



Designation: E3183 – 24

Standard Guide for Harvesting Coal Combustion Products Stored in Active and Inactive Storage Areas for Beneficial Use¹

This standard is issued under the fixed designation E3183; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This guide covers a framework to address critical aspects related to the *harvesting* of CCPs placed in *active* (operational) and *inactive* (closed or no longer receiving CCPs) *storage areas*. These storage areas may be used for wet or dry material, and may be located at *active* or *inactive facilities* (that is, coal-fired electric utilities or independent power producers that are currently generating electricity or have ceased to do so, respectively). Also, CCPs may be harvested from *active* or *inactive storage areas* located on-site or off-site of the *facility*.

1.2 This guide does not include information on how to determine what *storage areas* or facilities, or both, should be selected for potential *harvesting* of CCPs, as each entity may approach a *harvesting* program in accordance with their own *harvesting* pursuits and regulatory requirements. In addition, it does not include information on how an energy company or other interested parties should evaluate inventories to determine the order of their *storage areas* for potential *harvesting*, including consideration of risk, performance, and cost. This guide is intended to be used to evaluate the potential *harvesting* of the *storage areas* once the *storage areas* are selected for evaluation.

1.3 This guide is comprised of the following sections: Scope, Section 1; Referenced Documents, Section 2; Terminology, Section 3; Significance and Use, Section 4; Project Planning and Scoping, Section 5; Background Review of CCP Storage Areas, Section 6; Detailed Characterization of CCP Storage Areas, Section 7; Harvesting Planning and Scoping of CCP Storage Areas, Section 8; Harvesting Detailed Design and Approval (as applicable) of CCP Storage Areas, Section 9; and Harvesting Implementation of CCP Storage Areas, Section 10. Not all information within this guide will be necessary for each *harvesting* project, and the user should determine the applicability of each section.

¹ This guide is under the jurisdiction of ASTM Committee E50 on Environmental Assessment, Risk Management and Corrective Action and is the direct responsibility of Subcommittee E50.03 on Beneficial Use.

Current edition approved Feb. 1, 2024. Published April 2024. Originally published in 2018. Last previous edition approved in 2019 as E3183 – 19. DOI: 10.1520/E3183-24

1.3.1 Section 1, Scope, includes information related to contents of this guide, as well as what is not included in this guide.

1.3.2 Section 2, Referenced Documents, includes published documents referenced within this guide.

1.3.3 Section 3, Terminology, includes definitions for terms as they relate to this guide.

1.3.4 Section 4, Significance and Use, describes the *beneficial use* of CCPs stored within *active* and *inactive storage areas*, including each CCP potential beneficial use; the context of the guide and its use; the professional judgment that is appropriate for use of the guide; and the inherent uncertainty with the processes described within the guide.

1.3.5 Section 5, Project Planning and Scoping, describes the steps needed prior to implementing this guide, including: establishing a *project team*; determining what *storage areas* within the *facility* should be evaluated for potential *harvesting* of CCPs; determining the potential materials to be harvested; compiling existing land use, environmental compliance, geologic/hydrogeologic, topographic, design and construction information; estimating potential project costs and project schedule with contingencies (if feasible); and identifying factors that may impact the ability to harvest the CCPs.

1.3.6 Section 6, Site Background Review of CCP Storage Areas, describes the steps for evaluating the attributes of *storage areas* at the *facility* relative to *harvesting* CCPs.

1.3.7 Section 7, Detailed Characterization of CCP Storage Areas, describes the steps for developing and implementing the CCP characterization sampling and analysis plan that will evaluate the chemical and physical characteristics of the CCPs within the *storage areas*, and determining if amendments to the CCPs will be needed for beneficial use.

1.3.8 Section 8, Harvesting Planning and Scoping of CCP Storage Areas, describes the steps necessary to evaluate the approval status of the *storage areas* and develop a conceptual *harvesting* strategy and approval approach for the project. Considerations are given for both *active* and *inactive storage areas*.

1.3.9 Section 9, Harvesting Detailed Design and Approval (as applicable) of CCP Storage Areas, describes the steps needed to prepare the detailed design and approval documents

(as applicable) for the *CCP storage area harvesting* and receive the appropriate approval (as applicable).

