleanup levels are standard Method B air cleanup levels modified with chemical-specific or site-specific data. When making these adjustments, the resultant cleanup levels shall meet applicable state and federal laws, health risk levels and explosive limit limitations required for standard Method B air cleanup levels. Changes to exposure assumptions must comply with WAC 173-340-708(10). The following adjustments may be made to the default assumptions in the standard Method B equations to derive modified Method B cleanup levels:

(i) The inhalation absorption ((~~percentage~~)) fraction may be modified if the requirements of WAC 173-340-702 (14), (15), (16) and WAC 173-340-708(10) are met;

(ii) Adjustments to the reference dose and cancer potency factor may be made if the requirements in WAC 173-340-708 (7) and (8) are met;

(iii) The toxicity equivalency factor procedures described in WAC 173-340-708(8) may be used for assessing the potential carcinogenic risk of mixtures of chlorinated dibenzo-p-dioxins, chlorinated dibenzofurans and polycyclic aromatic hydrocarbons;

(iv) Modifications incorporating new science as provided for in WAC 173-340-702 (14), (15) and (16); and

(d) Using modified Method B to evaluate air remediation levels. In addition to the adjustments allowed under subsection (3)(c) of this section, adjustments to the reasonable maximum exposure scenario or default exposure assumptions are allowed when using a quantitative site-specific risk assessment to evaluate the protectiveness of a remedy. See WAC 173-340-355, 173-340-357 and 173-340-708 (3)(d) and (10)(b).

(4) Method C air cleanup levels.

(a) Applicability. Method C air cleanup levels consist of standard and modified cleanup levels as described in this subsection. Meth-

od C air cleanup levels may be approved by the department if the person undertaking the cleanup action can demonstrate that the site qualifies for use of Method C under WAC 173-340-706(1).

(b) Standard Method C air cleanup levels. Standard Method C air cleanup levels for ambient air shall be at least as stringent as all of the following:

(i) Applicable state and federal laws. Concentrations established under applicable state and federal laws;

(ii) Human health protection. For hazardous substances for which sufficiently protective health-based criteria or standards have not been established under applicable state and federal laws, concentrations that protect human health and the environment as determined by the following methods:

(A) Noncarcinogens. Concentrations that are anticipated to result in no significant acute or chronic effects on human health and are estimated in accordance with Equation 750-1 except that the average body weight shall be 70 kg and the estimated breathing rate shall be 20 m^3/day;

(B) Carcinogens. For known or suspected carcinogens, concentrations for which the upper bound on the estimated excess cancer risk is less than or equal to one in ((~~one hundred thousand~~)) 100,000 (1×10^{-5}) and are determined in accordance with Equation 750-2.

(C) Petroleum mixtures. Cleanup levels for petroleum mixtures shall be calculated as specified in subsection (3)(b)(ii)(C) of this section, except that the average body weight shall be 70 kg and the estimated breathing rate shall be 20m^3/day.

(iii) Lower explosive limit limitation. Standard Method C air cleanup levels shall not exceed ((~~ten~~)) 10 percent ((~~(10%)~~)) of the lower explosive limit for any hazardous substance or mixture of hazardous substances.

(c) Modified Method C air cleanup levels. Modified Method C air cleanup levels are standard Method C air cleanup levels modified with chemical-specific or site-specific data. The same limitations and adjustments specified in subsection (3)(c) of this section apply to modified Method C cleanup levels.

(d) Using modified Method C to evaluate air remediation levels. In addition to the adjustments allowed under subsection (4)(c) of this section, adjustments to the reasonable maximum exposure scenario or default exposure assumptions are allowed when using a quantitative site-specific risk assessment to evaluate the protectiveness of a remedy. See WAC 173-340-355, 173-340-357 and 173-340-708 (3)(d) and (10)(b).

(5) Adjustments to air cleanup levels.

(a) Total site risk adjustments. Air cleanup levels for individual hazardous substances developed in accordance with subsections (3) and (4) of this section, including cleanup levels based on applicable state and federal laws, shall be adjusted downward to take into account exposure to multiple hazardous substances and/or exposure resulting from more than one pathway of exposure. These adjustments need to be made only if, without these adjustments, the hazard index would exceed one ((~~(1)~~)) or the total excess cancer risk would exceed one in ((~~one hundred thousand~~)) 100,000 (1×10^{-5}). These adjustments shall be made in accordance with the procedures in WAC 173-340-708 (5) and (6). In making these adjustments, the hazard index shall not exceed one ((~~(1)~~)) and the total excess cancer risk shall not exceed one in ((~~one hundred thousand~~)) 100,000 (1×10^{-5}).

