

REVIEW OF FLORIDA REGULATIONS, STANDARDS, AND PRACTICES RELATED TO THE USE OF COAL COMBUSTION PRODUCTS

Final Report

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NOMENCLATURE

| | |
|-------------------------------|--|
| AASHTO | American Association of State Highway and Transportation Officials |
| ACAA | American Coal Ash Association |
| ASTM | American Society for Testing and Materials |
| BACT | best available control technology |
| C ² P ² | Coal Combustion Products Partnership |
| CAMR | Clean Air Mercury Rule |
| CBO | carbon burnout |
| CCP | coal combustion product |
| CFB | circulating fluidized bed |
| CO ₂ | carbon dioxide |
| DOE | U.S. Department of Energy |
| EERC | Energy & Environmental Research Center |
| EIA | Energy Information Administration |
| EPA | U.S. Environmental Protection Agency |
| FCG | Florida Electric Power Coordinating Group, Inc |
| FDEP | Florida Department of Environmental Protection |
| FDOT | Florida Department of Transportation |
| FGD | flue gas desulfurization |
| IGCC | integrated gasification combined cycle |
| IWDR | Industrial Waste Disposal and Reuse |
| LEED | Leadership in Energy and Environmental Design |
| NO _x | nitrogen oxide |
| NSR | New Source Review |
| RMDB | Recycling Market Development Board |
| SGLP | synthetic groundwater leaching procedure |
| SO ₂ | sulfur dioxide |
| SPLP | synthetic precipitation leaching procedure |
| TCLP | toxicity characteristic leaching procedure |
| USG | United States Gypsum, now USG Corporation |

REVIEW OF FLORIDA REGULATIONS, STANDARDS, AND PRACTICES RELATED TO THE USE OF COAL COMBUSTION PRODUCTS

EXECUTIVE SUMMARY

About 49 million tons of coal combustion products (CCPs) are beneficially used in the United States each year, but over 73 million tons, or 60%, are still being disposed of in landfills (American Coal Ash Association [ACAA], 2005). Many of the technical barriers associated with CCP utilization have been solved, but social and knowledge barriers still exist. One of the key nontechnical barriers is the broad range of state laws, regulations, policies, and guidelines regarding the use of CCPs (ACAA, 1998; Pflughoeft-Hassett et al., 1999; Dockter and Jagiella, 2005).

To address different CCP utilization situations across the United States, the University of North Dakota Energy & Environmental Research Center (EERC) is conducting a series of state reviews. The first review was conducted in Texas in 2004, and the second was in Florida in 2005. A third state review will take place in 2006. This report takes an in-depth look at CCP use in Florida and reports on what Florida is doing right, what barriers still exist, what actions can be taken to overcome those barriers, and what threats could impact future utilization.

Based on information obtained during the Florida state review process, the following items were identified as keys to successful CCP utilization in Florida:

1. Florida has a robust concrete market that uses nearly all of the concrete-grade Class F fly ash produced in the state.
2. The state's six cement plants use large quantities of off-spec fly ash and bottom ash in their manufacturing processes.
3. Synthetic gypsum wallboard plants are located adjacent to power plants and use nearly all of the 1.8 million tons of flue gas desulfurization (FGD) gypsum produced by Florida's electric utilities.
4. The Florida Department of Transportation (FDOT) specifies the use of fly ash in concrete and supports CCP use in concrete projects.
5. The engineering community relies on fly ash to produce good-quality, economical concrete.
6. Florida's electric utilities support coal ash utilization because they realize the economic advantages of utilization versus disposal.
7. Electric utilities, the Florida Department of Environmental Protection (FDEP), and FDOT communicate with each other and share a common goal to develop proposed legislation or regulations designed to increase coal ash utilization in the state.

The following barriers that hinder increased CCP utilization in Florida were identified during the review:

1. FDEP does not use a formal process for new beneficial use applications, which makes the process to get a new beneficial use approved extremely difficult and frustrating for applicants.
2. FDEP is not comfortable with CCP use in land applications because agency personnel believe those uses may constitute a potential threat to human health and the environment.
3. FDEP has not clearly defined what ash characterization data it needs to feel comfortable with reuse applications that it considers nontraditional such as structural fills and, therefore, electric utilities have not provided FDEP with the data it needs to consider new applications.
4. Industry has nearly given up on pushing CCP recycling in applications other than concrete, cement, and wallboard. In addition, there is no push for CCP recycling from the federal or state government.
5. FDOT is hesitant to embrace CCPs as a construction material in nonconcrete applications.
6. Electric utility plant operators have not placed a priority on producing consistent-quality fly ash and are naturally more concerned about producing electricity.

In addition to current barriers, the following potential threats were identified that could hinder CCP utilization in the future:

1. FDEP may have unwarranted concerns about the environmental contamination that may result from the handling and interim storage (stockpiling) of CCPs.
2. Mercury emission control requirements for cement and wallboard manufacture may make it more difficult to beneficially use CCPs.
3. Florida's CCP utilization options are not diversified and rely nearly entirely on the cement, concrete, and wallboard markets.
4. Fly ash with high unburned carbon may become unsuitable for use in cement manufacture.

The following are suggested actions that would help increase CCP utilization in Florida:

1. Industry will collectively work with FDEP to develop a beneficial use rule.

2. FDEP and electric utilities need to agree on less restrictive temporary storage and management practices.
3. FDEP needs to determine what ash characterization data it needs in order to evaluate beneficial use applications, and industry needs to provide that data to FDEP.
4. Higher-level state initiatives or federal programs could provide stronger encouragement and incentives to recycle CCPs.
5. Electric utilities should educate plant operators on the value of producing consistent-, good-quality CCPs.
6. The Florida CCP industry should develop long-term partnerships with universities to create a useful resource for future efforts to promote the beneficial use of CCPs.

Using the keys, barriers, threats, and actions identified in this report, Florida and other states can improve CCP utilization in their states.

REVIEW OF FLORIDA REGULATIONS, STANDARDS, AND PRACTICES RELATED TO THE USE OF COAL COMBUSTION PRODUCTS

BACKGROUND

About 49 million tons of coal combustion products (CCPs) are beneficially used in the United States each year, but over 73 million tons, or 60%, are still being disposed of in landfills (American Coal Ash Association [ACAA], 2005). The U.S. Department of Energy (DOE) and U.S. Environmental Protection Agency (EPA) set goals to increase CCP utilization to 50% by 2010. Many of the technical barriers associated with CCP utilization have been solved, but social and knowledge barriers still exist. One of the key nontechnical barriers is the broad range of state laws, regulations, policies, and guidelines regarding the use of CCPs (ACAA, 1998; Pflughoeft-Hassett et al., 1999; Dockter and Jagiella, 2005). Some states have worked to develop progressive and effective guidance for CCP utilization, while other states still lack the resources and information to feel comfortable with a more progressive approach, particularly with applications they consider to be nontraditional such as geotechnical, agriculture and other non-confined applications (Pflughoeft-Hassett et al., 1999).

To address different CCP utilization situations across the United States, the University of North Dakota Energy & Environmental Research Center (EERC) was given a grant by EPA and Headwaters Resources, LLC, to conduct a pilot review of state regulations, standards, and practices related to the use of CCPs (Buckley and Pflughoeft-Hassett, 2005). Texas was selected as the pilot state because of its progressive approach to CCP utilization. The review took place in September 2004, and a final report was published January 2005 and can be accessed online at www.undeerc.org/carrc/html/review.html. A subsequent grant was awarded by EPA and DOE to conduct a second state review. Florida was selected as the second state to review primarily because it is undergoing changes to its CCP regulations.

The EERC received a third grant from EPA, DOE, and ACAA to perform a state review in a third cooperating state. The third state will exhibit a CCP use scenario and geographic area different from the previous two states reviewed.

GOAL

The goal of these reviews is to move toward the development of a national analysis of what actions can be taken to remove barriers to increased CCP use. The reviews will share information on the programs and actions undertaken by states in fostering the beneficial use of CCPs. The specific goals of this second review are to 1) evaluate factors related to the use of CCPs in Florida; 2) summarize Florida's successes, barriers, and threats; and 3) develop recommendations that may help Florida and other states increase the use of CCPs in an environmentally sound manner.

PRE-SITE VISIT REVIEW PROCESS

The following tasks were completed prior to the site visit. Tasks are listed in order; however, many tasks were implemented concurrently.

Task 1: Establish an Administrative Team

A project administrative team was established to perform the majority of the administrative work, including organizing the review, compiling findings, and writing reports. Ms. Tera Buckley, EERC, acted as team leader, and other team members were Ms. Debra Pflughoeft-Hassett, EERC; Mr. John Sager, EPA; and Mr. William Aljoe, DOE.

Task 2: Select a State

The project's administrative team conducted an evaluation to select the second state. The team looked for a pilot state matching the following criteria:

1. The state must exhibit geographic conditions different from Texas. Only states east of the Mississippi will be considered.
2. The state must have CCP beneficial use policies different from Texas.
3. Preference will be given to states undergoing changes to their current CCP regulations.
4. State environmental and transportation departments must be willing to participate.

The administrative team used a report entitled "Engineering and Environmental Specifications of State Agencies for Utilization and Disposal of Coal Combustion Products" to determine which states best matched these criteria (Dockter and Jagiella, 2005). The state selection was narrowed to Connecticut and Florida because both matched the criteria outlined above. At the time the state selection process took place, Connecticut's environmental department was reviewing the first formal application under state law for coal ash reuse in cement and concrete products and asphalt subbase. The agency expected to submit a draft permit for first public notice and comment in spring 2005. In Florida, the current statutory beneficial use provisions are considered inadequate to clearly authorize many coal ash uses. To address these ambiguities, in 2003, the Florida Department of Environmental Protection (FDEP) began the process of developing a new Industrial Waste Disposal and Reuse (IWDR) rule but delayed this process primarily because of workload issues brought on by two devastating hurricane seasons and other rulemaking efforts. FDEP plans to actively pursue a new IWDR rule in 2006.

Ultimately, the administrative team selected Florida for the second state review mainly because more CCPs are generated in Florida; hence, there is more opportunity for utilization. The amount of CCPs that might be used in Florida with the proper regulatory environment undoubtedly surpasses the amount that would be used in Connecticut.

Task 3: Form an Advisory Board

A second team, the project advisory board, was formed to provide input to interviewee selection, assist in the development of a standard questionnaire, and review findings. Advisory board members and associated contact information are listed in Appendix A.

Task 4: Assemble a Review Team

A select group of individuals from the advisory board made up the review team. The primary role of the review team was to administer the meetings at the review. Review team members and associated contact information are listed in Appendix A.

Task 5: Create a Review Guide

A review guide was developed for Florida interviewees that included background information and targeted questionnaires for each discussion group (see Appendix B). To facilitate appropriate discussions, the following five discussion groups were formed to answer questions posed by the review team:

- Government agencies – directors and other key personnel of state or regional transportation and environmental agencies
- CCP generators – electric utility environmental and ash managers
- CCP suppliers – CCP marketers and suppliers of ash beneficiation systems
- Cement and concrete – ready-mix concrete suppliers and cement producers
- Wallboard – users of flue gas desulfurization (FGD) gypsum for wallboard production

The review guide also included an agenda. The review took place December 6–8, 2005. The Florida Electric Power Coordinating Group, Inc. (FCG) hosted the interviews in Tampa, Florida. FCG is the umbrella organization in Florida representing the majority of electric utilities in the state, including investor-owned utilities, rural electric cooperatives, and municipal electric utilities.

Task 6: Develop a List of Interviewees

With input from the advisory board, the administrative team developed a list of potential interviewees for each of the discussion groups identified in Task 5. The wallboard discussion group was canceled prior to the review because those participants preferred to submit written comments. The final participant list for the review is included in Appendix C.

STATUS OF CCP PRODUCTION AND UTILIZATION IN FLORIDA

Florida is not a coal-producing state. Coal is transported to Florida's coal-based power plants on water-borne vessels via the Mississippi River and Gulf of Mexico, as well as from the Appalachian area by rail and from South America by barge. Most coal-based power plants in the state burn a blend of 80% bituminous coal and 20% petcoke. Petcoke is supplied from domestic Gulf Coast oil refineries, Aruba, and South America. The Energy Information Administration (EIA)(2004a), reported that Florida's electric utilities consumed 27.644 short tons of coal in 2004.

The following is a list of Florida's electric generating companies (of these, eight have coal-based power plants, as indicated by the asterisks):

- City of Lakeland*
- City of Tallahassee
- City of Vero Beach
- Florida Municipal Power Agency
- Florida Power & Light*
- Gainesville Regional Utilities*
- Greater Lake Worth
- Gulf Power Company
- JEA*
- OUC, The Reliable One*
- Progress Energy*
- Seminole Electric Cooperative, Inc.*
- TECO Energy, Inc.*

Interviewers reported that Florida's coal-based power plants produce approximately 2 million tons of Class F fly ash and 300,000–400,000 tons of bottom ash a year. On the contrary, EIA (2004b) reported nearly 3 million tons of fly ash and over 500,000 tons of bottom ash was produced in Florida. Four generating stations have wet scrubbers and produce approximately 1.8 million tons of FGD gypsum (CaSO_4). EIA (2004b) reported a production rate at 1.5 million tons of FGD gypsum and 380,000 tons of sludge (CaSO_3). Production statistics on boiler slag are not available.

