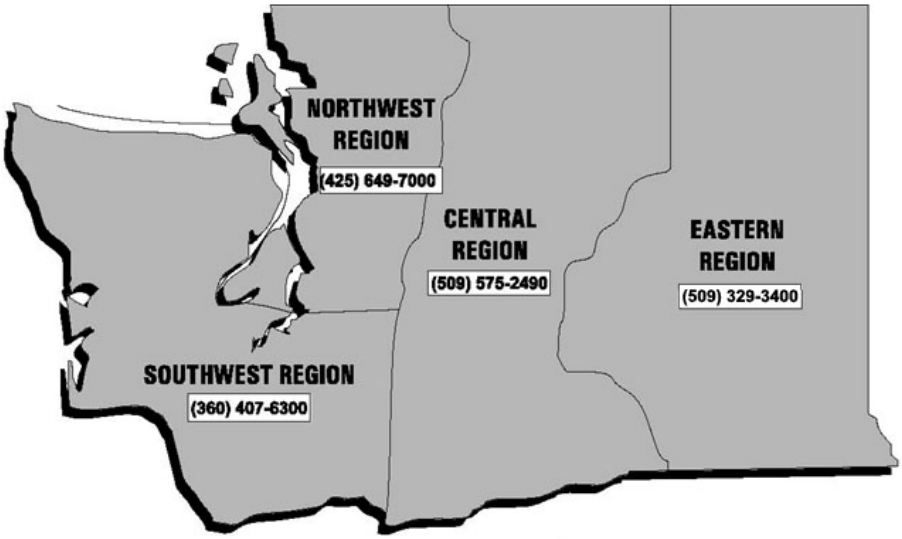
Guidance for Clean Closure of Dangerous Waste Units and Facilities

Prepared by
Washington State Department of Ecology
Hazardous Waste and Toxics Reduction Program
Publication #94-111
Revised May 2005

The Hazardous Waste and Toxics Reduction Program is responsible for the management and reduction of hazardous waste and toxic substances in Washington State. Contact your nearest regional office and ask for a Hazardous Waste Specialist if you are uncertain about your responsibilities as a hazardous waste generator. For information on reducing or recycling hazardous waste, ask for a Toxics Reduction Specialist.

State of Washington
Department of Ecology Regional Office
24-Hour Oil & Hazardous Materials Spill Reporting Numbers



Need to Know

- Reporting Party
- Company Name
- Contact Phone(s)
- Material
- Resource Damages (i.e. dead fish)
- Quantity
- Concentration
- Location
- Cleanup Status

OR CALL:
Division of Emergency Management
24 Hour Number
1-800-258-5990

If you need this information in an alternate format, please call the Hazardous Waste and Toxics Reduction Program at 360-407-6700. If you are a person with a speech or hearing impairment, call 711, or 800-833-6388 for TTY.

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1.0 INTRODUCTION

The purpose of this document is to provide guidance on clean closure of dangerous waste units and facilities and associated financial assurance requirements. "Closure" is the term used in the *Dangerous Waste Regulations* to refer to the process of taking a unit out of service and properly cleaning up or decontaminating the unit and any areas affected by releases from the unit. When this process is finished, a unit is referred to as "closed." When closure is being carried out, a unit is referred to as "closing" or "in closure."

This guidance addresses "clean closure." Clean closure refers to closure activities that result in full removal of all waste and full removal or decontamination of all structures, equipment, debris, environmental media (such as soil and ground water), and other materials affected by releases from a unit.

Closures are carried out on a unit by unit basis. This means a dangerous waste facility might have operating units, closed units, and closing units all at the same time. Closures that occur at facilities where other dangerous waste units continue to operate are referred to as "partial closures." When the last dangerous waste unit at a facility closes it is referred to as "final closure." At the end of final closure a facility is referred to as "closed" for purposes of the *Dangerous Waste Regulations*, even if the facility continues to be in business.

1.1 What is Covered by this Guidance and How is it Organized?

Five types of dangerous waste units/facilities are required to undergo closure:

- Dangerous waste treatment, storage and disposal (TSD) units/facilities,
- Dangerous waste recycling units/facilities,
- Used oil processing units/facilities, and
- Dangerous waste generator accumulation units/facilities.
- Dangerous waste transfer units/facilities.

Use of the term "dangerous waste management unit" in this document should be construed broadly, to encompass all of the units described above.

The substantive requirements for what must be accomplished during closure are the same for all units/facilities, and the Department of Ecology (Ecology) guidance on the technical approach to closure should be used for all units/facilities. Administrative requirements for closure differ depending on the type of unit/facility.

This document addresses both the substantive requirements for what must be accomplished during closure and the administrative requirements for closure. The substantive requirements for what must be accomplished at all units/facilities during closure and Ecology guidance on the technical approach to closure are addressed in Sections 2.0 through 7.0.

- Section 2.0 addresses the closure performance standard, including use of the Model Toxics Control Act (MTCA) cleanup levels as clean closure levels. The closure performance standard establishes the end conditions that must be achieved when closure activities are complete.

- Section 3.0 addresses removal of wastes and provides Ecology guidance on waste removal and subsequent management.

- Section 4.0 addresses inspection of units after waste is removed. This is a critical step in the closure process, because it supports evaluation of the likelihood that releases at or from a closing unit have affected environmental media and requirements for further sampling and analysis that may be needed.

- Section 5.0 addresses removal and proper management of structures, equipment, and other debris, and provides Ecology guidance on decontamination of debris.

- Section 6.0 addresses cleanup of environmental media affected by releases from a closing unit.

- Section 7.0 addresses sampling and analysis during closure and how unit/facility owners/operators can demonstrate compliance with the closure performance standard.

The administrative requirements for closure, which differ depending on the type of unit/facility being closed, are addressed in Sections 8.0 through 10.0.

- Section 8.0 addresses administrative requirements for interim and final status dangerous waste TSD units/facilities.

- Section 9.0 addresses administrative requirements for dangerous waste recyclers and used oil processors.

- Section 10.0 addresses administrative requirements for closures of dangerous waste accumulation units at dangerous waste generator sites and closure of dangerous waste transfer facilities.

At many facilities, closure activities will be only a portion of an overall facility cleanup strategy. Section 11.0 of this guidance addresses coordination of closure activities with other activities such as corrective action, Superfund cleanup, and cleanup under MTCA.

In addition to meeting the substantive and administrative requirements for closure, owners and operators of interim and final status dangerous waste TSD facilities, dangerous waste recyclers and used oil processors must estimate the cost of closure and meet associated financial assurance requirements. Section 12.0 of this guidance addresses closure cost estimates for dangerous waste TSD facilities, dangerous waste recyclers, and used oil processors. Section 13.0 addresses financial assurance requirements for these facilities.

1.2 How to Use This Guidance

All closing dangerous waste units/facilities must meet the same substantive requirements for what must be accomplished during closure—these requirements are described in Sections 2.0 through 7.0 of this guidance. Administrative requirements, which govern whether or not closure plans are required, closure plan review and approval, and closure timing differ depending on the type of unit/facility being closed.

The best way to use this guidance is to first refer to the administrative requirements for closure for the type of unit/facility you need to close. Section 8.0 addresses administrative requirements for interim and final status dangerous waste TSD facilities, Section 9.0 addresses administrative requirements for dangerous waste recyclers and used oil processors, and Section 10.0 addresses administrative requirements for dangerous waste accumulation units at dangerous waste generator sites. The administrative requirements Section appropriate to your facility will indicate whether a written closure plan is required, provide guidance on closure plan content, review, and approval, and orient you to the closure process so you can use Sections 2.0 through 7.0 of this guidance to develop your substantive approach to closure.

1.3 Authority

Generators and transporters of dangerous waste, owners and operators of dangerous waste treatment, storage, or disposal facilities, and dangerous waste recyclers and used oil processors must comply with the applicable requirements of Chapter 173-303 of the Washington Administrative Code (WAC) entitled "*Dangerous Waste Regulations*." Specific requirements for closure of dangerous waste accumulation units at dangerous waste generator sites are found in WAC 173-303-200(1)(b)(i) and (ii). Transporters must address specific requirements closure of containers in WAC 173-303-630(10). Requirements for closure and financial assurance for dangerous waste TSD units/facilities that operate under interim status units are found in WAC 173-303-400(3), which incorporates 40 CFR 265 Subparts G and H by reference. Requirements for closure and financial assurance for final status units/facilities are found in WAC 173-303-610 through WAC 173-303-620. Requirements for closure and financial assurance for dangerous waste recyclers and used oil processors are referenced in WAC 173-303-120(3) and (4)(c) (recyclers), WAC 173-303-515(9) (used oil processors), and found in WAC 173-303-610(1)(c), -610(2), -610(12), and -620(1)(e).

1.4 Overview of the Clean Closure Process

Clean closure is the process by which dangerous waste management units are taken out of service and the unit and all areas affected by releases at or from the unit are properly cleaned up. During clean closure, facility owners/operators must:

- Remove and properly manage all wastes and waste residues from the closing unit;
- Remove and properly manage the unit structure and all associated piping, equipment, containment areas, and any other materials used in construction or operation of the unit, or decontaminate these materials; and
- Remove and properly mange any environmental media (soil, ground water, surface water, and sediments) affected by releases from the unit, or decontaminate such environmental media.

Except for dangerous waste accumulation units at dangerous waste generator sites and container storage areas at transfer facilities, a written closure plan is required for each dangerous waste unit/facility. Written closure plans must be in place during the operating life of a unit/facility and must be updated as facility conditions and/or anticipated closure activities change. Written closure plans serve as the basis for an estimate of closure costs. All interim and final status dangerous waste TSD facilities, dangerous waste recyclers, and used oil processors must estimate closure costs and meet requirements to assure that they can pay for closure should it become necessary. Liability coverage for accidental occurrences such as fires and spills also is required.

Ecology oversees closure activities and determines when closure is complete. In addition, at TSDs, dangerous waste recyclers, and used oil processors, Ecology reviews and approves closure plans, cost estimates, financial assurance, and liability coverage, and reviews and approves final certification of completion of closure activities. TSDs, dangerous waste recyclers, and used oil processors must provide a copy of their closure plans and financial assurance documents to Ecology for review and approval.

1.5 Additional Requirements

This guidance does not address requirements that apply during the active life of a dangerous waste management unit/facility including, but not limited to, requirements for waste analysis, training, ground water monitoring, inspections, and recordkeeping. It also does not address in any detail requirements that must be met if you are unable to clean close a dangerous waste management unit and must, instead, initiate a plan for long-term cleanup or care of the unit or contaminated area, such as soil and ground water. You should become familiar with the requirements that apply to your facility, because you are responsible for compliance with these requirements.

1.6 Additional Information

Ecology encourages facility owners/operators, generators, and transporters to whom this guidance applies to work closely with the department when developing closure plans and conducting closure activities. For more information on the application of specific closure requirements to your facility, you may contact the appropriate regional office of the Department of Ecology as listed in the map at the beginning of this document and ask to speak with a Hazardous Waste Specialist or request a technical assistance visit.

1.7 Disclaimer

Conformance with this guidance does not release facility owners/operators from their obligations to notify Ecology prior to beginning the closure process, to submit closure plans for Ecology review and approval, or to in any other way comply with the requirements of Chapter 173-303 WAC. This guidance cannot be relied on by any person to create a right or benefit enforceable at law or equity. Ecology reserves the right to act at variance with this guidance at any time.

The methods described in this document do not represent the only methods acceptable to Ecology for demonstration of clean closure. Alternative methods to those presented here may be used during the closure plan approval process, subject to site specific review and approval by Ecology.

2.0 CLOSURE PERFORMANCE STANDARD

The closure performance standard is found at WAC 173-303-610(2). According to the closure performance standard, all dangerous waste management units and facilities must be closed in a manner that:

(1) Minimizes the need for further maintenance;

(2) Controls, minimizes, or eliminates to the extent necessary to protect human health and the environment, post-closure escape of dangerous waste, dangerous constituents, leachate, contaminated run-off, and dangerous waste decomposition products to the ground, surface water, ground water, and air; and

(3) Returns the land to the appearance and use of surrounding land areas to the degree possible given the nature of the previous dangerous waste activity.

In addition to compliance with the performance standard, clean closure requires the removal or decontamination of all dangerous waste, waste residues, and equipment, bases, liners, soils/subsoils and other material containing or contaminated with dangerous waste or waste residue. Ecology will consider removal and decontamination complete when:

(1) The concentrations of dangerous waste, dangerous waste constituents, and dangerous waste residues throughout the closing unit and throughout any areas affected by releases (including releases to soils, ground water, surface water, and air) from the closing unit do not exceed numeric cleanup levels determined using unrestricted site use exposure assumptions according to the Model Toxics Control Act (MTCA) Cleanup Regulation, Chapter 173-340 WAC (referred to as "clean closure levels"); and

(2) All structures, equipment, bases, liners, and other materials containing or contaminated with dangerous wastes, constituents, or residues have met specific removal and decontamination standards approved by Ecology in accordance with WAC 173-303-610(2)(b)(ii).

Clean closure levels and decontamination standards are described more fully below.

2.1 Clean Closure Levels

WAC 173-303-610(2)(b)(i) requires that numeric clean closure levels for soils, ground water, surface water, and air must be determined using unrestricted site use exposure assumptions according to the MTCA.

For non-carcinogenic substances, the MTCA cleanup level for each substance must be below that which could cause illness in humans. If more than one substance at a site affects the body in the same way, the effects of all those substances combined must be considered when determining cleanup levels.

Facility owners/operators who wish to demonstrate clean closure must develop site- and media-specific numeric cleanup levels for dangerous wastes and dangerous waste constituents using unrestricted site use exposure assumptions using MTCA Method A or B. Cleanup levels must be met throughout closing units and any areas affected by releases from closing units. The MTCA Method A and B requirements for determining site- and media-specific cleanup levels are found in WAC 173-340-700 through -760, and are described below. MTCA Method C and WAC 173-340-745, which address industrial exposure assumptions, are not appropriate for clean closure.

2.2 Model Toxics Control Act Cleanup Levels and Clean Closure Levels

2.2.2 MTCA Method A

The MTCA Method A tables provide cleanup levels that are protective of human health for 25 to 30 of the most common hazardous substances found in soil and ground water at cleanup sites. Use of MTCA Method A is limited to routine closures at sites with relatively few dangerous waste constituents, and closures where numeric standards are available in the MTCA regulations or other applicable state and federal laws for all indicator dangerous waste constituents in all media of concern.

2.2.1 Definition of Routine

A routine closure is any closure that Ecology determines meets the MTCA definition of a routine cleanup. Under MTCA, a cleanup may be considered routine if:

- It involves an obvious and limited choice among cleanup methods;
- It uses a cleanup method that is reliable and has proven capable of accomplishing the cleanup standard;
- Cleanup standards for each hazardous substance addressed by the cleanup are obvious and undisputed, and allow an adequate margin of safety for protection of human health and the environment;
- Ecology has experience with similar actions; and
- The action does not require an environmental impact statement.

Routine cleanups may include one or more of the following activities: cleanup of above- ground structures; cleanup of below-ground structures; cleanup of contaminated soils where the cleanup will restore the site to cleanup levels; or

cleanup of solid wastes, including containers. For additional information on the MTCA definition of routine, see WAC 173-340-200.

Ecology believes that very few closures will be considered "routine." The most common example of a routine closure will be closure of a container storage or accumulation area with little or no contamination of the containment structures. Facility/unit closures that involve ground water remediation and/or decontamination of structures normally will not be considered routine.

2.2.2 MTCA Method A Cleanup Levels

Clean closure levels established using MTCA Method A must, at a minimum, meet all of the following:

- Concentrations of individual dangerous waste constituents listed in the Method A tables in WAC 173-340-900, Table 720-1 (Method A Cleanup Levels for Ground Water) and Table 740-1 (Method A Soil Cleanup Levels for Unrestricted Land Uses) as protective of human health and the environment;

- Concentrations of individual dangerous waste constituents established under applicable state and federal laws as protective of human health and the environment;

- 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 WAC 173-340-7493 unless it is demonstrated that establishing a soil concentration is unnecessary; and

- For individual dangerous waste constituents that do not meet the conditions described above, concentrations that do not exceed natural background concentrations or the practical quantitation limit (PQL) for the dangerous waste constituent in question.

2.2.3 Misuse of the MTCA Method A Tables

Care should be taken not to misuse the MTCA Method A tables. The MTCA Method A tables were developed for specific purposes; they are intended to provide conservative cleanup levels for sites undergoing routine cleanup actions and/or sites with relatively few hazardous substances. The Method A tables should not automatically be used to define clean closure levels. You may contact an Ecology Hazardous Waste Specialist to discuss the applicability of MTCA Method A cleanup levels to your site-specific closure work.

2.3 Model Toxics Control Act Method B

MTCA Method B may be used to establish clean closure levels at any dangerous waste management unit or facility. Clean closure levels established using Method B must, at a minimum, meet all of the following:

- Concentrations of individual dangerous waste constituents established under applicable state and federal law as protective of human health and the environment;
- Concentrations that are estimated to result in no adverse effects on the protection and propagation of aquatic life and no significant adverse effects on terrestrial ecological receptors using the procedures specified in WAC 173-340-7490 through 173-340-7494; and
- For dangerous waste constituents 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 specified in WAC 173-340-720 through WAC 173-340-760, excluding the references to WAC 173-340-745, which deals with industrial site cleanup.

When establishing clean closure levels using MTCA Method B, the excess cancer risk from individual carcinogens cannot exceed one-in-one-million (10^{-6}); if more than one type of carcinogenic dangerous waste constituent is present or there is more than one exposure pathway, the total excess cancer risk from the unit may not exceed one in one-hundred-thousand (10^{-5}). For non-carcinogens, MTCA Method B clean closure levels cannot exceed the concentration at which a constituent could cause acute or chronic toxic effects on human health and the hazard index of dangerous waste constituents with similar toxic effects cannot exceed one (1). For all constituents, cleanup levels in soil must be adequate to protect ground water so that ground water will not become contaminated at levels that exceed MTCA Method A or B (whichever is appropriate) ground water cleanup levels.

MTCA Method B is divided into two tiers—standard and modified. Standard MTCA Method B uses generic default assumptions to calculate cleanup levels. Modified Method B provides for the use of chemical-specific and site-specific information to change selected default assumptions. Facility owners/operators, generators, and transporters may use either standard or modified MTCA Method B to calculate clean closure levels. Modified MTCA Method B allows for limited use of site-specific reasonable maximum exposure scenarios or assumptions and chemical-specific toxicity information instead of the default assumptions used in MTCA Method A and Standard MTCA Method B. Note that owners/operators who propose to use modified MTCA Method B must demonstrate to Ecology's satisfaction that use of the site- or chemical-specific information will result in cleanup levels that protect human health and the environment, as summarized in WAC 173-340-705(2). Any proposal to use new scientific information must meet the criteria for quality of information outlined in WAC 173-340-702(16).

2.4 Adjusting Constituent Concentrations to Meet the Cleanup Standards

To meet the MTCA cleanup standards, clean closure levels for individual dangerous waste constituents may need to be adjusted downward to take into account exposure from multiple pathways and to multiple dangerous constituents. Any such adjustments should be made in accordance with the procedures in WAC 173-340-708(5) and (6).

2.5 Natural Background

Natural background concentrations of dangerous waste constituents may be considered when establishing clean closure levels. MTCA defines natural background as "the concentration of hazardous substance consistently present in the environment which has not been influenced by localized human activities." (See WAC 173-340-200.) Methods for defining natural background concentrations are found in WAC 173-340-709, and guidance on natural background is available in the Ecology guidance document *Natural Background Soil Metals Concentrations in Washington State* (October 1994, Publication #94-115).

2.6 Decontamination Standards for Clean Closure

WAC 173-303-610(2)(b)(ii) describes that Ecology will establish clean closure decontamination standards on a case-by-case basis in a manner that controls, minimizes or eliminates to the extent necessary to protect human heath and the environment, post-closure escape of dangerous waste, dangerous constituents, leachate, contaminated runoff, or dangerous waste decomposition products to the ground, surface water, ground water or air.

Decontamination approaches and standards will differ depending on the material in question. For debris, information on decontamination methods is provided in Section 5.0 of this guidance. For soil, information on decontamination methods is provided in Section 6.0 of this guidance.

2.7 Indicator Constituents

During clean closure, facility owners/operators, generators, and transporters must consider all dangerous waste, dangerous waste constituents, and dangerous waste residues (including decomposition products) generated or managed at the site and within individual units at the site. At some sites this may be a high number of constituents that must be evaluated through sampling and analysis. The closure process often can be expedited through use of indicator constituents. Indicator constituents are constituents proposed by the facility owner/operator and approved by Ecology as representative of the wastes managed (and their decomposition products) at the closing unit. For information on selecting indicator constituents refer to Section 7.7 of this guidance.

2.8 Pre-Existing Contamination

In some cases, hazardous substances may have been present at the location of a dangerous waste management unit before the unit was constructed or before the dangerous waste management occurred. In other cases, hazardous substances may have migrated to the unit from another, unrelated, source. In these cases, clean closure of individual units may occur provided:

- All dangerous wastes, constituents, and waste residues that originated from the unit or waste management activities associated with the unit are removed to appropriate clean closure levels; and
- The facility owner/operator or generator demonstrates to Ecology's satisfaction that the remaining contamination did not emanate from the closing unit and was not in any way caused by waste management activities at the closing unit.

The requirement for closure at any given unit is fulfilled when Ecology accepts a unit-specific clean closure certification. If pre-existing contamination remains at a clean-closed unit in concentrations above appropriate MTCA cleanup levels, the unit is subject to additional remediation under dangerous waste corrective action requirements, MTCA, or the Comprehensive Emergency Response Compensation and Liability Act (CERCLA or Superfund), as appropriate. Ecology encourages facility owners/operators to work closely with the Department during closure activities to ensure that all contamination at closing units is appropriately addressed and to minimize the need for additional remedial activities after closure.

In certain circumstances, where releases from a dangerous waste unit have co-mingled with other releases at a facility, Ecology can replace closure requirements with alternative requirements. See Section 11.0 of this guidance for a discussion of when alternative requirements might be used.

3.0 REMOVAL OF WASTES AND WASTE RESIDUES

The first step in any clean closure is to remove all wastes and waste residues from the closing unit. Ecology expects facility owners/operators, generators, and transporters to use all practical and appropriate methods to remove waste from closing units. For example, in the case of removing waste from a tank, such methods could include, but are not limited to, pumping or vacuuming, pouring, scraping, and shoveling.

All wastes and waste residues removed from closing units must be managed in accordance with all applicable requirements. Wastes removed from closing dangerous waste management units will continue to carry the dangerous waste codes that were associated with the wastes managed in the units, unless the wastes removed from the closing unit no longer exhibit a dangerous waste characteristic or criteria or are delisted. For example, if a unit was used to manage spent tetrachloroethylene from degreasing (listed dangerous waste code F001), waste removed from the unit would need to be managed as F001 dangerous waste and meet all applicable requirements unless delisted. If a unit was used to manage lead waste (characteristic dangerous waste code D008), waste removed from the unit would need to be managed as D008 dangerous waste and meet all applicable requirements unless it is tested and found no longer to exhibit a dangerous characteristic for lead.

Where a closure plan is required, the plan must:

- Fully describe each step in removing wastes and waste residues;
- Estimate the volumes and types of wastes and waste residues that will be removed during closure; and
- Describe how wastes will be managed on-site during closure and, if applicable, transported off-site for treatment and/or disposal.

It is important to fully describe every activity that will be needed, including, but not limited to, staging and containerization of waste or reagents, equipment to be used, removal pattern and depth increments, and management of staging, accumulation, storage, and loading areas. Closure plans should describe how you will minimize and/or prevent emissions of dangerous waste and dangerous constituents during closure activities. For example, if waste management activities during closure will include loading and transport of contaminated materials in trucks, the closure plan should describe the steps that will be taken to minimize air emissions from windblown dust and truck rinsing.

3.1 Waste Minimization

Management of waste during closure must include consideration of the waste management hierarchy. The waste management hierarchy emphasizes recycling and treatment over land disposal and includes the following waste management priorities, in order of diminishing preference:

- Waste reduction;
- Waste recycling;
- Physical, chemical, and biological treatment;
- Incineration;
- Solidification/stabilization treatment; and
- Landfill.

Choosing a waste management approach higher on the waste management hierarchy could be used as a basis for requesting additional time for closure if such additional time were necessary to implement the higher-priority approach. (See Section 8.0 [TSDs], Section 9.0 [recyclers and used oil processors], and Section 10.0 [generators and transporters] of this guidance for a discussion of the time allowed for closure and how to request additional time.)

3.2 The Empty Container Rule

The empty container rule is found at WAC 173-303-160. Under the empty container rule, a container is considered "empty" when all wastes have been removed that can be removed using practices commonly employed to remove materials from that type of container and there is either less than one inch or less than 1 percent of the container's capacity by volume of waste remaining in the container, whichever is less.[1] Tanks are not considered "containers" for purposes of the empty container rule. Achievement of the performance standard and specific requirements of the empty container rule do not remove the obligation to decontaminate closing container storage areas, container systems, and ancillary equipment.

[1] If the total capacity of the container is greater than 110 gallons, the amount of waste remaining in the container may not exceed 0.3 percent of the container's total capacity.

4.0 INSPECTING UNITS AFTER REMOVAL OF WASTES AND WASTE RESIDUES

After wastes and waste residues are removed, facility owners/operators must visually inspect closing units to determine if releases at or from the closing unit may have occurred or might occur during decontamination. This must include identification of all cracks and other openings in the unit and unit containment structure through which waste, debris, or decontamination media (such as wash water) could be released to the environment. If cracks or other openings are found, facility owners/operators, generators, and transporters may be required to seal or repair the cracks or other openings to prevent releases prior to or during decontamination.

Facility owners/operators must maintain records of the locations and dimensions of all cracks or other openings identified during closure, because these areas are considered to have a higher potential for allowing releases of dangerous waste from the closing unit and may require more focused sampling and analysis. Records may be kept in the facility operating record or in the field notebook discussed in Section 7.10.1 of this guidance. Facility owners/operators must investigate and evaluate all cracks and other openings identified during closure to determine if releases of dangerous waste or dangerous waste constituents have occurred or may be occurring. Sampling of environmental media below these cracks or other openings may be required at Ecology's discretion.

When closure plans are required, the closure plan must fully describe procedures for inspecting all units prior to decontamination, identifying and recording releases and potential releases, and reporting such releases and potential releases to Ecology.

