



MEMORANDUM

Subject: Guidelines for Evaluating and Adjusting the Post-Closure Care Period for Hazardous Waste Disposal Facilities under Subtitle C of RCRA

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To: RCRA Division Directors, Regions 1-10
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Purpose

The purpose of this memorandum is to provide guidance to assist regulators in evaluating the length of the post-closure care period for hazardous waste disposal facilities subject to Subtitle C of the Resource Conservation and Recovery Act (RCRA), and in determining whether it should be adjusted. This guidance also provides information to assist facility owners and operators in preparing documentation to support a decision to adjust the post-closure care period.

Introduction and Need for Guidance

The RCRA Subtitle C hazardous waste management regulations establish a post-closure¹ care period for certain hazardous waste treatment, storage and disposal facilities, and specify post-closure care activities. These activities consist of two primary responsibilities: monitoring and reporting; and maintaining waste containment systems (see 40 CFR 264/265.117). The regulations generally provide that post-closure care for each hazardous waste management unit subject to the regulations must begin after completion of closure of the unit and continue for 30 years after that date, although they also provide discretion to the permitting authority to adjust the post-closure period.

Post-closure care requirements apply to land disposal units that leave hazardous waste in place after closure. These include landfills, land treatment units, surface impoundments, and other units (e.g., certain tanks or containment buildings) where the constructed unit has been removed, but not “clean

¹ Post-closure can be generally described as the period of time after closure during which owners and operators conduct specified monitoring and maintenance activities to preserve the integrity of the containment system and to continue to prevent or control releases of contaminants.

closed”² due to residual subsurface contamination.

Many facilities around the country are now approaching the end of the initial 30-year post-closure period established in their RCRA permits or post-closure plans. Accordingly, questions have arisen about how to determine whether the post-closure care period needs to be adjusted—that is, extended or shortened, or whether a 30-year post-closure period is adequate for a given situation. In response, the Office of Resource Conservation and Recovery has developed this guidance to assist regulators in determining whether the post-closure care periods for hazardous waste disposal facilities under Subtitle C of RCRA should be adjusted.³ The U.S. Environmental Protection Agency (EPA) anticipates that the regulated community may also find this information useful. This guidance recommends criteria for consideration in ensuring that human health and the environment will be adequately protected in making decisions to adjust the post-closure care period, and sets forth a recommended process for preparing for and making an evaluation of the post-closure care period in a timely fashion. Finally, this guidance also discusses additional considerations that may be important for decision makers when evaluating the adequacy of the post-closure care period.

Regulatory Overview of the Post-Closure Care Period

According to 40 CFR §§ 264.117 (for permitted facilities) and 265.117 (for interim status facilities) the post-closure care period begins after completion of closure of the hazardous waste management unit and continues for 30 years after that date.

Still, the regulations’ identification of a 30-year post-closure care period does not reflect a determination by EPA that 30 years of post-closure care is necessarily sufficient to eliminate potential threats to human health and the environment in all cases. In fact, the regulations provide authority for a permit authority to conduct a case-by-case review of the post-closure care period and to establish arrangements to adjust the length of the post-closure care period on a facility-specific basis, where the record supports a determination that the revised post-closure period will protect human health and the environment.⁴

² The RCRA Subtitle C regulations generally provide for closure by removal or decontamination (“clean closure”) and closure with waste in place. The premise of clean closure is that all hazardous wastes have been removed from a given RCRA unit and any releases at or from the unit have been remediated so that further regulatory control under RCRA Subtitle C is not necessary to protect human health and the environment. More information on clean closure is available in *Memorandum: Risk-Based Clean Closure* from Elizabeth Cotsworth, Acting Director Office of Solid Waste, March 16, 1998.

³ This document is solely intended to provide guidance to EPA personnel on implementing the RCRA Subtitle C regulations and to provide policy advice and recommendations. As such, this document does not impose any legally binding requirements, and the use of such phrases as “guidance,” “recommend,” “may,” “should,” and “can,” are not intended to impose or connote any legal obligations. Accordingly, this document does not change or substitute for any law, regulation, or any other legally binding requirement and is not legally enforceable. The policies described in this document may not apply to a particular situation based upon the circumstances, and EPA may deviate from or revise any of the policies described in this document without prior notice to the public. While EPA has made every effort to ensure the accuracy of the discussion in this document, the obligations of the regulated community are determined by statutes, regulations or other legally binding requirements. In the event of a conflict between the discussion in this document and any statute or regulation, this document would not be controlling.