It is estimated that Florida uses 60%–70% of the CCPs it produces; however, EIA (2004b) reported a utilization rate of 54% in 2004. Florida imports 450,000–500,000 tons of concrete-grade fly ash per year, and some utilities are reclaiming and selling previously disposed fly ash. Fly ash and bottom ash are sold predominantly into the cement and concrete markets; boiler slag is used as a blasting grit and to manufacture roofing shingles; and gypsum is used primarily for wallboard manufacture. TECO's integrated gasification combined cycle (IGCC) Polk Station is unique in that it produces a sulfuric acid stream and a slag stream. JEA produces a circulating fluidized-bed (CFB) material, and it is used in roadbeds and highway embankments in surrounding states.

KEYS TO SUCCESSFUL CCP UTILIZATION IN FLORIDA

The 60%–70% CCP utilization rate in Florida can be directly attributed to the following key factors. The authors believe these keys are listed in order of importance.

Key 1: Florida Has a Robust Concrete Market

The National Ready Mixed Concrete Association (2005) reported that 41,326,000 cubic yards of concrete were used in Florida in 2005, up 16% from 2004. Since the mid 1990s, Florida's concrete market has boomed, with an average growth rate of 7.2% per year from 1996 to 2004. This growth has stretched the state's cement supply and made fly ash an economical and necessary substitute for portland cement. The vast majority of ready-mix companies in Florida replace 18%–22% of portland cement with Class F fly ash in their mix designs. Nearly all of the state's supply of concrete-grade Class F fly ash is used in the local concrete market, and concrete producers indicated they pay \$40–\$50 a ton. In fact, Florida imports 450,000–500,000 tons of fly ash a year, and some utilities are reclaiming and selling previously disposed fly ash for use in concrete. The concrete demand is not expected to slow down and will continue to demand more concrete-grade Class F fly ash.

Key 2: Local Cement Plants Use a Large Amount of CCPs

Florida will use about 10 million tons of cement in 2005 and has experienced about a 10% growth rate since the mid-1990s. The state's six cement plants—owned and operated by Cemex, Titan America, Rinker, Florida Rock Industries, and Suwannee American Cement—produce 5–6 million tons of cement each year. The remaining supply is imported from overseas. In addition, two new cement plants have been permitted to Natural Resources of Central Florida and Sumter Cement Company, and more cement plants are expected to be built. Florida does not export cement, but a small amount does get used in concrete in surrounding states.

Off-spec fly ash not meeting ASTM International (ASTM) C618 specifications for concrete because of high unburned carbon content is used as raw feed in Florida's cement plants. One plant is new and cannot use high unburned carbon fly ash (greater than 30% carbon) because of operational problems and the need to meet carbon dioxide (CO₂) emission requirements and total hydrocarbon limits. Bottom ash is also used as a replacement for bauxite as a cement kiln feed material. FGD gypsum is typically not used in Florida's cement plants because the wallboard plants pay a higher price for FGD gypsum than cement plants and existing supplies in the state are under long-term contracts; therefore, the cement plants use natural gypsum or synthetic gypsum from outside the state.

Key 3: Synthetic Wallboard Plants Located Adjacent to Power Plants Use All Wallboard-Quality FGD Gypsum

At present, 8.1 million tons of FGD gypsum is used to manufacture wallboard in the United States (ACAA, 2005). Of that, 1.8 million tons of FGD gypsum is being used by wallboard producers in Florida. Lafarge Gypsum, BPB, and USG Corporation own and operate

wallboard plants adjacent to coal-based power plants in Florida. Wallboard manufacture uses all of the wallboard-quality FGD gypsum produced in the state.

More FGD gypsum will be generated in Florida as additional wet scrubbers are installed to reduce sulfur dioxide (SO₂) emissions. It is estimated that the state's wallboard producers will be able to absorb at least an additional 1 million tons of FGD gypsum. Beyond that, utilities will need to look for other ways to use the material.

Wallboard producers seem to realize the environmental advantages of using FGD gypsum versus natural gypsum, but economics are really the driving force behind choosing to use FGD gypsum over natural gypsum. For those purchasing wallboard, the Leadership in Energy and Environmental Design (LEED) Program encourages the use of products made with synthetic gypsum and awards credits toward satisfying this criteria. Beyond the LEED program, there does not appear to be any other consumer-based incentives in Florida for using wallboard made from FGD gypsum versus natural gypsum, and wallboard producers do not make that distinction in marketing their products.

Key 4: FDOT Specifies and Supports CCP Use in Concrete

Florida Department of Transportation (FDOT) representatives interviewed were knowledgeable and accepting of the use of fly ash in concrete applications. Ash marketers also indicated that FDOT has been a long-time supporter of using fly ash in concrete. Nearly all of FDOT's experience with CCPs is related to fly ash as a cement replacement in concrete and the use of fly ash and bottom ash as feedstocks to produce cement.

FDOT has an approved source list of concrete sources (cement, slag, and fly ash) that are routinely used in state projects. The list also includes a biomass ash generated from burning tree bark and coal. To get on the approved source list, a CCP supplier must follow strict quality assurance/quality control procedures and submit samples to the FDOT laboratory every 3 months. FDOT recalled one instance when a fly ash supplier took itself off the approved source list because of high unburned carbon content, but FDOT did not recall a time when it had taken a CCP supplier off the list.

FDOT is responsible for writing specifications for the use of CCPs in highway applications, but it often defers to ASTM C618 specifications for fly ash in concrete and to American Association of State Highway and Transportation Officials (AASHTO) M85 specifications for cement. FDOT specifies 18%–22% Class F fly ash replacement for portland cement in regular concrete projects. FDOT indicated that there had been instances where the need for fast-setting concrete limited the amount of fly ash that was used in some projects. Mass concrete can use up to 50% fly ash and drill shafts can use 35% fly ash. FDOT, ash marketers, and ready-mix suppliers interviewed agreed these percentages allow for the best durability in marine environments and create a superior product.

Key 5: The Engineering Community Relies on Fly Ash to Produce Good-Quality and Economical Concrete

The Florida engineering community (i.e. architects, contractors, and ready-mix suppliers) is generally accepting of the use of fly ash to replace portland cement in concrete. Ash marketing companies educated the engineering community about 20 years ago about the benefits of using fly ash in concrete, and the engineering community is comfortable with using fly ash in concrete now. The acceptance is predominantly based on pure economics and performance, and the green aspects of using the material are generally overlooked. However, it should be noted that LEED awards credits for using fly ash in concrete and Florida does have active LEED chapters. Nevertheless, the engineering community relies on fly ash to supply good-quality and economical concrete and is happy to use the material.

Key 6: Florida's Electric Utilities Support Coal Ash Utilization

The electric utility representatives interviewed were middle-level managers at their companies and said that convincing upper management to make ash utilization a priority was possible once they saw the economic advantages. These economic advantages are best realized when they are shown in the operations and planning side of the electric utility rather than the fuel side because the revenue stream from selling by-products gets lost in the fuel cost. Some electric utilities in Florida have established and extremely successful ash utilization programs, while others are just starting their ash utilization efforts. All electric utility representatives interviewed said they had the support of upper management to implement ash utilization programs.

Key 7: Electric Utilities, FDEP, and FDOT Share a Common Goal to Write a Beneficial Use Rule

Electric utilities and ash marketers interviewed expressed extreme frustration in working with FDEP and indicated that they had made numerous proposals to FDEP to beneficially use CCPs over a period of decades and had been repeatedly rejected. Despite their frustrations, everyone who participated in this review appeared to be open to each others' ideas and willing to work with each other to develop a beneficial use rule that would benefit industry, consumers, and the environment.

Two previous attempts have been made to develop a beneficial use rule. In 2003, the FCG developed draft legislative bills SB 2338 and HB 1607 (see Appendix D). These bills were later abandoned after FDEP and FCG agreed the vision was too broad and because they could not agree on interim storage requirements. Although this effort did not result in new CCP regulations, this exercise was still valuable in that all parties got to know each other and understand each other's viewpoints. This legislative process was a separate undertaking from the rulemaking effort on the IWDR rule that was initiated by FDEP. A workshop to kick off this rulemaking was held in summer 2003 but was delayed primarily because of workload issues brought on by two devastating hurricane seasons and other rulemaking efforts. FDEP plans to work again on developing the IWDR rule that will address CCPs along with other industrial by-products.

At the state review session, electric utilities, ash marketers, and FDEP agreed to get together in 2006 to develop new regulations concerning industrial by-products, including CCPs. All parties agree that the new rule will likely include a list of preapproved uses and a list of uses that will need to be evaluated by FDEP on a case-by-case basis.

REPORTED BARRIERS TO INCREASING CCP UTILIZATION IN FLORIDA

The following barriers were identified during the Florida review process. The authors believe the barriers are listed in order of significance.

Barrier 1: FDEP Does Not Use a Formal Approval Process for New Beneficial Use Applications

Florida statutes [Section 403.703(13)] generally define “solid waste” to include any discarded material resulting from domestic, industrial, commercial, mining, agricultural, or governmental operations. This includes CCPs. However, there is another provision of the Florida statutes [Section 403.7045] that exempts certain materials from regulation as solid waste, if:

1. A majority of the industrial by-products are demonstrated to be sold, used, or reused within 1 year.
2. The industrial by-products are not discharged, deposited, injected, dumped, spilled, leaked, or placed upon any land or water so that such industrial by-products, or any constituent thereof, may enter other lands or be emitted into the air or discharged into any waters, including groundwater, or otherwise enter the environment such that a threat of contamination in excess of applicable department standards and criteria is caused.
3. The industrial by-products are not hazardous wastes as defined under Section 403.703.

Currently, FDEP does not have a rule implementing this section. Sometimes, FDEP points applicants to beneficial reuse guidance documents prepared for recovered screen material and waste-to-energy ash. Until a rule is promulgated, beneficial use projects are evaluated on a case-by-case basis. FDEP acknowledges that the current case-by-case approval procedure for CCP beneficial reuse is unclear.

FDEP does not issue permits for beneficial use but will provide an approval letter if requested. The approval letter affirms that the CCP will not be viewed by the state as a solid waste when managed as specified in the letter (CCP approval letters issued by FDEP are included in Appendix E). Those wanting to use CCPs are unsure as to when, where, and how to apply for an approval letter. Those interviewed said that FDEP did not give consistent direction and sometimes did not respond to projects. FDEP prefers those requesting permission to approach them with a well-defined use for the CCP and characterization data on the specific material that will be used; however, there is no clear process for requesting permission from FDEP. Sometimes the FDEP district office deals with a request, and sometimes FDEP

headquarters gets involved. This uncertainty has made CCP producers and marketers reluctant to continue requesting FDEP approval for uses outside of concrete, wallboard, and cement manufacture because they fear they will have to go through a lengthy and expensive demonstration process for each and every beneficial use application.

When deciding whether to approve an application for beneficial reuse, FDEP must determine whether or not the use will create “a significant impact to human health or the environment” and that the “by-products are not managed so as to create a threat of environmental contamination.” FDEP has definitive criteria on what constitutes pollution as described in its groundwater and surface water standards. FDEP does not have standards for determining impacts on human health but has developed soil cleanup target levels for contaminated site rehabilitation. These target levels can be used as a starting point for evaluating the potential threat to human health from direct contact with CCPs. Typically, FDEP requires applicants to supply results of CCP leaching tests conducted with the synthetic precipitation leaching procedure¹ (SPLP) and then compares the results to existing groundwater cleanup standards. If the CCP leaching test indicated no exceedances of groundwater standards, FDEP would not impose any limitations on the use of the CCP. FDEP acknowledged that not many CCPs can pass this very stringent test, although one bottom ash, when segregated from other CCPs and washed, came close to meeting the criteria and is used as an aggregate. Most CCPs will indicate exceedances and therefore, their beneficial use options are limited. As an alternative, the applicant can conduct a demonstration project involving groundwater monitoring via monitoring wells or lysimeters. FDEP will then review the results of the demonstration to make its determination.

In 2003, the FCG developed draft legislative bills SB 2338 and HB 1607 (see Appendix D). These bills were later abandoned after both FDEP and FCG agreed the vision was too broad and because they could not agree on interim storage requirements. This legislative process was a separate undertaking from the rulemaking effort on the IWDR rule that was initiated by FDEP. A workshop to kick off this rulemaking was held in summer 2003 but was delayed primarily because of workload issues brought on by two devastating hurricane seasons and other rulemaking efforts. FDEP plans to work again on developing the IWDR rule that will address CCPs along with other industrial by-products.

As previously mentioned in Key 7, the FDEP will reconvene its process to develop an IWDR rule within the next 1 to 2 years. To write the new rule, it is important that FDEP is able to answer the following questions (Tedder and McGuire, 2003):

1. How should risks to human health and the environment be evaluated?
 - a. What risk targets, or risk ranges, should be used?
 - b. What leaching tests should be used, and how should results be interpreted?
 - c. How will this be implemented for beneficial use?

