August 18, 2010

United States Environmental Protection Agency
Hazardous Waste Management System;
Identification and Listing of Special Wastes;
Disposal of Coal Combustion Residuals from Electric Utilities Docket,
Attention Docket ID No. EPA-HQ-RCRA-2009-0640
Mailcode: 5305T
1200 Pennsylvania Ave., NW
Washington, DC 20460

RE: **Docket Number EPA-HQ-RCRA-2009-0640, Notice of Proposed Rule for Hazardous and Solid Waste Management System; Identification and Listing of Special Wastes; Disposal of Coal Combustion Residuals from Electric Utilities**

Dear Administrator Jackson:

Public Employees for Environmental Responsibility ("PEER") respectfully submits these comments in response to the Notice of Proposed Rulemaking for Hazardous and Solid Waste Management System; Identification and Listing of Special Wastes; Disposal of Coal Combustion Residuals From Electric Utilities, Docket Number EPA-HQ-RCRA-2009-0640 ("Proposed Rule"). PEER's membership consists of public employees of federal, state, and local environmental and natural resource protection agencies. Additionally, PEER works in support of the public interest, helping to protect the nation's environment and to conserve natural resources.

One of PEER's priorities has been to ensure that coal combustion wastes are managed or used in an environmentally safe manner, and that government efforts to promote so-called "beneficial use" of coal combustion wastes do not benefit the coal industry at the expense of public and environmental health. Our activities in this regard have included investigation into the U.S. Environmental Protection Agency ("EPA")'s promotion of "beneficial use" without demonstrated scientific support for the safety or quantifiable benefits of using coal combustion wastes in building and consumer products, including cosmetics, countertops, and carpet-backing.[1]

Contents

[1] PEER Coal Combustion Waste: News Releases, http://www.peer.org/campaigns/publichealth/coalash/news.php.

1.0 Introduction

The hazards associated with coal combustion wastes ("CCWs")[2] are well-known, as damage cases such as TVA's disastrous ash spill and contaminated drinking water in Pines, Indiana, have shown. We urge strong federally enforceable regulation of coal combustion wastes under Resource Conservation and Recovery Act ("RCRA") Subtitle C regulations. We also urge that reuse (so-called "beneficial use") be regulated under Subtitle C. Without federal enforcement and tracking, even EPA recognizes that "it has been EPA's experience in developing and implementing RCRA regulation and elsewhere that material inevitably flows to less regulated applications,"[3] we urge that reuse of coal combustion waste be banned to prevent

[2] PEER uses the term "coal combustion wastes" interchangeably with the term, "coal combustion residuals," as that term is used in the proposed rule.
[3] Envtl. Protection Agency Proposed Rule: Hazardous and Solid Waste Management System; Identification and Listing of Special Wastes; Disposal of Coal Combustion Residuals from Electric Utilities, 75 Fed. Reg. 35,128, 35,186 (June 21, 2010) (to be codified at 40 C.F.R. pts. 257, 261, 264 et al.).

large-scale sham recycling and use constituting disposal. Of the approximately 136 million tons of coal combustion wastes that were produced by coal fired power plants in 2008, 44% – over 60 million tons – were reused as fill materials, cement and concrete production, wallboard products, snow and ice traction control, mining applications, agriculture, "miscellaneous/other," and a variety of other categories.

Regulation under hazardous waste provisions is needed to protect human health and the environment from the tons of wastes that have been stored in dangerous stockpiles and that will go to disposal each year. Federally enforceable regulation is also needed to ensure that the nearly half of these wastes that are claimed to be reused each year are not able to avoid regulation solely by being directed to sham recycling operations. Unencapsulated uses of coal combustion wastes – including but not limited to any use as structural fill or agricultural applications – are more like disposal than legitimate reuse and should be subject to Subtitle C regulations. Other uses, including so-called "encapsulated" uses such as cement and wallboard, should also be subject to subtitle C regulations because toxics are released during manufacture, use, and disposal or incineration at end of life.

We urge EPA to consider the following comments and to protect the environment by regulating coal combustion wastes destined for disposal or reuse under RCRA subtitle C.

2.0 Coal Combustion Waste Destined for Disposal Should Be Regulated Under Federally Enforceable RCRA Subtitle C Requirements

The Kingston coal ash spill, as well as the proven and potential damages from buried and beneficially used ash used as fill in Pines, Indiana, and at the Battlefield Golf Course, clearly demonstrate the need for strong Federal regulatory oversight of coal combustion waste. These wastes should be regulated under strict, federally-enforceable environmental protections as listed waste under Subtitle C. New air pollution controls mean that more toxics are being removed from air emissions and instead leaving the power plants as solid waste. We need to take the lessons from the proven and potential coal combustion waste damage cases and regulate beneficial uses along with disposal until we are sure that effective measures are in place to adequately protect human health and the environment.

2.1 Newer Air Pollution Controls Are Increasing the Volume and Toxic Content of Coal Combustion Wastes; Data Used to Support Previous Regulatory Determination Is Outdated

EPA expects that due to increasing electricity demand, and the continued dominance of coal-generated electricity production (~45%) in the United States, the quantity of coal combustion wastes produced and available for reuse is also expected to increase.[4] Implementation of newer air pollution control requirements to remove mercury, NOx, and SOx will result in generation of more coal combustion waste byproducts of air pollution control and in more captured mercury. A report published by EPA in December 2009 and included in the docket for this Proposed Rule notes in its discussion of prior research on environmental impact from disposal of CCRs that "most of the existing CCR data are for CCRs prior to implementation of mercury and multi-pollutant controls."[5]

[4] http://www.epa.gov/epawaste/nonhaz/define/pdfs/coal-combust.pdf
[5] D. KOSSON, F. SHANCHEZ, P. KARIHER, L.H. TURNER, R. DELAPP, P. SEIGNETTE, PREPARED FOR SUSAN A. THORNELOE, U.S. ENVTL. PROTECTION AGENCY, OFFICE OF RESEARCH AND DEVELOPMENT NATIONAL RISK

Mercury ("Hg") in the coal that is fed to coal-fired power plants will leave the power plants either in the air emissions stacks or the liquid or solid waste residue. With increasing implementation of mandated improvements to reduce mercury and other pollution to air, more mercury will leave the power plants in the liquid and solid waste residues. One recent article reported that although the Clean Air Mercury Rule (CAMR), which would have required the electric utility sector to remove at least 70% of mercury stack emissions by 2018, has been vacated by the Court, new rules are being worked on and twenty states have implemented their own regulations already.[6]

Efforts to finally reduce mercury emissions to air from power plants must not be circumvented by creating other avenues for release of the captured mercury. In 2005, EPA's Office of Research and Development described interim results from leach testing of coal combustion residuals resulting from facilities utilizing various air pollution controls.[7] The memorandum noted, "Results from two scrubber sludge facilities suggest that leaching of mercury may occur under certain conditions … further evaluation is warranted to understand if the extent of this leaching would pose potential concern … [r]esults for arsenic and selenium indicate that additional evaluation is warranted to determine if there is a potential concern to human health and the environment."[8]

In addition, a recent article in reports that one landfill containing FGD solids mixed with lignitic fly ash released mercury fluxes estimated at about four times higher than surrounding soil.[9] The potential for release of mercury and other constituents of concern provide further support for the most environmentally-protective disposal regulations, including provisions for federal permitting, enforcement, and financial assurance requirements.

2.2 Claims that "Special Waste" Designation Will Create a "Stigma" that Reduces Coal Combustion Waste Reuse Markets Are Misdirected

EPA's preamble states that EPA would be interested in suggestions on methods by which the Agency could reduce any stigmatic impact that might indirectly arise as a result of regulation of CCRs destined for disposal as a "special" waste under RCRA subtitle C.

MANAGEMENT RESEARCH LABORATORY, AIR POLLUTION PREVENTION AND CONTROL DIVISION, CHARACTERIZATION OF COAL COMBUSTION RESIDUES FROM ELECTRIC UTILITIES – LEACHING AND CHARACTERIZATION DATA, EPA-600/R-09/151, 14 (Dec. 2009), available at http://www.regulations.gov/, type in EPA-HQ-RCRA-2009-0640-0329 and click enter.

[6] CONSTANCE L. SENIOR, SUSAN THORNELOE, BERNINE KHAN, DAVID GOSS, FATE OF MERCURY COLLECTED FROM AIR POLLUTION CONTROL DEVICES, JOURNAL OF AIR AND WASTE MANAGEMENT (2009); also available at oaspub.epa.gov/eims/eimscomm.getfile?p_download_id=491053.

[7] Memorandum from Susan Thorneloe, Atmospheric Protection Branch, US EPA National Risk Management Research Laboratory, to Sally L. Shaver, Director, Emissions Standards Division, Office of Air Quality Planning and Standards, Potential for Cross-Media Transfers from management of Mercury-Enriched Coal Combustion Residues (Feb. 18, 2005), available at http://www.regulations.gov, enter EPA-HQ-OAR-2002-0056/6139.

[8] *Id*. at 7.

[9] CONSTANCE L. SENIOR, SUSAN THORNELOE, BERNINE KHAN, DAVID GOSS, FATE OF MERCURY COLLECTED FROM AIR POLLUTION CONTROL DEVICES, JOURNAL OF AIR AND WASTE MANAGEMENT (2009); also available at oaspub.epa.gov/eims/eimscomm.getfile?p_download_id=491053; citing Xin, M.; Gustin, M.S.; Ladwig, K.; Pflughoeft-Hassett, D.F. Air-Substrate Mercury Exchange Associated with Landfill Disposal of Coal Combustion Products, 56 J. Air & Waste Manage. Assoc. (2006) 1167-1176.

