ISSUE I • 2026

ASH at work

Applications, Science, and Sustainability of Coal Ash

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ASH at work

Applications, Science, and Sustainability of Coal Ash

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Welcome to WOCA!

By Tom Kierspe, ACAA Chair

Welcome to World of Coal Ash 2026! We're back where WOCA all started in 2005: Lexington, Kentucky. The inaugural edition of this event had just over 500 attendees, 40 exhibitors, and 16 sponsors. Final tallies for 2026 are not yet in. But we expect to more than double each of those numbers this year.

It's difficult to overstate the importance of this conference to our industry, as it:

- Delivers critical educational opportunities related to safely and responsibly managing and marketing coal combustion products.
- Facilitates networking and knowledge transfer among CCP producers, marketers, and customers.
- Produces significant and enduring research that is chronicled in published proceedings.
- Generates positive publicity for our oft-misunderstood industry.
- Provides an opportunity for the next generation (students) to receive recognition for their CCP-related work, and interact and forge relationships with professionals in our industry.

For those who have not attended WOCA before, the number and scope of events can be formidable. Fortunately, the WOCA team has developed an expanded app to help attendees organize their schedules; connect with others in attendance, including potential customers and collaborators; locate exhibitors; and engage with sponsors. I encourage everyone to use the app to optimize your experience throughout the week.

While the volume of activity at WOCA is significant, it is not necessary—or even possible—to take it all in. What distinguishes the conference is how effectively it brings together the people and ideas that drive the industry forward. With so many parallel sessions, meetings, and informal interactions, no one attendee will capture everything—nor should they. The goal is not to attend as many presentations as possible, but to be deliberate about where your time is best spent.

The technical sessions remain a cornerstone of WOCA, reflecting the depth of expertise and practical problem-solving that continue to advance the beneficial use of CCPs. But their value is often realized outside the meeting room—in the discussions that follow, where ideas are tested, refined, and translated into practice. A paper may introduce a concept; a discussion may determine whether it moves forward.

I encourage attendees to approach WOCA as a forum for engagement. Seek out the people behind the work. Ask questions that go beyond the slides. Share your own experience. In an industry where practical knowledge is as valuable as published research, these exchanges are essential.

Beyond the sessions and discussions, the exhibit hall brings together a valuable cross-section of the industry—producers, marketers, equipment suppliers, service providers, and end users—each bringing a different perspective on how CCPs are managed and utilized. These conversations often provide insight into emerging trends, operational challenges, and new technologies that complement what is presented in formal sessions.

Equally important are the exchanges made with peers. Many of the issues facing our industry are shared, and WOCA provides a setting where they can be discussed openly and where solutions begin to take shape. For newer professionals, this is an opportunity to build lasting relationships. For more experienced attendees, it is an opportunity to share hard-earned lessons, offer practical perspective, and help others navigate real-world scenarios that do not always appear in formal presentations.

As you move through the week, approach WOCA with purpose, but remain open to unplanned opportunities. Some of the most valuable moments will come from conversations and interactions that are not on your schedule.

Whether this is your first WOCA or one of many, I hope you leave with new connections, fresh insight, and a clearer sense of how you can contribute to the future of our industry.

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Not so fast, my friend...

By Thomas H. Adams, ACAA Executive Director

There is an axiom regarding messaging that is well-known. "If a lie is repeated often enough, it becomes the truth." Today, we are witnessing this regarding the availability of coal ash for use in concrete.

In 2008, Senator Barack Obama was campaigning for election to become the president of the United States. In that campaign, he made the following statement regarding the use of coal for fueling power plants. "You can continue to build coal-fired power plants if you wish. My administration will make sure you go bankrupt doing that." Later that year, a massive coal ash spill at a power plant in Kingston, Tennessee, provided anti-coal activists with a tool that demonstrated that coal for use in generating electricity was a danger to communities because of its toxicity and the problems of managing disposal of the residual materials following combustion. It is time to close coal-fueled plants as soon as possible, they said.

Ironically, the initial position of organizations such as the Sierra Club was to convert the nation's coal plants to use natural gas as their fuel while the emerging renewable technologies became viable. That idea did not last very long. Purists in the anti-coal movement demanded that natural gas be avoided as well. While having a lower carbon dioxide footprint than coal, gas still contributed an unacceptable amount of CO2 to the atmosphere.

While the federal government attempted to create regulations to expedite the closing of coal-fueled plants, the availability of coal combustion products (CCP) for beneficial uses started to decrease. The most important of these uses—fly ash use in concrete mixtures and flue gas desulfurization gypsum in gypsum panel products—were impacted. No longer was the supply of these materials so easily available across the country. Eventually, CCP would need to be replaced by other materials—or so the thinking went.

Even today, we continue to hear statements from prominent leaders in and around academia and the engineering profession repeat some iteration of this lie: "fly ash is disappearing." Lee Corso, former college football coach and long-time co-host (now retired) of the very popular ESPN program College GameDay was famous for interrupting a statement that was either a lie or just wrong by saying, *"Not so fast, my friend."* Mr. Corso would then go on to point out the fallacy being spoken.

This is a Lee Corso moment for our industry. Coal ash—bottom ash and fly ash—supplied for concrete production in the United States of America has never been greater. The amount of coal ash from active power plants and harvesting operations was greater in 2024 than ever. *Over 17 million tons of coal ash went into concrete production in 2024.* This data point comes from the annual Survey of the Production and Use of Coal Combustion Products, performed by the American Coal Ash Association since 1968.

Yes, there are regions in the country where coal ash is not available in the quantities the local market desires. Logistical costs are the primary reason for most of these shortages. Other markets are doing just fine, thank you. President Trump and the leadership at the Environmental Protection Agency have taken steps to stop the premature retirement of the remaining coal-fueled plants. Recent weather and grid demand issues have demonstrated the necessity of continuing to use our existing coal fleet to power our economy and society. Harvesting activity continues to expand the supply of ash for concrete production.

Fact: The amount of coal ash used in concrete mixtures continues to be greater than ALL other supplementary cementitious materials combined by a factor of two.

So this reality begs the question: How can coal ash be disappearing from the marketplace and growing in use at the same time? The next time you hear the "coal ash is disappearing" lie, just be ready to say, "not so fast, my friend."

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Modernizing the Rulebook

The Evolution of ASTM and AASHTO Specifications for SCMs

By Lawrence L. Sutter, Ph.D., P.E.

Standard specifications are a foundational component of the concrete industry. Organizations such as ASTM International (ASTM) and the American Association of State Highway and Transportation Officials (AASHTO) write standard material specifications that establish consistent requirements for materials, thereby facilitating the use of materials with predictable outcomes. Standard specifications also form the basis of quality assurance programs for material end users. However, the same standards can also be an impediment to adoption of new materials. Historically, specifications for supplementary cementitious materials (SCMs) have been prescriptive, including scope limitations restricting a specification to apply for only one type of material. Even for materials meeting the scope of a specification, prescriptive limits within a specification may hinder broad application, an example being the specification of harvested coal ash. Another drawback of standard specifications is the time and effort needed to make changes as well as ensuring harmonization between specifications written by the key organizations. Fortunately for the concrete industry, there have been significant advances in ASTM and AASHTO specifications over the past seven years, creating a specification environment that supports innovation and provides broad access for existing materials as well as emerging materials.

A Turning Point for ASTM C618

Some of the most significant changes have occurred with the most widely used specification, ASTM C618 (AASHTO M 295), which historically covered coal fly ash and natural pozzolans. This specification has its origins with ASTM C 350 for coal fly ash, issued in 1954, and ASTM C 402 for natural pozzolans, issued in 1957. The two standards were merged to form ASTM C618 in 1968, and the last major change occurred in 1977 when Class C ash was added to the specification. The standard remained relatively constant for the next 40 years with some notable changes, such as removing the linkage between the ash class and the coal type, and acknowledging that coal combustion is a process that often involves adding materials other than coal into the fuel stream (e.g., limestone). Over the last seven years, compared to this past period of stasis, Specification C618 has changed significantly by incorporating research results and field experience garnered over time, and now embraces a broader range of coal combustion products.

The first notable change occurred in the 2019 version when the basis of classification for coal fly ash changed from using the sum of the oxides (i.e., $Al_2O_3 + SiO_2 + Fe_2O_3$) to using the calcium oxide content (CaO) as the determining factor. Copious research over the years has shown that CaO is the key composition measure to correlate with performance such as alkali-silica reaction (ASR) mitigation and improving the sulfate resistance of concrete. The sum of the oxides approach dated back to the 1950s version of ASTM C 350 and was more than likely a backdoor approach to reject what we now call Class C ash. Other changes in Specification C618 occurred such as eliminating the drying shrinkage test, which also dated back to the 1950s when fly ash was tested as a sand replacement. Also, the soundness test was eliminated given that few if any ash sources failed and the test has been shown to not correlate well with soundness issues in concrete.

Harvested Ash and Natural Pozzolans Gain New Standing

The next major change occurred with the 2023 version of ASTM C618, in which changes were made to allow for harvested ash to be included under the specification. To accommodate harvested ash, the specification title and scope were changed to cover coal ash and natural pozzolans, with coal ash defined as "fly ash and bottom ash obtained from current power production or harvested from landfills or impoundments." In turn, bottom ash was defined as "ash that results from combustion of ground or powdered coal and that is not transported by flue gases." Bottom ash, like fly ash, is classified based on the CaO content as either Class C or Class F and is required to meet all of the chemical and physical properties provided in the specification. Last, a manufacturing section was added to establish that ash can be processed to meet the requirements of the standard. This is, again, to address the unique needs of processing harvested ash. Together, these changes to ASTM C618 now position the specification to apply to what is arguably the largest potential source of SCMs, harvested ash.

The last major change related to ASTM C618 occurred in 2024 when ASTM C1945 was published. Specification C1945 is a new standard specification for natural pozzolans. Initially the Specification C618 boiler-plate language and Class N criteria formed the basis of this new specification. The intent is to get Specification C1945 referenced in downstream specifications and codes (i.e., state agencies, ACI 318) and then delete Class N from Specification C618, making it a coal ash-only specification. Since its adoption, Specification C1945 has been modified to make loss on ignition (LOI) report only, changed the SO3 limits to match coal ash, removed the drying shrinkage test and limits, and most importantly added the newly developed standard test method ASTM C1897 for measuring the reactivity of an SCM.

This new test method is based on extended research by RILEM and is often referred to as the R3 tests (i.e., R3 standing for rapid, reliable, and reproducible). The test method provides two ways to establish reactivity. Method A uses isothermal calorimetry to measure the heat of reaction that results from reacting a known mass of the SCM with a solution that mimics the pore water solution in concrete (i.e., a solution comprising calcium carbonate, potassium sulfate, and potassium hydroxide). The heat evolution at 7 and 28 days is reported. In Method B, a known mass of SCM is reacted with the same solution and the total water bound by the hydration reactions is determined gravimetrically and reported at 7 and 28 days. Specification C1945 includes Method A as a report-only requirement but sets a limit for Method B. Method A is still undergoing refinement to improve the multi-laboratory precision. The new ASTM C1945 provides the specifier with information not available under the traditional ASTM C618 Class N specification and removes barriers such as the LOI limit that have been imposed on natural pozzolans for nearly 70 years.

Recent Changes to ASTM C618

Revision	Key Changes
2012	☑ Drying shrinkage test removed
2019	☑ CaO classification adopted
2023	☑ Harvested ash allowed ☑ Bottom ash defined and included ☑ Manufacturing/processing section added

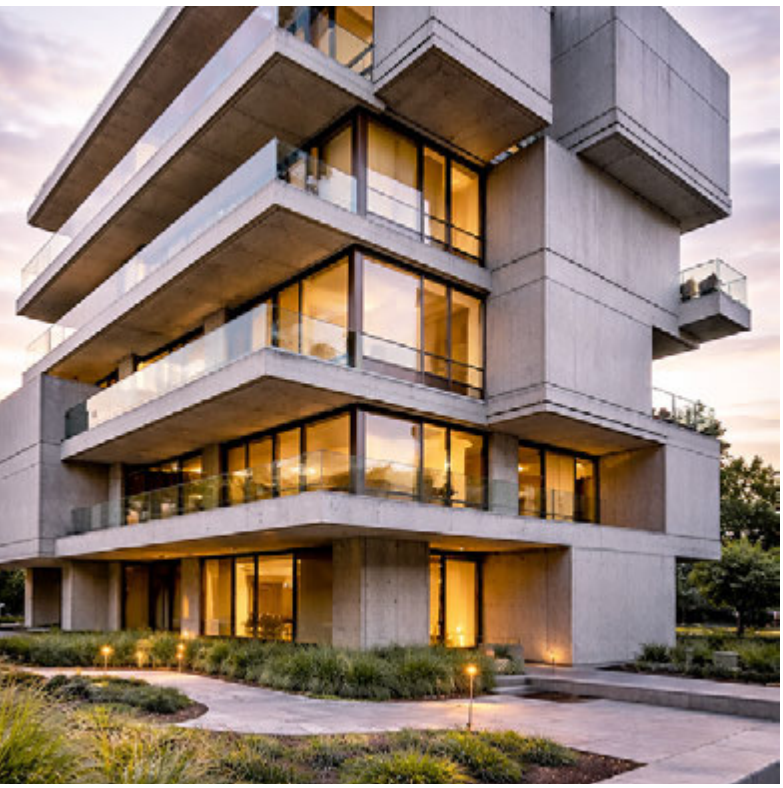
Evaluating Durability Performance

Further changes to Specifications C618 and C1945 are being balloted and center on inclusion of another new test method, ASTM C1952, for determining the bulk resistivity of the mortar cubes used for the Strength Activity Index (SAI) test. This new test is relatively simple, involves no additional sample preparation, and provides new information regarding the effectiveness of an SCM with respect to reducing the permeability of a hardened cement paste. Reduced permeability is key to both ASR mitigation and improving sulfate resistance.

Regarding sulfate resistance, another change impacting all ASTM specifications is development of a guide document for how to measure and improve sulfate resistance in concrete. The guide will be analogous to the ASTM C1778 guide addressing ASR mitigation and, once the guide is approved, it is planned to remove testing for sulfate resistance from all ASTM specifications and direct the specifier to the new guide. This approach recognizes that improving sulfate resistance of concrete requires consideration of factors other than SCM use, and the guide will provide more complete information for specifiers designing concrete for placement in sulfate environments.

Performance Specifications and the Rise of Alternative SCMs

These changes to existing specifications will facilitate increased use of conventional SCMs but still do not address emerging materials. For years, materials have been brought forward where the proponent claims, "It performs just like fly ash" or "…just like slag." Unfortunately the materials were not fly ash and slag and therefore they did not fall under the scope of existing standards.

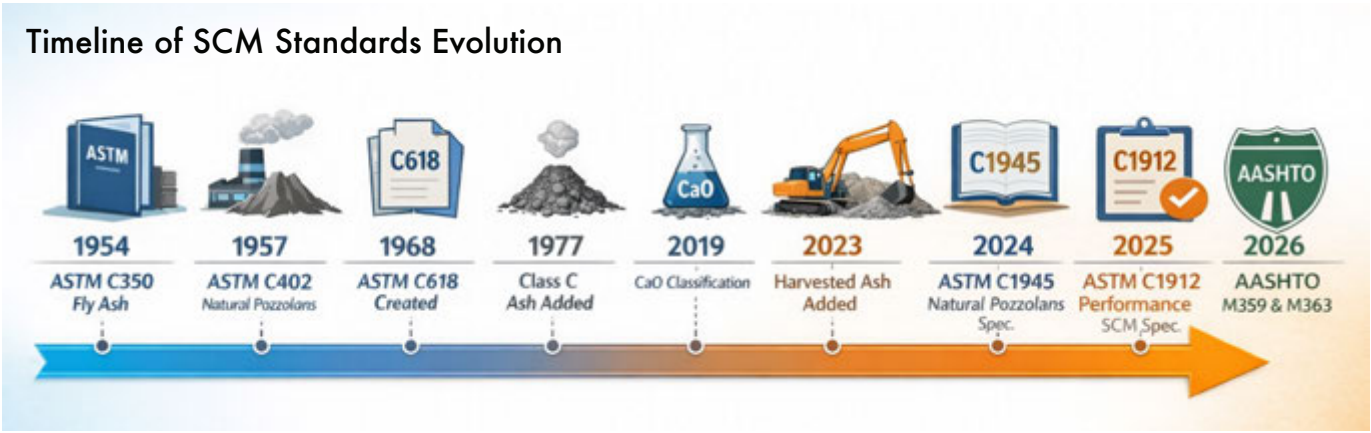


In 2011, ASTM published Guide 1709, which provides a process for evaluating alternative supplementary cementitious materials (ASCMs). The guide defines an ASCM as any material not meeting Specifications C618, C989/C989M (slag cement), C1240 (silica fume), C1866/C1866M (ground glass pozzolan), or C1945. The guide lays out a detailed approach to gathering the data needed to document performance of an SCM used in concrete.

After publishing this guide, ASTM Subcommittee C09.24 undertook writing a specification for ASCMs. Given the wide range of materials that could fall under this specification, it was determined, after much discussion, that a performance-based specification would be required. It would simply be impossible to write an all-encompassing prescriptive specification, and developing individual prescriptive specifications for each new material would be unworkable.

After many years of discussion, ASTM C1912 Standard Specification for Supplementary Cementitious Materials for Use in Concrete was published in 2025. Specification C1912 was possible largely due to the development of new tests such as ASTM C1897 and another new standard test, ASTM C1827, which is the standardized version of the foam index test. Specification C1912 includes the ASTM C1897 Method B bound water test with a limit. The specification also requires the conventional SAI test but with limits of 80 at 7 and 28 days, or a limit of 80 at 56 days. The specification places no limits on composition or source of material, but both must be reported.