(b) Adjustments to applicable state and federal laws. Where a cleanup level developed under subsection (3) or (4) of this section is based on an applicable state or federal law and the level of risk upon which the standard is based exceeds an excess cancer risk of one in ((~~one hundred thousand~~)) 100,000 (1×10^{-5}) or a hazard index of one ((~~(1)~~)), the cleanup level must be adjusted downward so that the total excess cancer risk does not exceed one in ((~~one hundred thousand~~)) 100,000 (1×10^{-5}) and the hazard index does not exceed one ((~~(1)~~)) at the site.

(c) Natural background and PQL considerations. Cleanup levels determined under subsection (3) or (4) of this section, including cleanup levels adjusted under (a) or (b) of this subsection, shall not be set at levels below the practical quantitation limit or natural background, whichever is higher. See WAC 173-340-709 and 173-340-707 for additional requirements pertaining to practical quantitation limits and natural background.

(6) Points of compliance. Cleanup levels established under this section shall be attained in the ambient (outdoor) air and air within any building, utility vault, manhole or other structure large enough for a person to fit into, throughout the site. For sites determined to be industrial sites under the criteria in WAC 173-340-745, the department may approve a conditional point of compliance not to exceed the property boundary. A conditional point of compliance shall not be approved if use of a conditional point of compliance would pose a threat to human health or the environment.

(7) Compliance monitoring.

(a) Where air cleanup levels have been established at a site, monitoring may be required to be conducted to determine if compliance with the air cleanup levels has been achieved. Sampling and analytical procedures shall be defined in a compliance monitoring plan prepared under WAC 173-340-410. The sample design shall provide data that are representative of the site.

(b) Data analysis and evaluation procedures used to evaluate compliance with air cleanup levels shall be defined in a compliance monitoring plan prepared under WAC 173-340-410.

(c) Averaging times specified in applicable state and federal laws shall be used to demonstrate compliance with those requirements.

(d) When cleanup levels are not based on applicable state and federal laws, the following averaging times shall be used:

(i) Compliance with air cleanup levels for noncarcinogens shall be based on ((~~twenty-four-hour~~)) 24-hour time weighted averages except where the cleanup level is based upon an inhalation reference dose which specifies an alternate averaging time;

(ii) Compliance with air cleanup levels for carcinogens shall be based on annual average concentrations.

PART ((~~VIII~~)) 8 - GENERAL PROVISIONS

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-810 Worker health and safety ((~~and health~~)). (1) **General provisions.** Requirements under the Occupational Safety and Health Act of 1970, as amended (29 U.S.C. Sec. 651 et seq.) and the Washington Industrial Safety and Health Act (chapter 49.17 RCW), and regulations promulgated pursuant thereto shall be applicable to remedial actions taken under this chapter. These requirements are subject to enforcement by the designated federal and state agencies. All governmental agencies and private employers are directly responsible for the safety and health of their own employees and compliance with those requirements. Actions taken by the department under this chapter do not constitute an exercise of statutory authority within the meaning of section (4)(b)(1) of the Occupational Safety and Health Act.

(2) **Health and safety** ((~~and health~~)) **plan.** Persons responsible for undertaking remedial actions under this chapter shall prepare a health and safety plan when required by chapter ((~~296-62~~)) 296-843 WAC. Plans prepared under an order or decree shall be submitted for the department's review and comment. The health and safety ((~~and health~~)) plan must be consistent with chapter 49.17 RCW and regulations adopted under that authority.

NEW SECTION

WAC 173-340-815 Cultural resource protection. (1) **Purpose.** This section specifies requirements that are intended to avoid, minimize, or mitigate adverse effects from remedial actions on archaeological and historic archaeological sites, historic buildings and structures, traditional cultural places, sacred sites, and other cultural resources.

(2) **Applicable laws.** Remedial actions must comply with applicable state and federal laws regarding cultural resource protection, including:

(a) The National Historic Preservation Act of 1966, as amended (54 U.S.C. 300101 et seq.);

(b) The Archaeological and Historic Preservation Act of 1974, as amended (54 U.S.C. 312501 et seq.);

(c) The Archaeological Resource Protection Act of 1979, as amended (16 U.S.C. 470aa et seq.);

(d) The Native American Graves Protection and Repatriation Act of 1990, as amended (25 U.S.C. 3001 et seq.);

(e) Chapter 27.53 RCW, Archaeological sites and resources;

(f) Chapter 27.44 RCW, Indian graves and records;

(g) Chapter 68.50 RCW, Human remains;

(h) Chapter 68.60 RCW, Abandoned and historic cemeteries and historic graves; and

(i) Chapter 43.21C RCW, State Environmental Policy Act and chapter 197-11 WAC, SEPA rules.

