**WAC 173-340-360 Cleanup action requirements.** (1) **Purpose.** This section 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 action must meet all of the requirements in this subsection. When a cleanup action includes more than one cleanup action component, the overall cleanup action must meet the requirements in this subsection. Ecology recognizes that some of the requirements contain flexibility and require the use of professional judgment in determining how to apply them at a particular 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 specifies the requirements and procedures for determining whether a cleanup action alternative provides for a reasonable restoration time frame, as required under subsection (3)(a)(ix) of this section.

(b) **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 must be considered 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;

(v) Potential future use of the site, surrounding areas, and associated resources that are, or may be, affected by releases from the site;

(vi) Availability of alternative water supplies;

(vii) Likely effectiveness and reliability of institutional controls;

(viii) Ability to control and monitor migration of hazardous substances from the site;

(ix) Toxicity of the hazardous substances at the site;

(x) Natural processes that reduce concentrations of hazardous substances and have been documented to occur at the site or under similar site conditions; 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) **Cleanup levels below area background concentrations.** At sites where area background concentrations, as defined in WAC 173-340-200, would result in recontamination of the site to levels that exceed cleanup levels:

(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; and

(iii) The remedial action 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 to achieve:

(i) The remedial action must achieve concentrations that are technically possible to achieve within a reasonable restoration time frame, as determined under (c) of this subsection; and

(ii) The remedial action is an interim action until cleanup levels are attained.

(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.

[Statutory Authority: Chapters 70A.305 and 70A.355 RCW. WSR 23-17-159 (Order 18-09), § 173-340-360, filed 8/23/23, effective 1/1/24. Statutory Authority: Chapter 70.105D RCW. WSR 01-05-024 (Order 97-09A), § 173-340-360, filed 2/12/01, effective 8/15/01; WSR 91-04-019, § 173-340-360, filed 1/28/91, effective 2/28/91; WSR 90-08-086, § 173-340-360, filed 4/3/90, effective 5/4/90.]