5.0 DEBRIS

After wastes and waste residues are removed and units inspected, facility owners/operators, generators, and transporters will manage two types of materials during closure: debris (such as unit parts, structures, piping, equipment, and unit containment systems) and environmental media (such as soil, ground water, surface water, and sediments). This Section addresses removal and decontamination of debris. Section 6.0 addresses removal and decontamination of environmental media.

Debris is defined as solid material that exceeds a 60 mm (2.5 inches) particle size and is intended for disposal. Debris may become contaminated through contact with dangerous waste that occurred as a normal part of unit operations, or as a result of releases at or from a unit. Contaminated debris must be removed from a closing unit and properly managed and disposed of or decontaminated to achieve clean closure.

"Hazardous debris" is defined as debris that is contaminated with listed dangerous waste or which itself exhibits a dangerous waste characteristic or criteria. Hazardous debris must be managed as dangerous waste unless or until it no longer contains the waste and does not exhibit a dangerous waste characteristic or criteria or is delisted. Because it must be managed as dangerous waste, hazardous debris must be treated to comply with applicable land disposal restriction (LDR) treatment standards before it can be placed in a land disposal unit.

Not all debris generated during the closure process will meet the definition of hazardous debris. Facility owners/operators, generators, and transporters should plan to work closely with Ecology to determine the regulatory status of debris managed during closure and are encouraged to consider recycling or reuse of such materials.

There are three options for managing debris:

- Hazardous debris can be removed from a closing unit and managed as a dangerous waste, treated to comply with applicable LDR treatment standards, and disposed of at an appropriate dangerous waste disposal facility. (See Section 5.1.)
- Debris can be managed in special types of units in ways that do not constitute placement in a land disposal unit and therefore do not trigger LDR treatment standards. (See Section 5.2.)
- Facility owners/operators, generators, and transporters can decontaminate debris and ask Ecology to make a determination that debris does not contain dangerous waste. (See Section 5.3.)

5.1 Managing Hazardous Debris as Dangerous Waste

Facility owners/operators, generators, and transporters who manage hazardous debris as dangerous waste must comply with all dangerous waste requirements, including requirements to place debris in containers, label containers, accumulate and transport debris properly, comply with LDR treatment standards, and dispose of debris at an appropriate dangerous waste disposal facility.

There are two options for complying with LDR treatment standards for hazardous debris: the Alternative Treatment Standards for Hazardous Debris and the universal treatment standards. The Alternative Treatment Standards for Hazardous Debris are established in 40 CFR 268.45 Table 1. The Alternative Treatment Standards for Hazardous Debris are expressed as treatment technologies and associated treatment operating and performance standards that apply to common types of debris. Debris treated using one of the established technologies is considered to comply with LDR treatment standards with no further testing needed. In addition, if debris is treated using an approved extraction or destruction technology, it need not be managed as a dangerous waste after treatment, provided it meets the technology specific operating performance standard(s) and does not exhibit a dangerous waste characteristic or criteria. 40 CFR 268.45 Table 1 is incorporated by reference at WAC 173-303-140(2)(a) and reprinted on pages 30 through 33 of this guidance.

Universal treatment standards (UTS) are expressed as numeric constituent concentrations in 40 CFR 268.48, which is incorporated by reference at WAC 173-303-140(2)(a). If the universal LDR treatment standards are chosen, hazardous debris must be treated to meet the constituent-specific LDR treatment standard for the waste or waste-specific constituents contaminating the debris. Such debris, even after treatment, may still be considered to contain dangerous waste and may require management as dangerous waste.

5.2 Managing Hazardous Debris in Special Types of Units

Certain types of units provide special options for managing hazardous debris during closures and other cleanup actions. The most common of these special units are Corrective Action Management Units (CAMUs). CAMUs are not considered land disposal units. If Ecology determines that hazardous debris meets the definition of CAMU-eligible waste, the debris can be managed in a CAMU on- or off-site. Placement of CAMU-eligible waste in a CAMU does not constitute placement in a land disposal unit, and special treatment standards apply instead of the LDR treatment standards that would otherwise need to be met. CAMUs and CAMU-eligible waste are discussed in detail in Section 11.2. Note that it would be unusual to manage hazardous debris in a CAMU or other special type of unit during closure.

5.3 Decontaminating Debris

The most common approach for debris is decontamination. Facility owners/operators, generators, and transporters have three options for decontaminating hazardous debris during closure:

- Use the debris-specific, technology-based Alternative Treatment Standards for Hazardous Debris specified in 40 CFR 268.45 Table 1 (incorporated by reference at WAC 173-303-140(2)(a)) and meet the debris-specific performance standards specified therein.
- Propose a site-specific decontamination method for decontamination and way to evaluate whether decontamination is successful.
- Meet Ecology-approved, site-specific numeric clean closure levels in the debris (that is, meet MTCA unrestricted site use cleanup levels discussed in Section 2.0 of this guidance).

5.3.1 Alternative Treatment Standards for Hazardous Debris

As discussed above, the Alternative Treatment Standards for Hazardous Debris are expressed as treatment technologies and associated treatment operating and performance standards that apply to common types of debris. 40 CFR 268.45 Table 1 is incorporated by reference at WAC 173-303-140(2)(a) and reprinted on pages 30 through 33 of this guidance.

Debris listed on the Alternative Treatment Standards for Hazardous Debris table include glass, metal, plastic, rubber, brick, cloth, concrete, pavement, rock, and wood. Ecology will consider such materials decontaminated if they have been treated using an appropriate extraction or destruction technology (as specified below and in 40 CFR 268.45 Table 1), meet the technology-specific performance, design, and/or operating standards, and, if intended for disposal, the material does not exhibit a dangerous waste characteristic or criteria. Ecology believes this is consistent with EPA's determination that, after treatment with most extraction and destruction treatment technologies, hazardous debris will no longer be subject to regulation as a hazardous waste (for example, appropriately treated debris can be recycled, reused, or land disposed in a solid waste landfill without further control under the federal hazardous waste regulations).

Debris decontaminated using an immobilization technology could be subject to long-term monitoring requirements under a post-closure scenario. Requiring long-term monitoring for materials treated using an immobilization technology is consistent with EPA's determination that treatment using an immobilization technology will be adequate to comply with LDR treatment requirements, but the treated debris will remain subject to regulation as dangerous waste (for example, can be land disposed only at a facility permitted to manage dangerous waste).

Facility owners/operators, generators, and transporters who choose to decontaminate debris using biodegradation, chemical destruction (which includes chemical oxidation and chemical reduction), or to decontaminate dioxin-contaminated debris using thermal destruction, must prepare a demonstration of equivalent technology. Where closure plans are required, the demonstration of equivalent technology should be included in the closure plan and should document that the proposed technology treats the material undergoing decontamination such that residual concentrations of hazardous contaminants will not pose a hazard to human health and the environment. If the material undergoing decontamination is considered hazardous debris and the purpose of the proposed decontamination method is, in part, to satisfy LDR treatment requirements, the demonstration must be prepared in accordance with the requirements of 40 CFR 268.42(b).

Ecology recognizes that not all materials requiring decontamination during closure will meet the regulatory definition of "hazardous debris" listed in the regulations associated with the Alternative Treatment Standards for Hazardous Debris. For example, materials requiring decontamination during closure may include structures, such as concrete containment systems, that are not intended for disposal. Although these structures will not meet the regulatory definition of "hazardous debris," if they are not removed from closing units and properly disposed of, they require adequate and appropriate decontamination during closure. The Alternative Treatment Standards for Hazardous Debris represent the best demonstrated available technology (BDAT) for materials typically subject to decontamination during closure and, as such, are appropriate minimum clean closure decontamination standards regardless of the regulatory status of the materials in question.

5.3.2 Site-Specific Decontamination Methods

Instead of relying on the Alternative Treatment Standards for Hazardous Debris, facility owners/operators may wish to propose site-specific decontamination methods. An example of a site-specific decontamination method is high-pressure water washing for decontamination of concrete that is over 1.2 cm (approximately ½ inches) thick instead of removal of the top 0.6 cm (approximately ¼ inches) of the concrete surface. (For more detail on decontamination of concrete, see Section 5.6, below.)

At a minimum, requests for approval of site-specific decontamination methods must include:

- Information demonstrating that the proposed decontamination method is in compliance with the closure performance standard at WAC 173-303-610(2), including information demonstrating that the proposed decontamination method or standard will control, minimize, or eliminate post-closure escape of dangerous waste, dangerous constituents, leachate, contaminated run-off, and dangerous waste decomposition products to the ground, surface water, ground water, and air.

- Information demonstrating that the proposed decontamination method is in compliance with federal, state, and local requirements.
- Information demonstrating that the proposed decontamination method is protective of human health and the environment.
- Proposed evaluation criteria to measure the effectiveness of the site-specific decontamination method. For example, MTCA unrestricted site use cleanup levels might be used to define when debris is considered decontaminated.

Based on this information and any other available or requested information, Ecology may approve the use of the proposed site-specific decontamination method. All approvals will be in writing and may contain such provisions and conditions as Ecology deems appropriate. Where closure plans are required, if adequate information is provided in the closure plan, Ecology can grant such approval during the closure plan review process.

If the material undergoing decontamination is considered hazardous debris and the purpose of the proposed decontamination method is, in part, to satisfy LDR treatment requirements, the proposal for a site-specific decontamination method must include a demonstration of equivalent technology prepared in accordance with the requirements of 40 CFR 268.42(b).

5.3.3 Decontamination Residuals

Residuals from decontamination (for example, rinse water and concrete dust) may be subject to regulation as dangerous waste and may be required to carry the dangerous waste codes associated with the waste managed in the unit(s) undergoing closure. For example, residuals from decontamination of concrete contaminated with spent tetrachloroethylene from degreasing (listed waste code F001) must be managed as F001 waste unless they are delisted. Facility owners/operators should work closely with Ecology to determine the regulatory status of decontamination residuals generated during closure. Where closure plans are required, they should include procedures for collection and management of decontamination residuals.

5.4 The Contained-In Policy for Debris

The contained-in policy for hazardous debris is similar to the contained-in policy for contaminated environmental media discussed in Section 6.0. Under WAC 173-303-071(3)(qq)(ii), Ecology can determine, on a case-by-case basis, that debris does not or no longer contains dangerous waste. Ecology will typically base contained-in determinations for debris on the history of the unit undergoing closure, the concentrations of dangerous constituents present, potential routes of exposure to such dangerous constituents, and other applicable information. There are no numeric

standards routinely used to define contained-in concentrations for hazardous debris. Ecology believes that soil cleanup levels determined under MTCA using unrestricted site use exposure assumptions represent a very conservative assessment of the potential risks posed by debris. If the concentrations of dangerous constituents in debris are below MTCA unrestricted site use cleanup levels, Ecology likely will determine that the debris no longer contains dangerous waste. Facility owners/operators who choose this option are encouraged to work closely with Ecology to develop appropriate supporting information. Ecology emphasizes that MTCA unrestricted site use soil cleanup standards should not automatically be used to define contained-in concentrations for hazardous debris. Ecology may make contained-in determinations for hazardous debris based only on facility- and debris-specific considerations and in the absence of a comparison of concentrations of hazardous constituents in the debris to MTCA cleanup levels. In addition, debris that has been treated to comply with the LDR treatment standards using an extraction or destruction technology generally will be considered not to contain dangerous waste.

5.5 Sampling Debris

Ecology may require sampling of material subject to decontamination to determine the nature and extent of contamination present in the material and/or to confirm the adequacy of any decontamination method. For example, chip sampling of concrete containment systems or rinsate sampling for tank decontamination may be required.

Ecology recognizes that sampling of many materials typically subject to decontamination during closure may be problematic. Ecology emphasizes that the advantage of using an appropriate extraction or destruction technology from 40 CFR 268.45 Table 1 for closure decontamination is that treated material may exit the dangerous waste regulatory system and sampling will not typically be required.

If facility owners/operators, generators, or transporters anticipate that sampling will be necessary during closure decontamination, they should propose sampling methods in the sampling and analysis portion of the closure plan. For more information on sampling and analysis considerations, please see Section 7.0 of this guidance.

5.6 Decontamination of Concrete Containment Structures

Concrete containment structures will be one of the most common types of debris decontaminated during closure. Facility owners/operators, generators, and transporters have two options for decontaminating concrete: meet the operating and performance standards associated with the Alternative Treatment Standards for Hazardous Debris appropriate to concrete, or propose a site-specific decontamination method.

5.6.1 Decontamination Options for Concrete

The Alternative Treatment Standards for Hazardous Debris appropriate to concrete include: abrasive blasting using water to propel abrasive media, scarification (to break up and loosen), grinding and planing, vibratory finishing, and high pressure steam and water sprays (considered physical extraction technologies); and water washing and spraying and liquid or vapor phase solvent extractions (considered chemical extraction technologies). (See 40 CFR 268.45 Table 1, reprinted on pages 30 through 33 of this guidance.) The performance standards for physical extraction technologies are based on removal of the contaminated layer of debris. The physical extraction performance standard for concrete is removal of 0.6 cm. (~ ¼ inch) of the debris surface layer and treatment to a "clean debris surface."[2] The performance standards for chemical extraction are based on dissolution of contaminants in the cleaning solution. The chemical extraction performance standard for concrete requires treatment to a "clean debris surface," limits the thickness of the concrete to 1.2 cm (~ ½ inch), and requires that the dangerous constituents being addressed are soluble to at least 5% by weight in the water solution, emulsion, or solvent as applicable.

As part of establishing the Alternative Treatment Standards for Hazardous Debris, EPA determined that the treatment performance standard for physical extraction technologies cannot be met by treating concrete that is greater than 1.2 cm thick (the vast majority of concrete used in containment systems will be greater than 1.2 cm thick) with high pressure steam and/or water spray. Facility owners/operators, generators, and transporters who believe that high pressure steam and/or water spray treatment will achieve an adequate level of concrete decontamination at their facility can propose to use this method as a site-specific decontamination method, provided they also propose, and Ecology approves, appropriate site-specific evaluation criteria to determine if decontamination is successful.

In considering what decontamination methods and evaluation criteria will be most appropriate, Ecology will consider a range of site-specific circumstances, including the potential for various decontamination methods and performance standards to minimize cross-media transfer of contamination. For example, if concrete containment is in good condition and unstained or has a history of a well maintained coating, removal of the top 0.6 cm of concrete surface may not be necessary for decontamination and may not be the best environmental solution considering the amount of dust typically generated during scarification of concrete. Also, it may not be technically reasonable to remove 0.6 cm of specially formulated

[2] "Clean debris surface" means the surface, when viewed without magnification, is free of all visible contaminated soil and dangerous waste except that residual staining from soil and waste consisting of light shadows, slight streaks, or minor discolorations, and soil and waste in cracks, crevices, and pits may be present provided that such staining and waste and soil in cracks, crevices, and pits shall be limited to 5% of each square inch of surface area. See 40 CFR 268.45 Table 1, Footnote 3.

high density silica concrete. Therefore, in some cases, decontamination of concrete using high-pressure steam or water washing, with appropriate site-specific performance standards, may be a better option than removal of the top 0.6 cm of concrete surface. If high-pressure stem or water washing is used, the site-specific decontamination performance standard might involve comparing concrete chip samples with MTCA unrestricted site use cleanup levels.

On the other hand, if the history of concrete maintenance and repair is unknown or substandard, removal of 0.6 cm to meet the clean debris standard may be the only viable approach. Ecology will work with facility owners/operators, generators, and transporters to identify viable options and make facility specific determinations for concrete.

5.6.2 Contained-In Policy Applied to Concrete

Depending on the condition and degree of contamination present in concrete, facility owners/operators, generators, and transporters may wish to use the contained-in policy to demonstrate to Ecology that their concrete containment system does not require decontamination because it does not contain dangerous waste. Facility owners/operators, generators, and transporters may propose contained-in demonstrations for concrete that has been treated or decontaminated (using any treatment or decontamination method except dilution) so that it no longer contains dangerous waste.

Ecology will make contained-in determinations for concrete on a case-by-case basis after considering the history of the unit, the dangerous constituents present and/or potentially present, potential routes of exposure, and other pertinent information. There are no numeric standards that are routinely used to define constituent concentrations at which concrete no longer contains dangerous waste; however, Ecology believes that MTCA unrestricted site use cleanup levels for soil represent very conservative assessments of the potential exposure risks posed by concrete. If concentrations of dangerous constituents of concern in concrete are below MTCA unrestricted site use cleanup levels and present minimal potential for contamination of underlying environmental media, Ecology likely will determine that the concrete no longer contains dangerous waste.

Where closure plans are required, if adequate information is provided, Ecology can make contained-in determinations as part of the closure plan approval process.

5.7 Decontamination of Metal Tanks and Tank Systems

Decontamination of metal tanks, tank systems, and ancillary equipment (for example, pumps, piping) will be a common part of the closure process. As with concrete, facility owners/operators, generators, and transporters have two options for decontaminating metal tanks and tank systems: meet the operating and performance standards associated with the Alternative Treatment Standards for Hazardous Debris appropriate to metal tanks and tank systems, or propose a site-specific decontamination method.

Alternative Treatment Standards for Hazardous Debris appropriate for metal include: abrasive blasting, scarification, grinding and planing, spalling, vibratory finishing, and high pressure steam and water sprays (physical extraction); and water washing and spraying, and liquid and vapor solvent extraction (chemical extraction). The performance standard for physical and chemical extraction technologies is treatment to a "clean debris surface." "Clean debris surface" means the surface, when viewed without magnification, is free of all visible contaminated soil and dangerous waste except that residual staining from soil and waste consisting of light shadows, slight streaks, or minor discolorations, and soil and waste in cracks, crevices, and pits may be present provided that such staining and waste and soil in cracks, crevices, and pits must be limited to 5% of each square inch of surface area.

Remember, the first step in the closure process is to remove all waste from the closing unit and visually inspect the unit for any cracks or other openings. (Section 3.0 addresses removal and Section 4.0 addresses inspection.) Waste removal and visual inspection must be completed before tank decontamination may begin. If you plan to go inside a tank to accomplish waste removal, visual inspection, or decontamination, you may be subject to regulations for worker safety and/or confined space entry under the Washington Industrial Safety and Health Administration (WISHA) and/or the federal Occupational Safety and Health Administration (OSHA). To find out more about WISHA/OSHA regulations, you may contact the Washington Department of Labor and Industries at (360) 902-5800 or www.lni.wa.gov.

5.8 Decontamination of Asphalt

Asphalt is considered a form of porous debris and is subject to the same Alternative Treatment Standards for Hazardous Debris as concrete (see Section 5.6 of this guidance). In general, Ecology expects that it will be uncommon for facility owners/operators to successfully decontaminate contaminated asphalt because of its porosity and because of the high likelihood that any contamination in asphalt may have migrated through the asphalt to contaminate underlying soils. In most cases, Ecology expects that contaminated asphalt will be removed and disposed of during closure. The contained-in policy for debris (described above) applies to asphalt. If asphalt is contaminated with listed dangerous waste or itself exhibits a dangerous waste characteristic or criteria it must be managed as dangerous waste. If your closure will

involve management of contaminated asphalt you should consult with Ecology during development of your closure plan to identify appropriate management and disposal methods. Due to the difficulties associated with asphalt decontamination, in most cases where an asphalt base will be decontaminated for reuse, Ecology will require sampling to confirm asphalt decontamination and to investigate for contaminated soils under the asphalt base. Often asphalt that is relatively clean can be recycled to create new asphalt.

5.9 Other Materials and Decontamination

Occasionally, closure will involve decontamination other materials such as building materials, drywall, wood, or other items. If you anticipate your closure will involve management of these materials, you should consult with Ecology during development of your closure plan to identify appropriate management methods.

6.0 ENVIRONMENTAL MEDIA

Releases from dangerous waste management units may contaminate environmental media, including soils, ground water, surface water, and sediments. In general, Ecology will consider environmental media contaminated when hazardous substances are present in the media at concentrations above MTCA unrestricted site use cleanup levels. When environmental media are contaminated by releases from a dangerous waste management unit, the media must be removed and properly managed and disposed of or decontaminated to achieve clean closure.

Under the contained-in policy, some contaminated environmental media is considered to "contain" dangerous waste and therefore must be managed as dangerous waste. In general, Ecology will consider contaminated environmental media to contain dangerous waste when:

(1) The environmental media was in contact with characteristic or criteria dangerous waste and the soil, when tested, exhibits a dangerous waste characteristic or criteria; or

(2) The environmental media was in contact with listed dangerous waste and hazardous substances are present in the media at concentrations above MTCA unrestricted site use cleanup levels.

Contaminated environmental media that contain dangerous waste must be managed as dangerous waste unless or until they no longer contain the waste and do not exhibit a dangerous waste characteristic or criteria, or are delisted. Because it must be managed as dangerous waste, environment media that contain dangerous waste must be treated to comply with applicable LDR treatment standards before it can be placed in a land disposal unit.

Not all contaminated environmental media generated during closure will contain dangerous waste. Facility owners/operators should carefully consider the conditions at their closing units, and work with Ecology to determine the regulatory status of contaminated environmental media.

6.1 Soil

The most common environmental media managed during closure is soil. The first step in creating a strategy for management of soil during closure is to do sampling and analysis to determine if soil is contaminated and to determine if contaminated soil contains dangerous waste.

6.2 Determining if Contaminated Soil Contains Dangerous Waste

As described above, under the contained-in policy, soil that contains dangerous waste must be managed as dangerous waste. During closure, facility owners/operators may demonstrate that contaminated soil does not contains dangerous waste and therefore does not require further regulatory control or decontamination. Under Ecology's contained-in policy, this determination is referred to as a "contained-in determination" although in the field it also may be referred to as a "contained-out determination." A contained-in determination can be made at three points in the closure process.

- Before soil is first placed in containers or otherwise removed from the area of a closing unit. This type of determination might be made if sampling shows that soil is not contaminated in concentrations above MTCA unrestricted site use cleanup levels. As described above, because of the way that LDR treatment standards apply, it is important to work with Ecology to make this determination, if applicable.

- After soil is placed in containers or otherwise removed from the area of the closing unit. In these situations, even if Ecology determines that soil does not contain dangerous waste, LDR treatment standards may apply to subsequent placement of soil in a land disposal unit.

- After contaminated soil has been decontaminated or otherwise treated to reduce constituents to below MTCA unrestricted site use cleanup levels for soil. Again, in these situations, even if Ecology determines that soil does not contain dangerous waste, because the soil contained dangerous waste when first managed, LDR treatment standards may apply to subsequent placement of the soil in a land disposal unit.

In all cases, Ecology will review demonstrations that contaminated soil does not contain, or no longer contains, dangerous waste on a case-by-case basis, considering facility- and waste-specific circumstances, including management approaches. Ecology typically bases contained-in determinations on a comparison of the concentrations of hazardous substances in soil to MTCA unrestricted site use cleanup levels for soil. When concentrations of hazardous substances in soil fall below these cleanup levels, and the soil does not exhibit a dangerous waste characteristic or criteria, Ecology may make a contained-in determination. (Note that MTCA unrestricted site use cleanup levels for soil include consideration of protection of ground water from hazardous substances in soil.) Facility owners/operators, generators, and transporters who believe a contained-in determination is appropriate for their site should work closely with Ecology to develop information adequate to support a contained-in determination.

The point at which a contained-in determination is made has important implications for the subsequent management requirements that will apply to soil. One of the most important factors to consider in managing soil during closure is whether the soil is

subject to LDR treatment standards. Because regulations requiring compliance with LDR treatment standards have the potential to attach to soil as soon as it is placed in containers or otherwise removed from the area affected by a closing unit, it is best to work with Ecology to determine whether soil contains dangerous waste before moving soil to another location at your facility. If excavation is necessary as part of removal of a closing unit or associated containment structure, take care to keep excavated soil within the area affected by the closing unit until you can work with Ecology to determine whether soil contains dangerous waste.

Where closure plans are required, facility owners/operators may submit a request for, and information supporting, a contained-in determination in their closure plan. Provided the supporting documentation is adequate, Ecology can include contained-in determinations in closure plan approvals.

6.3 Management Options for Soil That Contains Dangerous Waste

Facility owners/operators, generators, and transporters have three options for managing contaminated soil that contains dangerous waste:

- Contaminated soil can be managed as dangerous waste, treated to comply with applicable LDR treatment standards, and disposed of in an appropriate dangerous waste disposal facility.
- Contaminated soil can be managed in special types of units in ways that do not constitute placement in a land disposal unit and therefore do not trigger LDR treatment standards.
- Facility owners/operators, generators, and transporters can decontaminate soil and ask Ecology to make a contained-in determination for contaminated soil.

6.3.1 Managing Contaminated Soil as Dangerous Waste

Facility owners/operators, generators, and transporters who manage soil as dangerous waste must comply with all dangerous waste requirements, including requirements to place soil in containers, label containers, accumulate and transport soil properly, meet applicable LDR treatment standards, and dispose of soil at an appropriate dangerous waste disposal facility. There are two options for complying with LDR treatment standards for soil: alternative treatment standards and the universal treatment standards.

Alternative treatment standards for contaminated soil are established in 40 CFR 268.49, incorporated by reference at WAC 173-303-140(2)(a). Under the alternative treatment standards for contaminated soil, hazardous constituents in the soil must be treated to reduce constituent concentrations by 90 percent or achieve a concentration that is 10 times the universal treatment standard (UTS), whichever is higher. That means, if treatment to reduce constituent concentrations by 90 percent

would result in a constituent concentration that is less than 10 times the UTS for that constituent, treatment is capped at 10 times the UTS. Remember that treatment to meet LDR treatment standards is required only if there will be placement in a land disposal unit.

The universal treatment standards (UTS) are expressed as numeric constituent concentrations in 40 CFR 268.48, incorporated by reference at WAC 173-303-140(2)(a). If the UTS are chosen, soil must be treated to meet the constituent-specific universal treatment standard for the waste or waste-specific constituents contaminating the debris.

6.3.2 Managing Contaminated Soil in Special Types of Units

Certain types of units provide special options for managing contaminated soil during closures or other clean-up activities. The most common of these special units are CAMUs. CAMUs are not considered land disposal units. If Ecology determines that contaminated soils meet the definition of CAMU-eligible waste, the soil can be managed in a CAMU. Placement of CAMU-eligible waste in a CAMU does not constitute placement in a land disposal unit, and special treatment standards apply instead of the LDR treatment standards that would otherwise need to be met. CAMUs and CAMU-eligible waste are discussed in detail in Section 11.2.

6.3.3 Decontaminating Soil

Although it is unusual, some facility owners/operators, generators, and transporters may choose to decontaminate soil during closure activities. Ecology will consider soil decontaminated when constituent concentrations drop below MTCA unrestricted site use cleanup levels for soil, and the soil does not exhibit a dangerous waste characteristic or criteria. Decontamination of soil that contains dangerous waste must be carried out in a way that meets all applicable dangerous waste management standards. For example, under some circumstances, decontamination of soil that contains dangerous waste may be considered "treatment" of dangerous waste and management standards and permitting requirements for treatment may apply.

