

# **American Coal Ash Association Programs to Advance the Management and Use of Coal Combustion Products (CCPs)**

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## ABSTRACT

Since its founding in 1968 the American Coal Ash Association (ACAA) has worked to advance the management and use of coal combustion products (CCPs) in ways that are technically sound, commercially competitive and environmentally safe. ACAA is the trade association of the coal ash industry, and its members are producers of CCPs, marketers of CCPs, and other organizations with interests in CCPs. ACAA is recognized as the worldwide leader in advancing the beneficial use of CCPs. This reputation has been earned through a wide variety of activities including an annual survey and report on the CCP production and use; a biannual symposium that attracts registrants from more than thirty countries; an educational program for the managers of CCP production and marketing activities; and a membership base that includes all stakeholders in CCP management and use.

## INTRODUCTION

The American Coal Ash Association (ACAA) was founded in 1968, eight years before enactment of the federal Resource Conservation and Recovery Act (RCRA), which, as amended, has been the dominant statute governing the management and use of ash derived from the combustion of coal. In the earlier years, ACAA held a unique pioneering status under RCRA as a "resource recovery and recycling" organization. More recently, ACAA has expanded its efforts and has established "product" status in the marketplace for coal ash that is beneficially used. The term, coal ash, or coal combustion products (CCPs), now refers to the four high-volume materials: fly ash, bottom ash, boiler slag, flue gas desulfurization (FGD) material; as well as other clean-coal combustion materials such as the residues from fluidized bed combustion (FBC) boilers.

ACAA's mission is to advance the management and use of CCPs in ways that are technically sound, commercially competitive and environmentally safe. A guiding principle for accomplishing ACAA's mission is to gain and expand the recognition of CCPs as engineering and manufacturing materials. ACAA and its members lead in efforts that result in the use of some 30 million tons of CCPs each year in the USA. In calendar-year 1998, that amounted to about 29 percent of the 109 million tons of the high-volume CCPs produced (Table 1).

The worldwide use of CCPs exceeds 100 million tons annually. As in the USA, CCPs worldwide are produced from the combustion of coal, the principal fuel source for today's electric energy needs; they are specified by designers and engineers who rely on the availability of CCPs of known quality as a mineral resource, both today and into the twenty-first century; they are marketed by companies with knowledge of CCPs as engineering and manufacturing materials; and CCPs have a documented record of satisfactory performance in numerous applications.

Our vision is to be recognized worldwide as a leader for the CCP industry. To this end, we are working with organizations from more than 20 countries to establish an Internet-based organization, the Worldwide Coal Combustion Product Council (WCCPC). The WCCPC will provide for the exchange of technical information in a highly effective manner, in terms of both time and other resources. ACAA's vision is that we will continue to be the world leader in advancing the beneficial use of CCPs.

The CCP industry is a group of stakeholders connected by common interests in the management and use of coal ash. Worldwide, the industry includes: producers of coal ash, including coal-burning electric generating companies, independent power producers and industrial boiler owners; marketers of CCPs; organizations and individuals, including coal companies, allied trade groups, consultants, universities and others having commercial, academic, research or related interests in coal ash.

The deregulation of the electric power industry, not only in the USA but worldwide, is prompting electric generating companies to reevaluate their corporate structure, goals and strategies. The production of low-cost power is essential to their ability to thrive in a highly competitive environment--and CCP management and use becomes an important part of the overall strategy to reduce costs and generate revenue. ACAA too must look within to contain costs and deliver basic services for members. ACAA's challenge is to continuously assess the needs of the CCP industry and respond with programs that are both effective and flexible.

## PROGRAMS

Codes & Standards: Develop consensus standards and guidance documents for the use of CCPs through participation in organizations having both national and international recognition.

The lack of standards was identified in the USDOE's (United States Department of Energy) Report to Congress on Barriers to Increased Utilization of Coal Combustion/Desulfurization Byproducts by Government and Commercial Sectors<sup>1</sup> as being a barrier to utilization. The ACAA as well as other allied organization have worked diligently to produce standards which give guidance in the technically sound use of CCPs. Some examples of these standards include ASTM E1861 Standard Guide for the Use of Coal Combustion Byproducts as Structural Fill, and the ACI 229 Committee Report on Controlled Low Strength Material (flowable fill). The ACAA and its members have lead the way for the establishment of these and other standards for CCP use.