¹ Synthetic Precipitation Leaching Procedure (SPLP): This method (EPA Method 1312) was developed for use in evaluating the impact that contaminated soils may have on groundwater. This is an agitated extraction method that uses simulated acid rain as an extraction fluid. If the sample is a soil, the extraction fluid used is a function of the region of the United States where the sample site is located; if the sample is waste or wastewater, the extraction fluid is a solution having a pH of 4.2; and if volatile or cyanide leachability is being evaluated, reagent water is used as the extraction fluid (Sorini, 1997).

2. How should FDEP balance beneficial use with waste cleanup concerns?
3. If used, does a material cease to be a solid waste? When does a waste become a product?
4. Should risks be balanced with expected benefits (cost-benefit analysis)?

Barrier 2: FDEP Is Not Comfortable with CCP Use in Land Applications

FDEP does not require that a CCP generator receive an individual approval to use CCPs in cement, concrete, or wallboard applications even though FDEP regulations do not explicitly authorize these uses. FDEP said these applications encapsulate the CCPs and, therefore, do not pose a direct threat to human health or the environment. However, FDEP is extremely concerned, and admittedly overly cautious, about any CCP use in land applications (geotechnical or agricultural) because of the state's high water table and extensive use of groundwater for potable use. FDEP believes there is too much of a "potential threat" to allow CCPs to be used in an application that does not encapsulate the material.

FDEP's hesitance to use CCPs in any geotechnical application spills over to FDOT. FDOT stated it would probably approve CCP use in road-building applications based on engineering performance, but it would not recommend or develop specifications for CCP use in those applications because FDEP is not comfortable with the environmental appropriateness of using CCPs in that manner.

There is one exception to this barrier. FDEP recently approved the use of a CCP in a geotechnical application after JEA invested over \$400,000 on a series of field demonstrations. JEA produces a CFB by-product generated from burning 70% petcoke and 30% coal. The by-product is now marketed as EZBase™ and comprises a mixture of hydrated sorbent mixed fly and bed ash. The chemical composition is primarily lime and gypsum, with less than 10% by weight being derived as ash from the combustion of fossil fuels. JEA said that during the approval process, the procedures for the beneficial use designation were not well defined, nor were approval requests reviewed by FDEP in a timely manner. Numerous meetings were held with various FDEP personnel from the Northeast District and Tallahassee Solid Waste Offices to determine what information needed to be generated to obtain approval for use. FDEP staff at all levels offered strong encouragement to proceed with a field demonstration and also provided input on how to capture appropriate data to accurately assess potential environmental impacts from the by-product itself relative to other commodity construction products that the by-product would displace (JEA, 2004). The approval letter to use EZBase™ for road surfacing and base course is included in Appendix E. However, JEA is concerned that similar costly demonstrations might be required by FDEP if it tried to use the material in projects where conditions deviated only slightly from those in the demonstration. Partly because of this, and partly because of general market conditions, JEA is primarily using EZBase™ in road-building application projects in other states while a local market is being developed. Additionally, JEA is currently seeking FDOT approval. If obtained, this approval is expected to facilitate use in Florida. JEA is also pursuing the bulk transport of EZBase™ by rail and barge, which could increase and facilitate use both in and out of state.

Lakeland Electric contemplated a similar demonstration effort for using its off-spec FGD by-product as a subbase for roads but would have had to install an extensive set of monitoring wells that would have made the demonstration project very costly. Lakeland Electric subsequently decided it would be more cost-effective to modify its FGD process to produce wallboard-quality gypsum. In the interim, Lakeland Electric is using its off-spec FGD gypsum as a soil amendment in Florida. The Florida Department of Agriculture supports this use, but FDEP has not issued a formal approval letter for this application.

Barrier 3: FDEP Has Not Defined What Data It Needs to Feel Comfortable with Nontraditional Uses, and Industry Has Subsequently Not Provided FDEP with Appropriate Data from CCPs Generated at Florida's Electric Utilities

With the exception of the recent JEA demonstration project, FDEP said it has not been presented with the characterization data it needs to be comfortable with using CCPs in nontraditional applications. It is important to note that FDEP has not clearly defined what data it needs and the data required varies with each request. FDEP said the limited data submitted to date displays a pronounced variability in CCP characteristics which appear to be a function of plant type, fuel source, and operational procedures which makes an unrestricted use approval for CCPs difficult. (Florida's electric utilities burn about 20% petcoke and, therefore, produce a different ash than many other utilities outside of the state). FDEP does not believe that demonstration projects conducted in other states are applicable to Florida because ashes generated in Florida were not used and Florida's high water table was not taken into consideration in determining the environmental appropriateness of using the material in specific applications. Generating these data is difficult and costly because the responsibility falls entirely to the industrial entity proposing the use, without any assistance from state government or industry groups that are available in several coal-mining states. In addition, Florida electric utilities have not yet partnered extensively with universities to develop the experience and expertise needed to perform CCP research or establish extensive databases of CCP project results.

Barrier 4: There Is No Push for CCP Recycling

Statewide, there is no push to recycle CCPs from either an industrial or governmental standpoint; however, several electric utilities and marketers indicated that numerous requests were made to FDEP in years past, but monitoring and other requirements were so restrictive that beneficial use requests in recent years have not been pursued. The efforts required to get a beneficial use approved by FDEP appear to be so insurmountable to electric utilities and marketers that they have nearly given up. Although JEA did get an approval from FDEP after it invested \$400,000 in a demonstration project, the electric utilities and marketers interviewed indicated that the outcome of this study didn't encourage them to consider similar studies. FDEP and FDOT could each only recall one recent instance when they were asked to approve the use of CCPs in a nontraditional manner. FDEP was approached by an electric utility one time to get an approval letter to use CCPs in a nontraditional application (JEA, 2004), and FDOT could recall one instance when a contractor wanted to use a flowable fill material containing fly ash inside an underground pipe. FDEP reported that there had been environmental impacts due to runoff in at least one utility CCP disposal site, making it difficult to cite environmental benefits

of using CCPs. FDOT believes that if contractors really wanted to use CCPs, they would ask FDOT to develop specifications for nontraditional uses. Additionally, there isn't a strong green building movement in Florida that recognizes the benefits of using CCPs. The environmental benefits of using CCPs are not a factor when the decision is made to use products that may or may not contain CCPs. If CCPs are used in a construction project, it is likely due to the economic savings associated with using the material.

Barrier 5: FDOT is Hesitant to Embrace CCPs as a Construction Material in Nonconcrete Applications

FDOT had very limited knowledge on the use of fly ash in nonconcrete applications. It did recall one recent instance when it approved a request from a contractor to use a CCP-based flowable fill inside an abandoned underground pipe. FDOT issued an approval after close consultation with FDEP on the environmental appropriateness of this application.

Like FDEP, FDOT would be unlikely to propose new specifications based on the results of demonstrations conducted in other states and hasn't been presented with the information needed to propose new specifications or endorse the use CCPs in a nonconcrete application. FDOT wants to be sure that the construction contractors would be completely aware of any engineering or environmental issues associated with the CCP use.

Adding to FDOT hesitance to use CCPs in nonconcrete applications, is the pressure in Florida to build roads quickly. This has made FDOT and its contractors reluctant to deviate from tried-and-true road construction methods. In fact, because of the relatively mild Florida climate, FDOT has made speed and practicality a higher priority than all-weather durability when reviewing and approving new road design and construction methods. The perception that using new materials such as CCPs could slow down the construction process (via blending, dusting, etc.) has made FDOT and its contractors hesitant to embrace CCPs as a construction material in applications other than using fly ash as a replacement for portland cement in concrete.

Barrier 6: Plant Operators Have Not Placed a Priority on Producing Consistent, Good-Quality Fly Ash

Any ready-mix supplier would agree that having a consistent quality and supply of fly ash is essential to producing good concrete. However, producing a good-quality, consistent CCP is not easy when plant operators at the utilities have not placed a priority on producing good fly ash. Naturally, the plant operator's main priority is to produce electricity, not ash, and reuse values have historically been low.

Eliminating this barrier would not necessarily increase the amount of CCPs used in Florida; however, producing a consistent, high-quality fly ash would increase the overall economic value of the fly ash because it could be sold to the higher-value ready-mix concrete market. Furthermore, if mercury air emission regulations render off-spec ash unsuitable for cement kilns, then the production of concrete-quality ash in Florida may become essential.

Florida electric utilities have the support of upper management to embrace coal ash utilization. One utility has already used this company support to initiate a formal training program to teach plant operators about the value of producing consistent-quality ash, while meeting emission requirements. Other utilities hope to implement similar education programs to teach plant operators about ash production, management, and the value of beneficial use opportunities.

In addition, some Florida electric utilities are using or are considering investing in beneficiation systems to produce concrete-grade fly ash which will allow some fly ashes with either high unburned carbon or ammonia content to meet ASTM C618 specifications for use in concrete. However, the combustion facility associated with the use of carbon burnout (CBO) systems may be categorized by FDEP as a new NO_x source. If categorized in this manner, the installation of CBO systems may trigger New Source Review (NSR) requirements under the Prevention of Significant Deterioration provisions of the Clean Air Act. The overall impact of this designation is currently unclear, and the permitting process needs revision.

POTENTIAL THREATS THAT COULD IMPACT FUTURE CCP UTILIZATION IN FLORIDA

Florida currently has a thriving coal ash industry, but the following potential threats could hinder the future of CCP utilization in the state. Based on review discussions, the authors believe the following threats are listed in order of importance.

Threat 1: FDEP May Have Unwarranted Concerns about Ash Handling and Interim Storage

CCP producers, ash marketers, and ready-mix suppliers believe FDEP is overly and unnecessarily concerned about environmental contamination that may result from interim storage (stockpiling) of CCPs. In some cases, FDEP has required end users to install expensive liners under temporary CCP storage areas as a precautionary measure. FDEP also requires the material to be covered. These requirements were viewed as unfair because they do not apply to comparable materials or even to materials that interviewees considered to be of greater threat of environmental contamination, such as coal or limerock. CCPs are essentially being treated as a regulated solid waste by FDEP in this regard.

FDEP believes utilities want to avoid disposal if at all possible, not just because of the direct cost of developing a Class I double-lined disposal site, but because of vehement public opposition to new landfills. To avoid landfilling and limit the need for siting and constructing new disposal facilities, some electric utilities are storing CCPs on-site with the intent of eventually selling the materials for use. However, long-term on-site storage is viewed by FDEP as waste disposal.

If electric utilities were to try to avoid regulation by implementing interim storage in lieu of long-term disposal, FDEP would take the necessary steps to reprimand violators. If a case such as this occurred, FDEP will take proactive measures to make certain that interim storage

does not become a pseudo landfill. If FDEP decided to impose strict temporary storage requirements, transport and use of CCPs may become uneconomical because the material will have to be handled as a regulated solid waste rather than as a product like cement.

Threat 2: Mercury Emissions from Cement and Wallboard Manufacture May Make CCP Use Unacceptable

FDEP's NSR air permit program is designed to ensure that air quality is not significantly degraded by the addition of new, and modification of existing, sources of air pollution. NSR provides assurance that any large new or modified air pollution source will be as clean as possible and that advances in pollution control occur concurrently with facility expansion. The implementation of the U.S. Clean Air Mercury Rule (CAMR) may result in increased mercury associated with fly ash and FGD material as a result of mercury emission reduction technologies being installed at coal-based power plants. Since fly ash and FGD material are used in cement and wallboard manufacturing, electric utilities and cement and wallboard manufacturers are concerned that FDEP's NSR may limit or even eliminate the use of CCPs in these products. Similar impacts may also occur for fly ash containing higher levels of unburned carbon or other components resulting from changes in operations, fuel, or emission controls.

Wallboard producers are well aware that there are potential issues regarding the ultimate fate of mercury from FGD gypsum used in wallboard manufacture and that tighter mercury limits could restrict the use of FGD gypsum in wallboard. Wallboard manufactures are conducting independent studies on this issue, but USG Corporation publicly reports its research in this area (Marshall et al., 2005).

Likewise, FDEP's state permitting rules specify an emission threshold of 0.1 tons of mercury per year on cement plants (Florida Administrative Code, 2005), limiting the amount of fly ash that can be used. At that level or beyond, applicants must propose, with final determination from FDEP, the best available control technology (BACT) for mercury control. To avoid mercury control technologies, most Florida cement plants agree to emit less than 200 lb of mercury per year. FDEP reviews are typically for one kiln at a time, so a cement plant can have a limit greater than 200 lb of mercury per year. Following the FDEP review session, FDEP proposed a limit on mercury emissions of 122 lb per year for a new cement plant (FDEP, 2005).

Furthermore, EPA's proposed rule on National Emission Standards for Hazardous Air Pollutants for the Portland Cement Manufacturing Industry (Federal Register, 2005) suggests that one possible solution to reduce mercury emissions from cement kilns would be to "ban the use of fly ash from a utility boiler that is controlling mercury as an additive to cement kiln feed." Importantly, the proposed rule does not explicitly define the term "utility boiler that is controlling mercury"; therefore, environmental advocates are likely to claim that all coal utility boilers with particulate collection devices are controlling mercury to some extent via capture of mercury on fly ash, even when no efforts to enhance such capture are being made by the utility. The proposed ban could eliminate all current and future use of fly ash as a cement kiln feed.