If soil is decontaminated so that constituent concentrations drop below MTCA unrestricted site use cleanup levels and the soil does not exhibit a dangerous waste characteristic or criteria, facility owners/operators, generators, and transporters may ask Ecology to make a determination that the soil does not or no longer contains dangerous waste. Note that, if soil was considered to contain dangerous waste when first managed (that is, before decontamination), soil that is determined to no longer contain dangerous waste after decontamination may remain subject to LDR treatment standards if it will be placed in a land disposal unit.

6.4 Ground Water, Surface Water, and Sediments

In some circumstances, facility owners/operators, generators, and transporters may find that releases at or from closing units have contaminated ground water, surface water, or sediments. In these cases, the ground water, surface water, and sediments must be removed and properly managed and disposed of or decontaminated for clean closure to be achieved. Removal and decontamination of ground water, surface water, and sediments will involve cleanup time frames that are longer than the 180 day time frame generally contemplated for completion of closure activities, and cleanup actions that are more complicated than most closure activities. Facility owners/operators, generators, and transporters who find themselves in a situation where they must address contaminated ground water, surface water, and sediments during closure should work closely with Ecology to develop successful closure strategies.

Table 1.—Alternative Treatment Standards for Hazardous Debris \1\

(Reprinted from 40 CFR 1 268.45 [7/01/04])

Technology description	Performance and/or design and operating standard	Contaminant restrictions /2/
A. Extraction Technologies:		
1. Physical Extraction		
a. *Abrasive Blasting:* Removal of contaminated debris surface layers using water and/or air pressure to propel a solid media (e.g., steel shot, aluminum oxide grit, plastic beads).	*Glass, Metal, Plastic, Rubber:* Treatment to a clean debris surface./3/. *Brick, Cloth, Concrete, Paper, Pavement, Rock, Wood:* Removal of at least 0.6 cm of the surface layer; treatment to a clean debris surface./3/	*All Debris:* None
b. *Scarification, Grinding, and Planing:* Process utilizing striking piston heads, saws, or rotating grinding wheels such that contaminated debris surface layers are removed.	Same as above	Same as above
c. *Spalling:* Drilling or chipping holes at appropriate locations and depth in the contaminated debris surface and applying a tool which exerts a force on the sides of those holes such that the surface layer is removed. The surface layer removed remains hazardous debris subject to the debris treatment standards.	Same as above	Same as above
d. *Vibratory Finishing:* Process utilizing scrubbing media, flushing fluid, and oscillating energy such that hazardous contaminants or contaminated debris surface layers are removed./4/	Same as above	Same as above
e. *High Pressure Steam and Water Sprays:* Application of water or steam sprays of sufficient temperature, pressure, residence time, agitation, surfactants, and detergents to remove hazardous contaminants from debris surfaces or to remove contaminated debris surface layers.	Same as above	Same as above
2. Chemical Extraction		
a. *Water Washing and Spraying:* Application of water sprays or water baths of sufficient temperature, pressure, residence time, agitation, surfactants, acids, bases, and detergents to remove hazardous contaminants from debris surfaces and surface pores or to remove contaminated debris surface layers.	*All Debris:* Treatment to a clean debris surface /3/ *Brick, Cloth, Concrete, Paper, Pavement, Rock, Wood:* Debris must be no more than 1.2 cm (1/2 inch) in one dimension (i.e., thickness limit,/5/ except that this thickness limit may be waived under an ''Equivalent Technology'' approval under 68.42(b);/8/ debris surfaces must be in contact with water solution for at least 15 minutes.	*Brick, Cloth, Concrete, Paper, Pavement, Rock, Wood:* Contaminant must be soluble to at least 5% by weight in water solution or 5% by weight in emulsion; if debris is contaminated with a dioxin-listed waste,/6/ an ''Equivalent Technology'' approval under 268.42(b) must be obtained./8/

Technology description	Performance and/or design and operating standard	Contaminant restrictions /2/
b. *Liquid Phase Solvent Extraction:* Removal of hazardous contaminants from debris surfaces and surface pores by applying a non-aqueous liquid or liquid solution which causes the hazardous contaminants to enter the liquid phase and be flushed away from the debris along with the liquid or liquid solution while using appropriate agitation, temperature, and residence time./4/	Same as above	*Brick, Cloth, Concrete, Paper, Pavement, Rock, Wood:* Same as above, except that contaminant must be soluble to at least 5% by weight in the solvent.
c. *Vapor Phase Solvent Extraction:* Application of an organic vapor using sufficient agitation, residence time, and temperature to cause hazardous contaminants on contaminated debris surfaces and surface pores to enter the vapor phase and be flushed away with the organic vapor./4/	Same as above, except that brick, cloth, concrete, paper, pavement, rock and wood surfaces must be in contact with the organic vapor for at least 60 minutes.	Same as above
3. Thermal Extraction		
a. *High Temperature Metals Recovery:* Application of sufficient heat, residence time, mixing, fluxing agents, and/or carbon in a smelting, melting, or refining furnace to separate metals from debris.	For refining furnaces, treated debris must be separated from treatment residuals using simple physical or mechanical means,/9/ and, prior to further treatment, such residuals must meet the waste-specific treatment standards for organic compounds in the waste contaminating the debris.	*Debris contaminated with a dioxin-listed waste:/*5/ Obtain an ‘‘Equivalent Technology’’ approval under 268.42(b).8//
b. *Thermal Desorption:* Heating in an enclosed chamber under either oxidizing or nonoxidizing atmospheres at sufficient temperature and residence time to vaporize hazardous contaminants from contaminated surfaces and surface pores and to remove the contaminants from the heating chamber in a gaseous exhaust gas./7/	*All Debris:* Obtain an ‘‘Equivalent Technology’’ approval under 268.42(b);/8/ treated debris must be separated from treatment residuals using simple physical or mechanical means,/9/ and, prior to further treatment, such residue must meet the waste-specific treatment standards for organic compounds in the waste contaminating the debris. *Brick, Cloth, Concrete, Paper, Pavement, Rock, Wood:* Debris must be no more than 10 cm (4 inches) in one dimension (i.e., thickness limit),/5/ except that this thickness limit may be waived under the ‘‘Equivalent Technology’’ approval.	*All Debris:* Metals other than mercury.
B. Destruction Technologies:		
1. *Biological Destruction (Biodegradation):* Removal of hazardous contaminants from debris surfaces and surface pores in an aqueous solution and biodegration of organic or nonmetallic inorganic compounds (i.e., inorganics that contain phosphorus, nitrogen, or sulfur) in units operated under either aerobic or anaerobic conditions.	*All Debris:* Obtain an ‘‘Equivalent Technology’’ approval under 268.42(b);/8/ treated debris must be separated from treatment residuals using simple physical or mechanical means,/9/ and, prior to further treatment, such residue must meet the waste-specific treatment standards for organic compounds in the waste contaminating the debris. *Brick, Cloth, Concrete, Paper, Pavement, Rock, Wood:* Debris must be no more than 1.2 cm (1⁄2 inch) in one dimension (i.e., thickness limit),/5/ except that this thickness limit may be waived under the ”Equivalent Technology” approval	*All Debris:* Metal contaminants.

Technology description	Performance and/or design and operating standard	Contaminant restrictions /2/
2. Chemical Destruction		
a. *Chemical Oxidation:* Chemical or electolytic oxidation utilizing the following oxidation reagents (or waste reagents) or combination of reagents—(1) hypochlorite (e.g., bleach); (2) chlorine; (3) chlorine dioxide; (4) ozone or UV (ultraviolet light) assisted ozone; (5) peroxides; (6) persulfates; (7) perchlorates; (8) permanganates; and/or (9) other oxidizing reagents of equivalent destruction efficiency./4/ Chemical oxidation specifically includes what is referred to as alkaline chlorination.	*All Debris:* Obtain an ''Equivalent Technology'' approval under 268.42(b);/8/ treated debris must be separated from treatment residuals using simple physical or mechanical means,/9/ and, prior to further treatment, such residue must meet the waste-specific treatment standards for organic compounds in the waste contaminating the debris. *Brick, Cloth, Concrete, Paper, Pavement, Rock, Wood:* Debris must be no more than 1.2 cm (1⁄2 inch) in one dimension (i.e., thickness limit),/5/ except that this thickness limit may be waived under the "Equivalent Technology" approval	*All Debris:* Metal contaminants.
b. *Chemical Reduction:* Chemical reaction utilizing the following reducing reagents (or waste reagents) or combination of reagents: (1) sulfur dioxide; (2) sodium, potassium, or alkali salts of sulfites, bisulfites, and metabisulfites, and polyethylene glycols (e.g., NaPEG and KPEG); (3) sodium hydrosulfide; (4) ferrous salts; and/or (5) other reducing reagents of equivalent efficiency./4/	Same as above	Same as above
3. *Thermal Destruction:* Treatment in an incinerator operating in accordance with Subpart O of Parts 264 or 265 of this chapter; a boiler or industrial furnace operating in accordance with Subpart H of Part 266 of this chapter, or other thermal treatment unit operated in accordance with Subpart X, Part 264 of this chapter, or Subpart P, Part 265 of this chapter, but excluding for purposes of these debris treatment standards Thermal Desorption units.	Treated debris must be separated from treatment residuals using simple physical or mechanical means,/9/ and, prior to further treatment, such residue must meet the waste specific treatment standards for organic compounds in the waste contaminating the debris.	*Brick, Concrete, Glass, Metal, Pavement, Rock:* Metals other than mercury, except that there are no metal restrictions for vitrification. *Debris contaminated with a dioxin-listed waste./*6/ Obtain an ''Equivalent Technology'' approval under 268.42(b),/8/ except that this requirement does not apply to vitrification.
C. Immobilization Technologies:		
1. *Macroencapsulation:* Application of surface coating materials such as polymeric organics (e.g., resins and plastics) or use of a jacket of inert inorganic materials to substantially reduce surface exposure to potential leaching media.	Encapsulating material must completely encapsulate debris and be resistant to degradation by the debris and its contaminants and materials into which it may come into contact after placement (leachate, other waste, microbes).	None
2. *Microencapsulation:* Stabilization of the debris with the following reagents (or waste reagents) such that the leachability of the hazardous contaminants is reduced: (1) Portland cement; or (2) lime/pozzolans (e.g., fly ash and cement kiln dust). Reagents (e.g., iron salts, silicates, and clays) may be added to enhance the set/cure time and/or compressive strength, or to reduce the leachability of the hazardous constituents./5/	Leachability of the hazardous contaminants must be reduced.	None

Technology description	Performance and/or design and operating standard	Contaminant restrictions /2/
3. *Sealing:* Application of an appropriate material which adheres tightly to the debris surface to avoid exposure of the surface to potential leaching media. When necessary to effectively seal the surface, sealing entails pretreatment of the debris surface to remove foreign matter and to clean and roughen the surface. Sealing materials include epoxy, silicone, and urethane compounds, but paint may not be used as a sealant.	Sealing must avoid exposure of the debris surface to potential leaching media and sealant must be resistant to degradation by the debris and its contaminants and materials into which it may come into contact after placement (leachate, other waste, microbes).	None.

\1\ Hazardous debris must be treated by either these standards or the waste-specific treatment standards for the waste contaminating the debris. The treatment standards must be met for each type of debris contained in a mixture of debris types, unless the debris is converted into treatment residue as a result of the treatment process. Debris treatment residuals are subject to the waste-specific treatment standards for the waste contaminating the debris.

\2\ Contaminant restriction means that the technology is not BDAT for that contaminant. If debris containing a restricted contaminant is treated by the technology, the contaminant must be subsequently treated by a technology for which it is not restricted in order to be land disposed (and excluded from Subtitle C regulation).

\3\ "Clean debris surface"' means the surface, when viewed without magnification, shall be free of all visible contaminated soil and hazardous waste except that residual staining from soil and waste consisting of light shadows, slight streaks, or minor discolorations, and soil and waste in cracks, crevices, and pits may be present provided that such staining and waste and soil in cracks, crevices, and pits shall be limited to no more than 5% of each square inch of surface area.

\4\ Acids, solvents, and chemical reagents may react with some debris and contaminants to form hazardous compounds. For example, acid washing of cyanide-contaminated debris could result in the formation of hydrogen cyanide. Some acids may also react violently with some debris and contaminants, depending on the concentration of the acid and the type of debris and contaminants. Debris treaters should refer to the safety precautions specified in Material Safety Data Sheets for various acids to avoid applying an incompatible acid to a particular debris/ contaminant combination. For example, concentrated sulfuric acid may react violently with certain organic compounds, such as acrylonitrile.

\5\ If reducing the particle size of debris to meet the treatment standards results in material that no longer meets the 60 mm minimum particle size limit for debris, such material is subject to the waste-specific treatment standards for the waste contaminating the material, unless the debris has been cleaned and separated from contaminated soil and waste prior to size reduction. At a minimum, simple physical or mechanical means must be used to provide such cleaning and separation of nondebris materials to ensure that the debris surface is free of caked soil, waste, or other nondebris material.

\6\ Dioxin-listed wastes are EPA Hazardous Waste numbers FO20, FO21, FO22, FO23, FO26, and FO27.

\7\ Thermal desorption is distinguished from Thermal Destruction in that the primary purpose of Thermal Desorption is to volatilize contaminants and to remove them from the treatment chamber for subsequent destruction or other treatment.

\8\ The demonstration "Equivalent Technology"' under Sec. 268.42(b) must document that the technology treats contaminants subject to treatment to a level equivalent to that required by the performance and design and operating standards for other technologies in this table such that residual levels of hazardous contaminants will not pose a hazard to human health and the environment absent management controls.

\9\ Any soil, waste, and other nondebris material that remains on the debris surface (or remains mixed with the debris) after treatment is considered a treatment residual that must be separated from the debris using, at a minimum, simple physical or mechanical means. Examples of simple physical or mechanical means are vibratory or trommel screening or water washing. The debris surface need not be cleaned to a "clean debris surface"' as defined in note 3 when separating treated debris from residue; rather, the surface must be free of caked soil, waste, or other nondebris material. Treatment residuals are subject to the waste-specific treatment standards for the waste contaminating the debris.

7.0 SAMPLING AND ANALYSIS FOR CLEAN CLOSURE

All closures will include a sampling and analysis component. At a minimum, sampling and analysis will be necessary to characterize the areal and vertical extent of contamination at and/or released from the closing unit and to confirm the effectiveness of closure activities.

7.1 Sampling and Analysis Plan

Where closure plans are required, they must include a sampling and analysis plan. Sampling and analysis plans should specify procedures that ensure that sample collection, handling, and analysis will result in data of sufficient quality to plan and evaluate closure activities at the facility. Sampling and analysis plans should be designed to define the nature, degree and extent of contamination at and from the closing unit to the fullest extent possible. The level of detail in the sampling and analysis plan should be commensurate with the complexity of conditions at the closing unit. Sampling and analysis plans must include information necessary to ensure proper planning and implementation of sampling activities. All sampling and analysis plans should, at a minimum, include the following information and rationale for each selection:

(1) A statement of the purpose and objectives of the data collection

(2) Organization and responsibilities for the sampling and analysis activities

(3) Project schedule

(4) General information on selection of types of samples needed (such as grab or composite), and amount of samples to be analyzed

(5) General information on selection of sampling locations and method used to determine where the sampling will occur

(6) Specific sampling approach and methods, including:
- Sampling locations and a unique ID number for each location;
- Protocols for sample labeling and chain of custody;
- Procedures for installation of sampling devices;
- Procedures for sample collection and handling;
- Procedures for personnel and equipment decontamination;
- Procedures for the management of waste materials generated by sampling activities;
- Description and number of quality assurance and quality control samples, including blanks and duplicates;
- Provisions for splitting samples, when appropriate; and
- Confirmational sampling to demonstrate clean closure.

(7) Sampling and analysis procedures to confirm decontamination of tanks and concrete containment systems and other media or equipment (if required)

(8) Procedures for analysis of samples and reporting of results, including:
- Selection of an Ecology accredited laboratory to perform analysis;
- Identification and justification of parameters to be sampled and analyzed;
- Physical and chemical properties of the wastes to be sampled;
- Analytical techniques and procedures;
- Detection or quantitation limits;
- Quality assurance and quality control procedures; and
- Data reporting procedures and, where appropriate, data validation procedures.

7.2 Designing a Sampling Program

Sampling programs should be designed to determine the probable maximum horizontal and vertical extent of contamination at and from the closing unit. At the end of the closure process, additional sampling is typically required to confirm that clean closure levels have been achieved.

When designing a sampling program, facility owners/operators, generators, and transporters should consider area-wide sampling, focused sampling, and sampling for hot spots. Knowledge of past management practices at the facility should help determine which type of sampling is the most appropriate. In many cases, a combination of sampling techniques will be required, for example, area-wide sampling of a closing unit could be combined with focused sampling at the location of a known release. Each type of sampling is discussed briefly in this guidance. Facility owners/operators are encouraged to rely on Ecology's *Guidance on Sampling and Data Analysis Methods* (January 1994, updated in 1995, Publication #94-49) for specific guidance on the preparation of sampling programs. For additional information on sampling, facility owners/operators may consult U.S. EPA (1986b), U.S. EPA (1984), and Schweitzer, et al. (1984); see Section 14.0 for a complete reference.

Sampling and analysis plans should be prepared and submitted with your initial closure plan, and used to help you create your closure cost estimate. (See Section 12.0 of this guidance for information on closure cost estimating.) Use your best judgment about the types and amounts of sampling and analysis that will be needed.

Because initial closure plans generally are submitted to Ecology many years before closure actually occurs, you probably will have to update your sampling and analysis plan immediately before closure to account for new information. You also likely will need to update your sampling and analysis plan after removal and decontamination activities are complete to refine sample numbers and locations for certification of closure. For example, you may need to update the sampling and analysis plan to provide for sampling of environmental media under identified cracks or other openings

in containment structures. If an update to your sampling and analysis plan is needed, you should submit the update when you notify Ecology of your intent to begin closure. This notification will result in Ecology oversight of your closure activities, and you can work with the Ecology Hazardous Waste Specialist assigned to your site to determine if subsequent updates to the sampling and analysis plan will be needed.

Updates or other changes to sampling and analysis plans made before you notify Ecology of your intent to begin closure is considered an amendment to your closure plan. Requirements for closure plan amendments for treatment, storage, and disposal facilities are described in Section 8.2.4. Requirements for closure plan amendments for dangerous waste recyclers and used oil processors are described in Section 9.2.4.

7.2.1 Area-Wide Sampling

During area-wide sampling, an imaginary sampling grid, three-dimensional if necessary, is imposed over the area to be sampled. The area to be sampled must encompass the closing unit and the maximum extent of any releases from the closing unit. Each node of the grid is a sampling location with an assigned number. Area-wide sampling is appropriate when the spatial distribution of contamination at or from the closing unit is uncertain.

Variations of area-wide sampling include random and systematic sampling. In these variations, only certain nodes in the grid are sampled. For random sampling, a computer can be used to choose each sample location randomly from the nodes on the grid. For systematic sampling, a repetitive pattern of sampling is established such that, for example, every fifth node on the grid is sampled.

7.2.2 Focused Sampling

Focused sampling involves selective sampling of areas where contamination is expected or releases have been documented. Focused sampling should be conducted in addition to grid sampling where there is evidence of leaks or spins or potential for a dangerous waste constituent to migrate. Focused sampling could involve linear sampling along a drainage-way, boundary, or other linear dimension. Likely areas for focused sampling include, but are not limited to:

(1) Containers, tanks, waste piles, or any other units (such as ancillary pipes) in contact with soil;

(2) Below any sumps or valves;

(3) Load or unload areas;

(4) Storage units with underlying pavements or concrete that appears to be cracked or broken; and

(5) Areas receiving runoff or discharge from dangerous waste management units, such as a ditch, a swale, or the discharge point down gradient from a pipe.

Evidence for additional areas of focused sampling could include:

(1) Visual or olfactory evidence of contamination including evidence based on direct reading field instrumentation or field test kits;

(2) Knowledge, such as reports by employees, inspectors, or others that releases have or may have occurred;

(3) Length of time the unit has been in existence;

(4) Entries into the unit operating record; and

(5) Soil gas surveys or soil borings.

For small units where there is documentation of the extent of contamination, Ecology may approve use of focused sampling exclusive of grid sampling.

7.2.3 Sampling for Hot Spots

Hot spots (or small patches of higher-level contamination) may be encountered during area-wide or focused sampling. If hot spots are encountered or suspected, sampling programs can be designed to delineate their size and location. The intensity of sampling for hot spots will depend on the anticipated size and/or number of hot spots. Detailed information on designing sampling plans for detection and characterization of hot spots can be found in Gilbert (1987) (see references in Section 14.0 of this guidance).

7.3 Sampling to Determine or Confirm Clean Closure

The area-wide approach outlined above is generally appropriate for sampling to determine or confirm that clean closure levels are achieved. The sampling grid used to determine or confirm clean closure should overlay contaminated areas discovered during the initial sampling at the unit.

If a sample collected during closure confirmation exceeds the cleanup standard, then the area represented by the sample (subunit) will be considered to exceed cleanup standards and additional actions will be required. These additional actions could include removal of media followed by additional confirmational sampling, and/or additional sampling, or statistical analysis at the subunit or across the entire closing unit.

Ecology expects that, generally, sampling to determine or confirm clean closure will be based on grab rather than composite samples. Note that, as described in Section 7.2, you may need to update your sampling and analysis plan immediately before sampling to confirm clean closure. Updates may be needed to ensure that sampling and analysis

to confirm clean closure provides for appropriate investigation of releases and potential releases at and from the closing unit. For example, if you identified cracks or other openings in a containment structure during closure, your sampling and analysis plan may need to be updated to provide for sampling of environmental media under these cracks or other openings.

7.4 Statistical Guidelines

Ecology will typically make decisions regarding clean closure by direct comparison of sampling data to the site specific clean closure levels. If contamination at or from the closing unit is widespread, Ecology may require that the *Statistical Guidance for Ecology Site Managers* (August 1992, Ecology Publication #92-54) be used to confirm that clean closure levels have been achieved.

When a background comparison is used to determine cleanup levels, the *Statistical Guidance for Ecology Site Managers* or an equivalent method must be used to confirm that clean closure levels have been achieved.

For more information on statistical analysis, facility owners/operators can consult U.S. EPA (1986b) and Schweitzer, et al. (1984); see Section 14.0 of this guidance for complete citations.

7.5 Soil Sampling During Closure

The following soil sampling considerations are specific to the closure process. Facility owners/operators are encouraged to rely on Ecology's *Guidance on Sampling and Data Analysis Methods* (January 1994, updated in 1995, Publication #94-49) and U.S. EPA (1989b) for more detailed guidance on soil sampling.

7.5.1 Soil Sampling Under Structures

Soil sampling locations at a closing unit will typically be located over structures as well as exposed soil. When sampling points (including sampling points determined by the grid system for area-wide sampling) overlay structures, Ecology may require the underlying soil to be sampled. Soil sampling under structures should generally be conducted after cleaning and decontamination of the structure, but before the structure is removed. Sampling of soils under structures will be done through holes bored in the overlying structure, if possible. For example, samples of soil overlain by concrete should be collected through holes bored in the concrete. Sampling under structures must be conducted in a manner that minimizes disturbance to the underlying soil.

After any structure is removed, Ecology may inspect the underlying soil. Areas under documented spills and areas susceptible to releases will receive close scrutiny.

Additional sampling and testing may be required if there are indications of discolored soil, the presence of wet areas, volatile emissions detected on field detection equipment, odor, or other signs of potential contamination.

7.5.2 Soil Sampling at Various Depths

Ecology may require soil sampling at various depths to determine the extent of contamination. The intervals for sampling soil at various depths may be dependent on several factors, including:

(1) Soil type and permeability;

(2) Suspected magnitude of surface contamination;

(3) Physical state of the waste and its mobility;

(4) Ground water level;

(5) Length of time waste was present at the site; and

(6) Relative toxicity of the waste.

If surface samples demonstrate contamination, then sampling must be conducted at depth intervals to determine the extent of contamination.

7.6 Ground Water Monitoring During Closure

In the event of confirmed or potential soil contamination, ground water monitoring may also be required to demonstrate or confirm clean closure. Ground water monitoring may be required for any dangerous waste management unit, including those not subject to a regulatory requirement for ground water monitoring under WAC 173-303-645 (for example, a container storage unit). If the closing unit is already subject to ground water monitoring requirements, the locations of monitoring wells, frequency of sampling, and constituents being monitored may be modified during and/or after closure activities, as necessary, to verify that clean closure levels have been achieved. The duration and frequency of ground water monitoring necessary to verify clean closure will be determined by Ecology on a case-by-case basis taking into account hydrogeologic conditions, waste characteristics, and other relevant factors.

When ground water is contaminated, a long-term cleanup action consistent with the requirements for post-closure generally will be required. Under WAC 173-303-645(1)(e), Ecology can replace closure and post-closure ground water monitoring requirements with alternative requirements, provided that certain conditions are met. See Section 11.2 of this guidance for additional information on when alternative requirements might apply.

For additional information on sampling and evaluating ground water, facility owners/operators are encouraged to refer to Ecology's *Guidance on Sampling and Data Analysis Methods* (January 1994, updated in 1995, Publication #94-49) and U.S. EPA (1988).

7.7 Selection of Constituents to be Analyzed

The data developed to support clean closure certifications and other closure decisions must be of sufficient quality to withstand any scientific and/or legal challenges. An overview of analytical considerations is provided in this Section. For additional information, Facility owners/operators may consult Ecology's *Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies* (July 2004, Publication #04-03-030).

Selection of the proper analytical constituents must reflect current and historic operations at the facility and closing unit. Certification of clean closure must consider all dangerous waste constituents generated or managed at the facility and within individual units at the facility; however, the closure process can often be expedited through use of indicator constituents. Indicator constituents are constituents proposed by the facility owner/operator and approved by Ecology as representative of the wastes managed at the closing unit and their degradation products. To recommend indicator constituents, the facility owner/operator must first conduct relatively broad-based sampling and analysis to gather information on conditions at the closing unit; therefore, the closing unit should first be sampled for the full suite of dangerous waste constituents generated or managed at the facility. For some units, this may include all the constituents listed in WAC 173-303-9905 and/or Appendix IX of 40 CFR 264.

