

2808



# United States Department of the Interior



FISH AND WILDLIFE SERVICE  
Pennsylvania Field Office  
315 South Allen Street, Suite 322  
State College, Pennsylvania 16801-4850

January 8, 2010

Arthur Coccodrilli, Chairman  
Independent Regulatory Review Commission  
333 Market Street, 14<sup>th</sup> Floor  
Harrisburg, PA 17101

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INDEPENDENT REGULATORY  
REVIEW COMMISSION

Dear Mr. Coccodrilli:

I understand that the Independent Regulatory Review Commission is reviewing the Pennsylvania Department of Environmental Protection's (DEP) proposed rulemaking on "Beneficial Use of Coal Ash" (IRRC #2808, Reg. #7-442). The U.S. Fish and Wildlife Service reviewed these proposed regulations and provided extensive comments to the Environmental Quality Board (EQB) via electronic mail during the public comment period. However, I have just learned that, due to a typographical error on my part (I entered the email address incorrectly), the EQB did not receive our comments before the official close of the public comment period. DEP's Regulatory Coordinator has informed us that our comments will be forwarded to DEP staff for consideration, but that the comments will not be acknowledged in DEP's comment/response document.

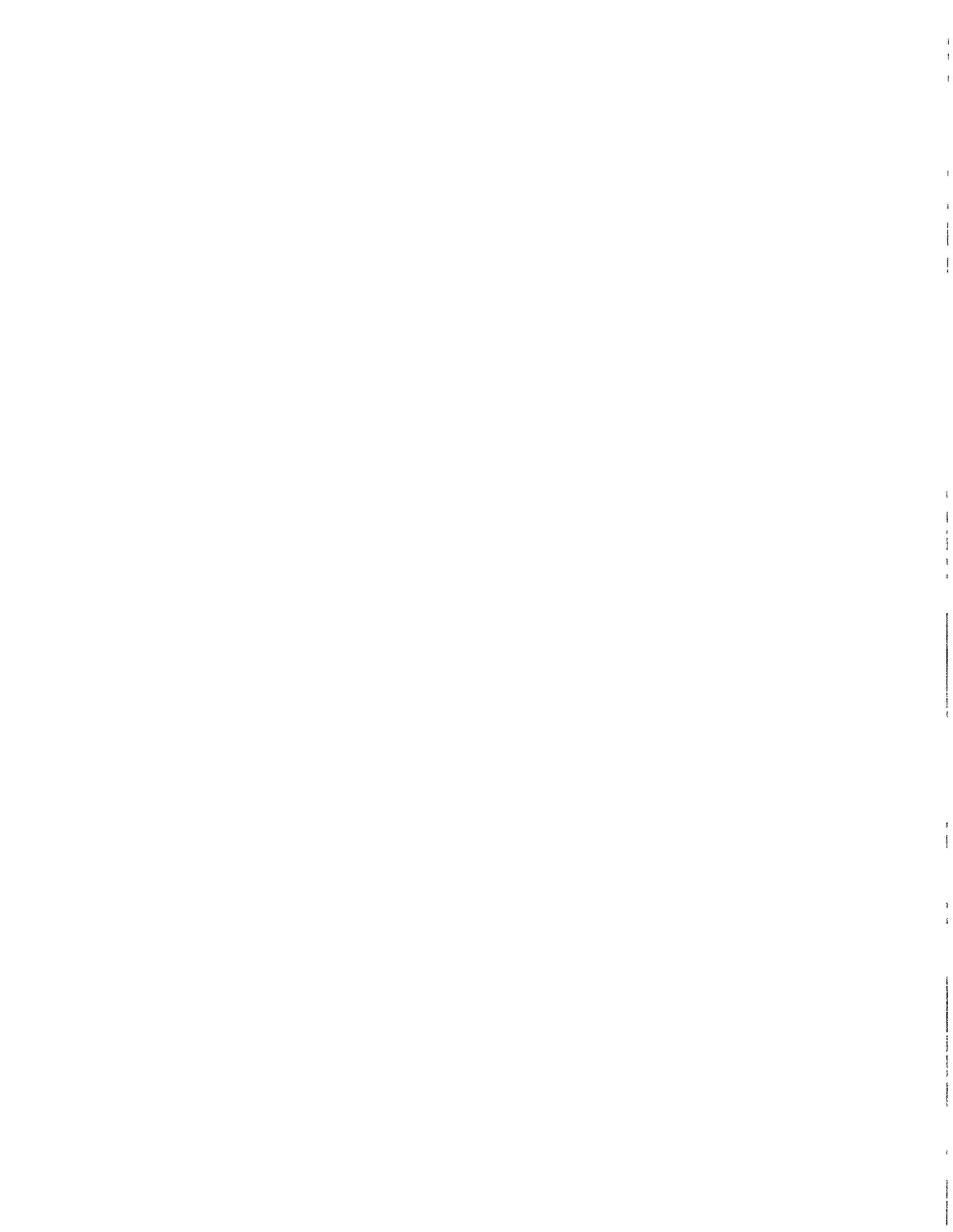
Our comments provided a number of constructive recommendations to enhance the effectiveness of the proposed regulations in achieving successful mined land reclamation using coal ash, while protecting water quality. We are providing a copy (enclosed) for your consideration as you evaluate the proposed regulations.