Also, for materials classified as an ASCM, as described in Guide C1709, the specification requires that all tests included in Guide C1709 Stage I-IV be performed, or Stage V testing must be performed, which involves providing data of field performance of the SCM when used in concrete. Another unique aspect of Specification C1912 is that it can be used for specifying conventional SCMs. However, if a producer elects to specify a material meeting the scope of an existing specification, the producer is required to perform all tests required in the existing prescriptive specifications in addition to all the tests in Specification C1912, and report both sets of results. ASTM C1912 now provides a path for any SCM to be used in concrete, opening the door for emergent materials. It also provides a means of specifying off-spec conventional materials. The new Specification C1912 should serve to significantly impact SCM supply.



Harmonizing ASTM and AASHTO Specifications

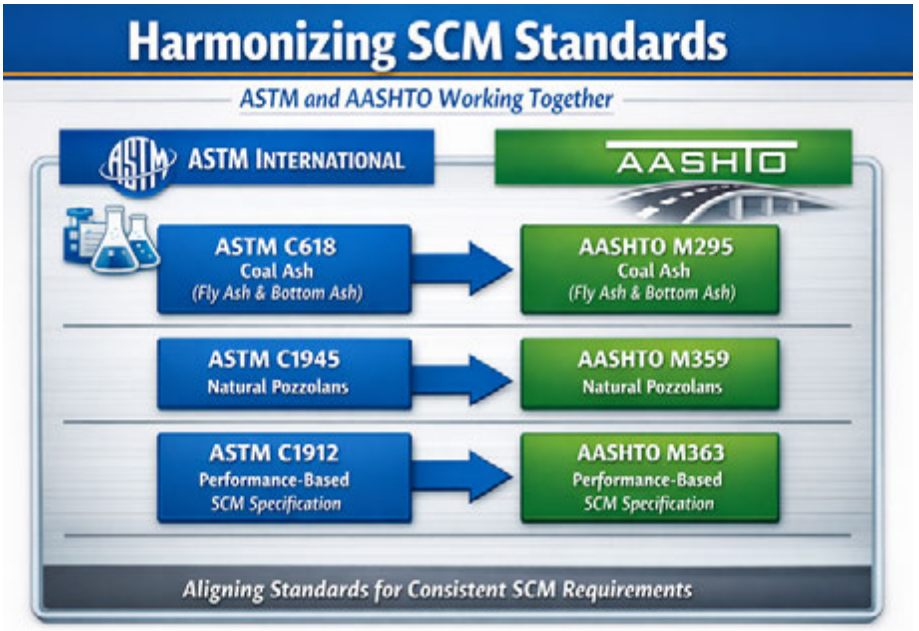
Finally, over the last seven years there has been significant improvement in cooperation between ASTM and AASHTO. A joint task group formed in 2019 that has worked to harmonize SCM specifications between the two organizations. Currently, AASHTO M 295 and ASTM C618 are harmonized. This has resulted in removal of the available alkali, drying shrinkage, and soundness tests from AASHTO M 295. AASHTO has adopted the CaO-based approach to classification as well as all changes addressing harvested ash.

Further, in 2026 AASHTO will publish AASHTO M 359, a natural pozzolan specification harmonized with ASTM C1945, and AASHTO M 363M/M 363, a performance specification harmonized with ASTM C1912. Future activities of the task group will be to verify harmonization of AASHTO M 307 and ASTM C1240.

What Comes Next for SCM Standards

Progress continues on many fronts, and the progress over the past seven years has been unprecedented. Other standard specifications and test methods are in development. For example, ASTM Subcommittee C09.27 is currently drafting a specification for steel slag for use in concrete. Within Subcommittee C09.24, tests for measuring properties such as water absorption of natural pozzolans are in development.

Currently, the specification environment for SCMs is robust and every material should be able to find a path into the marketplace. But maintaining and improving these standards is a never-ending challenge. The value of involvement in ASTM or AASHTO has never been higher and progress would not be possible without the hard work and commitment of those that volunteer within these organizations. Through the effort of these individuals, the concrete and SCM industry is well positioned to meet the demands of specifiers seeking to increase use of SCMs in concrete.

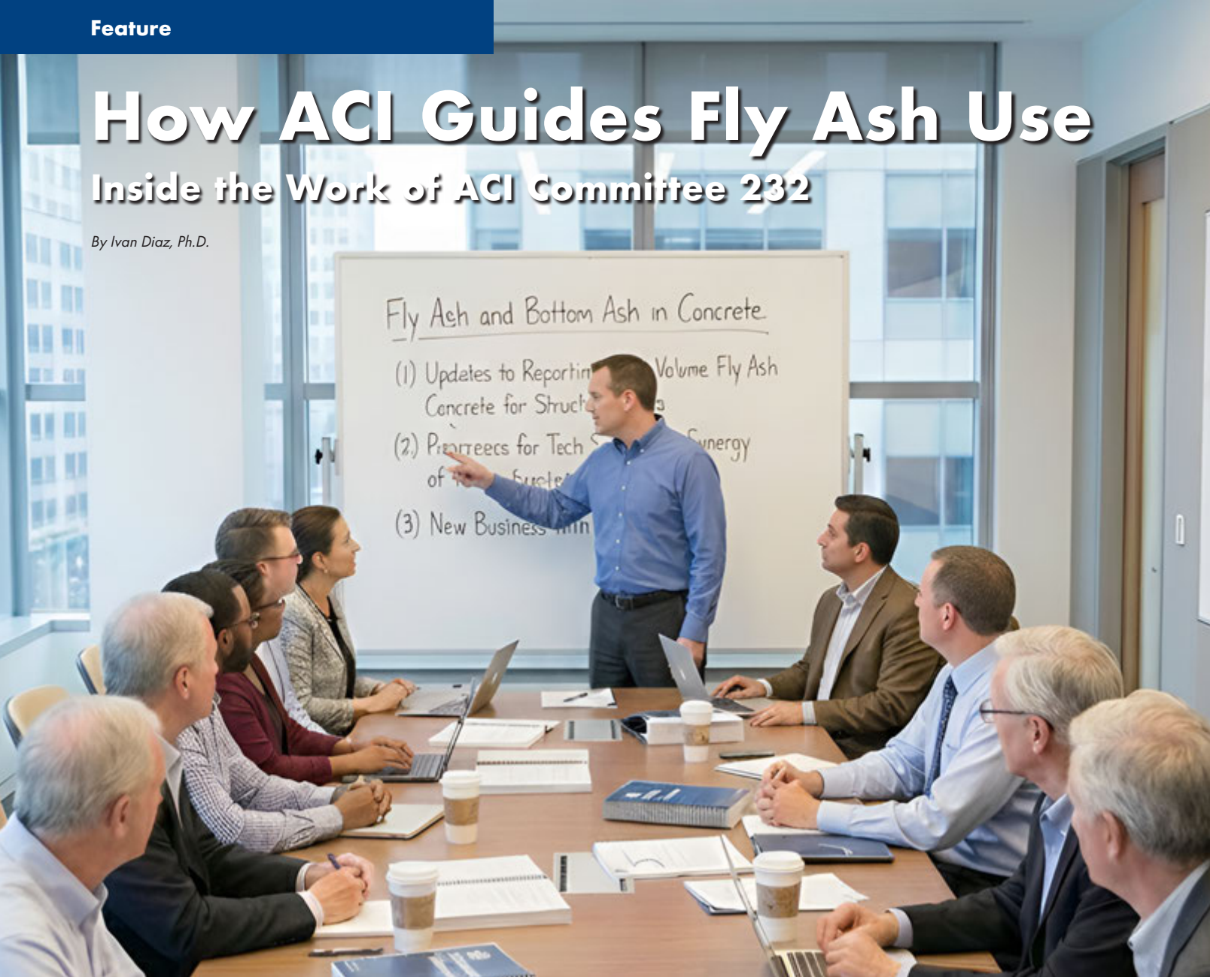


Lawrence L. Sutter *is the Principal of Sutter Engineering LLC and is Professor Emeritus at Michigan Technological University. Previously, Professor Sutter taught Materials Science and Engineering and served as Associate Dean of Research and External Relations, as well as Director of the Applied Chemical and Morphological Analysis Laboratory. For over 40 years, he has been engaged in materials characterization, concrete materials research, and concrete durability issues. Professor Sutter is actively engaged in numerous committees and subcommittees of ASTM International and the American Concrete Institute. He is a fellow of both organizations and has worked to continually revise and improve numerous guides, specifications, and standards, most notably ASTM C618, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete—the cornerstone specification for the use of fly ash in concrete in the U.S.*

How ACI Guides Fly Ash Use

Inside the Work of ACI Committee 232

By Ivan Diaz, Ph.D.



Cement and concrete professionals are practical people. We're tasked to deliver structures that perform for decades in the real world—through heat, cold, chlorides, sulfates, moisture cycles, and the unpredictable variability that comes with construction. That's why supplementary cementitious materials (SCMs) like fly ash have earned a permanent place in modern concrete: when used well, they can improve durability, manage heat, and improve sustainability.

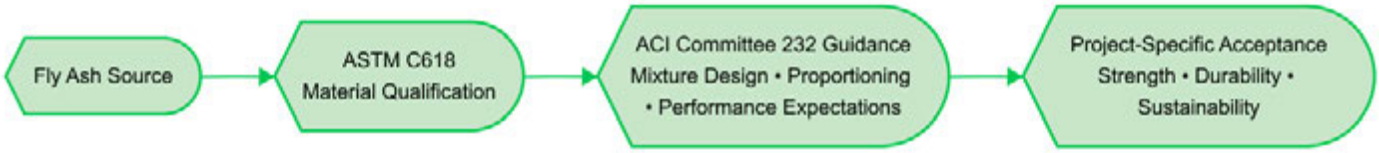
But fly ash (and increasingly bottom ash) also comes with a reality that designers, owners, producers, and contractors live with every day: performance is not guaranteed by intent. Success depends on knowing what material you have, how it behaves with your cement and aggregates, what your project needs, and how to document the decisions so they're technically sound and defensible.

That's the space where American Concrete Institute (ACI) Committee 232—Fly Ash and Bottom Ash in Concrete does its work. Our mission is straightforward: to develop and report information on the use of fly ash and bottom ash in concrete as supplementary cementitious materials. In practice, that means translating materials science and field experience into consensus-based guidance that engineers can rely on—especially when codes and specifications don't address the nuance that projects demand.

This article explains what Committee 232 does, why it matters, and how our recent work is responding to the changing SCM landscape.

Why Consensus Guidance Matters

Concrete is governed by a standards framework that works because it is both rigorous and adaptable. Consensus-based



standards are industry-developed, voluntary, and technically grounded guidelines shaped through a structured process involving producers, users, academics, and owners. Once established, these standards are widely adopted by local, state, and national authorities—frequently with minimal modification—because they represent a credible baseline for safety, quality, and performance.

Within this framework, different organizations play distinct and complementary roles:

- *ACI* committees develop consensus guidance and standards addressing how materials and systems are designed, proportioned, and used in concrete. The most rigorous of these publications are ACI Standards, written in mandatory language.
- *ASTM International* establishes material eligibility through measurable physical and chemical requirements and associated test methods.

ACI Committee 232 sits at the intersection of these roles. We do not write building codes like ACI 318, nor do we establish material specifications like ASTM C618. Instead, the committee develops reports, guides, and TechNotes that explain how ASTM-qualified fly ash and bottom ash behave in concrete—and how they can be used responsibly to meet performance, durability, and sustainability objectives.

What Committee 232 Does (And What We Don't)

Again, Committee 232 does not create mandatory building code requirements. Our work influences practice, but it's not a design code. Where we create value is by helping the industry answer questions that come up constantly in design offices and batch plants, such as:

- How will a given fly ash affect workability, water demand, and set time?
- What does it mean when early-age strength is slower—but later-age strength is strong?
- When do higher replacement levels work, and what extra steps make them successful?
- How do you evaluate and qualify nontraditional sources such as harvested fly ash?
- How do you align durability and sustainability goals without taking on unnecessary risk?

Technical Sessions—How We 'Road Test' Emerging Issues

One way ACI committees keep guidance connected to practice is through technical programming at ACI Conventions and other industry events. These sessions both share established knowledge and help identify areas where additional consensus guidance is needed.

Recent sessions hosted have included the following, which can be accessed via the ACI website:

- The Future of Coal Combustion Products in Concrete – Spring 2021
- Raw Natural Pozzolans in Concrete – Spring 2021
- Use of Bottom Ash in Concrete as an SCM – Spring 2022
- Synergy of Nanoparticles with SCMs – Fall 2022
- A to Zs of SCMs Reactivity – Fall 2022
- Moving Forward Through Innovative Prescriptive and Performance-Based Specifications for Fly Ash and Natural Pozzolans – Spring 2023
- Evaluation and Use of Harvested Fly Ash and Ground Bottom Ash as SCM in Concrete – Spring 2023
- Strategies to Use Available Supplementary Cementitious Materials – Fall 2023
- Harvesting Fly Ash: Sustainable Value and Benefits – Fall 2024

Fly Ash Behavior Matrix: What Changes—and Why

Concrete Property	Typical Effect of Fly Ash	Key Influencing Factors
Workability	Improved	Particle Shape, Fineness
Water Demand	Reduced	Carbon Content, Gradation
Early-Age Strength	Typically Reduced	Cement Chemistry, Curing
Later-Age Strength	Typically Increased	Replacement Level, Curing
Heat of Hydration	Reduced	Fly Ash Class, Dosage
Durability	Enhanced	Exposure Class, Mix Design

Our publications are used to inform:

- *Material selection* and usage in ready-mixed concrete, pavements, mass concrete, and specialty mixtures
- *Performance evaluation* of impacts on fresh and hardened properties
- *Quality control and assurance*, including testing and monitoring approaches
- *Guidance documents*, including committee reports and TechNotes that address specific, practice-facing questions

The common thread is practical: help decision-makers understand how fly ash and bottom ash behave in concrete and how to use them responsibly within established standards such as ASTM C618.

Fly Ash as a Reactive Ingredient

One reason Committee 232 stays busy is that fly ash performance is contextual. Two fly ashes can meet the same specification and still behave differently in a particular mixture. The committee's work consistently emphasizes that outcomes depend on a set of interacting variables, including:

- Chemical and mineral composition
- Fineness and particle shape
- Cement chemistry and alkali content
- Curing temperature and moisture availability
- Exposure conditions and performance targets

That "systems thinking" matters because concrete specifications sometimes reduce SCMs to a checkbox: *allowed or not allowed; limited to X percent; default assumptions about set and strength.* Committee 232's role is to bring the conversation back to engineering behavior—what changes, why it changes, and how to manage it with qualification testing and mixture optimization.

This is also where performance-based thinking becomes essential. Prescriptive limits can be helpful in certain exposure scenarios, but they can also be misapplied as blanket rules, detached from actual durability requirements and modern test methods. When that happens, projects can lose both performance opportunities and sustainability progress.

A Quick History of Committee 232

Committee 232 has deep roots in ACI's evolving understanding of pozzolans. Before ACI had a dedicated fly ash committee, pozzolans were addressed through ACI Committee 212 (Admixtures)—including, as early as 1954, discussion of pozzolans for controlling alkali-aggregate expansion.

Committee 232 emerged to provide focused guidance on fly ash and related materials, and it was active by at least July 1994, when ACI 232.1R-94 was published as a state-of-the-art report on natural pozzolans in concrete. Over time, the committee's scope and the industry's needs shifted. A major structural change occurred in October 2014, when ACI announced that natural pozzolans warranted separate treatment—leading to the formation of new committees (including a dedicated committee for pozzolans), so each category could receive the attention it deserved.

As a result, Committee 232's focus has steadily consolidated around coal combustion-derived materials—and, more recently, the broader coal ash spectrum including bottom ash.

Impact of the Changing Supply Landscape

For years, fly ash guidance assumed a relatively stable supply stream: large volumes of consistent material sourced directly from operating coal-fueled power plants. That assumption is no longer reliable. Retirements, changes in combustion and emissions controls, and shifting regional availability have created new constraints—and new variability.

In response, Committee 232's work has evolved in several key ways:

- *Expansion of scope from fly ash to coal ash*—including bottom ash
- *Greater attention to "nontraditional" sources*—including harvested (reclaimed) fly ash
- *More explicit alignment with sustainability objectives*—in coordination with groups such as ACI Committee 130 and the broader low-carbon concrete movement
- *A move toward more actionable guidance*—including TechNotes that target real specification bottlenecks and recurring misunderstandings
- *Clear separation of natural pozzolan coverage*—including transfer of that responsibility to ACI Committee 240 on Pozzolans

If there's a theme here, it's that the committee is adapting to a world where ensuring consistent performance requires more than relying on historical assumptions. The goal isn't to lower the bar—it's to help practitioners meet performance expectations with the materials available today, using the best technical tools we have.

HVFA: Making 'Possible' into 'Engineerable'

One of the committee's most important contributions has been documenting the use of high-volume fly ash (HVFA) concrete for structural applications. HVFA can offer meaningful durability and sustainability benefits, but it isn't plug-and-play. Higher replacement levels can require:

- Thoughtful mixture proportioning
- Attention to curing conditions and time
- Temperature management and maturity-based acceptance approaches
- Performance verification through appropriate testing

The committee's role has been to move the discussion from "Can we do this?" to "Here are the conditions under which it works—and how to justify it." That shift matters because it turns HVFA from a niche concept into a reviewable, defensible option that owners and engineers can specify with confidence.