Facility owners/operators, generators, and transporters should base their recommendations of indicator constituents on knowledge of the facility and closing unit and the results of the broad-based sampling discussed above. In most cases, indicator constituents will be those constituents that are most likely to have been released at or from the unit. For example, soil underlying an F006 surface impoundment might be analyzed for 1,1,1-trichloroethane, a solvent likely to be used at a plating facility in addition to constituents common to the listed F006 waste; or, soil at a unit used to manage chlorinated solvents might also be analyzed for vinyl chloride, a common breakdown product of chlorinated solvents.

When reviewing and approving indicator constituents, Ecology will, at a minimum, consider the following:

- The toxicological characteristics of the constituent that influence its ability to adversely affect human health or the environment relative to the concentration of the constituent at the closing unit;
- The chemical and physical characteristics of the constituent that govern its tendency to persist in the environment;

- The chemical and physical characteristics of the constituent that govern its tendency to move into and through environmental media;
- The natural background concentrations of the constituent;
- The thoroughness of testing for the constituent at the closing unit;
- The frequency that the constituent has been detected at the closing unit; and
- Degradation by-products of the constituent. (See WAC 173-340-703.)

7.8 Approved Analytical Methods

Samples should be analyzed consistent with methods appropriate for the facility, the media being analyzed, the dangerous constituents being analyzed for, and the anticipated use of the data. Ecology may require or approve modification to the standard analytical methods identified below to provide lower quantitation limits, improved accuracy, and/or greater precision. All analytical procedures should be conducted in accordance with an Ecology-approved sampling and analysis plan, as discussed in Section 7.1 of this guidance.

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 must comply with the requirements of the following standard methods as applicable:

- *Test Methods for Evaluating Solid Waste, Physical Chemical Methods*, Third Edition, U.S. EPA, SW-846 and any revisions or amendments thereto;
- *Methods for Chemical Analysis of Water and Wastes*, U.S. EPA, EPA-600/4-79-020 and any revisions or amendments thereto;
- *Standard Methods for the Examination of Water and Wastewater*, ASTM American Public Health Association, American Water Works Association and Water Pollution Control Federation and any revisions or amendments thereto.

SW-846 methods should be used to determine contaminant concentrations in soil and solid waste. Any of the referenced methods may be used to determine contaminant concentrations in ground water. Analyses for which methods have not been specified in this Section should be performed using standard methods or procedures such as those specified by the ASTM when available.

7.9 Multiple Analytical Methods

When more than one of the approved methods specified in Section 7.8 of this guidance has a practical quantitation limit less than the clean closure level, any of the methods may be selected. When selecting a particular method, facility owners/operators should consider confidence in the data, analytical costs, quality assurance, and analytical efficiencies.

Ecology may require an analysis to be conducted by more than one method if there is a reasonable concern about the quality of the data generated by a particular method.

7.10 Quality Assurance and Quality Control Requirements

During closure activities, samples must be collected and analyzed with sufficient quality assurance and quality control (QA/QC) procedures to ensure representative and reliable results. The validity of both sampling techniques and laboratory analytical procedures must be assured so that the data from sampling activities can be used to accurately assess the presence or absence of contamination at the closing unit. For more information on QA/QC requirements, please refer to Ecology's *Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies* (July 2004, Publication #04-03-030). Additional information on field documentation and chain-of-custody can be found in U.S. EPA (1986a), a complete reference list is provided in Section 14.0 of this guidance.

7.10.1 Field Quality Assurance/Quality Control

A field notebook must be maintained by the person conducting closure. The person conducting closure should use the field notebook to record times, dates, and locations of all samples, including QA/QC blanks, as well as daily events, observations, field measurements, and any other applicable information obtained during the field activities. All entries should be made in ink, signed, and dated. Photographs should be taken of each sampling location and of all unusual circumstances encountered during closure activities.

Field QA/QC may also include collection of specific types of samples designed to monitor sampling techniques and/or field conditions. Field blanks, equipment blanks, and/or transportation blanks can be used to check for contamination from field conditions, equipment, and/or transportation, respectively. Field duplicates can be collected to check the precision of the sample collection and/or the procedures conducted at the laboratory.

Field notebooks and photographs should be kept for a minimum of five years after Ecology approves a clean closure certification to help reconstruct sampling procedures and to aid, if necessary, in legal testimony.

7.10.2 Laboratory Quality Assurance/Quality Control

All samples taken to document compliance with closure requirements should be submitted to a laboratory accredited under Chapter 173-50 WAC. A list of accredited laboratories may be obtained by contacting Ecology's Manchester Environmental Laboratory at 360-895-6144, or visit the website at http://www.ecy.wa.gov/programs/eap/labs/srchmain.htm.

QA/QC requirements associated with approved analytical methods include analysis of check standards, duplicate samples, laboratory control samples, matrix and surrogate spike samples, and method blanks, as required. Check standards are used to estimate the precision of the analytical method. Duplicate analyses of samples are used to check the precision of instrument and the sample preparation. Matrix and surrogate spike samples are used to test for recovery bias due to matrix interference. Method blanks are used to check for laboratory contamination. Such QA/QC should be routinely run because is provides information for interpreting the accuracy, precision, and detection capabilities of the analytical procedures used. Where closure plans are required, specific QA/QC methods and activities must be detailed in the closure plan.

Facility owners/operators, generators, and transporters conducting clean closure must obtain the QA/QC results run with each batch of analyses from the laboratory and must save the QA/QC results with other closure documentation for a minimum of five years after Ecology approves a clean closure certification.

7.11 Data Quality Objectives

Facility owners/operators, generators, and transporters should consider data quality objectives before conducting any sampling activity. Data quality objectives are statements of the precision, bias, representativeness, completeness, and comparability of the data necessary for the data to serve the objectives of the project. Guidance on data quality objectives can be found in Ecology's *Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies* (July 2004, Publication #04-03-030).

7.12 Practical Quantitation Limits

Laboratories must achieve the lowest PQL consistent with the selected analytical method; however, Ecology recognizes that there may be situations where a dangerous waste constituent is not detected or is detected at a concentration below the PQL of the chosen analytical method. In situations where the clean closure level is less than the PQL, Ecology may require one or more of the following:

- Use of surrogate measures of contamination;
- Use or development of specialized sample collection or analysis techniques to improve the method detection limit or PQL; and/or
- Additional sampling to assure that the concentrations of dangerous constituents do not exceed detectable levels.

If, after alternatives have been exhausted, the PQL is still higher than the clean closure level for the constituent, Ecology may, based on site-specific considerations and depending on the PQL, consider the PQL to be the clean closure level. As discussed in WAC 173-340-707(4), when the PQL is above the cleanup level, Ecology must consider the availability of improved analytical techniques when performing periodic review under WAC 173-340-420.

8.0 DANGEROUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES

As discussed in Section 1.0 of this guidance, clean closure involves meeting both substantive requirements for what must be accomplished during closure and administrative requirements that govern the closure process. Under WAC 173-303-400 and WAC 173-303-610, owners and operators of interim and final status dangerous waste TSD facilities must meet substantive and administrative closure requirements. This Section describes the administrative requirements for closure of dangerous waste TSD units/facilities, including preparation of closure plans and closure time lines and schedules. The substantive requirements for what must be accomplished during closure are discussed in Sections 2.0 through 7.0 of this guidance.

8.1 Applicability

Dangerous waste TSD facilities are places where dangerous waste, whether generated on-site or received from off-site, is treated, stored, or disposed. "Treatment" is defined in WAC 173-303-040 as the physical, chemical, or biological processing of dangerous waste to make such wastes non-dangerous or less dangerous, safer for transport, amenable for energy or material resource recovery, amenable for storage, or reduced in volume, with the exception of compacting, repackaging, and sorting as allowed under WAC 173-303-400(2) and 173-303-600(3). "Storage" is defined in WAC 173-303-040 as the holding of dangerous waste for a temporary period. Remember that "accumulation" of dangerous waste by the generator on the site of generation is not storage as long as the generator complies with applicable requirements of WAC 173-303-200 and -201. "Disposal" is defined in WAC 173-303-040 as the discharging, discarding, or abandoning of dangerous waste or the treatment, decontamination, or recycling of such wastes once they have been discarded or abandoned. This includes the discharge of any dangerous wastes into or on any land, air, or water. Common types of dangerous waste TSD units are: container and tank systems (see WAC 173-303-640), surface impoundments (see WAC 173-303-650), land treatment units (see WAC 173-303-655), waste piles (see WAC 173-303-660), and landfills (see WAC 173-303-665).

The term "facility" means all contiguous land and structures, other appurtenances, and improvements on the land used for recycling, reusing, reclaiming, transferring, storing, treating, or disposing of dangerous waste. A facility may consist of several dangerous waste treatment, storage, or disposal units.

Dangerous waste TSD facilities may operate under interim or final status, provided they comply with applicable requirements. Interim status facilities have submitted the first part (Part A) of their dangerous waste facility permit application, but are awaiting submittal or Ecology review and approval of the second part (Part B) of their dangerous waste permit application. Final status facilities operate under a full, Ecology-approved, dangerous waste facility permit.

8.2 The Closure Plan

Owners and operators of dangerous waste TSD facilities must have written closure plans. Written closure plans must address closure of each dangerous waste management unit and final closure of the facility.

8.2.1 Contents of the Closure Plan

The closure plan must identify and describe the steps that will be taken to remove dangerous waste from the TSD unit, remove or decontaminate the unit, and otherwise meet the closure performance standard. The closure plan will assure Ecology that you have thought through what will be needed to properly remove and dispose of any waste remaining when you finish operating the unit and remove or decontaminate the unit, its containment structure, and any contaminated soils or surrounding area. The closure plan also serves as the basis for your development of a cost estimate for closure (see Section 12.0).

It is important that your closure plan completely identify and describe all the steps that will be needed at closure so that your cost estimate will be accurate. Be as specific and detailed in your descriptions as possible. The closure plan must include, but is not limited to:

(1) The closure performance standard:

- A detailed description of how each dangerous waste management unit at the facility will be closed in accordance with the closure performance standard, including detailed descriptions of all activities planned during the closure period; and
- A description of how final closure of the facility will be conducted in accordance with the closure performance standard. This description must identify the maximum number and capacity of dangerous waste management units that will be in use (un-closed) during the active life of the facility. Detailed information on the substantive requirements associated with the closure performance standard is provided in Section 2.0 of this guidance. TSD owners and operators should refer to Section 2.0 as they develop their closure plans.

(2) Procedures for removal of wastes and waste residues:

- An estimate of the maximum inventory of dangerous wastes on-site during the active life of the facility;
- A detailed description of the methods planned to remove wastes and/or contaminated equipment, bases, liners, and soils/subsoils during partial closure(s) and final closure. The description should include, but not be limited to, methods for removing, transporting, treating, storing, or disposing

of all dangerous wastes and waste residues (including hazardous debris and contaminated environmental media), and identification of any management or treatment requirements that will apply (including LDR treatment standards) and how you plan to meet these standards; and

- Identification of the type(s) of on- and off-site dangerous waste management units that will be used, if applicable. Detailed information on the substantive requirements associated with removal of wastes and waste residues from closing units is provided in Section 3.0 of this guidance. TSD owners and operators should refer to Section 3.0 as they develop their closure plans.

(3) Procedures for inspecting units after wastes and waste residues are removed:

- A detailed description of the steps needed to inspect units to identify cracks or other openings through which dangerous waste or decontamination fluids might migrate;
- Procedures for identifying and recording releases and potential releases;
- Procedures for reporting such releases and potential releases to Ecology.

Detailed information on the substantive requirements associated with inspecting units after waste is removed is provided in Section 4.0 of this guidance. TSD owners and operators should refer to Section 4.0 as they develop their closure plans.

(4) Removal and decontamination procedures for debris and environmental media:

- A detailed description of the steps needed to decontaminate all dangerous waste residues and contaminated containment system components, equipment, structures, soils, and subsoils during partial and final closure, including, but not limited to, procedures for cleaning and decontaminating equipment and removing contaminated soils/subsoils and ground water;
- Detailed descriptions of implementation of planned decontamination methods;
- Detailed description of methods that will be used to collect and manage decontamination residuals (for example, rinse water); and
- Methods for sampling and testing surrounding soils/subsoils and, if applicable, ground water, surface water, and sediments, and criteria for determining the extent of decontamination required to satisfy the closure performance standard. Detailed information on the substantive requirements associated with removal and decontamination of debris and environmental media are provided in Sections 5.0 and 6.0 of this guidance. TSD owners and operators should refer to Sections 5.0 and 6.0 as they develop their closure plans.

(5) Procedures for sampling and analysis:

- A sampling and analysis plan prepared in accordance with Section 7.1 of this guidance, including sampling approach, methods, and procedures and rationale for each selection; and
- Detailed descriptions of field and lab quality assurance/quality control (QA/QC) procedures. Detailed information on the substantive requirements associated with sampling and analysis during closure is provided in Section 7.0 of this guidance. TSD owners and operators should refer to Section 7.0 as they develop their closure plans.

(6) Discussion of closure time line:

- A schedule for closure of each dangerous waste management unit and for final closure of the facility. Detailed information on the requirements associated with the closure time line is provided in Section 8.3 of this guidance (below). TSD owners and operators should refer to Section 8.3 as they develop their closure plans.

8.2.2 Closure Plan Review and Approval

Ecology is responsible for ensuring that approved closure plans are consistent with the closure performance standard and other applicable requirements of the *Dangerous Waste Regulations*, and for ensuring meaningful opportunities for public review of closure activities.

For final status facilities, Ecology typically reviews and approves closure plans as part of the dangerous waste permitting process. Public review of final status facility closure plans typically occurs as part of the public review associated with issuance of dangerous waste permits.

At facilities operating under interim status, Ecology typically reviews closure plans when the facility owner/operator notifies Ecology that they expect to begin partial or final closure activities. After receipt of a notification of intent to begin partial or final closure and a written interim status closure plan, Ecology will review the plan and either tentatively approve or disapprove the plan within ninety (90) days. If Ecology tentatively approves the closure plan, the tentative approval will be included in the public notice procedures discussed below. If Ecology disapproves the closure plan, the facility owner/operator will be provided with detailed written comments summarizing the reasons for the disapproval.

If Ecology disapproves the initial closure plan, the facility owner/operator has thirty (30) days from receipt of Ecology's disapproval and comments to modify the closure plan and submit a revised closure plan for Ecology review and approval. Ecology will then either tentatively approve or modify the revised closure plan within sixty

(60) days of receipt. If Ecology tentatively approves the closure plan, the tentative approval will be included in the public notice procedures discussed below. If Ecology modifies the plan, the modified plan becomes the tentatively approved closure plan (also subject to the public participation period discussed below) and Ecology will send a copy of the modified and tentatively approved plan with a detailed statement of the reasons for the modifications to the facility owner/operator.

The facility owner/operator and Ecology may agree to incorporate additional, informal review and comment steps in the closure plan approval process. For example, many facility owners/operators choose to coordinate informally with Ecology prior to submitting a closure plan for the initial 90-day review. Ecology has found that such informal coordination can significantly increase the quality of initial closure plan submittals and reduces the number of formal Ecology comments.

8.2.3 Public Participation

Ecology is responsible for providing meaningful opportunities for the public to review and comment on closure activities. Ecology will notify the public of their opportunity to review and comment on proposed closure activities through a newspaper notice and written notice mailed to persons on the facility mailing list. At final status permitted facilities, the public's opportunity for review of closure plans typically occurs during the public review and comment associated with issuance of the final status permit and major modifications to the final status permit. For facilities operating under interim status, Ecology must provide a thirty (30) day public comment period to give interested persons an opportunity to review and comment on the tentative decision to approve any given closure plan. In response to requests or public interest, Ecology may hold a public hearing to invite further dialogue on proposed closure activities. Significant changes to approved interim status closure plans are subject to additional public review.

Final Ecology approval of closure plans must include consideration of all comments received during the public comment period.

8.2.4 Duty to Amend Approved Closure Plans

Facility owners/operators can amend their closure plan at any time prior to the notification of intent to begin partial or final closure. Facility owners/operators must amend closure plans whenever:

- A change in facility design or operating plan(s) affects the closure plan;
- There is a change in the expected year of closure; or
- Unexpected events encountered during closure activities require a modification of the closure plan.

Facility owners/operators who amend their unapproved closure plans do so at their discretion. Facility owners/operators who wish to amend their Ecology-approved closure plans must submit an amended plan to Ecology with a written request for Ecology review and approval. All amendments and changes to approved interim status closure plans are subject to the review, approval, and public notice procedures discussed above. Amendments and changes to final status closure plans are subject to applicable requirements for permit modification as specified in WAC 173-303-830. If the change in the closure plan increases the cost of closure, the owner or operator must revise the closure cost estimate, no later than 30 days after Ecology's approval of the request to modify the closure plan.

Amendments to closure plans will most likely require revisions to closure cost estimates and, ultimately, to financial assurance requirements (see Section 12.5 and Section 13.3.4).

8.2.5 Availability of Closure Plans

You must keep a copy of your closure plan and all updates to the plan at your facility until you no longer treat, store, or dispose of dangerous waste and have completed and certified, and Ecology has approved, all closure activities. A copy of your plan and all updates must be made available to Ecology on request, including requests by mail.

8.2.6 Activities Conducted Prior to Closure Plan Approval

Closure plan approval (see Section 8.2.2) and closure notification (see Section 8.3.1) are required; however, facility owners/operators may conduct activities, including removing wastes and decontaminating or dismantling equipment and structures, at any time prior to closure. Provided Ecology determines that such activities were conducted in accordance with the requirements for closure, they could be approved in the subsequently submitted closure plan.

In order for Ecology to make such determinations, facility owners/operators must keep detailed records documenting that all activities conducted prior to closure plan approval are consistent with closure requirements. Information maintained to support consistency with the closure requirements should, at a minimum, include the information required for closure certification, as discussed in Section 8.4 of this guidance.

Ecology cannot accept activities if they are inconsistent with the closure regulations or if adequate information is not available to support a determination of consistency with closure requirements. If Ecology determines that activities were inconsistent with the closure requirements and/or if adequate information is not available to determine consistency, Ecology can require facility owners/operators to conduct additional activities, including, but not limited to, removal and/or decontamination of wastes, waste residues, equipment and/or structures, additional sampling and analysis, and/or

investigatory activities designed to determine the degree to which previously conducted activities comply with closure requirements. (See WAC 173-303-610(3)(c)(iv), and 40 CFR 265.112(e), incorporated by reference at WAC 173-303-400(3).)

Ecology emphasizes that facility owners/operators can incur considerable liabilities when they choose to conduct removal and/or decontamination prior to closure plan review and approval. Facility owners/operators are encouraged to work closely with Ecology formally and informally to develop closure strategies that are appropriate for their facility-specific conditions.

8.3 Closure Time Frame and Schedule

The *Dangerous Waste Regulations* establish specific time frames for closure of dangerous waste TSD units/facilities. Facility owners/operators who have reason to believe, when developing their closure plans, that the closure time frames established in the regulations are inappropriate for their unit and/or facility are encouraged to propose alternative time frames for Ecology review and approval in accordance with the provisions discussed below.

8.3.1 Closure Notification

Facility owners/operators must notify Ecology prior to beginning partial and final closure activities. Closure notification is required so Ecology can ensure that the facility has an approved closure plan and that closure proceeds in accordance with applicable regulations. For facility owners/operators without approved closure plans, the closure notification triggers Ecology review and approval of the closure plan in accordance with the procedures discussed in Section 8.2.2 of this guidance.

Facility owners/operators with approved closure plans (this will include most final status facilities, since the closure plan would have been reviewed and approved as part of final permit issuance) must notify Ecology at least sixty (60) days prior to the date on which they plan to begin partial or final closure activities at a surface impoundment, waste pile, land treatment, or landfill unit and at least forty-five (45) days prior to the date on which they plan to begin partial or final closure activities at a facility with only treatment or storage tanks, container storage, incinerator and/or boiler and industrial furnace units.

Facility owners/operators whose closure plans have not yet been reviewed and approved by Ecology (this will include most facilities operating under interim status) must notify Ecology and submit a copy of their closure plan at least one-hundred and eighty (180) days prior to the date by which they expect to begin partial or final closure at a surface impoundment, waste pile, land treatment, or landfill unit and forty-five (45) days prior to the date they expect to begin partial or final closure at a facility with only treatment or storage tanks, container storage, incinerator and/or boiler and industrial furnace units.

The date that a facility owner/operator expects to begin closure must be either:

(1) Within thirty (30) days of the date on which any dangerous waste management unit receives the known final volume of dangerous waste or, if there is a reasonable possibility that the dangerous waste management unit will receive additional dangerous wastes, no later than one year after the date on which the unit received the most recent volume of dangerous waste; or

(2) For landfills, land treatment units, or surface impoundments that have been given approval to receive non-dangerous waste in accordance with WAC 173-303-610(4)(d) and (e) or 40 CFR 265.113(d) and (e), incorporated by reference at WAC 173-303-400(3), thirty (30) days from the date on which the unit received the known final volume of non-dangerous waste or, if there is a reasonable possibility that the unit will receive additional non-dangerous waste, no later than one year after the date on which the unit received the most recent volume of non-dangerous waste.

Ecology may require a facility owner/operator to initiate closure activities. If Ecology requires an interim status facility owner/operator to begin closure activities, the owner/operator must submit a closure plan to Ecology for review and approval no later than fifteen (15) days after termination of interim status or issuance of a judicial decree or final order to cease receiving dangerous wastes and close (see 40 CFR 265.113(d)(3), incorporated by reference at WAC 173-303-400(3)). At permitted facilities, Ecology will impose requirements to initiate closure activities in accordance with the provisions for permit modification or revocation or reissuance at WAC 173-303-830(3) or the provisions for permit termination at WAC 173-303-806(12).

8.3.2 Time Allowed for Closure

Facility owners/operators are allowed ninety (90) days from the date that a closing dangerous waste management unit received the final volume of waste or ninety (90) days from the date Ecology approves the facility/unit closure plan (whichever is later) to remove all dangerous wastes from the closing unit in accordance with the Ecology approved closure plan. Facility owners/operators are allowed an additional ninety (90) days (for a total of 180 days) to complete closure activities in accordance with the approved closure plan. The time allowed for closure is referred to as the "closure period."

8.3.3 Additional Time Allowed for Closure

Ecology may approve additional time for closure in two circumstances:

(1) Closure activities will, of necessity, require additional time to be completed (referred to as "extension of closure"); or

(2) The closing unit has capacity to receive additional dangerous waste or the closing unit is a landfill, land treatment, or surface impoundment unit which

has capacity to receive additional non-dangerous waste and complies with WAC 173-303-610(4)(d) and (e) or 40 CFR 265.113(d) and (e), incorporated by reference at WAC 173-303-400(3) (referred to as "delay of closure").

Many facility owners/operators may foresee, when preparing closure plans, that closure activities will, of necessity, take longer than 180 days to complete or that the closing unit will receive additional dangerous or non-dangerous waste. If this is the case, facility owners/operators may submit appropriate documentation and request additional time for closure in the closure plan. Provided the documentation is sufficient, Ecology may approve additional time for closure when approving the closure plan.

At a minimum, all requests for extensions or delays to the closure period should be made in accordance with the procedures discussed below and should be submitted at least thirty (30) days before the deadline for which the extension or delay is requested.

8.3.4 Extension of the Closure Period

For Ecology to approve an extension to the closure period, the facility owner/operator must demonstrate that closure activities will, of necessity, take additional time to complete. Ecology will determine, on a case-by-case basis, circumstances that constitute a "necessity" for extension; however, Ecology would likely consider extensions associated with required analytical work, scheduling of equipment and personnel, or inclement weather conditions (for example, frozen ground could prevent sampling) as necessary. In addition to demonstrating that the extension is necessary, facility owners/operators must show that they have taken and will continue to take all steps to prevent threats to human health and the environment. At permitted facilities, the demonstration must also include documentation of compliance with all applicable permit conditions and the facility owner/operator must comply with all applicable requirements for modification of the permit. Final status facility owners/operators should refer to WAC 173-303-610(4)(a)(i) for an extension to the closure period for additional time to remove waste and/or WAC 173-303-610(4)(b)(i) for extension of the closure period for additional time to complete remaining closure activities. Owners/operators of facilities operating under interim status should refer to 40 CFR 265.113(a)(1)(i) and (b)(1)(i), incorporated by reference at WAC 173-303-400(3).

8.3.5 Delay of Closure

For Ecology to approve a delay of closure, the facility owner/operator must demonstrate that the closing unit has capacity to receive additional dangerous or non- dangerous wastes,[3] that there is reasonable likelihood that operation of the unit

[3] Delay of closure for units to receive additional non-hazardous waste is only available for landfills, land treatment units, and surface impoundments.

will recommence within one year, and closure of the unit would be incompatible with continued operation of the facility. Ecology will review and approve requests for delays of closure on a case-by-case basis. As an example, Ecology would likely approve a delay of closure if a facility owner/operator could demonstrate that the unit subject to closure was not in operation because the waste stream managed at the closing unit is generated by a process shut down for extended maintenance, the extended maintenance will take less than one year, and the process, when restarted, will generate the same dangerous waste stream. The facility owner/operator must also demonstrate that they have taken and will continue to take all steps to prevent threats to human health and the environment. At permitted facilities, the demonstration must include documentation of compliance with all applicable permit conditions and the facility owner/operator must comply with all applicable requirements for modification of the permit. Final status facility owners/operators should refer to WAC 173-303-610(4)(a)(ii) and WAC 173-303-610(4)(b)(ii). Owners/operators of facilities operating under interim status should refer to 40 CFR 265.113(a)(1)(ii) and (b)(1)(ii), incorporated by reference at WAC 173-303-400(3).

For Ecology to approve a delay of closure for a landfill, land treatment unit, or surface impoundment to receive additional non-dangerous waste, the final status facility owner/operator must also comply with WAC 173-303-610(4)(d) and (e). The owners/operators of a facility operating under interim status must also comply with 40 CFR 265.113(d) and (e), incorporated by reference at WAC 173-303-400(3). Delays of closure to allow a landfill, land treatment unit, or surface impoundment to receive additional non-dangerous waste are considered class two dangerous waste permit modifications and must conform to the associated requirements for review and approval, including public notice and a 60-day public comment period.

8.4 Closure Certification

Within sixty (60) days of completion of closure activities at each dangerous waste management unit (including tank systems and container storage units) and within sixty (60) days of completion of final facility closure, facility owners/operators must submit a closure certification to Ecology. The closure certification must be sent to Ecology by registered mail and must certify that the dangerous waste management unit or facility was closed in accordance with the requirements and specifications of the approved closure plan. The closure certification must be signed by the facility owner/operator and signed and stamped by an "independent qualified registered professional engineer."[4] Documentation supporting the closure certification must be provided to

[4] Ecology defines "independent qualified registered professional engineer" as "a person who is licensed by the state of Washington, or a state which has reciprocity with the state of Washington as defined in RCW 18.43.100, and who is not an employee of the owner or operator of the facility for which construction or modification certification is required. A qualified professional engineer is an engineer with expertise in the specific area for which certification is given." See WAC 173-303-040.