PEER submits that coal combustion waste reuse – which has increased to over 60 million tons – in construction, general fill, consumer products, minefill, and agriculture – should have been "stigmatized" previously. The result of EPA and industry effort to promote coal combustion waste reuse and to dismiss concerns about health and safety impacts (or unknowns) has been an unprecedented expansion, with little independent environmental testing, to reuse totaling over 44 percent of the coal combustion waste produced. The coal combustion waste reuse market has expanded to the point where even EPA claims that it may not be aware of all the uses of coal combustion wastes.[10]

Additionally, the so-called stigma concern appears to be an effort to distract EPA from the real issue at hand – the danger posed by 136 million tons of unregulated hazardous waste – in order to help the coal industry avoid federally-enforceable regulation and save money on coal ash disposal. To the extent that any "stigma" might exist, even it the completely unregulated state prior to coal ash regulation, mercury content of coal fly ash has been a concern of green building certification programs for healthy schools and healthcare facilities. The Collaborative for High-Performance Schools ("CHPS") limits "recycled content credits" for use of fly ash to fly ash containing levels of mercury below 11 ppb (or outside of California, less than 5.5 ppb).[11] Similarly, the U.S. Green Building Council's LEED standard for Healthcare facilities allowed coal fly ash substituted for Portland cement to qualify for recycled content if the mercury content was no greater than 2 ppb and the coal ash did not come from plants also burning municipal or hazardous waste.[12] These standards were set before EPA proposed to regulate coal combustion waste as hazardous and were based on the toxic content of the fly ash. In other words, the standards were set based on the actual tested content of particular sources of coal ash and were implemented regardless of the fact that EPA was marketing coal ash as a "valuable commodity."

In May 2008 – well before proposals to regulate disposed coal combustion wastes as hazardous wastes – the U.S. Department of Energy (DOE) National Energy Technology Laboratory (NETL) studied the economics of enhanced flu gas desulfurization (FGD) mercury capture and noted that with "increased public awareness of and concern about Hg, the notion that FGD gypsum contains 'increased' levels of Hg could significantly dampen or destroy the market for FGD materials."[13] Thus, any impacts due to "stigma" should be attributed as a cost of implementing congressionally mandated clean air controls rather than costs associated with this rulemaking. The solution to preventing "stigma" should not be save the industry money because of a fear of limiting an existing stream of revenue for coal fired utilities.

Failing to regulate a high volume hazardous waste stream that is growing and getting more toxic because of industry-generated concern about coal ash markets is missing the point – the purpose of the regulation is to protect human health and the environment by regulating hazardous waste from cradle to grave.

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[10] Proposed Rule at 35,163 ("Of particular concern in this regard are reports that CCRs are being used in producing counter tops, bowling balls, and in the production of makeup.")

[11] *Groups Set Mercury Limits for Flyash in Concrete*, ENVTAL. BUILDING NEWS, Sept. 2008, *available at* http://www.buildinggreen.com/auth/article.cfm/2008/8/28/Groups-Set-Mercury-Limits-for-Flyash-in-Concrete/.

[12] *Id.*

[13] Andrew P. Jones, Research and Development Solutions, LLC, and Thomas J. Feeley, III, U.S. Department of Energy, National Energy Technology Laboratory, DOE/NETL's Mercury Control Technology Field Testing Program: Preliminary Economic Analysis of Wet FGD Co-Benefit Enhancement Technologies 27 (May 2008), available at http://www.netl.doe.gov/energy-analyses/pubs/Enhanced%20FGD%20Hg%20Capture%20Economics%20FINAL%20May2008.pdf.

Additionally, stringent federal regulation for coal ash that tracks storage, transportation, and disposal and that applies across state lines will help prevent a "race to the bottom" and ensure that EPA failure to regulate does not contribute to disproportionate impacts to communities with less state oversight or less consistent state enforcement.

3.0 Coal Combustion Wastes Reuse – So-Called "Beneficial Use" -- Should Also Be Regulated; Reuse Should Be Prohibited Waste- and Site-Specific Regulations Are in Place to Ensure Toxics Are Not Released During Manufacture, Use, or End of Life

RCRA was designed as a preventive regulation to avoid unsafe waste management practices by regulating hazardous wastes from cradle-to-grave. EPA's preamble describes a system of coal combustion waste management that would regulate waste only from cradle to consumer. As the proven and potential damage cases in Pines, Indiana, Battlefields Golf Course, or excess waste used to fill sand and gravel quarries make obvious, the "unencapsulated" use of coal combustion waste as large scale fill, road base, or application to the water table in sand and gravel quarries and minefills pose dangers to water sources and should be regulated as disposal under Subtitle C. Similarly, uses that EPA calls "encapsulated" should also be regulated, because toxics are released during product manufacture, use, or at end of life when the recycled coal ash is ultimately disposed or recycled. Without regulation, utilities looking to save money can say virtually any use of coal combustion wastes is "recycling" and thereby avoid tracking and permitting regulations for storage, transport, spills, and ultimate disposal.

Recent EPA research has noted that fly ash and FGD residues are coal combustion residues "with the potential to have increased mercury and/or other pollutant concentrations from the implementation of new air pollution control technologies … [t]he chemical and physical properties may also change as a result of sorbents and other additives being used to improve air pollution control."[14] Allowing increasing quantities of increasingly mercury-containing wastes to avoid regulation by being placed into consumer products undercuts efforts to reduce mercury. Ignoring potential cross-media transfers of mercury also runs counter to the strategy EPA developed to reduce health risks associated with mercury exposure.[15]

Moreover, without federal regulation, EPA relies on industry voluntary data to estimate volumes of coal combustion waste generated and reused each year.[16] The industry association acknowledges that the data may be incomplete.[17] EPA should regulate coal combustion wastes destined for reuse in order to have a means of tracking and accounting for the over 60 million tons that are reused in the United States each year. If the wastes destined for reuse continue to be exempted from regulation, citizens will have to continue to rely on industry's aggregated voluntarily reported data to find out how much of the coal combustion wastes are used in agriculture, ice control, cement, and other uses each year.

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[14] Susan Alice Thorneloe-Howard, U.S. Envtl. Protection Agency, Evaluating the Thermal Stability of Mercury and Other Metals in Coal Combustion Residues Used in the Production of Cement Clinker, Asphalt, and Wallboard, EPA/600/R-09/152, at 1-2 (2009), available at http://www.epa.gov/nrmrl/pubs/600r09152/600r09152.pdf, last accessed June 15, 2010.

[15] U.S. ENVTL. PROTECTION AGENCY, EPA'S ROADMAP FOR MERCURY, EPA-HQ-OPPT-2005-0013 (2006), http://www.epa.gov/mercury/pdfs/FINAL-Mercury-Roadmap-6-29.pdf.

[16] Proposed Rule at 35,172.

[17] ACAA 2007 Coal Combustion Product (CCP) Production and Use Survey Results Revised (2008), http://www.acaa-usa.org/displaycommon.cfm?an=1&subarticlenbr=3 (follow link for ACAA 2007 CCP Report). ("**Note 3:** Response to this survey is voluntary. Not all utilities respond, respond every year or respond with all requested data. Thus, actual production and usage numbers received may vary from year to year. When significant inconsistencies occur, such data is footnoted.")

Federal standards are also needed because coal combustion wastes can be produced across state lines from point of use, resulting in duplication of effort and difficulty as states, industries, and end-users distinguish between a patchwork of criteria and facility-specific impacts to coal combustion wastes. This patchwork could result in a flow of materials that are off-spec in one place to a location with less stringent requirements. Uniform regulation of reuse will ensure that sham recycling does not disproportionately impact some communities, as well as ensure that there are federal mechanisms in place to track generation of wastes and to enforce against use in a manner constituting disposal.

3.1 Characterization of These Wastes Has Failed to Keep Up With Changes to Air Pollution Controls that Increase Contaminants in the Wastes

An EPA study published in December 2009 noted,

> "Coal-fired power plants are the largest remaining source of anthropogenic mercury emissions in the U.S. Power plants are also a major source of nitrogen and sulfur oxides, particulate matter, and carbon dioxide. New environmental regulations in the U.S. will result in lower mercury air emissions. However, the mercury and other pollutants are transferred from the flue gas to fly ash and other air pollution control residues.
>
> "The Clean Air Mercury Rule (CAMR) would have required the electric utility sector to remove at least 70% of the mercury released from power plant stack emissions by 2018. CAMR was vacated by [the court] in 2008. EPA is currently developing regulations under Section 112 of the Clean Air Act to reduce hazardous air pollutants (including mercury) from coal-fired power plants. Twenty states have implemented their own mercury regulations already … [o]ther EPA regulations will necessitate the addition of new air pollution control devices for NOx and SO_2 at some power plants. This can also affect the fate of mercury and other [constituents of potential concern].[18]

A Materials Characterization of Coal Combustion Residuals prepared by EPA in support of another proposed rulemaking in April, 2010, included the following in a list of "impacts of CCRs use":

> "One health risk issue currently gaining attention in the use of fly ash in high heat applications such as cement manufacture. When exposed to elevated temperatures (approximately 2,750 degrees Fahrenheit) in a cement kiln, laboratory experiments have found that mercury is readily released from fly ash (Plufhoeft-Hasset et al. 2007). At this time, the level of mercury in fly ash has not been significant to create a health risk. However, as coal utilities increasingly employ mercury capture technologies, some facilities may implement technologies that result in

[18] SUSAN THORNELOE-HOWARD, U.S. ENVTL. PROTECTION AGENCY, EVALUATING THE THERMAL STABILITY OF MERCURY AND OTHER METALS IN COAL COMBUSTION RESIDUES USED IN THE PRODUCTION OF CEMENT CLINKER, ASPHALT, AND WALLBOARD, EPA/600/R-09/152 at 1-1, (2009), http://www.epa.gov/nrmrl/pubs/600r09152/600r09152.pdf.

> fly ash with much higher mercury content that is not suitable for use in cement manufacture."[19]

An article in *Environmental Health Perspectives* recently reported, "depending on the mercury removal technique used, the amount of mercury in the fly ash rises by up to 184 times, according to tests reported by Amy Dahl of Frontier GeoSciences at the 2008 MEGA Symposium, a meeting sponsored by the EPA, the Department of Energy, the Electric Power Research Institute, and the Air & Waste Management Association.[20]

EPA, DOE, and trade groups have acknowledged that newer air pollution controls will change the nature of air pollution control residues and shift mercury from air emissions toward air pollution control residues such as fly ash and FGD gypsum.[21] In 2009, EPA's Office of Research and Development published the third in a series of reports examining the changes to coal combustion residuals resulting from newer air pollution controls and resulting changes in potential for cross media transfer of constituents of potential concern from CCRs.[22] EPA has plans to assess leaching of "constituents of potential concern" from applications including "beneficial use on the land" in a future report.[23]

The potential impacts of mercury controls on coal fired power plants is unknown and EPA's Atmospheric Protection Branch of the Office of Research and Development is still conducting research to characterize coal combustion wastes generated in facilities with mercury controls.[24] In particular, EPA has stated a need for further analysis of potential mercury release from coal combustion residuals with increased levels of mercury and other metals for "the variety of beneficial uses currently in place (e.g. wall board, cement, asphalt, soil amendment)."[25] Additionally, analysis is still being performed to characterize the wastes and to assess whether mercury is released in some reuse applications.