When Specs Get Overly Restrictive

In the field, one of the most common barriers we see is the persistence of fixed percentage caps on fly ash content that are applied independent of exposure class, performance criteria, or qualification testing. These limits often remain in place long after the technical basis has changed—or after better test methods and durability concepts have matured.

Committee 232 has addressed this directly through TechNotes, including guidance that ties fly ash limits to exposure conditions and clarifies when prescriptive limits may be unnecessary if performance-based durability criteria are demonstrated. In practice, this helps engineers and owners:

- Understand what a limit is trying to protect against
- Separate legitimate exposure-driven constraints from legacy habits
- Qualify mixtures in a way that preserves durability while enabling sustainability

As chair, I've found that some of the most productive conversations happen when we reframe the issue. The question isn't "How much fly ash are we allowed to use?" It's "What performance do we need—and how do we prove we're achieving it?"

Harvested Fly Ash: Engineering a New Supply Reality

As the industry turns increasingly to reclaimed sources—such as fly ash harvested from landfills and ash ponds—the conversation can drift into perception, policy, or uncertainty. Committee 232's approach has been to keep it rooted in materials engineering:

- How is the ash processed?
- What are the key characterization and quality requirements?
- How does it perform in concrete when evaluated against established frameworks such as ASTM C618?
- What additional testing or control steps are prudent?

The committee's publication of a TechNote on harvested fly ash in 2021 was a meaningful milestone because it acknowledged, clearly and constructively, that future supply will increasingly include beneficiated or recovered materials—and that these can be evaluated and used responsibly with proper processing, characterization, and testing.

That's a practical outcome: it helps owners and specifiers treat harvested ash as a qualification and performance question, not an automatic rejection.

Bottom Ash as an SCM

A significant portion of the committee's current effort is aimed at developing a report on the use of bottom ash as an SCM. Bottom ash represents a different material stream with different physical characteristics and handling considerations—and that means guidance must be equally specific.

The report in development is organized to address the full pathway from source to production:

- Chapter 1 – Introduction, Scope, Sources, and Sustainability
- Chapter 2 – Definitions
- Chapter 3 – Bottom Ash Composition
- Chapter 4 – Effects of Bottom Ash on Concrete
- Chapter 5 – Concrete Mixture Proportioning
- Chapter 6 – Bottom Ash Specifications, Test Methods, and Quality
- Chapter 7 – Concrete Production: Handling, Storage, and Batching

This is exactly the kind of "between the standards" guidance that practitioners need. A material can be promising, but without a shared technical playbook—definitions, testing expectations, mixture guidance, and production practices—adoption can be uneven. Committee 232's job is to help build that playbook.

A Chair's-Eye View: What's Changed Since 2020

I became chair in Fall 2020, when the industry (and the committee) was still operating in a COVID-era reality: meetings online, then a return to in-person engagement in Spring 2022. That period coincided with a rapid acceleration of change in SCM supply, specifications, and decarbonization priorities.

Some of the key committee actions during this period included:

- Updating the committee's scope and name from Fly Ash in Concrete to Fly Ash and Bottom Ash in Concrete
- Publishing the TechNote: Harvested Fly Ash as a Supplementary Cementitious Material (2021)
- Launching the bottom ash report effort described above
- Beginning work to update the Report on High-Volume Fly Ash Concrete for Structural Applications, with the help of Matt Gombeda, Assistant Professor of Civil Engineering and Director of the Concrete Materials and Structures Laboratory
- Transferring the report on the use of natural pozzolans in concrete to ACI Committee 240 on Pozzolans to keep each committee's focus clear

A lot of this work shares a common motivation: The industry needs guidance that matches today's materials landscape—not the landscape we had 20 years ago.

Key Committee 232 Publications

Committee 232 produces technical reports and guides rather than mandatory construction specifications or design codes. Core documents include:

- *ACI 232.2R-18: Report on the Use of Fly Ash in Concrete*
- *ACI 232.3R-14: Report on High-Volume Fly Ash Concrete for Structural Applications*
- *ACI 232.1R-12: Report on the Use of Raw or Processed Natural Pozzolans in Concrete (legacy document; ongoing natural pozzolan work transferred to ACI Committee 240)*
- *ACI 232.4T-20: TechNote: Limits on the Proportions of Fly Ash in Concrete*













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ACI vs. ASTM in Fly Ash Concrete

Topic	ACI (via ACI Committee 232)	ASTM (ASTM C618)
Primary role	Engineering guidance on fly ash use in concrete	Material specification for fly ash
Key question	*How will fly ash perform in concrete?*	*Does this fly ash meet the spec?*
Material classification	Interprets behavior of Class F and Class C fly ash	Defines Class F and Class C fly ash
Acceptance framework	Assumes ASTM compliance; focuses on application	Establishes test methods and limits
Replacement levels	Discusses appropriate use based on performance	No guidance on proportions
Concrete behavior	Addresses fresh properties, strength development, durability	Not addressed
Evolving practice	Covers HVFA and harvested/reclaimed fly ash	Material acceptance based on measured properties
Bottom line	*Understanding concrete performance in practice*	*Material qualification*

ACI and ASTM: Different Jobs, One Practical Outcome

Discussions around harvested fly ash, higher replacement levels, and alternative qualification approaches often expose a deeper source of confusion: the respective roles of ACI and ASTM in concrete standards. Clarifying that division of responsibility helps explain why ACI Committee 232's work exists in the first place.

It is essential to distinguish between engineering application and material qualification—roles that ACI and ASTM address in fundamentally different ways.

- *ACI* explains the engineering behavior. Through Committee 232 and related efforts, ACI publishes guidance on how fly ash and bottom ash behave in concrete, including their effects on strength development, durability, setting characteristics, and appropriate mixture proportions.
- *ASTM* defines the material. Standards such as ASTM C618 establish whether a fly ash qualifies for use based on measurable physical and chemical properties and associated test methods.

In short, ACI supports engineering judgment, while ASTM establishes material eligibility. Together, they allow fly ash to be standardized as a material while still being applied responsibly and defensibly in real-world concrete construction (see figure at the top of this page).

Looking Ahead: Performance-Based Guidance

If the last decade has taught the concrete industry anything, it's that materials practice doesn't stand still. Fly ash remains central to durability and low-carbon strategies, but the path forward increasingly depends on:

- Stronger qualification frameworks
- Clearer guidance for reclaimed and higher-variability materials
- Smarter integration of performance-based approaches alongside prescriptive requirements
- Ongoing alignment across committees focused on durability, sustainability, and code language

Committee 232 will continue doing what it has always done at its best: build consensus around technically rigorous guidance that helps the industry use fly ash and bottom ash responsibly—so decisions are not just allowed, but well founded.

And speaking personally, that's what motivates me about this committee. When we get the guidance right, we're not just publishing another document. We're helping engineers, owners, producers, and contractors make better decisions—decisions that improve durability, reduce risk, and keep concrete moving toward a more sustainable future without sacrificing the fundamentals that structures depend on.

Ivan Diaz *is Vice President of Research and Product Development at Eco Material Technologies. He holds a Ph.D. from Louisiana Tech University and has more than 15 years of experience in cementitious materials. He is the chair of ACI Committee 232, Fly Ash in Concrete and is a member of Committees 240, Natural Pozzolans, 236, Material Science of Concrete, and 242, Alternative Cements. He is also a member of ASTM Committees C01 on Cement and C09 on Concrete and Aggregates. His career has focused on evaluating characteristics and performance of supplementary cementitious materials in concrete, alternative supplementary cementitious materials, and evaluating the technical soundness of new materials and processes for the concrete industry.*

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Recent Developments in SCM and Blended Cement Standards North of the 49th and Across the Pond

By R. Douglas Hooton, Ph.D., P.E.

As the cementitious materials landscape evolves, standards bodies are adapting to accommodate changes in existing materials, new material streams, and performance expectations. A closer look at developments in Canada and Europe reveals how different frameworks are addressing many of the same technical and market challenges.

North of the 49th Parallel: General Differences from ASTM

The Canadian (CSA) standards are very similar to those of ASTM. Many members of CSA cement and concrete committees are also active at ASTM. Due to the involvement of essentially the same producer companies operating in both countries and to expedite cross-border shipments of cementitious materials, considerable effort is taken to reduce technical differences in test methods and specifications.

One major difference in the organization of CSA standards is that the A3000 Cementitious Materials Compendium includes portland, blended, and portland-limestone cements, as well as all supplementary cementitious materials (SCMs), in one specification, A3001, which is under the jurisdiction of one technical committee. At ASTM, cements are under Committee C01 and SCMs are under Committee C09. CSA made this change over 25 years ago because it seemed logical to have all the cementitious materials for concrete in one place. In terms of designations, cement types are the same as in ASTM C1157: GU for general use, HE for high early strength, MS for moderate sulfate resistant, and HS for high sulfate resistant.

Another difference from ASTM in CSA A3001 cement standards is that portland-limestone cements are in a separate classification from blended cements. Portland-limestone cements have a designation "L"—so GUL, HEL, MSL, and HSL. Blended cements use the designation "b"—so GUb, HEb, MSb, and HSb. Also, when cements are combined with SCMs at the concrete plant, to provide a binder with equivalent sulfate resistance the designations are MSe and HSe.

Recent Changes to CSA SCM Specifications

In 2021 CSA A3001 allowed the use of harvested fly ash, bottom ash, and co-mingled ash to be simply designated as fly ash under the existing Type F (≤ 15% CaO), CI (> 15 – ≤ 20% CaO), and CH (> 20% CaO) designations. The only additional requirement for harvested ash is that, to minimize coarse particles, it has to have ≥95% passing a 160µm (#100) sieve.

While Saskatchewan, Nova Scotia, and New Brunswick are the only Canadian provinces with operating coal plants, Alberta now boasts three ash harvesting sites.

Even though there are no active coal power plants in Alberta, there are currently at least three sites where fly ash is being harvested there. The only provinces with operating coal power plants in Canada are Saskatchewan, Nova Scotia, and one plant in New Brunswick that will close in the next year or so.

Another interesting aspect of testing fly ash in A3001 is that there is only a limit of 75% for the 28-day strength activity index, and it is an optional requirement. The only mandatory physical requirement for fly ash is the maximum limit of 34% retained on a 45 µm (325 mesh) sieve fineness. However, typical mill reports provide the same information as for ASTM C618 coal ash. There are optional LOI limits of 8% on Type F ash and 6% on both CI and CH ashes.

Type N natural pozzolans are also included in A3001. The recent changes to ASTM C1945-26 that allow additional methods for processing and activating natural pozzolans are currently being balloted by the CSA committee. The strength activity index is optional in A3001, but natural pozzolans must meet a minimum 5 MPa (725 psi) 7-day pozzolanic strength activity test with lime. This test is the same as was included in ASTM C618 prior to 1983.

CSA A3001, "Cementitious Materials for Use in Concrete," allows harvested fly ash, bottom ash, and co-mingled ash to be classified as fly ash under the existing Type F, Type CI, and Type CH designations.

Binary and ternary blended SCMs are also covered in CSA A3001 and are designated as SCMb but require the types and target proportions of the blend to be identified. For example, a blended supplementary cementitious material comprising 50% Type F fly ash, 30% slag, and the remainder Type CH fly ash would be labeled SCMb-50F/30S/CH.

Specifications Across the Pond

In Europe, cement specifications are defined under European Norm EN 197. In the harmonized EN 197-1, there are 27 types cements that cover portland cement (CEM I), portland-limestone cements (CEM II /A-L and CEM II/A-LL) with up to 20% limestone, along with 17 other types of CEM II blends with either up to 20% or 35% SCMs of different types and three levels of CEM III slag-blended cements, 2 levels of CEM IV pozzolanic cements (with pozzolans including silica fume, natural pozzolans, and/or both F and C fly ash), and two types of CEM V composite cements containing levels of silica fume, natural pozzolan, and/or F fly ash [designated siliceous fly ash and calcareous fly ash, but equivalent to Type F and C ash]). To make life more interesting, most of these cement types can be made to have up to three different characteristic 28-day strengths of either 32.5, 42.5, or 52.5 MPa (4,700, 6160, or 7610 psi). Of course, each of the 27 European countries produces only a limited number of these cement types and strength levels. Note that since the UK left the European Union, they still use the same cement specifications but they are labeled BS EN 197.

In 2021, more cement types were added as EN 197-5 and E 197-6 but these are not yet accepted by all European Union countries. EN 197-5 has five new types of cements: CEM II/C-M portland-composite cement with 36-50% clinker replacement by any of the SCMs and four CEM-VI composite cements containing 31-59% slag and 6-20% of different specific types of pozzolans.

Under European Norm EN 197-1, 27 cement types are organized across portland, limestone, slag, pozzolanic, and composite blends, incorporating varying proportions of materials such as fly ash, slag, and natural pozzolans.

In 2023, EN 197-6 included six more types, with four similar to the EN 197-5 portland-composite and composite types but now allowing inclusion of different levels of 6-29% recycled concrete fines. The other two are called portland-recycled concrete fines cements, CEM II/A-F and CEM II/B-F with 6-20% and 21-35% recycled concrete fines, respectively. The recycled concrete fines need to be at least 90% by mass concrete, concrete products, mortar, concrete masonry units, unbound aggregate, natural stone, hydraulically bound aggregate, and less than 10% by mass clay masonry units (i.e., bricks and tiles), calcium silicate masonry units, aerated non-floating concrete. There are also limits on contaminants: ≤ 1% by mass bituminous materials; ≤ 2 cm^3/kg floating material in volume; and ≤ 1% by mass glass and other materials.

EN SCM Specifications[1]

The fly ash specification is EN 450-1 and covers only low-calcium siliceous fly ash containing a maximum of 10% total calcium oxide and the average sum of the oxides (i.e., Al_2O_3 + SiO_2 + Fe_2O_3) of at least 70%. In the current French AFNOR 2026 revision to this 2012 standard, the fly ash has to have been combusted using at least 60% pulverized coal. There are two different classes based on fineness as measured by wet sieving on the 45 µm (#325)—max. percent retained = 12% for Class S and 40% for Class F—and these declared values cannot vary by more than ±10 percentage points. Fly ash is also divided into three ranges based on average LOI: 5.0% by mass (category A), 7.0% by mass (category B), and 9.0% by mass (category C), with no single values exceeding 7.0%, 9.0%, and 11.0%, respectively. The types of other physical and chemical test requirements appear to be similar to those in ASTM C618. Maximum limits on chlorides = 0.1%, sulfates = 3.0%, and alkali content of 5.0%. If free CaO is greater than 1.5%, the ash must be tested for soundness using the Le Chatelier test method. If fly ash is produced using fuels not exclusively from coal, there are limits on MgO = 4.0% and phosphate (P_2O_5) = 5.0%. The strength activity index at 28 days and at 90 days shall not be less than 75% and 85%, respectively, for 25% cement replacement (note that strengths are measured using equivalent cube strengths on 40 x 40 x 160 mm mortar bars cast at w/cm = 0.50).

1. *The information contained in this section is based on available documentation and may not reflect the most current iterations of the cited standards.*

It is interesting that, like several other EN specifications, EN 450-1 has chemical and physical property limits on both average and single values. There is currently no provision for use of harvested landfilled fly ash, but it is being discussed.

Ground granulated blast-furnace slag (GGBFS) is specified in EN 15167-1. The current 2006 edition includes chemical requirements, moisture content, LOI, setting time, and 7- and 28-day strength indexes (at 50% slag replacement of cement) of 45% and 70%, respectively.

European cement standards define multiple cement families based on composition and strength class, with expanding provisions for supplementary cementitious materials and, more recently, the inclusion of recycled concrete fines.

Natural pozzolans are specified in EN 8615-1 with two categories for raw natural pozzolans (P) and natural calcined pozzolans (Q). The strength activity tests at 7 and 28 days are reported but there appears to be no limit.

There is also a new draft standard being developed, prEN 18314:2026, Natural Pozzolana and Natural Activated Pozzolanic Material. Natural activated pozzolanic material is being defined as "natural pozzolanic material activated by a specific treatment (thermal, chemical, and/or mechanical) intended to obtain *pozzolanic properties* of the material." In February 2026, this draft was sent out for "enquiry" and appears to have similarities to ASTM C1945. Reactivity will be measured by either heat of hydration or bound water content at 7 days, determined in accordance with EN 196-12 (essentially the same as ASTM C1897). Either heat of hydration or bound water content shall be used and declared to assess the reactivity. The heat of hydration shall be at least 90 J/g of pozzolana. The bound water content will have to be at least 3.5% by mass of dry paste (almost the same limit as the minimum 3.6% bound water limit in ASTM C1945). Fineness is determined on percent retained on a #325 (45 µm) sieve and will have a limit of 5% retained on a 200 µm sieve (between a #70 and #80 sieve size). Setting times and strength activity tests will use 25% pozzolan by mass replacement of cement. Average strength activity indexes (SAI) must be at least 75% at 28 days and 85% at 90 days with no single value less than 70% or 80%, respectively. The 90-day SAI is not required if the 28-day value exceeds 90%. Setting times cannot exceed 2.25 times that of the control. To maintain a w/cm = 0.50 in these tests, a superplasticizing admixture is allowed to obtain a flow equal to that of the control cement mixture. There is a chloride limit of 0.10% and a sulfate limit of 3.0% (with no single value > 3.5%), but these values can be exceeded if declared.

The standard for silica fume used in concrete is EN 13263.