(3) **Consultations and inadvertent discovery plans.**

(a) **Applicability.** The requirements in this subsection apply to:

(i) Ecology-conducted remedial actions, except initial investigations;

(ii) Ecology-supervised remedial actions; and

(iii) Ecology-funded independent remedial actions.

(b) **Requirements.** For remedial actions identified under (a) of this subsection, ecology will do the following before any person conducts a field activity capable of affecting a cultural resource:

(i) Consult with the department of archaeology and historic preservation and affected Indian tribes on the potential effects of planned remedial actions on cultural resources at the site, unless the remedial action is subject to Section 106 review under the National Historic Preservation Act of 1966, as amended (54 U.S.C. 300101 et seq.). Based on the consultations, ecology may require the development and implementation of a cultural resources work plan, such as a survey or monitoring plan, to identify cultural resources and to avoid, minimize, or mitigate adverse impacts to cultural resources at the site; and

(ii) Prepare or require an inadvertent discovery plan for the site.

(A) The inadvertent discovery plan must be prepared using the applicable form provided by ecology or an equivalent document that includes the same or more comprehensive information.

(B) For ecology-supervised remedial actions, ecology may require submittal of the inadvertent discovery plan for its review.

(C) The inadvertent discovery plan must be readily available during all remedial actions at the site. Persons conducting remedial actions at the site must be familiar with the contents and location of the plan.

(D) The inadvertent discovery plan must be updated as needed to reflect the discovery of cultural resources.

AMENDATORY SECTION (Amending WSR 01-05-024, filed 2/12/01, effective 8/15/01)

WAC 173-340-830 ((~~Analytical~~)) Sampling and analysis procedures.

(1) **Purpose.** This section specifies ((~~acceptable analytical methods and other testing requirements for sites where remedial action is being conducted under this chapter.~~

~~(2) General requirements.~~

~~(a) All hazardous substance analyses shall be conducted by a laboratory accredited under chapter 173-50 WAC, unless otherwise approved by the department.~~

~~(b) All analytical procedures used shall be conducted in accordance with a sampling and analysis plan prepared under WAC 173-340-820.~~

~~(c) Tests for which methods have not been specified in this section shall be performed using standard methods or procedures such as those specified by the American Society for Testing of Materials, when available, unless otherwise approved by the department.~~

~~(d) Samples shall be analyzed consistent with methods appropriate for the site, the media being analyzed, the hazardous substances being analyzed for, and the anticipated use of the data.~~

~~(e) The department may require or approve modifications to the standard analytical methods identified in subsection (3) of this section to provide lower quantitation limits, improved accuracy, greater precision, or to address the factors in (d) of this subsection.~~

~~(f) Limits of quantitation. Laboratories shall achieve the lowest practical quantitation limits consistent with the selected method and WAC 173-340-707.~~

~~(g) Where there is more than one method specified in subsection (3) of this section with a practical quantitation limit less than the cleanup standard, any of the methods may be selected. In these situations, considerations in selecting a particular method may include confidence in the data, analytical costs, and considerations relating to quality assurance or analysis efficiencies.~~

~~(h) The department may require an analysis to be conducted by more than one method in order to provide higher data quality. For example, the department may require that different separation and detection techniques be used to verify the presence of a hazardous substance ("qualification") and determine the concentration of the hazardous substance ("quantitation").~~

~~(i) The minimum testing requirements for petroleum contaminated sites are identified in Table 830-1.~~

~~(3) Analytical methods.~~

~~(a) The methods used for sample collection, sample preservation, transportation, allowable time before analysis, sample preparation, analysis, method detection limits, practical quantitation limits, quality control, quality assurance and other technical requirements and specifications shall comply with the following requirements, as applicable:~~

~~(i) Method 1. **Test Methods for Evaluating Solid Waste,** Physical/Chemical Methods, U.S. EPA, SW-846, fourth update (2000);~~

~~(ii) Method 2. **Guidelines Establishing Test Procedures for the Analysis of Pollutants**, 40 C.F.R. Chapter 1, Part 136, and Appendices A, B, C, and D, U.S. EPA, July 1, 1999;~~