Thus, the data EPA used to make its May 2000 regulatory determination is no longer representative of the waste stream. EPA needs to reverse the Bevill determination for wastes being reused until new studies have been conducted, results evaluated, risks and benefits weighed, and regulations promulgated for determination of waste- and site-specific reuse applications.

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[19] U.S. ENVTL. PROTECTION AGENCY, MATERIALS CHARACTERIZATION PAPER IN SUPPORT OF THE PROPOSED RULEMAKING – IDENTIFICATION OF NONHAZARDOUS SECONDARY MATERIALS THAT ARE SOLID WASTE: COAL COMBUSTION RESIDUALS – COAL FLY ASH, BOTTOM ASH, AND BOILER SLAG at 7 (April 5, 2010), http://www.epa.gov/epawaste/nonhaz/define/pdfs/coal-combust.pdf.

[20] David J. Tenenbaum, *Trash or Treasure: Putting Coal Combustion Waste to Work*, 117 Envtl. Health Persps, A490, http://ehp03.niehs.nih.gov/article/fetchArticle.action?articleURI=info:doi/10.1289/ehp.117-a490.

[21] Constance L. Senior, Susan Thorneloe, Bernine Khan, David Goss, Fate of Mercury Collected From Air Pollution Control Devices, Air and Waste Management (July 2009); also available at oaspub.epa.gov/eims/eimscomm.getfile?p_download_id=491053.

[22] D. KOSSON, F. SHANCHEZ, P. KARIHER, L.H. TURNER, R. DELAPP, P. SEIGNETTE, PREPARED FOR SUSAN A. THORNELOE, U.S. ENVTL. PROTECTION AGENCY OFFICE OF RESEARCH AND DEVELOPMENT NATIONAL RISK MANAGEMENT RESEARCH LABORATORY, AIR POLLUTION PREVENTION AND CONTROL DIVISION, CHARACTERIZATION OF COAL COMBUSTION RESIDUES FROM ELECTRIC UTILITIES – LEACHING AND CHARACTERIZATION DATA, EPA-600/R-09/151 (Dec. 2009), http://www.regulations.gov/, type in EPA-HQ-RCRA-2009-0640-0329 and click enter.

[23] *Id*. at 4.

[24] U.S. Envtl. Protection Agency Office of Research and Development Atmospheric Protection Branch Mercury Non-Combustion Research, http://www.epa.gov/appcdwww/apb/mercury.htm.

[25] *Id.*

The changing nature of coal combustion wastes and variability in waste management scenarios mean that the decades old data that EPA and others rely on to assert the safety of some coal combustion waste uses needs to be updated. Pulling the toxics out of the air emissions from coal-fired power plants is a necessary step to protecting public health, but the benefits may be lost if the toxics are just recycled back into the environment in another form. Ultimately, continuing to promote recycling of these wastes subsidizes a dirty industry at the expense of public health.

3.2 "Encapsulated" Uses Should Be Prohibited Unless Regulations Are in Place to Prevent Release of Mercury and Other Toxics during Product Manufacture, Use, and End-of-Life

EPA states in the preamble that it is "proposing [not to reconsider the regulatory determination regarding "beneficial use"] in recognition that some uses of CCRs, such as encapsulated uses in concrete, and use as an ingredient in the manufacture of wallboard, provide benefits and raise minimal health or environmental concerns."[26]

PEER disagrees with EPA's broad assertion that "encapsulated" uses of coal combustion waste in concrete or as wallboard ingredient "raise minimal health or environmental concerns." (PEER also disagrees with EPA's assertion that reusing coal combustion wastes is beneficial. See below.)

Research has shown that some so-called encapsulated uses of coal combustion wastes particularly use in high temperature manufacturing processes – such as raw feed to cement kilns or as ingredient in FGD wallboard – release mercury to the environment. According to industry data, gypsum panel projects accounted for over 8 million tons – or about 14% of FGD gypsum reuse – in 2008.[27] Over 4 million tons of FGD gypsum, fly ash, and bottom ash were used in blended cement/raw feed for clinker.[28] In the case of fly ash as raw ingredient in cement, the temperatures may be high enough to result in complete volatilization and release to the atmosphere of all of the mercury in the coal combustion waste.

Mercury is a persistent, bio-accumulative, and toxic pollutant and any additional release of mercury to the atmosphere can hardly be considered of "minimal health or environmental concern." EPA has targeted mercury for agency-wide strategic action to reduce release and prevent exposure. EPA should ensure that regulations – or special reuse exemptions from regulation – do not result in cross media transfers of mercury. In this case, removal of mercury from coal fired power plant air emissions should not be undercut by allowing mercury to instead be released from less stringently regulated cement kiln air or waste streams.

Even assuming (based on the industry-generated data that EPA often relies on in its promotional materials for coal ash reuse) that toxics are "bound" in some products and not volatilized or leached during the useful life of the product, there are still significant points of potential emission and worker exposure during manufacture (e.g. dust and releases during storage or transportation, spills, and volatilization of toxics subject to higher heat processing), during installation (e.g. cement mixing and curing, calcination of drywall during manufacture, or cutting drywall during installation, etc.) or end of life (e.g. demolition, concrete grinding,

[26] Proposed Rule at 35,160.
[27] American Coal Ash Association 2008 Coal Combustion Product (CCP) Production and Use Chart, http://acaa.affiniscape.com/associations/8003/files/2008_ACAA_CCP_Survey_Report_FINAL_100509.pdf.
[28] *Id*.

drywall disposal, used carpet incineration, etc.) that should be regulated to prevent release of hazardous constituents from the wastes.

EPA's air pollution research branch has identified concerns about potential for cross-media transfers of mercury due to potential leaching of mercury and other metals from coal combustion wastes not only from land disposal, but also when coal combustion residues are used to make products. In a 2005 memo, EPA's National Risk Management Laboratory specifically identified concerns about the fate of mercury when CCRs were used to make products – including high temperature processes – and when products containing CCRs were ultimately disposed of – as in when wall board is disposed of in unlined landfills.[29] The memorandum also noted that the EPA researchers were working with the Electric Power Research Institute, the Department of Energy, and others, to obtain additional CCRs to represent a "likely range of coal type and air pollution control configuration combinations that are expected in response to anticipated mercury or multi-pollutant control requirements."[30]

Because of variability in coal combustion wastes due to different coal feedstock (containing varying amounts of contaminants), air pollution controls, and byproduct handling systems, EPA should put regulations in place to ensure that hazardous wastes do not flow to unregulated reuse sectors. EPA should reverse the regulatory determination for waste reuse. Updated characterization of each waste stream (i.e. fly ash, bottom ash, FGD gypsum, etc.) must be completed and any future determination on reuse must rely on data that is more reflective of new air pollution controls, waste volumes, coal sources, and site-specific reuse applications and rates.

a. High Heat Used to Manufacture Products – Particularly Cement Clinker and Drywall -- Will Volatilize and May Release Mercury, Arsenic, Selenium, Lead, and Other Pollutants

According to a recent study, "Virtually all mercury will be volatilized when [coal combustion residuals) are used as a feedstock to cement kilns as the result of high operating temperatures (1450ºC)."[31] "The results [of a laboratory simulation of cement clinker production] indicate that all of the As, Se and Pb are volatilized as a result of the high temperatures (1450ºC) …[w]ith potential changes in air pollution control at cement plants, there will be less Hg and other metals being emitted. However, these metals will be retained in the cement kiln dust and the air pollution control residues [of the cement kiln].

Ensuring that these metals are not later released based on how the air pollution control residues (FGD gypsum and cement kiln dust) are managed, requires additional research to evaluate the potential leaching of Hg and other metals for the conditions that the residues are managed. Currently there are no federal requirements for lining of landfills used for cement kiln

[29] Memorandum from Susan Thorneloe, Atmospheric Protection Branch, US EPA National Risk Management Research Laboratory, to Sally L. Shaver, Director, Emissions Standards Division, Office of Air Quality Planning and Standards, Potential for Cross-Media Transfers from management of Mercury-Enriched Coal Combustion Residues (Feb. 18, 2005), available at http://www.regulations.gov, enter EPA-HQ-OAR-2002-0056/6139.
[30] *Id*. at 6.
[31] Senior, Constance L., Susan Thorneloe, Bernine Khan, David Goss, Fate of Mercury Collected From Air Pollution Control Devices, Journal of Air and Waste Management, July 2009; also available at oaspub.epa.gov/eims/eimscomm.getfile?p_download_id=491053.

dust disposal. In addition, some sites are using cement kiln dust in engineering and commercial applications."[32]

Pending assurance that new regulations on cement kiln air emissions or waste streams are in place, coal combustion wastes should be prohibited from use in cement kilns. Capturing mercury and other pollutants from coal power plant emissions does not reduce net mercury air emissions if the contaminant-containing coal combustion wastes are burned in another type of plant with less stringent controls.

Problems with cement

After finding high levels of mercury in the soil and wildlife surrounding Lafarge North America's cement plant in Ravena, New York, the state announced in October 2009 that the Ravena cement plant would be prohibited from using fly ash.[33] The plant used between 30,000 and 60,000 tons of coal ash a year. It has been reported that although fly ash is less than 2% of the kiln mixture, in 2008 it caused more than 10% of the plant's mercury emissions on average, emissions Lafarge, with one of four tests showing that the ash accounted for 19% of the plant's mercury emissions.[34] The same report cites industry figures that show cement kilns have increased use of fly ash from about 1 million tons in 2001 to more than 4 million tons in 2006.