Threat 3: Florida's CCP Utilization Options Are Not Diversified

CCP utilization in Florida relies nearly entirely on three uses: 1) concrete, 2) cement, and 3) wallboard. If any of these uses became uneconomical, unacceptable, or inappropriate for the types of CCPs being produced, other options for use have not been well evaluated by industry and the state does not have rules or policies in place that would allow it to quickly and effectively look into other beneficial use options.

Threat 4: Fly Ash with High Unburned Carbon May Become Unsuitable for Use in Cement Manufacture

Florida electric utilities that have installed low-NO_x (nitrogen oxide) burners have subsequently produced a fly ash with high unburned carbon content. These fly ashes are no longer suitable for use in concrete and, therefore, are sold to cement manufactures. As reported in Key 2, one new cement plant in Florida is new and cannot use high unburned content fly ash (greater than 30% carbon) because of operational problems and the need to meet CO₂ emission requirements and total hydrocarbon limits. It is unknown if the proposed new cement plants in Florida will experience similar issues.

ACTIONS THAT COULD INCREASE CCP USE IN FLORIDA

The following activities were suggested during the reviews as actions that would help increase CCP utilization in Florida and are believed to be listed in order of significance.

Action 1: Industry Will Collectively Work with FDEP to Develop a Beneficial Use Rule

FDEP does not have a beneficial use rule to evaluate the reuse of CCPs, and projects are evaluated on a case-by-case basis. An attempt was made in 2003 by FCG to develop legislation on this issue, but the effort was abandoned. FDEP tried in 2003 to develop an IWDR rule, but that process was delayed and hasn't been a top priority for FDEP. As a collective group, the FCG and ash marketers plan to revisit this issue in 2006 and work with FDEP to develop an IWDR rule within the next 1 to 2 years.

The new rule is expected to apply to all industrial by-products and will have a specific subsection that applies to CCPs. It is likely that the new rule will include a list of approved CCP sources that can be used in specific applications. In addition, the new rule will establish a process for evaluating beneficial use and set clear criteria for evaluating proposed projects. Beneficial use applications not on the preapproved list will need to apply for an approval letter and will likely require a demonstration. The new rule should also outline the requirements for a demonstration.

It is imperative that Florida's electric utilities, ash marketers, end users, and the FDOT are involved in this rulemaking effort and continue to push FDEP to make this rule a priority. FDEP realizes this process will be cumbersome and complicated and will look to key CCP stakeholders

for guidance. If the CCP stakeholders are able to collectively approach FDEP with one universal message, much like the Texas Coal Ash Users Group did in Texas, it is more likely that a rule will be written that will increase the beneficial use of CCPs in Florida.

Action 2: FDEP and Electric Utilities Need to Agree on Less Stringent Temporary Storage and Ash-Handling Practices

When FCG drafted legislation and presented it to FDEP in 2003, the effort was abandoned, in part, because the two parties could not agree to reasonable temporary storage and ash-handling practices. The regulatory oversight and restrictions placed on generators and end users of CCPs need to contain flexibility with respect to temporary storage locations and practices so that the respective costs associated with such practices do not preclude beneficial use opportunities. CCP generators, in turn, must establish temporary storage locations and adopt management practices that clearly demonstrate their intent to store and not dispose of the CCPs. Temporary storage and management concepts that are flexible, scientifically based, and protective of human health and the environment should be developed. Existing university research and reports should be consulted in this regard (FCG, 2006).

Action 3: FDEP Needs to Determine What Ash Characterization Data It Needs, and Industry Needs to Provide It

FDEP said it does not have the necessary ash characterization data to be comfortable with the use of CCPs in applications other than cement, concrete, and wallboard. It also said that data generated from other states are not sufficient because the fuel source and combustion systems are different; hence, the CCPs will be different. It would use out-of-state data with in-state data to analyze the acceptability of a beneficial use.

Electric utilities and ash marketers argued that FDEP has not identified what data it is concerned with or what specific data it would need to be able to make a decision on a beneficial use. Based on previous experience working with FDEP, electric utilities and ash marketers believe field data would be required because FDEP is not certain laboratory leaching is a good predictor of what will happen in the real world.

To address this issue, FDEP said it would like a statewide CCP characterization database. It would use this database to develop an approved ash source list, similar to FDOT's list. Those ashes could be used in preapproved applications. FDEP indicated that total metals analysis and leaching analysis would be useful information for the database. FDEP is not sure how this characterization data should be generated because it does not know what leaching protocol would be the best predictor of what would happen in the field. FDEP tends to favor the SPLP method; however, it is open to using the toxicity characteristics leaching procedure² (TCLP) and

² Toxicity Characteristics Leaching Procedure (TCLP): The TCLP was designed to determine the mobility of 40 toxicity characteristics constituents in liquid, solid, and multiphase waste. TCLP is the regulatory method EPA uses for classifying wastes as hazardous or nonhazardous. The TCLP was designed to simulate the leaching a waste will undergo if disposed in an unlined sanitary landfill. It is an agitated extraction test using extraction fluid that is a function of the alkalinity of the solid phase of the waste (Sorini, 1997).

the synthetic groundwater leaching procedure³ (SGLP). The EERC is currently working on an ASTM procedure that would allow one to select the appropriate leaching procedure. FDEP said it would likely use this ASTM method to select a leaching procedure.

Action 4: State and Federal Programs Could Provide Stronger Encouragement and Incentives to Recycle CCPs

Offices such as FDEP and FDOT will likely continue on the same path if they are not approached to change policies. Both offices indicated that they do not have a push from the state or federal government to use CCPs. The only push to recycle industrial by-products in Florida was in 1974 when the Florida Resource Recovery and Management Act (Chapter 403.701.) required each county to prepare a Solid Waste Management Plan. In 1988, this Act was amended by the Solid Waste Management Act to establish state goals, regulations, and programs for a host of solid waste activities. The Act sets recycling goals and requires counties to develop recycling programs to meet these goals. It also creates programs to encourage the recycling of specific materials such as waste tires, compost, and batteries. However, the Act does not address or encourage the beneficial use of CCPs.

In Texas, both the transportation and environmental departments had programs that promoted the use of recycled materials, including CCPs. These programs were a result of the state senate passing a bill to establish the Recycling Market Development Board (RMDB). The RMDB was charged with coordinating the recycling activities of all state agencies and pursuing an economic development strategy that focuses on the state's waste management priorities and the development of recycling industries and markets. Programs such as EPA's Coal Combustion Products Partnership (C²P²) could encourage CCP use at the state level by showing state legislators how initiatives such as the RMDB encouraged recycling in other states. The promotion of Comprehensive Procurements Guidelines may also be helpful in encouraging states to recycle.

Action 5: Electric Utilities Should Educate Plant Operators about the Value of Producing Consistent, Good-Quality CCPs

Utilities mentioned that one of their biggest hurdles is to educate their own plant operators about how to produce good-quality CCPs on a consistent basis. One utility interviewed said it already has an internal education program for plant operators under way. External educational programs could be developed by universities, with funding from utilities and the federal government, to teach plant operators about how to produce electricity efficiently while meeting emission control requirements and still maintaining a consistent by-product. Colleges educating future plant operators could also integrate ash production and management into their course curriculum.

³ Synthetic Groundwater Leaching Procedure (SGLP): The SGLP was developed by the EERC to 1) simulate natural groundwater conditions with respect to groundwater chemistry, 2) be flexible enough to be site-specific, and 3) be directly comparable to the TCLP. The steps involved in the SGLP are the same as those performed in the TCLP, except synthetic groundwater is used in place of the specified acetic acid solution or sodium acetate buffer solution (Sorini, 1997).

Action 6: The Florida CCP Industry Should Develop Partnerships with Universities

Universities that have a long track record of conducting performance tests and environmental evaluations of CCPs are often viewed by state regulators as a relatively unbiased source of CCP data. By establishing and maintaining long-term partnerships with universities, the Florida CCP industry could help create a useful resource for future efforts to promote CCP beneficial use. The universities would be able to develop an enhanced level of expertise in CCPs and could establish an infrastructure that may 1) facilitate the collection of scientific data to support the development of regulations and 2) attract federal, state, and private funding to support future research, development, and demonstration projects related to CCPs.

CONCLUSIONS

Florida is a perfect example of how economics play a crucial role in utilizing CCPs. Even without the regulatory framework in place to encourage CCP use, Florida has managed to successfully utilize 60%–70% of the CCPs it produces and even imports fly ash from surrounding states. This high utilization rate is directly attributed to the state's large number of cement and wallboard manufacturers and its high and growing demand for concrete. These three markets depend on CCPs to economically produce their products.

Although it is expected that these industries will continue to grow and demand more CCPs, there are some potential threats that exist that could negatively impact these markets. The biggest threat is mercury. It is still unknown if mercury captured on fly ash and FGD materials as a result of clean air emission regulations will be rereleased into the environment. Using fly ash or FGD gypsum from power plants with mercury control technologies in the manufacture of cement or wallboard could be prohibited in the future. Also, if thermal beneficiation systems such as CBO are used at Florida coal-based power plants, these systems could be viewed as new NO_x sources by air regulatory agencies. In turn, this designation would subject the host facilities to increased regulatory burdens and could trigger the imposition of NO_x emission restrictions on their main pulverized coal boilers that are much more stringent than if the CBO system were not present. If CCPs became unacceptable to use in one of these key industries, Florida does not have the framework in place to readily explore new beneficial use applications.

Perhaps the most enlightening part of the Florida review came when FDEP acknowledged it wants to support CCP use in principle, but that the actual possibility of use with the current regulatory framework is difficult at best. FDEP has a cautious and informal approach to beneficial use, which limits the amount of applications submitted to FDEP because users are not sure how to approach FDEP, nor are they sure of what is required to get a beneficial use application approved. FDEP generally accepts encapsulated uses (cement, concrete, and wallboard) but wants vast amounts of data to meet its subjective criteria for other applications.

To increase utilization in Florida, the first step Florida may take is to develop a beneficial use rule for CCPs. Based on information presented, it is not anticipated that FDEP will adopt a substantively less restrictive approach toward CCP use in land applications. Electric utilities are not expected to push for this use because the cost to dispose the material will likely be cheaper

than the cost to conduct large-scale demonstrations with the hope that FDEP may approve an application. However, it may be possible to develop less restrictive provisions for temporary CCP storage and management that reduces the impact of this barrier to CCP use. In addition, federal and state governments could help Florida make strides toward beneficial use in nontraditional applications by providing outside funding to conduct large-scale demonstrations.

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APPENDIX A

**ADVISORY BOARD AND REVIEW TEAM
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**REVIEW OF FLORIDA REGULATIONS, STANDARDS, AND PRACTICES RELATED
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**Review team members.*

APPENDIX B
REVIEW GUIDE

REVIEW OF FLORIDA REGULATIONS, STANDARDS, AND PRACTICES RELATED TO THE USE OF COAL COMBUSTION PRODUCTS

Florida Review Guide

December 6–8, 2005

BACKGROUND

The University of North Dakota Energy & Environmental Research Center (EERC), in cooperation with the U.S. Environmental Protection Agency and the U.S. Department of Energy, is conducting a second review of state regulations, standards, and practices related to the use of coal combustion products (CCPs). The first state review was conducted in Texas in September 2004. The final report from the Texas state review can be accessed online at www.undeerc.org/carrc/html/review.html.

GOAL

The primary goal is to review factors related to the use of CCPs in Florida and develop recommendations that may help Florida and other states increase the use of CCPs in an environmentally sound manner. Florida was selected as the second state for an in-depth review of its capacity to generate coal-based electricity, eastern location, and current regulation status. It is anticipated that at least one additional state review will be conducted after Florida's.

SCOPE

The scope of the Florida review, as identified by the project's advisory board members, is to evaluate the various factors related to CCP use in Florida. In order to focus the study on current practices, which are most readily transferable, the Florida review will highlight various CCP use practices, including highway construction and building practices, and will not consider the use of CCPs at mine sites. This is not to diminish the use of CCPs at mine sites but to recognize the national regulatory review on the use of CCPs at mine sites, which is being conducted independently of this review.

PROCESS

The review team will travel to Florida to visit state agencies and other key stakeholders involved in CCP utilization. Six discussion groups will be formed to answer questions posed by the review team. The discussion groups include the following:

- Government agencies – directors and other key personnel of state or regional transportation and environmental agencies
- CCP generators – utility environmental and ash managers

- CCP suppliers – CCP marketers and suppliers of ash beneficiation systems
- Cement and concrete – ready-mix concrete suppliers and cement producers
- Wallboard – users of synthetic gypsum for wallboard production and suppliers of FGD beneficiation systems
- Open meeting conference call – open to anyone who is unavailable to attend their scheduled session

INSTRUCTIONS

Please come to the review prepared to answer the following list of questions, and assemble all applicable information prior to the review. Answer the questions as completely as is reasonably possible without stating proprietary information. If you would prefer to answer questions in writing, as well, please provide written comments to Tera Buckley at tbuckley@undeerc.org. Any written documentation or responses you can provide will ensure that exact citations are included in the final report and are extremely helpful to the review team. The time allotted for the review is noted in the enclosed agenda. The review will be recorded.

