

ISSUE 2 • 2010

ASH **at work**

Applications, Science and Sustainability of Coal Ash

Inside: Annual
Membership
Directory



INVESTING IN ENVIRONMENTAL IMPROVEMENT:

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- 2009 Production and Use Report Posts Troubling Decline
- Time to Plan for 2011 World of Coal Ash



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Applications, Science and Sustainability of Coal Ash

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On the Cover

Utilizing coal combustion products requires more than know-how. It often requires substantial capital investment, as well. Coverage of recent examples begins on page 8.





C²P²—RIP?

By Thomas H. Adams, Executive Director ACAA

Once upon a time, the U.S. Environmental Protection Agency (EPA) believed in beneficial use of Coal Combustion Products (CCP). In fact, the federal agency charged with protecting human health and the environment had determined that CCP did not warrant management as a hazardous waste not once, but twice. So in order to promote the use of CCP and reduce the amount sent to disposal, the agency joined with other federal agencies and industry to find ways to increase the beneficial use of CCP.

In 2003, the Coal Combustion Products Partnership (C²P²) was formed. The Department of Agriculture, Department of Energy, Environmental Protection Agency, Federal Highway Administration, American Coal Ash Association, and the Utility Solid Waste Activities Group joined together to find ways to promote the safe beneficial use of CCP. And it worked. Following the EPA Final Determination of 2000 that CCP did not warrant hazardous waste management in disposal and the creation of C²P² in 2003, the beneficial use rate increased from 30 percent to almost 45 percent in 2008 – a success by any measure.

C²P² activities included workshops in which presentations were made detailing the current state of the art in beneficial use. Documents were produced providing information on beneficial uses. Dozens of individual companies signed on to be part of the partnership. A web-site was created and hosted by EPA to provide a home for C²P² information. Clearly the partnership was working as intended.



EPA Headquarters photo by Dave Blue

Alas, one day the planets began to align in a new direction. In November of 2008, a new administration was elected to be led by President Barack Obama. It was clear that the new administration would change the priorities of many federal agencies as established under President George Bush. Then the Dec. 22, 2008 event at the TVA facility at Kingston, Tennessee provided an opportunity for anti-coal activists to renew their assault on coal-fueled generation. New regulation of CCP disposal was demanded in response to what some of them called the “worst environmental disaster in the history of the country.”

The new EPA Administrator, Lisa Jackson, vowed to deliver CCP disposal regulation by the end of 2009. In the frenzy to create regulations, the beneficial use of CCP began to be attacked. An activist group, Public Employees for Environmental Responsibility (PEER), accused the EPA of being too closely aligned with industry. PEER went on the claim the EPA

had ignored environmental protection by participating in the C²P² initiative. PEER filed two Freedom of Information Act Requests demanding communications between the EPA and industry on C²P². EPA staff was required to produce thousands of documents. PEER then used information obtained to distort collaborative efforts between the agency and industry.

Other environmental groups joined the chorus. Instead of defending the program, the EPA elected to pull back from C²P². When questioned in 2009 about future C²P² activities, the agency would not provide definitive statements. Finally, in 2010, the EPA said it was suspending its participation in C²P² while the coal ash rule making process was in process. However, the web site containing C²P² information was still available to citizens. Then, in July 2010, the EPA unilaterally deactivated the C²P² web site. No advance

» Continued on page 4



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» Continued from page 2

notice or consultation with the sponsors was attempted. The agency just shut it down. The stated reason was that it was inappropriate for the EPA to continue to host the website while rule making was in-process.

When challenged about the shutdown of the website, the EPA apologized and said they should have consulted or advised the other sponsors. ACAA contacted EPA senior management and requested that the website be partially restored to make available data on beneficial uses the agency said they continue to support. A meeting was scheduled for Sept. 15, 2010, in Washington, DC, at EPA headquarters. ACAA was hopeful that the EPA would demonstrate their commitment to beneficial use by restoring portions of the website. Then, just hours before the meeting, the EPA sent an email message that their position was that the website would remain unavailable at least until rule making was finished. No need to have a meeting. The policy would remain as stated. The entire purpose for the meeting was now off the table.

“The EPA appears to be running away from beneficial use in order to satisfy anti-coal activists while ignoring the science and track record of decades of safe recycling.”

Fast forward to Oct. 15, 2010. A report from the EPA Inspector General reveals two main problems. First, the IG determines that information on the C²P² website was “misleading” on the risks of beneficial use. Second, the appearance of certain information on the website created the impression that products or companies were endorsed by the EPA contrary to agency ethics policies. Prompted by PEER, the EPA appears to be running away from beneficial use in order to satisfy anti-coal activists while ignoring the science and track record of decades of safe recycling.

The question growing out of the events surrounding the C²P² program is simple: Is there a future for this important beneficial use collaboration? Based on EPA’s desire to satisfy environmental activists

and ignore the documented progress in reducing disposal while increasing environmental protection, it would appear that the program is virtually dead. Declaring CCP to be hazardous for disposal, suspending participation in programs which encourage beneficial uses supposedly supported by the agency, and removal of the website containing information needed by citizens to understand beneficial use, clearly demonstrates the agency position more clearly than any public pronouncements.

While other federal agencies may wish to preserve the program, EPA support is essential to its survival. EPA now appears to want to increase disposal under an authority which allows it to have maximum control under all circumstances. More change you can believe in. ❖

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REMEMBERING EPA PUBLIC HEARINGS AND PREPARING FOR WHAT COMES NEXT

By Mark Bryant, Chairman ACAA, Ameren Energy Fuels & Services

As the holiday season is upon us and a New Year looms, our industry has reached the end of a phase unlike any other in our history. Many months have been spent attending public hearings and preparing comments regarding coal ash disposal rules proposed by the Environmental Protection Agency. At this time of reflection, here are some thoughts about what we've been through in the rearview.

To use my example of a political science class grading system: the oral presentation portion of our grade deserves a solid high B. Arlington, Denver, Dallas, Charlotte, Chicago, Pittsburgh, Louisville and Knoxville all now have special memories for those who could make the journey for EPA's public hearings. I personally was able to make the Virginia, North Carolina, Kentucky and Tennessee hearings and was happy to be able to see industries' efforts at the beginning, middle and end of this process.

We definitely improved at the Kabuki Theatre that was to become portions of these hearings (analogy borrowed from John Ward, thanks) and did our industry a service by staying on point and keeping to the facts. The plant staff and ash users who testified brought a face not often seen: people who work with ash every day.

We have achieved our goal so far and let EPA and those with the opposing view know we are engaged. We showed up and we showed well. We would have been conspicuous if absent; we were not. If only sheer numbers matter, we held our own. However, if substance counts for anything, we carried the day. I received several comments from utility industry

“We have achieved our goal so far and let EPA and those with the opposing view know we are engaged. We showed up and we showed well.”

representatives that regularly attend these types of hearings that the response from our industry was overwhelming, very complimentary of the effort.

At the first few public hearings, our industry was able to provide approximately one speaker out of every four. Our substance was strong. Progressively as our site coordinators gained and shared experience and our planning improved we were able to increase to one out of three. Ultimately we out-performed our well-organized opposition at Louisville and probably split at Knoxville.

This is not an activity that many of us have much experience with. But in every case that I was able to observe, or based on the reports that I received, our industry provided facts, cites, quotes and substance to support our testimony that was compelling. I am not sure how EPA will go about validating and verifying the written and spoken testimony, almost an impossible task, but I am confident that we will carry the substance measure by a significant margin.

But then again this is Science vs. Political Science. Anyway, nicely done by all who helped plan, coordinate, organize, staff and testify at these hearings. The many companies that encouraged employee participation helped make a strong impression. Special props go to John Ward

for attending all eight of these events and for staffing the Citizens for Recycling First/ACAA speaker preparation room. (The refreshments made the day and stay much more tolerable.) Make no mistake: By the end of these hearings, no matter which side of the issue or what the role, EVERYBODY was tired.