How SCMs Are Handled in the EN 206 European Specification for Concrete

In the current EN 206:2013+A2:2021 standard for concrete, any EN 197 blended cements can be used, but SCMs added separately to concrete as "Type II additions" are treated differently than when those same materials are included in blended cements. Each type of SCM is assigned a k equivalency factor. This k-factor states the fraction of the mass of an SCM that can be included in the concrete's water-to-cement ratio, with the objective of maintaining the same 28-day concrete strength. The term "water/cement ratio" is replaced with "water/ (cement + *k* x addition) ratio." For concrete mixtures with a maximum of 33% fly ash replacement of cement, the k-factor is 0.4 when used with CEM I cement. So the majority of separately added fly ash is treated as aggregate! The common k-factor for silica fume is 2.0 and for slag (GGBFS) is 0.6. These k-factors are conservative and they can be increased if there is strength dated from trial mixtures available. Note that the UK does not use the k-factor concept in concrete mix design.

R. Douglas Hooton, Ph.D., P.Eng., *is Professor Emeritus, Department of Civil and Mineral Engineering, at the University of Toronto. He is internationally recognized as a subject matter expert related to concrete durability with emphasis on cements and supplementary cementitious materials (SCMs). Professor Hooton has received numerous awards and recognitions from major technical organizations in Canada, the U.S., and abroad. He retired from his teaching duties in 2021 but is continuing research projects on SCMs, concrete durability, and in contributions to the American Concrete Institute, ASTM International, the Canadian Standards Association, and RILEM.*

New ARTBA Analysis Points to a Stronger Fly Ash Supply Outlook

By John Simpson

U.S. fly ash supply may prove more resilient than earlier forecasts suggested, even as coal-fueled power generation declines. A new analysis by the American Road & Transportation Builders Association (ARTBA) finds that rapid growth in ash harvesting and beneficiation could offset falling supplies of freshly produced ash and help sustain the material's availability for decades.[1]

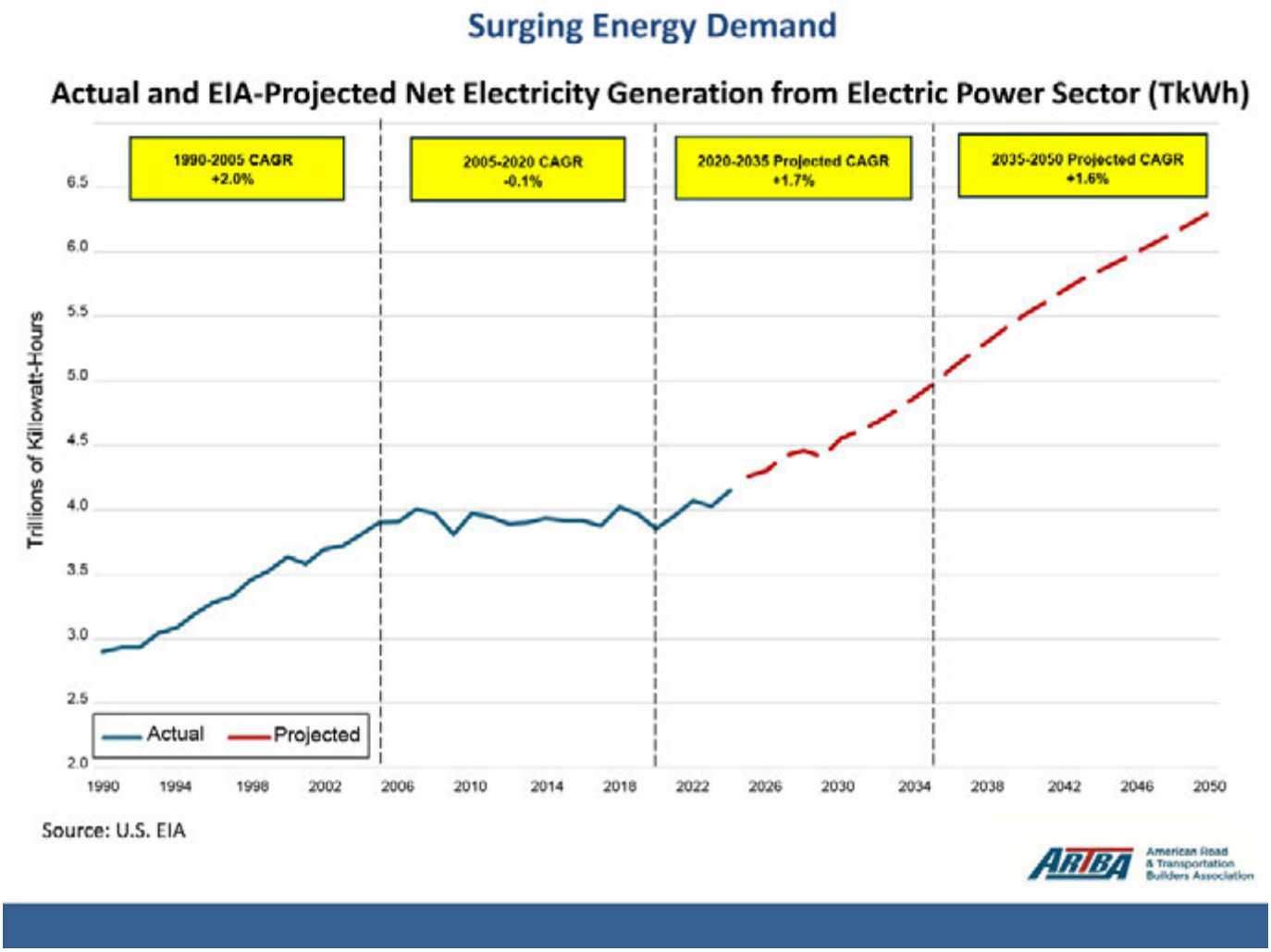
The findings were presented by Josh Hurwitz, Ph.D., ARTBA Senior Economist, at the American Coal Ash Association's 2026 Winter Membership Meeting. The study revisits ARTBA's 2019 forecast of fly ash production and utilization and examines how recent changes in electricity markets and the growth of ash harvesting could influence the long-term supply outlook.

1. As this issue of *ASH at Work* went to press, ARTBA had not formally released this study. It expects to publish its analysis later this spring or early summer, following EIA's release of updated long-range forecast data.

Why the Forecast Needed Updating

ARTBA's 2019 analysis relied on the U.S. Energy Information Administration's 2019 "Reference Case" outlook for coal-fueled electricity generation, which assumed output would stabilize near one trillion kilowatt-hours annually within a few years. Instead, generation declined much more quickly than anticipated.

By 2024, coal generation had fallen to roughly 0.65 trillion kilowatt-hours, far below earlier projections. The updated study attributes that divergence to several developments: natural gas remained relatively inexpensive; renewable generation costs continued to decline; plant operating costs and the pace of coal retirements and conversions were underestimated; and regulatory policies affecting coal generation became more stringent than earlier forecasts assumed.



Because fresh fly ash production historically tracks coal-fueled electricity output closely, these energy-market developments significantly altered expectations for future ash supply. But coal-generation trends alone no longer define the long-term outlook for fly ash supply. Stronger electricity demand forecasts, coal plant retirement delays, and the rapid expansion of ash harvesting and beneficiation are reshaping the supply picture in ways that earlier forecasts did not anticipate.

A Changing Market Environment

One reason coal-generation trends no longer tell the whole story is projected growth in electricity demand. After more than a decade of relatively flat consumption, the U.S. Energy Information Administration now expects electricity demand to grow roughly 1.6 to 1.7 percent annually through 2050, driven primarily by the AI race and a surge in data center construction, along with broader reindustrialization and electrification.

Stronger demand is already influencing coal plant retirement decisions. ARTBA identified 37 generating units with announced retirement delays, many reported in 2024 and 2025. Those units accounted for nearly one-fifth of coal-fueled electricity generation in 2024, and for facilities with revised schedules the average delay is about 2.5 years.

Policy initiatives from the current administration supporting coal generation—including regulatory relief proposals, expanded access to federal coal resources, and federal intervention delaying certain plant closures—could extend the operating life of some coal-fueled generating units. Taken together, these developments suggest coal generation may decline more gradually than earlier projections anticipated.

Harvested Ash Emerges as a Major Supply Source

Perhaps the most consequential trend identified in the analysis is the rapid growth of harvested and beneficiated ash recovered from legacy disposal sites.

Recovered ash production has increased rapidly in recent years, growing from about 1.8 million short tons in 2022 to roughly 5 million tons in 2025. Operations are now active in 16 states across 27 sites, and additional projects are under development.

Several market developments are supporting that expansion. Coal generation has declined in recent years, while recovery projects and beneficiation technologies have advanced, contributing to growing interest in harvested ash as an additional supply source. Improvements in beneficiation technology and

industrial-scale processing have also boosted the consistency and reliability of recovered material.

Large inventories of stored coal combustion residuals also represent a substantial potential source of recoverable ash, making harvested material an increasingly important component of the overall fly ash supply.

Modeling Future Production

To estimate how fly ash supply could evolve through 2045, ARTBA modeled fresh ash production and harvested ash production separately and then combined the results into a total supply outlook.

Fresh ash projections were generated using an ARIMAX econometric model that estimates ash production based on projected coal-fueled electricity generation. The analysis evaluated several electricity-generation pathways drawn from Energy Information Administration outlook scenarios.

One pathway assumes emissions regulations take full effect early in the next decade, producing a sharp decline in coal generation. Other pathways assume more gradual changes in

Harvested Ash Volume Scenarios

Harvested Ash: Base Case

Forecast Scenario	2024	2030	2035	2040	2045	Total Change	Avg. Annual Growth
Regulatory Cliff	24.7	22.4	10.1	10.9	13.5	-45.3%	-1.3%
Economic Glide Path	24.7	22.9	24.6	23.0	25.8	4.3%	0.3%
Legacy Outlook	24.7	20.6	23.4	25.1	27.3	10.4%	0.6%
Deferred Glide Path	24.7	30.1	31.3	27.9	30.6	23.8%	1.1%

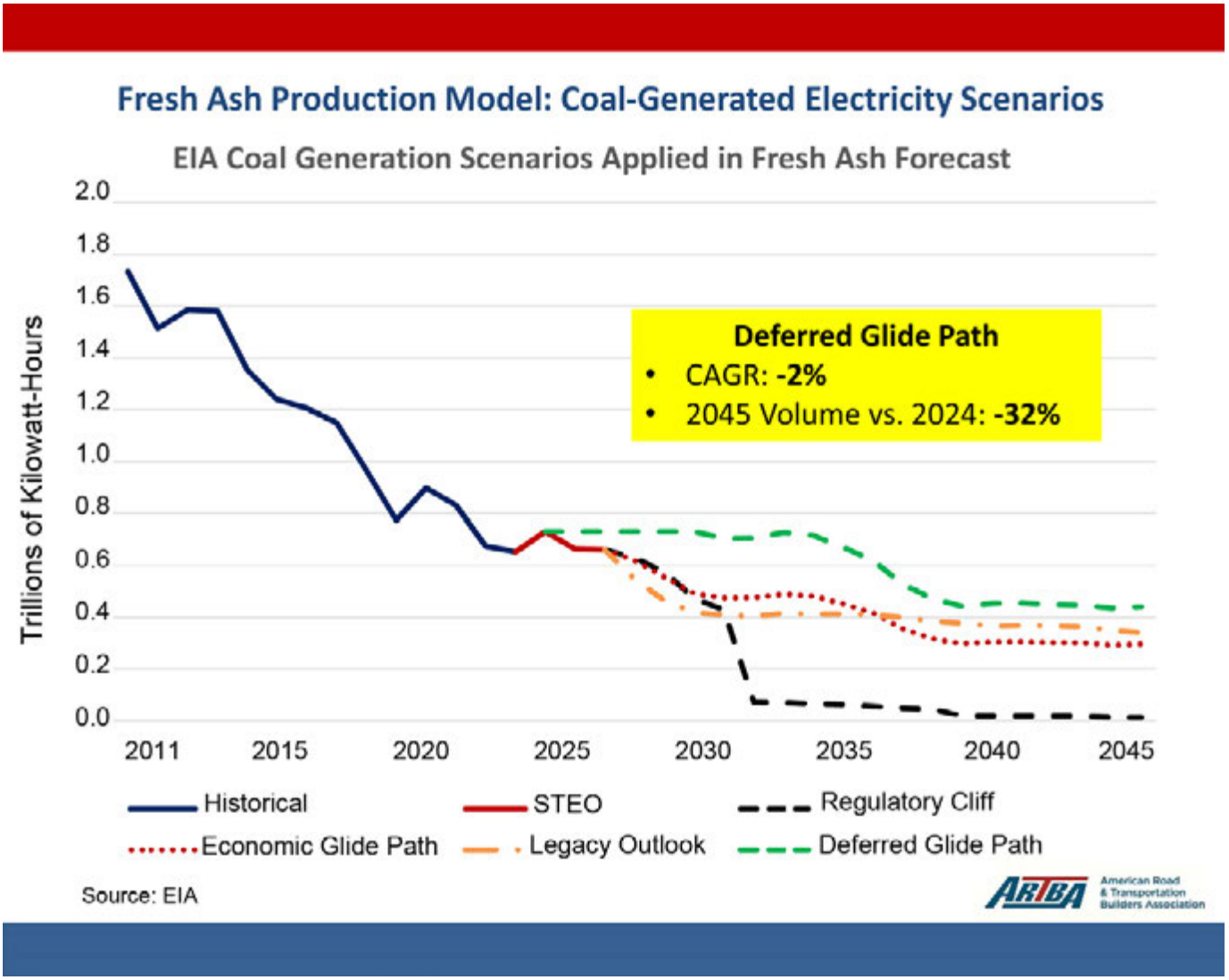
Harvested Ash: High Growth Case

Forecast Scenario	2024	2030	2035	2040	2045	Total Change	Avg. Annual Growth
Regulatory Cliff	24.7	24.4	14.5	17.8	22.0	-11.1%	0.6%
Economic Glide Path	24.7	24.9	29.1	29.9	34.2	38.5%	1.6%
Legacy Outlook	24.7	22.6	27.9	32.0	35.7	44.6%	1.9%
Deferred Glide Path	24.7	32.1	35.7	34.9	39.0	58.0%	2.3%

Harvested Ash: Low Growth Case

Forecast Scenario	2024	2030	2035	2040	2045	Total Change	Avg. Annual Growth
Regulatory Cliff	24.7	21.3	7.5	6.6	7.2	-70.9%	-3.8%
Economic Glide Path	24.7	21.9	22.1	18.8	19.5	-21.3%	-1.0%
Legacy Outlook	24.7	19.6	20.9	20.8	21.0	-15.2%	-0.7%
Deferred Glide Path	24.7	29.0	28.8	23.7	24.3	-1.9%	0.0%

ARTBA American Road & Transportation Builders Association



market conditions or delayed declines tied to stronger electricity demand.

Harvested ash growth was modeled independently, reflecting the rapid expansion of recovery operations in recent years and the limited historical data available for forecasting what remains a relatively young industry.

Total Supply Outlook

When harvested ash is incorporated into the analysis, the long-term supply picture changes significantly.

Under ARTBA's base-growth assumption for harvested ash, total fly ash production remains close to current levels under several plausible energy-market conditions. In some cases—particularly those involving slower coal plant retirements—total supply increases modestly by 2045.

Even in cases where coal generation declines sharply, growth in harvested ash production helps stabilize overall supply after an initial drop. Without accounting for recovered ash, projections tied strictly to coal generation would imply a sharply reduced supply of fresh fly ash.

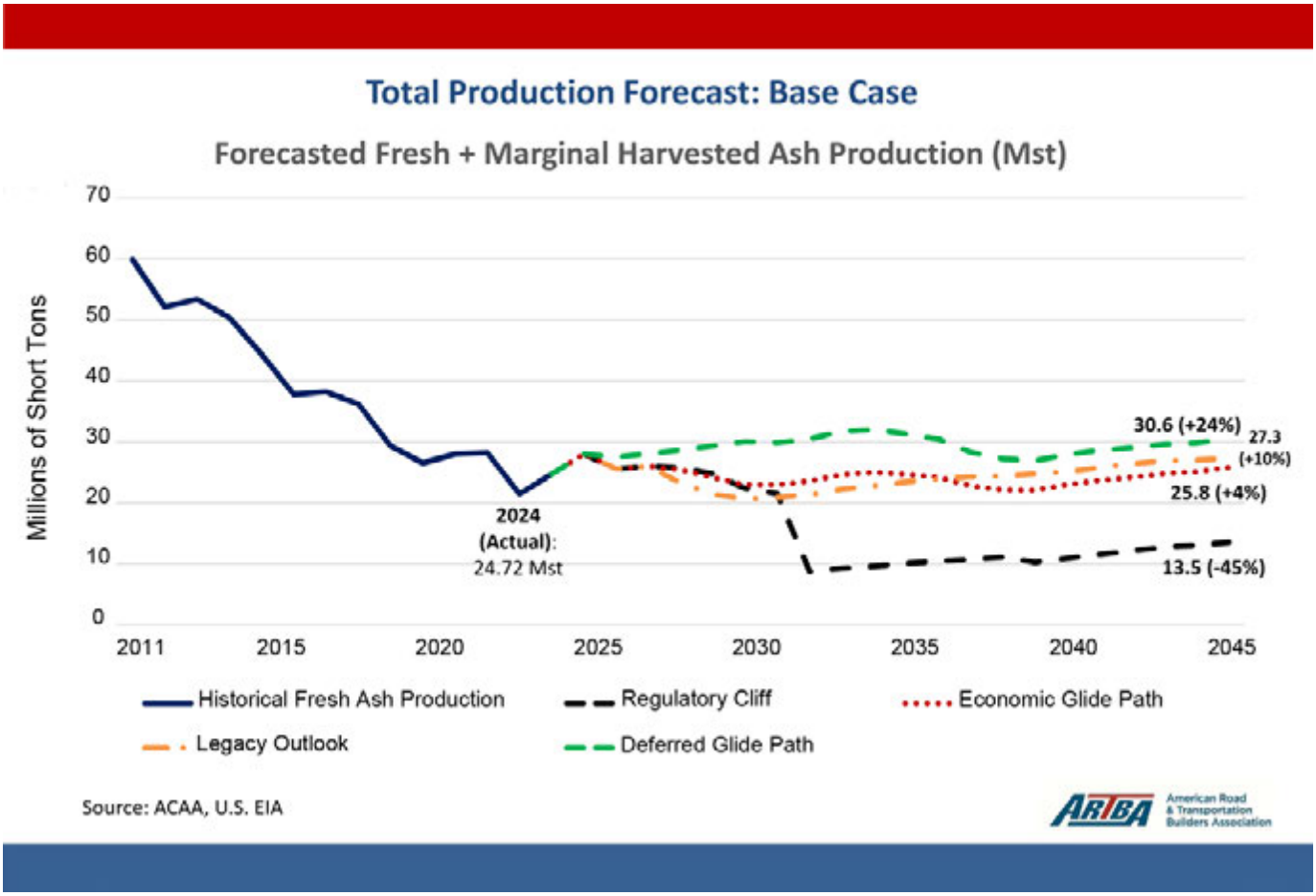
Utilization Trends

Supply projections tell only part of the story; demand conditions also shape the long-term outlook for fly ash. Demand conditions remain favorable for fly ash, particularly in construction markets. In recent years, the vast majority of beneficial fly ash use has been concentrated in concrete, blended cement, and related products, reflecting the material's importance as a supplementary cementitious material.