Allowing the coal fired utility air pollution control solid waste byproduct to be transported and burned in another industry is not resulting in overall removal of mercury from the atmosphere. Cement kiln byproducts will also need to be disposed. Currently, landfills disposing of cement kiln dust do not have federally imposed requirements for liners. Allowing the unrestricted use of coal combustion residues as raw feed in cement kilns may negate the environmental benefits of regulating mercury emissions from coal fired power plants as well as any environmental benefit from regulating coal combustion waste disposal. Essentially, sending the coal combustion wastes to be used to produce clinker in cement kilns means that you have captured the mercury from the coal fired power plant and prevented the coal fired power plant from disposing of the resulting air pollution control byproduct in an unsafe way, only to ultimately transfer the captured mercury to less stringently regulated air emissions or waste streams of cement kilns.

Currently there are no federal requirements for lining landfills used for cement kiln dust disposal. Recent research from the EPA Office of Research and Development also raises questions about the thermal transport of mercury from cement, asphalt, and wallboard manufacture.[35]

Communities should not have to wait for individual state action to remove this source of mercury from air emissions; EPA should prevent nationwide transfer of coal combustion wastes to cement plants.

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[32] SUSAN ALICE THORNELOE-HOWARD, U.S. ENVTL. PROTECTION AGENCY, EVALUATING THE THERMAL STABILITY OF MERCURY AND OTHER METALS IN COAL COMBUSTION RESIDUES USED IN THE PRODUCTION OF CEMENT CLINKER, ASPHALT, AND WALLBOARD, EPA/600/R-09/152, at 4-1, (Dec. 2009), http://www.epa.gov/nrmrl/pubs/600r09152/600r09152.pdf.

[33] http://ehp03.niehs.nih.gov/article/info:doi%2F10.1289%2Fehp.117-a498>

[34] Brian Nearing, Paterson bottling up mercury ban at plant, TimesUnion, May 22, 2010, available at http://www.timesunion.com/ASPStories/Story.asp?storyID=933617&newsdate=5/26/2010&BCCode=MBTA.

[35] SUSAN ALICE THORNELOE-HOWARD, U.S. ENVTL. PROTECTION AGENCY, EVALUATING THE THERMAL STABILITY OF MERCURY AND OTHER METALS IN COAL COMBUSTION RESIDUES USED IN THE PRODUCTION OF CEMENT CLINKER, ASPHALT, AND WALLBOARD, EPA/600/R-09/152, (Dec. 2009), http://www.epa.gov/nrmrl/pubs/600r09152/600r09152.pdf.

Problems with FGD gypsum wallboard manufacture

Around 33% of the gypsum used to make U.S. wallboard in 2008 was FGD gypsum. ACAA reported that over 8.5 million tons of FGD gypsum was used in gypsum panel products in 2008.[36] This number may grow; a representative for the Gypsum Association recently noted, "Only cutbacks in construction due to the recession have prevented the use of even more FGD gypsum.[37,38] According to a recent article published in *Air & Waste Management* magazine, the "best data available for thermal stability during wallboard production are from a study of five wallboard plants where a mercury mass balance was attempted."[39] The study reported "wide variation in mercury loss (2 to 55%) from seven FGD samples [that was] attributed to the different conditions under which each gypsum sample was generated … This variability included coal type, [air pollution control] configuration, and purge rate of fine gypsum particles. …Any remaining mercury in the finished FGD-wallboard could be released during use or subsequent disposal or recycling of the wallboard."[40] Results from another laboratory simulation showed that temperatures in wallboard processes were too low to volatilize the arsenic, selenium, or lead (suggesting that non-Hg metals are retained in wallboard during production), while potential mercury loss during production was 9 to 48%.[41]

The Pharos Project[42] recently reported compared 2008 Toxics Release Inventory data from U.S. wallboard manufacturers and reported that the analysis revealed was a "direct correlation between substantial mercury releases to the environment and the use of synthetic gypsum."[43] Pharos acknowledged that renewable or recycled content building products, but added, "specifiers should consider this positive [recycled content] in the context of the common presence of mercury in the synthetic gypsum production life cycle."[44] Pharos added, "These synthetic gypsum wallboard plants represent a secondary release point for coal-fired power plants' mercury emissions. The FGD units capture mercury from coal. Wallboard production using synthetic gypsum then redistributes the mercury into the wider environment at the

[36] American Coal Ash Association 2008 Coal Combustion Product (CCP) Production and Use Chart, http://acaa.affiniscape.com/associations/8003/files/2008_ACAA_CCP_Survey_Report_FINAL_100509.pdf.
[37] David J. Tenenbaum, *Trash or Treasure: Putting Coal Combustion Waste to Work*, 117 Envtl. Health Persps, A490, http://ehp03.niehs.nih.gov/article/fetchArticle.action?articleURI=info:doi/10.1289/ehp.117-a490.
[38] The percent of gypsum wallboard made with FGD, or synthetic, gypsum has trended up. (In 2007, synthetic gypsum accounted for approximately 28% of gypsum used annually by wallboard manufacturers in the United States. GYPSUM ASSOCIATION, GYPSUM ASSOCIATION COMMENTS ON IMPORTED CHINESE DRYWALL 2 (2009), http://www.gypsum.org/pdf/Gypsum_Association_Comments_on_Chinese_Wallboard_Issue.pdf .)
[39] Senior, Constance L., Susan Thorneloe, Bernine Khan, David Goss, Fate of Mercury Collected From Air Pollution Control Devices, Journal of Air and Waste Management, July 2009; also available at oaspub.epa.gov/eims/eimscomm.getfile?p_download_id=491053; citing SANDERSON, J.; BLYTHE, G.M., FATE OF MERCURY IN SYNTHETIC GYPSUM USED FOR WALLBOARD PRODUCTION: FINAL REPORT, US DOE/NETL Cooperative Agreement No. DE- FC26-04NT42080 (June 2008).
[40] *Id.*
[41] SUSAN ALICE THORNELOE-HOWARD, U.S. ENVTL. PROTECTION AGENCY, EVALUATING THE THERMAL STABILITY OF MERCURY AND OTHER METALS IN COAL COMBUSTION RESIDUES USED IN THE PRODUCTION OF CEMENT CLINKER, ASPHALT, AND WALLBOARD, EPA/600/R-09/152, 4-2 (2009), available at http://www.epa.gov/nrmrl/pubs/600r09152/600r09152.pdf.
[42] "The Pharos Project seeks to define a consumer-driven vision of truly green building materials and establish a method for evaluation that is in harmony with principles of environmental health and justice. The Project's foundation is a partnership, pairing those who use building materials with those who study the products' impacts on health and the environment," http://www.pharosproject.net/about/index/
[43] Jim Vallette, Mercury Contamination of Drywall, http://www.pharosproject.net/index/blog/mode/detail/record/40/mercury-contamination-drywall
[44] http://www.pharosproject.net/index/blog/mode/detail/record/40/mercury-contamination-drywall

production site, through the board itself.[45] Pharos also noted that there is some mercury present in mined gypsum, but that a U.S. Department of Energy funded study (conducted by U.S. Gypsum) concluded "the highest mercury concentration found in the natural gypsum was 0.03 μg / g compared to the lowest mercury concentration of synthetic gypsum of 0.10 μg / g."[46]

A recent EPA publication also describes the results of a study of release of metals from a simulation of asphalt manufacture.[47] While the simulation results indicated that non-Hg metals were retained in the samples after exposure and several samples showed "minimal volatilization" of mercury, one facility showed "significant loss of Hg into the gas-phase as a result of exposure to the asphalt manufacturing conditions. [That facility was] the only facility included in this study that has an in-furnace SCR design … [necessitating] that the fly ash come in contact with the SCR catalyst surface regardless of whether ammonia is being injected or not. Further investigation of fly ashes from facilities with an in-furnace SCR design is probably warranted."[48]

Aside from the obviously problematic high-heat reuse scenarios identified above, other events incidental to the manufacturing process can also create points of release of toxics in coal combustion wastes. Materials spilled during transport or released during storage, speculative storage, or off-spec material can all pose risks to human health and the environment if coal combustion wastes destined for reuse are not regulated. The docket for this rule contains notes from a July 2010 meeting between EPA representatives and members of a byproduct-using manufacturers association that record manufacturers' questions that EPA's proposed rule leaves unanswered, including the following two questions related to classification of coal combustion residuals that are destined for reuse: a) "How will spills of CCRs during the manufacturing process and during transportation be classified?"; and b) "What is the status of slag that has not entered the manufacturing process (i.e., purchased but never used) and of off-spec material?"[49]

b. Use of Products Containing Coal Combustion Wastes May Release Pollutants and Expose Construction Workers and Building Occupants to Contaminants

On average, Americans spend about 90% or more of their time indoors.[50] Gypsum is the most common fibrous mineral found indoors.[51] Almost 30% of gypsum wallboard manufactured in the U.S. is made with synthetic gypsum. Even in the case that mercury and other toxics do not volatilize out of FGD gypsum wallboard products to contaminate the air in buildings, workers

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[45] *Id.*

[46] *Id*., citing Sanderson, J.; Blythe, G.M. Fate of Mercury in Synthetic Gypsum Used for Wallboard Production: Final Report, US DOE/NETL Cooperative Agreement No. DE-FC26-04NT42080, June, 2008); *see also* U.S. Envtl. Protection Agency, Drywall Sampling Analysis, 530R09016 (2009), http://www.epa.gov/nscep/, click "simple search," type 530R09016 and click enter.

[47] SUSAN ALICE THORNELOE-HOWARD, U.S. ENVTL. PROTECTION AGENCY, EVALUATING THE THERMAL STABILITY OF MERCURY AND OTHER METALS IN COAL COMBUSTION RESIDUES USED IN THE PRODUCTION OF CEMENT CLINKER, ASPHALT, AND WALLBOARD, EPA/600/R-09/152, 4-1 (2009), available at http://www.epa.gov/nrmrl/pubs/600r09152/600r09152.pdf.

[48] *Id*.

[49] Notes from EPA Meeting with the Asphalt Roofing Manufacturers Association (July 15, 2010), available at www.regulations.gov, type "EPA-HQ-RCRA-2009-1916" and click enter.