We saw theatrics, passion, emotion and personal testimony. We heard scripture from several religious beliefs, even a cosmologist (the study of the universe in its totality as it now is or at least as it can be observed now), and by extension, humanity's place in it. (*I had to look that one up!*). We have seen a human reenactment of the Kingston incident, activists rappelling down the front of a hotel with a protest banner, a fly ash lemonade stand, picket lines with megaphones, a political rally in a nearby park complete with folk music, and lots of young people engaged. The level of activity against our cause was impressive, even a bit overwhelming, until you stop to consider that we are not the real target. We are more or less collateral damage, maybe considered expendable in the effort to negatively impact coal and other carbon based energy sources.

There is no reason to guess about this real objective, we heard direct testimony to it at several hearings. Still, we continued to provide substance, choosing to use science, good science, and peer

reviewed data to support our case: Coal Combustion Residuals do not warrant listing or management as a subtitle C hazardous or "special" waste under RCRA.

From all the testimony at the hearings there is one group of people that I truly feel sympathy for: the families whose homes and property were affected by the release that fateful night at Kingston. That must have been truly a frightful experience that should never be allowed to happen again.

Back to our class example, our term paper (written comments) was submitted by ACAA on November 18 – one day ahead of the deadline. The numbers tell the story here: More than 14,000 volunteer hours were expended to produce a 211-page comment document backed up by well over 10,000 pages of supporting material. Grade: A.

Planning is now under way for our winter meeting in Las Vegas February 1-2, with a program that is coming together nicely. It has been a long time since we have met in

LV, but a cost conscious association cannot ignore the value.

As we enter the New Year, November's elections have shifted control of the House of Representatives and the political prognosticators can't agree on what the reaction of the administration will be. One thing is certain, though: We will need to press the administration and the EPA to consider the facts and good science. Everyone who reads this will need to consider how they can engage their legislators in the House and Senate and continue to persuade them toward a non-hazardous solution.

Thanks to all for your hard work, to our leadership team for the continued support of Tom and his staff, and to the comments team for the tireless effort to get ACAA's comments finalized.

This is an unprecedented time for our industry and association. We all have a lot to be proud of.

See you all in Las Vegas, and thanks. Now get busy. ♦

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INVESTING IN ENVIRONMENTAL IMPROVEMENT:

Wet to Dry Ash Handling Conversion Completed by Headwaters and Detroit Edison

By Sara Cowgill, Headwaters Resources

Headwaters Resources – America’s largest manager and marketer of Coal Combustion Products – has completed the conversion of a wet-handled coal ash facility to a dry ash operation in Monroe, Michigan. The conversion to dry handling is designed to collect the coal ash before it is placed in a disposal impoundment and to make it available for safe and environmentally beneficial use in the production of concrete.

“Converting wet ash handling systems to dry handling is increasing as an important coal ash management strategy,” said Mike Adams, vice president of Headwaters Resources. “Regulatory changes on the horizon are expected to make conversions like this one even more desirable.”

The wet-to-dry conversion project under way in Michigan is located at Detroit Edison’s Monroe Power Plant – a four



Photos supplied by Headwaters Resources

New fly ash storage silos and truck loading facilities were key elements in converting Monroe Power Plant's ash handling system from wet to dry.

unit, 3,200-megawatt power station originally constructed in 1974.

The dry collection equipment is being installed in two phases. The first phase was completed in July 2010, and included installation of vacuum separation equipment to collect the coal ash produced in Units 1 and 2 in a dry state, pneumatic systems to convey the coal ash to a new 4,000-ton storage facility, and truck/rail loading equipment for distribution to concrete producers in the Midwest United States and Eastern Canada. Headwaters Resources is providing \$10 million in financing for the project.

The second phase of the project is scheduled to begin in 2011 or 2012 and plans include equipment to collect ash from Units 3 and 4 and an additional 4,000-ton storage silo. When completed, Headwaters Resources estimates that it will collect 400,000 tons of coal ash annually that has previously been placed in the on-site impoundment and anticipates safe re-use of the fly ash in the production of concrete and concrete products.

"Utilizing coal ash in concrete has numerous performance and environmental benefits," said Adams. "Concrete made with fly ash is stronger and more durable than concrete made with

cement alone. In addition to reducing the amount of material going to landfills, coal ash utilization also allows concrete producers to use less cement. Not producing that cement conserves natural resources and reduces greenhouse gas emissions from cement production to the tune of up to 15 million tons last year alone in the United States."

This is one of many projects Headwaters Resources has undertaken to collect and beneficially use coal ash that was previously disposed. With ongoing projects at 103 utility locations and approximately 20 million tons of coal combustion products under management annually, Headwaters Resources is the largest manager of coal ash resources in the United States. Headwaters Resources is also responsible for more than half of the nation's total sales of coal fly ash for use in concrete applications – an important contributor to reducing greenhouse gas emissions associated with concrete construction.

Detroit Edison is an investor-owned electric utility serving 2.2 million customers in Southeastern Michigan and a subsidiary of DTE Energy (NYSE:DTE), a Detroit-based diversified energy company involved in the development and management of energy-related businesses and services nationwide. ♦

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INVESTING IN ENVIRONMENTAL IMPROVEMENT:

UNIQUE LIMESTONE GRINDING FACILITY

OPENED BY CHARAH AND AMEREN MISSOURI

By Scott Sewell, Charah Inc.

Charah Inc., a leading ash management provider for the coal-fueled electric utility industry, and St. Louis-based Ameren Missouri officially opened a new limestone grinding facility in October 2010 at APAC Tennessee's Brickey Quarry located in Bloomsdale, Missouri. The unique project results from a partnership in which Charah designed, constructed and will now operate the facility for Ameren Missouri to meet the utility's powdered limestone needs.

The Brickey Limestone Grinding Facility will process up to 400,000 tons of limestone annually into powdered limestone

for use at Ameren Missouri's Sioux coal-fired power plant located in West Alton, Missouri. Powdered limestone is used as a reagent in scrubbers to capture sulfur dioxide (SO₂) emissions.

The facility has a series of hoppers and conveyors which are used to move the limestone from a raw material storage building to two 85-inch Williams Patent Crusher roller mills. Once crushed and sized, the limestone is stored in an 8,000-ton storage dome and then conveyed into one of two load-out silos.

According to Charles Price, president and CEO of Charah, "Charah provides a

broad base of power plant support services to the coal-fired utility industry to assist them in meeting the increasing environmental requirements under which they operate. We are committed to providing our utility partners, like Ameren, with innovative, environmentally conscious solutions to meet all of their ash management and power plant support services needs."

Above: Ribbon cutting ceremony at the Limestone Grinding Facility, October 13, 2010. (L-R) Charles Price, President & CEO, Charah, Inc.; Mike Mueller, President, Ameren Energy Fuels and Services; Scott Sewell, Vice President of Operations, Charah, Inc.



The Limestone Grinding Facility is designed to produce 400,000 tons of crushed limestone per year with on site storage and load out capabilities. Photos on this page and the previous page were supplied by Charah Inc.

“While typically limestone is ground on-site in a wet environment at each power plant, this centralized resource will produce a dry reagent powder which can easily and cost-effectively be transported to nearby facilities, thus saving significant equipment costs at multiple locations and improving environmental performance,” added Price.

According to Mike Mueller, President of Ameren Energy Fuels and Services, “This ‘one-of-a-kind’ facility is an example of what can happen quickly when everyone pulls together. We look forward to a very successful relationship with Charah.”

Based in Louisville, KY, Charah provides a complete line of ash management services including landfill design, construction, management & operations; bottom ash processing & marketing; fly ash marketing; dry ash conversion systems; fly ash load out systems; engineered fills & GreenFill™ programs; ash pond management; mechanical dewatering; gypsum handling; limestone grinding & handling; and Integrated Gasification Combine Cycle (IGCC) slag beneficiation.

