

Perspectives on Health Risks Associated with Beneficial Re-Use of Byproducts of Coal Combustion

Overview

- June 21, 2010 Proposed Rule for Coal Combustion Residuals (CCRs) [draft was available electronically May 4, 2010]
- Coal Combustion Product Partnership (C²P²)
- EPA's testimony in Congress – April 14, 2011
- Risk Evaluations



EPA Defined Beneficial use in the Proposed Rule

- **FR 75(118):35148**

- “EPA continues to believe the Bevill exclusion should remain in place for CCRs going to certain beneficial uses, because of the important benefits to the environment and the economy from these uses, and because the management scenarios for these products are very different from the risk case being considered for CCR disposal in surface impoundments and landfills.”

- **Beneficial Use of CCRs is a use that:**

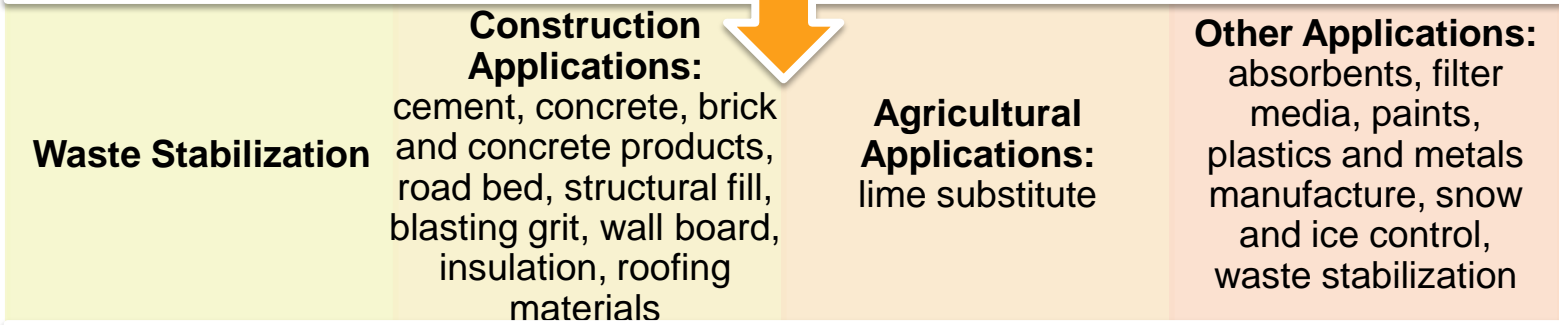
- Provides a functional benefit;
- Replaces the use of an alternative material, conserving natural resources that would otherwise need to be obtained through practices such as extraction; and
- Meets relevant product specifications and regulatory standards (where these are available)

- **The following are not considered beneficial uses:**

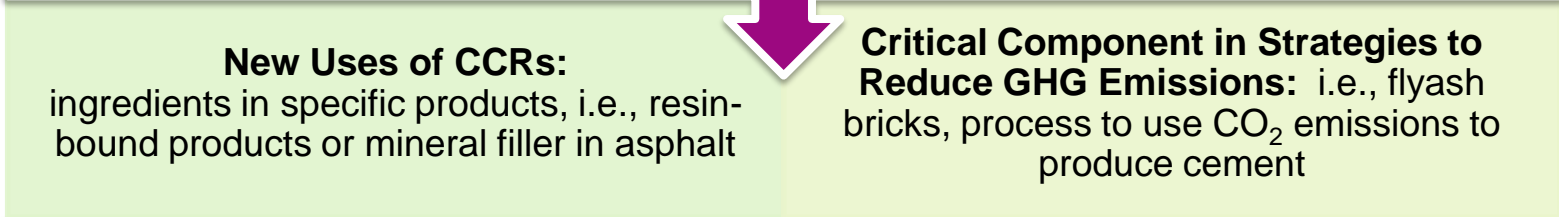
- CCRs that are used in excess quantities (e.g., the field-applications of FGD gypsum in amounts that exceed scientifically-supported quantities required for enhancing soil properties and/or crop yields),
- CCRs placed as fill in sand and gravel pits, or
- CCRs used in large scale fill projects, such as for restructuring the landscape

Proposed Rule Characterization of Beneficial Uses

Beneficial Uses Covered by the EPA May 2000 Determination:



Additional Developments since EPA May 2000 Determination:



Future EPA Expectations

Uses could shift as a results of changes in composition and characteristics due to new air pollution controls

EPA's Future Consideration of Beneficial Use

Future EPA Expectations

“EPA has still seen no evidence of damages from the beneficial uses of CCRs that EPA identified in its original Regulatory Determination.”