⁴ EPA explained this approach early in the RCRA program. See 45 Fed. Reg. 33197 (May 19, 1980); see also 47 Fed. Reg. 32287-88 (July 26, 1982); 46 Fed. Reg. 2819 (Jan. 12, 1981).

The regulations provide that the decision to alter the length of the post-closure care period can be made any time preceding partial closure⁵ of a hazardous waste management unit subject to post-closure care or final closure⁶, or any time during the post-closure care period for a particular unit.

Any decision to extend or shorten the post-closure care period must be made on the basis of protection of human health and the environment. For permitted facilities, such a decision must be made through the permit renewal or modification procedures in 40 CFR parts 124 and 270. For interim status facilities, adjustment to the post-closure care period must be made in accordance with § 265.118(g).

For more details on particularly relevant portions of the federal RCRA hazardous waste regulations, see Appendix A.

Criteria to Consider for Extending or Shortening the Post-Closure Care Period

As stated in the previous section, the decision to adjust the post-closure care period will be made on a facility or unit-specific basis by the permitting authority, typically based on the most recent information available. EPA recommends that the criteria set out in this section be considered in determining whether to adjust the post-closure care period. These criteria can also be periodically used to evaluate whether activities in the post-closure care plan could themselves be amended. For instance, if the regulator determines it is necessary to extend the post-closure care period, these criteria can be used to determine if the frequency of one or more post-closure care monitoring requirements could be reduced during that extended timeframe.

Each of the criteria presented is not necessarily appropriate for every unit in post-closure care. The questions provided under each criterion are intended to help identify potential threats to human health and the environment. However, they do not all need to be answered in order to make a decision concerning the appropriate post-closure care period.

Presence of hazardous waste: Because many hazardous wastes degrade slowly or do not degrade under containment in these units, the continued presence of hazardous waste in the unit (i.e., any case other than clean closure) indicates the potential for unacceptable impacts on human health and the environment in the future if post-closure care is not maintained, and suggests that post-closure care should be extended, even if there is no current evidence of actual releases from the facility. This should be considered in combination with the other criteria.

Nature of hazardous wastes remaining in the unit: What is the degree of hazard associated with the wastes in the unit? Are the wastes highly toxic? Do they degrade into substances that are more or less toxic, or non-toxic? What is the potential for adverse impacts from releases based on contaminant fate and transport considerations (e.g., presence of persistent, bioaccumulative contaminants, as compared to biodegradable contaminants; presence of highly mobile constituents)? Are there indications that the waste may become unstable? The properties of the hazardous waste (e.g., degradation, solubility)

⁵ *Partial closure* is defined in 40 CFR 260.10 as “the closure of a hazardous waste management unit in accordance with the applicable closure requirements of parts 264 and 265 of this chapter at a facility that contains other active hazardous waste management units. For example, partial closure may include the closure of a tank (including its associated piping and underlying containment systems), landfill cell, surface impoundment, waste pile or other hazardous waste management unit, while other units of the same facility continue to operate.”

⁶ *Final closure* is defined in 40 CFR 260.10 as “the closure of all hazardous waste management units at the facility in accordance with all applicable closure requirements so that hazardous waste management activities under parts 264 and 265 of this chapter are no longer conducted at the facility unless subject to the provisions in § 262.34.”

provide an important indication of the waste's ability to migrate or be dispersed in the environment. EPA recommends that current data from applicable media be available or collected for comparison to facility-specific performance goals articulated in the post-closure care plan, and that, as necessary, the plan be updated to account for any new information on toxicity and carcinogenicity.

Type of unit: Is the unit, for example, a landfill, a surface impoundment, or a closed tank with residual contamination? To what extent does the overall design and construction of the unit minimize the need for long-term maintenance, resist the generation of leachate and emissions, and contain any remaining waste in perpetuity?

It is recommended that the permitting authority consider any unit-specific closure and post-closure requirements when evaluating whether adjustment of the post-closure care period is warranted to protect against any potential impact on human health and the environment. There can be circumstances in which continuing to maintain unit-specific controls may be necessary to protect human health and the environment; this could support a decision to extend the post-closure care period. For example, if hazardous constituents would continue to be produced (as a degradation product) from wastes that remain in the unit, an extension of the post-closure care period may be necessary to ensure that the containment system continues to function properly.

