



NATIONAL WASTE AND RECYCLING ASSOCIATION

Position Statement

PERFORMANCE-BASED APPROACHES TO EVALUATE THE TERMINATION OF LANDFILL POST-CLOSURE CARE REQUIREMENTS

December 2018

INTRODUCTION

The Resource Conservation and Recovery Act (RCRA), Subtitle D Criteria for Municipal Solid Waste Landfills established a required post-closure care (PCC) period of thirty (30) years (CFR Title 40 § 258.61). However, the regulations also stipulated that the period could be increased or decreased to protect human health and the environment (HHE) as determined by an approved state. As written, the regulation does not include guidance on assessing impacts on HHE, nor determining whether increases or decreases to the PCC period are appropriate. The National Waste & Recycling Association (NWRA) believes it is important to establish a clear industry-wide approach for measuring impacts to HHE and determining how those impacts relate to setting the appropriate PCC period. Establishing this methodology will allow facilities to plan effectively for collecting the information necessary to demonstrate the site is protective of HHE and to support the appropriate termination of the PCC period.

While EPA (2016) developed guidelines for evaluating PCC timeframes for hazardous waste disposal facilities under RCRA Subtitle C (CFR Title 40 § 265), it has not prepared similar guidance for evaluating PCC at Subtitle D landfill facilities. Therefore, each approved state remains responsible for developing policy and regulations, and many take different approaches to determining when to terminate PCC. The two most common approaches are to terminate PCC when the waste achieves organic stability, or when the landfill achieves functional stability. Both approaches have significant data collection requirements during a landfill's operating and post-closure periods to support termination of the PCC period.

NWRA supports a consistent, performance-based evaluation process that clearly identifies the criteria for demonstrating protection of HHE. Accordingly, NWRA has developed this position paper advocating for a performance-based methodology regarding how to end regulatory PCC.

BACKGROUND

As previously stated, states are increasingly utilizing landfill stability to determine PCC requirements. Two approaches that are commonly considered to represent protection of HHE are organic stability or functional stability, which are defined as follows:

- Organic stability – Generally characterized as the protection of HHE from the latent threat potential of an unmanaged waste mass without consideration to potential receptors. The goal is to reach a point where the landfill waste mass is at a state of near complete decomposition such that human health, environmental, and financial risks associated with undecomposed waste are minimized. To meet organic stability over the planned PCC period, a landfill facility may need to undertake upstream organic waste diversion, or pre-processing of waste materials through thermal, biological or physical means while the landfill is still accepting waste, and/or some form of in-situ treatment via leachate recirculation or bioreactor landfill operation to enhance degradation during its active life.
- Functional stability – a landfill is commonly considered to be functionally stable and protective of HHE when active controls (ITRC) are not required to protect potential receptors. This requires data for leachate, landfill gas, and cover settlement to demonstrate a “predictable steady-state” such that an evaluation of a future threat potential to a potential receptor based upon a specific end-use can be developed with confidence. Under a functional stability approach, a landfill facility would rely on the natural degradation of the waste materials during operating and post-closure periods to achieve the steady state conditions for the termination of PCC.

For a case study comparison of the two approaches see O’Donnell et al (2018).

In the absence of an EPA-approved approach to terminating PCC, some states have developed their own methods to terminate regulatory PCC. A few examples are included below.

Florida

In 2016, the State of Florida issued a guidance on long-term care (LTC) at solid waste disposal facilities. LTC is essentially the same as the PCC period described by the federal regulations. This guidance applies to municipal solid waste landfills as well as other solid waste facilities such as construction and demolition debris landfills. In considering how to terminate LTC for lined disposal facilities, Florida considers the potential for using performance-based methodology. They acknowledge that the approach focuses on when a facility reaches functional stability. While not completely inert, functional stability is found when the facility does not pose an unacceptable threat to HHE in the absence of active controls (i.e., leachate collection, landfill gas collection and control, etc.). Following achievement of functional stability, a facility can be moved to custodial care. Custodial care is the term used by Florida to describe the property management period following LTC.

Demonstration of functional stability can be achieved by addressing four components: leachate management, gas control, groundwater monitoring and maintenance of the final cover. The guidance provides clear criteria for establishing functional stability for each of the components.