[50] U.S. EPA, Buildings and their Impact on the Environment: A Statistical Summary (April 2009), available *at* www.epa.gov/greenbuilding/pubs/gbstats.pdf.

[51] INTEGRATED LABORATORY SYSTEMS, INC., PREPARED FOR NATIONAL TOXICOLOGY PROGRAM, NATIONAL INSTITUTE OF ENVIRONMENTAL HEALTH SERVICES, NATIONAL INSTITUTE OF HEALTH, U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, CHEMICAL INFORMATION REVIEW DOCUMENT FOR SYNTHETIC AND NATURALLY MINED GYPSUM (CALCIUM SULFATE DIHYDRATE) [CAS NO. 13397-24-5] SUPPORTING NOMINATION FOR TOXICOLOGICAL EVALUATION BY THE NATIONAL TOXICOLOGY PROGRAM (2006), http://ntp.niehs.nih.gov/files/Gypsum1.pdf.

and homeowners are routinely exposed to gypsum dust either during installation of gypsum wallboard or during remodeling projects.

A chemical information review document used to support the nomination of synthetic and naturally mined gypsum for toxicological evaluation by the National Toxicology Program (part of the National Institute of Environmental Health Sciences) noted that study of gypsum safety was warranted in part because of gypsum's prevalence indoors.[52] Gypsum was nominated for toxicological study by Mount Sinai-Irving J. Selikoff Center for Occupational and Environmental Medicine and by the Operative Plasterers' and Cement Masons' International Association of the United States and Canada in 2005 citing the widespread exposure to gypsum in the workplace and in the home, as well as the lack of adequate long-term studies for chronic toxicity due to this prevalent building material. The nomination study also notes that recently implemented mercury emissions controls on coal-fired power plants have increased the presence of mercury in wallboard produced from FGD gypsum.[53] In response to NTP's request for comments on the nomination of gypsum for toxicological study, several commentators noted that gypsum has been safely used for used, but none of the responsive comments addressed the changing nature of synthetic gypsum due to new air pollution controls for mercury. After a public comment process, and despite one commenter's implication of safety because "Flu Gas Desulferization (FGD) gypsum has been used to make gypsum wallboard since the early 1990s,"[54] the NTP decided the widespread exposure to gypsum and the lack of adequate toxicity tests warranted some study of the toxicological effects of gypsum exposure. Today's changing composition of FGD gypsum wallboard warrants additional caution by EPA in promotion of this product.

According to a 1999 report on the Condition of America's Public School Facilities, in the mid-1990s, one in five U.S. schools reported unsatisfactory indoor air quality, and one in four schools reported ventilation as unsatisfactory.[55] Studies have also shown that compounds in the concrete matrix can migrate after reactions between carpet and flooring adhesives and concrete.[56] EPA's endorsement of the safety of a product – either implied or explicit – is very influential. Coal combustion wastes should not be able to avoid environmental regulation just because they are destined for reuse in construction; the distribution of these products in homes, schools, and roads throughout the nation should not be allowed unless adequate, independent testing is done to ensure that the increasing usage will not result in increasing exposures to building occupants or construction workers.

Without new regulations in place mandating characterization before coal combustion waste reuse, wastes may be reused based on assumptions that old data is still sufficient. For example, to address potential concerns about "vegetation and food chain issues" resulting from using coal ash in highway construction, an EPA publication relied only on the 2000 regulatory determination and a 1995 study by the Electric Power Research Institute to imply that coal ash as highway fill material does "not pose a risk of concern" and that "use of coal ash in

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[52] *Id.*
[53] *Id.* at vi.
[54] Charles D. Byers, Ph.D., Manager, Product Safety & Industrial Hygiene, USG Corporation, Comments to NIEH/NTP regarding nomination of gypsum to the NTP Testing Program at 4 (2006), http://ntp.niehs.nih.gov/files/USG_Byers_051006_att.pdf.
[55] U.S. EPA, Buildings and their Impact on the Environment: A Statistical Summary (April 2009); citing Condition of America's Public School Facilities: 1999, NCES 2000 032, U.S. Department of Education, Office of Educational Research and Improvement, National Center for Education Statistics (June 2000).
[56] Stein, Antoinette, PhD, Health and Safety Risks of Fly Ash Cement Mixtures, available at http://www.peer.org/docs/epa/09_4_10_Health_Concerns_with_Fly_Ash.pdf.

unencapsulated highway construction projects poses limited risks to roadside vegetation."[57] EPA published this booklet that purports to include "benefits and impacts" of coal ash use, yet the booklet fails to provide adequately address concerns or to document food chain issues from materials more typical of those generated by today's (or this decade's) coal fired power plants. EPA should use independent, non-proprietary, publicly-available research to support any implied endorsements of environmental safety of reuse.

The characteristics and volumes of coal combustion wastes are changing due to air pollution controls and shifting feed stocks. At the same time, reuse in building products is increasing. Renewed, independent, publicly-available environmental risk studies are needed before allowing reuse of coal combustion wastes in consumer products and construction materials. Older, industry-selected data is not adequate to evaluate the risks that may be posed by today's coal combustion wastes.

c. Contaminants Such as Mercury Are Released During Product Disposal, Recycling, or Incineration

Regulating coal combustion waste disposal as hazardous without addressing end of life concerns for coal combustion wastes that are "beneficially used" ignores significant potential release of any contaminants that have not already been volatilized during manufacture or use. If hazardous constituents have not already leached out or volatilized during pre-manufacturing storage, transportation, manufacturing process losses, or use, then any hazardous constituents that were in the coal combustion waste when it left the power plant will still be in the reused coal combustion waste at the end of the useful life. For example, gypsum wallboard is recycled into use as agricultural soil amendment. If the mercury and other metals captured in fly gas desulfurization gypsum remain in the wallboard because they were "encapsulized," as EPA implies, then those constituents would be present in the wallboard at the end of its useful life, and thus could be released to the environment when the wallboard is ultimately disposed of in unlined construction and demolition debris landfills or when ground up and spread onto agricultural soils.

The Collaborative for High-Performance Schools ("CHPS") has included recycled content credit for use of fly ash construction materials, so long as the fly ash contains levels of mercury below 11 ppb (or outside of California, less than 5.5 ppb).[58] In explaining the primary motivation behind setting limits for mercury in recycled fly ash, a representative of CHPS told Environmental Building News that the end of the life of the concrete was a primary driver behind the concerns: "Twenty years from now the new problem is going to be how to dispose of mercury in concrete."[59] EPA's *Characterization of Coal Combustion Residuals III*, published in December 2009, also identifies that the "fate of mercury and other metals is also a potential concern when CCRS are used … to make products that are subsequently disposed (e.g., disposal of wallboard in unlined landfill).[60]

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[57] U.S. ENVTL. PROT. AGENCY, EPA-530-K-05-002, USING COAL ASH IN HIGHWAY CONSTRUCTION: A GUIDE TO BENEFITS AND IMPACTS 26 (2005).
[58] *Groups Set Mercury Limits for Flyash in Concrete*, ENVTAL. BUILDING NEWS, Sept. 2008, *available at* http://www.buildinggreen.com/auth/article.cfm/2008/8/28/Groups-Set-Mercury-Limits-for-Flyash-in-Concrete/.
[59] *Groups Set Mercury Limits for Flyash in Concrete*, ENVTAL. BUILDING NEWS, Sept. 2008, *available at* http://www.buildinggreen.com/auth/article.cfm/2008/8/28/Groups-Set-Mercury-Limits-for-Flyash-in-Concrete/.
[60] D. KOSSON, F. SHANCHEZ, P. KARIHER, L.H. TURNER, R. DELAPP, P. SEIGNETTE, PREPARED FOR SUSAN A. THORNELOE, U.S. ENVTL. PROTECTION AGENCY, OFFICE OF RESEARCH AND DEVELOPMENT NATIONAL RISK MANAGEMENT RESEARCH LABORATORY, AIR POLLUTION PREVENTION AND CONTROL DIVISION, CHARACTERIZATION OF COAL COMBUSTION RESIDUES FROM ELECTRIC UTILITIES – LEACHING AND

In addition to exposure concerns during production, dust from concrete demolition and concrete grinding may also expose workers and others to fugitive dust emissions that contain toxics. Concrete is recycled/ground at very high rates – about 90%. Reusing clean concrete saves resources and landfill space. Introducing contaminants into concrete products (via fly ash cement) may complicate future opportunities for recycling the crushed concrete into aggregate for new concrete projects. Allowing unregulated quantities of coal combustion wastes to be including in construction and building materials without tracking also presents worker exposure concerns and potential for contaminated runoff from construction sites. Requiring labeling of concrete containing coal combustion wastes should be considered to ensure that personal protective equipment and stormwater controls at demolition sites are appropriate to the risks.

A Federal Highway Administration Technical Advisory on recycled concrete pavement points out that "disposal of existing concrete pavements is often a problem faced on many pavement reconstruction projects" and that recycling concrete is common practice by several State Departments of Transportation. Options for old pavement can include disposal in a landfill, use as riprap on shorelines, "rubblizing" and using as base for new pavement, and other uses.[61]

California's Department of Resources, Recycling, and Recovery estimates that approximately 12 percent of new construction drywall is wasted during installation each year, and states that new construction drywall is currently recycled into soil amendment in California.[62]

Carpet backing containing coal fly ash is encouraged and can help earn recycled-content credits from growing "green" rating systems. However, used carpet is often incinerated at high temperature, potentially releasing toxic contaminants such as mercury that may have been contained in the carpet backing.

3.3 "Unencapsulated" Uses Need to be Defined and Regulated Under Subtitle C to Avoid Sham Recycling Scenarios and to Prevent Contamination from Use Constituting Disposal

Coal combustion wastes that are "reused" by applying to land and in or near water tables should strictly regulated as disposal under Subtitle C. So-called encapsulated uses of coal combustion wastes (such as concrete, cement, and wallboard) accounted for less than half of the coal combustion wastes reused in 2008.[63] The remainder of coal combustion waste reuse was in categories that included, among others, agriculture, structural fill/embankments, snow and ice traction, road base, soil stabilization, miscellaneous/other, mining applications, and other uses.