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Founded in 1989, Civil & Environmental Consultants, Inc. (CEC) has 20 years of experience assisting energy clients with coal combustion product (CCP) management projects. We integrate our company's core practices and expertise in the areas of environmental and ecological services, civil / site development, waste management and water resources into all our CCP management solutions. Our clients receive a streamlined approach to engineering and permitting CCP projects which take into consideration the management of risk, addresses regulatory obligations, and minimizes bottom-line costs. Our CCP Management Services include:

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- § Groundwater modeling and human health risk evaluation
- § Ecological / cultural resource assessments and mitigation
- § Surface water management / permitting / NPDES
- § Dams / impoundments and ash pond design / closures
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USAGE DECLINES MAY SIGNAL BEGINNING OF TROUBLING TREND

By David C. Goss, ACAA Adviser

In mid-October, ACAA released the results of the 2009 coal combustion products (CCP) production and use survey. ACAA has surveyed the electric utility industry since 1966 to identify trends in the production and utilization of a variety of CCPs. Materials reported in the survey include fly ash, bottom ash, boiler slag, FGD gypsum, and several clean coal technology residuals including wet and dry flue gas desulfurization materials and ashes from fluidized bed combustion units. In 2004, the reporting of cenospheres was incorporated into the survey and reporting process. Cenospheres, a sub-set of fly ash, is a high-value material, used for the manufacture of paints, plastics, metal alloys and other applications. Of particular note is the production of cenospheres is reported in pounds, not tons. It is assumed that all cenospheres collected are used.

The survey (shown on the opposite page) reflects the statistical status of CCP utilization in fifteen beneficial use categories. The results are reported in short tons and percent comparisons. Each year survey forms are sent to electric utilities that use coal to generate electricity. More than 100 survey forms were distributed seeking 2009 data. Voluntary responses for 2009 represented approximately 64.7 percent of all U. S. coal-fueled utility plant megawatt name plate capacity. This is just slightly less than 2008's 68 percent response rate.

Survey information includes: 1) the types of coal consumed to generate electricity



“It is a travesty that this highly successful example of industrial recycling may be lost due to issues that are largely political in nature and not at all related to the material itself.”

(i.e., bituminous, sub-bituminous and lignite); 2) the method of combustion (i.e., the boiler system used); and 3) the type of resulting CCPs produced. Other factors considered by ACAA when estimating utilization include seasonal demands for coal-fuel generated electricity due, in part, to weather conditions, plant outages or shutdowns, changing industry standards or specifications, impact of actual or proposed government regulations and similar worldwide production and use trends for CCPs.

Annual CCP production in 2009 was almost 2 million tons less than 2008; CCP

beneficial utilization declined this year to 41.6 percent as compared to 44.53 percent in 2008. We believe the decline in CCP utilization was due to two primary factors: 1) the downturn in the economy; and 2) stigmatization of CCPs resulting from rumors of soon-to-be-released EPA proposed regulations. Housing and other construction starts were much lower in 2009 as compared to 2008, with cement kilns and wallboard plants operating at reduced levels. With the marked decrease of utility coal consumption (10 percent lower in 2009 as compared to 2008) and an adjusted corresponding decrease in CCP production, it was not surprising to see the reductions in utilization of CCPs that were reported.

Fly Ash saw a significant decrease of 2.7 million tons in utilization over 2008, especially in concrete and concrete products. As mentioned before, this reflects a reduction in construction activities

across the nation. Cement kiln products were down in 2009 because demand for portland cement was much less than the previous year. In 2009, approximately 9.7 million tons of fly ash was used in concrete products as compared to more than 12.5 million tons in 2008. National portland cement consumption in 2009 was only 70.1 million tons as compared to 96.3 million tons in 2008. That decrease is expected to continue into 2010. Fly ash remains the most widely used CCP, primarily found in concrete products, structural fills, waste stabilization and raw feed as clinker for cement production.



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2009 Coal Combustion Product (CCP) Production & Use Survey Report

Beneficial Utilization versus Production Totals (Short Tons)									
CCP Categories	Fly Ash**	Bottom Ash**	Boiler Slag*	FGD Gypsum**	FGD Material Wet Scrubbers*	FGD Material Dry Scrubbers*	FGD Other*	FBC Ash*	CCP Production / Utilization Totals
2009 Total CCPs Produced by Category	63,000,000	16,600,000	2,176,054	18,000,000	11,700,000	10,622,601	76,288	12,524,796	134,699,739
2009 Total CCPs Used by Category	24,716,665	7,000,665	1,879,532	8,951,315	907,543	342,798	67,671	11,748,374	55,614,563
1. Concrete/Concrete Products /Grout	9,796,483	555,996	0	239,376	0	18,555	0	0	10,610,410
2. Blended Cement/ Raw Feed for Clinker	2,435,904	720,828	0	420,994	0	0	0	0	3,577,726
3. Flowable Fill	264,611	113,395	0	0	0	16,212	192	20,000	414,410
4. Structural Fills/Embankments	4,646,626	2,944,354	64,727	413,790	484,379	162,997	53,982	145,000	8,915,855
5. Road Base/Sub-base	198,507	765,181	0	0	0	0	160	4,443	968,291
6. Soil Modification/Stabilization	670,035	188,504	1,200	0	0	3,332	0	94,045	957,116
7. Mineral Filler in Asphalt	0	0	45,275	0	0	0	0	0	45,275
8. Snow and Ice Control	0	207,250	45,275	0	50,302	0	0	0	302,827
9. Blasting Grit/Roofing Granules	47,710	78,156	1,617,755	0	0	0	0	0	1,743,621
10. Mining Applications	2,148,171	498,180	43,511	195,526	567,049	124,320	0	11,425,386	15,002,143
11. Gypsum Panel Products	0	0	0	7,286,404	0	0	0	0	7,286,404
12. Waste Stabilization/Solidification	3,515,289	5,867	0	108,869	0	35,937	13,337	59,500	3,738,799
13. Agriculture	102,908	3,696	0	282,386	0	0	0	0	388,990
14. Aggregate	87,317	452,066	34,700	0	0	0	0	0	574,083
15. Miscellaneous/Other	803,104	467,192	27,089	3,970	0	0	0	0	1,301,355
Summary Utilization to Production Rate									
CCP Categories	Fly Ash	Bottom Ash	Boiler Slag	FGD Gypsum	FGD Material Wet Scrubbers	FGD Material Dry Scrubbers	FGD Other	FBC Ash	CCP Utilization Total**
2009 Totals by CCP Type/Application	24,716,665	7,000,665	1,879,532	8,951,315	907,543	361,353	67,671	11,748,374	55,633,118
Category Use to Production Rate (%)***	39.20%	43.70%	84.20%	50.30%	7.70%	3.30%	88.70%	93.80%	41.30%
Supplemental: In 2005, the industry established a goal of 50% utilization for CCPs by the year 2011, not including mine reclamation. This year's utilization rate without mine reclamation is 30.5%									
2009 Cenospheres Sold (Pounds)	9,120,702								

ACAA received survey data representing 200,198 MegaWatts Name Plate capacity of the total industry-wide 337,300 MegaWatts Name Plate capacity (i.e., 59.3%)

* These are actual tonnages reported by utilities responding and do not reflect estimates for utilities that did not respond this year; Mine reclamation data includes tonnages reported by ARIPPA

**These numbers are derived from previous, current and applicable industry-wide available data, to include Energy Information Administration Reports 923 and 860.

***Estimates based on actual tons reported and based on extrapolated estimates for fly ash, bottom ash, and FGD gypsum; Utilization exceeded 2009 production as some CCPs were reclaimed from storage

Detailed survey results can be obtained on-line at www.acaa-usa.org under the Publications tab.

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Flue Gas Desulfurization (FGD) Gypsum

remained the second highest used CCP, following fly ash when both totals are compared. Approximately 50 percent of the estimated 18 million tons produced, or 9 million tons, were used for beneficial purposes. This decline of nearly 1.5 million tons was largely attributable to a reduction in the manufacture of wallboard and panel products (7.2 million tons in 2009 as compared to 8.5 million in 2008). Because of the increase of flue gas desulfurization emission controls, production numbers were 500,000 tons higher than in 2008 and this upward trend should continue for several more years. As quantities increase, utilization percentages may remain relatively level or even decline further until construction picks up. However, if the EPA were to require CCPs to be disposed of as a “special waste” under RCRA Subtitle C, ACAA believes that beneficial use of this material will decrease dramatically.