Wide acceptance of the use of CCRs in encapsulated uses, i.e., wallboard, concrete, and bricks, because CCRs are bound into the products.

“The Agency believes that such beneficial uses of CCRs offer significant environmental benefits.”

- **The Proposed Rule is essentially an Advanced Notice of Proposed Rulemaking for beneficial uses**
- **The Proposed Rule indicates EPA is considering the following:**
 - Better defining beneficial use
 - Developing detailed guidance on the beneficial use of CCRs
 - Regulate the beneficial use of CCRs under the regulations that apply to “use constituting disposal”
 - Prohibit unencapsulated uses outright, including CCRs used in direct contact with water matrices, including the seasonal high groundwater table
 - Require front-end CCR and site characterization through the use of leach tests adapted for specific uses of CCR, prior to CCR management decisions

- **Coal Combustion Products Partnership (C²P²)**

- The Coal Combustion Products Partnership was created in 2003.
- Cooperative effort between EPA and ACAA, USWAG, DOE, FHWA, EPRI, USDA-ARS
- Goal to “promote the beneficial use of coal combustion products (CCPs) and the environmental benefits that result from their use.”

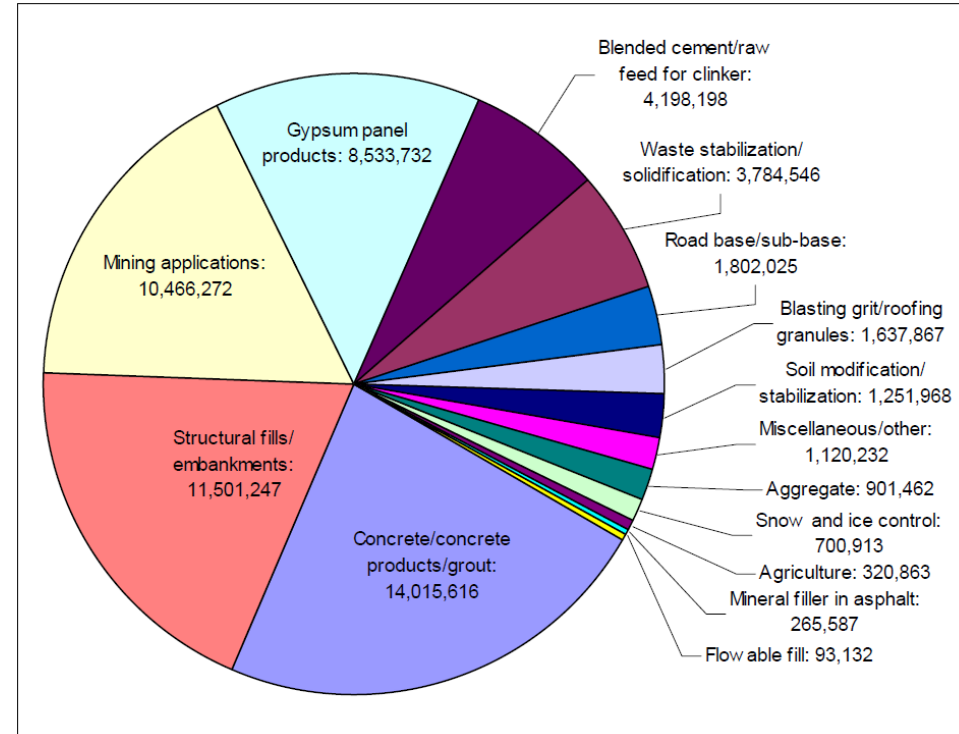
- **Recent Developments**

- May 2010 – EPA placed a disclaimer on the C²P² website that said,
 - “...the Agency has suspended active participation in the Coal Combustion Products Partnership. EPA continues to believe that beneficial use of coal combustion residuals, when performed properly and in a safe manner, is beneficial to the environment.”
- July 2010 – EPA replaced the entire website with the statement: The C²P² program web pages have been removed while the program is being re-evaluated.
- October 13 – EPA Office of Inspector General (OIG) report “Website for Coal Combustion Products Partnership Conflicts with Agency Policies”
 - Because EPA “showed” in the proposed rule that environmental risks and damage are associated with large-scale placement of CCR, and the C²P² website did not disclose this information, and the website gave the appearance of EPA endorsement of commercial products, they recommended suspension of the program.

Recent Developments – cont'd

- March 2011 – EPA OIG Report “EPA Promoted the Use of Coal Ash Products with Incomplete Risk Information”
- “EPA did not follow accepted and standard practices in determining the safety of the 15 categories of CCR beneficial uses it promoted through the C²P² program. EPA’s application of risk assessment, risk screening, and leachate testing and modeling was significantly limited in scope and applicability. Without proper protections, CCR contaminants can leach into ground water and migrate to drinking water sources, posing significant public health concerns.”
- This opens **all** forms of beneficial use to question – and adds to the uncertainty of beneficial use going forward