CHARACTERIZATION DATA, EPA-600/R-09/151, 14 (Dec. 2009), available at http://www.regulations.gov/, type in EPA-HQ-RCRA-2009-0640-0329 and click enter.

[61] Federal Highway Administration, Technical Advisory: Use of Recycled Concrete Pavement as Aggregate in Hydraulic-Cement Concrete Pavement, T 5040.37 (July 2007), available at http://www.fhwa.dot.gov/pavement/t504037.cfm.

[62] CalRecycle Construction and Demolition Recycling; Wallboard (Drywall) Recycling (April 2010), http://www.calrecycle.ca.gov/condemo/wallboard/.

[63] The ACAA reported that in 2008: 14,015,616 tons of CCPs went to concrete; 4,198,196 tons of CCPS were used as raw feed in cement kilns; and 8,533,732 tons of CCPs were used in gypsum wallboard production. Total CCP use was 60,593,660 tons, or about 44% of CCPs produced. American Coal Ash Association 2008 Coal Combustion Product (CCP) Production and Use Chart, http://acaa.affiniscape.com/associations/8003/files/2008_ACAA_CCP_Survey_Report_FINAL_100509.pdf.

EPA must prohibit placement of coal combustion wastes in direct contact with water or in applications that would create contaminated surface runoff or fugitive dust. Any future determination EPA makes to allow or list specific approved uses should require updated leaching and volatilization data appropriate to the type of waste, the source of coal, generating facility, site-specific application, and demonstrated environmental benefits. Regulation under Subtitle C is necessary to prevent large scale shift of wastes into sham recycling or use that is really thinly-disguised disposal.

Increasing application to agricultural soils

FGD gypsum is expected to increasingly be used in loose agricultural applications. To date, FGD gypsum has been shown to have higher levels of arsenic, mercury, antimony, and other elements than FGD obtained through mining.[64] EPA, DOE, and others have also predicted that more mercury and other metals are expected to be captured in air pollution scrubber residues. Synthetic gypsum is being examined for application to crops such as peanuts, alfalfa, tomatoes, sweet corn, and cantaloupes.[65] "Use in agriculture is expected to increase significantly … applicable for all power plants … lower cost vs. mined gypsum may result in broader usage on multiple crops."[66] As the constituents and characteristics of FGD gypsum shift and contaminants in the gypsum increase (due to changes in air pollution control configurations), EPA cannot continue to rely on older data sets to make determinations that use of FGD gypsum in agriculture is safe. Materials must be tested for environmental safety in addition to engineering soundness, agricultural fertilizer benefit, or cost savings.

In the Preamble, EPA notes that it is conducting a joint effort with USDA to consider the characteristics of FGD gypsum and directs people to information on the current study. Pending outcome of new studies on potential risks, in addition to potential benefits, agricultural uses of coal wastes should be banned. Independent studies of waste streams are needed to evaluate site-specific and crop-specific risks of today's waste streams; EPA should not rely solely on industry generated data or samples from sites pre-selected by industry partners. Broad approval of agricultural applications is not appropriate because of product differences due to variable coal source, air pollution control configurations, and crop uptake potential.

There is possibility for exposure through ingestion of food crops if crops have been grown in soil amended with FGD gypsum or recycled drywall. In one older study, researchers reported greater concentrations of arsenic, boron, magnesium, and selenium in crops grown on fly ash amended soil than control crops grown on soil alone.[67] The study noted earlier research that found selenium and other elements "markedly elevated" in the tissues of Guinea pigs fed on fly ash amended clover. A more recent study evaluated variation in trace element uptake in young, middle-aged, and mature basil, tomato, zucchini, and sunflower plants grown in soil

[64] US Envtal Protection Agency, Agricultural Uses of FGD Gypsum, EPA 530-F-08-009 (table summarizing background data on agricultural uses of FGD gypsum (to accompany EPA's 2008 document, *Agricultural Uses of FGD Gypsum*).
[65] Lamar Larrimore, Southern Company, Presentation at FGD Gypsum Workshop in Indianapolis, FGD Gypsum Overview: Production, Handling, Use (Nov. 17, 2009), http://www.fgdproducts.org/Presentations_Indy_11_09/Tue_1330_Larrimore.pdf.
[66] *Id*. at 61
[67] A. Keith Furr, Thomas F. Parkinson, Walter H. Gutenmann, Irene S. Pakkala, and Donald J. Lisk, Elemental Content of Vegetables, Grains, and Forages Field-Grown on Fly Ash Amended Soil, 26 J. Agric. Food Chem. 357 (1978).

amended with from 5 and 20% fly ash amendment.[68] Among the results was that "elevated concentrations of [arsenic] in plant tissue suggests that fly ash treatment programs can lead to potentially toxic accumulations of [arsenic], and thus, should be carefully monitored.[69]

Although coal combustion wastes have been cheaply available and may contain some essential elements for crops, the fact that coal combustion wastes also contain toxics like arsenic that accumulate in plant tissue highlights why agricultural use of coal ash should be discontinued.[70] The potential for trace element uptake by coal combustion waste-amended crops (and animals that consume them) must be researched and risks as well as benefits considered before continuing a blanket allowance of agricultural reuse. Similarly, the use of coal combustion wastes in cattle feeders and as soil stabilization on dairy feedlots poses potential risks from contaminated surface water runoff or animal exposure to contaminants leaching out or volatilization.

Unencapsulated uses that may directly impact water (including the seasonal high groundwater table) are of particular concern and should be banned. Lack of regulation has led to a proliferation of unregulated applications to loose coal combustion wastes, including application to agricultural soils, application to roads as snow and ice traction control, and applying from the air by "dusting" wastes directly on to icy rivers to encourage melting (see the appendix to these comments for more examples).

Loose application to roads for snow and ice traction

New studies are needed to ensure that contaminants from coal ash generated by more modern air pollution controls do not reach the natural environment when the wastes are applied to roads for snow and ice traction. Reported studies of impacts of winter use of sand/abrasives to the environment indicate that impacts from abrasives remain after initial application. For example, the American Association of State Highway and Transportation Officials Center for Environmental Excellence reports that an Oregon Department of Transportation study found that 50 to 90 percent of sand applied to pavements remains in the environment, and that "materials may wash downstream and end up in streams and lakes."[71] Additionally, "[a]ir pollution from particles less than 10 microns in size (PM10) has been documented from winter abrasive use … Vehicle grinding of sand allows fine particulate matter, PM10 (or PM2.5), to become airborne when dry, and causes river silting during snow melt via surface drainage. Sand used for snow and ice control increases air pollution and has been estimated to contribute approximately 45 percent of the small particulates present in air."[72] These studies highlight potential pathways for environmental contamination and human exposure to contaminants in coal ash applied to roads. Loose coal combustion waste application to roads should be prohibited due to risks to water sources and from dust and fine particulate.

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[68] S.S. Brake, R.R. Jensen, and J. M. Mattox, Effects of Coal Fly Ash Amended Soils on Trace Element Uptake in Plants, 45 Envtl. Geology 680 (March 2004).
[69] *Id*.
[70] Mathew Cimitile, Is Recycling Coal Fly Ash at Farms Environmentally Safe?, Environmental Health News (Feb. 6, 2009), http://www.environmentalhealthnews.org/ehs/news/recycling-coal-waste-at-farms.
[71] Center for Envtl. Excellence by AASHTO, Chapter 8: Winter Operations and Salt, Sand, and Chemical Management § 8.1.3, http://environment.transportation.org/environmental_issues/construct_maint_prac/compendium/manual/8_1.aspx.
[72] *Id*., citing Oregon Department of Transportation, "Routine Road Maintenance: Water Quality and Habitat Guide Best Management Practices (July 1999), http://www.ci.gladstone.or.us/NPDES/ODOTresearch-roadside_maintenance_manual.pdf.

EPA should remove the Bevill exemption for unencapsulated uses and regulate those uses under Subtitle C. EPA notes in numerous instances throughout the proposed rule that EPA is seeking comment on current uses or dangers resulting from uses, or that EPA is studying the impacts. To prevent a repeat of the contamination of Pines, Indiana, EPA should employ a precautionary approach and regulate unencapsulated uses as disposal under Subtitle C. In no case should unencapsulated uses be approved without a site-specific evaluation of the proposed waste (using data representative of the facility that generated the waste), proposed use, purported environmental benefit, and potential risk.

Without federally enforceable waste management requirements in place, coal combustion wastes that have entered commerce will add to the growing toxic exposure to consumers through products and buildings. Similarly, products containing coal combustion wastes can release contaminants during disposal, recycling, or incineration at end of life. Environmental controls on disposal sites for consumer products or construction and demolition debris are not as stringent as environmental controls required at hazardous waste disposal sites. Increasing volumes and toxic content of coal combustion wastes warrant regulation of reuse under Subtitle C.

4.0 "Beneficial Reuse" Should be Defined and Require Showing of Environmental Benefit

4.1 EPA's Suggested Criteria to Distinguish Legitimate Reuse are Vague, Circular, and Not Environmentally Protective

EPA proposed definition of "beneficial use" not only fails to balance and seek net environmental benefits from proposed coal combustion waste reuse scenarios, but the criteria also fails to require any environmental benefit at all. In explaining "What Constitutes Beneficial Use" EPA states:

> "EPA believes the following criteria can be used to define legitimate beneficial uses appropriately…[1] material must provide a functional benefit … [2] material substitutes for the use of a virgin material … [3] where relevant product specifications or regulatory standards are available, the materials meet those specifications, and where such specifications or standards have not been established, they are not being used in excess quantities."[73]

The proposed criteria fail to establish any standard to ensure that coal combustion waste reuse is protective of human health and the environment. Product specifications may include engineering requirements for products such as cement, but engineering standards, when available, may apply only to product performance (such as strength) and not to environmental risk or consumer exposure (such as leaching or volatilization of toxics during curing or normal wear and tear). Additionally, if no specifications guide the use of the coal combustion waste, then the legitimacy criteria appear to be satisfied by default.