Leachate: Will the leachate collection system integrity and function, leachate generation rate⁷, and leachate quality remain sufficient to prevent harm to human health or the environment in the absence of post-closure care? Can the facility owner or operator show through monitoring and modeling that the leachate would not pose a threat to human health and the environment because it does not exceed applicable standards? Will those standards likely be exceeded in the future, for example, through formation and release of degradation products? Do the data demonstrate that there are no increasing trends in the concentration of leachate constituents? Can the facility owner or operator demonstrate that maintenance and operation of the leachate collection system can be ceased without posing a threat to human health and the environment?

Groundwater: It is important that groundwater analytical results, adequacy of the groundwater monitoring network, and groundwater monitoring well integrity be evaluated. Is groundwater quality in compliance with current standards? Have there been changes or are changes anticipated in land use/groundwater use that could change the applicable standards (e.g., introduction of agricultural irrigation to an area)? Are there additional substances not addressed in the current permit that ought to be considered, for example, because of changes in the composition of the wastes in the landfill over the post-closure care period? Has an expanded list of analytes (e.g., Appendix VIII of part 261) been analyzed within a reasonable time frame? Have the monitoring wells been maintained to provide valid data, for example no well screen occlusion?

Siting and site geology/hydrogeology: Relevant facility location characteristics (which might have changed since the post-closure plan was approved) may include proximity to vulnerable areas such as residential areas and surface and drinking water sources. The current and reasonably anticipated future land use of the facility and surrounding properties may also be relevant. Location in potentially vulnerable areas increases the likelihood and potential severity of releases. For example, if units are located in areas prone to flooding, it may be appropriate for reviewers to consider the potential for

⁷ "If leachate is generated well into the post-closure care period, this could suggest a cover or liner failure warranting an extension of the post-closure care period." See page B-13 of the RCRA Guidance Manual for Subpart G Closure & Post-Closure Care Standards and Subpart H Cost estimating Requirements, EPA/530-SW-87-010 (January, 1987).

continuing risks to surface water from washout in evaluating whether extension of the post-closure care period is necessary. Additional hydrologic and geologic conditions such as wetlands and earthquake zones, unstable soils, and areas at risk for subsurface movement might also need to be taken into account. Proximity to residential areas can also present unique considerations. It may be appropriate to consider whether facility conditions minimize the potential for adverse impact on local populations if there is a release from the unit.

What is the distance to sensitive receptors for groundwater flow and emissions? Could the distance to sensitive receptors change under reasonably foreseeable future conditions, as reflected, for example, in land use development plans for the area? Is there the potential for impact on surface water quality? Have new potential exposure pathways been identified and evaluated? For example, vapor intrusion had not been identified as a potential exposure pathway at the time many permits were issued.

In addition, EPA recommends that the potential effects of climate change also be taken into account in making these assessments.⁸ For example, flooding from more intense and frequent storms and sea-level rise may lead to contaminant releases from units subject to post-closure requirements by transport of contaminants through surface soils, groundwater, surface waters and/or coastal waters. Saltwater intrusion and increased groundwater salinity in coastal aquifers may increase the permeability of clay liners installed at waste sites, such as landfills. Changes in precipitation patterns and temperature may also adversely affect the performance and efficacy of engineering controls.

Facility history: Has past noncompliance with regulatory requirements contributed to present environmental conditions that warrant extension of the post-closure care period? What is the history of releases and current contaminant levels? Are analyses being conducted for the correct parameters? How complete and accurate is the facility operating record? Is there confidence that the record accurately reflects spills, releases, lapses in maintenance or other events that may have a bearing on potential facility impacts?

In order to fully understand the facility history, EPA recommends that the permit authority also review the closure plan and certification of closure. To what extent were closure activities conducted in a manner that minimized the need for further maintenance and controls? To what extent have closure activities minimized or eliminated escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere during the post-closure care period?⁹

Gas collection system integrity: Is there a landfill gas capture system, and if so, to what extent is it capable of being modified or shut down at the end of the post-closure care period without exceeding emission levels that are consistent with applicable regulatory standards and with public safety at the facility? It is recommended that statistical or graphical analysis of the data be used to identify any significant increasing trends in gas emissions.