Ecology on request. At a minimum, Ecology will typically require the following documentation and information to support a clean closure certification:

- All field notes and photographs related to closure activities;
- A description of any minor deviations from the approved closure plan and justification for these deviations,[5]
- Documentation of the removal and final disposition of all dangerous wastes and dangerous waste residues, including contaminated media, debris, and all treatment residuals;
- Documentation that decontamination procedures were followed and that decontamination standards were achieved.
- All laboratory and/or field data, including sampling procedures, sampling locations, QA/QC samples, and chain of custody procedures for all samples and measurements, including samples and measurements taken to determine background conditions and/or to determine or confirm clean closure; and
- A summary report that itemizes the data reviewed by the independent qualified registered professional engineer and tabulates the analytical results of samples taken to determine and/or confirm clean closure.

8.5 Closure Verification

Ecology will verify closure certifications by reviewing the information submitted to support the certification, the facility closure plan, any documentation or information generated by Ecology during oversight of closure activities (for example, inspection reports), and other pertinent information and documentation. In some situations, Ecology will visit the site as part of closure verification. If Ecology accepts the closure certification, Ecology will inform the facility owner/operator of the acceptance in writing.

In some cases, Ecology may be unable to verify the certification of closure and, therefore, unable to accept the closure certification. Typically, these cases will involve units/facilities at which ground water contamination was discovered during closure activities or units/facilities whose owners/operators did not keep the records and other documentation necessary for Ecology to verify a closure certification. In such cases, Ecology may require additional ground water or other sampling and monitoring to verify the closure certification or may require the facility owner/operator to submit an application for a post-closure permit. If sampling and/or monitoring is required, Ecology will extend the closure period to cover the time period of the required monitoring, and the closure certification will not be accepted until the facility owner/operator has completed the required activities.

[5] Most deviations from an approved closure plan are subject to prior Ecology review and approval in accordance with the provisions for amending closure plans. See Section 8.2.5 of this guidance.

8.6 What to Do If Clean Closure Is Not Possible

If it is not possible to remove or decontaminate all unit structures, equipment, containment systems, and other material (including environmental media) affected by releases at or from a closing unit, long-term cleanup and care of the unit will be required consistent with the requirements for post-closure care. In these cases, Ecology likely will supervise removal of all dangerous waste and removal and decontamination of all surface structures and soil in accordance with the approved closure plan and will oversee cleanup of residual contamination using a cleanup order issued under the Model Toxics Control Act (MTCA), or, for permitted facilities, will proceed with cleanup by modifying the permit.

8.7 Closure Cost Estimates and Financial Assurance

Owners/operators of dangerous waste TSD facilities also are required to estimate the costs of implementing closure and provide assurance that they are able to fund closure costs (referred to as "financial assurance"). Section 12.0 of this guidance describes closure cost estimates. Section 13.0 describes the requirements for financial assurance.

9.0 DANGEROUS WASTE RECYCLERS AND USED OIL PROCESSORS

On January 1, 2005, new regulations took effect for owners and operators of dangerous waste recycling facilities and used oil processors that receive waste from off-site. Under these new regulations, dangerous waste recyclers and used oil processors must go through "closure." As discussed in Section 1.0 of this guidance, "closure" is the term used in the *Dangerous Waste Regulations* to refer to the process of taking a unit out of service and properly cleaning up or decontaminating the unit and any areas affected by releases from the unit. "Clean closure" refers to closure activities that result in full removal of all waste and full removal or decontamination of all structures, equipment, debris, environmental media (such as soil and ground water), and other materials affected by releases from a unit.

Dangerous waste recyclers and used oil processors must meet both substantive requirements for what must be accomplished during closure and administrative requirements that govern the closure process. This Section describes the administrative requirements for closure of dangerous waste recycling and used oil processing units. The substantive requirements for what must be accomplished during closure are discussed in Sections 2.0 through 7.0 of this guidance. Dangerous waste recyclers and used oil processors must refer to Sections 2.0 through 7.0 for guidance on substantive closure requirements.

9.1 Applicability

Facilities at which dangerous waste received from off-site is recycled generally are considered dangerous waste recycling facilities. Facilities at which used oil received from off-site is processed generally are considered used oil processors. Dangerous waste recyclers and used oil processors are required to go through "closure."

Closure requirements for dangerous waste recyclers and used oil processors are found in WAC 173-303-610(2) and (12). Requirements in WAC 173-303-610(2) establish the closure performance standard that must be met. Requirements in WAC 173-303-610(12) establish the administrative requirements for closure and incorporate by reference additional substantive standards in WAC 173-303-610(3), (4), (5), and (6).

9.1.1 Definition of a Dangerous Waste Recycler

For purposes of closure and financial assurance requirements, any facility at which dangerous waste from off-site is recycled is considered a dangerous waste recycling facility, and the owners/operators of such facilities are referred to as dangerous waste recyclers. This includes recycling of solid wastes that are sometimes dangerous wastes as described in WAC 173-303-120(2), recycling dangerous wastes as described in WAC 173-303-120(3), and recycling dangerous wastes without

storing the waste prior to recycling as described in WAC 173-303-120(4). Recycling means to use, reuse, or reclaim a material. If you recycle dangerous waste that you receive from off-site, you likely are considered a dangerous waste recycler and are subject to closure and financial assurance requirements.

Note that the new closure requirements for dangerous waste recyclers do apply to recyclers who operate under Ecology's "72-hour" rule. Under the "72-hour" rule, Ecology can, on a case-by-case basis, determine that recyclable materials received from off-site are not considered "stored" if they are moved into an active recycling process within 72 hours of being received (see WAC 173-303-120(4)). Staging areas are subject to closure with the active recycling unit. If you are operating under the 72-hour rule, you must include all areas where dangerous waste is staged prior to recycling in your closure plan and cost estimate. Closure requirement apply to the active recycling unit, all staging areas, load and unload areas, and all other areas where dangerous waste is managed. You must include all these areas in your closure plan and cost estimate.

9.1.2 Definition of a Used Oil Processor

For purposes of closure and financial responsibility requirements, any facility at which used oil from off-site is recycled is considered a used oil processing facility, and the owners/operators of such facilities are referred to as used oil processors.

In Washington State, the federal definitions and requirements related to used oil have been adopted by reference at WAC 173-303-515, and modified slightly to add state-only requirements and standards. "Used oil" is any oil that has been refined from crude oil, or any synthetic oil, that has been used and as a result of such use is contaminated by physical or chemical impurities. "Processing" is defined as "chemical or physical operations designed to produce from used oil, or make used oil more amenable for production of fuel oils, lubricants, or other used oil-derived product." (See 40 CFR 279.1, adopted by reference at WAC 173-303-515(2).)

Wastewaters discharged subject to regulation under Section 402 or 307(b) of the Clean Water Act that are contaminated with de minimus quantities of used oil are not considered "used oil" and so are not subject to used oil requirements. For purposes of this determination, "de minimus quantities" are defined as small spills, leaks, or drippings from pumps, machinery, pipes, and other similar equipment during normal operations or small amounts of oil lost to the wastewater treatment system during washing or draining operations. If used oil is discarded as a result of abnormal manufacturing operations resulting in substantial leaks, spills, or other releases, is not considered "de minimus." Used oil recovered from wastewater is considered "used oil" and is subject to closure, financial assurance, and other applicable used oil requirements. (See 40 CFR 279.10(f), adopted by reference at WAC 173-303-515(3).)

Processing includes blending used oil with virgin petroleum products, blending used oil to meet fuel specifications, filtration, simple distillation, chemical and physical separation, and re-refining. If you process used oil that you did not generate at your facility, you likely are considered a used oil processor and are subject to closure and financial assurance requirements.

Closure requirements apply to your used oil storage units (for example, tanks, containers and their secondary containment systems), and your processing units and their secondary containment systems. Closure requirements also apply to other areas, such as used oil loading and unloading areas, and all other areas where used oil is managed. You must include all these areas in your closure plan and cost estimate.

9.1.3 Definition of a Dangerous Waste Recycling or Used Oil Processing Unit

Closure and financial assurance requirements apply to dangerous waste recycling and used oil processing units. Dangerous waste recycling or used oil processing units are the contiguous area of land, structures, and equipment where dangerous waste or used oil are placed, processed, and recycled. A container, tank, or processing equipment alone is not the unit; the unit includes containers, tanks, and other processing equipment, ancillary equipment and secondary containment systems, and the land upon which they are placed. This includes areas where waste is staged for 72 hours or less prior to recycling and loading and unloading areas at dangerous waste recyclers, and used oil storage and processing units and any staging areas at used oil processors. Closure plans (described below) must address closure of the full extent of each dangerous waste recycling and used oil processing unit. Note that, in some cases dangerous waste recycling and used oil processing units are referred to as "resource reclamation units;" these terms should be considered synonymous for purposes of closure and financial assurance.

9.2 Requirement to Have a Written Closure Plan

Dangerous waste recyclers and used oil processors must have a written closure plan. The written closure plan must address closure of each dangerous waste recycling unit and each used oil processing unit. Requirements for the timing of submittal of closure plans for dangerous waste recyclers and used oil processors are established in WAC 173-303-610(12)(a). For units that were in existence on January 1, 2005, the effective date of closure regulations for recyclers and used oil processors, closure plans must be submitted to Ecology no later than June 29, 2005. For units created after January 1, 2005, closure plans must be submitted to Ecology with the notification of new dangerous waste activity required by WAC 173-303-060.

9.2.1 Contents of the Closure Plan

The closure plan must identify and describe the steps that will be taken to remove dangerous waste and used oil from the recycling/used oil processing unit, remove or decontaminate the unit, and otherwise meet the closure performance standard. The closure plan will assure Ecology that you have thought through what will be needed to properly remove and dispose of any waste or used oil remaining when you finish operating the unit and remove or decontaminate the unit, its containment structure, and any contaminated environmental media (soils, ground water, surface water, or sediments) and the surrounding area. The closure plan also serves as the basis for your development of a cost estimate for closure (see Section 12.0).

It is important that your closure plan completely identify and describe all the steps that will be needed at closure so that your cost estimate will be accurate. Be as specific and detailed in your descriptions as possible. The closure plan must include, but is not limited to:

(1) The closure performance standard:

- A detailed description of how each dangerous waste management unit at the facility will be closed in accordance with the closure performance standard, including detailed descriptions of all activities planned during the closure period; and
- A description of how final closure of the facility will be conducted in accordance with the closure performance standard. This description must identify the maximum number and capacity of dangerous waste management units that will be in use (un-closed) during the active life of the facility.

Detailed information on the substantive requirements associated with the closure performance standard is provided in Section 2.0 of this guidance. Dangerous waste recyclers and used oil processors should refer to Section 2.0 as they develop their closure plans.

(2) Procedures for removal of wastes and waste residues:

- An estimate of the maximum inventory of dangerous wastes on-site during the active life of the facility;
- A detailed description of the methods planned to remove wastes and/or contaminated equipment, bases, liners, and soils/subsoils during partial closure(s) and final closure. The description should include, but not be limited to, methods for removing, transporting, treating, storing, or disposing of all dangerous wastes and waste residues (including hazardous debris and contaminated environmental media), and identification of any management

or treatment requirements that will apply (including LDR treatment standards) and how you plan to meet these standards; and

- Identification of the type(s) of on- and off-site dangerous waste management units that will be used, if applicable.

Detailed information on the substantive requirements associated with removal of wastes and waste residues from closing units is provided in Section 3.0 of this guidance. Dangerous waste recyclers and used oil processors should refer to Section 3.0 as they develop their closure plans.

(3) Procedures for inspecting units after wastes and waste residues are removed:

- A detailed description of the steps needed to inspect units to identify cracks or other openings through which dangerous waste or decontamination fluids might migrate;
- Procedures for identifying and recording releases and potential releases;
- Procedures for reporting such releases and potential releases to Ecology.

Detailed information on the substantive requirements associated with inspecting units after waste is removed is provided in Section 4.0 of this guidance. Dangerous waste recyclers and used oil processors should refer to Section 4.0 as they develop their closure plans.

(4) Removal and decontamination procedures for debris and environmental media:

- A detailed description of the steps needed to remove or decontaminate all dangerous waste residues and contaminated containment system components, equipment, structures, soils, and subsoils during partial and final closure, including, but not limited to, procedures for cleaning and decontaminating equipment and removing contaminated soils/subsoils;
- Detailed descriptions of implementation of planned decontamination methods;
- Detailed description of methods that will be used to collect and manage decontamination residuals (for example, rinse water); and
- Methods for sampling and testing surrounding soils/subsoils and, if applicable, ground water, surface water, and sediments, and criteria for determining the extent of decontamination required to satisfy the closure performance standard.

Detailed information on the substantive requirements associated with removal and decontamination of debris and environmental media are provided in Sections 5.0 and 6.0 of this guidance. Dangerous waste recyclers and used oil processors should refer to Sections 5.0 and 6.0 as they develop their closure plans.

(5) Procedures for sampling and analysis:

- A sampling and analysis plan prepared in accordance with Section 7.1 of this guidance, including sampling approach, methods, and procedures and rationale for each selection; and
- Detailed descriptions of field and lab quality assurance/quality control (QA/QC) procedures.

Detailed information on the substantive requirements associated with sampling and analysis during closure is provided in Section 7.0 of this guidance. Dangerous waste recyclers and used oil processors should refer to Section 7.0 as they develop their closure plans.

(6) Discussion of the closure time line:

- A schedule for closure of each dangerous waste management unit and for final closure of the facility.

Detailed information on the requirements associated with the closure time line is provided in Section 9.3 of this guidance. Dangerous waste recyclers and used oil processors should refer to Section 9.3 as they develop their closure plans.

9.2.2 Availability of a Closure Plan Template

Ecology has created a closure plan template for dangerous waste recyclers and used oil processors. The closure plan template provides:

- An outline of the Section and subsection headings that you should consider for your closure plan;
- Instructions for what each Section of the closure plan should cover; and
- Sample text.

The Ecology guidance document *Closure Plan Template for Dangerous Waste Recyclers and Used Oil Processors* (April 2005, Publication #05-04-006), is available on the Ecology website at www.ecy.wa.gov/pubs.shtm or by contacting a Hazardous Waste Specialist using the information listed inside the cover page of this guidance. Dangerous waste recyclers and used oil processors are encouraged to refer to the closure plan template when developing their site-specific closure plans.

9.2.3 Closure Plan Review and Approval

Ecology is responsible for ensuring that approved closure plans are consistent with the closure performance standard and other applicable requirements of the *Dangerous Waste Regulations.*

Ecology will review your closure plan and will approve it, deny it, or provide comments on how your closure plan must be changed before it can be approved. Ecology's decision to approve, deny, or provide comments on your closure plan will be based on how well your plan complies with the requirements of WAC 173-303-610(2) and WAC 173-303-610(12) and the guidance on substantive closure requirements provided in Sections 2.0 through 7.0 of this document. If Ecology does not approve your initial closure plan submittal, Ecology will provide you with comments on how your closure plan must be changed so it can be approved. If Ecology provides comments, you have 90 days to address the comments and resubmit your closure plan for Ecology review and approval. (See WAC 173-303-610(12)(a) and (b).)

If your revised closure plan adequately addresses Ecology comments and meets regulatory requirements, Ecology will approve the revised plan and notify you in writing. If your revised closure plan does not meet regulatory requirements, Ecology may modify the plan and the plan as modified by Ecology will become the approved closure plan. If Ecology modifies the closure plan, they will notify you in writing and send you a copy of the modified plan with a detailed statement of the reasons for the modifications.

Dangerous waste recyclers and used oil processors and Ecology may agree to incorporate additional, informal review and comment steps in the closure plan approval process. For example, many facility owners/operators choose to coordinate informally with Ecology prior to submitting a closure plan for the initial 90-day review. Ecology has found that such informal coordination can significantly increase the quality of initial closure plan submittals and reduces the number of formal Ecology comments.

If you disagree with Ecology's final decision about your closure plan, you can appeal the decision to the Pollution Controls Hearings Board, under the provisions of WAC 173-303-845. (See WAC 173-303-610(12)(b).)

9.2.4 Duty to Amend Approved Closure Plans

If you plan to make major changes to your dangerous waste recycling or used oil processing operations you must update (amend) your closure plan and submit the updated plan to Ecology at least 60 days before you make the change. In general, a major change is any change that results in changes to the closure cost estimate or that expands or decreases dangerous waste or used oil management activities, or the areas of the facility at which these activities occur. Major changes include: the addition of recycling or used oil processing units; addition of recycling capacity, processes, or techniques for existing units; any increase in the maximum amount of dangerous waste or used oil that will be on site; change in facility ownership or operational control; and the closure of all or part of a recycling or used oil processing unit. (See WAC 173-303-610(12)(e).)

If you are unsure about whether a planned change would be considered a "major change," you should contact the Hazardous Waste Specialist assigned to your facility for advice before you make the change to ensure that your closure plan stays current. You can find out the name and contact information for the Hazardous Waste Specialist assigned to your facility by contacting the appropriate Ecology regional office. A map showing the Ecology regional offices is listed in the front of this guidance.

Ecology will review your amended closure plan and will approve it, deny it, or provide comments on how your amended closure plan must be changed before it can be approved. If Ecology provides comments, you must address the comments and resubmit your amended closure plan within 90 days. (See WAC 173-303-610(12)(e).)

Ecology's decision to approve, deny, or provide comments on your amended closure plan will be based on how well your plan complies with the requirements of WAC 173-303-610(2) and WAC 173-303-610(12). Ecology's decision to approve or deny an amended closure plan may be appealed to the Pollution Control Hearings Board under the provisions of WAC 173-303-845. (See WAC 173-303-610(12)(e).)

9.2.5 Availability of Closure Plans

You must keep a copy of your closure plan and all updates to the plan at your facility until you no longer recycle dangerous waste or process used oil and have completed and certified, and Ecology has approved, all closure activities. A copy of your plan and all updates must be made available to Ecology on request, including requests by mail. (See WAC 173-303-610(12)(c).)

9.2.6 Activities Conducted Prior to Closure Plan Approval

Closure plan approval (see Section 9.2.2) and closure notification (see Section 9.3.1) are required; however, you may conduct activities, including removing wastes and decontaminating or dismantling equipment and structures at any time prior to closure. Provided Ecology determines that such activities were conducted in accordance with the requirements for closure, they could be approved in the subsequently submitted closure plan.

For Ecology to make such determinations, you must keep detailed records documenting that all activities conducted prior to closure plan approval are consistent with closure requirements. Information maintained to support consistency with the closure requirements should, at a minimum, include the information required for closure certification, as discussed in Section 9.4 of this guidance.

Ecology cannot accept activities if they are inconsistent with the closure regulations or if adequate information is not available to support a determination of consistency with closure requirements. If Ecology determines activities were inconsistent with the closure

requirements and/or if adequate information is not available to determine consistency, Ecology can require you to conduct additional activities, including, but not limited to, removal and/or decontamination of wastes, waste residues, equipment and/or structures, additional sampling and analysis, and/or investigatory activities designed to determine the degree to which previously conducted activities comply with closure requirements. (See WAC 173-303-610(3)(c)(iv) as referenced by WAC 173-303-610(12).)

Ecology emphasizes that you can incur considerable liabilities when they choose to conduct removal and/or decontamination prior to closure plan review and approval. You are encouraged to work closely with Ecology formally and informally to develop closure strategies that will be successful.

9.3 Closure Schedule and Time Line

The *Dangerous Waste Regulations* establish specific time frames for closure of dangerous waste recycling and used oil processing units. These requirements are established by WAC 173-303-610(4), as referenced by WAC 173-303-610(12). It is important that you are aware of these time frames and that you plan to follow them in your closure plan. If you believe you will be unable to meet these time frames, you can request an extension in your closure plan or in subsequent discussions with Ecology.

9.3.1 Duty to Notify Ecology Before Closure Begins, and Date You Expect to Begin Closure

You must notify Ecology in writing at least 45 days before you expect to begin closure activities. Your written notification should refer to your approved closure plan and should specify the day on which you expect to begin closure. Mail your written notification to the appropriate Ecology regional office, to the attention of the Hazardous Waste Specialist assigned to your facility. (See WAC 173-303-610(12)(f).)

Under some circumstances, the date that you expect to begin closure activities will be defined by the *Dangerous Waste Regulations*. In general, the date on which you expect to begin closure must be either: 1) within 30 days of the date that you recycle or process the known final volume of dangerous waste or used oil; or 2) if 30 days has passed but there is a reasonable possibility that the dangerous waste recycling unit or used oil processing unit will be used to recycle or process more waste or oil, no later than one year after the date on which you last recycled dangerous waste or processed used oil. (See WAC 173-303-610(3)(c)(ii), as referenced by WAC 173-303-610(12)(d)(ii).)

Ecology can require you to begin closure activities. If you are ordered by a final administrative order or judicial decree to stop recycling dangerous waste or processing used oil, you must stop and begin closure immediately. (See WAC 173-303-610(3)(c)(iii), as referenced by WAC 173-303-610(12)(d)(ii).)

Amendments to closure plans will most likely require revisions to closure cost estimates and, ultimately, to financial assurance requirements (see Section 12.5 and Section 13.3.4).

9.3.2 Time Allowed for Closure

In general, you are allowed 90 days from the date a unit recycles the final volume of dangerous waste or processes the final volume of used oil to remove all dangerous waste and used oil from the unit. You then are allowed an additional 90 days to complete the remaining closure activities in accordance with your approved closure plan, for a total of 180 days allowed for closure. If Ecology has not yet approved your closure plan when your dangerous waste recycling or used oil processing unit receives the final volume of dangerous waste or used oil, you are allowed 90 days from the date that Ecology approves your closure plan. (See WAC 173-303-610(4) as referenced by WAC 173-303-610(12)(d)(ii).)

9.3.3 Requesting Additional Time for Closure

Ecology can approve additional time for closure of dangerous waste recycling and used oil processing units if closure activities will, of necessity, require additional time to be completed. This is referred to as "extension of the closure period." If you believe that closure activities will take longer than a total of 180 days to complete, you should request an "extension of the closure period" in your closure plan. For Ecology to approve an extension to the closure period, you must demonstrate that closure activities will, of necessity, take additional time to complete. Ecology will determine, on a case-by-case basis, circumstances that constitute a "necessity" for extension; however, Ecology likely will consider extensions associated with required analytical work, scheduling of equipment and personnel, or inclement weather conditions (for example, frozen ground could prevent sampling) as necessary. In addition to demonstrating that the extension is necessary, you must show that you have taken and will continue to take all steps to prevent threats to human health and the environment during the extension of the closure period. Refer to WAC 173-303-610(4)(a)(i) for additional information on extensions to the closure period for additional time to remove waste and WAC 173-303-610(4)(b)(i) for additional information on extensions of the closure period for additional time to complete remaining closure activities.

9.4 Closure Certification

Within 60 days after you have completed all closure activities, you must submit a closure certification to Ecology. The closure certification must be sent to Ecology by registered mail and must certify that the dangerous waste recycling or used oil processing unit was closed in accordance with the requirements and specifications of the approved closure plan. (See WAC 173-303-610(6) as referenced by WAC 173-303-610(12)(d)(ii).) The closure certification

must be signed by the facility owner/operator and signed and stamped by an "independent qualified registered professional engineer."[6] Documentation supporting the closure certification must be provided to Ecology on request. At a minimum, Ecology typically will require the following documentation and information to support a clean closure certification:

All field notes and photographs related to closure activities;

- A description of any minor deviations from the approved closure plan and justification for these deviations,[7]
- Documentation of the final disposition of all dangerous wastes and dangerous waste residues, including contaminated media, debris, and all treatment residuals;
- All laboratory and/or field data, including sampling procedures, sampling locations, QA/QC samples, and chain of custody procedures for all samples and measurements, including samples and measurements taken to determine background conditions and/or to determine or confirm clean closure; and
- A summary report that itemizes the data reviewed by the independent qualified registered professional engineer and tabulates the analytical results of samples taken to determine and/or confirm clean closure.

9.5 Closure Verification

Ecology will verify closure certifications by reviewing the information submitted to support the closure certification, the closure plan, any documentation or information generated by Ecology during oversight of closure activities (for example, inspection reports), and other pertinent information and documentation. In some situations, Ecology will visit the site as part of closure verification. If Ecology accepts the closure certification, Ecology will inform you of the acceptance in writing.

In some cases, Ecology may be unable to verify and, therefore, unable to accept the closure certification. Typically, these cases will involve units at which ground water contamination was discovered during closure activities or units whose owners/operators did not keep the records and other documentation necessary for Ecology to verify a closure certification. In such cases, Ecology may require additional ground water or other sampling and monitoring

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[6] Ecology defines "independent qualified registered professional engineer" as "a person who is licensed by the state of Washington, or a state which has reciprocity with the state of Washington as defined in RCW 18.43.100, and who is not an employee of the owner or operator of the facility for which construction or modification certification is required. A qualified professional engineer is an engineer with expertise in the specific area for which certification is given." See WAC 173-303-040.

[7] Most deviations from an approved closure plan are subject to prior Ecology review and approval in accordance with the provisions for amending closure plans. See Section 9.2.4 of this guidance.

to verify the closure certification or may require you to carry out additional cleanup under a cleanup order under the Model Toxics Control Act (MTCA). If sampling and/or monitoring or additional cleanup are required, Ecology will extend the closure period to cover the time period of the required monitoring, and the closure certification will not be accepted until you have completed the required activities.

9.6 Coordination with Closure Plans for Other Dangerous Waste Units

If you are responsible for a dangerous waste treatment, storage, or disposal unit or units at the same facility at which you also are responsible for a dangerous waste recycling or used oil processing unit, you may choose to combine all closure requirements into a single plan. (See WAC 173-303-610(12)(g).) At final status TSDs, combining plans will require a permit modification to the dangerous waste facility permit. You do not have to combine units into a single closure plan. Preparation of a separate closure plan for a dangerous waste staging and recycling unit or a used oil storage and processing unit at a final status TSD does not require an amendment to the dangerous waste facility permit.

If you choose to combine closure requirements for multiple units into a single plan, use care to ensure that Ecology will be able to distinguish how you plan to carry out closure for each unit and verify that you have planned to fulfill all applicable closure requirements for each unit.