Thank you for your consideration. If you have any questions, please contact me at 814-234-4090.

Sincerely,

Cindy Tibbott  
Acting Supervisor

Enclosure





# United States Department of the Interior



FISH AND WILDLIFE SERVICE  
Pennsylvania Field Office  
315 South Allen Street, Suite 322  
State College, Pennsylvania 16801-4850

December 21, 2009

Environmental Quality Board  
P. O. Box 8477  
Harrisburg PA 17105-8477

Dear Chairman Hanger:

The U.S. Fish and Wildlife Service (Service) has reviewed the Department of Environmental Protection's "Proposed Rulemaking: Beneficial Use of Coal Ash (25 PA. Code Ch. 290)" as announced in the November 7, 2009, *Pennsylvania Bulletin*. The following comments are provided pursuant to the Fish and Wildlife Coordination Act (48 Stat. 401, 16 U.S.C. 661 *et seq.*).

The Service concurs that the Commonwealth has hundreds of thousands of acres of abandoned and active mine lands and waste coal piles that need to be reclaimed. We recognize the substantial effort that the Department has made toward that objective. We support a program that allows for the beneficial use of coal ash for mine reclamation in an environmentally-responsible manner with monitoring of sufficient spatial and temporal scope.

We believe that the Department has overlooked a unique opportunity to encourage the restoration of mined land to native forests in conjunction with the beneficial use of coal ash under conditions that minimize the risk of groundwater contamination. This objective can be achieved by considering coal ash as one soil amendment or fill material, reducing bioavailability and leaching potential of contaminants in the coal ash or coal ash-soil mixture with the addition of organic materials, and minimizing compaction to facilitate deeper root growth.

Mining operators have historically had little incentive to reproduce good forest sites or spend money on quality seedlings or planting (Burger 2002). However, mine reclamation, reforestation, and forest management can provide major benefits: revenue generated from growing forests, job creation, economic enhancement of the local economies, reducing the negative effects of global warming by storing carbon in the trees, sale of carbon credits, enhancement of wildlife habitat, improvement of air and water quality, reduction in soil erosion and increased recreational opportunities (Kronrad, Bates, and Huang 2002).

Virginia's Department of Mines, Minerals, and Energy (DMME) has amended regulations and implemented procedures that encourage operators to select forestry as a post mining land use (Lambert 2002). They recognized the three problems with past reclamation practices concerning reforestation and timber production: 1) compacted mine soil, 2) inappropriate spoil material, and 3) competition from herbaceous ground covers established to control erosion. Based on DMME's review of successful reforestation projects, DMME began encouraging alternative regrading methods and the use of tree-compatible groundcover. DMME has partnered with The Nature Conservancy, mine operators, and the utility industry to encourage cooperation among the parties that would enhance mine lands by returning them to a forestry land use for the development of carbon sinks (Lambert 2002).

The Service encourages the Department to modify the proposed rules for the beneficial use of coal ash to improve the final soil quality and facilitate reforestation to realize the maximum benefits of restoring abandoned and active mine lands. We have provided some details on this approach within our comments on specific subsections of the chapter, but recommend that the Department also consult with regional reforestation experts.

**§ 290.101. General requirements for the beneficial use of coal ash.**

In subsection (d), a water quality monitoring plan must be developed when more than 10,000 tons of coal ash per acre is to be used on a project or more than 100,000 tons in total on a project. While it is stated that contiguous projects will be considered as a single project, the regulations do not address non-contiguous projects within the same aquifer or drainage area. Water quality monitoring should be required if a substantial volume of coal ash has the potential to leach into a contiguous aquifer or surface water body regardless of whether or not the coal ash fills are contiguous.

In subsection (e), the Department may approve the placement of coal ash within 8 feet of the water table if the operator can demonstrate that groundwater contamination will not occur. However, criteria are not listed for demonstrating that groundwater will not be contaminated. Based on the National Academy of Sciences findings (NAS 2006), prediction of the leaching potential is not likely to be reliable as it can take decades before any leaching would be evident. Since demonstrating groundwater protection with high confidence is not currently feasible, we recommend that the 8-foot buffer to the water table be mandatory for all coal ash projects.

**§ 290.102. Use of coal ash as structural fill.**

Under subsection (d) (1), the pH of coal ash used as structural fill must be in the range of 6.0 to 9.0. The Department previously required the pH for this purpose to be between 7.0 and 12.5. Lowering the pH range to 6.0 would increase the leaching potential of several metals, while lowering the upper bound from 12.5 to 9.0 will reduce leaching of metals. We recommend that the range be 7.0 to 9.0 to minimize leaching potential.