AGENDA
The Towers at Westshore
1408 N. Westshore Blvd., Suite 1002
Tampa, FL 33607
Phone: (813) 289-5644

Tuesday, December 6, 2005

- | | |
|------------------------|--|
| 8:15 a.m. – 8:45 a.m. | Review Team Kickoff Meeting |
| 9:00 a.m. – 12:00 p.m. | CCP Generators |
| 1:30 p.m. – 4:30 p.m. | Florida Department of Environmental Protection |
| 4:30 p.m. – 5:00 p.m. | Review Team Meeting |

Wednesday, December 7, 2005

- | | |
|-------------------------|--------------------------------------|
| 10:00 a.m. – 12:30 p.m. | Florida Department of Transportation |
| 1:30 p.m. – 4:30 p.m. | Cement and Concrete |
| 4:30 p.m. – 5:00 p.m. | Review Team Meeting |

Thursday, December 8, 2005

- | | |
|-------------------------|---------------------|
| 8:30 a.m. – 11:30 a.m. | CCP Suppliers |
| 11:30 a.m. – 12:00 p.m. | Review Team Meeting |

Open Meeting Conference Call

A conference call is scheduled for Wednesday, December 14, 2005, at 10:00 a.m. (EST) for those who are unable to attend their scheduled review session. If you would like to participate in this conference call, contact Tera Buckley by e-mail at tbuckley@undeerc.org or phone at (701) 777-5296. Written comments will also be accepted until December 14, 2005.

GOVERNMENT AGENCIES

1. What is your agency's role in the use of CCPs?
2. What type of infrastructure (i.e., employees, programs) has your agency dedicated to CCP management?
3. For which of the following CCPs does your agency have guidelines, guidance documents, material specifications, regulations, orders, or statutes? If applicable, provide references for, and dates of, the specific guidelines, guidance documents, material specifications, regulations, orders, or statutes related to CCPs.
 - a. Fly ash
 - b. Bottom ash
 - c. Flue gas desulfurization material
 - d. Boiler slag
 - e. Cenospheres
 - f. Fluidized-bed combustor ash
 - g. Integrated gasification combined cycle (IGCC) residuals
 - h. Other _____
4. How would changes to the chemical or physical composition of CCPs impact your agency's role in the generation, use, or disposal of CCPs? For example, new air pollution control requirements may increase the carbon and mercury content of CCPs.
5. Are there any plans to implement any new policies, rules, or regulations regarding CCPs currently in process or expected in the near future? For example, some Florida utilities are considering increasing the amount of petcoke they burn which will impact the CCPs produced. Does your agency foresee and changes to the current regulations as a result of this change in fuel source?
6. What process does your agency undergo to make changes to its policies, rules, or regulations?
7. Please list and explain any successful projects/applications using CCPs. Why were they successful?

8. Please list and explain any problematic projects/applications using CCPs. Explain the problems encountered and any instances where the use of CCPs was precluded in a project.
9. Please list and explain any cases in Florida where the use of CCPs has caused environmental damage or resulted in violations of environmental requirements. Describe any corrective actions, monitoring, and follow-up employed to address the issues.
10. In your opinion, what is the biggest obstacle hindering the increased use of CCPs in Florida? How could this obstacle be addressed?
11. Which of the following sources of information does your agency rely on in approving the use of CCPs in particular applications?
 - a. _____ Surveys of current practices (federal or state)
 - b. _____ Demonstration projects
 - c. _____ Internal (agency) testing and evaluations
 - d. _____ Technical reports submitted by qualified consultants
 - e. _____ Research projects or reports by other agencies, research institutions, or consultants
 - f. _____ Other _____
 - g. _____ Other _____
12. What further research, laboratory work, or policy initiatives would be necessary to assist your agency in overcoming barriers?
13. In general, how do you perceive the position that Florida has taken toward CCPs in comparison to other states?

CCP GENERATORS

1. Are there any operational or business issues that impact the way you process or handle CCPs?
2. What types of quality assurance/quality control procedures are employed at your company with regard to CCPs?
3. How would changes to the chemical or physical properties of CCPs impact your company's role in the generation, use, or disposal of CCPs? For example, new air pollution control requirements may increase the carbon and mercury content of CCPs.
4. Please indicate your thoughts on the current CCP specifications or guidelines that you are aware of in the state of Florida. Are there any environmental policies, permits, regulations, or statutes that impact the way you process and handle CCPs? What specifications or guidelines do you feel promote or restrict CCP utilization? What changes would you like to see made to the current specifications and guidelines?
5. Are you or your CCP users (marketers/contractors) provided with the flexibility to make the decision to utilize CCPs when the material meets standard specification requirements, or does the state require additional approvals and testing?
6. Please list and explain any successful projects/applications using CCPs. Why were they successful?
7. Please list and explain any problematic projects/applications using CCPs. Explain the problems encountered and any instances where the use of CCPs was precluded in a project. Describe any corrective actions, monitoring, and follow-up employed to address the issues.
8. Provide details of any ongoing or completed research and demonstration projects regarding CCPs.
9. In your opinion, what is the biggest obstacle hindering the increased use of CCPs in Florida? How could this obstacle be addressed? Would any changes to state or federal regulations help you address this obstacle?
10. What barriers has your company overcome to increase the use of CCPs? How?
11. What further research, laboratory work, or policy initiatives would be necessary to assist your company in overcoming barriers?
12. In general, how do you perceive the position that Florida has taken toward CCPs in comparison to other states?

CCP SUPPLIERS

1. Provide a general description of the CCP market in Florida, including supply and demand, and identify the major use applications. Specifically, describe the current state of CCP use in road building and commercial and residential building construction projects.
2. Please indicate your thoughts on the current specifications or guidelines that you are aware of in the state of Florida related to CCPs. Are there any environmental policies, permits, regulations, or statutes that impact the way you process and handle CCPs? What specifications or guidelines do you feel promote or restrict CCP utilization? What changes would you like to see made to the current specifications and guidelines?
3. Please list and explain any successful projects/applications using CCPs. Why were they successful?
4. Please list and explain any problematic projects/applications using CCPs. Explain the problem encountered and any instances where the use of CCPs was precluded in a project. Describe any corrective actions, monitoring, and follow-up employed to address the issues.
5. What role do other alternative materials (i.e. foundry sand) play in your business?
6. How would changes to the chemical or physical composition of CCPs impact your company's role in the management of CCPs? For example, new air pollution control requirements may increase the carbon and mercury content of CCPs.
7. In your opinion, what is the biggest obstacle hindering the increased use of CCPs in Florida? How could this obstacle be addressed? Would any changes to state or federal regulations help you address this obstacle?
8. What further research or laboratory work would be necessary to overcome barriers to CCP utilization?
9. In general, how do you perceive the position Florida has taken towards CCPs in comparison to other states?

CEMENT AND CONCRETE

1. Provide a general description of the cement and concrete markets in Florida. Is supply meeting demand? How much concrete is being used in various segments of the market (i.e. residential, commercial, highway construction)? How much fly ash or FGD gypsum is being used for cement and concrete manufacture?
2. What is the general feeling toward CCPs in your industry? How would you describe the competition between fly ash and portland cement?
3. Please indicate your thoughts on the current specifications or guidelines that you are aware of in the state of Florida related to CCPs. Are there any environmental policies, permits, regulations, or statutes that impact the way you utilize CCPs? What specifications or guidelines do you feel promote or restrict CCP utilization? What changes would you like to see made to the current specifications and guidelines?
4. Please list and explain any successful projects/applications using CCPs. Why were they successful?
5. Please list and explain any problematic projects/applications using CCPs. Explain the problem encountered and any instances where the use of CCPs was precluded in a project. Describe any corrective actions, monitoring, and follow-up employed to address the issues.
6. How would changes to the chemical or physical composition of CCPs impact how your company uses CCPs? For example, new air pollution control requirements may increase the carbon and mercury content of CCPs.
7. In your opinion, what is the biggest obstacle hindering the increased use of CCPs in Florida? How could this obstacle be addressed? Would any changes to state or federal regulations help you address this obstacle?
8. What further research or laboratory work would be necessary to help your company overcome barriers to CCP utilization?
9. In general, how do you perceive the position Florida has taken towards CCPs in comparison to other states?

WALLBOARD

1. Provide a general description of the wallboard market in Florida. Is supply meeting demand? How much FGD gypsum is being used for wallboard manufacture? Is any FGD gypsum being imported or exported?
2. What is the general feeling toward FGD gypsum in your industry? How would you describe the competition between natural gypsum and FGD gypsum? Does the wallboard industry encounter any product acceptance issues with regards to purchasing wallboard made from FGD gypsum vs. natural gypsum?
3. Please indicate your thoughts on the current specifications or guidelines that you are aware of in the state of Florida related to CCPs. Are there any environmental policies, permits, regulations, or statutes that impact the way you utilize FGD gypsum? What specifications or guidelines do you feel promote or restrict FGD gypsum utilization? What changes would you like to see made to the current specifications and guidelines?
4. As the government continues to reduce SO₂ emissions and thereby increase FGD gypsum production, how will these changes impact the way your company does business?
5. Research is underway to determine if mercury contained in FGD gypsum will be released during wallboard production or disposal. What approach is your company taking to deal with this issue?
6. Can you offer any advice to utilities looking to utilize their FGD gypsum?
7. In your opinion, what is the biggest obstacle hindering the increased use of CCPs in Florida? How could this obstacle be addressed? What state or federal regulations could be implemented to overcome these obstacles?
8. What further research, laboratory work, or policy initiatives would be necessary to overcome barriers to CCP utilization?
9. In general, how do you perceive the position Florida has taken towards CCPs in comparison to other states?

MAKE-UP CONFERENCE CALL

1. In your experience, what are the significant factors impacting the use of CCPs in Florida?
2. Please indicate your thoughts on the current specifications or guidelines that you are aware of in the state of Florida related to CCPs. What specifications or guidelines do you feel promote or restrict CCP utilization? What changes would you like to see made to the current specifications and guidelines?
3. How would changes to the chemical or physical composition of CCPs impact your association's/company's role in the generation, use, or disposal of CCPs? For example, new air pollution control requirements may increase the carbon and mercury content of CCPs.
4. Provide details of any ongoing or completed research or demonstration projects regarding CCPs. Specify any successes or problems.
5. In your opinion, what is the biggest obstacle hindering the increased use of CCPs in Florida? How could this obstacle be addressed?
6. What further research, laboratory work, or policy initiatives would be necessary to overcome barriers to CCP utilization?
7. In general, how do you perceive the position Florida has taken toward CCPs in comparison to other states?

APPENDIX C
PARTICIPANT LIST

**REVIEW OF FLORIDA REGULATIONS, STANDARDS, AND PRACTICES RELATED TO
THE USE OF COAL COMBUSTION PRODUCTS**

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APPENDIX D

**FLDOT SPECIFICATIONS RELATED TO THE
USE OF CCPS**

FLDOT SPECIFICATIONS RELATED TO THE USE OF CCPS

Excerpted from:

Dockter, Bruce A.; Jagiella, Diana M. *Engineering and Environmental Specifications of State Agencies for Utilization and Disposal of Coal Combustion Products*; Final Report Prepared for the Combustion By-Products Recycling Consortium; CBRC Project No. 02-CBRC-W12, EERC Publication No. 2005-EERC-07-04; July 2005.

Unless a specific type of cement is designated elsewhere, use Type I, Type IP, Type IS, Type IP (MS), Type II, or Type III cement in all classes of concrete. Use only the types of cements designated for each environmental condition in structural concrete. A mix design for a more aggressive environment may be substituted for a lower environmental condition.

In bridge superstructures, blended cements are allowed in slabs, barriers, precast, and prestressed applications exposed to moderately aggressive environments. In extremely aggressive environments, the recommended cementitious mixtures are Type II cement with fly ash or GGBF slag. For bridge substructures, drainage structures, and other structures, the recommendations are basically the same.

Pozzolans and slags can be used as desired on an equal weight replacement basis. It is allowable to use fly ash, silica fume, Metakaolin, other pozzolans, and slag materials as a partial cement replacement in all classes of concrete, with the following limitations:

- Mass concrete:
 - Fly ash – ensure that the quantity of cement replaced with fly ash is 18% to 50% by weight.
 - Slag – ensure that the quantity of cement replaced with slag is 50% to 70% by weight. Ensure that slag is 50% to 55% of total cementitious content by weight of total cementitious materials when use in combination with silica fume and/or metakaolin.
- Drilled shaft:
 - Fly ash – ensure that the quantity of cement replaced with fly ash is 33% to 37% by weight.
 - Slag – ensure that the quantity of cement replaced with slag is 58% to 62% by weight.

- For all other concrete uses not covered in “mass concrete” and “drilled shaft” above:
 - Fly ash – ensure that the quantity of cement replaced with fly ash is 18% to 22% by weight.
 - Slag – ensure that the quantity of cement replaced with slag is 25% to 70% for slightly and moderately aggressive environments and 50% to 70% by weight when used in extremely aggressive environments. Ensure that slag is 50% to 55% of total cementitious content by weight of total cementitious materials when used in combination with silica fume and/or metakaolin.
- Type IP (MS): Ensure that the quantity of pozzolan in Type IP (MS) is in the range of 15% to 40% by weight.
- Silica fume and metakaolin
 - Cure in accordance with the manufacturer’s recommendation and approved by the engineer.
 - Silica fume – ensure that the quantity of cement replaced with silica fume is 7% to 9% by weight.
 - Metakaolin – ensure that the quantity of cement replaced with metakaolin is 8% to 12% by weight.