9.7 What to Do If Clean Closure is Not Possible

Ecology believes that, in general, dangerous waste recyclers and used oil processors will be able to complete "clean closure." "Clean closure" means that you will be able to completely remove or decontaminate the dangerous waste recycling or used oil processing unit within the time allowed for closure so that no waste, oil, or contamination remains and the area where the unit was located can be used for unrestricted purposes. If you have suffered releases of dangerous waste, dangerous constituents, or used oil from the recycling or processing units, you might not be able to completely remove or decontaminate the affected environmental media during the time allowed for closure. In these cases, Ecology will supervise removal of all dangerous waste and used oil and removal and decontamination of all surface structures and soil in accordance with the approved closure plan and oversee cleanup of residual contamination using a cleanup order issued under the Model Toxics Control Act (MTCA).

9.8 Closure Cost Estimates and Financial Assurance

Dangerous waste recyclers and used oil processors also are required to estimate the costs of implementing closure and provide assurance that they are able to fund closure costs (referred to as "financial assurance"). Section 12.0 of this guidance describes closure cost estimates. Section 13.0 describes the requirements for financial assurance.

10.0 DANGEROUS WASTE GENERATORS AND TRANSFER FACILITIES

As discussed in Section 1.0, clean closure involves meeting both substantive requirements for what must be accomplished during closure and administrative requirements that govern the closure process. Generators and transporters that operate transfer facilities must meet substantive closure requirements for dangerous waste accumulation units. The substantive requirements for closure are discussed in Sections 2.0 through 7.0 of this guidance. However, unless a generator's or transporter's unit has caused contamination that can not be adequately removed or decontaminated to achieve clean closure, the administrative process for a generators' and transporters' closure is simpler than it is for other facilities.

10.1 Applicability

If a "generator" accumulates or treats waste at their site, then they will usually be subject to regulatory requirements to "close" the location and unit where the waste was accumulated. "Generator" means any person, by site, whose act or process produces a dangerous waste or whose act first causes a dangerous waste to become subject to regulation (WAC 173-303-040).

The status of the generator influences regulatory requirements for closure. "Status" is determined by the quantity of dangerous wastes the generator produces and/or accumulates. "Large quantity generators" (LQG) produce 2,200 or more pounds per month or accumulate over 2,200 pounds of waste on their site at any one time. "Medium quantity generators" (MQG) are those who generate between 220 and 2,200 pounds per month and who do not accumulate more than 2,200 pounds on site at any one time. "Conditionally exempt small quantity generators" (SQG) generate less than 220 pounds of dangerous waste permit per month and do not accumulate more than 2,200 pounds.

If a "transporter" operates a transfer facility, then they will usually be subject to regulatory requirements to "close" the containment system where dangerous waste is managed at the transfer facility. "Transporter" means a person engaged in the off-site transportation of dangerous waste. Dangerous waste transfer facilities are any transportation related facility including loading docks, parking areas, storage areas, buildings, piers, and other similar areas where shipments of dangerous waste are held, consolidated, or transferred within a period of ten days or less during the normal course of transportation (WAC 173-303-040).

Generator and transporter closure requirements are also somewhat influenced by the type of unit (for example, containers, tanks, drip pads, or containment buildings) that is used to manage the waste. These different units may be used to accumulate wastes, and they may have slightly different regulatory requirements for closure. However, from a practical standpoint, to achieve clean closure, the same degree of decontamination and removal will be needed regardless of the type of unit.

This portion of the guidance focuses on common elements for generator and transporter closures, regardless of the generator status or the type of unit. Therefore, the guidance references regulatory requirements for LQG. Although this simplifies some aspects of the regulations, Ecology does not expect it will change the way most MQG and transporters would conduct their closure. For example, even though standards established specifically for dangerous waste tank closures are not cited for MQG tanks, as they are for LQG tanks and at satellite accumulation areas, MQG tanks are subject to the following closure requirements (WAC 173-303-202(4)):

> *Generators of between two hundred twenty and two thousand two hundred pounds per month accumulating dangerous waste in tanks must, upon closure of the facility, remove all dangerous waste from tanks, discharge control equipment, and discharge confinement structures.*

Ecology expects that a MQG and transporters will conduct the same closure activities as a LQG to meet this closure standard. As another example, the same closure performance standards apply to a person closing a containment building or drip pad regardless of their generator status.

There are no specific container closure requirements for SQG. However, compliance with other aspects of the regulations such as accumulation time limits, spill prevention measures, and the "empty container rule" help to ensure removal of wastes and waste residues by SQG.

10.2 Requirements for Clean Closure for Generators and Transporters

10.2.1 General Closure Requirements for Generators

Generators to which closure requirements apply must meet closure performance standards at WAC 173-303-610(2) and (5). This means that when a unit is closed all dangerous waste must be removed, and units managing or accumulating dangerous wastes and the surrounding soil must be removed or decontaminated. Sections 2.0 through 7.0 of this guidance elaborate on these standards. Section 2.0 provides details on the overall closure performance standard. Section 3.0 addresses removal of wastes and waste residues from closing units. Section 4.0 addresses inspecting units after removal of wastes and waste residues. Sections 5.0 (debris) and 6.0 (environmental media) address decontamination of units and cleanup of environmental media affected by releases from the closing unit. Section 7.0 addresses sampling and analysis after closure activities to demonstrate compliance with the closure performance standard. Specific actions described in the Sections above that will be required for a given generator's unit will depend on the specifics of the site and its operation. A generator should consult with an Ecology dangerous waste inspector if they have questions. Transporters are not subject to general closure requirements, but instead must meet unit-specific closure requirements for containers, as described in Section 10.2.3, below.

10.2.2 Unit-Specific Closure Requirements for Generators

In most cases the "general closure requirements" discussed in the previous subsection above will address "unit specific closure requirements" outlined below.

Containers—LQG with containers must address unit specific requirements in WAC 173-303-630(10). These regulations state:

> *At closure, all dangerous waste and dangerous waste residues must be removed from the containment system. Remaining containers, liners, bases, and soil containing or contaminated with dangerous waste or dangerous waste residues must be decontaminated or removed.*

Tanks—LQG and generators with satellite accumulations areas with tanks must meet the requirements in the first sentence of WAC 173-640(8)(a) and all of (b). These are:

> *(a) At closure of a tank system, the owner or operator must remove or decontaminate all waste residues, contaminated containment system components (liners, etc.), contaminated soils, and structures and equipment contaminated with waste, and manage them as dangerous waste, unless WAC 173-303-070 (2)(a) applies.*
>
> *(b) If the owner or operator demonstrates that not all contaminated soils can be practicably removed or decontaminated as required in (a) of this subsection, then the owner or operator must close the tank system and perform post-closure care in accordance with the closure and post-closure care requirements that apply to landfills (see WAC 173-303665(6)). In addition, for the purposes of closure, post-closure, and financial assurance, such a tank system is then considered to be a landfill, and the owner or operator must meet all of the requirements for landfills specified in WAC 173-303-610 and 173-303-620.*

Containment Buildings and Drip Pads— Relevant regulatory citations for unit specific closures of containment buildings are at 40 CFR 265.1102 (a) (first sentence only) and (b), and at 40 CFR 265.445(a) and (b) for drip pads. Although the regulatory language for these units is slightly different from that used for tanks, the practical requirements for clean closure are the same.

10.2.3 Unit-Specific Closure Requirements for Transporters

Transporters that operate transfer facilities are not subject to general closure requirements, but instead must meet unit-specific closure requirements for containment systems used for storage of containers. Transporters must address specific requirements closure of containers in WAC 173-303-630(10). These regulations state:

At closure, all dangerous waste and dangerous waste residues must be removed from the containment system. Remaining containers, liners, bases, and soil containing or contaminated with dangerous waste or dangerous waste residues must be decontaminated or removed.

10.3 Administrative Requirements for Clean Closure for Generators and Transporters

The administrative process for clean closure of a generator's or transporter's unit is simple. Generators and transporters that can achieve clean closure are generally not required to do the following:

- Submit a closure plan to Ecology for review and approval.
- Notify Ecology that the facility is going to implement removal and decontamination steps to achieve final closure.
- Provide a certification from an independent qualified registered professional engineer that closure steps for the units were conducted in accordance with an approved closure plan.

Although generators and transporters are not required to submit a closure plan or notify Ecology of closure activities, they are strongly encouraged to contact Ecology to discuss closure requirements and to work with Ecology to ensure that closure is carried out properly.

Under the following situations, the administrative process for a generator's closure is not as straightforward as described above.

If soil or ground water contamination exists at the site, and the generator cannot achieve clean closure standards for a tank system, drip pad, or containment building, then they are subject to unit-specific closure and post closure requirements for landfills. This usually means the generator will need to enter into a binding agreement with Ecology on how the site will be cleaned up and decontaminated. In that case the administrative process can be complex and involved. Generators who find themselves in this position should work closely with Ecology to develop cleanup strategies that will be successful and identify the type of agreement that is most appropriate, and should refer to Section 8.0 of this guidance for information on closure at dangerous waste treatment, storage and disposal facilities.

If an existing drip pad does not comply with current liner requirements, then closure requirements in 40 CFR 265.445(c) may apply. Discussing this situation is beyond the scope of this guidance, and the reader is referred to the following federal guidance on closure of drip pads: *Wood Preserving Resource Conservation and Recovery Act Guide – A Guide to Federal Regulations* (June 1996, EPA-305-B-96-001). Generators with drip pads should work closely with their Ecology contact to satisfy closure requirements of their unit.

11.0 COORDINATION OF CLOSURE AND CORRECTIVE ACTION OR OTHER CLEANUP ACTIVITIES

Often, when a dangerous waste management unit is undergoing closure, other cleanup activities will be occurring at the facility. These may include corrective action for solid waste management units (SWMU)[8] in accordance with WAC 173-303-646, cleanup of releases of hazardous substances under MTCA, or cleanup under the CERCLA or Superfund. In these circumstances, facility owners/operators should work with Ecology to coordinate cleanup activities. For example, in most cases, cleanup levels calculated for purposes of corrective action or other cleanup activities also may be appropriate as clean closure levels (provided they meet the MTCA standards for unrestricted site use cleanup levels described in Section 2.0 of this guidance).

In addition, in some cases, special standards can be applied to closure of dangerous waste management units, or management of waste or contaminated environmental media and debris. The remainder of this Section discusses two such special standards.

11.1 Special Requirements for Closing Regulated Units Situated Among Other Solid Waste Management Units

Under certain circumstances, Ecology can replace most closure requirements with alternative requirements. Except for the closure performance standard (described in Section 2.0), which cannot be replaced, Ecology can replace all closure requirements with alternative requirements when:

- A closing dangerous waste management unit is situated among other solid waste management units or areas of concern;
- A release has occurred;
- Both the dangerous waste management unit and one or more of the solid waste management units or areas of concern have contributed to the release or it is not possible to determine which units contributed to the release; and
- Ecology determines that it is not necessary to apply closure requirements because the alternative requirements will protect human health and the environment.

[8] A "solid waste management unit" is defined as "any discernible location at a facility, as defined for the purposes of corrective action, where solid wastes have been placed at any time, irrespective of whether the location was intended for the management of solid or dangerous waste. Such locations include any area at a facility at which solid wastes, including spills, have been routinely and systematically released. Such units include regulated units as defined by Chapter 173-303 WAC.

For example, when a closing dangerous waste management unit is located at a site that is also undergoing cleanup under MTCA multiple units including the dangerous waste unit have contributed to the releases at the site, and Ecology determines that it would be best to incorporate closure of the dangerous waste management unit into the MTCA cleanup, Ecology may choose to substitute alternative requirements for the closure requirements that would otherwise apply to the dangerous waste unit. If Ecology specifies alternative requirements, the requirements will be established in an enforceable document, such as an order or a permit. Ecology also may allow alternative requirements for closure and post-closure ground water monitoring and financial assurance. See WAC 173-303-645(1)(e) and WAC 173-303-620(1)(d)(i), respectively.

If you have a dangerous waste management unit and you believe the circumstances described above apply to your situation, and you want to explore establishing alternative requirements as a replacement for closure requirements, you should contact the Hazardous Waste Specialist assigned to your facility. Please note that only Ecology can make a decision to replace closure requirements with alternative requirements and specify the alternative requirements that will apply. The proposed approach under alternative requirements will be subject to public review and comment.

11.2 Relationship to Corrective Action Management Unit Requirements

Ecology has the authority to approve special units for management of wastes from cleanup activities, including closures. One such unit is a corrective action management unit, or CAMU. Ecology also has the authority to allow CAMU-eligible wastes, including wastes from closures, to be managed in permitted dangerous waste landfills. In general, wastes managed in a CAMU are subject to special LDR treatment standards instead of the treatment standards that would otherwise apply to dangerous wastes.

11.2.1 CAMU-Eligible Waste

All solid and dangerous wastes and all media and debris that are managed for implementing cleanup are considered CAMU-eligible, provided the waste is not considered "as generated." "As generated" wastes are wastes from ongoing industrial operations. In addition, wastes that are found during closure above ground in intact or substantially intact containers, tanks, or other non-land-based units are not considered CAMU-eligible. If you are interested in managing wastes from closure as CAMU-eligible, you must consult with an Ecology Hazardous Waste Specialist for a waste eligibility determination. For more information on CAMUs and CAMU-eligible wastes, see WAC 173-303-64650.

11.2.2 Management Requirements that Apply to CAMU-Eligible Wastes

In general, wastes managed in a CAMU are subject to special LDR treatment standards instead of the treatment standards that would otherwise apply.

Treatment of CAMU-eligible wastes must achieve 90 percent reduction in concentrations of principle hazardous constituents, or a concentration that is 10 times the universal treatment standard (UTS), whichever is higher. That is, if treatment to reduce concentrations of principle hazardous constituents would reduce concentrations to below 10 times the UTS, treatment may be held at 10 times the UTS. The UTS are found in 40 CFR 268.48, incorporated by reference at WAC 173-303-140(2)(a). Treatment also must eliminate any dangerous waste characteristic or criteria. Treatment must occur prior to or within a reasonable time after placement of waste in a CAMU. Ecology can adjust the treatment standards to a higher or lower level based on consideration of a number of factors including technical practicability of treatment, relationship of treatment levels to site-specific cleanup standards, community views, and short- and long-term risks. CAMU-eligible waste is subject to these special treatment standards even if it is managed in a traditional dangerous waste management unit instead of a CAMU. If applicable, it may be to your advantage to have waste from closure designated as CAMU-eligible waste even if you do not intend to manage it in a CAMU. For more information on treatment standards for wastes managed in CAMUs, see WAC 173-303-64660(3)(iv).

11.2.3 Disposal of CAMU-Eligible Wastes in Permitted Dangerous Waste Landfills.

Ecology can approve disposal of CAMU-eligible waste in off-site permitted dangerous waste landfills. If management of CAMU-eligible waste in a dangerous waste landfill is approved, the CAMU-eligible waste will be treated to meet the treatment standards for CAMU-eligible waste instead of the LDR treatment standards that otherwise would apply. See WAC 173-303-646910 for a discussion of disposal of CAMU-eligible waste in permitted dangerous waste landfills or WAC 173-303-646920 for requirements on disposal of CAMU-eligible wastes into permitted hazardous waste landfills located outside Washington State.

11.2.4 Incorporation of a Regulated Unit Within a CAMU

Ecology may designate a closed or closing dangerous waste management unit as a CAMU or incorporate a closed or closing dangerous waste management unit into a CAMU if inclusion of the regulated unit will enhance implementation of effective, protective, and reliable remedial actions at the facility. If Ecology designates a closed or closing dangerous waste management unit as a CAMU, the unit will be able to receive CAMU-eligible waste; however, the unit-specific requirements that applied before the unit was designated as a CAMU will continue to apply, unless alternative requirements are specified as described in Section 11.1 of this guidance.

12.0 CLOSURE COST ESTIMATES

12.1 Overview

Owners/operators of dangerous waste treatment, storage, and disposal (TSD) facilities, dangerous waste recyclers, and used oil processors, must prepare an estimate of the cost of closing their facility. As discussed in Section 1.0, "closure" is the term used in the *Dangerous Waste Regulations* to refer to the process of taking a dangerous waste unit out of service and properly cleaning up or decontaminating the unit and any areas affected by releases at or from the unit. Sections 2.0 through 7.0 of this guidance describe in detail the substantive requirements for how to carry out closure. Sections 8.0 through 10.0, respectively, describe the administrative requirements for closure of dangerous waste TSD facilities, dangerous waste recycling and used oil processing facilities, and dangerous waste generator sites. (In most circumstances, dangerous waste generators are not required to prepare a closure cost estimate.)

This section outlines the assumptions you must use in developing a closure cost estimate, points you to some tools available to assist you in preparing your estimate, and summarizes when and how estimates must be updated.

Once a closure cost estimate is prepared, it serves as the basis for the amount of financial assurance you are required to provide for closure. Financial assurance for closure is covered in Section 13.0 of this guidance.

12.2 Applicability

Owners/operators of dangerous waste TSDs, dangerous waste recyclers, and used oil processors must prepare a detailed written estimate of the cost of closing their facility. This is referred to as a "current closure cost estimate." Closure cost estimates must estimate the current cost of carrying out closure in accordance with an approved unit/facility closure plan. Section 8.0 of this guidance addresses closure plan requirements and approval processes for dangerous waste TSDs; Section 9.0 addresses closure plan requirements and approval processes for dangerous waste recyclers and used oil processors. Current closure cost estimates must be prepared within 30 days of Ecology's approval of your closure plan. Ecology recommends the current closure cost estimate be submitted at the same time as the closure plan so both plan and cost estimate can be reviewed and approved at the same time.

Current closure cost estimates must reflect the costs of conducting closure assuming your facility is operating at it maximum capacity. Section 12.3.1 describes critical assumptions for estimating this cost. If your facility expands in the future, then the closure cost estimate must be revised at that time to reflect current added costs for closing the increased capacity. Conversely, if you partially close your operation and

your maximum capacity decreases, you may revise the closure cost to reflect your reduced capacity. These changes are subject to Ecology review and approval.

12.3 Ecology Review of Closure Cost Estimates

Ecology will review your current closure cost estimate, so the estimate must include sufficient detail to allow Ecology to evaluate its accuracy. Section 12.4, below, describes tools that can assist you in developing an appropriately detailed closure cost estimate.

Closure cost estimates for existing TSDs should have been submitted to Ecology in each facility's final dangerous waste permit application. Under WAC 173-303-805(5)(b)(i) and WAC 173-303-805(8), owners/operators of facilities operating under interim status must submit a final facility permit application to Ecology within six months of a written request by Ecology or within a certain amount of time (generally two years) from the date the facility qualified for interim status. Under WAC 173-303-806(4)(a)(xv), owners/operators proposing new dangerous waste treatment, storage, and disposal facilities must submit a copy of the current closure cost estimate and liability mechanisms with their dangerous waste permit application, which must be submitted before physical construction of the facility begins. See Section 8.0 of this guidance for information on Ecology review and approval of closure plans for TSDs.

For **dangerous waste recyclers and used oil processors**, Ecology recommends the current closure cost estimate be submitted at the same time as the closure plan so both plan and cost estimate can be reviewed and approved at the same time. A current closure cost estimate must be submitted within 30 days of Ecology's approval of your modified closure plan. According to WAC 173-303-620(1)(e)(i), if a closure plan has not been approved by Ecology within one year of initial plan submittal to Ecology, Ecology may independently estimate the current cost of closure and direct the facility owner/operator to establish financial assurance in the estimated amount. This might be the case, for example, if a facility submitted inadequate closure plans that would not result in compliance with closure requirements or accurate estimates of closure costs. However, the closure cost estimate would need to be revised to be in agreement with the closure plan, if and once approved by Ecology. See Section 9.2.3 for information on review and approval of closure plans for dangerous waste recyclers and used oil processors.

Under WAC 173-303-620(1)(e)(ii), dangerous waste treatment, storage, or disposal facilities that also own/operate dangerous waste recycling or used oil processing units at the same facility may choose to consolidate financial responsibility requirements into a single mechanism. That mechanism would cover the estimated cost of closing all units, including permitted units and any recycling or used oil units at the facility.

All facility owners/operators must keep a copy of the latest closure cost estimate at the facility, and make the estimate available to Ecology for review on request, including in response to requests for review sent by mail.

12.3.1 Assumptions to Be Used In Closure Cost Estimates

The closure cost estimate is intended to determine the cost to close a facility that might be incurred if the government had to conduct the closure (that is, by contracting with a third party) at the point in a facility's operations where closure would be the most expensive. The government might find itself in this situation, for example, if a facility goes bankrupt or if a facility is abandoned. Therefore, the rules for developing closure cost estimates require use of the following specific assumptions:

- **Most expensive point** (WAC 173-303-620(3)(a)(i))**.**[9] The closure cost estimate must equal the cost of closure at the point in the facility's operating life when the extent and manner of its operation would make closure the most expensive, as indicated by the facility closure plan. Among other things, this means you must assume the maximum extent of your operation and maximum inventory of waste at your facility when estimating closure costs.

- **Third party costs** (WAC 173-303-620(3)(a)(ii))**.** The closure cost estimate must be based on the cost of hiring a third party, such as an environmental cleanup contractor, to carry out closure activities. A third party is a party who is neither a parent nor a subsidiary of the facility owner or operator. "Parent corporation" means a corporation that directly owns at least fifty percent of the voting stock of the corporation that is the facility owner or operator; the latter corporation is deemed a "subsidiary" of the parent corporation. The purpose of third party costs is to ensure sufficient funds for Ecology to hire an independent contractor to completely implement the approved closure plan if the facility owner was not able to, for example because of bankruptcy. Dangerous waste recyclers and used oil processors that plan to process all recyclable materials as their first step at closure and do not meet the requirements allowing them to exclude the estimated value of certain recyclable materials from the estimated cost of closure must assume that dangerous wastes and used oils will be sent offsite for processing by a third party, or that a properly trained third party will process materials on site.

- **No salvage value (**WAC 173-303-620(3)(a)(iii))**.** For TSDs, the cost estimate may not incorporate any salvage value that might be realized with the sale of dangerous wastes, or nondangerous wastes if applicable under WAC 173-303-610 (4)(d), facility structures or equipment; land; or other assets associated with the facility at the time of partial or final closure. This means that even if you believe your waste, equipment or structures will have value at the time of closure, you cannot use that assumed value to offset some of the

[9] References to WAC 173-303-620 refer to regulations that apply to permitted dangerous waste TSDs. Requirements for dangerous waste TSDs that are operating under interim status are found in 40 CFR Part 265, which is adopted by reference at WAC 173-303-400(3).

cost it will take to treat or dispose of the waste and decontaminate or dispose of the equipment and structures. Again, the purpose of no salvage value is to ensure the closure cost estimate reflects sufficient funds to close your facility under a worst case scenario (in this case, no salvage value). As described in the next paragraph, there is a limited exception to this requirement for certain recyclable materials for recyclers and used oil processors.

Dangerous waste recyclers and used oil processors are allowed to exclude the estimated value of certain recyclable materials from the estimated cost of closing a recycling or oil processing unit. You may exclude dangerous wastes or used oil that: (1) is held in tanks or containers dedicated solely to the management of recyclable materials; and (2) will require only incidental processing before producing a product that may be sold to the general public. "Incidental processing" includes simple screening or filtering to remove minor amounts of foreign material or removal of less than five percent water by volume. In other words, if you can demonstrate that your recyclable material has value and only requires "incidental processing," you can subtract its value from other costs a third party would incur during closure. Closure costs for decontamination and disposal of tanks, containers, and incidental processing equipment handling dangerous waste recyclable material or waste oil must still be included in the cost estimate. If you meet the requirements and can exclude the estimated value of certain recyclable materials from your closure costs, you do not have to include the estimated costs of incidental processing of these materials in your closure cost estimate.

- **No zero costs** (WAC 173-303-620(3)(a)(iv))**.** The closure cost estimate may not incorporate a **zero cost** for dangerous wastes, or nondangerous wastes if applicable under WAC 173-303-610(4)(d) that might have economic value. This means that, for the closure cost estimate, you cannot assume it will cost nothing to deal with dangerous waste remaining at the facility at the time of closure, even if you think the waste might have economic value at the time the facility actually closes. You must assume a reasonable cost for disposing of this waste.

- **Reliable unit cost data.** The closure cost estimate must be based on reliable unit cost data. As examples, "unit cost" means the cost to do a specific discrete task, treat or dispose of specific type of waste, hire a person to do a specific task, transport waste a specific distance, and similar activities. "Reliable" means that unit cost assumption must be supported and documented. Using reliable unit cost data is essential to calculating a valid closure cost estimate. Note that acceptable unit cost estimates are already incorporated into the "tools" presented in Section 12.4.

12.3.2 Actual Closure May Be Done At Less Cost than the Official Estimate As Long As Standards Are Met

When the time comes for you to actually close your facility, you may be able to complete closure activities at less cost than specified in the closure cost estimate. In part, this is because some of the "maximum cost" assumptions listed above may not apply if you are closing the facility instead of the government. For example, you might choose to carry out some closure activities using facility staff instead of a third party, or you may realize salvage value from sale of equipment or other assets. Also, you might not be operating at maximum waste inventory when you close. The key point is that you may conduct the closure at less cost than the estimate as long as all elements of the approved closure plan are achieved and closure performance standards are met.

12.4 Tools Available to Assist in Developing Closure Cost Estimate

In the 1980s, the U.S. Environmental Protection Agency (EPA) developed a methodology to assist with the calculation of closure costs. Since then, the methodology has been incorporated into various software packages and into manual calculation sheets. The software packages are commercially available. Ecology has automated the EPA manual calculation sheets to simplify the process of developing cost estimates for dangerous waste recyclers and used oil processors. The software and automated calculation sheets are described in detail below.

12.4.1 Cost Estimating Software

A software package known as "***CostPro***" is commercially available to help facilities estimate the cost of closure.[10] The *CostPro* software allows a user to input facility-specific information on facility location and anticipated closure activities, and uses standard unit cost estimates to estimate the cost of closure. For example, if the user provides the dimensions of a secondary containment pad and berm, and selects the level of personal protective equipment needed, *CostPro* uses work rates and costs per hour from its cost database to calculate the cost for demolition, loading, and removal of the containment system. *CostPro* can be purchased from TetraTech EMI, Inc., for $570 (as of 2005) for one license.[11] The current version of *CostPro* is version 5, and it incorporates unit costs from the year 2001. Anyone using this version of *CostPro* to produce a current cost estimate would need to adjust for inflation since 2001. See Section 12.6 for information on adjusting closure costs for inflation.