- “We recommend that EPA define and implement risk evaluation practices for beneficial uses of CCRs, and that it determine if further action is warranted to address historical CCR structural fill applications.”

Figure 1: Beneficial uses of coal ash in 2008



EPA Testimony to Congress

- **Mathy Stanislaus, Asst. Administrator, OSWER, USEPA - Testimony to the House on April 14, 2011**
 - Reiterated that “EPA continues to believe that the Bevill exclusion should remain in place for CCRs that are beneficially used in an environmentally-sound manner. Further, the management scenarios for these materials are very different from the risk case being considered for the disposal of CCRs in landfills and surface impoundments.”
 - However, EPA’s proposal “sought additional information, and requested specific comment on certain aspects of the beneficial use of CCRs including:
 - whether unencapsulated uses of CCRs warrant tighter controls;
 - whether beneficial use guidance is needed to ensure protection of human health and the environment;
 - whether further incentives could be provided to encourage beneficial use of CCRs; and
 - seeking information and on how best to estimate current and future quantities and changes in the beneficial use of CCRs.”

What do we know from risk assessment?

- TVA Kingston evaluations:
 - Studies by the Tennessee Department of Health: The coal ash at the site of the Kingston release “should not have caused harm to the community’s health.” The coal ash and the metals in coal ash have not impacted private well or spring water, the municipal drinking water nor increased particulate matter or metals concentrations in ambient air around the site.
 - Studies by Oakridge National Laboratories: “No adverse health effects were found among those Roane County residents who elected to participate in medical evaluations following the December 2008 fly ash spill at TVA’s Kingston Fossil Plant.”
- ATSDR conducted a risk evaluation of bottom ash used as road grit as part of its Public Health Assessment of Fort Wainwright in Alaska. ATSDR concluded that:
 - The use of the bottom ash as road grit material did not constitute an ingestion hazard for post residents or visitors,
 - The use of the bottom ash for road grit did not cause a drinking water hazard, and
 - The use of bottom ash from the coal power plant did not present an inhalation health hazard for the residents of Fort Wainwright.
 - Report at: http://www.atsdr.cdc.gov/hac/pha/fortwainwright/wai_p5.html

Risk Evaluation – Building Products

- EPRI's risk assessment of mercury in concrete and wall board made with fly ash found:
 - “Using many assumptions that tend to overestimate exposure and toxicity, this risk assessment shows that the mercury in CFA-concrete and FGD gypsum wallboard (both in use and after disposal in a landfill) does not pose a health concern. Moreover, the estimated mercury exposures from concrete and wallboard containing CCPs are at or below levels commonly encountered in indoor and outdoor environments.”