Kansas

The State of Kansas developed one policy and three technical guidance documents in 2013 and 2014 outlining data collection requirements for ultimate reduction or termination of the PCC period with an organic stability target in its current form. Kansas considers achieving stability in the context of key monitoring parameters to be important to reducing or terminating PCC. Part of their analysis would be conducting trend analysis and collecting data to support the determination.

Washington

Washington revised their closure and post-closure care regulations in November 2012. Under the new regulations, a landfill is functionally stable when it does not present a threat to HHE at the point of exposure (POE) for humans or environmental receptors. To determine this, the landfill should assess potential threats to HHE by considering leachate production and quality, LFG production and composition, cover system integrity, and groundwater quality.

Wisconsin

Wisconsin developed their guidance in 2006, before most of the other states. The state focuses on organic stability instead of functional stability. It proposes organics diversion, mechanical or biological treatment or in-landfill treatment to achieve organic stability. The rule required existing landfills that had not filled 50 percent or more of their approved capacity by January 1, 2012, to submit a plan modification by that date to implement organic stability measures. The rule also required that operation plans include organic stability plans for all new landfills or landfill expansions submitted for review after January 1, 2007.

Data needs summary for state programs

To implement either functional or organic stability objectives, data are required. What data over what period remains site-specific, but states such as Florida have provided a specific framework for compliance. Washington left such a program up to the owner/operator, as did California, but both require state approval of the data collection process and review. All states with PCC period termination programs agree that landfills should demonstrate stability in four areas: groundwater monitoring; landfill gas; leachate; and stability and cover integrity. Once a state of long-term protection of HHE is demonstrated, the state may approve a reduction or terminate the PCC period, including cessation of data acquisition and active controls. Below are some considerations for demonstrating stability for groundwater monitoring; landfill gas;

leachate; and stability and cover integrity based on the variety of state PCC termination approaches.

Landfill Gas – landfills should demonstrate that gas generation is decreasing, and the facility does not pose an unacceptable risk to HHE at the POE. Landfills should determine what data are necessary to be able to demonstrate landfill gas stability, including, but not limited to:

- Methane migration;
- Methane flow;
- Temperature; and
- Methane and carbon dioxide concentrations.

Leachate – landfills should demonstrate that the leachate quality and quantity is stable or improving and that leachate, should it reach the POE, does not pose an unacceptable risk to HHE at that location. At a minimum, the following data should be collected over time from sumps and/or tanks:

- Biochemical oxygen demand (BOD) and chemical oxygen demand (COD);
- Ammonia; and
- pH.

Stability and Cover integrity – landfills should provide data over a time period demonstrating that the cover is performing well in controlling gas and leachate generation, settlement is within acceptable parameters, and surface water management controls (e.g., let-down structures) are functioning as designed.

Groundwater Monitoring – landfills should provide information over time to demonstrate groundwater parameters are being met or are below the established regulatory threshold. This data should also be used after terminating active controls to confirm continued compliance. Landfills should determine what data are necessary to demonstrate that the other control systems and/or waste mass have achieved stability including:

- Frequency of measurement; and
- Indicator parameters suitable for measuring impact from a relatively degraded waste mass.

RECOMMENDED APPROACH

NWRA has a position that the regulatory PCC period defined under 40 CFR §258.61 for solid waste landfills is finite in nature. The termination of the PCC period should be determined by the owner/operator and approved by state solid waste Director as protective of human health and the environment (HHE) in the absence of active control systems. To date, state have implemented varying approaches under 40 CFR §258.61 to end the PCC period. NWRA recommends that to effectively evaluate and determine the appropriate PCC period, state programs should incorporate three (3) fundamental principles in guidance or regulation:

- The regulatory PCC period has a finite term with the length determined on a site-specific basis;
- To end the PCC period, a performance-based approach with appropriate data over a specified site-specific period is required; and
- Performance-based criteria must be established using an agreed upon technical evaluation approach.

ACKNOWLEDGEMENTS

NWRA is grateful to members: Mike Caldwell, Waste Management; Tim Mitchell, Civil & Environmental Consultants; and Anastasia Welch, SCS Engineers; as well as Jeff Murray, HDR for assistance in developing this document.

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