Bottom Ash utilization was 7.2 million tons or 40.7 percent of the total 16.6 million tons produced. This is a very modest drop of approximately 0.1 percent from 2008 figures. Bottom ash was primarily used in structural fills, road base, raw feed for portland cement clinker, aggregates, mining applications and snow and ice control. ACAA is of the opinion that possible changes proposed by the EPA would significantly impact utilization of bottom ash due to liability concerns by generators and end-users if it should be categorized as a “special waste” under Subtitle C.

Production of FBC Ash reported in 2009 was more than 12.5 million tons, of which nearly 75 percent was produced by independent power producers located in Pennsylvania (ARIPPA). The majority of this ash is used in mine reclamation activities (re-contouring, treatment of acid mine drainage, and land restoration). In 2005, the EPA and industry set a goal for national utilization rate of CCPs of 50 percent in 2011. ARIPPA's utilization rates were a significant part of achieving that goal. Recently, the EPA in proposed rule-making indicated that it may recommend in the future removing mining activities from their list of beneficial uses for CCPs. If mining activities were taken out of this year's survey, the national utilization rate for all CCPs would only be 30.5 percent as compared to the 41.6 percent reported by



Fly ash remains the most widely used CCP, primarily found in concrete products.

including this significant use. The utilization rate for FBC ash is reported as 93.8 percent in 2009. If the EPA rules that beneficial use of CCPs in mining applications are not allowed, then utilization in this category will be nil.

Boiler Slag, although produced in relatively small numbers (1.8 million tons in 2009), reported the third highest use percentage among regularly reported categories. Over 84 percent of boiler slag produced is used for applications such as blasting grit, roofing granules, aggregates and as mineral filler in asphalt. The availability of boiler slag will gradually be reduced with the continuing retirement of more and more cyclone and slag-tap boiler units.

Reversal of a Positive Trend

Until this year, ACAA's forty years of CCP surveys have reflected steady growth of beneficial use. This year's decline marks a possible change that may not be reversible. While largely attributed to a downturn in the economy, ACAA firmly believes the uncertainty around proposed EPA rule-making has had an adverse impact on utilization in 2010 and beyond. If the EPA goes forward with promulgating final regulations that classify coal combustion residuals (CCRs) as a “special waste” to

be managed under RCRA Subtitle C for the purposes of disposal, ACAA expects to see further stigmatization of CCPs and a significant decline in their use. In 2010, utilities, marketers and end-users have already reported that some utilities are withholding CCPs from the marketplace because of concerns about potential liabilities. ACAA members and end-users have also reported numerous examples of loss-of-market in 2010.

The Los Angeles Unified School District issued a memo in April 2010 stating it will stop the use of fly ash in LAUSD projects until the EPA confirms fly ash to be a non-hazardous toxic waste. That statement alone stigmatizes fly ash besides stopping its use. An editorial in *Engineering News Record* in April raised the question “Is fly ash the next asbestos?” Although some may consider such a statement to be a stretch, it is a legitimate concern for producers and end-users. In 1989 the EPA issued the Asbestos Ban and Phase-Out Rule which has been implemented in the US to reduce potential human exposure to materials containing asbestos. Some nations like Australia, Japan and the European Union have banned the use of asbestos. Asbestos occurs naturally, but numerous lawsuits have been brought against companies that manufactured

products containing asbestos in the United States. In 2002, the RAND Corporation described asbestos litigation as the longest, most expensive mass tort in U.S. history, involving more than 8,400 defendants and 730,000 claimants. Although they do not possess similar hazards to asbestos to warrant a comparison based on the science, due to the sheer volume of CCPs litigation that might ensue from a special waste determination by the EPA raises even greater concern for claimants and damages. This is why a number of utilities have, or are planning to withhold their CCPs from beneficial use until EPA's rulemaking is finalized. Competitors of CCPs raise this comparison of their products not being toxic when compared to CCPs. This is stigmatization which has a genuine adverse impact on current and future use.

In a worst case scenario, ACAA is of the opinion that beneficial use will drop dramatically if a special waste designation is applied to CCRs destined for disposal. Since fly ash, bottom ash and other CCPs are virtually the same when used beneficially or when disposed, utility generators

are concerned that lawsuits or potential misuse of CCPs would take away all incentives to use CCPs in many of the applications tracked above. The EPA, in its proposed rulemaking, has separated utilization into two vague categories: "encapsulated" and "unencapsulated." "Encapsulated" uses include the use of fly ash in concrete products and the use of FGD gypsum in wallboard and panel products. "Unencapsulated" uses include structural fills, flowable fills and land applications such as in agriculture and snow and ice control. ACAA estimates that less than 24 million tons of the CCPs reported in 2009 would have fallen under the "encapsulated" uses terminology. **This would have resulted in a national utilization rate of less than 9 percent as compared to the 41.3 percent reported in this survey.**

The final results of the EPA's proposed rulemaking may be years away from conclusion. ACAA will continue to promote the positive impact of CCP utilization. However, the results of the 2009 annual CCP production and use survey hint at challenging times ahead for uses of CCPs.

It is extremely important that members of the industry provide ACAA examples of stigmatization or situations where CCPs have been adversely impacted by the proposed rulemaking. Where editorials in newspapers or websites portray CCPs as toxic or hazardous substances, providing ACAA copies of these examples helps the industry illustrate to the EPA that adverse impact on the use of CCPs is occurring despite the fact that the rulemaking is only proposed, not implemented.

ACAA wishes to thank those who responded to the 2009 survey request for data and urges all members and colleagues to plan to provide new data next year for the 2010 calendar year. It is a travesty that this highly successful example of industrial recycling may be lost due to issues that are largely political in nature and not at all related to the material itself. Activist groups opposed to the generation of electricity from coal are using the proposed rulemaking as a tool to further their agenda. However, the use or reuse of CCPs supports sustainable practices and should not stop but instead be increased. ♦

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WORLD OF COAL ASH CONVENES IN DENVER IN 2011



The World of Coal Ash (WOCA) is an international conference organized jointly by the American Coal Ash Association (ACAA) and the University of Kentucky Center for Applied Energy Research (CAER). The 2011 conference will mark the two organizations' fourth joint biennial meeting. It will again focus on the science, applications and sustainability of coal ash worldwide. As such, it will encompass all aspects of Coal Combustion Products (CCP) as well as gasification products.

WHERE AND WHEN

WOCA '11 will take place in Denver, Colorado, May 9 to 12, 2011, at the Denver Marriott Tech Center Hotel. In 2009, there were 537 American and International attendees.

SHORT COURSE

Monday, May 9 hosts a day long Short Course entitled "The Science of Ash Utilization", featuring two concurrent sessions, basic and more advanced. Use the regular registration form to register for this course. The course cost will be announced soon; please watch the WOCA website for details.

PRESENTATIONS AND POSTER SESSION

Tuesday through Thursday, May 10 to 12, will be host to four parallel concurrent sessions of presentations. Additionally, a poster session will be available for viewing the entire week, with a hosted Poster Reception from 3:30 to 5 p.m. on Tuesday, May 10. Authors and researchers will be available during this time to answer questions about their work.

REGISTRATION INCLUDES

Registration fee of \$735 (early bird – through 4/1/2011) includes continental breakfasts as well as morning and afternoon coffee breaks Tuesday through Thursday, May 10 to 12; a Welcome Reception and a sponsored lunch on Tuesday; and the social highlight of WOCA '11 – dinner and entertainment at an offsite location on Wednesday evening, May 11.

EXHIBITORS

Exhibit Booths are available for \$1,350 each, which includes one full conference registration. For the first time, this year WOCA has extended reduced registration rates for two additional booth assistants per exhibitor; the reduced registration includes FULL conference participation. Please contact the ACAA staff (phone: 720-870-7897 or info@acaa-usa.org) as soon as possible for the best exhibit booth choices. Wireless internet will be available throughout the conference and exhibit areas! Exhibitor participation has increased from 39 exhibitors in 2005 to 55 in 2009.

SPONSORS

Sponsorship opportunities vary widely, from \$200 literature suppliers to \$25,000 reception sponsors, with many other choices in between. Please contact the ACAA staff (phone: 720-870-7897 or info@acaa-usa.org) as soon as possible for a list of opportunities and to have your first choice of sponsorships!