Integrity of cover system: To what extent will the integrity of the cover system be preserved in the absence of long-term care? Has the cover system been designed and maintained to minimize migration of water into the management unit and to prevent contaminants from escaping into the environment? Has periodic testing or inspection been conducted to identify and assure any necessary repairs? Potential

⁸ For more information on climate change adaptation consult the “Climate Change Adaptation Technical Fact Sheet: Landfills and Containment as an Element of Site Remediation,” EPA 542-F-14-001 (May 2014).

⁹ For further information on closure performance standards, see 40 CFR §§ 264.111 and 265.111.

concerns include differential settlement, problems with cover integrity (cracks, burrows, etc.), cover drainage, and the adequacy of the diversion or drainage system. Even where such problems have not occurred, are they likely to arise without long-term care, e.g., will the cover system remain intact without mowing to prevent growth of trees? For alternative covers, it is recommended that the potential effects of climate change (e.g., increasing frequency and intensity of weather events) be taken into account. For example, will the vegetation remain viable under altered precipitation patterns?

Long-term care: The concept of long-term care (also known as long-term stewardship) generally includes the establishment and maintenance of physical and legal controls that are necessary to prevent inappropriate exposure to contaminated environmental media left in place at a site or closed facility. As a general matter, the RCRA post-closure care requirements (for example, monitoring and cap maintenance) fall under the umbrella of long-term care. When considering whether to adjust the post-closure care period, regulatory authorities should evaluate any continuing need to maintain engineering controls (ECs)¹⁰, particularly those specified in the RCRA post-closure regulations. How will the potential for human exposure to contamination be minimized in the absence of RCRA post-closure care? How is the integrity of the whole containment system going to be preserved over time? Can maintenance and monitoring activities cease or be reduced without causing an adverse impact to human health and the environment?

A further need to maintain ECs would likely justify an extension of the post-closure care period. This may be the case even if the frequency of some activities could be adjusted (e.g., some activities may be needed more frequently in the early years of the post-closure care period).

The RCRA post-closure regulations provide for the imposition of institutional controls (ICs)¹¹ as well. For example, §§ 264.117(c) and 265.117(c) provide that post-closure uses of a property where hazardous wastes remain after final or partial closure must *never* [emphasis added] be allowed to disturb the integrity of the containment system or the functioning of the monitoring system, with limited exceptions. In addition, §§ 264.119(b)(1)(ii) and 265.119(b)(1)(ii) provide that the owner or operator must record a notation, in accordance with state law, on the deed to the facility property – or on some other instrument which is normally examined during title search – that will in perpetuity notify any potential purchaser of the property that, among other things, the property’s use is restricted under the RCRA closure/post-closure regulations. States can choose to supplement or support such deed restrictions under state law, e.g., by setting up a deed restriction tracking system, ensuring that deed restrictions remain in place, or ensuring that information on existing ICs is available to interested parties.

Even in cases where the post-closure care period need not be extended to protect human health and the environment, the permitting authority may want to ensure that some long-term ICs, such as an easement that provides access to the property, are continued. EPA recommends that any ICs needed beyond the post-closure care period be in place before the post-closure care period ends. EPA expects that the permit authority would typically need to assess the availability and adequacy of other potential mechanisms for overseeing ICs. EPA also recommends that consideration be given as to whether a funding source is available to support any necessary long-term maintenance beyond the post-closure care period. (See Appendix B for a list of ICs resources.)

¹⁰ Engineering controls are the engineered physical barriers or structures (e.g., caps, impermeable liners, mitigation barriers, or fencing) designed to monitor and prevent exposure to the contamination.

¹¹ Institutional controls are administrative or legal instruments (e.g., deed restrictions/notices, easements, restrictive covenants, zoning) intended to minimize the potential for human exposure to contamination by limiting land or resource use.

Recommended Approach for Reviewing Hazardous Waste Management Units Approaching the End of the Post-Closure Care Period

EPA believes that, at a minimum, it is important to make a decision about the length of the post-closure care period well before that period nears its end. Therefore, EPA recommends that regulators assess the overall status of all the facilities under post-closure care, and plan to evaluate the adequacy of their post-closure care periods well in advance of their anticipated conclusions.

As stated before, the federal RCRA hazardous waste regulations provide discretionary authority to the permitting authority to extend or shorten the length of the post-closure care period. However, the facility owner or operator is responsible for providing the information necessary to support this decision (see, for example, 40 CFR 270.30(h) Duty to provide information). A lack of relevant and complete information may justify a conclusion by the regulatory authority that extension of the post-closure care period is necessary to protect human health and the environment.

