Coal Ash Production and Use Survey 2014

News Conference – Washington DC
Thomas H. Adams, ACAA Executive Director

December 15, 2015
American Coal Ash Association

• Founded in 1968
• Headquartered in Farmington Hills, MI
• 160 members – utilities, marketers, contractors, equipment suppliers, consultants, academics
• Active with similar organizations around the world
The mission of the American Coal Ash Association is to encourage beneficial use of CCP in ways that are:

- *environmentally responsible*,
- *technically sound*,
- *commercially competitive*,
- *supportive of a sustainable global community.*
Coal Combustion Products

- **Fly ash** – cement manufacture, concrete products, geotechnical
- **Bottom ash** – aggregate, geotechnical
- **Boiler slag** – roofing granules, blasting grit
- **Flue gas desulfurization gypsum** – wallboard, agriculture
CCP Around the House

- Fly ash – concrete foundations, slabs, counter tops, masonry units, carpet backing
- Bottom ash – masonry units
- Boiler slag – roofing shingles
- FGD gypsum – wallboard
38 Years of Regulatory Effort

- 1976 – Resource Conservation and Recovery Act
- 1980 – Bevill Amendment passed
- 1993 – First Determination by EPA that CCP does not warrant regulation as hazardous waste
- 2000 – Final Determination by EPA that CCP does not warrant regulation as hazardous waste
- 2009 – EPA reopens coal ash rulemaking
- 2014 – EPA Final Rule regulating coal ash disposal as non-hazardous
Subtitle D Consistent with Science

- With few exceptions constituent concentrations in coal ash are below screening levels for residential soils, and are similar in concentration to background US soils.
- Thus, not only does coal ash not qualify as a hazardous substance from a regulatory perspective, it would not be classified as hazardous on a human health risk basis.
- Because exposure to coal ash used in beneficial applications, such as concrete, road base, or structural fill would be much lower than a residential scenario, these uses would also not pose a direct contact risk to human health.
EPA Support for Beneficial Use

- EPA on February 7, 2014, released an exhaustive study re-affirming support for two major uses – fly ash in concrete and FGD gypsum in wallboard:
  - “…environmental releases of constituents of potential concern (COPCs) from CCR fly ash concrete and FGD gypsum wallboard during use by the consumer are comparable to or lower than those from analogous non-CCR products, or are at or below relevant regulatory and health-based benchmarks for human and ecological receptors… **EPA supports the beneficial use of coal fly ash in concrete** and FGD gypsum in wallboard. The Agency believes that these beneficial uses provide significant opportunities to advance Sustainable Materials Management (SMM).” [http://1.usa.gov/1blyP62](http://1.usa.gov/1blyP62)
History of CCP Utilization

- 1990s – Recycling volumes grow from approximately 20 million to 30 million tons
- 2000 – Recycling volume 32.1 million tons as EPA issues Final Regulatory Determination
- 2008 – Recycling volume 60.6 million tons
- 2009-13 – Recycling stalls in face of regulatory uncertainty and misleading publicity regarding safety of coal ash
- 2014 – Recovery begins, led by increases in fly ash utilization for concrete and synthetic gypsum utilization for wallboard and agriculture
### 2014 Production and Use Results