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INNOVATION

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ASH QUALITY IMPROVEMENT—AMMONIA REMOVAL AND RECOVERY

New Technology Treats Ash Affected by Power Plant Actions to Address “Blue Plume”

Authors:

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One challenge that impacts the ash industry is ammonium sulfate deposition in fly ash. Often, when power plants install pollution control devices, the contaminants removed end up in the fly ash. One example is control of NO_x using Selective Catalytic Reduction (SCR). Although very effective in controlling NO_x , the SCR catalyst also increases the conversion of SO_2 (sulfur dioxide) to SO_3 (sulfur trioxide). The SO_2 can be removed to a high degree in the “scrubber” (Flue Gas Desulfurization or FGD), but the scrubber is largely ineffective at removing SO_3 . Water from the FGD and/or the atmosphere reacts with the SO_3 to form small quantities of acid mist. This acid mist is typically yellow-brown to grey-blue in color and makes the stack plume very visible and is often referred to as “blue plume.”

Blue plume can be prevented in a number of ways. Arguably the most efficient is the injection of ammonia between the power plant air preheater and electrostatic precipitator (ESP). This removes SO_3 from the stack gas to a very high degree by converting it primarily to ammonium sulfate ($(\text{NH}_4)_2\text{SO}_4$) which is captured in the ESP along with the fly ash. This typically

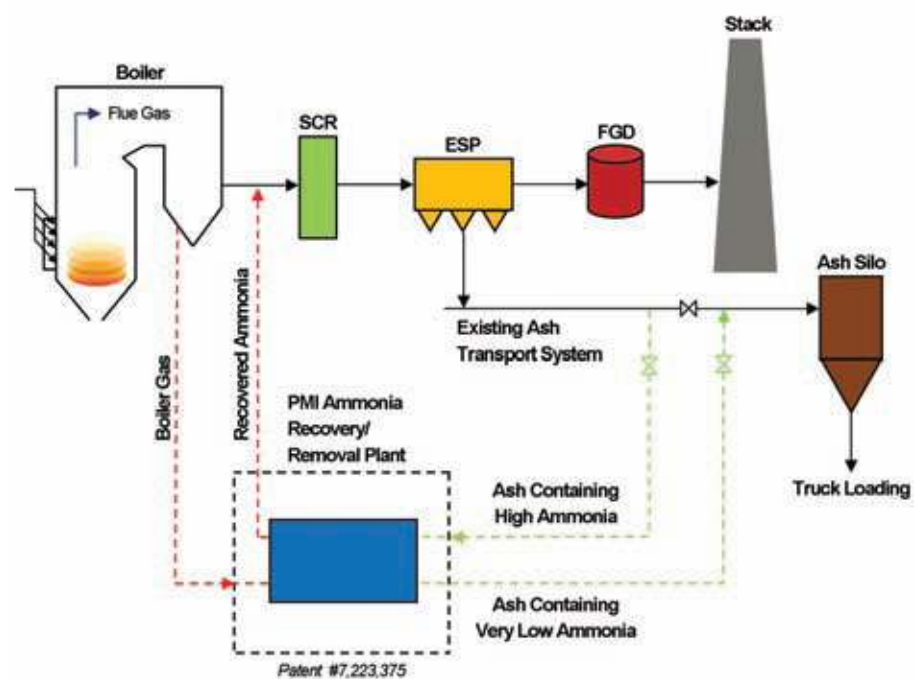


Figure 1. PMI Ammonia Recovery/Removal Plant tie-in. Ammonia removal and recovery systems are designed to integrate with existing power plant emissions control equipment.

results in levels of 1,000 to 3,500 ppm ammonia on the ash. Although ammonia is also used in the SCR and the ammonia “slip” (unreacted portion) from the SCR also makes ammonium sulfate, that use typically leaves only about 50 to 100 ppm on the ash. By far, the biggest contributor of ammonium sulfate on fly ash is the injection of ammonia to mitigate blue plume.

PMI Ash Technologies, LLC is a technology development company specializing in coal combustion products and processes. We are also an operating company. We have invented and/or commercialized several technologies related to processing

fly ash to make it more recyclable. Among the things that make us unique is that we have owned and operated processing plants as well as developed the technology that the plants were based upon. As a result, we have expertise in fine particle processing plant development, design and operation as well as the engineering subdisciplines that make them work. This includes combustion, thermal processing, powder handling, storage and transport and the associated machinery. One of the most recent development programs we have undertaken is the removal of the ammonium sulfate from ash and the recovery of the ammonia for reuse in the power plant.



Figure 2. PMI Ammonia Recovery/Removal Pilot Plant.

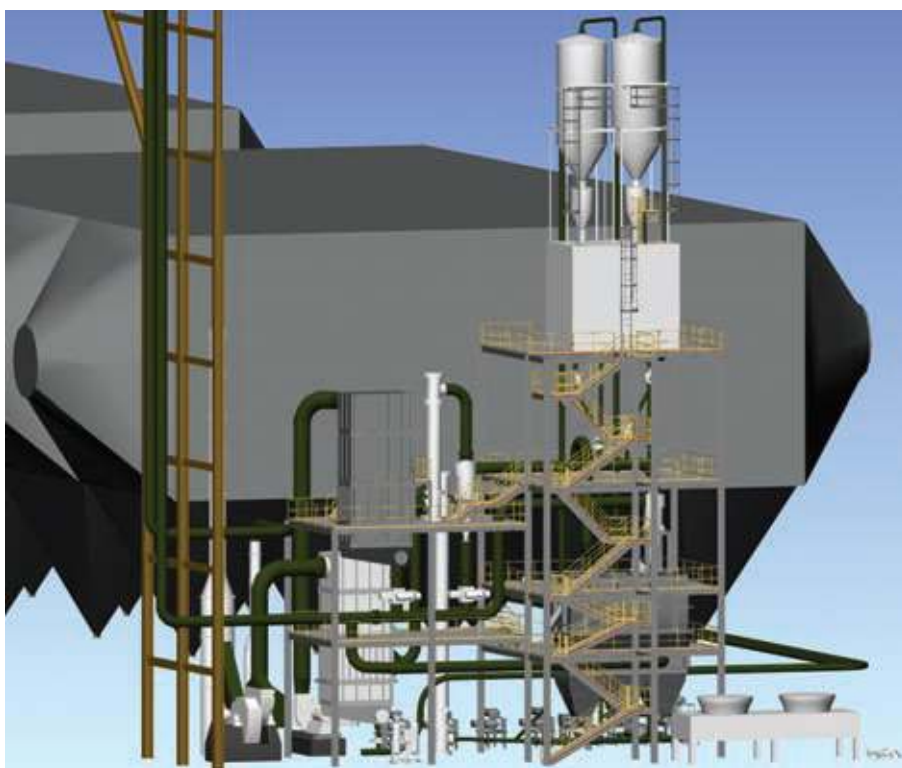


Figure 3. PMI Ammonia Recovery/Removal Commercial Plant.

There are various ways to remove the ammonium sulfate from the fly ash. For example, ammonium sulfate breaks down at elevated temperatures (to various compounds depending on the temperature). PMI's fly ash carbon reducing process, Carbon Burn-Out (CBO), is very effective at decomposing ammonium sulfate so that no ammonia

exists (either in the ash or the exhaust gas) after CBO processing. However, some fly ash containing ammonia does not require carbon reduction – that is, it does not have the higher than specification loss on ignition (LOI) levels for which the CBO process was developed. For ash with the lower LOI, another process was needed.

PMI performed laboratory and bench scale pilot testing (which formed the basis for US Patent #7,223,375) that showed that the ammonium sulfate could be made to release the ammonia in gaseous form by exposing the ash to a suitable temperature for a suitable residence time. This thermal exposure greatly reduces the ammonia content of the fly ash while making a substantial part of the ammonia available for recovery and reuse. Notably, the heat required for the process can be provided by using a small amount of hot boiler gas (less than 1 percent) from the power plant boiler (see figure 1). After processing the fly ash, the boiler gas – now containing the recovered ammonia – can be reinjected into the boiler gas stream for reuse of the ammonia.