For reinforced concrete that does not require Type II cement plus slag or pozzolan(s), all applications that require Type II cement plus pozzolan(s), and prestressed concrete, there is a table specifying the maximum chloride content limits for each of the concrete applications.

A flowable fill mixture, which is designed to be excavatable, is not allowed to contain fly ash, contain 75–100 pounds of cement per cubic yard, and have a maximum 28-day strength of 100 psi. A flowable fill mixture, designed to be nonexcavatable is to contain 75–100 pounds of cement and 150–600 pounds of fly ash per cubic yard and have a maximum 28-day strength of 125 psi.

Fly ash derived from the combustion of ground or powdered coal shall meet the requirements of ASTM C618 for Class C or Class F. Sampling and testing shall follow the requirements of ASTM C311. Fly ash resulting from the combustion of coal and petroleum coke shall meet the physical and chemical requirements of ASTM C618 Class F fly ash. Fly ash shall not include the residue resulting from the burning of municipal garbage or any other refuse with coal or the burning of industrial or municipal garbage in incinerators. Fly ash resulting from the combustion of timber bark ash and coal shall meet the physical and chemical requirements of ASTM C618 Class F fly ash.

GGBF slag shall meet the requirements of ASTM C989. Sampling and testing procedures shall follow the requirements of ASTM C989. Microsilica shall meet the requirements of ASTM C1240 using the referenced test methods and frequencies.

Metakaolin shall meet the requirements of ASTM C618 Class N with the following modifications:

- The sum of $\text{SiO}_2 + \text{Al}_2\text{O}_3 + \text{Fe}_2\text{O}_3$ shall be at least 85%.
- The loss on ignition shall be less than 3.0%.
- The available alkalis, as equivalent Na_2O , shall not exceed 1.0%.
- The amount of material retained on a No. 325 mesh sieve shall not exceed 1.0%.
- The strength activity index, at 7 days, shall be at least 85%.

When metakaolin is used in concrete, the test results shall verify improved or comparable strength, sulfate resistance, corrosion protective properties, and other durability performance properties of concrete, as compared to the performance of silica fume concrete.

The suppliers of fly ash, GGBF slag, and microsilica are required to furnish, at the time of shipment, certification of test results from samples of the material taken during production or transfer to ensure compliance to applicable ASTM requirements. In the case of the fly ash, the laboratory performing the fly ash testing is required to be inspected by the CCRL on a regular basis as a fly ash testing laboratory and shall have corrected any deficiencies noted at the previous inspection. The laboratory must authorize the CCRL to send a copy of the inspection report to the state Materials Office.

When a Class C fly ash is used in moderately or extremely aggressive environments, tests made by the supplier shall verify improved sulfate resistance of the concrete in accordance with ASTM C1012 and improved corrosion protective properties as compared to similar concrete made with the Class F fly ash. No mix designs will be approved in advance of satisfactory completion of such tests.

For sources where the fly ash is not derived solely from ground or powdered coal combustion, certified test results performed by an independent approved laboratory shall be submitted by the supplier. Only GGBF slag grade 100 or better (28-day index) will be permitted. For slurried or densified microsilica, tests shall be made on the raw microsilica from which these products were made.

Neither fly ash nor slag shall be used in conjunction with Type IP or Type IS cements. Acceptance of fly ash, slag, microsilica, and metakaolin from sources operating under an approved quality control plan shall be based on certified testing meeting the appropriate ASTM requirements for each material. When the loss on ignition exceeds 5% for fly ash, the uniformity requirements in the supplementary optional physical requirement shall be mandatory.

APPENDIX E

**DRAFT LEGISLATIVE CCP BENEFICIAL REUSE
BILLS**



HB 1607

2003

1 A bill to be entitled

2 An act relating to environmental protection; creating s.
3 403.7047, F.S.; exempting beneficial use of fossil fuel
4 combustion products from specified regulations; defining
5 "fossil fuel combustion products," "beneficial use,"
6 "structural fill," "pavement aggregate," "pipe bedding
7 aggregate," and "fossil fuel-fired electric or steam
8 generation facility"; providing requirements and
9 procedures for certain projects to be considered
10 beneficial use; requiring the Department of Transportation
11 to maintain certain plans; requiring that department to
12 notify the Department of Environmental Protection where
13 said plans are located; providing an effective date.

14
15 WHEREAS, fossil fuel combustion products are currently
16 utilized in a variety of beneficial applications, and

17 WHEREAS, beneficial use of fossil fuel combustion products
18 reduces the volume of materials placed in disposal facilities,
19 and

20 WHEREAS, beneficial use of fossil fuel combustion products
21 allows certain industries and end-users to avoid the mining and
22 processing of virgin materials through substitution of fossil
23 fuel combustion products, which preserves natural resources and
24 minimizes environmental emissions, and

25 WHEREAS, beneficial use of fossil fuel combustion products
26 ultimately lowers overall energy consumption required for
27 processing and disposing of fossil fuel combustion products, and

28 WHEREAS, beneficial use of fossil fuel combustion products
29 promotes economic activity while replacing limited natural
30 resources, and



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31 WHEREAS, beneficial use of fossil fuel combustion products
 32 is consistent with and furthers the purpose of Florida's
 33 Resource Recovery and Management Act by encouraging the
 34 development of waste reduction and recycling as a means of
 35 managing solid waste and conserving resources, and

36 WHEREAS, the Legislature has determined that it is in the
 37 state's best interest to conserve natural resources, reduce
 38 overall energy consumption, reduce or eliminate the need to
 39 dispose of fossil fuel combustion products in disposal
 40 facilities, and facilitate the development of readily available
 41 markets for fossil fuel combustion products, and

42 WHEREAS, the Legislature is taking this action after
 43 balancing all the competing needs of the state, NOW, THEREFORE,

44
 45 Be It Enacted by the Legislature of the State of Florida:

46
 47 Section 1. Section 403.7047, Florida Statutes, is created
 48 to read:

49 403.7047 Regulation of fossil fuel combustion products.--

50 (1) The beneficial use of fossil fuel combustion products
 51 as provided in this section is exempt from regulation pursuant
 52 to part IV of chapter 403 and rules adopted thereunder. Nothing
 53 in this section shall be construed to limit any other
 54 requirements that are applicable to the beneficial use of fossil
 55 fuel combustion products that are established under chapter 376
 56 or chapter 403 or under local or federal laws, including,
 57 without limitation, requirements governing air pollution control
 58 permits, national pollutant discharge elimination system
 59 permits, and water quality certifications pursuant to s. 401 of
 60 the Clean Water Act, 33 U.S.C. ss. 1251 et seq.



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61 (2) As used in this section:

62 (a) "Fossil fuel combustion products" means fly ash,
63 bottom ash, slag, flue gas desulfurization system products,
64 gasified products, fluidized bed combustion system products, and
65 other combustion products from the operation of a fossil fuel-
66 fired electric or steam generation facility, any material from a
67 clean coal or other innovative technology process at a fossil
68 fuel-fired electric or steam generation facility, or any
69 combination thereof.

70 (b) "Beneficial use" means the use or the handling,
71 processing, transportation, or temporary storage for such use of
72 fossil fuel combustion products or materials which incorporate
73 fossil fuel combustion products as provided below:

74 1. Uses for structural fill, pavement aggregate, pipe
75 bedding aggregate, aggregate, asphalt, concrete products, cement
76 products, roofing materials, wallboard products, plastics,
77 paint, metallurgical applications, insulation products, flowable
78 fill and roller compacted concrete, fertilizer products,
79 blasting grit, filter cloth precoat for sludge dewatering, waste
80 stabilization, extraction or recovery of materials and compounds
81 contained within fossil fuel combustion products, and drainage,
82 capping, or cover material for lined Class I, Class II, or Class
83 III landfills.

84 2. Discrete, controlled land application uses for
85 agronomic value, land reclamation, and pilot demonstration
86 projects that:

87 a. Are not likely to cause contamination in excess of
88 applicable department air or water quality standards or can be
89 demonstrated to have equivalent environmental impacts to those
90 raw products or materials other than fossil fuel combustion



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91 products currently used in discrete, controlled land application
92 uses for agronomic value, land reclamation, and pilot
93 demonstration projects; and

94 b. Meet the requirements set forth in subsection (3).

95
96 The beneficial uses of fossil fuel combustion products outlined
97 in this subsection have been evaluated only with regard to the
98 protection of human health and the environment. In the case of
99 roadway applications, the beneficial use of fossil fuel
100 combustion products shall be in accordance with Department of
101 Transportation specifications, American Society for Testing and
102 Materials specifications, or other generally recognized
103 construction standards.

104 (c) "Structural fill" means the use of a fossil fuel
105 combustion product as a substitute for a conventional aggregate,
106 raw material, or soil under or immediately adjacent to a
107 building or structure. "Structural fill" does not include uses
108 that involve general filling or grading operations or valley
109 fills.

110 (d) "Pavement aggregate" means the use of a fossil fuel
111 combustion product as a sub-base material under or immediately
112 adjacent to a paved road, sidewalk, walkway, or parking lot
113 where the fossil fuel combustion product is a substitute for a
114 conventional aggregate, raw material, or soil.

115 (e) "Pipe bedding aggregate" means the use of a fossil
116 fuel combustion product as a substitute for a conventional
117 aggregate, raw material, or soil under, around, or immediately
118 adjacent to a water, sewer, or other pipeline.

119 (f) "Fossil fuel-fired electric or steam generation
120 facility" includes any electric or steam generation facility



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121 that is fueled with coal, alone or in combination with petroleum
 122 coke, oil, natural gas, other fossil fuels, or renewable energy
 123 materials.

124 (3) In order for discrete, controlled land application
 125 uses for agronomic value, land reclamation, and pilot
 126 demonstration projects to be considered beneficial uses, the
 127 following requirements must be met:

128 (a) Notification.--

129 1. A minimum of 30 days before using fossil fuel
 130 combustion products for land application for agronomic value,
 131 land reclamation, or pilot demonstration projects, the person
 132 proposing the use shall submit a written notice to the
 133 department. The notice shall contain, at a minimum:

134 a. A description of the nature, purpose, and location of
 135 the project, including the name of the Unites States Geological
 136 Survey seven and one-half minute map on which the project is
 137 located and a Department of Transportation map or an 8 1/2 inch
 138 by 11 inch topographic map showing the project.

139 b. The estimated start and completion dates for the
 140 project.

141 c. An estimate of the volume of fossil fuel combustion
 142 products to be used for the project.

143 d. A signed and dated statement by the owners of the site
 144 on which the fossil fuel combustion products are used
 145 acknowledging and consenting to the use of fossil fuel
 146 combustion products for land application for agronomic value,
 147 land reclamation, or pilot demonstration projects.

148 e. The notification shall include:

149 (I) The name of the fossil fuel combustion products
 150 generator.



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- 151 (II) The physical location of the generating facility.
152 (III) The address of the generator.
153 (IV) The name of contact for the generator.
154 (V) The telephone number of the generator.

155
156 Changes to such information will require subsequent notification
157 to the department.

158 2. In addition to the notification requirements under
159 subparagraph 1., at least 30 days before using fossil fuel
160 combustion products for land reclamation or pilot demonstration
161 projects in volumes of more than 10,000 cubic yards, the person
162 proposing the use shall submit a written notice to the
163 department containing construction plans for the facility,
164 including a stability analysis when necessary, which shall be
165 prepared, signed, and sealed by a registered professional
166 engineer in accordance with sound engineering practices. The
167 Department of Transportation is not required to submit
168 construction plans with the written notice. The Department of
169 Transportation shall maintain a complete set of construction
170 plans and shall notify the department where the construction
171 plans are located.

172 (b) Storage.--Fossil fuel combustion products used for
173 land application for agronomic value, land reclamation, or pilot
174 demonstration projects may not be stored or speculatively
175 accumulated at the immediate area where they will be put to
176 beneficial use for a period of time longer than necessary to
177 complete the project. Fossil fuel combustion products used for
178 land application for agronomic value, land reclamation, or pilot
179 demonstration projects are not being speculatively accumulated
180 when a minimum of 51 percent of the fossil fuel combustion



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181 products at the project site are beneficially used annually.

182 Section 2. This act shall take effect July 1, 2003.

By Senator Peaden

2-1153B-03

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A bill to be entitled
An act relating to resource recovery and
management; creating s. 403.7047, F.S.;
providing for the regulation of certain fossil
fuel combustion products; providing
definitions; providing use requirements,
notification requirements, and exceptions;
providing an effective date.

Be It Enacted by the Legislature of the State of Florida:

Section 1. Section 403.7047, Florida Statutes, is
created to read:

403.7047 Regulation of fossil fuel combustion
products.--

(1) The beneficial use of fossil fuel combustion
products is exempt from regulation under this part. However,
this section does not limit any other requirements under
chapter 376 or other parts of this chapter or local or federal
laws, including, without limitation, requirements governing
air pollution control permits, national pollutant discharge
elimination system permits, and water quality certifications
pursuant to section 401 of the Clean Water Act.