[10] As CostPro addresses post-closure activities, it is broader than needed for facilities that will clean close, but is still useful by simply using only the few modules needed for a given facility. Clean closure is described in Section 1.0 of this guidance.
[11] Contact Steve Jeffords, Tetra Tech, Inc., (303) 312-8892, for more information about CostPro.

Ecology staff has *CostPro* software available, in addition to other tools, to assist them in evaluating closure cost estimates submitted by owners/operators. For this reason, it could be advantageous to a facility to use the same software, so that communication and cost estimating assumptions between the facility and Ecology are facilitated by use of a common technique. Note that use of *CostPro* does not guarantee that Ecology will approve your closure cost estimate. Results from other cost estimating tools (described below) correspond well with results using *CostPro*.

12.4.2 Closure Cost Estimating Tool Available From Ecology

To simplify the task of developing closure cost estimates for smaller and/or less complicated facilities, such as dangerous waste recyclers and used oil processors, Ecology has developed an Excel© workbook ("Closure Cost Estimating Tool") and an accompanying User Guide that walk facility owners/operators through the process of calculating closure costs by carrying out automatic cost calculations. Although these tools were developed with dangerous waste recyclers and used oil processors in mind, they can be used by any similar dangerous waste facility.

The Closure Cost Estimating Tool provides a series of spreadsheets to assist with calculating the various components for closing **tank systems** and **container storage areas**. Dangerous waste recyclers and used oil processors may not be accustomed to thinking about their units as tank systems or container storage areas; however, the components of these units (tanks, containers, secondary containment structures, ancillary piping) likely are the main components of most recycling and used oil processing units. The spreadsheet tool also has spaces for owners/operators to enter information on recycling or used oil processing equipment that is not covered by the descriptions of tanks and containers.

For each dangerous waste recycling or used oil processing unit that will undergo closure, the spreadsheet tool provides space for facility-specific information on the main types of closure activities. These include:

- Removal of waste
- Demolition and removal of secondary containment system
- Decontamination
- Sampling and analysis
- Transportation of waste
- Treatment and disposal of waste
- Certification of closure

Because of the large number of spreadsheets included within one workbook, the spreadsheet tool may seem overwhelming at first, but it has been designed to be

very intuitive, and the sheets are color coded and include explanations to make them more understandable. The User Guide walks users through the spreadsheet tool using straightforward explanations and screenshots to demonstrate how the tool is used. The Closure Cost Estimating Tool includes year 2005 unit costs, and has the capacity to incorporate updated costs in future years to reduce the need for inflation adjustments.

The Closure Cost Estimating Tool and User Guide are available at no cost from Ecology's Hazardous Waste and Toxics Reduction Program. See Section 13.10 for contact information.

12.4.3 Summary For Cost Estimation

Sections 12.4.1 and 12.4.2 describe specific tools you can use to estimate your closure costs. Ecology strongly recommends that you use one of these tools. If your closure activities can be adequately covered by the Closure Cost Estimating Tool, Ecology recommends that you use this tool. If your facility has units or if your closure plan anticipates activities not covered by the spreadsheet tool, Ecology recommends that you use *CostPro*. You can also develop your own closure cost estimating tool. If you do that, you must include sufficient information so Ecology can review and verify your assumptions and methods. When using any method for cost estimating, you must ensure you meet assumptions in Section 12.3.1. In addition to satisfying these assumptions, the following principles are key to an acceptable cost estimate:

- Address every applicable area or unit at your facility (for example, staging, storage, processing, etc.)
- Address all critical steps in the closure process (that is, those requirements under bullets in Section 12.4.2 and discussed in detail in Section 3.0 through 7.0 of this guidance)
- Ensure reliable unit cost data for each distinct activity (for example, unit labor cost for separate tasks such as decontaminating structures versus operating heavy equipment, equipment rental, transportation, disposition of the various types of waste, including those generated during closure activities itself, etc.)

12.5 Requirement to Adjust Cost Estimate for Changes in Closure Plan

If your closure plan changes and the change increases the cost of closure, you must revise the closure cost estimate within 30 days of Ecology's approval of the modified plan. Ecology recommends you submit the revised closure cost estimate at the same time you submit the modified plan for approval. Revised closure cost estimates must reflect then-current closure costs, so all costs that you carry over from your previous closure cost estimate must either be (1) recalculated using current unit cost data or (2) adjusted for inflation using an inflation factor as described in the next section.

12.6 Requirement to Adjust Annually for Inflation

In order to assure that closure cost estimates reflect up-to-date costs, you must adjust the estimate annually to account for inflation. For most facilities, this update must be done during the 60 days before the anniversary date of the establishment of the financial instrument used to comply with the financial assurance requirements. (Financial assurance requirements are described in Section 13.0 of this guidance.) For facilities using the financial test or corporate guarantee mechanism of financial assurance for closure (described in Section 13.5.5), the closure cost estimate must be updated within 30 days of the close of the firm's fiscal year and before any revisions to financial assurance documents are filed with Ecology.

There are two ways to update a closure cost estimate for inflation:

(1) Recalculate the total closure cost using current unit costs for each closure activity, or

(2) Update the previous cost estimate using an inflation factor.

Generally, the latter method is easier. The simplest way to use this method is to ask Ecology's Financial Assurance Officer for the current inflation factor. Contact information for the Financial Assurance Officer is provided in Section 13.11. Multiply your present closure cost estimate by that inflation factor to obtain the new cost estimate.

Alternatively, you can update a previous cost estimate for inflation by following these three steps:

Step 1. Obtain the numbers representing the Implicit Price Deflator (IPD) for the latest annual year's IPD and the preceding annual year's IPD.

Step 2. Calculate the year-to-year inflation factor by dividing the latest annual year's IPD by the preceding annual year's IPD.

Step 3. Multiply the previous year's cost estimate by the inflation factor to derive the current inflation adjusted cost estimate.

More detail on each of these steps is provided below:

Step 1. You must obtain the following two numbers: the annual "Implicit Price Deflator" for the latest year and the same number for the preceding year. The rules allow you to use either the Implicit Price Deflator (IPD) for Gross *Domestic* Product (GDP) or the IPD for Gross *National* Product (GNP). In practice, these two numbers are nearly identical, so it makes very little difference which one is used. The IPD numbers are available in the Bureau of Economic Analysis of the U.S. Department of Commerce, *Survey of Current Business,* Table 1.1.9 "Implicit Price Deflator for Gross Domestic Product." This document can currently be found at the following internet address:

http://www.bea.doc.gov/bea/dn/nipaweb/TableView.asp?SelectedTable=13&FirstYear=2002&LastYear=2004&Freq=Qtr

When you reach this Table:

- Click the button that says Annual (not Quarterly), underneath the table title
- Hit the "Refresh Table" on the same line, far to the right
- It may take 5 second for annual IPDs to appear
- Select the latest annual IPD and the previous year's annual IPD

Note: Annual IPDs appear early in the following year, so you may have to use the previous two year's date to update a cost estimate if the IPD is not yet available. That is, if you are calculating cost estimates in February 2005, you may have to use the IPDs from 2003 and 2004.

If the internet address above is no longer functioning, you can try the following address to access the version of the *Survey of Current Business* published monthly in pdf format: http://www.bea.gov/bea/pubs.htm.

If you have problems finding or calculating the IPD numbers, you can contact Ecology's Financial Assurance Officer for assistance. Contact information for the Financial Assurance Officer is provided in Section 13.11.

Step 2. The inflation factor equals the most recent IPD divided by the previous year's IPD. The table below shows IPD figures for recent years and the year during which the IDP would be considered the most recent annual IDP. As an example (using IDP for Gross *Domestic* Product), if we wanted to calculate an inflation factor in 2005 for a closure cost estimate originally done in 2004, we would divide 108.237 (IPD for 2004) by 105.998 (IPD for 2003) to get a result of 1.0211. If it is still early in 2005 when the IPD for 2004 may not yet be available, you would have to use the IPDs for 2002 and 2003 to calculate the inflation factor.

Year	Annual Implicit Price Deflator for Gross Domestic Product	For Use in the Year of
1999	97.868	
2000	100.000	2001
2001	102.399	2002
2002	104.092	2003
2003	105.998	2004
2004	108.237	2005

Step 3. Once you have calculated the inflation factor, multiply the previous closure cost estimate by the inflation factor to derive the inflation-adjusted closure cost estimate.

The inflation-adjusted current closure cost estimate, together with the original (not adjusted for inflation) closure cost estimate, must be kept on file at your facility.

13.0 FINANCIAL ASSURANCE

13.1 Overview and Purpose of Financial Assurance

The purpose of financial assurance is to ensure that, in the event of bankruptcy, corporate dissolution, abandonment of a facility, or unwillingness to pay, taxpayers do not end up paying costs for cleanup and closure that rightfully should be paid by facility owners/operators. In addition, the financial assurance requirements ensure that resources will be available in the event of injury or property damage to a third party arising from the operation of the facility.

Facility owners/operators must pay attention to two distinct parts of the financial assurance requirement:

- Financial assurance for **closure**, described in Sections 13.4 and 13.5, and
- Financial assurance for **liability**, described in Sections 13.6 and 13.7.

The amount of financial assurance needed for closure is based on a facility's closure cost estimate. Section 12.0 of this guidance discusses developing closure cost estimates in detail. The amount of financial assurance needed for liability is established by regulation and is described in Section 13.6.1.

The idea behind financial assurance should be familiar to facility owners/operators. Financial assurance is required in many situations, including common non-environmental situations. For example, financial assurance for closure of dangerous waste facilities is comparable to construction bonding. Financial assurance for liability at dangerous waste facilities is comparable to the requirement for liability coverage to drive a car.

Compliance with financial assurance requirements will involve filing financial assurance documents with Ecology. These documents will show that you have set aside adequate resources for closure and liability or that you have immediate access to adequate resources should the need arise. There are a number of options that facility owners/operators can choose from to comply with financial assurance requirements including letters of credit, trust funds, surety bonds, and insurance. These mechanisms are discussed in detail in Section 13.5 (for closure financial assurance) and Section 13.7 (for liability).

When working on complying with the financial assurance requirements, it is advisable to have available both the state *Dangerous Waste Regulations*, especially WAC 173-303-620 (financial requirements), and the federal hazardous waste regulations that have been incorporated by reference into the state regulations, especially 40 CFR 264.143

(closure assurance), 40 CFR 264.147 (liability coverage), and 40 CFR 264.151 (wording of financial instruments).[12]

13.2 Special Requirements for Dangerous Waste Recyclers and Used Oil Processors

In general, the financial responsibility requirements and options for dangerous waste recyclers and used oil processors are the same as the financial responsibility requirements and options for dangerous waste treatment, storage, and disposal facilities. There are three instances where different requirements apply to recyclers and used oil processors:

(1) Owners/operators of existing recycling and used oil units that become subject to the new financial requirements as of January 1, 2005, may establish a partially funded closure trust fund with a five year pay-in period. After five years, the trust fund must be fully funded to cover the costs of closure. (See WAC 173-303-620(4)(c)(i).)

(2) Existing recycling and used oil facilities have 36 months (until January 1, 2008) to establish any financial assurance mechanism other than a trust fund. New facilities must establish their financial assurance mechanism at least 60 days before they accept their first waste. (See WAC 173-303-620(4)(d).)

(3) Dangerous waste recyclers and used oil processors may request an alternative mechanism to finance the closure of recycling and used oil units, on a case-by-case basis. (See WAC 173-303-620(4)(e).)

Each of these differences is described in more detail in the appropriate section below. For example, the five-year pay-in for a closure trust fund is described in detail in Section 13.5.1. Look for the bolded text "**Dangerous waste recyclers and used oil processors**" to quickly locate these descriptions.

13.3 Applicability and Timing of Financial Assurance Requirements

13.3.1 Applicability of Financial Assurance Requirements

All dangerous waste treatment, storage and disposal facilities must comply with financial assurance requirements and file financial assurance documents. This requirement has been in place for many years. Starting in 2005, dangerous waste recyclers and used oil processors who receive waste from off site must comply with the requirements for financial assurance and file financial assurance documents.

[12] References to WAC 173-303-620 and 40 CFR Part 264 refer to regulations that apply to permitted dangerous waste TSDs. Requirements for dangerous waste TSDs that are operating under interim status are found in 40 CFR Part 265, which is adopted by reference at WAC 173-303-400(3).

13.3.2 Timing for Providing Financial Assurance Information to Ecology

Financial assurance mechanisms should already be in place for all existing dangerous waste treatment storage and disposal facilities. Information on financial assurance for existing TSDs should have been submitted to Ecology in each facility's final dangerous waste permit application. You may contact the local Ecology regional office or the Hazardous Waste Specialist assigned to your facility to seek assistance in understanding the immediate regulatory requirements for financial assurance.

Under WAC 173-303-805(5)(b)(i) and WAC 173-303-805(8), owners/operators of facilities operating under interim status must submit a final facility permit application to Ecology within six months of a written request by Ecology or within a certain amount of time (generally two years) from the date the facility qualified for interim status. Financial assurance requirements for interim status TSDs are found in 40 CFR 265 Subpart H, which is adopted by reference at WAC 173-303-400(3).

Under WAC 173-303-806(4)(a)(xv), owners/operators proposing new dangerous waste treatment, storage, and disposal facilities must submit a copy of the closure cost estimate and liability mechanisms with their dangerous waste permit application, which must be submitted before physical construction of the facility begins.

Dangerous waste recyclers and used oil processors that were newly subject to financial assurance requirements in 2005 have some time to develop and file their financial assurance mechanism for closure, as follows. Dangerous waste recyclers and used oil processors who were in existence on the effective date of new regulations (January 1, 2005) have three years to establish financial assurance for closure; that is, they must file financial assurance documents for closure no later than January 1, 2008. If a dangerous waste recycler or used oil processor chooses to use a trust fund to comply with financial assurance requirements for closure, they may pay into the trust fund over five years from the date of Ecology's approval of the closure plan.

For *new* dangerous waste recycling and used oil processing facilities, financial assurance must be established and submitted to Ecology at least 60 days before the facility accepts the first shipment of dangerous waste or used oil. (See WAC 173-303-620(4)(d)(iii).)

Under WAC 173-303-620(1)(e)(ii), owners/operators of dangerous waste treatment, storage, or disposal facilities who also own/operate dangerous waste recycling and used oil processing units at the same facility may choose to consolidate closure cost estimates and financial responsibility requirements into a single mechanism.

13.3.3 Wording of Financial Instruments

The mechanism that puts financial assurance in place and documents the amount of the financial assurance is referred to as a "financial instrument." Financial instruments commonly used for financial assurance include letters of credit, trust funds, surety bonds, insurance, financial tests, and corporate guarantees. The exact wording of the various financial instruments that may be used to demonstrate financial assurance is spelled out in WAC 173-303-620(10) which incorporates federal rules at 40 CFR 264.151 by reference. Be aware that the required wordings for the financial instruments for dangerous waste facilities may be different from those that a bank, insurance agency, or other financial assurance provider would normally use. Owners/operators should be sure your financial assurance provider is aware of the required language early in your negotiations.

13.3.4 Effect of Changes in Closure Cost Estimate on Financial Assurance

Changes in closure cost estimates will generally occur at least annually to account for inflation if not also for other reasons. If the closure cost estimate increases, the owner and operator must increase the face amount or obtain other supplementary financial assurance within 60 days. If the closure cost decreases, generally the owner/operator can decrease the financial assurance after receiving written approval from Ecology.

13.4 Financial Assurance for Closure

All dangerous waste management facilities eventually will close and costs for carrying out the closure will be incurred. The necessary funds for closure, therefore, must be available throughout the life of the facility so that the funds are available when the need to carry out closure occurs (whether planned or unplanned).

The amount of financial assurance required for closure is the amount of the closure cost estimate calculated according to the assumptions and process described in WAC 173-303-620(3) and Section 12.3.1 of this guidance. Owners/operators are reminded that the full amount of the closure cost estimate does not have to be spent to achieve closure as long as the closure performance standards are met (Section 12.3.2).

13.5 Mechanisms for Financial Assurance for Closure

Owners/operators of dangerous waste treatment, storage and disposal facilities, dangerous waste recyclers, and used oil processors can choose from among six financial mechanisms to demonstrate financial assurance for closure. (See WAC 173-303-620(4) which incorporates 40 CFR 264.143 by reference.) The six options are listed below and described in detail in the following sections. Please note that the choice of which financial mechanism to use is up to facility owners/operators. This guidance does not recommend any specific financial assurance mechanisms over others. The financial mechanisms from which facility owners/operators may choose are:

- Closure trust fund
- Surety bond guaranteeing payment into a closure trust fund
- Surety bond guaranteeing performance of closure
- Irrevocable letter of credit for closure
- Closure insurance
- Financial test or corporate guarantee[13]

13.5.1 Closure Trust Fund

A trust fund is an arrangement in which one party, the grantor, transfers cash, liquid assets, certificates of deposit, or government securities into a fund controlled by a special "custodian," the trustee, who manages the money for the benefit of one or more beneficiaries. A trust fund serves as a way for the owner/operator to set aside monies specifically earmarked for closure costs.

To select a closure trust fund, facility owners/operators must choose a financial institution that has the authority to act as a trustee and whose trust operations are regulated and examined by a federal or state agency. Banks and trust companies frequently serve as trustees.

To use a closure trust fund, facility owners/operators must satisfy the following requirements:

- **Dangerous waste recyclers and used oil processors** that were newly subject to financial assurance requirements in 2005 may establish a partially funded closure trust fund with a pay-in period of five years. Under WAC 173-303-620(4)(c)(i), payments into the trust fund must be made at least once each year after the date of Ecology's approval of the closure plan, to reach full funding

[13] Even though the financial test and corporate guarantee are often listed together, they are in fact two distinct mechanisms for providing financial assurance. They are related by the fact that the corporate guarantor must pass the financial test as well as meet other requirements described in Section 13.5.5.

by the fifth year. *New* recycling and used oil facilities choosing the trust fund mechanism must fully fund the trust at least 60 days before they accept their first shipment of waste.

- For TSD facilities, the trust fund must be fully funded at all times.
- Detailed requirements for closure trust funds are described in 40 CFR 264.143(a). The wording of the trust agreement must be identical to the wording specified in 40 CFR 264.151(a)(1), with the modifications noted in WAC 173-303-620(10). The trust agreement must be accompanied by a notarized certification of acknowledgment; an example of such a certification is provided at 40 CFR 264.151(a)(2). See also Section 13.11 below.
- Facility owners/operators who choose a closure trust fund must submit the following documents to Ecology:
  - An originally signed duplicate of the trust agreement.
  - The notarized certification of acknowledgment.
  - "Schedule A" of the trust agreement which includes the closure cost estimates.
  - "Schedule B" of the trust agreement which lists property used to establish the fund.
  - "Exhibit A" listing persons authorized to sign instructions.
  - "Receipt of Initial Payment" for partly funded trust funds from waste oil and recycling facilities. Fully funded TSD facilities must have a receipt of the total payment into the fund.

  A copy of the trust agreement must be placed in the waste management unit's operating record. Schedule A of the trust agreement must be updated within 60 days after a change in the amount of the current closure cost estimate covered by the agreement.

13.5.2 Surety Bond Guaranteeing Payment into a Closure Trust Fund and Surety Bond Guaranteeing Performance of Closure

A surety bond is a guarantee by a third party surety company that certain specified obligations will be fulfilled. If an owner/operator fails to meet those obligations, the surety company is liable for the obligation. There are two types of surety bonds:

Payment Bond - A payment bond will, in the event an owner and operator fails, fund a standby trust fund in an amount equal to the value of the bond; this is referred to as the "penal sum." The penal sum must be at least the amount of the current closure cost estimate.

Performance Bond - A performance bond guarantees that the owner and operator will perform the final closure in accordance with the closure plan and, for facilities

with permits, other requirements of the permit. In lieu of performing closure, the surety may pay the penal sum into a standby trust fund that funds closure. Interim status TSD facilities cannot use performance bonds.

Surety bonds only pay when the owner and operator fails to either pay for or perform closure activities. Owners/operators generally are obligated to repay surety companies.

It is somewhat unlikely that a small company operating as a TSD facility or a dangerous waste recycler or used oil processor would have the financial standing to be able to persuade a surety company to issue a bond. Small companies may want to pursue other mechanisms for financial assurance.

To use the surety bond mechanism, you must also establish a **standby trust fund.** A standby trust is similar to a standard trust, but is set up to function based upon contingent funding rather than direct funding. In other words, the trust is established—but remains unfunded—unless there is a default that triggers the surety bond. If this happens, payments from the surety bond are made directly to the trust and Ecology will direct the trustee of the standby trust fund to pay closure costs. In most cases, a standby trust fund is established with an initial nominal fee, which is agreed to by the owner/operator and the trustee.

To use a surety bond for closure, facility owners/operators must satisfy the following requirements:

- The surety company must be listed as an acceptable surety in the most recent version of U.S. Treasury *Circular 570.* This document is available online at http://www.fms.treas.gov/c570/
- Detailed requirements for surety bonds are described in 40 CFR 264.143(b) and (c). The wording of the surety bond documents must be identical to the wording specified in 40 CFR 264.151(b) and (c), with the modifications noted in WAC 173-303-620(10). See also Section 13.11 below.
- Facility owners/operators who choose a surety bond must submit the following documents to Ecology:
  - An originally signed duplicate of the surety bond, and
  - An originally signed duplicate of the standby trust agreement.

13.5.3 Irrevocable Letter of Credit for Closure

A letter of credit is a formalized agreement for a line of credit from a bank or another institution on behalf of an owner/operator. The line of credit will specify a beneficiary, such as the state, and a specific sum of money that will be made available during a specific time period.

To use a letter of credit assuring financial coverage for closure, facility owners/operators must satisfy the following requirements:

- The letter of credit must be irrevocable, issued for a period of at least one year, and be automatically renewable unless the issuing institution provides at least 120 days notice to the owner/operator and Ecology of a decision not to extend the expiration date. The letter must be issued in an amount at least equal to the current closure cost estimate. The issuing institution must be an entity that has the authority to issue letters of credit and whose letter-of-credit operations are regulated and examined by a federal or state agency.
- In addition to the letter of credit itself, the owner/operator must establish a **standby trust fund** into which any payments made by the issuing institution will be deposited. If the owner/operator fails to fulfill closure requirements, Ecology is entitled to direct the issuing institution to deposit funds into the standby trust fund.
- The owner/operator must increase the amount of the letter of credit within 60 days whenever the current cost estimate increases.
- Detailed requirements for letters of credit are described in 40 CFR 264.143(d). The wording of the letter of credit must be identical to the wording specified in 40 CFR 264.151(d), with the modifications noted in WAC 173-303-620(10). See also Section 13.11 below.
- Facility owners/operators who choose a letter of credit for closure must submit the following documents to Ecology:
  - A cover letter from the owner/operator referring to the letter of credit by number, issuing institution, and date, and providing the following information: the EPA Identification Number; the name and address of the facility; and the amount of funds assured for closure of the facility by the letter of credit.
  - An originally signed duplicate irrevocable letter of credit, and
  - An originally signed duplicate of the standby trust agreement.

13.5.4 Closure Insurance

A closure insurance policy is a contract through which one party guarantees another party's monies, usually a prescribed amount, to perform closure in return for premiums paid.

For a facility owner/operator to use insurance as the financial mechanism covering the cost of closure, the following requirements must be satisfied:

- The owner/operator must obtain an insurance policy for a face amount (the total money the insurer is obligated to pay under the policy) at least equal to the current closure cost estimate.
- If the closure cost estimate increases, the owner/operator must increase the face amount or obtain other supplementary financial assurance within 60 days.
- The policy must allow its assignment to a successor owner/operator.
- The policy must renew automatically. If the owner and operator fail to pay the premium, the insurer may cancel, terminate, or decide not to renew the policy only after 120 days written notice to the facility and to Ecology.
- The insurer must be licensed by a state or show that it is an excess line or surplus line company licensed by another state and approved by the State of Washington Office of the Insurance Commissioner; off-shore (foreign) insurers are not acceptable. In addition, the insurer must have a current rating of financial strength of:
  - AAA, AA+, AA, AA-, A+, A as rated by Standard and Poor's;
  - Aaa, Aa1, Aa2, Aa3, A1, A2 as rated by Moody's; or
  - A++, A+, A, A-, B++, B+ as rated by A.M. Best.[14]
- You must make sure that Ecology is named as the secondary beneficiary on an insurance policy used for this purpose.
- Detailed requirements for closure insurance are given in 40 CFR 264.143(e). The wording of the certificate of insurance must be identical to the wording specified in 40 CFR 264.151(e), with the modifications noted in WAC 173-303-620(10), subject to the additional requirement to name Ecology as secondary beneficiary. See also Section 13.11 below.
- Facility owners/operators who choose closure insurance must submit a witnessed or notarized certificate of insurance to Ecology.
- Ecology may request and the owner/operator must supply a signed duplicate original of the insurance policy.

13.5.5 Financial Test or Corporate Guarantee for Closure

The financial test or closely-related corporate guarantee mechanism of providing financial assurance for closure can be used either by a facility owner/operator, or through a parent company/guarantor which must in turn meet the same financial tests.

[14] Financial strength rating information can be found online or through many insurance agents. The websites for the rating companies are: www.standardandpoors.com, www.moodys.com, and www.ambest.com.

Financial Test. Corporate financial tests are a method for owners/operators to self-guarantee that they have the financial resources to pay for closure costs. Implicit in using a financial test is a reliance on Generally Accepted Accounting Principles to provide fairly represented accounting data. Corporate financial statements must be audited by an independent certified public accountant. If the accountant gives an adverse opinion or a disclaimer of opinion of the financial statements, you will need to use a different financial assurance mechanism and cannot use the financial test.

Owners/operators who choose the financial test have two alternatives to satisfy the requirements for financial assurance. The owner/operator must pass at least one of the two alternative financial tests specified below:

Financial Test for Closure—Alternative I
Alternative I has two parts. To pass this test, the owner/operator must satisfy the criteria in both Part 1 and Part 2.

Part 1. The owner/operator must meet **each** of the following criteria:

- Net working capital and tangible net worth each at least six times the current closure, post-closure, plugging, and abandonment cost estimates
- Tangible net worth is greater than $20 million
- At least ninety percent of total assets are located in the United States, **or,** if less than 90 percent, the total assets in the U.S. must be at least six times the current closure, post-closure, plugging, and abandonment cost estimates

AND

Part 2. The owner/operator must satisfy **two of the following three** ratios:

- Liabilities to net worth ratio less than 2
- Current assets to current liabilities ratio greater than 1.5
- Net income (plus depreciation, depletion, and amortization) to liabilities ratio greater than 0.1.