PEER suggests that EPA include demonstration that toxics will not be released from the products or use at later stages of the lifecycle (including product manufacture, use, and end of life disposal). EPA should also include explicit criteria to ensure that proposed reuse meets available *environmental* product specification. The criteria as written are so vague as to be meaningless to manufacturers (trying to determine which requirements might apply) and to

[73] Proposed Rule at 35,162.

consumers (trying to determine if a product or use met relevant environmental specifications). If no environmental criteria are available to prevent leaching, volatilization, or mislabeling, then the criteria should be specific enough that the use would be banned until applicable environmental specifications were met.

In addition, the proposed criteria uses a circular logic by requiring that "legitimate" reuse would include that "where such specifications or standards have not been established, [the materials] are not being used in excess quantities." What criteria will be used to determine if coal ash is being applied to a river or a road in "excess quantities?" This would be a difficult standard to enforce as it is, but it also fails to take into account cumulative impacts to land and roadsides from repeated annual applications of "non-excessive" quantities of coal ash or FGD gypsum. As new uses proliferate and the nature of these wastes change, environmental standards have not kept up. EPA should not allow reuse of coal combustion wastes unless meaningful criteria are in place to guard against sham recycling and cumulative impacts to human health and the environment.

Addressing concerns about agricultural applications of coal combustion wastes, EPA further explains its proposed legitimacy test by stating:

> "In the case of agricultural uses, CCRs would be expected to meet *appropriate* standards, constituent levels, prescribed total loads, application rates, etc. EPA has developed specific standards governing agricultural application of biosolids. While the management scenarios differ between biosludge application and the use of CCRs as soil amendments, EPA would consider application of CCRs for agriculture uses not to be a legitimate beneficial use if they occurred at constituent levels or loading rates greater than EPA's biosolids regulations allow."[74]

As explained above, loose large scale agricultural applications of coal combustion wastes pose a particular risk to water sources and safety of food crops. EPA's logic is circular – legitimate use will be determined by whether application rates meet appropriate standards. EPA needs to specifically require demonstration of more than comparisons to typical application rates of mined materials – e.g. coal combustion wastes are unique materials and comparison to typical rates of application of "natural" gypsum is inappropriate.

EPA's suggestion that it could use criteria designed for a different wastes stream – biosludge – to determine whether agricultural application rates were excessive is inadequate to ensure safe application of this waste stream. Agricultural applications should be prohibited. Unregulated spreading of coal combustion wastes on fields is more like disposal and should be subject to controls as stringent as Subtitle C. At a minimum, this use cannot be continued absent updated situation-specific risk analysis has been concluded (evaluation should be specific to each instance to account for variation between wastes, sites, crops, groundwater pathways, surface runoff patterns, proximity to drinking water, and crop uptake potential).

EPA itself notes that total concentrations of metals, as biosolids are assessed, may not be the most appropriate standard for assessing the highly variable metal leaching behavior of CCRs.[75] EPA should prohibit agricultural applications unless specific standards are developed and implemented through separate notice and comment rulemaking.

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[74] Proposed Rule at 35,163 (emphasis added).
[75] *Id*.

EPA needs to rely on more than existence of engineering performance standards or comparisons to typical application rates of mined materials – coal combustion wastes are unique materials and comparison to typical rates of application of "natural" gypsum or other soil amendments is inappropriate.

4.2 Reuse of Coal Combustion Wastes in Consumer Products and Construction Has Expanded Far Beyond the Uses Identified in the May 2000 Regulatory Determination; EPA Should Formally List Any Approved Use

In the Proposed Rule, EPA states, "EPA solicits comment on whether additional uses of CCRs have been established since the May 2000 Regulatory Determination that has not been discussed elsewhere in today's preamble should be regarded as beneficial." PEER submits that numerous so-called "beneficial uses" have been established – some with explicit EPA endorsement, but many with apparently no government oversight at all. Please also see Appendix A to our comments.

EPA further states in the Proposed Rule, "Of particular concern in this regard are reports that CCRs are being used in producing countertops, bowling balls, and in the production of makeup. The Agency solicits comment on whether use of CCRs in consumer products of this kind can be safely undertaken … the Agency further solicits comment any new uses of CCR, as well as the information and data that supports that is beneficially used in an environmentally sound manner."

As mentioned above, the Agency has repeatedly voiced express support for a variety of beneficial uses, apparently with little or no consideration to the negative environmental impacts of the federal environmental agency's endorsement of such uses. The conflict of interest apparent in having a regulatory agency responsible for protecting public health and the environment also involved in an industry partnership to promote use of coal combustion wastes was apparent to EPA's own Inspector General, who in November 2009 recommended for IG investigation the underlying basis for the Agency's Coal Combustion Products Partnership ("C^2P^2").[76] Further, EPA voiced express support for the uses of "concern" in a 2005 speech: "We support the beneficial use of coal ash in products such as cement and concrete, wallboard, flowable fill, roads and highways, kitchen counter tops, and bowling balls."[77] If these uses are not safe, or the safety is unknown, EPA should issue clarification as to specific characterization tests needed before any reuse could be considered "beneficially used in an environmentally sound manner."

Of particular concern is the fact that the Agency is apparently not even aware of all the ways in which coal combustion wastes have been "beneficially used." This fact alone demonstrates the need for regulation of coal combustion wastes going to beneficial use; without regulation, reuse of coal combustion waste has increased to nearly 45% -- or over 60 million tons – of the total coal combustion wastes generated.[78] EPA relies on industry-generated (i.e. "voluntary") annual reports that break down coal combustion waste generation and reuse into

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[76] OFFICE OF INVESTIGATIONS, ENVTAL. PROT. AGENCY OFFICE OF INSPECTOR GEN., REPORT NO. 10-N-0019, OFFICE OF INVESTIGATIONS SPECIAL REPORT: RESPONSE TO EPA ADMINISTRATOR'S REQUEST FOR INVESTIGATION INTO ALLEGATIONS OF A COVER-UP IN THE RISK ASSESSMENT FOR THE COAL ASH RULEMAKING 7 (2009).

[77] Maria Vickers, Deputy Director, U.S. Envtal. Prot. Agency Office of Solid Waste, Remarks at the Beneficial Use Summit (Nov. 29-30, 2005), http://www.epa.gov/osw/inforesources/news/speeches/bene-05.htm.

[78] American Coal Ash Association 2008 Coal Combustion Product (CCP) Production and Use Chart, http://acaa.affiniscape.com/associations/8003/files/2008_ACAA_CCP_Survey_Report_FINAL_100509.pdf.

over a dozen categories, but even these reports note that over one million tons of coal combustion wastes are reused in "miscellaneous/other" applications.[79] In 2007, the industry reported that more coal combustion wastes were used in "miscellaneous/other" applications than in categories for aggregate, soil modification, or use as road base or sub-base.[80]

PEER has found documentation of dozens of examples of coal combustion waste reuse in construction, building materials, agriculture, and consumer products.[81] Among many uses listed on the PEER website are the following: drywall soil amendment, toothpaste, levee stabilization, loose application of coal bottom ash as ice control ("ice dusting") on frozen rivers, low permeability liners in construction of water and manure holding ponds, liner for constructed wetlands for wastewater treatment, cosmetics, lipstick, utensils, cattle feeders, feedlot stabilization, cenospheres for concrete countertops, foam carpet backing, paint filler, modeling clay, bowling balls, shoe soles, buttons, and a variety of "green building" (due to recycled content) products.

EPA should formally list any use that is approved and has a demonstrated benefit

EPA requested comment on the need to provide a formal listing of all beneficial uses, but added that "the concern with such an alternative is that new and innovative uses that are not on the list would be subject to disposal regulations, until EPA revised its rule."[82] PEER points to the evidence that unmonitored, untested uses have proliferated in the absence of regulation, and cites those uses – including uses that EPA claims to not have been aware of – as support for the need for EPA to regulate reuse and ban unrestricted reuse until/unless specific regulations are in place.

The above and attached lists of ever-increasing so-called beneficial uses illustrate the need for EPA to develop a formal listing of all approved waste streams and application or usage rates. Development of such a list would support transparency in government decision-making and facilitate public participation and comment on a significant volume of regulated wastes that would otherwise escape regulation just because a coal ash producer claims to be sending the materials to beneficial use.

4.3 Coal Combustion Waste Reuse Should Have to Demonstrate Environmental Benefits

Any approved use should have to demonstrate environmental benefits beyond avoiding disposal or saving disposal costs.

In the preamble to the proposed rule, EPA asserts that the "beneficial use of CCRs offers significant environmental benefits, including greenhouse gas (GHG) reduction, energy conservation, reduction in land disposal (i.e., avoidance of potential CCR disposal impacts), and

[79] In 2007, over 1.9 million tons of coal combustion wastes were attributed to uses in the "other" category. See http://www.acaa-usa.org/displaycommon.cfm?an=1&subarticlenbr=3 (follow link for ACAA 2007 CCP Report).
[80] The American Coal Ash Association 2007 Annual CCP Production and Use Survey Results noted that of the approximately 56 million tons of coal combustion wastes used, over 1.9 million tons went to "miscellaneous/other," while use in aggregate totaled just over one million, use in soil modification/stabilization totaled over 1.3 million tons, and use in road base/sub-base totaled over 1.1 million tons. See http://www.acaa-usa.org/displaycommon.cfm?an=1&subarticlenbr=3 (follow link for ACAA 2007 CCP Report).
[81] PEER Coal Combustion Wastes: Coal Ash Is Everywhere, http://www.peer.org/campaigns/publichealth/coalash/everywhere.php.
[82] Proposed Rule at 35,163.

reduction in the need to mine and process virgin materials and the associated environmental impacts."[83]

PEER vehemently disagrees with the inaccurate assertion that reuse of all coal combustion wastes reduces greenhouse gas emissions. To this end, PEER has previously filed a complaint with EPA challenging EPA false claims of greenhouse gas savings from reuse of coal combustion wastes.[84] EPA makes vague and varying claims as to the greenhouse gasses allegedly reduced through coal combustion waste reuse, but EPA fails to provide supporting documentation for its general assertion that "beneficial use of CCRs offers significant environmental benefits, including greenhouse gas (GHG) reduction."