EPA's recommendations for evaluating units approaching the end of the post-closure care period are discussed in more detail below.

Timing – Regulators should track permit terms and 30-year dates of all post-closure permits and have a strategy for when they will begin looking at whether to extend the post-closure period, allowing enough time for the necessary steps to take place prior to the 30-year expiration:

- Identify and gather necessary information
- Evaluate information
- Make decision on whether to adjust
- Incorporate tentative decision into permit renewal (or modification) process.

For permitted units, EPA recommends starting the process at least 18 months before the expiration of the post-closure permit or post-closure period, whichever comes first.¹² In addition, for a permitted land disposal facility, the length of the post-closure period would be an important component of the 5-year review required under § 270.50(d).

For facilities conducting post-closure care under interim status, regulators might want to adopt time frames for review similar to those of permits (e.g., every ten years) to initiate the process of identifying and gathering relevant information. At a minimum, they should evaluate the adequacy of the post-closure care period well in advance of its end date.

Post-closure plan – Regulators should request a copy of the most current version of the post-closure plan, if it is not already available. Under §§ 264.118(b) and 265.118(c), the post-closure plan identifies certain activities (and their frequency) that must be conducted during the post-closure care period (e.g., monitoring and maintenance). The post-closure plan may also identify performance standards or performance goals, which should be updated to account for any new information on toxicity and carcinogenicity. The post-closure plan thus provides an important starting point for the review. The project file should have a history of permit modifications including those made to the post-closure plan.

¹² Keep in mind that in accordance with 40 CFR § 270.1(c) units subject to post-closure must have post-closure permits or an enforceable document in lieu of a post-closure permit, and under § 270.50 permits can be issued for no longer than 10 years, so over the course of a 30 year post-closure period, the permit would need to be renewed at least twice.

It is also important that the results of the post-closure period assessment be incorporated into a revised post-closure plan, as appropriate.

Relevant information – As part of the review of the post-closure plan and any relevant historical information, regulators should also determine whether they possess the information necessary to adequately evaluate the conditions at the unit so that a decision can be made whether adjustment of the post-closure care period is necessary or appropriate. Relevant information may include monitoring reports, results from testing or inspections of the cover system, information concerning land use and institutional controls, and any other information that would be helpful in determining whether post-closure care continues to be needed for the unit. The absence of adequate information (e.g., to address unresolved risk issues) may lead a permitting authority to conclude that an extension of the post-closure care period is necessary to protect human health and the environment. Any proposal to adjust the post-closure care should be supported by adequate data and initial analysis to demonstrate the anticipated long-term performance of the unit. To account for cyclical fluctuations in weather and hydrology, EPA recommends that multiple-year performance data be considered (e.g., 10 years).

The recommended criteria outlined in the previous section are also relevant to inform deliberations on whether and what additional information about the facility is necessary.

Similarly, if information becomes available indicating changing circumstances that might necessitate the need to revisit the post-closure care (e.g., monitoring results show leaching) it is recommended that the regulator immediately request any additional information needed from the facility owner or operator to inform a decision about adjusting the post-closure care period. This can be accomplished through various means, including under the facility's permit terms (e.g., under § 270.30(h), the permit holder has a duty to provide relevant information and records; under § 270.30(k)(4), monitoring results must be reported at intervals specified in the permit); through enforcement of the relevant interim status regulations; or through EPA information requests (e.g., § 270.28), inspections, or studies required pursuant to RCRA sections 3007 or 3013.

Expiration/Renewal of post-closure permits – As mentioned earlier, permits are issued for a fixed term not to exceed 10 years, which means post-closure permits will need to be renewed periodically throughout the post-closure period (e.g., a 30 year period could span 3 permit terms). Renewal applications must be submitted 180 days before the expiration date of an effective permit (see § 270.10(h)). A facility owner or operator with a specified 30-year post-closure period may not submit a renewal application as they near the end of their 30 years and permit expiration, thinking they will complete post-closure care and submit their certification. If the permitting authority anticipates, towards the end of the post-closure care period, any issues regarding the acceptability of the certification of completion of post-closure care, and has not received a permit renewal application from the facility, EPA recommends that the regulatory authority remind the owner or operator of their duty to reapply for a permit and request submission of the permit renewal application. See 40 CFR §§ 270.10(h) and 270.30(b). Timely submission of an application for permit renewal will ensure that the permit continues in effect (per § 270.51) pending a resolution. If a facility owner or operator does not submit a timely renewal application, and thus the permit is not administratively continued, there are provisions in § 270.51(c) the regulator may consider, ranging from initiating an enforcement action to issuing a new permit.