(2) As used in this section, the term:

(a) "Fossil fuel combustion products" means fly ash,
bottom ash, slag, flue gas desulfurization system products,
gasified products, fluidized bed combustion system products,
and other combustion products from the operation of fossil
fuel-fired electric or steam generation facilities, or
material from clean coal or other innovative technology

1 processes at fossil fuel-fired electric or steam generation
2 facilities.

3 (b) "Beneficial use" means the use, handling,
4 processing, transportation, or temporary storage of products
5 or materials that incorporate fossil fuel combustion products
6 as provided below:

7 1. Uses for structural fill, pavement aggregate, pipe
8 bedding aggregate, lightweight aggregate, asphalt, concrete
9 products, cement products, roofing materials, wallboard,
10 plastics, paint, flowable fill and roller compacted concrete,
11 fertilizer products, gypsum used as a soil amendment, blasting
12 grit, filter cloth precoat for sludge dewatering, drainage,
13 capping, or cover material for lined Class I, II, or III
14 landfills, and extraction or recovery of materials and
15 compounds in fossil fuel combustion products; and

16 2. Discrete, controlled land application uses for
17 agronomic value, land reclamation, and pilot demonstration
18 projects that:

19 a. Are not likely to cause contamination in excess of
20 applicable department air or water quality standards or that
21 can be demonstrated to have equivalent environmental impacts
22 to raw products or materials other than fossil fuel combustion
23 products currently used in discrete, controlled land
24 application uses for agronomic value, land reclamation, and
25 pilot demonstration projects; and

26 b. Meet the requirements in subsection (3).

27
28 The beneficial uses of fossil fuel combustion products
29 specified in this subsection have been evaluated only with
30 regard to the protection of human health and the environment.
31 The beneficial use of fossil fuel combustion products in

1 roadway applications must be pursuant to specifications of the
2 Department of Transportation, specifications of the American
3 Society for Testing and Materials, or other generally
4 recognized construction standards.

5 (c) "Structural fill" means fossil fuel combustion
6 products used as a substitute for a conventional aggregate,
7 raw materials, or soil under or immediately adjacent to a
8 building or structure, but does not include uses that involve
9 general filling or grading operations or valley fills.

10 (d) "Pavement aggregate" means fossil fuel combustion
11 products used as subbase material under or immediately
12 adjacent to a paved road, sidewalk, walkway, or parking lot as
13 a substitute for conventional aggregate, raw material, or
14 soil.

15 (e) "Pipe bedding aggregate" means fossil fuel
16 combustion products used as a substitute for conventional
17 aggregate, raw material, or soil under, around, or immediately
18 adjacent to a water, sewer, or other pipeline.

19 (f) "Fossil fuel-fired electric or steam generation
20 facility" means an electric or steam generation facility that
21 is fired with coal, alone or in combination with, petroleum
22 coke, oil, natural gas, other fossil fuels, or renewable
23 energy materials.

24 (3) Discrete, controlled land application uses for
25 agronomic value, land reclamation, and pilot demonstration
26 projects are considered beneficial uses if:

27 (a) A minimum of 60 days before using fossil fuel
28 combustion products for such land application, the user
29 submits written notice to the department, which notice
30 contains:

31

1 1. A description of the nature, purpose, and location
2 of the project, including the name of the United States
3 Geological Survey 7 1/2 minute map on which the project is
4 located and a Department of Transportation map or an 8 1/2 by
5 11 inch topographic map showing the project.

6 2. The estimated start and completion dates for the
7 project.

8 3. An estimate of the volume of fossil fuel combustion
9 products to be used for the project.

10 4. A signed and dated statement by the property owner
11 where the fossil fuel combustion products are used,
12 acknowledging and consenting to the use of the products for
13 such land applications.

14 5. The name of the fossil fuel combustion products
15 generator.

16 6. The physical location and address of the generating
17 facility.

18 7. The name and telephone number of contact for the
19 generator.

20 8. Acknowledgement that any changes that occur will
21 require subsequent notification to the department.

22
23 In addition to the notification requirements under this
24 paragraph, at least 30 days before using fossil fuel
25 combustion products for land reclamation or pilot
26 demonstration projects in volumes of more than 10,000 cubic
27 yards, the person proposing the use must submit a written
28 notice to the department containing construction plans for the
29 facility, including a stability analysis when necessary,
30 prepared, signed, and sealed by a registered professional
31 engineer. The Department of Transportation is not required to

1 submit construction plans with the written notice, but must
2 maintain a complete set of construction plans and notify the
3 department where the plans are located.

4 (b) Such products are not stored or speculatively
5 accumulated at the immediate area where they will be used
6 longer than is necessary to complete the project. They are
7 speculatively accumulated when a minimum of 51 percent of such
8 products at the project site are beneficially used annually.

9 Section 2. This act shall take effect July 1, 2003.

10
11 *****

12 SENATE SUMMARY

13 Provides for the regulation of fossil fuel combustion
14 products and exempts from regulation the beneficial use
15 of such products. Provides definitions, notification
16 requirements, and exemptions. (See bill for details.)
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APPENDIX F

**CCP BENEFICIAL REUSE LETTERS ISSUED BY
FDEP**



Jeb Bush
Governor

Department of Environmental Protection

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Colleen M. Castille
Secretary

July 25, 2005

Ms. Susan Hughes, P.E.
Vice President Environmental Services
JEA
21 West Church Street, T-9
Jacksonville, Florida 32202-3139

RE: EZBase Beneficial Use Project Approval
JEA Northside Generating Station, Duval County

Dear Ms. Hughes:

This letter replaces both my letter dated April 1, 2005 and the letter dated December 3, 2004 from Mike W. Sole on the same subject. Rule 62-701.300(1), Florida Administrative Code (F.A.C.), prohibits any person from disposing of solid waste except at a permitted or exempt facility. Disposal is defined in Rule 62-701.300, F.A.C. to include the placing of any solid waste into or upon any land or water. At the same time, Section 403.7045(1), Florida Statutes (F.S.), authorizes the Department to exempt certain materials which are beneficially used from regulation as solid waste. These materials include industrial byproducts, which are regulated as solid waste unless three conditions are met:

1. A majority of the industrial byproducts are demonstrated to be sold, used, or reused within one year;
2. The industrial byproducts are not managed so as to create a threat of environmental contamination; and
3. The industrial byproducts are not hazardous wastes.

Based upon the documentation you have provided, the Department finds that the following proposed project constitutes a beneficial use of an industrial byproduct, and that the storage and use of this industrial byproduct is not prohibited by Chapter 62-701, F.A.C. Furthermore, the Department agrees that the industrial byproduct used in the following proposed project is not considered solid waste and will not be regulated as such. You should be aware, however, that any other uses of the material which involve placing it into or upon any land or water may be considered disposal of solid waste by the Department. For this reason, we strongly recommend that any person wishing to beneficially use the industrial byproduct, in a manner other than approved below, first seek the concurrence of the Department that such use does meet the exemption criteria in the statute.

"More Protection, Less Process"

Printed on recycled paper.

Proposed Project

JEA has submitted a Beneficial Use Demonstration addressing several proposed uses for a byproduct material generated in the circulating fluidized bed (CFB) boilers at their Northside Generating Station. The fuel for the CFB boilers consists of petroleum coke blended with pulverized coal, typically in ratios of 80 percent petroleum coke to 20 percent coal. Limestone is also added to create thermal mass for the fluidized bed and to provide a scrubbing medium for removal of sulfurous gases. The resulting CFB byproduct material has cement-like properties when compacted at the proper moisture content. This material will be marketed as "EZBase." For each beneficial use project, the EZBase is trucked directly to the area of intended use and installed, rather than being stockpiled at the job site. EZBase may be used as conditioned below in the following applications, provided that it is used only in the amounts needed to achieve the design structural strength for the project based upon normal civil engineering practice, or as may otherwise be specifically required by the Department in a remedial project:

1. Final top surface for roads, parking lots, lay down yards and similar industrial and commercial applications using compacted EZBase either alone or with stone (such as granite or limestone) or asphalt millings rolled into the top surface;
2. Compacted as a base course for civil applications in accordance with Florida Department of Transportation (FDOT) Standard Specification Section 200, where the EZBase will be covered with a friction surface (final top surface) such as asphalt or concrete or compacted EZBase;
3. Stabilized base course (meeting compaction requirements) for civil applications in accordance with FDOT Standard Specification Sections 160 and 230, where a final top surface such as asphalt or concrete or compacted EZBase will be used;
4. Mixed with existing limestone base for civil applications in compliance with FDOT Standard Specification Section 210, where a final top surface such as asphalt or concrete or compacted EZBase will be used; and
5. Used in stabilization processes for remedial projects where access controls (engineering and/or institutional) are in place and where the remedial project has been reviewed and approved by the Department.

In order to assure that this material is not managed so as to create a threat of environmental contamination, JEA shall provide written documentation to all EZBase purchasers which includes at least the following:

1. A list of the approved beneficial uses of EZBase;
2. A description of the proper procedures for transportation, storage and management of EZBase prior to its intended beneficial use;
3. A recommendation that EZBase should not be stored or used as a final top surface immediately adjacent to sensitive wetlands unless measures are in place to minimize stormwater runoff into the wetlands; and
4. A recommendation that EZBase, either alone or mixed with other materials, should not be used in contact with ground water or surface water bodies.

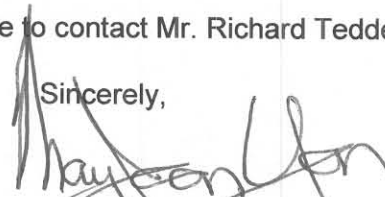
This approval is also conditioned on the following additional actions by JEA.

1. JEA shall conduct three additional monthly sampling events (July, August and September 2005) of ground water at the four pads at Brandy Branch (of the upgradient and nearest downgradient wells for the asphalt over EZBase, limerock and concrete pads and of all four monitoring wells for the EZBase pad) analyzing for iron, sulfate, ORP, turbidity and pH. If no significant increases are detected after these three events, JEA may terminate this monthly monitoring.
2. To monitor the chemical characteristics of the product, every quarter JEA shall collect two representative, composite samples of newly produced EZBase and analyze them for total concentrations of aluminum, arsenic, iron, lead and vanadium. JEA shall compare these results to the EZBase total analyses conducted during the characterization study. If this comparison shows that a significant increase in chemical concentrations in EZBase has occurred, or if there is a significant change in the operation of the CFB boilers that could adversely affect the chemical quality of the EZBase product, then JEA shall notify the Department and conduct additional testing if necessary to ensure that continued use of EZBase will not result in any adverse environmental or human health effects.
3. JEA shall maintain records for a minimum of three years, and make them available to the Department upon request, that include the following information:
 - Name of the purchaser or contractor who is beneficially using the EZBase;
 - Number of tons of EZBase purchased by each purchaser or contractor; and,
 - The test results required in conditions 1 and 2 above.

The Department recognizes and appreciates the significant effort JEA has exerted to obtain research data and documentation to justify this beneficial use approval for EZBase. Based on this research, the Department believes the use of EZBase as described above will have a net environmental benefit to the state of Florida. This approval letter, however, applies only to the engineered uses of EZBase listed above and does not apply to other means of storage or management on-site of the CFB ash.

If you have any questions, please feel free to contact Mr. Richard Tedder at (850) 245-8735.