~~(iii) Method 3. **Standard Methods for the Examination of Water and Wastewater**, American Public Health Association, American Water Works Association, and Water Pollution Control Federation, 20th edition, 1998;~~

~~(iv) Method 4. **Recommended Protocols for Measuring Selected Environmental Variables in Puget Sound**, Puget Sound Estuary Program/Tetra Tech, 1996 edition;~~

~~(v) Method 5. **Quality Assurance Interim Guidelines for Water Quality Sampling and Analysis**, Groundwater Management Areas Program, Washington Department of Ecology, Water Quality Investigations Section, December 1986;~~

~~(vi) Method 6. **Analytical Methods for Petroleum Hydrocarbons**, Ecology publication #ECY 97-602, June 1997; or~~

~~(vii) Equivalent methods subject to approval by the department.~~

~~(b) The methods used for a particular hazardous substance at a site shall be selected in consideration of the factors in subsection (2) of this section.~~

~~(c) Groundwater. Methods 1, 2, 3 and 4, as described in (a) of this subsection, may be used to determine compliance with WAC 173-340-720.~~

~~(d) Surface water. Methods 1, 2, 3, 4 and 5 as described in (a) of this subsection, may be used to determine compliance with WAC 173-340-730.~~

~~(e) Soil. Method 1, as described in (a) of this subsection, may be used to determine compliance with WAC 173-340-740 and 173-340-745.~~

~~(f) Air. Appropriate methods for determining compliance with WAC 173-340-750 shall be selected on a case-by-case basis, in consideration of the factors in subsection (2) of this section~~)) requirements for sampling and analysis activities conducted as part of a remedial action. These activities include sample collection, handling, preservation, transportation, holding time, preparation, laboratory analy-

sis, method detection limits, practical quantitation limits, quality assurance, quality control, data reporting, and other technical requirements and specifications.

(2) **Applicability.** All sampling and analysis activities conducted as part of a remedial action must comply with the requirements in this section and, for sites where there is a release or threatened release to sediment, the requirements in chapter 173-204 WAC.

(3) **Plans.** All sampling and analysis must be conducted in accordance with a sampling and analysis plan prepared under WAC 173-340-820.

(4) **Methods.**

(a) All sampling and analysis must be conducted in accordance with an ecology-approved method or, if ecology has not approved an applicable method, a standard method or procedure such as those specified by the American Society for Testing of Materials, when available.

(i) Ecology will maintain a list of ecology-approved methods and make the list publicly available on ecology's website.

(ii) Ecology will provide notice in the *Contaminated Site Register* when ecology adds or removes a method from the list of ecology-approved methods.

(iii) Ecology will maintain a record of its decisions to add or remove a method from the list of ecology-approved methods.

(iv) Any person may propose another method for ecology review and approval.

(b) The methods used to collect, handle, and analyze samples must be appropriate for the site, the media being analyzed, the hazardous substances being analyzed for, and the anticipated use of the data.

(c) Ecology may require or approve modifications to a method identified under (a) of this subsection to provide lower quantitation limits, improved accuracy, greater precision, or to address the factors in (b) of this subsection.

(d) Ecology may require an analysis to be conducted by more than one method in order to provide higher data quality. For example, ecology may require that different separation and detection techniques be used to verify the presence of a hazardous substance (qualification) and determine the concentration of the hazardous substance (quantitation).

(e) If ecology has approved more than one method with a practical quantitation limit less than the cleanup level, any of those methods may be used. When selecting a method in these situations, consider confidence in the data, analytical costs, quality assurance, and analysis efficiencies.

(5) **Laboratories.**

(a) All hazardous substance analyses must be conducted by a laboratory accredited under chapter 173-50 WAC, unless otherwise approved by ecology.

(b) Laboratories must achieve the lowest practical quantitation limits consistent with the selected method and WAC 173-340-707.

(6) **Petroleum testing.** The minimum testing requirements for petroleum releases are identified in Table 830-1.

AMENDATORY SECTION (Amending WSR 90-08-086, filed 4/3/90, effective 5/4/90)

WAC 173-340-860 Endangerment. In the event that the department determines that any activity being performed at a ((~~hazardous waste~~))

site is creating or has the potential to create a danger to human health or the environment, the department may direct such activities to cease for such period of time as it deems necessary to abate the danger.

PART 9 - TABLES

REPEALER

The following sections of the Washington Administrative Code are repealed:

WAC 173-340-140	Deadlines.
WAC 173-340-610	Regional citizens' advisory committees.