As fresh ash production has declined, a larger share of the material produced has been directed to beneficial use. ARTBA's utilization analysis projects that the utilization rate for fresh ash could exceed 90 percent by 2045.

The utilization model assumes long-term cement consumption growth of roughly 1 percent annually, broadly consistent with historical trends. The analysis treats harvested ash and fresh ash as interchangeable sources in many concrete applications.

Taken together, those findings suggest that tightening fresh-ash supply, continued demand from cement and concrete markets, and growing acceptance of beneficiated ash all support a continuing role for fly ash in construction.



Feedback from State Transportation Agencies

Because state transportation agencies remain among the largest users of fly ash in highway and bridge construction, their procurement preferences offer an important indicator of how the market may respond to increasing supplies of harvested ash.

To better understand those priorities, ARTBA surveyed 31 state departments of transportation regarding how agencies evaluate harvested ash. Survey respondents ranked performance, consistency, and availability as the most important considerations when selecting ash sources. Cost and environmental attributes ranked somewhat lower.

Those priorities align closely with the characteristics often associated with beneficiated ash—particularly consistent performance and reliable supply. In some states, fly ash is used in virtually all concrete highway and bridge projects, underscoring the material's continued importance in transportation infrastructure.

Harvested Ash Strengthens the Long-Term Outlook

ARTBA's updated analysis ultimately points to a significant shift in how the long-term fly ash supply outlook should be understood. While fresh ash production will decline alongside coal-fueled electricity generation, the rapid expansion of ash harvesting is emerging as an increasingly important contributor to the overall fly ash supply.

The analysis evaluates several electricity-generation pathways and harvesting growth assumptions, underscoring the range of possible outcomes for future ash supply. A broad resurgence in coal generation is considered unlikely, and long-term structural forces still favor continued substitution away from coal.

At the same time, stronger electricity demand and recent policy actions suggest that the transition away from coal-fueled generation may take longer than earlier forecasts assumed.

In that environment, future fly ash availability will depend less on coal-generation trends alone and more on the recovery, beneficiation, and use of the large volumes of ash already stored in ponds and landfills across the United States.

John Simpson *is editor of ASH at Work.*

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Capturing the Full Market: ACAA Tracks the Rise of Harvested Ash

By John Simpson

For nearly six decades, the American Coal Ash Association has compiled one of the industry's most widely referenced datasets: the annual Production and Use Survey of coal combustion products (CCP). Since 1968, the survey has quantified CCP volumes generated by electric utilities and tracked their use across a wide range of beneficial applications.

Now, ACAA is undertaking a significant expansion of that effort—one that reflects how the coal ash supply chain itself is evolving.

In March ACAA, working with data analytics firm FirmoGraphs, launched its first annual survey focused specifically on harvested ash—coal ash recovered from landfills and surface impoundments and returned to beneficial use markets. The results, anticipated in the coming months, will complement and ultimately be integrated into ACAA's long-standing survey, helping provide a more complete picture of total coal ash supply in the United States.

Filling a Critical Data Gap

The need for a harvesting-focused survey is straightforward: ACAA's existing survey captures ash generated at active power plants, but not material recovered from legacy storage sites. In fact, the coal ash supply chain now extends well beyond the plant gate, with an expanding segment of the market focused on harvesting, processing, and marketing ash from legacy ponds and landfills.

Existing public and industry-tracked data provide a starting point for understanding the extent of harvesting activity. For example, project tracking efforts have identified harvesting operations across multiple states. But critical details—such as actual production volumes, operational status, and development pipelines—remain largely unknown.

To address this gap, the survey is structured to capture both current operations and future projects, collecting information on production volumes, beneficiation technologies, and pipeline activity that will provide a clearer view of how harvesting capacity is evolving.

Importantly, company-specific responses are treated as confidential and reported only in aggregated form. This approach—consistent with ACAA's long-standing survey practices—has been essential to building trust and ensuring broad industry participation.

Why Participation Matters

As with the Production and Use Survey, the value of the harvesting survey will ultimately depend on the breadth and quality of industry participation.

ACAA is positioning the effort not simply as a data collection exercise, but as a tool to support industry advocacy and improve market understanding. The resulting dataset is intended to strengthen engagement with federal agencies, including EPA Smart Sectors initiatives, inform state departments of transportation, and support the work of ASTM and AASHTO committees.

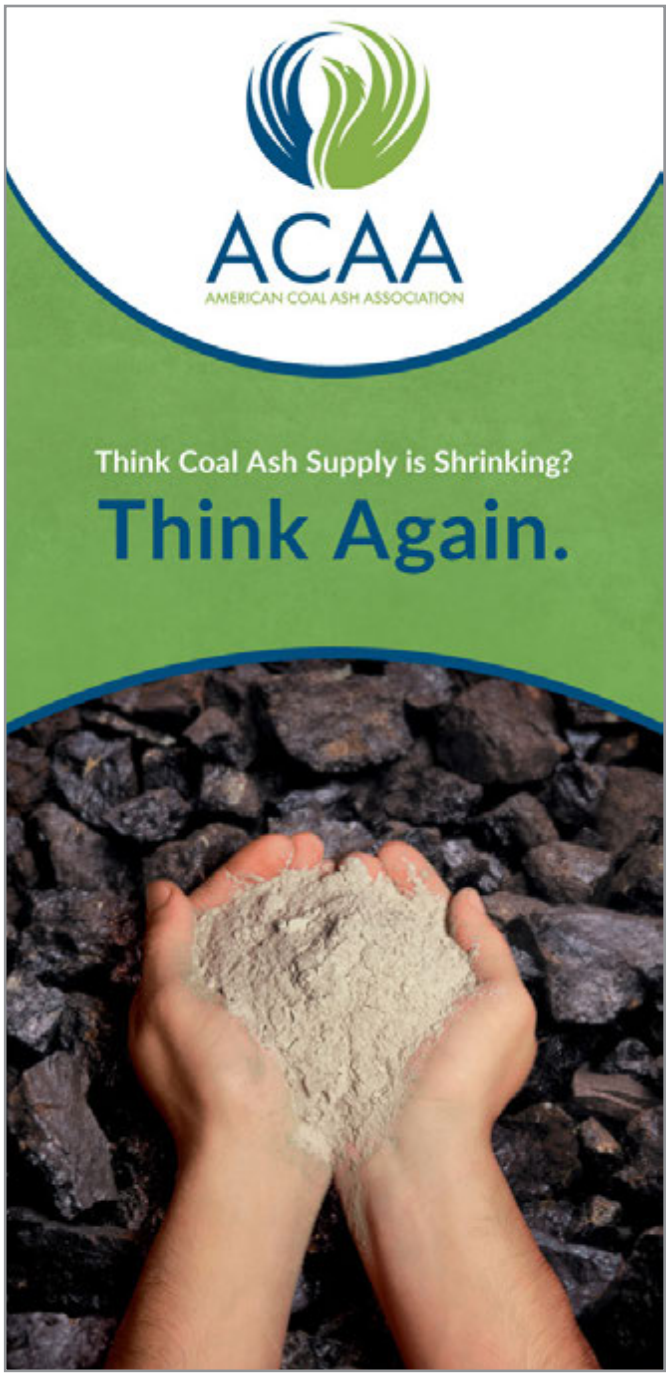
Equally important, the data will help communicate a more accurate picture of supply to the marketplace—an objective closely tied to a second initiative ACAA has launched in parallel.

"Think Again": Reframing the Supply Conversation

Alongside the new survey, ACAA has introduced a targeted outreach campaign aimed at concrete specifiers, producers, and other stakeholders: "Think coal ash supply is shrinking? Think again."

The campaign responds directly to a narrative that has gained currency in parts of the construction and materials community—that coal ash availability is in long-term decline due to reduced coal-fueled electricity generation.

ACAA's position, supported by emerging data, reflects a more complete picture of supply. Coal ash remains the most widely used supplementary cementitious material in the United States, accounting for more utilization volume than all other SCMs and novel cement alternatives combined, with approximately 19 million tons of freshly produced ash used annually in cement and concrete applications.



At the same time, two developments are reshaping the supply outlook.

First, electricity demand growth—driven by data centers, electrification, and reindustrialization—is delaying the retirement of many coal-fueled power plants. Dozens of generating units have already extended operating timelines, helping sustain fresh ash production.

Second, the rapid expansion of harvesting operations is adding entirely new supply streams. Harvested ash production has grown from roughly 1.8 million tons in 2022 to approximately 5 million tons in 2025, with projects active or planned across at least 16 states.

Taken together, these trends point not to a contraction of fly ash supply, but to transformation.

"Harvested ash utilization represents growth in coal ash recycling above and beyond the increasing volumes of ash recycled from current power plant operations," said ACAA Executive Director Thomas H. Adams. "The rapidly increasing utilization of harvested CCP shows that beneficial use markets are adapting to changing dynamics in coal-fueled electricity generation in the United States. With soaring electricity demand forecasts delaying many anticipated coal plant closures, the combination of continued fresh ash production and significant expansion of harvesting activity portends ample coal ash supplies for construction markets for many years to come."

Coal Ash Harvesting Sites – *Existing and Under Development*

From Narrative to Data

The outreach campaign and the harvesting survey are closely aligned—one focused on communicating the evolving supply picture, the other on developing the data that underpins it.

ACAA's Production and Use Survey has long been recognized by agencies such as EPA and the U.S. Geological Survey as an authoritative source on coal ash utilization. By extending that framework to include harvested ash, ACAA is working to ensure that a long-standing industry benchmark evolves alongside the supply landscape it reflects.

More complete data on harvested ash volumes will support specification development and inform infrastructure investment decisions, while also helping address one of the most persistent challenges facing the industry: aligning perception with reality.

Looking Ahead

As construction markets continue to prioritize performance, sustainability, and material availability, the role of coal ash—both freshly produced and harvested—will increasingly be defined not just by how much exists, but by how well it is measured, understood, and communicated.

ACAA's message to the market is clear: the supply story is changing—and the data is catching up.

John Simpson *is editor of ASH at Work.*

Beneficial Use Case Study

Nice-Middleton Bridge

Coal Combustion Product Type
Fly Ash

Project Name
Nice-Middleton Bridge

Project Location
Newburg, Maryland/Dahlgren, Virginia

Project Participants
Maryland Transportation Authority, Skanska–Corman–McLean JV, AECOM, Coastal Precast Systems, Chaney Enterprises, Heidelberg Materials (formerly The SEFA Group), Siva Corrosion Services

Project Completion Date
October 2022

Project Summary
The Nice-Middleton Bridge replaced a congested, unsafe two-lane crossing that had carried U.S. Route 301 over the Potomac River between Maryland and Virginia since its construction in 1940. Designed as a 1.9-mile, four-lane structure with a 100-year service life, the new bridge prioritizes safety, durability, and sustainability. Recognizing that concrete would largely determine both long-term performance and embodied carbon, the design team incorporated high-volume fly ash mixes to enhance durability while reducing environmental impact in a demanding tidal river environment.

Project Description
Constructing a nearly two-mile bridge across a tidal waterway required the installation of extensive foundations, large structural components, and deck systems exposed to moisture, salt air, and deicing chemicals. Managing internal heat during curing and protecting reinforcing steel from corrosion were critical design and construction considerations.

To address these performance demands, 17 different concrete mixtures were developed and tested throughout the project. All mass concrete placements ultimately incorporated mixes containing 45 percent fly ash. Replacing nearly half of the cement with fly ash helped moderate internal temperatures during curing in large placements, while also enhancing long-term durability in the brackish river environment, where chloride-induced corrosion is a primary concern. Temperatures were monitored in real time using remote electronic sensors to track curing conditions and verify compliance with service-life and mix design requirements under varying ambient conditions.

To maintain quality and efficiency, an on-site concrete plant was constructed adjacent to the bridge. Concrete was transported to placement locations via a coordinated barge system, supporting more than 65,000 cubic yards of concrete installed in and over water. Real-time digital batching and monitoring systems tracked concrete properties during placement to ensure consistency from production through final placement.

The Nice-Middleton Bridge was completed ahead of schedule and within budget, and its structural design and construction have been formally recognized. The bridge received a 2024 Precast/Prestressed Concrete Institute Design Award in the Transportation category for bridges with main spans between 76 and 200 feet, reflecting excellence in structural design and construction. The project stands as a model of how fly ash can help deliver infrastructure that is safer, longer-lasting, and more sustainable.

Photo: Maryland Transportation Authority

Beneficial Use Case Study

York University Computer Science Building

Coal Combustion Product Type
Canadian Standard (CSA) Type CI Fly Ash

Project Name
York University Computer Science Building

Project Location
Toronto, Canada

Project Participants
Busby + Associates Architects, Lafarge Canada, Van Nostrand di Castri Architects, Yolles Partnership, Ellis Don Construction, Ontario Ready-Mix

Project Completion Date
2022

Project Summary
Facing growing enrollment and a firm commitment to environmental leadership, York University commissioned a new Computer Science Building designed to showcase sustainable construction in a northern climate. The facility was designed to integrate energy efficiency, natural ventilation, and durable materials into a cohesive whole. Because cement manufacturing is carbon-intensive, the project team focused on reducing its environmental impact by replacing a substantial portion of portland cement with fly ash—lowering emissions while producing durable, high-quality concrete.

Project Description
Central to the project team's sustainability strategy, most of the building's interior concrete—representing approximately 80 percent of the building's total concrete use—was produced using mixes in which 50 percent of the portland cement was replaced with CSA A23.5 Type CI fly ash. The design team also specified a 50 percent fly ash replacement for all cast-in-place concrete elements.

Using such a high proportion of fly ash required coordination between the supplier and the contractor. Prior to placement, the project team reviewed procedures for finishing and curing under both summer and winter conditions.

Despite early concerns that high fly ash mixes might delay strength development, the concrete performed exceptionally well in the field. One-day strengths of approximately 2,300 psi were achieved on many placements, and the specified 4,350 psi strength was typically reached within seven days, with 28-day requirements comfortably exceeded.

Crews found the concrete easy to pump, place, and compact. Even with reduced water content, the fly ash improved flow and workability, producing smooth, consistent finishes. In fact, the resulting surface quality was so high that the architects ultimately chose to leave more of the structural concrete exposed than originally planned, incorporating it into the building's architectural expression. Beyond aesthetics, the dense, fly ash-rich concrete also provides low permeability and enhanced long-term durability, helping protect the structure from moisture intrusion and environmental exposure.

Crews placed about 6,540 cubic yards of concrete, incorporating roughly 500 cubic yards of fly ash sourced from the

Atikokan and Thunder Bay generating stations in northern Ontario. By replacing half of the cement across the project's cast-in-place concrete, the building avoided approximately 940 tons of carbon dioxide emissions.

The building received the 2002 Governor General's Award (Canada) and the World Architecture International Green Building Award, underscoring how high-volume fly ash concrete can contribute to sustainable, high-quality commercial construction without compromising schedule or performance.

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Beneficial Use Case Study

Zuri Gardens

Coal Combustion Product Type
Fly Ash (PozzoCem® Vite Green Cement)

Project Name
Zuri Gardens

Project Location
Houston, Texas

Project Participants
Eco Material Technologies, HiveASMBLD, LP Building Solutions, Cole Klein Builders, City of Houston

Project Completion Date
2026

Project Summary
Zuri Gardens is a 13-acre Houston development integrating 3D printing and fly ash-based green cement to create affordable, resilient housing. When complete, the community will include 80 two-story homes featuring printed concrete lower levels made with PozzoCem® Vite, a near-zero-carbon cement alternative. By replacing portland cement in the printed walls, the project significantly reduces the embodied carbon compared with traditional portland-cement systems.

Project Description
The first floor of each Zuri Gardens home is produced using a robotic 3D printing system. The equipment places a printable mortar made with Eco Material Technologies' PozzoCem® Vite in successive layers, forming the structural walls of each residence. Made from fly ash and proprietary additives—with no portland cement—the material reduces carbon emissions by more than 90 percent while delivering the strength required for durable housing: about 3,000 psi in seven days and more than 5,000 psi within 28 days.