Effects on post-closure financial assurance requirements – Finally, permitting authorities should keep in mind that a changed post-closure period may also necessitate revisions to the associated post-closure

cost estimate and financial assurance. These changes should be reflected in the facility's modified permit or other documentation (in the case of interim status facilities).

Additional Considerations:

Relationship of Subpart F Corrective Action and Post-closure Care: Corrective action and post-closure requirements may be linked, for example in the case of groundwater monitoring and/or corrective action for releases from closed regulated units being handled pursuant to 40 CFR 264.90–264.100. In many cases, it may be desirable (either by the facility owner/operator, the regulatory agency, or both) to coordinate the post-closure and monitoring/corrective action requirements. EPA addressed this question early on in the RCRA program:

Depending on when corrective action begins and its success in removing or treating contamination, it is possible that the compliance period will extend beyond the post-closure care period for the unit. The regulations do not provide that the post-closure period would be automatically extended for the same duration as the compliance period. It may not always be possible for the compliance period and the post-closure period to continue for the same amount of time because the activities involved may have different objectives. Cover maintenance, for example, may not be directly related to the task of cleaning up a plume caused by leachate that entered the ground during the unit's active life. The Regional Administrator or authorized state program director may, however, modify the permit to extend the post-closure period under § 264.117 of the existing regulations. Under the general criteria established in § 264.117, it may be entirely appropriate to extend the post-closure period to be coterminous with the compliance period. 47 FR 32300 (July 26, 1982).

Consistent with this, EPA recommends that the regulatory agency consider whether extending the post-closure care period (and associated permits or other enforceable documents) may be appropriate when corrective action continues beyond the original post-closure care period.

Scope of guidance and relationship to existing guidance: This document is not intended to provide guidance on decisions to extend or shorten the post-closure care period for non-hazardous waste units, nor is it intended to replace existing guidance concerning establishment and attainment of remedial goals at contaminated sites or facilities addressed under RCRA Subtitle C authority. This guidance is meant to supplement any existing guidance on the post-closure care period.

Under RCRA, states may apply to, and receive from EPA, authorization of a state program to operate in lieu of the federal RCRA hazardous waste program. These state programs may be broader in scope or more stringent than EPA's RCRA hazardous waste regulations, and requirements can vary from state to state. Members of the regulated community are encouraged to contact their state agencies for the particular post-closure care requirements that apply to them in any particular state.

For additional information, contact Lilybeth Colon (703-308-2392) or Tricia Buzzell (703-308-8622).

Appendix A: Overview of Federal Regulatory Provisions

Regulations governing RCRA post-closure care are set forth in 40 CFR part 264 subpart G for permitted facilities and part 265 subpart G for interim status facilities. Additional requirements for post-closure of specific types of units are included in the regulations for those units. *See* §§ 264/265.197 (Tank Systems); §§ 264/265.228 (Surface Impoundments); §§ 264/265.258 (Waste Piles); §§ 264/265.280 (Land Treatment Units); §§ 264/265.310 (Landfills); § 264.603 (Miscellaneous Units); §§ 264/265.1102 (Containment Buildings); §§ 264/265.1202 (Hazardous Waste Munitions and Explosives Storage).

Regulations governing financial assurance for post-closure care are set forth in 40 CFR part 264 subpart H for permitted facilities and part 265 subpart H for interim status facilities.

Regulations governing facility permitting are set forth in 40 CFR part 270.

Post-Closure Care – Sections 264.117(a) and 265.117(a) establish general requirements for post-closure care and a 30-year post-closure care period. However, the regulations also allow the permitting authority to shorten the 30-year post-closure care period if the reduced period is sufficient to protect human health and the environment, or extend it if necessary to protect human health and the environment (see the *Post-Closure Plan Amendment* section for more details). Sections 264.117(a)(2)(i) and 265.117(a)(2)(i) provide the following examples for shortening the post-closure care period: “...(e.g. leachate or groundwater monitoring results, characteristics of the hazardous wastes, application of advanced technology, or alternative disposal, treatment, or re-use techniques indicate that the hazardous waste management unit or facility is secure).”