Financial Test for Closure—Alternative II
The owner/operator must meet **each** of the following criteria:

- Tangible net worth at least six times current closure, post-closure, plugging, and abandonment cost estimates
- Tangible net worth is greater than $20 million

- At least ninety percent of total assets are located in the United States, **or**, if less than 90 percent, at least six times the current closure, post-closure, plugging, and abandonment cost estimates

- The current bond rating for the most recent bond issuance is AAA, AA, A, or BBB as issued by Standard & Poor's, or Aaa, Aa, A, or Baa as issued by Moody's.

"Tangible net worth" means the tangible assets that remain after deducting liabilities; such assets do not include intangibles such as goodwill and rights to patents or royalties. (40 CFR 264.141)

In addition to passing at least one of the two financial tests above, facility owners/operators who wish to use the financial test mechanism for closure must satisfy the following requirements:

- Detailed requirements for the financial test are given in 40 CFR 264.143(f). The wording of the letter from the owner/operator's chief financial officer is specified in 40 CFR 264.151(f), with the modifications noted in WAC 173-303-620(10). See also Section 13.11 below.
- Facility owners/operators who choose to use the financial test must submit the following documents to Ecology:
  - A letter signed by the owner/operator's chief financial officer (CFO) as specified in 40 CFR 264.151(f).
  - A copy of the independent certified public accountant's report on examination of the owner/operator's financial statements for the latest completed fiscal year.
  - A special report from the independent CPA to the owner/operator stating that they have compared the data in the CFO's letter to the latest financial statements successfully. Updated versions of these documents must be submitted to Ecology within 90 days after the end of close of each fiscal year.

Corporate Guarantee. Under a corporate guarantee, a parent company guarantees to pay for closure of a subsidiary's facility, if necessary. The parent company (guarantor) must pass the financial test outlined above to show that it has adequate financial strength to provide the guarantee. The corporate guarantee should be used only by firms with adequate financial strength. The guarantor must be a direct corporate parent (a corporation that directly owns at least 50 percent of the voting stock of another corporation or subsidiary), a corporate grandparent (a corporation that indirectly owns over 50 percent of a company through a subsidiary), a sibling corporation (a corporation that shares the same parent corporation), or a firm with a substantial business relationship with the owner/operator.

"Substantial business relationship," as defined in 40 CFR 264.141(h), means the extent of a business relationship necessary under applicable state law to make a guarantee

contract issued incident to that relationship valid and enforceable. A substantial business relationship must arise from a pattern of recent or ongoing business transactions, in addition to the guarantee itself, such that a currently existing business relationship between the guarantor and the owner/operator is demonstrated to the satisfaction of Ecology.

In the event that an owner/operator fails to carry out final closure in accordance with the approved closure plan, the guarantor must perform the required closure activities or establish a trust fund to pay a third party to perform them.

To use the corporate guarantee mechanism for closure, facility owners/operators must satisfy the following requirements:

- The guarantor must pass the financial test (at least one of the two alternatives) as described above.
- Detailed requirements for the corporate guarantee are given in 40 CFR 264.143(f)(10). The wording of the required letter from the owner/operator's chief financial officer is specified in 40 CFR 264.151(f), with the modifications noted in WAC 173-303-620(10). See also Section 13.11 below.
- Facility owners/operators who choose to use the corporate guarantee must submit the following documents to Ecology:
  - The same three documents as required for the financial test (above). The letter from the guarantor's Chief Financial Officer must also cover the items specified in 40 CFR 264.143(f)(10). Updated versions of these documents must be submitted to Ecology within 90 days after the close of each fiscal year.
  - A certified and notarized originally signed duplicate copy of the corporate guarantee. The wording of the guarantee must be identical to the wording specified in 40 CFR 264.151(h), with the modifications noted in WAC 173-303-620(10). An updated version of the corporate guarantee must be submitted only if there is a change in the parent or subsidiary's name.

13.5.6 Alternative Financial Assurance Mechanisms for Closure

Ecology has the authority under WAC 173-303-620(1)(d) to replace all or part of the financial assurance requirements in an enforceable document with alternative requirements for financial assurance when Ecology:

- Applies alternative requirements for ground water monitoring, closure or post-closure under WAC 173-303-610(1)(d) or 173-303-645(1)(e); and
- Determines that it is not necessary to apply the financial requirements specified in the rule because the alternative requirements will protect human health and the environment.

Section 11.1 of this guidance discusses the circumstances under which Ecology might replace financial assurance requirements with alternative requirements.

Dangerous waste recyclers and used oil processors may request an alternative mechanism for financing the closure of recycling units. Under WAC 173-303-620(4)(e), an alternative mechanism can be proposed by a recycler or used oil processor. Ecology must then determine whether the alternative is equivalent to one of the six financial assurance methods described above. The regulations specify that this may include any alternative mechanism as may be established through action by the Washington State Legislature. As of May 2005, no such mechanism has been established.

If you want to consider an alternative financial assurance mechanism, you should contact Ecology's Financial Assurance Officer to discuss the type of alternative mechanism you are interested in and determine the information that Ecology will need to review the alternative mechanism for equivalency. Contact information for the Financial Assurance Officer is provided in Section 13.11.

13.5.7 Combinations of Mechanisms

A facility owner/operator may use certain financial assurance mechanisms in combination to cover the cost of closure for a facility. For example, a letter of credit could be used to cover the first $100,000 of closure costs and an insurance policy could cover the next $500,000 of closure costs. An owner and operator **can** combine trust funds, payment surety bonds, insurance policies, and letters of credit to meet financial assurance requirements. However, not all financial assurance mechanisms can be combined. Performance surety bonds, financial tests, and corporate guarantees **cannot** be used in combination to demonstrate financial assurance for closure. A single standby trust fund may be established for two or more mechanisms.

Owners/operators with more than one facility may use a single financial assurance mechanism to meet the cost of closure for these facilities. The dollar amount of the funds available for closure through the mechanism must be no less than the sum of funds that would be available if a separate assurance mechanism for closure had been established and maintained for each facility.

13.6 Liability Requirements

Financial assurance to cover liability claims is the second of the two parts of financial assurance. Financial assurance for liability ensures that, should an accident resulting in a release of hazardous constituents occur, money will be available to compensate third parties suffering bodily injury or property damage resulting from the accident. It is distinguished from financial assurance for closure by the fact that liability coverage is for unforeseen events having uniform levels of monetary coverage.

Dangerous waste treatment, storage, and disposal facilities and **dangerous waste recyclers and used oil processors** must meet the same liability coverage requirements for sudden accidental occurrences (defined below). TSDs at which dangerous waste is managed in certain types of units—typically units that involve contact of waste with the ground—also must provide liability coverage for non-sudden occurrences. Details about the amounts and types of coverage required are described below. Under WAC 173-303-620(8)(a)(ii), Ecology can file a claim against liability insurance when contamination occurs as a result of releases or discharges of dangerous waste or used oil from recycling units to waters of the state. Waters of the state are defined in Chapter 90.48 RCW and include ground waters.

13.6.1 Amount of Coverage Required

Two types of liability coverage may be required, depending on the type of unit/facility involved. These two types of liability coverage are "sudden" and "non-sudden." They are defined below, together with the types of units/facilities required to have them, and the minimum liability amounts.

Coverage for <u>sudden</u> accidental occurrences. Under WAC 173-303-620(8)(a), which incorporates 40 CFR 264.147(a) by reference, all TSDs, recyclers, and used oil processors must have coverage for sudden accidental occurrences. A sudden accidental occurrence is an event that is not continuous or repeated. Examples of sudden accidental occurrences are fires and explosions. Coverage amounts for sudden accidental occurrences are specified by regulation. Coverage must be in the amounts of:

- $1 million per occurrence; and
- $2 million annual aggregate, exclusive of legal defense costs.

Coverage for <u>non-sudden</u> accidental occurrences. Under WAC 173-303-620(8)(b), which incorporates 40 CFR 264.147(b) and 40 CFR 264.174(f) through (j) by reference, all owners/operators of dangerous waste surface impoundments, landfills, land treatment units, and miscellaneous units must have coverage for non-sudden occurrences. A non-sudden accidental occurrence is an event that takes place over time and involves continuous or repeated exposure to dangerous waste. An example of a non-sudden accidental occurrence is a leaking surface impoundment that contaminates a drinking water source over time. Coverage amounts for non-sudden occurrences are specified by regulation. Coverage must be in the amounts of:

- $3 million per occurrence; and
- $6 million annual aggregate, exclusive of legal defense costs.

Owners/operators who need coverage levels for both sudden and non-sudden accidental occurrences must maintain liability coverage in the amount of at least:

- $4 million per occurrence ($1 million sudden plus $3 million non-sudden) and

- $8 million annual aggregate ($2 million sudden plus $6 million non-sudden) (See 40 CFR 264.147(b).)

13.7 Mechanisms for Demonstrating Liability Coverage

The available financial mechanisms that can be used to demonstrate compliance with requirements for liability coverage are similar, but not identical, to those described above for financial assurance for closure. As with financial assurance for closure, facility owners/operators choose the financial mechanism they wish to use for liability coverage from a list of available mechanisms. Available mechanisms are:

- Trust fund for liability coverage
- Irrevocable letter of credit for liability coverage
- Surety bond for liability coverage
- Liability insurance
- Financial test or corporate guarantee

13.7.1 Trust Fund for Liability Coverage

A trust fund for liability coverage must be funded for the full amount of the liability coverage to be provided by the trust fund before it may be relied upon to satisfy financial assurance requirements. If at any time after the trust fund is created the amount of funds in the trust fund falls below the full amount of the required liability coverage, the owner/operator, by the anniversary date of the establishment of the fund, must either add sufficient funds to the trust fund or obtain other financial assurance to cover the difference.

For a facility owner/operator to use a trust fund as the mechanism for liability coverage, the following requirements must be satisfied:

- The trustee must be an entity which has the authority to act as a trustee and whose trust operations are regulated and examined by a federal or state agency. Banks and trust companies frequently serve as trustees.
- Detailed requirements for trust funds are described in 40 CFR 264.147(j). The wording of the trust agreement must be identical to the wording specified in 40 CFR 264.151(m)(1), with the modifications noted in WAC 173-303-620(10). The trust agreement must be accompanied by a notarized certification of acknowledgment; an example of such a certification is provided at 40 CFR 264.151(m)(2). See also Section 13.11 below.
- Facility owners/operators who choose a trust fund for liability coverage must submit the following documents to Ecology:

- An originally signed duplicate of the trust agreement, including Schedules A and B and Exhibit A, and
- A notarized certification of acknowledgement.

13.7.2 Surety Bond for Liability Coverage

As described in Section 13.5.2, a surety bond is a guarantee by a surety company that certain specified obligations will be fulfilled. Note that in contrast to a surety bond for closure, owners/operators choosing a surety bond for liability do not need to establish a standby trust. Also, a surety bond for liability cannot be for performance, it must be a surety bond for payment.

- The surety company must be among those listed as acceptable sureties on federal bonds in the most recent version of U.S. Treasury *Circular 570.* This document is available online at http://www.fms.treas.gov/c570/.

- Detailed requirements for surety bonds for liability coverage are described in 40 CFR 264.147(i). The wording of the surety bond documents must be identical to the wording specified in 40 CFR 264.151(l), with the modifications noted in WAC 173-303-620(10). See also Section 13.11, below.

- Facility owners/operators who choose a surety bond for liability coverage must submit a copy of the surety bond to Ecology.

13.7.3 Irrevocable Letter of Credit for Liability Coverage

As described in Section 13.5.3, a letter of credit is a formalized agreement for a line of credit from a bank or another institution on behalf of an owner/operator. The line of credit will specify a beneficiary, such as the state, and a specific sum of money that will be made available during a specific time period.

An owner/operator may satisfy the requirements for liability coverage by obtaining an irrevocable standby letter of credit for the full amount of required coverage. To use a letter of credit for liability coverage, facility owners/operators must satisfy the following requirements:

- The financial institution issuing the letter of credit must be an entity that has the authority to issue letters of credit and whose letter of credit operations are regulated and examined by a federal or state agency.
- An owner/operator who uses a letter of credit may also establish a standby trust fund. The trustee of the standby trust fund, if used, must be an entity that has the authority to act as a trustee and whose trust operations are regulated and examined by a federal or state agency.

- Detailed requirements for letters of credit for liability coverage are described in 40 CFR 264.147(h). The wording of the letter of credit must be identical to the wording specified in 40 CFR 264.151(k), with the modifications noted in WAC 173-303-620(10). The wording of the standby trust fund, if used, must be identical to the wording specified in 40 CFR 264.151(n) , with the modifications noted in WAC 173-303-620(10). See also Section 13.11 below.
- Facility owners/operators who choose a letter of credit for liability coverage must submit a copy of the irrevocable letter of credit to Ecology.

13.7.4 Liability Insurance

An owner/operator may demonstrate the required liability coverage by having liability insurance in the required amount. For a facility owner/operator to use insurance as the mechanism for liability coverage, the following requirements must be satisfied:

- Each insurance policy must be amended by attaching the Dangerous Waste Facility Liability Endorsement or evidenced by a Certificate of Liability Insurance.
- The insurer must be licensed by a state; off-shore insurers are not acceptable. Insurance companies providing liability coverage must have a current rating of financial strength of:
  - AAA, AA+, AA, AA-, A+, A as rated by Standard and Poor's;
  - Aaa, Aa1, Aa2, Aa3, A1, A2 as rated by Moody's; or
  - A++, A+, A, A-, B++, B+ as rated by A.M. Best[15]
- Owners/operators must notify Ecology within 30 days of any claim or judgment for bodily injury or property damage arising from the operation of the facility. See 40 CFR 264.147(a)(7) and (b)(7).
- Detailed requirements for liability insurance are given in 40 CFR 264.147(a) and (b). The wording of the Dangerous Waste Facility Liability Endorsement must be identical to the wording specified in 40 CFR 264.151(i), with the modifications noted in WAC 173-303-620(10). The wording of the certificate of insurance must be identical to the wording specified in 40 CFR 264.151(j), with the modifications noted in WAC 173-303-620(10). See also Section 13.11 below.
- Facility owners/operators who choose liability insurance must submit the following documents to Ecology:
  - A signed duplicate original of the Dangerous Waste Facility Liability Endorsement or the certificate of insurance, and
  - If requested by Ecology, a signed duplicate original of the insurance policy.

[15] Financial strength rating information can be found online or through many insurance agents. The websites for the rating companies are: www.standardandpoors.com, www.moodys.com, and www.ambest.com.

13.7.5 Financial Test or Corporate Guarantee for Liability Coverage

The financial test mechanism of providing financial assurance for liability can be used either by a facility owner/operator, or through a parent company/guarantor which must, in turn, meet the same financial tests.

Financial Test. Corporate financial tests are a method for owners/operators to self-guarantee that they have the financial resources to pay up to the specified level of damages in case of accidental occurrences at the facility. Implicit in using a financial test is a reliance on Generally Accepted Accounting Principles to provide fairly-represented accounting data. Corporate financial statements must be audited by an independent certified public accountant. If the accountant gives an adverse opinion or a disclaimer of opinion of the financial statements, you will need to use a different financial assurance mechanism and cannot use the financial test.

To use the financial test mechanism, an owner/operator must pass the following financial test, and satisfy additional requirements as outlined below. To pass this test the owner/operator must meet the criteria of Alternative I **or** Alternative II:

Financial Test for Liability—Alternative I
The owner/operator must meet **all** of the following three criteria:

- Net working capital and tangible net worth each at least six times the amount of liability coverage to be demonstrated by this test; and
- Tangible net worth of at least $20 million; and
- Assets in the United States amounting to at least 90 percent of total assets; or, if less than 90 percent, the total assets in the U.S. must be at least six times the amount of liability coverage to be demonstrated by this test.

Financial Test for Liability—Alternative II
The owner/operator must meet **all** of the following four criteria:

- A current rating for his most recent bond issuance of AAA, AA, A, or BBB as issued by Standard and Poor's, or Aaa, Aa, A, or Baa as issued by Moody's; and
- Tangible net worth of at least $20 million; and
- Tangible net worth at least six times the amount of liability coverage to be demonstrated by this test; and
- Assets in the United States amounting to at least 90 percent of total assets; **or** if less than 90 percent, the total assets in the U.S. must be at least six times the amount of liability coverage to be demonstrated by this test.
- Additional detailed requirements for the financial test for liability coverage are given in 40 CFR 264.147(f).

- Facility owners/operators who choose to use the financial test for liability coverage must submit the following documents to Ecology:
  - A letter signed by the owner/operator's Chief Financial Officer (CFO) as specified in 40 CFR 264.151(g),
  - A copy of the independent certified public accountant's report on examination of the owner/operator's financial statements for the latest completed fiscal year, and
  - A special report from the independent CPA to the owner/operator stating that they have compared the data in the CFO's letter to the latest financial statements successfully. Updated versions of these documents must be submitted to Ecology within 90 days after the end of close of each fiscal year.

Corporate Guarantee for Liability Coverage. An owner/operator may meet the liability coverage requirements of a subsidiary's facility by obtaining a written guarantee. The guarantor must be the direct or higher-tier parent corporation of the owner or operator, a firm whose parent corporation is also the parent corporation of the owner or operator, or a firm with a substantial business relationship with the owner or operator.

"Substantial business relationship," as defined in 40 CFR 264.141(h), means the extent of a business relationship necessary under applicable State law to make a guarantee contract valid and enforceable. A substantial business relationship must arise from a pattern of recent or ongoing business transactions, above and beyond the guarantee itself, such that a currently existing business relationship between the guarantor and the owner or operator is demonstrated to the satisfaction of Ecology.

For a facility owner/operator to use the corporate guarantee for liability coverage, the following requirements must be satisfied:

- The guarantor must pass the financial test for liability (Alternative I or II) specified above.
- Detailed requirements for the corporate guarantee for liability coverage are given in 40 CFR 264.147(g). The wording of the guarantee must be identical to the wording specified in 40 CFR 264.151(h)(2), with the modifications noted in WAC 173-303-620(10). See also Section 13.11 below.
- Facility owners/operators who choose the corporate guarantee for liability coverage must submit the following documents to Ecology:
  - In addition to the three items required for the financial test (above), the required letter from the guarantor's CFO must also cover the items listed in 40 CFR 264.147(g)(1).
  - The owner/operator must also submit a certified and notarized original copy of the guarantee.

For corporations incorporated outside the United States, see 40 CFR 264.147(g)(2).

13.7.6 Combinations of Mechanisms for Liability Coverage

An owner/operator may demonstrate the required liability coverage through the use of combinations of insurance, financial test, guarantee, letter of credit, surety bond, and trust fund, *except* that the owner or operator may not combine a financial test covering part of the liability coverage requirement with a guarantee unless the financial statement of the owner or operator is not consolidated with the financial statement of the guarantor. If the owner/operator demonstrates the required coverage using a combination of financial assurances, the owner/operator must specify at least one such assurance as "primary" coverage and the other assurance as "excess" coverage. (See 40 CFR 264.147(a)(6) and (b)(6).)

13.8 Other Provisions Related to Liability Coverage

13.8.1 Continuous Coverage

Liability coverage is required continuously, until certification of closure of the dangerous waste facility, recycler, or used oil processor. (See WAC 173-303-620(8)(e).)

13.8.2 Request for Variance

If a facility owner/operator can demonstrate to the satisfaction of Ecology that the required levels of financial responsibility for liability are not consistent with the degree and duration of risk associated with the facility or group of facilities, the owner/operator may seek a variance from Ecology under WAC 173-303-620(8)(c). The request for a variance must be submitted to Ecology as part of the application under WAC 173-303-806(4) for dangerous waste recyclers, used oil processors, and TSDs operating under interim status, or pursuant to the procedures for permit modification under WAC 173-303-830 for a facility that has a permit.

If granted, the variance would take the form of an adjusted level of required liability coverage, based on Ecology's assessment of the risk associated with the ownership or operation of the facility or group of facilities. To enable Ecology to determine an appropriate level of financial responsibility for liability other than that required, the department may require an owner/operator who requests a variance to provide technical and engineering information as requested by Ecology.

13.8.3 Adjustments by Ecology

If Ecology determines that the levels of financial responsibility for liability are not consistent with the degree and duration of risk associated with treatment, storage, or disposal at the facility or group of facilities, it has authority under WAC 173-303-620(8)(d) to adjust the level of financial responsibility required for sudden or non-

sudden occurrences as necessary to protect human health and the environment. This adjusted level will be based on Ecology's assessment of the risk associated with the ownership or operation of the facility or group of facilities.

In addition, if Ecology determines that there is a significant risk from non-sudden accidental occurrences resulting from the operations at a facility that does not have dangerous waste surface impoundments, landfills, land treatment units, and miscellaneous units, it may require the owner/operator to obtain non-sudden liability insurance for other units such as dangerous waste recycling units, used oil processing units, and tank and container storage units.

An owner/operator must furnish to Ecology any information that Ecology requests to determine whether cause exists for such adjustments of level or type of coverage. For TSDs with final status permits, any adjustments of level or type of coverage for a facility that has a permit will be treated as a permit modification under WAC 173-303-830.

13.8.4 Liability Coverage for Multiple Facilities

The liability minimums apply regardless of the number of facilities held by an owner/operator. Therefore, someone owning multiple facilities needs only one set of coverage for the required amount. For example, suppose an owner/operator has Facility A that, by itself, would require $1 million/$2 million to cover sudden accidental occurrences and Facility B that requires $4 million/$8 million to cover both sudden and non-sudden liability. This owner/operator is in compliance for both facilities if they maintain $4 million/$8 million coverage. They do not need an additional $1 million/$2 million of coverage.

13.9 What to Do in Case of Incapacity of Owners/Operators, Guarantor, or Financial Institutions

Under WAC 173-303-620(9), an owner/operator must notify Ecology by certified mail within 10 days of the commencement of a Title 11 Bankruptcy proceeding naming the owner/operator as debtor. A guarantor of a corporate guarantee as specified in 40 CFR 264.143(f) must make such a notification if the guarantor is named as debtor, as required under the terms of the corporate guarantee.

An owner/operator who fulfills the financial assurance requirements by obtaining a trust fund, surety bond, letter of credit, or insurance policy will be considered to be without the required financial assurance or liability coverage in the event of bankruptcy of the trustee or issuing institution, or a suspension or revocation of the authority of the trustee institution to act as trustee or of the institution issuing the surety bond, letter of credit, or insurance policy to issue such instruments. The owner/operator must establish other financial assurance or liability coverage within 60 days after such an event.

13.10 Releasing the Owner/Operator From Financial Assurance Requirements After the Completion of Closure

After certification of closure and upon request by the facility, Ecology will determine whether it can release the owner/operator from the financial assurance requirements for closure. In accordance with WAC 173-303-610(6), the facility owner/operator must certify that the waste management unit or facility was closed in accordance with specification of the approved closure plan. The certification must be signed by the owner/operator of the facility and the independent registered professional engineer. Ecology may request additional information to substantiate that the closure has been completed.

Even if the approved closure plan has been completely implemented, Ecology may delay releasing the owner from the requirements of financial assurance (and the return of any excess funds held by the chosen financial assurance instrument), until the facility meets all performance standards for clean closure in WAC 173-303-610(2) and Section 2.0 of this guidance. For example, if contamination in soil above the performance standards is still in place even after the facility implements the approved closure plan, Ecology may delay releasing the owner/operator from closure financial assurance until either 1) that facility achieves the soil clean closure standards, or 2) financial assurance is in place for corrective action at the facility.

13.11 Wording of Financial Instruments

Owners/operators do not have to worry about preparing the wording of financial assurance documents. The exact wording of the various types of documents that can be used for financial assurance are included in federal regulations at 40 CFR 264.151, with the modifications noted in WAC 173-303-620(10). Standard versions of these documents are available from Ecology's Hazardous Waste and Toxics Reduction Program's financial assurance officer at:

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Hazardous Waste and Toxics Reduction Program
Department of Ecology
PO Box 47600
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13.12 Differences Between EPA's and Washington's Financial Responsibility Requirements

The following differences between EPA's and Washington's financial responsibility requirements apply to all facilities:

- To use the financial test/corporate guarantee mechanism, Washington's regulations require a $20 million minimum tangible net worth for the owner/operator or guarantor. Federal rules currently require a $10 million minimum. (See WAC 173-303-620(4)(c)(iv) and WAC 173-303-620(8)(a)(iii).)
- Washington's regulations prescribe minimum financial strength ratings for insurance companies that provide either closure insurance or liability insurance:
  - AAA, AA+, AA, AA-, A+, A as rated by Standard and Poor's;
  - Aaa, Aa1, Aa2, Aa3, A1, A2 as rated by Moody's; or
  - A++, A+, A, A-, B++, B+ as rated by A.M. Best;
- Washington's regulations require that Ecology be named the secondary beneficiary on insurance for closure. (See WAC 173-303-620(4)(c)(iii).)
- Washington's regulations provide explicitly that Ecology may file claims against liability insurance. (See WAC 173-303-620(8)(a)(ii).)
- Washington's regulations require TSD facilities to fully fund a closure trust fund, if used. Federal rules allow a multi-year pay-in period. (See also the special rule allowing a five-year pay-in period for existing dangerous waste recyclers and used oil processors that use a trust fund for closure.)
- The prescribed wording of financial instruments (40 CFR 264.151) is modified by WAC 173-303-620(10) to account for the fact that Ecology, rather than EPA, administers the program in Washington. For example, the words "EPA" or "Regional Administrator" are replaced by "Washington State Department of Ecology" and the words "hazardous waste" are replaced with "dangerous waste."

Differences that apply to dangerous waste recyclers and used oil processors:

- In Washington, facilities that receive dangerous waste or used oil from off site for recycling or processing are required to comply with financial assurance requirements. In general, the financial assurance requirements that apply to dangerous waste recyclers and used oil processors are the same as those that apply to TSDs. There are a few exceptions, as follows:
  - Washington's regulations allow dangerous waste recyclers and used oil processors newly subject to financial assurance requirements in 2005 to establish a partially funded closure trust fund with a pay-in period of five years.
  - Washington's regulations provide 36 months (until January 1, 2008) for existing recyclers and used oil facilities to establish their selected financial assurance mechanism. If they select the trust fund mechanism for closure, they have five years from the date of Ecology's approval of the closure plan to fully fund the trust fund.

- Dangerous waste recyclers and used oil processors may request an alternative mechanism to finance the closure of recycling units, on a case-by-case basis. (See WAC 173-303-620(4)(e).)
- Dangerous waste recyclers and used oil processors are allowed to exclude the estimated value of certain recyclable materials from the estimated cost of closing a recycling or oil processing unit. (See WAC 173-303-620(3)(a)(iii).)

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