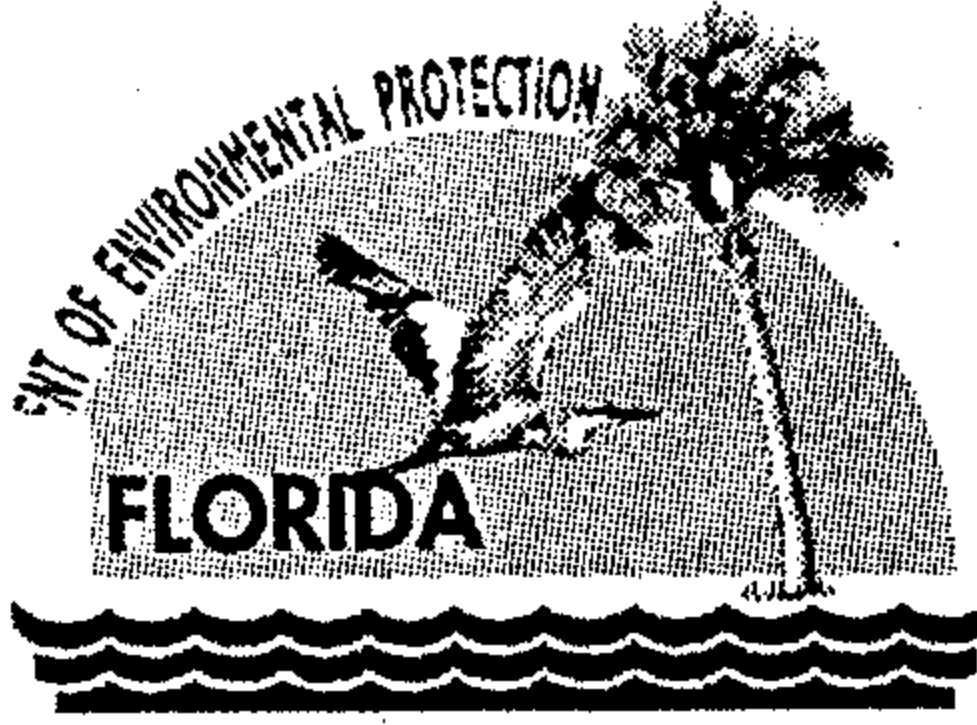
Sincerely,



Mary Jean Yon, Director
Division of Waste Management

MJY/rt

cc: Bill Green – NE District



Department of Environmental Protection

798

Jeb Bush
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

David B. Struhs
Secretary

September 3, 1999

Ruth Goins
Pincelli & Associates, Inc.
P.O. Box 1055
Hixson, TN 37343-4055

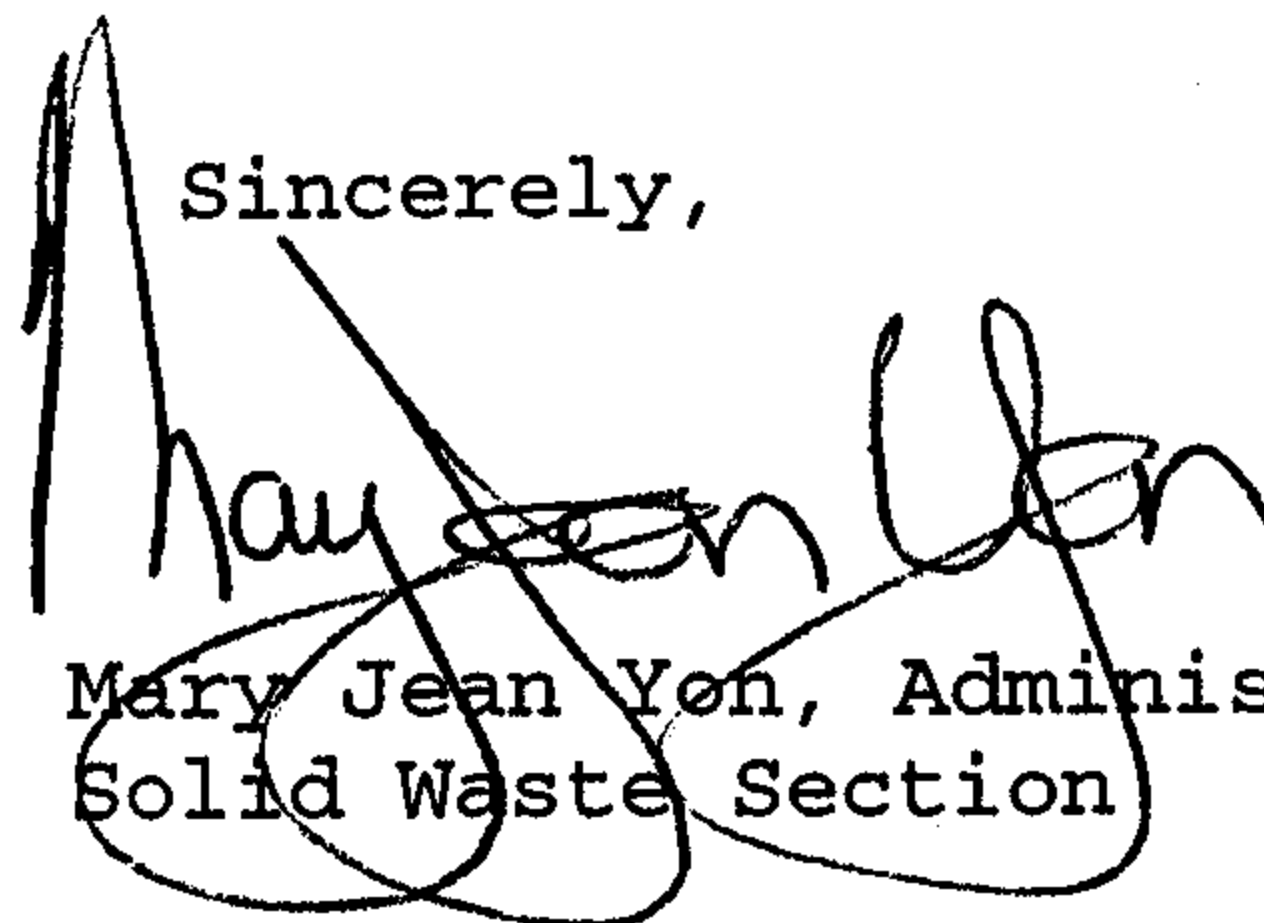
Dear Ms Goins:

Thank you for your letters dated July 30th and August 25th requesting written approval from the Department to use coal fly ash from the power generating industry in the production of cement. You have stated that the feed rate for the coal ash to the cement plants will typically not exceed two percent by weight of the total feed mixture, and that the coal ash will be managed in an environmentally safe manner.

The Department encourages recycling where practical and has no objection to the beneficial use of coal ash in the production of cement as you described provided the use does not violate any applicable Department standards and criteria. Generally, the Department's Division of Air Resource Management (DARM) authorizes in its permitting actions the use of coal ash as a raw material in the manufacture of Portland cement in Florida. DARM discourages use of certain ash that is characterized by a high loss on ignition (LOI) value because of concerns about increased emissions of carbon monoxide. In addition, the coal fly ash should be stored under cover to prevent contact with rain water. The Department's Division of Air Resource Management should be consulted if there are any questions about the air permitting requirements for a particular facility.

I hope this response will be helpful to your needs. If you have any questions, please feel free to contact me or Richard Tedder at 850/488-0300.

Sincerely,



Mary Jean Yon, Administrator
Solid Waste Section

MJY/rt

cc: Waste Program Administrators
Bill Hinkley
Chris Mcguire
Clair Fancy

"Protect, Conserve and Manage Florida's Environment and Natural Resources"

Pincelli & Associates, Inc./A.T.I., Inc.

798

August 25, 1999

P.O. Box 1055
Hixson, TN 37343-1055
(423) 842-1396 (Bus.)
(423) 842-0221 (FAX)
800-537-8538

Ms. Mary Jean Yon
Administrator, Solid Waste Section
Department Environmental Protection
State of Florida
2600 Blair Stone Road, MS 4565
Tallahassee, FL 32399

Pincelli & Associates, Inc./A.T.I., Inc.

Ruth Goins

P.O. Box 1055
Hixson, TN 37343-1055
(423) 842-1396 (Bus.)
(423) 842-0221 (FAX)
1-800-537-8538

Dear Ms. Yon:

This will confirm my telephone conversation with Richard Tedder yesterday regarding our request for written approval from the State of Florida to use coal ash in cement manufacturing. Richard asked that I address the following questions:

1. What percentage of the total cement mix is coal ash?

Coal ash is typically between one-half to two percent of the total cement mix;

2. How will the coal ash be used in cement?

The coal ash is transported via tarped tractor trailers to a cement plant. The ash is immediately used as part of the raw material input and is thermally decomposed at 2500+ degrees farenheit in a kiln. No residue of the coal ash remains after this procedure.

3. How is coal ash handled and stored?

Typically, coal ash is used as soon as it reaches the plant. It is dumped directly into a hopper/bin, where it is blended with other raw materials. If the cement plant is down for repairs or maintenance, coal ash is stored in a storage bin or silo. Coal ash is not stored with any other product prior to use.

RECEIVED

AUG 30 1999

Solid Waste Section

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Page 2
Letter to Ms. Mary Jean Yon
August 25, 1999

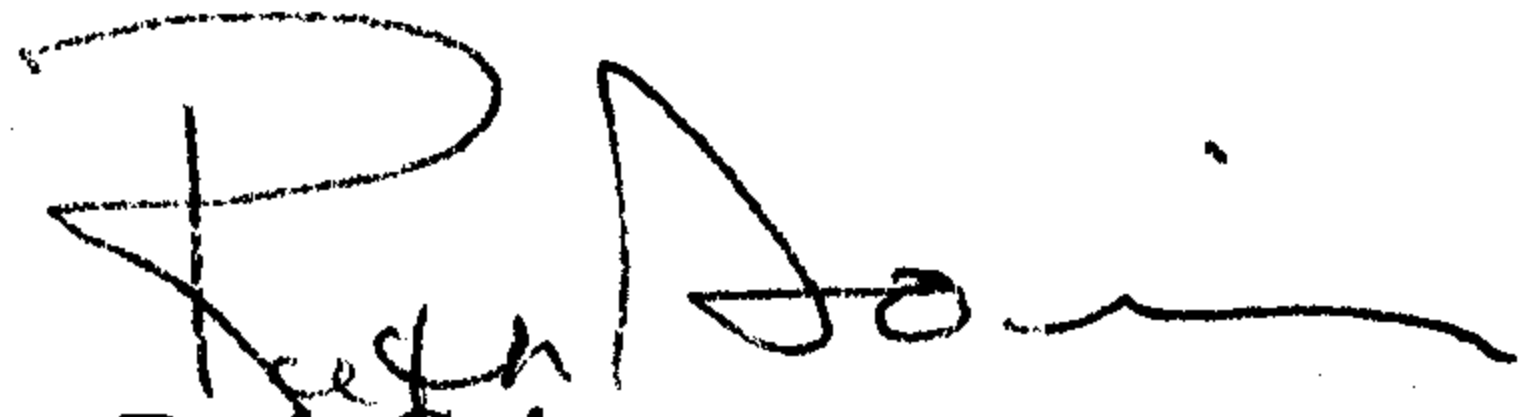
4. How is coal ash introduced into the cement system?

Coal ash is introduced into the system via beltline, along with other raw materials, i. e. sand, gravel and water. It is fed at a constant rate of between one-half and two percent of the total raw mix.

Enclosed is a copy of a recent newspaper article from Clinchfield, Georgia, explaining how coal ash is used at the Medusa Cement Plant. We hope this answers your questions. We look forward to hearing from the State of Florida on the beneficial re-use of coal ash in cement manufacturing.

Sincerely,

PINCELLI & ASSOCIATES, INC.



Ruth Goins
Vice President - Business Development

RG:ca

cc: Mr. Richard Tedder

Enclosure (1)

Pincelli & Associates, Inc./A.T.I., Inc.

July 30, 1999

798

P.O. Box 1055
Hixson, TN 37343-1055
(423) 842-1396 (Bus.)
(423) 842-0221 (FAX)
800-537-8538

Ms. Mary Jean Yon
Administrator, Solid Waste Section
Department Environmental Protection
2600 Blair Stone Road
MS 4565
Tallahassee, FL 32399

RE: Beneficial Re-Use of Coal Ash in Cement Manufacturing

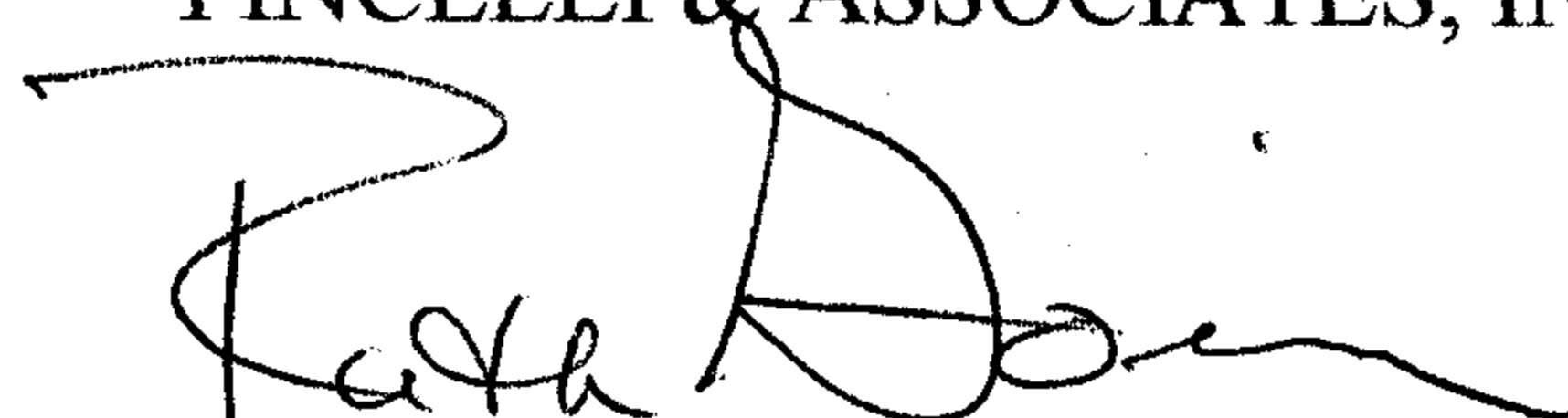
Dear Ms. Yon:

This will follow up on my request from your office regarding the beneficial re-use of coal ash as an ingredient in the manufacturing of cement. I am attaching several example letters of approval from Georgia Department of Natural Resources, South Carolina DHEC, State of North Carolina, Commonwealth of Kentucky and Commonwealth of Virginia. I need this type letter of approval from the state of Florida.

If you need additional information, please give me a call at 800/537-8538

Regards,

PINCELLI & ASSOCIATES, INC.



Ruth Goins
Vice President of Business Development

RG:ab

Enclosures (5)

RECEIVED

AUG - 2 1999

Solid Waste Section