Communications: Collect and disseminate information from national and international sources on the management and use of CCPs to ACAA members, materials specifiers, designers, purchasers, project managers, contractors, government agencies, universities and others.

There are many recent ACAA publications which help accomplish this goal. These include, but are not limited to: (1) *Coal Ash: Innovative Application of Coal Combustion Products (CCPs)*, a landmark “coffee table” picture book showing the many uses of CCPs. Copies of “The Coal Ash Book” have been distributed widely throughout the industry as well as to every member of the 106<sup>th</sup> U.S. Congress; (2) *Fly Ash Facts for Highway Engineers*, of which more than 20,000 copies have been distributed; (3) *Soil and Pavement Base Stabilization with Self-Cementing Coal Fly Ash*, a new guidance document dedicated to the use of Self-Cementing fly ash (fly ash from sub-bituminous and some lignite coals) in soil stabilization applications. Over 3,000 copies of this new manual have been distributed since its printing in May of 1999. These are just a few of the many publications that are available from ACAA.

Another vehicle by which ACAA collects and disseminates information is its bi-annual International Symposium on the Use and Management of CCPs. The next ACAA International Symposium will be held early in 2001. Previous symposia have featured around 100 published papers on many aspects of the use of coal ash. Proceedings volumes are published through a cooperative agreement with EPRI (Electric Power Research Institute). The author of each paper then makes a presentation during sessions arranged throughout the week-long event. These papers then become part of the technical library of ACAA. Through the years over thirteen hundred papers have been presented at ACAA symposia and these papers are available from ACAA.

*Ash at Work*, ACAA’s newsletter, plus technical and editorial memoranda, communicate information to ACAA members and other about ACAA programs, meetings, staff activities, events and publications related to the management and use of CCPs.

Education: Create understanding and support for the use of CCPs through greater knowledge by educating members of the CCP industry as well as other industry groups, government agencies, legislators, regulators, students and citizen groups.

The cornerstone of ACAA’s educational efforts is the ACAA Educational Foundation. The ACAA Educational Foundation was established in 1995 to create educational opportunities for the advancement of CCP management and use. The Foundation’s principle programs have included co-sponsorship with ACAA of international meetings on CCP management and use, the distribution of the resulting technical proceedings to hundreds of universities and an innovative scholarship program. The Foundation has laid solid groundwork for awarding scholarships on a continuing basis to students wishing to pursue an understanding of CCP management and use in conjunction with practically any field of study. To date over 20 students have been awarded scholarships via the John H. Faber Scholarship Program. Fund-raising activities have been established to perpetuate the Foundations activities.

The Educational Program for Managers of CCPs is another bi-annual ACAA event. This one-week, lecture style coarse can be an introduction or refresher coarse for an ash manager.

Students can receive continuing education credits through the co-sponsor the National Center for Coal and Energy of West Virginia University. More than 20 experts from the CCP industry are brought in to be instructors in this dynamic program. The next Ash Manager will be held in Morgantown, West Virginia, June 5-9, 2000.

A workshop is a vital part of each of the three yearly ACAA meetings. At the workshops timely topics in CCP Management and Use are presented by experts from many disciplines. Recent workshop topics have included, Toxic Release Inventory, Ash from Industrial Boilers, The Use of FGD Material in Cattle Pads and Mining Applications, and the Use of CCPs by Government Agencies.

ACAA is also a regular participant and contributor to other meetings on CCPs and other areas where CCPs are used. Participation in meetings allows ACAA to educate others about the use of CCPs.

Government Relations: Coordinate with ACAA members and related industry groups and all levels of government, both within the USA and internationally, to identify issues affecting the management and use of CCPs and to influence related regulations, legislation and guidance documents.

Many federal agencies interact with ACAA and its members. Each year the United States Geological Survey uses data collected by ACAA's survey of CCP production and use to produce a chapter for its annual Minerals Yearbook. Production and use statistics are analyzed and presented in this publication. *Fly Ash Facts for Highway Engineers* is a Federal Highway Administration publication which is currently printed and distributed by ACAA. ACAA was also active in the writing of this publication and is currently involved in an update.