1.3.10 Section 10, *Harvesting Implementation of CCP Storage Areas*, describes the steps needed to implement the *storage area harvesting* plans from installation of the appropriate pre-harvesting components and *harvesting* the CCPs in accordance with the approval requirements, to completing the post-harvesting monitoring and inspections.

1.3.11 Sections 6 through 10 provide the five phases (Phase I through V) of the *harvesting* process that follow once *storage areas* are selected for *harvesting* evaluation. Information related to Phase I through V is located on Table 1.

1.4 This guide does not include information on the *processing* of harvested CCPs, and therefore, additional approvals not discussed within this guide may be needed (for example, residual waste *processing* approvals, air approvals specific to *processing*, water control approvals, storage system approvals, etc.).

1.5 As CCPs are produced, they may be sent off-site directly to beneficial use applications, such as concrete, wallboard and controlled or structural fills, while the alternative is to direct them to *dry* or *wet storage areas*. Although many CCPs were placed in storage due to not meeting applicable specifications for use, many other CCPs were stored for lack of market. In either case, the CCPs retain the ability to be considered a wanted material that provides a functional benefit and a benefit to the environment. They can be harvested and lightly processed, if necessary, to meet relevant product specifications and substitute for the raw materials. Depending on the type and homogeneity of CCPs and the type of *storage area* from which the materials are being harvested (that is, *dry* or *wet storage areas*), this *harvesting* and *processing* may include, but is not limited to, excavating or dewatering/dredging, drying, milling, classifying and storing or transporting the material before they are beneficially used.

1.6 The CCPs that may be harvested include: *fly ash*, *bottom ash* and *economizer ash* generated by powdered carbon boilers; *boiler slag*; *flue gas desulfurization material*; *fluidized-bed combustion* products as defined in Terminology E2201; *cenospheres*; or other materials suitable for beneficial use.

1.7 Laws and approval requirements governing the use of CCPs vary by locality, state, and country, and generally do not yet include provisions for *CCP harvesting* as described herein. The user of this guide is responsible for determining and complying with the applicable approval requirements, which may extend beyond *harvesting* to include approval requirements or guidance on issues such as storage, transportation, end use, and other concepts. This guide complements approval programs where guidance on *harvesting* is unavailable or insufficient, thereby improving the chance that such *storage areas* may be repurposed for public or private benefit, or both. It is important to engage and educate the *approval authority* early and often throughout the planning, design, and implementation of the *harvesting* activities. The *project team* may also consider affording an opportunity to solicit input from other *stakeholders*.

1.8 This guide should not be used as a justification to avoid, minimize, or delay implementation of specific management, operation, *closure*, or remediation activities, or both as appropriate by law or directive, unless the *harvesting* activities are conducted in conjunction with such strategies to maintain or achieve compliance with the approval requirements or as otherwise agreed upon with the appropriate authorizing agencies.

1.9 This guide should not be used to characterize (that is, environmentally assess) a *storage area* for ownership transfer although portions of such information may supplement other environmental assessments that are used in such a transfer.

1.10 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.11 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

- C311 Test Methods for Sampling and Testing Coal Ash or Natural Pozzolans for Use in Concrete
- C618 Specification for Coal Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
- D653 Terminology Relating to Soil, Rock, and Contained Fluids
- E1527 Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process
- E2201 Terminology for Coal Combustion Products
- E2277 Guide for Design and Construction of Coal Ash Structural Fills

2.2 EPA Standards:³

- 40 CFR 260.10 Hazardous Waste Management System: General – Definitions
- 40 CFR 312.10 Innocent Landowners, Standards for Conducting All Appropriate Inquiries – Definitions

3. Terminology

3.1 For additional definitions related to *coal combustion products* (CCPs), see Terminology E2201. For definitions related to geotechnical properties, see Terminology D653.

3.2 Definitions:

- 3.2.1 *active facility, n*—a facility producing electricity.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Available from United States Environmental Protection Agency (EPA), William Jefferson Clinton Bldg., 1200 Pennsylvania Ave., NW, Washington, DC 20460, <http://www.epa.gov>.