PozzoCem® Vite hardens within minutes of placement, allowing each newly printed layer to support the next without slumping or distortion. This rapid-setting behavior enables continuous operation at high production rates: a roughly 90-square-foot wall can be printed in about 35 minutes, and the complete printed wall system for a home can be finished within a matter of days. According to the project team, pairing 3D printing with fly ash-based cement has reduced construction costs by an estimated 7 to 8 percent compared with traditional lumber-and-drywall methods.

After printing, crews install reinforcing steel, plumbing, and electrical lines within the hollow wall cavities. The walls are then filled with a lightweight concrete foam, creating a solid, insulated mass-wall assembly. This monolithic system yields homes that are quieter and more resistant to water, fire, termites, and impact damage than conventional wood-frame construction, while also helping stabilize interior temperatures during Houston's long, hot summers.

"This project proves that the next generation of cement and concrete and advanced construction technology can work hand-in-hand to deliver beautiful, durable, sustainable homes at scale—without compromising affordability or performance," said Grant Quasha, President of Eco Material Technologies.

Zuri Gardens marks Eco Material Technologies' second collaboration with HiveASMBLD on affordable housing in Texas, following a 2023 project in Round Top that used the same fly ash-based cement to construct a series of smaller 3D-printed homes. Together, the two developments demonstrate how fly ash-based cement alternatives and automated construction methods can be deployed at community scale to expand housing access while reducing cement-related emissions.

Rendering by Hive3d Builders


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I'm Glad You Asked

Editor's Note: "I'm Glad You Asked" is a recurring feature that invites a different expert each issue to answer a commonly asked question about coal combustion products. If you would like to submit a question and/or volunteer to provide a written answer to one, please contact the editor at johnfsimpson@gmail.com.

This issue's guest columnist is Dr. Thomas L. Robl, Associate Director and Senior Advisor at the University of Kentucky Center for Applied Energy Research. Tom has more than 35 years of energy research experience related to coal utilization and has been the principal investigator on projects for the U.S. Department of Energy, the National Science Foundation, and NATO. He received his BS in geology from the University of Wisconsin and his MS and Ph.D. degrees in geology from the University of Kentucky. On the occasion of Tom's final World of Coal Ash, we asked him to reflect on the past four decades of his service to the coal ash industry.

Q. What are your parting thoughts for the coal ash world (looking back on WOCA history and your career at UK generally as well)?

A. My first ACAA meeting was as an observer, at the request of Dr. Frank Derbyshire, our director, in about 1988 or 1989. The ACAA Executive Director was Erast Borisov, who was succeeded by Sam Tyson. The offices were on a lettered street (K or I) in Washington at the time, which was a great location for lobbying.

The organization had a different membership makeup at the time. The utilities ran the show and paid most of the dues. The meetings focused more on networking, i.e., golf, eating, drinking, and schmoozing, with a smaller technical component. Personally, I found it fascinating. JTM Industries was the largest marketer of ash at the time, representing a growing industry developing a national reach. There were a lot of interesting people. I well remember some of the debates between Tom Janson and Phil Zacarias on the merits of the ASTM C618 tests and specs. And also Joel Pattishall's willingness to vocally protest over whatever he found disturbing at the moment (every organization needs a gadfly).

The cement industry's initial reaction to fly ash in the early days was strong opposition, viewing it as a competing material that would displace cement. Hence, the need for a Washington-based lobbying effort. But eventually the truth always will tell. It became apparent that fly ash was not only a complementary component to portland cement in concrete, but also essential for durability and performance. This realization ushered in an era of "if you can't beat 'em, buy 'em," on the part of the cement companies, with Lafarge buying National Minerals and, more recently, SEFA's acquisition by Heidelberg Materials as examples.

After a couple of years of learning and observing, we decided in 1991 to sponsor a technical workshop for our Kentucky constituents. The response was very positive, and a second workshop was requested. Finally, in 1995, the first International Ash Utilization Symposium (IAUS) was offered. The meeting was co-sponsored by the journal *Fuel* but largely organized by Gretchen Tremoulet, who detailed and documented the entire experience and created a manual for putting on a symposium that is still used in some form today. The IAUS was offered at the annual ACAA meeting on alternate years from 1995 to 2003. These meetings were highly successful thanks to Gretchen, Marybeth McAlister, and Alice Marksberry, all three of whom are gone now, but will always be in my heart.

During this interval of time, ACAA itself faced some turmoil and difficulties. Through either negligence, malpractice, or worse, the Executive Director managed to bankrupt the organization. It lost its home, and he lost his job. However, due to the efforts of many of the utility members who contributed their time in a tireless fashion, and with some fits and starts, the treasure that was Dave Goss was located and hired as the Executive Director. Dave was the perfect person to repair and restore a troubled organization.

Although UK took some criticism for the IAUS, Dave Goss saw its success as a clear indication that ACAA needed to bolster its technical content. So in 2003, an agreement was reached between Dave and our Director, Rodney Andrews, to merge the two meetings, and the World of Coal Ash, or WOCA, was born. WOCA, now largely organized by Anne

Oberlink and Alyssa Barto, combined the strengths of both meetings and doubled the attendance of either.

The added muscle of WOCA and expanded membership were critical when, on December 22, 2008, the ash dam at TVA's Kingston Power Plant collapsed, ending a period of peaceful co-existence with the U.S. EPA. Dave had retired and was replaced by Tom Adams shortly before this, and thankfully Tom was fully up to the job. Eventually, the effort to classify coal ash as hazardous was defeated, with its value as a critical material for the national infrastructure clearly a factor in the debate.

The modern era has seen substantial changes in the makeup of the membership. The utilities are still important, but much leadership has been provided by the marketers, and engineering contractors and consultants are now important participants.

Topics, including the management and closure of ash ponds or landfills, have been debated along with ash recovery, or "harvesting." Additionally, we have seen the price of ash increase, as its value has become apparent, and the gap between supply and demand has closed. Somewhat ironically, coal ash is increasingly viewed as a critical material for reducing the carbon footprint of concrete. These factors, along with new applications such as the use of ash in enhanced oil and gas recovery, will help to ensure the relevance of ACAA well into the foreseeable future.

Flood Preparation and Safety

Editor's Note: As a service to our readers, ASH at Work publishes a recurring series on everyday health and safety topics. We welcome contributions from readers with expertise in health-related issues. Article length should be approximately 500 words. Please submit topic suggestions in advance to John Simpson at johnfsimpson@gmail.com.

Floods are the second-leading cause of weather-related deaths in the United States, claiming more than 125 lives per year on average in recent decades and causing billions of dollars in damage annually. They kill more Americans than tornadoes, hurricanes, or lightning—and because they can develop slowly or arrive as sudden flash floods, they remain one of the nation's most dangerous and underestimated hazards.

Flooding is defined as the temporary overflow of water onto land that is normally dry. It can result from heavy rain, snowmelt, coastal storms, storm surge, or failures of dams and drainage systems, and it can occur virtually anywhere in the country.

Before a Flood

Preparation dramatically reduces the risk to life, property, and critical infrastructure.

Know your risk

- Check FEMA's Flood Map Service Center to understand local flood hazards
- Sign up for local emergency alerts and NOAA Weather Radio
- Learn the difference between flood watches and flood warnings

Protect your finances and records

- Purchase flood insurance through the National Flood Insurance Program
- Standard homeowner's insurance does not cover flooding
- Store vital documents in waterproof, fireproof containers
- Create password-protected digital backups

Make a household plan

- Identify evacuation routes and shelter locations
- Plan for pets, medications, and mobility needs
- Prepare a communications plan that relies on text or messaging

Protect your property

- Move valuables and electronics to higher floors
- Elevate utilities when possible
- Clear drains and gutters
- Install check valves and a battery-powered sump pump
- Use sandbags if flooding is imminent

During a Flood

When floodwaters rise, the greatest danger comes from underestimating their force.

- Evacuate immediately if ordered
- Move to higher ground or the highest floor of a building
- Do not climb into a closed attic
- Stay off bridges over fast-moving water
- Never walk, swim, or drive through floodwaters
- If trapped in a car, stay inside and move to the roof if water rises
- Monitor emergency alerts and local news

After a Flood

Even after waters recede, flood zones remain dangerous.

- Return only when authorities say it is safe
- Avoid driving unless absolutely necessary
- Stay away from standing water, which may contain sewage, chemicals, or live electricity
- Watch for snakes, displaced animals, and sharp debris
- Do not touch wet electrical equipment
- Wear gloves, boots, and protective clothing during cleanup
- Avoid mold exposure, particularly if you have asthma or immune suppression
- Use generators only outdoors and far from buildings
- Photograph damage and contact your flood insurer
- Register with FEMA if disaster assistance is needed

Materials adapted from Ready.gov and FEMA.

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Eli Capilouto

President, University of Kentucky

Dr. Eli Capilouto became the 12th President of the University of Kentucky in 2011. Under his leadership, the Commonwealth's flagship land-grant university has experienced significant growth in research, infrastructure, and student success while advancing initiatives focused on improving health, economic development, and workforce outcomes across Kentucky. Prior to joining UK, Dr. Capilouto served as provost at the University of Alabama at Birmingham and dean of the UAB School of Public Health. He holds a Doctorate of Dental Medicine from UAB and a doctorate in Health Policy and Management from Harvard University.

Tom Robl

Senior Advisor, University of Kentucky Center for Applied Energy Research, Cementitious Materials Group

Dr. Robl has recently completed fifty years of service at the University of Kentucky Center for Applied Research and its forerunners. He has worked on the geology and geochemistry of oil shale and kerogen, the characterization and utilization of coal combustion products including scrubber materials and fly ash, the design and fabrication of novel cement and concretes and recently the rheology of ash-based fracking and proppant slurries. He is currently a senior advisor in the CAER's Cementitious Materials Group.

Scott Dickson

President, Heidelberg Materials, Southeast Region

Scott Dickson serves as President of Heidelberg Materials' Southeast Region, leading strategic growth and operational excellence across one of the company's most dynamic markets. He brings more than three decades of experience in the construction materials industry, combining deep technical expertise with strategic leadership.

Under Scott's leadership, the Southeast Region has achieved significant growth, including the 2023 acquisition of The SEFA Group and the 2025 acquisition of Giant Cement and its related waste-fuels business. Beyond his general management responsibilities, he spearheads the strategic development of supplementary cementitious materials for Heidelberg Materials North America. He is also actively involved in industry associations, including the National Sand, Stone & Gravel Association and the Carolina Ready Mix Concrete Association.

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416	AJ Transport
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713/715	Amrize
521	Arcadis U.S., Inc.
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630	AshTrans
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537	Atlantic Lining Company, Inc.
725	Atritor Limited
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404	Barr Engineering Co
618	BEUMER Group
539	Blue Tank and Pump
412	Burns & McDonnell Engineering Company
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733	Cascade Services LLC
710	CBP Environmental
121	CEMTEC Cement & Mining Technology GmbH
218	CETCO
425/524	Charah Solutions
201/300	Chesapeake Containment Systems
232	Christian Pfeiffer Maschinenfabrik GmbH
230	Civil & Environmental Consultants, Inc.
405	Coletanche
315	COMANCO
313	Concrete Canvas US, Inc.
227	Coperion
125	CPEG
622/624	CQA Solutions, Ltd.
129	DCL
123	DEL Tank & Filtration Systems.
529	DeWind One Pass Trenching LLC
638	Directional Technologies, Inc.
115	Drilling Services Incorporated
627	DustMASTER Enviro Systems
420	E-Tank, Ltd. E-Pump
401/500	Eco Material Technologies Inc.
706	Economy Ball Mill/JSB Industrial Solutions
546	ECS
119	Ellicott Dredge Enterprises
214	Ellingson - DTD
321	ENTACT, LLC
409/411	Environmental Specialties International, Inc
517	EP Power Minerals
304	EPI-The Liner Company
128	FCT Combustion
414	FirmoGraphs, LLC.
407	Fisher Contracting Co.
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329	Geocomp, Inc.
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721	ISCO Industries Inc.
628	J.F. Brennan Company
531	JRW Bioremediation, L.L.C.
603	Keller
331	Kenvirons, LLC
228	Key Environmental
711	LB Industrial Systems, LLC
443	Louisville Dryer Company
126	Malvern Panalytical
515	Marietta Silos, LLC
614	Martlin Drying Solutions
319	Mersino Water Solutions
533	Mintek Resources
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236	Neptune Automated Wheel Wash
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523	S&ME
203/205	Saiia Construction Company, LLC
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207	Scott Equipment Company
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702	Sequoia Services LLC
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445/447	Specto Technology
101/102	Stantec Consulting Services, Inc.
704	Sturtevant, Inc
636	SynTerra Corporation
609/611	Tarmac International, Inc.
143	Teklab Inc.
502/504	Tennessee Valley Authority
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211	Tetra Tech
709	The Mouat Company
220	THG Geophysics ltd.
311/410	Trans Ash, Inc.
323	TRC Companies
544	TREVIICOS
317	TRI Environmental
708	TRIFECTA
427	TTL, Inc.
222/224	UCC Environmental
307/406	Watershed Geo
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6 Questions for Rich Szecsy

Editor's Note: "6 Questions for..." is a regular ASH at Work feature in which leaders with unique insight affecting the coal ash beneficial use industry are asked to answer six questions.

Rich Szecsy, PhD., PE, FACI is Chief Executive Officer of Big Town Concrete in Irving, Texas. He is the Chair of ASTM International's Committee C09 on Concrete and Aggregates, as well as the Texas Aggregates and Concrete Association, and serves on the ASTM International Board of Directors. Rich is widely recognized as a subject matter expert in the areas of concrete technologies, recycled materials, concrete construction, and practical concrete sustainability and resiliency. He has a B.S. and M.S. in Civil Engineering from Texas A&M University, a Ph.D. in Civil Engineering from the University of Illinois, and an MBA in Management from Our Lady of the Lake University, and is a registered professional engineer in 19 states and the District of Columbia.

ASH at Work (AW): Many of today's decarbonization strategies depend on supplementary cementitious materials, including fly ash. What opportunities and constraints do you see for scaling SCM use as specifications continue to evolve?

Rich Szecsy (RS): In any commercial setting, the desire to achieve a low carbon value or other performance result is always tied to capital cost or capital expense. There's a very interesting balance going on right now at the ground level between the use of SCMs and reducing carbon footprint. Let's say that we have a product that is a negative carbon product—meaning that if you use it, not only does it reduce carbon, but it gets more carbon out of the project. The project is in Houston, but the product I need is in Seattle. By the time I load, ship, transport it, and put it into use, the cost is insane. But I was able to reduce the carbon on the project. So that balance is off.

The second thing is what I'm going to call "nerdfighting"—*advanced* nerdfighting. We are constrained when we construct things by building codes. So while we have these great technologies—new SCMs, new fly ash combinations, new combination of fly ashes with SCMs, low-carbon cements—I'm ready to use them but I'm constrained by codes that only recognize ACI's three-point curve [used by concrete producers to evaluate the performance of various material combinations] based on these new material combinations. As a producer, I have to make three variations of the concrete mix design, create a curve of the data, and interpolate from that, which then has to be reviewed and accepted by an engineer. So you have this crazy waiting period for the codes and engineering community to evolve their own specifications to innovative and cutting-edge combinations of SCMs in concrete.

And here's the other conundrum we face: how do you develop that data in advance of getting the purchase order? Nobody is going to invest the research time and effort to develop results if you don't have the PO. How do you fix that? This is a very dynamic situation that we're in because the technologies are now progressing faster than I've ever seen. But we're constrained by these archaic approaches on how we accept materials for usage. We're balancing technology advancement, and we're constrained by capital cost and how we approach the technology for acceptance.

AW: As Chair of ASTM Committee C09, you're overseeing standards development during a period of rapid material innovation. How well equipped is ASTM to respond to these changes and what guidance would you offer to coal ash stakeholders as the industry navigates decarbonization and changing cement specifications?

RS: ASTM is a consensus-based and transparent standards development organization (SDO), and I think that that's a key part. It is meant to serve as a platform and forum for the discussion of standards and specifications for use in an industry. And while we "follow the science," science is very, very messy. Every six months, ASTM convenes with respect to the development of its documents and, if a member presents new data and information, the science that governs the document can change via consensus. By example, if I have 100 people in the room and 51 of them say, "based on the data that has been presented, we think the color is blue," the standard document or standard specification now says the material is blue. Six months later, if the same 100 people are presented with new data and 51 people in that room say the new data says the color should be red, we update the document to be red. You don't need 100 percent. You need a consensus, 51 percent.

But consensus is based on the people who participate—by the people who show up and provide input. Any company that says, oh, that doesn't have value for us; we can't send somebody twice a year for four days at a time to go to a conference.

I'm thinking, are you kidding me? ASTM is an organization that writes the specifications that govern your product. How can you NOT participate?

When somebody approaches me and says, I have a new SCM for you to use in concrete, my first question to them is, what ASTM standard does the material comply with? If they don't have one, I can't use it in the ready-mix concrete I sell into the market. So for anybody who thinks that not participating is somehow cost effective, not only are you completely wrong, you're actually costing your company money. If your voice isn't in the room and isn't being heard, the consensus in the room listens to those that are.

Participation is easier now than it's ever been. You get to your phone and you can text and type in your comments of what you like or don't like. And yet we're struggling to explain the value of this to people. Again, if you want to move the needle—make a change with a technology that's being developed or with a product that has been there forever—ASTM meets every six months and if your voice isn't being heard in the room, I guarantee you somebody else's is.