Sections 264.117(a)(2)(ii) and 265.117(a)(2)(ii) provide the following example for extending the post-closure care period: “...(e.g. leachate or groundwater monitoring results indicate a potential for migration of hazardous wastes at levels which may be harmful to human health and the environment).”

Post-Closure Plan – Under §§ 264.118 and 265.118, the owner or operator of specified units must have a written post-closure plan. The plan must identify monitoring and maintenance activities that will be carried out after closure, and their frequency, to assure compliance with the requirements of specific subparts, including subparts F, K, L, M, N and X, where applicable. For permitted facilities (§ 264.118(a)), the post-closure plan must be submitted with the permit application and approved by the permitting authority as part of permit issuance procedures. The approved post-closure plan becomes a condition of any RCRA permit issued. (See the *Post-Closure Plan Amendment* section for more details). For interim status facilities (§ 265.118), the owner or operator must submit the post-closure plan to the permitting authority within specified time frames, and the regulations provide for making the post-closure plan available to the regulatory authority.

Procedures for Post-Closure Plan Amendment – For permitted facilities, the process for making changes to the post-closure plan is through permit modification. (Permit modification procedures are set forth in § 270.42). Under § 264.118(d)(1), the owner or operator may submit a written notification or request for a permit modification to amend the post-closure plan. Under § 264.118(d)(2), the owner or operator must submit a written notification of permit modification or request for a permit modification to authorize a change in the approved post-closure plan

under certain circumstances. Specific reasons set forth in the regulations include changes in operating plans or facility design that affect the approved post-closure plan, and events occurring during the active life of the facility that affect the approved post-closure plan. For interim status facilities, § 265.118(d) prescribes procedures for amending the post-closure plan. The permitting authority may also request modifications to the post-closure plan under §§ 264.118(d)(4) and 265.118(d)(4).

Procedures for Post-Closure Care Period Adjustment – Adjustments to the post-closure care period may be initiated at any time preceding partial or final closure or at any time during the post-closure care period of a particular unit. For interim status facilities, § 265.118(g) prescribes a process for extending or shortening the post-closure care period that includes provisions for public involvement. For permitted facilities, § 264.117(a)(2) provides for shortening or extending the post-closure care period in accordance with the permit modification provisions in parts 124 and 270.

Section 270.41 provides for Agency-initiated permit modifications. EPA may modify a permit for the following reasons: if there have been alterations or additions to the facility; there is new information that was not available at the time of permit issuance; new statutory or regulatory requirements were promulgated; EPA has cause to initiate a compliance schedule under § 270.33; or as necessary to assure that the facility continues to comply with the currently applicable requirements in parts 124, 260 through 266, and 270, when a permit for a land disposal facility is reviewed by the Director under § 270.50(d).

Section 270.42 contains the regulations that apply to the modification of a permit at the request of the permittee. For all modifications, the permittee submits information to EPA that describes the exact change to be made to the permit conditions, identifies whether the modification is Class 1, 2, or 3, and provides the applicable permit application information.

The process for extending the post-closure care period is a Class 2 modification, while the process for shortening the post-closure care period is a Class 3 modification, § 270.42, appendix I, E2 and E3. These procedures include provisions for public involvement. The post-closure care period can also be modified through permit renewal under § 270.32(d).

Financial Assurance for Post-Closure Care – EPA’s regulations under parts 264/265 subpart H establish requirements for financial assurance, including financial assurance requirements for post-closure care. (See §§ 264.140 and 265.140.) Under §§ 264.144 and 265.144, the owner or operator is required to have detailed written cost estimates for post-closure monitoring and maintenance in accordance with the applicable post-closure care requirements. Under §§ 264.145 and 265.145 generally, the owner or operator is required to establish financial assurance for post-closure care in an amount equal to the current post-closure cost estimate.

Certification of Completion of Post-Closure Care and Release of Owner and Operator from Financial Assurance Requirements – Under §§ 264.120 and 265.120, the owner or operator must submit to the permitting authority by registered mail a certification that the post-closure care for the unit(s) was performed in accordance with the approved post-closure plan. This certification must be submitted not later than 60 days after the completion of the post-closure care period for each hazardous waste disposal unit. The certification must be signed by the owner or operator and a qualified Professional Engineer. Documentation supporting the Professional Engineer’s

certification must be furnished to the permitting authority upon request until the permitting authority releases the owner or operator from the financial assurance requirements for post-closure care under §§ 264.145(i) and 265.145(h).