EPA's data is not sufficiently complete to support general claims of greenhouse gas savings for coal combustion wastes generally. The Proposed Rule cites to EPA's *Study On Increasing Usage of Recovered Mineral Components (RCMs) in Federally Funded Projects Involving Procurement of Cement or Concrete* ("2008 Study") to support greenhouse gas claims. But a technical footnote in the 2008 Study describes limits to the scope of the analysis: "We focus on coal fly ash, [ground granulated blast furnace slag], and silica fume because more comprehensive and robust life cycle data were available to analyze them. Relevant life cycle data for the substitution of other [recovered mineral components] were not available for purposes of this report."[85] Later in the 2008 Study EPA makes this statement: "Benefit results capture absolute differences in resource use and emissions between two concrete product types. These absolute differences likely overstate marginal welfare impacts resulting from RMC substitution. Accordingly, the results are best viewed as a relative measure of benefits across RMCs and concrete product types."[86]

It is not clear that EPA has performed an analysis of net greenhouse gas emissions from reuse of all coal combustion wastes – including using coal wastes as raw feed in cement kiln, structural fill, or as snow and ice control on roads. In fact, use in concrete, the most frequently cited application for alleged greenhouse gas benefits, accounts for just over 14 million tons – or only about 23% of all reuse.

EPA does offer as support for its concrete-related greenhouse gas and energy claims a document cited in footnote 58. The Proposed Rule notes that the cited estimates are based on calculations and extrapolations from typical percentages of fly ash to cement replacement in federally funded concrete projects, and continues to say, "[t]his estimate is *likely to underestimate* the total benefits that can be achieved."[87] In a footnote, the 2008 Study notes, "[f]or simplicity, however, our model assumes a 1:1 replacement ratio for silica fume and Portland cement in concrete when modeling life cycle impacts. This is *likely to overstate* the benefits of the use of this material as an [supplementary cementitious material]."[88]

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[83] Proposed Rule at 35,154.
[84] Press Release, Public Employees for Environmental Responsibility, EPA False Claims of Greenhouse Gas Savings from Coal Ash: PEER Files Complaint to Delete Inaccurate Statements from EPA Website and Publications (July 1, 2010), http://www.peer.org/news/news_id.php?row_id=1368.
[85] U.S. ENVTL. PROT. AGENCY, STUDY ON INCREASING THE USAGE OF RECOVERED MINERAL COMPONENTS IN FEDERALLY FUNDED PROJECTS INVOLVING PROCUREMENT OF CEMENT OR CONCRETE TO ADDRESS THE SAFE, ACCOUNTABLE, FLEXIBLE, EFFICIENT TRANSPORTATION EQUITY ACT: A LEGACY FOR USERS, EPA530-R-08-007, D-1 (June 2008), http://www.epa.gov/waste/conserve/tools/cpg/pdf/rtc/report4-08.pdf.
[86] *Id.* at D-40.
[87] Proposed Rule at 35,154.
[88] U.S. ENVTL. PROT. AGENCY, STUDY ON INCREASING THE USAGE OF RECOVERED MINERAL COMPONENTS IN FEDERALLY FUNDED PROJECTS INVOLVING PROCUREMENT OF CEMENT OR CONCRETE TO ADDRESS THE SAFE,

EPA also asserts in the Proposed Rule that "reducing the amount of cement produced by beneficially using fly ash as a substitute for cement leads to large supply chain-wide reductions in energy use and GHG emissions."[89] Yet, the 2008 Study acknowledges that "when one production system … makes two or more products with market value (i.e., co-products) it is accepted practice in life cycle analysis to *allocate* the total life cycle production impacts across products. It is important to consider whether co-products of electricity generation (e.g., fly ash) that are beneficially used should have some portion of the production impacts associated with coal combustion (e.g., energy use, greenhouse gas equivalents) attributed to them. The allocated impacts from coal-fired generation would likely associate only very small flows to the RMCs modeled in this Report. For this reason, we do not include either an economic or mass-based allocation in our analysis."[90] Failing to allocate any contribution to greenhouse gases from upstream coal mining or coal fired electricity generation ignores the facts (1) that electricity generation is the largest single source—contributing around 40%—of total CO_2 emissions in the United States,[91] and (2) that electricity generators use coal—a fuel source with relatively high CO_2 emissions—for over half of their total energy requirements.[92]

In addition, the Proposed Rule and accompanying regulatory analysis will guide regulation of coal combustion wastes disposal and reuse far beyond the near term time frame that can be modeled with today's data. The BEES model is "based upon current manufacturing processes and related energy intensity and emissions levels, which may change over time. *Thus, the accuracy of the impact values derived from these LCIs likely declines the further out they are applied to the 10-year projection of RMC substitution levels.*"[93] Finally, Appendix D of the 2008 Study lists some of the "general limitations of the analysis," stating "it is difficult to isolate, for quantification, the effect of current procurement regulations on RMC substitution. Thus the results may over- or understate actual benefits depending upon the accuracy of the estimated quantities."[94]

Taken together, these footnotes to EPA's conclusions reflect that EPA claims of greenhouse gas savings from coal combustion wastes are: (1) limited to an analysis of fly ash, ground granulated blast furnace slag, and silica fume used in federal concrete projects, (2) tend to overestimate and have uncertainty in underlying assumptions – with decreasing accuracy the further out they are applied from the ten year projection, and (3) the analysis assumes that coal combustion wastes enter the system with no associated emissions from burning the coal to make electricity, mining the coal, processing mined coal, or transporting the coal from mine to power plant.

ACCOUNTABLE, FLEXIBLE, EFFICIENT TRANSPORTATION EQUITY ACT: A LEGACY FOR USERS, EPA530-R-08-007, D-11 (June 2008), http://www.epa.gov/waste/conserve/tools/cpg/pdf/rtc/report4-08.pdf.

[89] Proposed Rule at 35,154.

[90] U.S. ENVTL. PROT. AGENCY, STUDY ON INCREASING THE USAGE OF RECOVERED MINERAL COMPONENTS IN FEDERALLY FUNDED PROJECTS INVOLVING PROCUREMENT OF CEMENT OR CONCRETE TO ADDRESS THE SAFE, ACCOUNTABLE, FLEXIBLE, EFFICIENT TRANSPORTATION EQUITY ACT: A LEGACY FOR USERS, EPA530-R-08-007, D-22 (June 2008), http://www.epa.gov/waste/conserve/tools/cpg/pdf/rtc/report4-08.pdf.

[91] U.S. ENVTL. PROT. AGENCY, INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS AND SINKS: 1990 – 2008 at 3-10 (2010).

[92] *Id.* at ES-8 (2010).

[93] U.S. ENVTL. PROT. AGENCY, STUDY ON INCREASING THE USAGE OF RECOVERED MINERAL COMPONENTS IN FEDERALLY FUNDED PROJECTS INVOLVING PROCUREMENT OF CEMENT OR CONCRETE TO ADDRESS THE SAFE, ACCOUNTABLE, FLEXIBLE, EFFICIENT TRANSPORTATION EQUITY ACT: A LEGACY FOR USERS, EPA530-R-08-007, D-41 (June 2008), http://www.epa.gov/waste/conserve/tools/cpg/pdf/rtc/report4-08.pdf.

[94] *Id*. at D-40.

Approved uses of any coal combustion waste stream should have to demonstrate real environmental benefits that take into account broader sustainability concerns than increasing recycling percentages. Cross media transfers, toxic exposure risks, and end of life impacts should also be considered. The environmental risk-benefit analysis should be specific to the feedstock/source of coal, the facility, the air pollution control equipment, the ash handling practices at that power plant, transportation considerations, application rates or percentages, and site-specific factors.

5.0 Conclusion

The demonstrated danger posed by unregulated coal combustion wastes show why federally enforceable Subtitle C regulations are warranted. Absent any monitoring or tracking, reuse has also proliferated and contributed to demonstrated and potential damage cases. Without federal regulation, EPA is not able to monitor disposal sites or reuse applications for safety. New air pollution controls on coal fired power plants are being developed and are expected to capture more mercury and other toxics in the coal combustion wastes. EPA must reconsider the regulatory determination for reuse, and prior to any approval of reuse, the fate of mercury and other constituents of concern in reuse applications (potential volatilization, leaching, and end of life concerns) needs to be evaluated on a situation-specific basis. Coal combustion wastes should be regulated under RCRA Subtitle C.

Sincerely,

Jeff Ruch
Executive Director
Public Employees for Environmental Responsibility

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Appendix A:
Coal Combustion Wastes Reuse Examples

Kitchen counter tops
Cosmetics
Toothpaste
Utensils and Tool Handles
Picture frames
Carpet Backing
Dog houses
Auto Bodies & Boat Hulls
Driveways
Running Tracks
Bowling Balls
Flotation Devices
Modeling clay
Shoe soles
Foam carpet backing
Cushion floor
Textured paints
Buttons
Utensils
Structural fills & embankments
Mining applications/minefill
Snow & ice traction on roads and parking lots
Dumping on rivers to melt ice
Land contour & golf course fill
Soil amendment & fertilizer
Dairy feedlot pads
Cattle Feeders
Agricultural stakes
Soil stabilization - stock feed yards
Recycled drywall soil amendment
Raw feed for cement clinker (in kiln)
Cement replacement (in concrete)
Low permeability liners for water and manure holding ponds
Constructed wetlands for wastewater treatment
Roofing granules
Carpet backing
Binding agent
Levee stabilization
Nutrient removal from urban runoff
Flooring & ceiling tile
Flowable fill
Asphalt roads
Slate-like roof tiles
Wood-like decking
Structural insulated housing panels
Drywall
Fireplace mantles
Aggregate
Soil modification & stabilization
Grout
Stucco
Cinder block
Roofing shingles
Paints & undercoatings
Ceiling Tile
Road base/Sub-base
Blasting Grit
Recycled plastic lumber
Utility poles & crossarms
Railway sleepers
Highway sound barriers
House siding & trim
Roofing tiles & panels
Marine pilings
Doors
Scaffolding, non-catastrophic failure
Window frames
Sign posts
Crypts
Architectural interiors & exteriors
Columns
Rail road ties
Bricks
PVC Pipe
Vinyl flooring
Paving stones
Paints & plastics filler
Shower Stalls
Garage doors
Park benches
Landscape timbers
Planters
Pallet blocks
Molding
Mail boxes
Artificial Reef