One final point. I have tremendous respect for people like Larry Sutter, Doug Hooton, Ivan Diaz, and the dozens of others who have spent careers, decades, investing in standards development. But many of us—myself included—are not men of youth anymore. The question I ask is, who's next? Who are we, as an industry, imparting that knowledge to? Who's your next ASTM expert? Who's your next standards-writing expert? Because if companies aren't investing now, they're not going to have time to do it later. This is not something you pick up watching a YouTube video. You have to be engaged, involved, and understand the process of how standards are developed and ultimately published for use.

AW: There is growing interest in performance-based specifications for cement and concrete. Do you expect ASTM standards to move further in this direction, and what would that shift mean for how materials like fly ash are evaluated and specified?

RS: I think you're going to see them progress on discrete materials like an SCM, an aggregate, or a cement. But when it comes to concrete itself, I don't believe that's going to happen in my lifetime. We actually see more prescriptive specifications than anything else, particularly when you look at DOTs. DOTs are enormously prescriptive. Municipalities and anything tied to a government entity are enormously prescriptive. Anyplace that has agencies that produce concrete, like in California, Florida, New York, and Illinois, is enormously prescriptive. As a result, the use of coal ash products or other SCMs is limited. And we're just going to continue to see that.

Performance for performance' sake is not a motivator; it's a philosophy. People like to say, "yes, we believe in it," but nothing makes an owner a believer like saving cost. That's where the rubber meets the road, and that's where we're going to make gains if there are gains to make.

We have to have project developers and owners say, "yes, I saved X amount of money or Y percent by going to a performance-based specification," or "The city of XYZ saved 15 percent of the cost on their pavements year over year by going to performance-based concrete specifications." As you start to promote those small victories, you'll see the needle move.

AW: Blended cements and reduced-clinker systems are gaining momentum in the U.S. From your perspective as a concrete producer, is this an incremental evolution—or a fundamental shift in how cement and concrete will be produced and used?

RS: I have never seen anything so divisive as blended cements. In some markets I've operated in, we've seen blended cements used effectively, efficiently, and with minimal disruption. Others will give you examples claiming it has been the worst thing possible for their industry, their markets, and their communities.

I can give you my anecdotal examples of what is happening, but where it's going to finish up, I have no idea. Some companies will continue to make blended cements, and they'll continue to push the envelope with them with higher and higher blends of replacement. And other cement companies will say, "we're good, we don't need to produce one, and we're not going to." Here's the crazy part: depending on which market you're in, you can have both kinds of cement companies. I operate in the largest concrete construction market in the U.S. [Texas], and I have a cement "gumbo": imports, domestics, imported/blended, imported/non-blended, domestic/blended, and domestic/non-blended. All of them work with various combinations of SCMs. If they didn't, we wouldn't be using them.

Here again, you've got to look at the science, do your homework, and rely on the experts—whether it's the expertise in the documents and specifications or it's the expertise in the scientists and practitioners who are using it. I use the word "anecdotal" purposely: for every person who can say, "I have an anecdotal example of where this is bad," I may have an equal and opposite anecdotal example of where it's good. So, again, science matters; engineering matters; specifications matter.

AW: Low-carbon cement specifications are moving rapidly from concept to practice. How do you see this transition affecting the U.S. cement and concrete market—particularly in terms of mix design flexibility, supply chains, and risk for producers and users?

RS: When you look at the big projects that are leaning into this, they often expect suppliers to absorb the upfront work without clear compensation. I'm still working in a low-bid environment, which means I'm not going to invest a single dollar of resources into pre-qualifying anything until I know that I have the purchase order. If I put in a low bid for something without those qualifications and I wind up getting the job, a lot of times the big projects will say, "wait a second, that was out of scope, we didn't account for that," or "you bid it that way, so you're going to have to supply it that way." And then we wind up having to go back and renegotiate, and we haven't advanced anything.

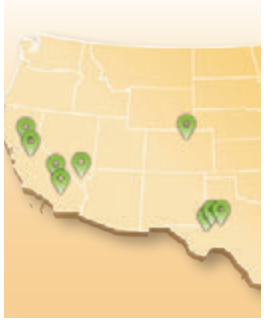
I must have missed the conference where somebody stood up and said, "low-carbon concrete is less expensive concrete." When you're talking about low-carbon concrete, particularly with the combination of SCMs, coal ash products, blended cements—this is science, this is technology. When have the combination of science, technology, and results ever *not* required more effort or resources to produce? That's the challenge that we're in today.

This isn't vanilla concrete. This isn't three scoops, two scoops, one scoop, and you make concrete. This is cutting-edge technology to produce results that haven't been asked for before. It requires additional mix design work, qualification, documentation, and coordination across the supply chain. So, the standards documents have to keep pace as the technology continues to evolve.

AW: What do you do when you're not producing concrete or working on standards?

RS: When you're a science and engineering nerd, you tend to obsess over things. And one of my current obsessions is barbecuing. If somebody says to me, "hey, on that next job interview, you better clear your social media of all those photos," I'm thinking, what photos? It's nothing but smoked meats, brisket, and ribs. But I enjoy it because, one, it allows me to share that love of BBQ with other people. And then the other thing is, it's a science. Science can turn into an art form with enough obsession, and I haven't got there yet. It's like that perfect golf shot; I'm in search of the perfect brisket, that perfect rack of ribs and smoked pork belly.











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For more than four decades, the National Coal Council (NCC) has served as a formal bridge between the U.S. coal community and federal energy policymakers. Established in 1984 as a Federal Advisory Committee to the U.S. Secretary of Energy, the NCC's core mission has remained consistent: to provide informed, practical advice on policies affecting coal production, utilization, technology, and markets. After its charter was allowed to lapse during the Biden administration, the Council has now been formally re-established under the Trump administration—an action that signals renewed federal attention to coal's role in U.S. energy reliability, industrial competitiveness, and advanced materials development.

The NCC's work is advisory in nature but broad in scope. Reporting directly to the Secretary of Energy through the Hydrocarbons and Geothermal Energy Office, the Council evaluates federal policies that directly or indirectly affect coal; assesses regulatory, technological, economic, and societal challenges facing the industry; and examines scientific and engineering advances in coal utilization, environmental controls, and coal conversion technologies. Its principal output is a series of reports prepared at the request of the Secretary of Energy, with study topics developed by the Council's Coal Policy Committee.

In January 2026, the reconstituted NCC convened its inaugural meeting at the Eisenhower Executive Office Building on the White House grounds. The Trump administration restored the Council as part of a wider effort to reinforce coal's contribution to grid reliability and American energy dominance. Council leadership includes Chair James Grech, CEO of Peabody Energy, and Vice Chair Jimmy Brock, CEO of Core Natural Resources, and the membership reflects a cross-section of industry, academia, state and tribal governments, and non-governmental organizations.

Of particular note for ACAA members, beneficial use and coal byproduct issues enjoyed strong representation at the Council's first meeting. American Coal Ash Association (ACAA) Executive Director Thomas Adams was appointed to the NCC, alongside ACAA Board member Danny Gray, Executive Vice President of Eco Material Technologies, and John Ward, Executive Director of the National Coal Transportation Association and chair of ACAA's Government Relations Committee. Their presence underscores the growing policy relevance of coal ash utilization, mineral recovery, and conversion technologies within the broader coal discussion.

During the January meeting, Secretary of Energy Chris Wright announced two initial NCC studies: one focused on maintaining and expanding the domestic coal-fueled power generation fleet, and another on increasing U.S. coal export capacity. Importantly for the coal ash community, the Department of Energy has also highlighted its interest in advancing mineral extraction from coal ash and supporting commercialization pathways for coal ash-derived products. DOE's National Energy Technology Laboratory has recently patented technologies aimed at extracting critical minerals from coal byproducts and converting coal ash into higher-value materials for energy, defense, and manufacturing applications.

(L-R): ACAA Executive Director Thomas Adams, DOE Secretary Chris Wright, ACAA Government Relations Committee Chairman John Ward, and Eco Material Technologies Executive Vice President Danny Gray.

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Since 2013, R.B. Jergens has consistently been recognized as one of Dayton, Ohio's top 100 companies. While our roots remain in Dayton and Southwest Ohio, we expanded our growth efforts in the late 2000s to serve the utility sector across the Midwest.

Today, as a 100 percent employee-owned company, R.B. Jergens stands among the premier heavy civil construction firms, operating in 11 states and partnering with some of the nation's largest utility providers. Our specialties include mass excavation, landfill development, CCR material handling, civil infrastructure, utility work, environmental remediation, pond and landfill closures, and a comprehensive range of transport and civil services.

As the utility industry encounters increasingly complex regulatory requirements for CCR management and disposal, our clients look to us for innovative solutions to manage their sites, products, and processes. While we continue to deliver proven procedures for landfill development, pond closure, and cap systems, R.B. Jergens is also leading the way in the harvesting and beneficial use markets by leveraging our extensive experience, expert project execution, and robust transportation services to connect clients with industry end-use partners and deliver comprehensive solutions.

Our team of highly trained and experienced professionals, combined with a large fleet of company-owned specialized earthwork equipment, strong industry partnerships, and the support of our sister company Journey Trucking, uniquely positions R.B. Jergens as the ideal partner for your project's success. We are deeply committed to safety and environmental stewardship, ensuring every project is completed to the highest-quality standards while meeting the industry's stringent and ever-evolving regulatory requirements. R.B. Jergens is truly your Partner for Success.

A Tribute to William P. "Bill" Jergens, Founder

Through visionary leadership and unwavering dedication to his people and community, Bill Jergens—alongside a remarkable team—transformed R.B. Jergens into the thriving company it is today. Bill's journey came to a close in December 2023, following a courageous three-year battle with leukemia. From the moment of his diagnosis, Bill began the transition to an Employee Stock Ownership Plan (ESOP), determined to secure the company's future for those who helped build it. His vision was fully realized in the summer of 2025, when R.B. Jergens proudly became an employee-owned company.

Bill embodied the words of Zig Ziglar: "A good life is when you smile often, dream big, laugh a lot, and realize how blessed you are." For Bill, this was more than a quote—it defined his way of life, his values, and his very spirit. He was not just the founder of R.B. Jergens; he was the architect of a life well-lived, leaving an indelible mark on everyone fortunate enough to know him. Today, we honor his legacy and remain deeply proud to carry forward his name and vision.

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- *Amphibious CCR Excavation*
- *Landfill Construction, Operation & Closure*
- *Water Management and Dewatering*
- *Value Engineering*
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In and Around ACAA

Charleston, S.C.

(L-R): Montgomery Spillane, Senior Project Manager at Haley & Aldrich; Susan Jackson, Senior Client Leader at Haley & Aldrich; Peg Rennick, Senior Manager of CCR Marketing and Beneficial Use at Talen Energy; and Dawn Santoianni, Principal Consultant at Haley & Aldrich, in attendance at the ACAA Winter Meeting.

Washington, D.C.

(L-R): ACAA Secretary-Treasurer Danny Gray, ACAA Government Relations Committee Chair John Ward, and ACAA Executive Director Thomas Adams stand in the White House State Dining Room while attending President Donald Trump's "Champion of Coal" event in February.

Charleston, S.C.

Lindsey Geiger, Senior Director of Environment and Sustainability at the American Cement Association, updates attendees of the ACAA's Winter Meeting on Product Category Rules for cementitious materials.

Chicago, Ill.

(L-R): Ivan Diaz, Eco Material Technologies; Sai Vaidya, Ashcor; Andy Hicks, Salt River Materials Group; Hunter Garrison, Salt River Materials Group; John Ward, John Ward Inc.; and Tom Adams, ACAA Executive Director, gather at the American Concrete Institute Convention in Chicago.

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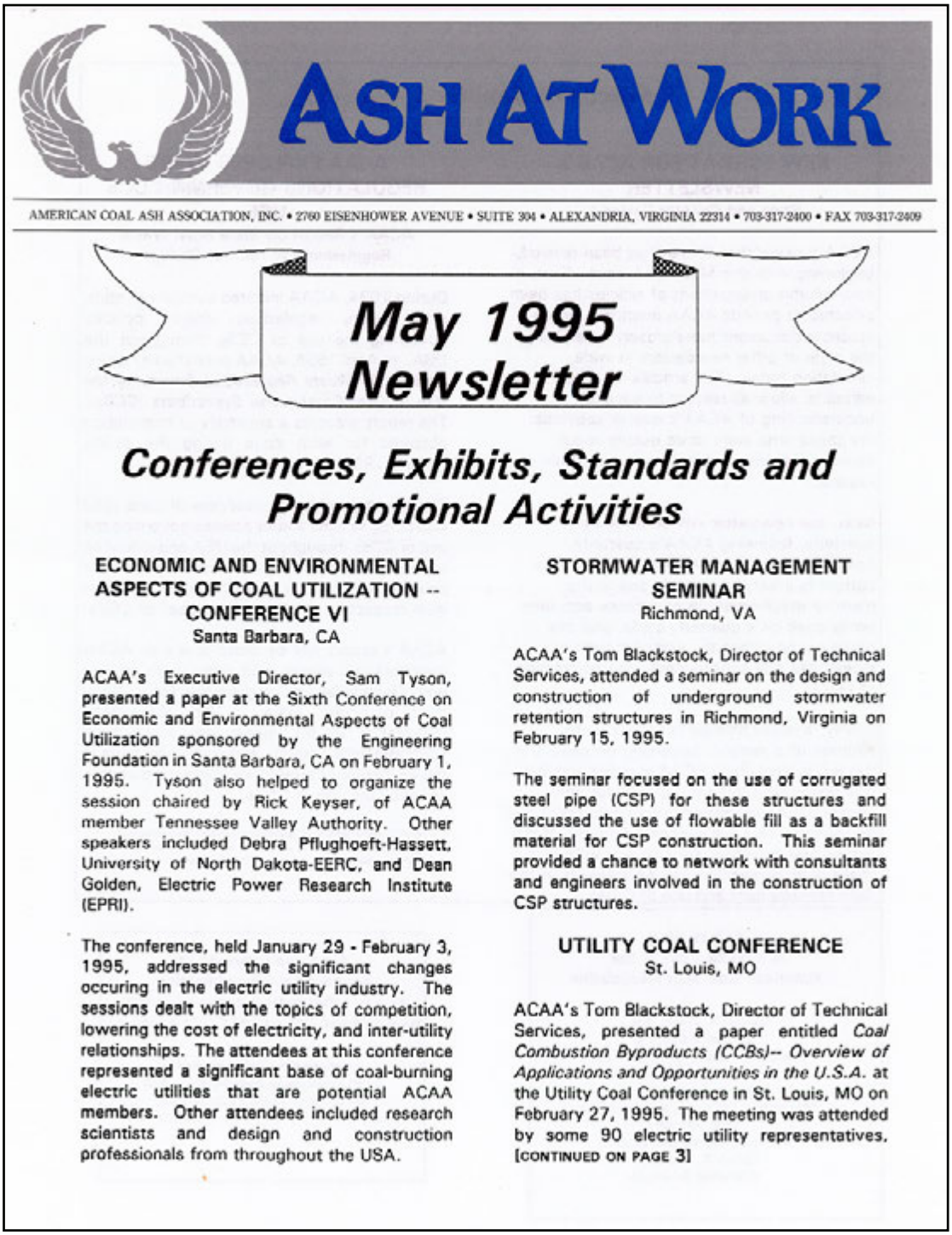
ASH Classics

A Look Back at the Beginnings of the U.S. Coal Ash Industry

"ASH Classics" is a recurring feature of ASH at Work that examines the early years of the American Coal Ash Association and its predecessor, the National Ash Association, focusing on issues and events that were part of the beneficial use industry's defining years. The following ASH Classic, from 1995, highlights ACAA staff and members' participation in meetings of ASTM Subcommittee E50.03 on Pollution Prevention, Recycling, and Reuse regarding standards relating to the use of fly ash in structural fills, controlled low-strength material (CLSM), and waste solidification and stabilization.



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May 1995 Newsletter

Conferences, Exhibits, Standards and Promotional Activities

ECONOMIC AND ENVIRONMENTAL ASPECTS OF COAL UTILIZATION -- CONFERENCE VI
Santa Barbara, CA

ACAA's Executive Director, Sam Tyson, presented a paper at the Sixth Conference on Economic and Environmental Aspects of Coal Utilization sponsored by the Engineering Foundation in Santa Barbara, CA on February 1, 1995. Tyson also helped to organize the session chaired by Rick Keyser, of ACAA member Tennessee Valley Authority. Other speakers included Debra Pflughoeft-Hassett, University of North Dakota-EERC, and Dean Golden, Electric Power Research Institute (EPRI).

The conference, held January 29 - February 3, 1995, addressed the significant changes occuring in the electric utility industry. The sessions dealt with the topics of competition, lowering the cost of electricity, and inter-utility relationships. The attendees at this conference represented a significant base of coal-burning electric utilities that are potential ACAA members. Other attendees included research scientists and design and construction professionals from throughout the USA.

STORMWATER MANAGEMENT SEMINAR
Richmond, VA

ACAA's Tom Blackstock, Director of Technical Services, attended a seminar on the design and construction of underground stormwater retention structures in Richmond, Virginia on February 15, 1995.

The seminar focused on the use of corrugated steel pipe (CSP) for these structures and discussed the use of flowable fill as a backfill material for CSP construction. This seminar provided a chance to network with consultants and engineers involved in the construction of CSP structures.