Under §§ 264.145(i) and 265.145(h), within 60 days of receipt of certification from the owner or operator and a qualified Professional Engineer that the post-closure care has been completed for a hazardous waste disposal unit in accordance with the approved plan, the permitting authority will notify the owner or operator that it is no longer required to maintain financial assurance for post-closure care for that unit. If the permitting authority has reason to believe that post-closure care has not been in accordance with the approved post-closure plan, the permitting authority must provide the owner or operator a detailed written statement of any such reason.

Scope of the post-closure permit requirements – Under § 270.1(c), owners and operators of surface impoundments, landfills, land treatment units, and waste pile units that received waste after July 26, 1982, or that certified closure (according to § 265.115) must have post-closure permits, unless they demonstrate closure by removal or decontamination, or obtain an enforceable document in lieu of a post-closure permit as provided under § 270.1(c)(7). Under § 270.10(h) if a permittee has an effective permit and they want to renew it, they must submit a new application at least 180 days before the expiration date of the effective permit.

Monitoring and Records – Under § 270.30(j)(2), the permittee must retain records of all monitoring information for a period of at least three years from the date of sample, measurement, report, or certification, unless extended by request of the permitting authority at any time. Records from all groundwater monitoring wells and associated groundwater surface elevations must be maintained for the active life of the facility, and for disposal facilities for the entire post-closure care period.

Compliance with an Expiring Permit – Under § 270.51(c), if the permittee is not in compliance with the conditions of the expiring or expired permit, the permitting authority may issue a new permit under part 124, initiate enforcement action or take other actions authorized by the 40 CFR regulations.

Appendix B: Resources Concerning Institutional Controls (ICs)

The following resources may be helpful in implementing and maintaining ICs throughout the post-closure care period and beyond.

- EPA guidance on *Ensuring Effective and Reliable Institutional Controls at RCRA Facilities* (Matt Hale, Director, Office of Solid Waste, and Susan Bromm, Director Office of Site Remediation and Enforcement, June 14, 2007) sets forth guiding principles and recommendations that can help EPA and state decision makers on the use of ICs at RCRA facilities, and EPA resources for additional information and assistance.
- *Institutional Controls: A Site Manager's Guide to Identifying, Evaluating, and Selecting Institutional Controls at Superfund and RCRA Corrective Action Cleanups* guidance provides some discussion about how ICs can be used at post-closure care facilities. (p.3 text box) EPA 540-F-00-005, OSWER 9355.0-74FS-P, September 2000, <http://www.epa.gov/superfund/policy/ic/guide/guide.pdf>
- *Institutional Controls: A Guide to Preparing Institutional Control Implementation and Assurance Plans at Contaminated Sites* provides information and recommendations that should be useful for planning, implementing, maintaining and enforcing ICs, and offers an overview of EPA's policy regarding the roles and responsibilities of the parties involved in the various life-cycle stages of ICs. Final, December 2012. OSWER 9200.0-77, EPA-540-R-09-002, <http://www.epa.gov/superfund/policy/ic/guide/Final%20PIME%20Guidance%20December%2012.pdf>
- *Institutional Controls: A Guide to Planning, Implementing, Maintaining, and Enforcing Institutional Controls at Contaminated Sites* guidance also discusses how ICs could be used at RCRA post-closure care facilities. (Section 2.3) Final, December 2012. OSWER 9355.0-89, EPA-540-R-09-001, <http://www.epa.gov/superfund/policy/ic/guide/Final%20PIME%20Guidance%20December%2012.pdf>
- *Long-Term Stewardship: Ensuring Environmental Site Cleanups Remain Protective Over Time* report identifies long-term stewardship challenges and opportunities for improvement, and makes recommendations for how EPA and its State, Tribal, and local partners should proceed in addressing them. This report also includes a definition of long-term stewardship, why long-term stewardship is important, and what EPA and others are currently doing to address long-term stewardship issues. Final, September 2005, EPA 500-R-05-001, http://www.epa.gov/landrevitalization/download/lts_report_sept2005.pdf