PMI advanced this invention into a scalable process that became the basis of a 1 TPH pilot plant (see figure 2). The fine particle fluid bed technology developed for the CBO process is an ideal method to provide the required residence time and is a key component in the ammonia removal/recovery process. However, it is not ideal for the initial heating of the fly ash to the desired temperature. For this, a proprietary, novel and efficient counterflow heat exchanger is used. The pilot plant confirmed the earlier data and process design, at a scale which allowed reasonable scale up to a commercial size. It also allowed optimization of the key temperature and residence time parameters. Finally, pilot plant stack gas testing was performed to confirm the composition of the gas being returned to the power plant.

Using data generated from the pilot plant, a preliminary design was developed to provide layout, interface and other technical data as well as a preliminary design level capital cost estimate for full scale commercial facility. A 750 megawatt power plant was assumed to be the “host” for the commercial ammonia reduction system preliminary design.

The commercial facility (see figure 3) will process a base load of 30 TPH of fly ash containing up to 3,500 ppm ammonia at the appropriate temperature and residence time to make a product ash containing well less than 75 ppm ammonia (see figure 4). This rate is somewhat

more than the full load fly ash production for the 750 megawatt unit. The system also has a peak mode in which it will process up to 45 TPH (made possible by the ability of the system to achieve acceptable fly ash ammonia levels at a shorter residence time). The peak mode may be used to “catch up” in situations such as if the ammonia reduction system were off line for several hours while the power plant continued to make fly ash.

The fly ash containing high ammonia levels, “the feed”, is intercepted during transport from the ESP to the existing fly ash silo (see figure 1). After processing, the ash containing very low ammonia levels is transported, using the existing transport system, to the existing fly ash silo for loadout into tankers and transport to the market.

Heat supply to the ammonia reduction system is provided by ducts connected to different locations in the boiler back passes. This arrangement provides a gas stream at a relatively constant temperature even when the boiler is operating at reduced load. Most of the gas stream passes through a proprietary counterflow heat exchange setup and heats the ash (which is metered into the other end of the same system) to near the desired temperature in a few seconds. The remaining gas enters the fluid bed where the ash attains the design temperature and resides for the design residence time. The fluid bed exhaust gas (now containing much of the ammonia originally on the fly ash) joins the gas used for heat exchange and is routed back to

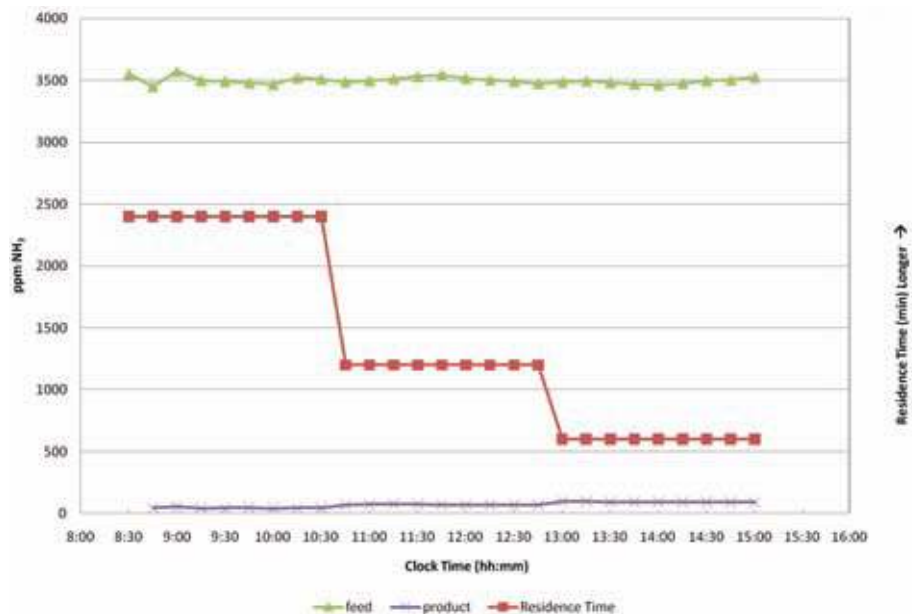


Figure 4: Typical Daily Chart of Pilot Plant Feed and Product Ammonia Content At Design Temperature while Decreasing Residence Time

the boiler just upstream of the SCR. The ammonia in this gas stream reduces the amount of new ammonia the power plant must purchase for use in the SCR.

The fly ash exiting the fluid bed has a very low ammonia content, but is still at bed temperature. A heat exchanger (very similar to the design proven in CBO plants for heat recovery) is used to cool the ash to a temperature acceptable for transport to the existing fly ash silo from which it is loaded into pneumatic tankers for transport to the concrete market.

In summary, utilizing ammonia for SO₃ control and the PMI technology solution

to recover the ammonia and “clean-up” the ash is a win-win-win for the power plant, the ash market, and the environment. The power plant can utilize ammonia for very effective mitigation of “blue plume”. The power plant most likely already has infrastructure for handling ammonia on site for its SCR. The market is assured a continued supply of fly ash with very low ammonia content to sell. Additionally, the environment is preserved by the recycling of fly ash and the well recognized reduction in CO₂ emissions from doing so. Ammonia is recovered from the ash for reuse which greatly reduces the need to manufacture alternatives from virgin feedstocks. ♦


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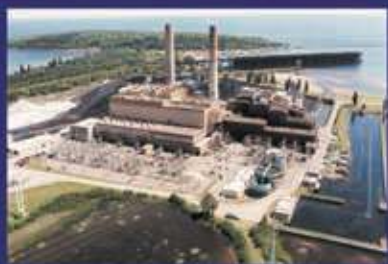


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Patented and built by InBulk Technologies, ISO-Veyors are versatile, intermodal containers for effective transportation, storage and horizontal discharge of Dry Bulk Materials (without need for tipping). Available in a range of configurations, specifications, sizes and materials, they're ideal for all types of cement and CCP's.

The ISO-Veyor has a highly impressive technical specification. Available in mild steel, stainless steel or aluminium, it is also available in either 20ft or 30ft configurations.

ISO-Veyors are discharged by standard 2-barg air supply. They can be used in conjunction with a variety of intermodal infrastructure commonly used for box containers, including Intermodal Transfer Points, Rail Ports, Reach Stackers, Side Lifting Trailers and Cranes.



Intermodal Solution

The future proofed intermodal solution

As the transportation landscape evolves, and the demands of projects change, the ISO-Veyor provides a flexible, cost effective solution.

Road Transportation

The ISO-Veyor can be placed on a skeletal trailer and deployed as a powder road tanker. This combination provides an equivalent to road tankers at a significant cost advantage, with no loss in performance and a small payload difference. Customers utilising ISO-Veyors benefit from driver controlled deliveries, and are able to drop or switch loads without queuing for discharge slots. There's also no requirement for expensive tipping chassis, as ISO-Veyors discharge from a horizontal position.

Rail Transportation

The ISO-Veyor can be placed on a rail car and used in the same way as a powder rail tanker. This delivers great rail economics with all the flexibility of Just-In-Time road deliveries, allowing suppliers, end-users and rail operating companies new opportunities for intermodal rail freight supply.

Sea Transportation

ISO-Veyors are ideally suited for either short or deep sea shipping, in the same way as standard box containers. This allows customers to increase their export reach and widen their geographical radius of supply. ISO-Veyors can be stacked on either container ships or barges.



Benefits

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Used on the ground, the ISO-Veyor becomes a ready-made weatherproof silo, for storage of cement blends to be used for construction or precast projects. This helps to avoid multiple handling and cuts investment in new silo capacity.

Cost Benefits

ISO-Veyors provide the functionality of dedicated powder road or rail tankers – without the expense. Dedicated modal solutions require storage silos to receive the material at either end of the transport chain. ISO-Veyors remove this requirement. Product integrity is ensured as the material itself is not handled until discharge into the final process.

Intermodal Benefits

ISO-Veyors are easy to fill, discharge, and handle. Deliveries of Dry Bulk materials are safe, efficient and secure, as there's no requirement to transfer the material from one modal container to another.