The USDOE (United States Department of Energy) has a strong interest in CCPs and has worked with ACAA on many projects. Recently ACAA's *Survey of State Regulations on the Beneficial Use of CCPs*<sup>2</sup> was added to the FETC (Federal Energy Technology Center) website. This has given this report a wider audience.

The United States Environmental Protection Agency (USEPA) is another agency that regularly interacts with ACAA and its members. Comprehensive Procurement Guidelines for concrete containing coal fly ash, and flowable fill containing fly ash mandate that procuring agencies purchase these products if they meet the project specification and are competitively priced. New regulations for the environmentally sound management of CCPs are often promulgated by USEPA and ACAA and its members are active in reviewing and providing comments on the proposed regulations.

Agricultural uses of CCPs are the subject of numerous research projects, many of which have produced positive results. The USDA (United States Department of Agriculture) has worked to develop some of these research results into viable applications. Guidance<sup>3</sup> from USDA on the use of FBC (Fluidized Bed Combustion) ash as a liming agent has led to widespread use of FBC ash in agricultural as well as mine reclamation. Similar guidance on the use of FGD (Flue Gas Desulfurization) material is also in the planning stages.

Market Promotion: Identify current and new market conditions and assist members in promoting the many technically sound, commercially competitive and environmentally safe uses of CCPs on par with other engineering and manufacturing products.

As new uses or new twists on existing uses of CCPs come to light they become the subjects of ACAA Symposium Papers, Ash Manager Program presentations, or ACAA workshop topics. These programs allow the dissemination of new information of the management and use of CCPs. Many of ACAA's publications are also market promotion pieces which educate the reader about the use of CCP's and in doing so promote that market.

Research, Development & Demonstration (R&D): Cooperate with industry groups, government agencies, universities and others to facilitate the creation of needed studies, surveys, databases and instructional programs to advance the management and use of CCPs.

Each year ACAA surveys the CCP industry to publish an annual report on Production and Use of CCPs (Table 1). The report contains information on CCPs used in numerous applications. The report is updated annually and is used by government agencies and industry groups. Producers and marketers of CCPs also use the information as a tool for evaluating CCP management programs.

Frequently ACAA will participate in the partial funding of research projects. ACAA members may bring forth project for evaluation and potential funding by using a form from ACAA. Recent examples of these projects include the research efforts which have produced reports on Life Cycle Assessment<sup>4,5</sup>, the role of CCPs in global climate change<sup>6</sup>, waste stabilization and solidification<sup>7</sup>, and state solid waste regulations<sup>2</sup>. Participation in advisory roles on research panels is another role for ACAA and its members. Several ACAA members have served in advisory roles in projects sponsored by OCDO (Ohio Coal Development Office), USDOE FETC, USDA, USDI OSM (United States Department of Interior Office of Surface Mining) and other agencies.

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Table 1. Production and use of CCPs for calendar year 1998. All data is in short tons. Data source ACAA.

Total CCPs - Category I (Dry) & II (Ponded)	Fly Ash	Bottom Ash	Boiler Slag	FGD Material
CCP Production	62,995,872	16,760,091	2,980,627	25,002,877
Subtotal -- Fly Ash, Bottom Ash, and Boiler Slag			82,736,590	
Total All CCPs				107,739,467
CCP Use				
Cement/Concrete/Grout	10,350,987	648,222	10,857	205,245
Flowable Fill	382,367	16,664	0	0
Structural Fills	2,792,948	1,172,589	56,026	20,809
Road Base/Subbase	1,447,146	1,603,224	500	83,765
Mineral Filler	336,264	78,578	12,424	0
Snow and Ice Control	3,276	707,424	56,620	0
Blasting Grit/Roofing Granules	0	220,914	2,138,958	0
Mining Applications	1,917,898	139,167	0	106,300
Wallboard	0	0	0	1,814,944
Waste Stabilization/Solidification	3,481,522	144,290	0	15,609
Agriculture	36,928	8,591	0	57,293
Miscellaneous/Other	356,132	499,521	112,352	190,297
Total Use	21,105,468	5,239,184	2,387,737	2,494,262
Subtotal -- Fly Ash, Bottom Ash, and Boiler Slag			28,732,389	
Total All CCPs				31,226,651
Individual Use Percentage	33.5%	31.3%	80.1%	10.0%
Cumulative Use Percentage	33.5%	33.0%	34.7%	29.0%

For metric equivalents, multiply tabular values by 0.9078