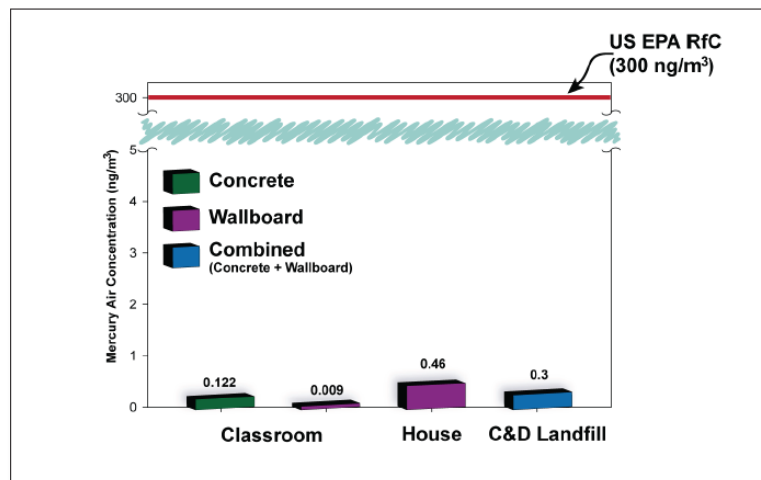


Figure 2: Time-Adjusted Mercury Exposures Compared to US EPA's RfC

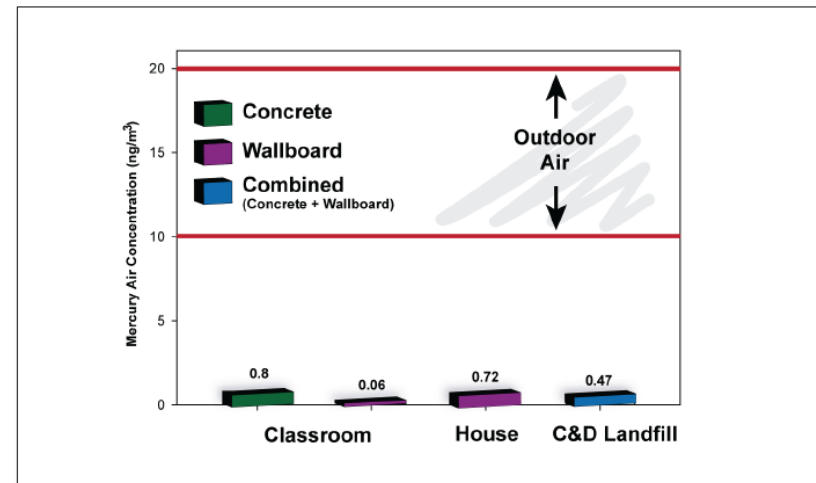


Figure 3: Estimated Indoor and Outdoor Concentrations Compared to Outdoor Background

Source

EPRI, 2009. *Evaluation of Potential Human Health Inhalation Risks from Release of Mercury from Building and Construction Materials Containing Coal Combustion Products*. Report No. 1019016. Available for download at www.epri.com.

FGD Gypsum vs Soil and Fertilizers

- EPRI evaluation has shown that the metals content of FGD gypsum is similar to soils and fertilizers