Environmental Benefits

The ISO-Veyor is a closed, sealed system resulting in zero opportunity for pollution or spillage of material during transfers. There's also a greatly reduced chance of accidental discharge into waterways, the atmosphere or other sensitive areas. The balancing of loads between road, rail and sea has a significant effect on air pollution and provides little opportunity for contamination.

Flexibility

ISO-Veyors can be utilised in any transport and storage setting. They offer strategic flexibility as the transportation landscape evolves and projects change.

Safety

As ISO-Veyors can be discharged in a horizontal position, without the need for tipping, this leads to a reduced risk of accidents and represents a major improvement to the safety of on-site deliveries.

Case Study

ISO-Veyors play a crucial part in building the world's longest railway tunnel

When Holcim cement required a special intermodal solution for the transport of cement and binders to remote construction sites, they turned to InBulk's ISO-Veyor for the solution.

Sedrun is a remote holiday town in the heart of the Swiss Alps. It's also the location used to provide materials for the construction of the world's longest railway tunnel. From Sedrun, a supply line runs 800m into the mountain, then a further 800m down. This brings material to the midpoint of the new Gotthard rail link, which will be a staggering 57KM in length when completed in 2016.

The Sedrun site is rail connected via a narrow gauge mountain railway, which carries the ongoing materials needed to build the tunnel. InBulk Technologies are currently supplying PFA ash to the site with a number of 20ft ISO-Veyors carried on small 20ft intermodal flat wagons.

The project highlights just how versatile InBulk's ISO-Veyors can be in serving the most difficult and remote customer locations, giving quality logistics solutions, tailored to the most demanding situations.



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TECHNOLOGIES

ASH UTILIZATION— PORCELAIN GRADE CERAMICS

Low-Quality Fly Ash Transformed Into High-Quality Floor Tiles

By Ross Guenther, General Manager,
Ceramext LLC

High-quality porcelain grade ceramics from coal ash can now be produced using Ceramext technology. A wide variety of fly ash has been successfully used for production, including ash not suitable for concrete production.

Several thousand square feet of tile that have been successfully produced in pilot plants using Ceramext patented and patent pending technologies have been installed in commercial and residential buildings. The strength of this tile exceeds the strength of typical commercial Italian porcelain.

TYPES OF ASH USED

More than 40 types of power plant fly ash have been successfully tested including anthracite, bituminous, lignite and biomass ash, which can make high quality ceramics generally using 100 percent ash. No binders are required. All ashes can be mixed with other ashes or other fine particle wastes such as most mine tailings and quarry fines.

Class C fly ash can be used for producing Ceramext products as well as Class F. With Class C fly ash, the self-cementing properties are often helpful in producing a stable green product prior to firing. The higher alkali contents often contribute to the necessary glass part of the composition at relatively lower temperatures. Class C fly ash often has higher sulfate contents. Using a new patented technology held by Ceramext, LLC, sulfur in the waste materials typically oxidizes and combines with calcium oxide to form anhydrite. Anhydrite cannot react

with water to become softer, unstable gypsum since the stable glassy matrix prevents water from reaching the anhydrite. Almost all potential waste materials tested to date have at least trace amounts of sulfur, with some materials having several percent sulfur that typically react to form anhydrite. The Ceramext® technology thus renders the sulfur in the waste materials inert by essentially locking the contaminant within a stable glassy matrix in the tile. The technology has been used to make strong ceramic products from coal fly ash containing in excess of 20 percent gypsum.

Fly ash that does not qualify for concrete production because of excessive LOI or particle size can be used with Ceramext technology. The unburned carbon in the fly ash is oxidized at about 750 to 800 C for a few minutes prior to hot forging at higher temperatures. If mercury is present with the unburned carbon, it will volatilize at firing temperatures and may have to be collected in conventional retorts or carbon filters; however, the amount of total gaseous emissions and temperatures will be much less than the initial firing at the coal power plant. Particle size, critical for cement use, is not a problem for Ceramext® technology, even for larger ash particles of 200µm. Ash color is not a problem and generally changes upon firing at production temperatures.

PRODUCTION OF CERAMICS FROM FLY ASH

Actual production costs are still being evaluated. Preliminary estimates are that energy costs will be significantly less than conventional ceramic production costs. The green unfired tile is generally heated to about 750 to 800 C to oxidize unburned carbon. It is then raised to higher

temperatures and hot forged in cold dies and then run through an annealing kiln. Then it can be polished, glazed, or left in its existing state, which is preferred by many architects for its visual qualities.

Tile made with this new technology have among the highest breaking strengths for commercial tiles and are essentially impermeable to water, even without glazing. Sulfur and many other contaminants can be rendered inert by locking them within a stable glassy matrix in the tile. The tile can also have the appearance of a variety of natural rock surfaces and can be polished or glazed if desired. Products made of this new composition can include floor, wall and roof tile; building cladding; brick and pavers; and other ceramic products.

The micro-fabric of this new composition provides for a high-strength tile while eliminating undesirable materials from the waste stream. The composition consists of some of the original partly melted fly ash or waste rock fragments (called clasts); glass melted from the clasts; and crystallites formed in the new glass. The strength of the material is increased by using pressure while the material is hot but below the melting point.

The unmelted clasts act much like the aggregate in concrete, with the newly formed glass as the cement binder holding the clasts together and the crystallites further reinforcing the glass itself. Since there is essentially a continuation from the clasts to the glass, there is no significant porosity to contribute to breakage, the release of contaminants from the composition, or the contamination of the composition by external liquids such as water. Initial studies indicate that the technology can enable certain potential

contaminants such as arsenic and lead to be locked up and rendered inert within a stable glassy matrix in the tile.

Actual production costs are still being evaluated; preliminary estimates are that energy costs will be significantly less than conventional ceramic production costs. With a worldwide emphasis to reduce energy consumption and rising energy costs, this should become an even more attractive aspect of the Ceramext technology. Obtaining high-quality clay material to process conventional ceramic tile is costly. A distinct advantage of the Ceramext technology is that it can be situated adjacent to an existing source of waste material that will have a very low or even a negative cost. A modern, fully automated ceramic factory using the Ceramext technology is expected to have capital costs less than a conventional ceramic tile factory.

PRODUCT QUALITY

Many natural rock-type appearances are possible, including rough, polished or honed. Glazing is optional, but can be useful with applications such as cool roof coatings. With a breaking strength of about 1,000 psi and a MOR of about 10,000 psi, the strength of the tile exceeds the strength of typical commercial Italian porcelain.

The tile is essentially impermeable (0.1 to 0.2 percent water absorption), and no sealants are required. The tile also features facial size control of ± 0.03 percent (without grinding) for normal commercial installations, thereby allowing narrow grout joints and precise layouts. In addition, it includes up to 100 percent recycled content and is eligible for LEED credits.

The technology is expected to produce quality ceramic products suitable for marketing at competitive prices. Porcelain-grade floor and wall tile has been produced with a range of earth tone colors. Tile of various colors including white, black, beige and subtle greens can be produced with no additives; the tile color depends on the specific type of fly ash being used. Mineral additives can produce many combinations of natural stone appearances and textures. Glazes in multiple colors can be applied, if desired, and relief designs can also be made.

“With a breaking strength of about 1,000 psi and a MOR of about 10,000 psi, the strength of the tile exceeds the strength of typical commercial Italian porcelain.”

Pavers and landscape stones made using this technology are essentially impervious to water and thus well suited for outdoor use. They are very unlikely to absorb water that might cause them to freeze, crack or break. Roofing and

siding tile produced with the technology are typically stronger and lighter than conventional cement and standard glazed ceramic roofing or siding tile. The tile also has desirable freeze-thaw qualities. ♦

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FLY ASH PLAYS KEY ROLE

IN ENERGY EFFICIENT HEADQUARTERS BUILDING

By Rachel Retterath, Great River Energy





Concrete mixtures for construction of Great River Energy's headquarters building replaced more than 45 percent of the portland cement with coal fly ash. Great River Energy's headquarters was the first commercial building in Minnesota to achieve LEED Platinum status.

