5.0 SELECTION OF CLEANUP ACTIONS PROCESS

5.1 Minimum Requirements for Cleanup

WAC 173-340-360 describes the minimum requirements and procedures for selecting cleanup actions. The minimum requirements, specified under WAC 173-340-360(2), include the following:

(a) Threshold requirements. The cleanup action shall:
  (i) Protect human health and the environment;
  (ii) Comply with cleanup standards;
  (iii) Comply with applicable state and federal laws;
  (iv) Provide for compliance monitoring.

(b) Other requirements. When selecting a cleanup action alternative that fulfills the threshold requirements, the selected action shall:
  (i) Use permanent solutions to the maximum extent practicable;
  (ii) Provide for reasonable restoration time frame; and,
  (iii) Consider public comments.

When selecting a cleanup action, preference shall be given to permanent solutions to the maximum extent practicable. A "permanent solution", under WAC 173-340-200, means a cleanup action in which cleanup standards of WAC 173-340-700 through WAC 173-340-760 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. To determine whether a cleanup action uses permanent solutions to the maximum extent practicable, the disproportionate cost analysis shall be used.

5.2 Disproportionate Cost Analysis [WAC 173-3340-360 (3)(e)]

Costs are disproportionate to benefits if the incremental costs of the alternative over that of the lower cost alternative exceed the incremental degree of benefits achieved by the alternative over that of the lower cost alternative. The following criteria are used to evaluate and compare each cleanup action alternative when conducting a disproportionate cost analysis to determine whether a cleanup action is permanent to the maximum extent practicable:

(i) Protectiveness. This involves 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 off-site risks resulting from implementing the alternative, and improvement of the overall environmental quality.

(ii) Permanence. This is 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. This is 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.

(iv) Effectiveness over the long term. This 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 off-site 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. This includes 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 mange such risks.

(vi) Technical and administrative implementability. This is the ability to implement the alternative including whether the alternative is technically possible, availability of necessary off-site 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. This is to address the concerns of the community regarding the alternative.

5.3 Reasonable Restoration Time Frame

To determine whether a cleanup action provides for a reasonable restoration time frame, the factors to be considered include the following:

(i) Potential risks posed by the site to human health and the environment;

(ii) Practicability of achieving a shorter restoration time frame;

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

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

(v) Availability of alternative water supplies;

(vi) Likely effectiveness and reliability of institutional controls;

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

(viii) Toxicity of the hazardous substances at the site;
(ix) Natural processes that reduce concentrations of hazardous substances and have been documented to occur at the site or under similar site conditions.

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 off-site disposal, isolation, or containment options. Extending the restoration time frames shall not be used as a substitute for active remedial measures, when such actions are practicable.

5.4 Screening of Alternatives

WAC 173-340-350 (8)(b) states that an **initial screening of alternatives** to reduce the number of alternatives for the final detailed evaluation may be appropriate. The following cleanup action alternatives or components may be eliminated from the detailed evaluation required in feasibility study:

(i) Alternatives that, based on a preliminary analysis, do not meet the minimum requirements specified in WAC 173-340-360. This includes alternatives for which costs are clearly disproportionate under WAC 173-340-360(3)(e);
(ii) Alternatives or components that are not technically possible at the site.

A reasonable number and type of alternatives shall be evaluated after the initial screening. Each alternative may consist of one or more cleanup action components. Each alternative shall be evaluated on the basis of the requirements and the criteria specified in WAC 173-340-360. The feasibility study shall include at least one permanent cleanup action alternative to serve as a baseline against which other alternatives shall be evaluated for the purpose of determining whether the cleanup action is permanent to the maximum extent practicable except under the following conditions:

(i) Where a model remedy is the selected cleanup action;
(ii) Where a permanent cleanup action alternative is not technically possible;
(iii) Where the cost of the most practicable permanent cleanup action alternative is so clearly disproportionate that a more detailed analysis is not necessary.

5.5 Expectations for Cleanup Action Alternatives [WAC 173-340-370]

WAC 173-340-370 lists the expectations for the development of cleanup action alternatives and the selection of cleanup actions. These expectations include:

(1) 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, Ecology expects that all hazardous substances will be destroyed, detoxified,

and/or removed to concentrations below cleanup levels throughout sites containing small volumes of hazardous substances.

(3) 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.

(4) To minimize the potential for migration of hazardous substances, Ecology expects that active measures will be taken to prevent precipitation and subsequent runoff from coming into contact with contaminated soils and waste materials.

(5) When hazardous substances remain on-site at concentrations which exceed 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) For facilities adjacent to a surface water body, active measures will be taken to prevent/minimize releases to surface water via surface runoff and ground water discharges in excess of cleanup levels.

(7) Natural attenuation may be appropriate if: source control has been conducted; leaving contaminants on-site during the restoration time frame does not pose a threat to human health and the environment; there is evidence that natural biodegradation of chemical degradation is occurring and will continue to occur at a reasonable rate; and appropriate monitoring requirements are conducted to ensure that natural attenuation is occurring.

(8) Cleanup actions will not result in a significantly greater overall threat to human health and the environment.