**2014 Coal Combustion Product (CCP) Production & Use Survey Report**

<table>
<thead>
<tr>
<th>Category</th>
<th>Fly Ash</th>
<th>Bottom Ash</th>
<th>Boiler Slag</th>
<th>FGD Gypsum</th>
<th>FGD Material Wet Scrubbers</th>
<th>FGD Material Dry Scrubbers</th>
<th>FGD Other</th>
<th>FBC Ash</th>
<th>CCP Production/Utilization Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total CCPs Produced</td>
<td>50,422,236</td>
<td>12,478,705</td>
<td>2,684,055</td>
<td>54,125,823</td>
<td>12,590,234</td>
<td>275,850</td>
<td>0</td>
<td>13,386,760</td>
<td>129,684,142</td>
</tr>
<tr>
<td>Total CCPs Used</td>
<td>23,181,723</td>
<td>6,063,026</td>
<td>1,705,621</td>
<td>16,750,390</td>
<td>1,163,434</td>
<td>275,850</td>
<td>0</td>
<td>13,386,760</td>
<td>62,427,551</td>
</tr>
<tr>
<td>1. Concrete/Concrete Products/Grout</td>
<td>13,126,020</td>
<td>649,036</td>
<td>0</td>
<td>423,912</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>14,100,960</td>
</tr>
<tr>
<td>2. Blended Cement/Feed for Clincker</td>
<td>3,391,272</td>
<td>1,197,398</td>
<td>0</td>
<td>1,398,298</td>
<td>120,606</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6,017,388</td>
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<tr>
<td>3. Fibreboard Fill</td>
<td>64,794</td>
<td>2,672</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>87,466</td>
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<tr>
<td>4. Structural Fill/Embankments</td>
<td>2,093,515</td>
<td>1,028,482</td>
<td>61,660</td>
<td>1,568,234</td>
<td>211,125</td>
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<td>0</td>
<td>0</td>
<td>6,808,004</td>
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<tr>
<td>5. Road Base/Sub Base</td>
<td>306,868</td>
<td>300,996</td>
<td>12,992</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>686,866</td>
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<tr>
<td>6. Soil Modifications/Stabilization</td>
<td>176,712</td>
<td>720,741</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>893,352</td>
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<tr>
<td>7. Mineral Filler in Asphalt</td>
<td>66,297</td>
<td>137,148</td>
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<td>0</td>
<td>0</td>
<td>0</td>
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<td>0</td>
<td>203,445</td>
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<tr>
<td>8. Snow and Ice Control</td>
<td>0</td>
<td>793,280</td>
<td>201,320</td>
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<td>0</td>
<td>994,600</td>
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<td>9. Blasting Gravel/Flooring Crushed</td>
<td>0</td>
<td>127,114</td>
<td>1,590,820</td>
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<td>0</td>
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<tr>
<td>10. Mining Applications</td>
<td>1,300,095</td>
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<td>0</td>
<td>813,415</td>
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<td>229,780</td>
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<td>12,161,161</td>
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<td>11. Gypsum Feed Products</td>
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<td>0</td>
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<td>11,221,830</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>11,221,830</td>
</tr>
<tr>
<td>12. Waste Stabilization/Soil&lt;liication</td>
<td>210,529</td>
<td>476</td>
<td>0</td>
<td>16,390</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>134,960</td>
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<tr>
<td>13. Agriculture</td>
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<td>1,332,708</td>
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<td>14. Aggregate</td>
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<td>0</td>
<td>181,107</td>
</tr>
<tr>
<td>15. Utility Field Services</td>
<td>512,109</td>
<td>4,398</td>
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<td>46,230</td>
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<td>563,341</td>
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<tr>
<td>16. Miscellaneous Other</td>
<td>976,165</td>
<td>290,565</td>
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<td>43,284</td>
<td>163,428</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1,299,582</td>
</tr>
</tbody>
</table>

**Summary Utilization to Production Data**

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<td>1,706,825</td>
<td>16,390,000</td>
<td>1,763,654</td>
<td>275,850</td>
<td>0</td>
<td>13,386,760</td>
<td>62,427,551</td>
</tr>
<tr>
<td>2014 Consumption (Thousand)</td>
<td>4,962,396</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
These are estimates for entire U.S. utility and IPP sectors calculated by dividing the survey respondents data by the portion of the overall industries coal burn they represent, as reported in the July 2015 EIA Electric Power Monthly (586).
7 Years – Overall Utilization

- 2008 - 44.53% - 60.6 million tons
- 2009 - 44.30% - 55.6 million tons
- 2010 - 41.20% - 52.4 million tons
- 2011 - 43.50% - 56.6 million tons
- 2012 - 47.28% - 51.9 million tons
- 2013 - 44.79% - 51.4 million tons
- 2014 - 48.00% - 62.4 million tons

2012-2014 utilization rates higher in part because of decreases in coal consumption attributed to natural gas competition and regulations closing older power plants.

If 2009-2013 had simply remained equal with 2008’s utilization, we would have seen 26.4 million tons less coal ash deposited in landfills and impoundments.
7 Years – Fly Ash in Concrete

- 2008 - 12.6 million tons
- 2009 - 9.8 million tons
- 2010 - 11.0 million tons
- 2011 - 11.8 million tons
- 2012 - 11.8 million tons
- 2013 - 12.3 million tons
- 2014 - 13.1 million tons
Fly Ash Utilization vs. Economy

Utilization of CCPs has increased during recessions, but dropped during a period of regulatory uncertainty

Figure 2. Regulatory uncertainty led to a decline in CCP markets
2014 Survey – Other Key Findings

• 129.7 million tons of coal combustion products produced in 2014 – up from 114.7 million tons the prior year
• Volume of coal fly ash and bottom ash actually declined from the prior year, reflecting a reduced amount of coal consumed by electric utilities
  • Fly ash production declined nearly 3 million tons to 50.4 million tons
  • Bottom ash production declined nearly 2 million tons to 12.5 million tons
• Overall fly ash utilization in 2014 was about even with the prior year at 23.2 million tons, but the use shifted toward concrete applications, where 1.9 million tons more ash was consumed compared to 2013
• Synthetic gypsum production in 2014 increased 9.7 million tons to 34.1 million tons as emissions control devices were added and operated.
• Use of synthetic gypsum increased 4.8 million tons to 16.8 million tons, driven by increased utilization in wallboard manufacturing and agricultural applications in which the gypsum improves soil conditions and prevents harmful runoff of fertilizers.
Synthetic Gypsum Production & Use

Percent Used (Right Axis)

Produced

Used

American Coal Ash Association
Outlook for Future Supply

- Despite closure of coal-fueled power plants in response to environmental regulations and competition from other energy sources, coal is expected to remain a major source of U.S. electricity.
Forecast for Future Use

- Power plants closing tend to be older, smaller generating units less likely to produce materials suitable for beneficial use without additional processing.
Beneficiation and Reclamation

- Beneficial use industry today is actively developing strategies and technologies for utilizing previously disposed coal ash.