Fly ash played an important role in the construction of Great River Energy's energy-efficient and sustainable headquarters in Maple Grove, Minnesota. The four-story, 166,000-square-foot building was awarded Platinum LEED (Leadership in Energy and Environmental Design) certification through the U.S. Green Building Council. This designation is the highest available to buildings that demonstrate energy efficiency and sustainability.

More than 45 percent of the portland cement that would have been used through traditional construction methods was replaced with fly ash from Great River Energy's Coal Creek Station power plant. In a typical concrete mixture 15 to 20 percent of the portland cement can be replaced with fly ash; however, designers found efficient ways to use higher

concentrations of fly ash in the building's columns, foundations and footings.

Fly ash is also in the carpet backing throughout the building.

"The use of Coal Creek Station's fly ash in the concrete and carpet backing was an important factor in the achievement of Platinum LEED certification," said Mike

"For every ton of portland cement produced, nearly one ton of carbon dioxide is emitted. More than 2,000 tons of fly ash was used to replace portland cement in the construction of the Great River Energy headquarters building."

Finley, director, business operations, Great River Energy. "Replacing the portland cement with fly ash also significantly reduced greenhouse gas emissions and waste being sent to landfills."

For every ton of portland cement produced, nearly one ton of carbon dioxide is emitted. More than 2,000 tons of fly ash was used to replace portland cement

in the construction of the Great River Energy headquarters building.

The facility is the first commercial building in Minnesota and one of only a small number in the world to receive Platinum LEED certification. The building adheres to stringent environmental standards, and when compared to similarly sized traditional office buildings Great River Energy's headquarters building:

- Consumes approximately 41 percent less energy.
- Uses 74 percent less water.
- Recycled more than 90 percent of construction waste.
- Produces up to 13 percent of the building's energy needs with an on-site 200-kilowatt wind turbine and 72-kilowatt photovoltaic array.
- Was constructed with recycled and locally manufactured materials.



The work site of Great River Energy's headquarters.

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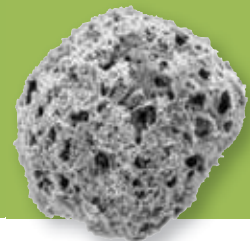
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Designers found efficient ways to use higher concentrations of fly ash in the building's columns, foundations and footings for River Energy's energy-efficient and sustainable headquarters in Maple Grove, Minnesota.

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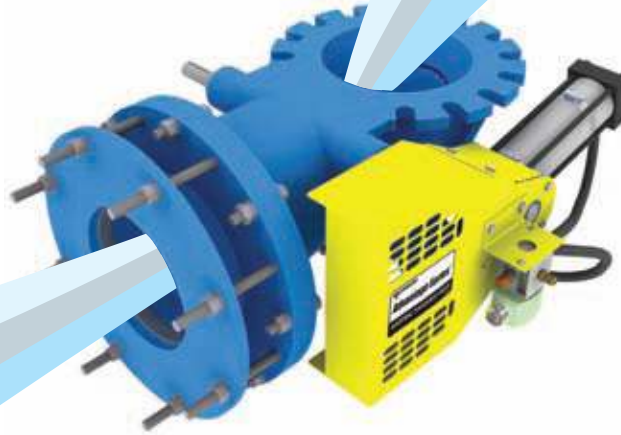
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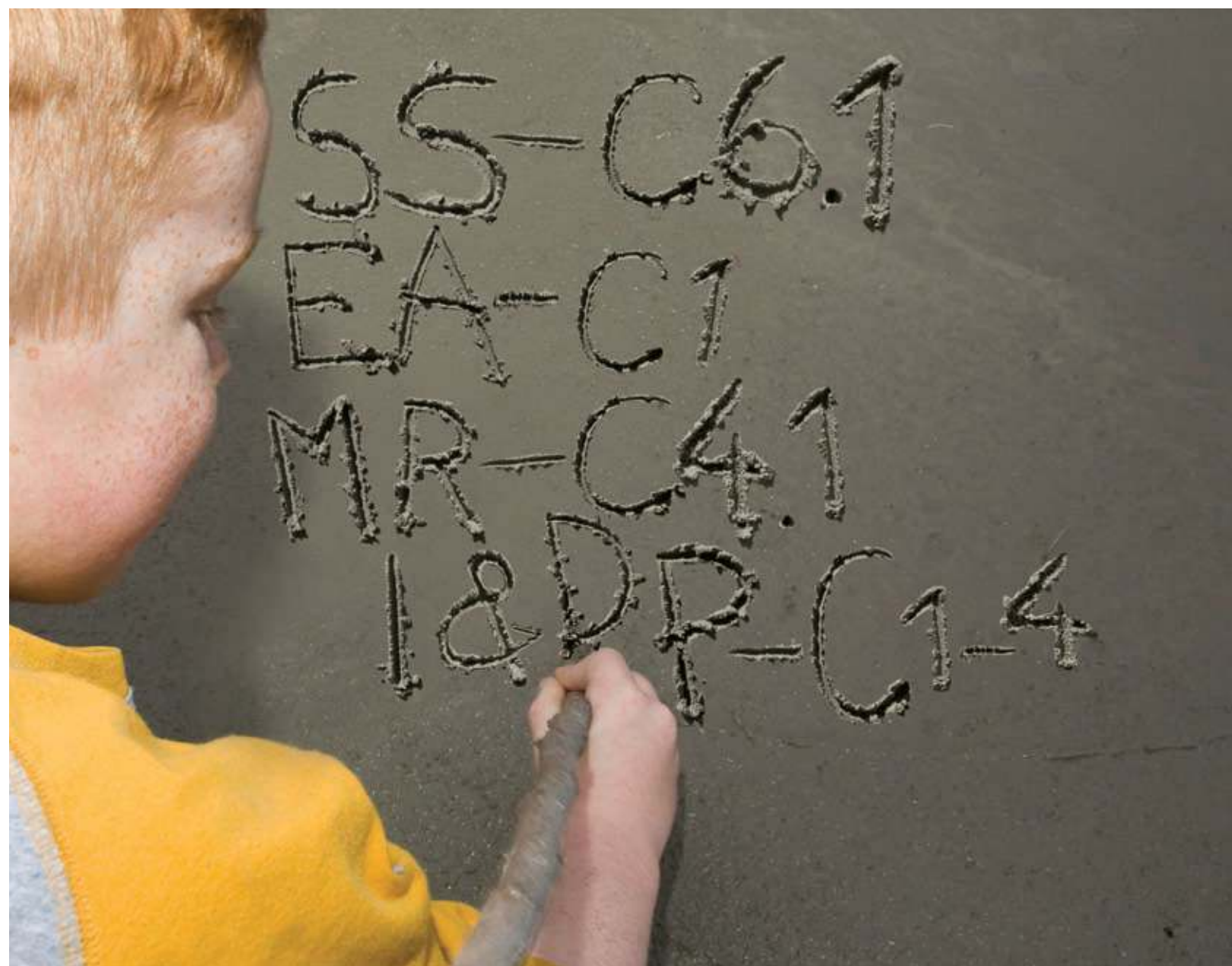
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The American Coal Ash Association achieved a significant increase in membership during 2010, welcoming a total of 30 new members.

New members were added in all membership categories, including Utilities (5), Non-utilities (1), Associates (14), Individuals (8), Marketers (1), and Specialty Marketers (1).

After accounting for members that did not renew, ACAA's total membership grew from 131 members in 2009 to 151 members in 2010 – a 13 percent increase.

“Growth in membership is one key to our success and helps reduce or eliminate future dues increases for the membership,” said Thomas Adams, ACAA Executive Director. “We encourage everyone to reach out to companies and individuals who have not yet joined us. Working together we can continue our steady growth into 2011 and beyond.”

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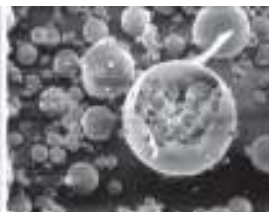
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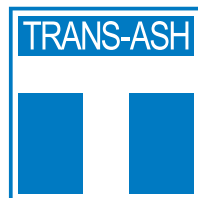
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