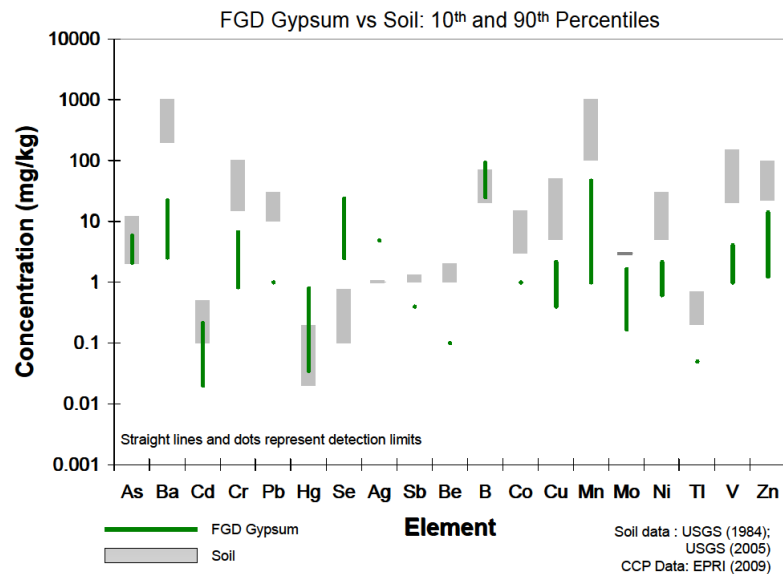


Figure 4-7
Trace element concentration ranges in U.S. soils and FGD gypsum

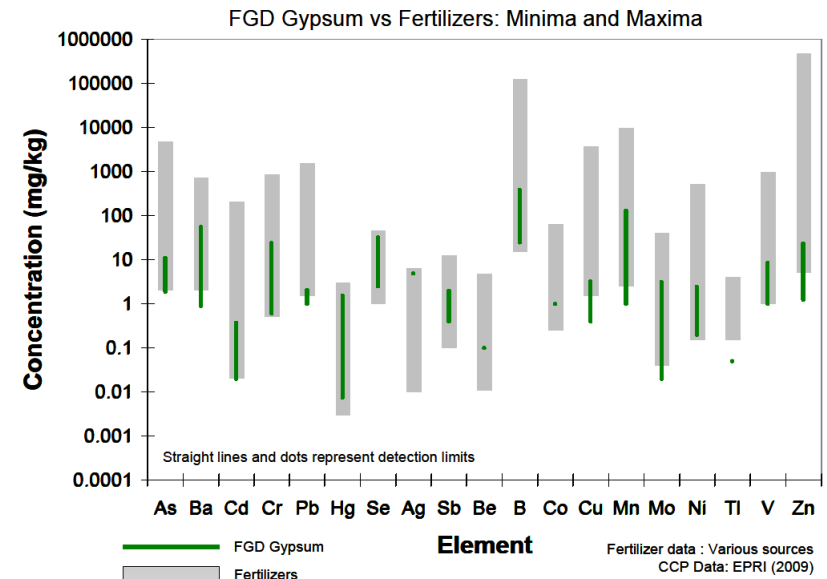


Figure 5-3
Trace element concentration ranges in FGD gypsum and fertilizer compared as minima and maxima

Source

EPRI, 2010. *Comparison of Coal Combustion Products to Other Common Materials – Chemical Characteristics*. Report No. 1020556. Available for download at www.epri.com.

EPA Risk Results – Landfills – Drinking Water

Chemical	90th Percentile HQ or Cancer Risk Value ^b		
	Unlined Units	Clay-Lined Units	Composite-Lined Units
Conventional CCW – 79 landfills			
Cancer			
Arsenic III	4E-04	2E-04	0
Arsenic V	2E-04	3E-05	0
Noncancer			
Antimony	2	0.8	0
Molybdenum	2	0.8	0
Thallium	3	2	0
Codisposed CCW and Coal Refuse – 41 landfills			
Cancer			
Arsenic III	5E-04	2E-04	0
Arsenic V	4E-04	6E-05	0
Noncancer			
Molybdenum	2	0.6	0
Thallium	2	1	0
FBC Waste – 7 landfills			
Cancer			
Arsenic III	3E-05	6E-05	0
Arsenic V	2E-05	2E-05	0
Noncancer			
Antimony	0.8	3	0
Thallium	1	4	0

Chemical	50th Percentile HQ or Cancer Risk Value ^b		
	Unlined Units	Clay-Lined Units	Composite-Lined Units
Codisposed CCW and Coal Refuse – 41 landfills			
Cancer			
Arsenic III	2E-05	6E-06	0

Summary

- While EPA has stated their support for beneficial use, the proposed rule is an ANPR for beneficial use
- The OIG reports have required EPA to develop and implement risk evaluation practices for the 15 categories of beneficial uses of CCRs
- Current information available risk evaluations of CCRs and beneficial uses do not suggest widespread adverse health risks

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