UTILITY COAL CONFERENCE
St. Louis, MO

ACAA's Tom Blackstock, Director of Technical Services, presented a paper entitled *Coal Combustion Byproducts (CCBs)-- Overview of Applications and Opportunities in the U.S.A.* at the Utility Coal Conference in St. Louis, MO on February 27, 1995. The meeting was attended by some 90 electric utility representatives.
[CONTINUED ON PAGE 3]

primarily from operations and fuels departments. ACAA's paper focused on the use of CCBs in beneficial applications and on ACAA's role as the only national organization dedicated to advancing the management and use of CCBs on behalf of the entire "CCB industry" in ways that are technically sound, commercially competitive and environmentally safe.

The Utility Coal Conference is a non-profit corporation of electric utility employees and is designed to educate engineers, power plant personnel, accountants, fuel specialists and others interested in coal and power plant operations. This conference provides an opportunity for ACAA to meet many potential members and advance ACAA's mission. A listing of the papers presented at the conference is available from ACAA.

AMERICAN CONCRETE INSTITUTE SPRING CONVENTION

ACAA's Director of Technical Services Tom Blackstock attended the Spring Convention of the American Concrete Institute in Salt Lake City, UT during March 6-9, 1995. Blackstock represented ACAA at committee meetings on fly ash in concrete, controlled low strength material (CLSM), and cellular concrete.

Guidance documents produced by ACI committees have a great deal of influence in the construction industry and must be continually reviewed and updated to assure that properties and applications of CCBs are appropriately represented. ACAA's involvement is crucial to the success of the standards development process. Reports of current committee activities are available from ACAA.

SOCIETY FOR MINING, METALLURGY & EXPLORATION

Denver, Colorado

Executive Director, Sam Tyson, participated in the Society for Mining, Metallurgy and Exploration (SME) annual meeting in Denver, CO, on Tuesday, March 7, 1995. While there, he presented a paper entitled *Coal Combustion Byproducts (CCBs) - Overview of Applications and Opportunities in the U.S.A.* in the morning session -- Upgrading Coal Preparation and Combustion Byproducts.

SME's 124th annual meeting and exhibit attracted over 5,000 participants from throughout the United States. The meeting lasted from March 6 - 9, 1995 and consisted of over 80 technical sessions and over 250 exhibitors.

SME has a membership of some 18,000 individuals involved in minerals exploration, extraction, production, processing, economics and metallurgy. This meeting enabled ACAA to educate a broad range of engineers on the information available from ACAA concerning the management and use of CCBs.

ELECTRIC POWER FOR A SUSTAINABLE FUTURE

Morgantown, West Virginia

Sam Tyson, ACAA's Executive Director, attended a meeting to discuss "the need for technology improvements in power generation, transmission and distribution; the current model for providing such improvements; and how industry roles are changing." The meeting, including a panel session, was held on March 28, 1995, in Morgantown, WV.

The meeting, sponsored by the Office of Science and Technology Policy under the National Science and Technology Council [which includes the Vice President of the United States and others with responsibility for significant science and technology programs], introduced the report *Technology for a Sustainable Future: A Framework for Action*. This report is the commencement of a "development of a long-term, comprehensive environmental technology strategy." The full report and executive summary are available at ACAA's office.

The Morgantown meeting provided an opportunity to strengthen the synergistic relationship between ACAA and various federal government agencies, especially the Department of Energy and the Environmental Protection Agency. The meeting was attended by approximately 300 invited representatives.

CIVIL ENGINEERING RESEARCH FOUNDATION NATIONAL COUNCIL FOR CIVIL ENGINEERING RESEARCH

ACAA's Director of Technical Services Tom Blackstock attended a meeting of the National Council for Civil Engineering Research (NCCER) in Washington, DC on March 29, 1995. NCCER is sponsored by the Civil Engineering Research Foundation and is a forum for construction-related organizations to influence public and government policy. The council is currently providing input for the development of a national construction goals strategy and participating in the federal Rapid Commercialization Initiative (RCI). Both of these programs are designed to improve the competitiveness of the US construction industry and simultaneously, address US environmental issues.

ACAA is involved in NCCER to ensure the advancement of CCBs as an engineering material and to support the accomplishment of the association's mission.

AMERICAN ROAD AND TRANSPORTATION BUILDERS ASSOCIATION ANNUAL CONVENTION

San Antonio, TX

ACAA's Tom Blackstock, Director of Technical Services, made a presentation to the Board of Directors of the American Road and Transportation Builders Association (ARTBA) on Saturday, April 1, 1995, at the annual meeting in San Antonio, TX.

ACAA is a member of ARTBA and participates in the Recycling, Rehabilitation, Recovered Materials, and Stabilization committee. Blackstock presented the results of a survey conducted by the Recycling Committee and outlined the committee's goals and program of work for 1995.

ACAA's involvement in the Recycling Committee is a key to developing partnerships between universities, government and the CCB industry.

STRUCTURAL FILL TASK GROUP

Guidance Document Completed at American Society for Testing and Materials (ASTM)

Coal fly ash may be used as a borrow material, similar to the use of compacted soils, in the construction of fills. When the fly ash is compacted in lifts, a structural fill is constructed which is capable of supporting buildings or other structures. An embankment is constructed when the fly ash is placed to support roads or to impound water. The size of structural fills/embankments that have previously been constructed with fly ash ranges from small fills, consisting of a few thousand cubic yards of material covering less than one acre, to fills covering several acres.

When used in structural fills and embankments, fly ash offers several advantages over soil and rock such as low unit weight and relatively high shear strength. The compacted maximum dry density of fly ash is typically within the range of 70 to 105 pcf. Compared to fills of silty sand that have a compacted maximum dry density of about 115 pcf, placing fly ash over weak, compressible foundation soils results in lower total settlement. Hauling costs may also be reduced because there is less tonnage for a given volume of fill. One of the most significant characteristics is its strength. Compacted fly ash is as strong or stronger than many compacted soils. In particular, high-calcium fly ash will self-harden, resulting in a fill that is stronger than most compacted soils.

During April 1995, ACAA's Director of Technical Services Tom Blackstock and approximately ten ACAA members met in Denver, CO to participate in a meeting of the American Society for Testing and Materials (ASTM). The Task Group on Structural Fill, a part of ASTM Subcommittee E50.03 on Pollution Prevention, Recycling and Reuse, held a meeting to resolve the ballots on a proposed standard which would serve as a guide for the use of coal combustion fly ash in structural fills. The proposed document had undergone balloting by the full ASTM E50 committee and there were several negative votes which were resolved. [CONTINUED ON NEXT PAGE]

After the ASTM E50.03 task group took appropriate actions to resolve all negative votes, the document was passed by the subcommittee and will be published on or about June 1, 1995 as a "provisional standard". The standard will be designated PS 23-95. The "provisional" status of the resulting structural fill standard will require that the standard be reconsidered by the ASTM committee after a two-year period instead of the five-year period required by ASTM for all other (non-provisional) standards.

The ASTM E50.03 task group on structural fill is chaired by Gary Brendel, GAI Consultants. Additional standards are being proposed by the subcommittee and will be available for general review as soon as they can be distributed following normal ASTM policies and procedures.

ASTM SUBCOMMITTEE E50.03
Additional Standards Proposed

In addition to the proposed guide for the use of coal combustion fly ash in structural fills, ASTM Subcommittee E50.03 on Pollution Prevention, Recycling and Reuse had proposed the development of standards for the use of coal fly ash in **Controlled Low Strength Materials (CLSM)** and in **Waste Solidification and Stabilization**. The proposed standard for CLSM was withdrawn due to an agreement between ASTM and the American Concrete Institute (ACI) which limits the standards development of each organization.

ACAA continues to work with its members and others to develop standards that promote the increased use of CCBs in construction and manufacturing applications.

AMERICAN PUBLIC POWER ASSOCIATION
Philadelphia, Pennsylvania

Sam Tyson attended the April 5, 1995 annual meeting of the American Public Power Association (APPA) in Philadelphia, PA. He presented a paper to the environmental and engineering committee of APPA.

In addition, ACAA member, Joel Pattishall of Pennsylvania Power & Light, presented a paper to this committee. The moderator for the session was ACAA member, Don Pauken of Muscatine Power.

APPA, a national trade association, has over 2000 members which are publicly-owned electric utility systems. These members, therefore, represent a significant base for membership in ACAA. Information pertaining to ACAA and membership in ACAA was distributed by Sam Tyson. Letters were sent to follow up many of the conversations and contacts.

ACAA's April 1995 COMMITTEE MEETINGS & WORKSHOP
Memphis, TN

Members of ACAA met in Memphis, TN for the Southcentral Region CCB Workshop and Spring Committee Meetings during April 17-19, 1995.

ACAA's quarterly meetings provide a regular opportunity for ACAA's committees to meet and review ongoing activities. Three of these committees, Communications & Marketing, Technical and Government Relations, met on Tuesday, April 18. Other committees including the Administrative, Steering and Executive met during the week as well.

The workshop focused on certain environmental benefits of using CCBs. Papers presented by ICF Resources, an environmental policy consulting firm located in Fairfax, Virginia, were coauthored by ACAA's Executive Director, Sam Tyson. The papers, available from ACAA, are titled--

--Climate Change and New Opportunities for Coal Combustion Byproducts; and

--Further Opportunities for Coal Combustion Byproducts to Reduce Greenhouse Gas Emissions.

The workshop also included a tour of the Ensley Levee structural fill project, which resulted from a joint effort by ACAA members, TVA and JTM, for the U.S. Army Corps of Engineers and the Memphis/Shelby County Port Authority.

Welcome, New ACAA Members!

CBP Environmental focuses on coal combustion product (CCP) remediation, environmental construction, and utility infrastructure support services. As an environmental remediation and construction contractor, the company supports coal ash impoundment closures, ash excavation and relocation, stabilization, and site restoration in compliance with applicable CCR and environmental regulations. CBP Environmental also provides utility construction support associated with coal ash management projects, including the installation of HDPE piping systems for containment, wastewater conveyance, leachate control, and water management. The company's activities emphasize regulatory compliance, environmental risk mitigation, constructability, and sustainable project execution. Participation in the American Coal Ash Association supports CBP Environmental's commitment to industry best practices, technical collaboration, and responsible coal ash and environmental management.

The company joins as an Associate Member. For more information, please visit www.cbpenvironmental.com.

ENTACT is a national contractor specializing in environmental remediation and geotechnical construction, with extensive experience managing coal combustion product (CCP) projects across the United States. Their work includes the closure, stabilization, and beneficial reuse of coal combustion residual (CCR) basins, impoundments, and landfills, as well as the design and construction of repositories and structural fills utilizing CCP materials.

ENTACT's in-house technical and construction teams perform every aspect of CCP management—from dewatering and material handling to grading, capping, and water treatment—using self-performed resources and equipment. They have completed numerous large-scale CCP projects for utilities and industrial clients, delivering solutions that ensure regulatory compliance, long-term performance, and environmental protection.

The company joins as an Associate Member. For more information, please visit www.entact.com.

Integrated Demolition and Remediation brings a focused, technical commitment to projects involving coal ash and CCR management, pairing heavy industrial expertise with disciplined environmental stewardship. As a contractor specializing in integrated demolition and dismantling, IDR supports utilities, municipalities, and private owners through the full lifecycle of coal plant closure—from structural takedown to CCR removal, handling, and compliant disposal. Our teams deliver turnkey environmental remediation solutions that address ash basins, contaminated soils, underground utilities, and legacy infrastructure, ensuring sites are restored safely and prepared for redevelopment. With a field-tested workforce, strict regulatory alignment, and a reputation for precision in high-risk environments, IDR provides clients with a single, accountable partner capable of managing the complex intersection of demolition, remediation, and CCR compliance.

The company joins as an Associate Member. For more information, please visit www.idrdemo.com.

Integrated Environmental Technology (IETLink) is an engineering and telemetry consulting team specializing in coal ash and CCR disposal facilities. They work with owners and operators to design, deploy, and support practical real-time monitoring systems for leachate sumps, underdrains, toe drains, stormwater ponds, pumps, and other critical infrastructure. The IETLink platform provides continuous, real-time visibility, enabling your team to detect issues early, respond faster, and reduce dependence on manual rounds and clipboards. By transforming CCR units into well-instrumented, data-driven assets, IETLink enables facilities to stay ahead of regulatory risk, control operating costs, and clearly demonstrate long-term performance with tangible data.

The company joins as an Associate Member. For more information, please visit www.ietteam.com.

Mt. Carmel Stabilization Group solves complex soil challenges for infrastructure, industrial, and commercial construction projects across North America. They specialize in soil stabilization, full-depth reclamation, soil drying, pond closures, and subgrade improvement, and they're known industry-wide for delivering value-engineered solutions that keep projects on time and on budget. They have assisted in the clean closure of many wet CCR storage facilities and reclamation sites.

They've developed patented specialty equipment and custom workflows to safely and efficiently stabilize soils in high-risk, hard-to-access, or unconventional environments. Whether the project involves environmental remediation, steep slopes, lagoons, or restricted-access excavation, their experienced crews and engineers are ready with a solution.

The company joins as an Associate Member. For more information, please visit www.mtcsg.com.

Palmetto Wastewater Solutions is a full-service water and wastewater treatment service company specializing in sludge removal and dewatering of tanks, lagoons, and production processes for various industries. The company develops and provides turnkey solutions based on process engineering and each of its clients' site-specific needs. Its solutions include capital equipment design and build, temporary treatment systems, and contract operations.

The company joins as an Associate Member. For more information, please visit pwsllc.us.

ReVanTEC Solutions, currently operating under the name Clean Concrete, is an emerging company introducing a novel approach to the beneficiation of landfill ash. The company's proprietary wet-process technology enables effective beneficiation at sites that are too challenging for traditional dry-processing methods. In addition, the process allows them to engineer higher-performing ash for use in concrete and provides a platform for removing elements beyond carbon, further enhancing material value.

The company joins as an Associate Member. For more information, please visit www.clnconcrete.com.

News Roundup

ACAA Officer and Director Elections

Danny Gray

Hollis Walker

John Tiberi

Johnny Lowe

ACAA members elected a new officer and three directors February 10, 2026, at the association's Winter Meeting in Charleston, South Carolina. Danny Gray, Eco Material Technologies, was elected Secretary-Treasurer, filling the unexpired term of Christine Harris, who resigned after accepting employment outside the industry. Elected to new three-year terms on the Board of Directors were Hollis Walker, Southern Company (representing utilities), John Tiberi, Ashcor (representing marketers), and Johnny Lowe, Schnabel Engineering (representing associates).

EPA Advances Coal Ash Initiatives

Since the last issue of *ASH at Work*, the U.S. Environmental Protection Agency advanced numerous regulatory proposals affecting coal ash management. Actions approved include:

- On December 23, 2025, EPA finalized the extension of near-term compliance deadlines for Effluent Limitation Guidelines at coal-fueled power plants.
- On February 9, 2026, EPA finalized the extension of near-term compliance deadlines for Coal Combustion Residuals Management Unit facility evaluation reports and groundwater monitoring under the agency's 2024 "Legacy" Coal Combustion Residuals Rule.
- On February 13, 2026, EPA reversed its January 2025 denial of Coronado Generating Station's "Part B" CCR alternative liner demonstration and proposed to approve the utility's application to continue using its evaporation pond.
- On February 24, 2026, EPA approved Wyoming's CCR permit program. Wyoming became the fifth state to obtain permit program approval, following Oklahoma, Georgia, Texas, and North Dakota.

At *ASH at Work* press time, EPA proposals to reconsider two major coal ash regulations appeared to be imminent:

- On February 9, 2026, EPA submitted for White House review a proposal for more extensive revisions to the 2024 "Legacy" Rule. Submission to the Office of Information and Regulatory Affairs represents the final regulatory step before the proposal is published for public comment.
- On March 9, 2026, EPA submitted for White House review a proposal for a broader reconsideration of its Steam Electric Power Generating Effluent Limitation Guidelines.

ACAA has submitted comments on several of the EPA rule-makings listed here, as well as responses to several other agency requests for information. Copies of all ACAA comments are available on the Government Relations Committee tab of the ACAA members-only website. ACAA members are also welcome to participate in Government Relations Committee update calls held every other Friday.

DOE Plant Closure Delay Orders Continue

The U.S. Department of Energy on December 24, 2025, issued emergency orders to prevent the retirement of coal-fueled generating units at two Indiana power stations. Approximately 950 megawatts of capacity was ordered to remain operational at the Schahfer power plant and F.B. Culley Unit 2. The action followed previous DOE emergency orders preventing the decommissioning of Michigan's Campbell Plant and Washington's Centralia Unit 2.

CCP 411: New ACAA Webinar Program

ACAA launched a new monthly webinar series entitled "CCP 411." Featuring presentations and conversations with a wide range of guest experts, the sessions are being held on Zoom at 11:00 a.m. Eastern time on the third Thursday of each month. (Webinars will not be held during the months of in-person ACAA meetings, including World of Coal Ash.) Sessions will also be recorded and posted to the members-only page of the ACAA website.

The inaugural CCP 411 session was held March 19, 2026, featuring Dr. Evan Granite, Senior Technical Advisor at the U.S. Department of Energy, discussing mercury and coal-fueled electricity generation. With EPA's recent rollback of mercury emissions standards to 2012 levels, the element is back on center stage. This presentation will provide valuable insight into mercury effects and controls.

The second CCP 411 session was scheduled for April 16, 2026, featuring Doug Green, President of DHGreen Counseling, discussing proposed revisions to EPA's Coal Combustion Residuals regulation.

ACAA
AMERICAN COAL ASH ASSOCIATION

Save the Date!
ACAA 2026 Fall Meeting

September 29-30, 2026
Hilton St. Petersburg Bayfront Hotel • St. Petersburg, Florida

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