Under subsection (d) (6), the Department will require that coal ash fill be covered with 12 inches of soil. The biologically-active zone is usually 24 inches. A 12-inch cover would result in direct exposure of plant roots, soil organisms, and burrowing animals to contaminants in the coal ash

which are likely to exceed toxic effects levels. To prevent toxic effects in plants and animals that migrate into the restored areas, a minimum of 24 inches of clean soil should be placed over the coal ash fill.

As stated above, the addition of organic materials (i.e., compost and biosolids) would reduce both leaching potential and bioavailability of contaminants in the coal ash. We recommend that the Department require the addition of organic material to raise the percent organic matter in coal ash used as structural fill to 5%.

Subsection (d) (7) includes the compaction specifications for coal ash structural fill. We acknowledge that the need to minimize erosion potential and ensure structural stability drives these compaction requirements. However, overly compacting materials on surface mines has prevented the regrowth of the native hardwood forest. Improved rooting conditions would also benefit native grass plantings, including switchgrass biofuel plantings. We recommend that the Department consult with surface mine reforestation experts to develop protective compaction specifications that will still enable tree root growth.

Under Subsection (e) (4), a set back of 100 feet from a sinkhole or area draining into a sinkhole is established. If the sinkhole is a result of unstable geomorphic features, then establishing a distance from an existing hole will not be protective when a new sinkhole develops under the coal ash. The Service contends that coal ash should not be used as fill unless the underlying geomorphic features are stable.

Subsection (e) (7) should include a 300-foot set back from exceptional value wetlands (§105.17), and Exceptional Value or High Quality waters (§ 93.4b).

**§ 290.103. Use of coal ash as a soil substitute or soil additive.**

Within subsection (d) (4), two criteria are presented: 1) coal ash can be added to less than 1 foot of soil until the resulting mixture is 1 foot deep, and 2) coal ash required for the beneficial use is limited to agronomic requirements. For very poor, thin soils, the amended soil could consist of primarily coal ash rather than soil with a coal ash amendment. Biota could be at risk from direct exposure to contaminants in the soil and coal ash mixture. If insufficient soil is present to achieve the 1-foot depth or suitable conditions for plant growth, then organic materials (i.e., compost and biosolids) need to be added in addition to the coal ash.

Under subsection (d) (7), coal ash may not be applied if the resultant concentrations would be detrimental to biota. However, the cumulative loading rates in subsection (f) would result in concentrations of boron, cadmium, chromium, copper, lead, selenium, and zinc in the 1-foot soil interval that exceed toxic thresholds for biota. Although analysis of receiving soils is required in subsection (b) (5), it is unclear if the maximum loading rates must account for pre-amendment contamination. It is not defensible to assume that using loading rates based on human health will be protective of other organisms. The loading rates need to be revised to prevent soil concentrations from exceeding ecological risk concentrations to protect terrestrial biota. We

recommend using the Oak Ridge National Laboratory Preliminary Remediation Goals ([www.esd.ornl.gov/programs/econrisk/documents/tm162r2.pdf](http://www.esd.ornl.gov/programs/econrisk/documents/tm162r2.pdf)).

Subsection (e) (2) should include a 300-foot set back from exceptional value wetlands (§105.17) and Exceptional Value or High Quality waters (§ 93.4b).

**§290.104. Beneficial use of coal ash at coal mining activity sites.**

Subsection (f)(4) includes the compaction specifications for coal ash structural fill. We acknowledge that the need to minimize erosion potential and ensure structural stability drives these compaction requirements. However, overly compacting materials on surface mines has prevented the regrowth of the native hardwood forest. Improved rooting conditions would also benefit native grass plantings, including switchgrass biofuel plantings. We recommend that the Department consult with surface mine reforestation experts to develop protective compaction specifications that will still enable deep root growth.

Under subsection (g) (1), coal ash may not be applied if the resultant concentrations would be detrimental to the environment. However, subsection (g) (3) refers to the maximum cumulative loading rates in subsection (f). As stated above, these rates would result in concentrations of boron, cadmium, chromium, copper, lead, selenium, and zinc in the 1-foot soil interval that exceed toxic thresholds for biota.

**§ 290.105. Coal ash beneficial use at abandoned coal surface mine sites.**

Under subsection (e) (1), the pH of coal ash used as fill must be in the range of 6.0 to 9.0. The Department previously required the pH for this purpose to be between 7.0 and 12.5. Lowering the pH range to 6.0 would increase the leaching potential of several metals, while lowering the upper bound from 12.5 to 9.0 will reduce leaching of metals. The Service recommends that the range be 7.0 to 9.0 to minimize leaching potential.

Under subsection (e) (6), the Department will require that coal ash fill be covered with 12 inches of soil. The biologically-active zone is usually 24 inches. A 12-inch cover would result in direct exposure of plant roots, soil organisms, and burrowing animals to contaminants in the coal ash, which are likely to exceed toxic effects levels. To prevent toxic effects in plants and animals that migrate into the restored areas, a minimum of 24 inches of clean soil should be placed over the coal ash fill.

Subsection (e)(7) includes the compaction specifications for coal ash fill. We acknowledge that the need to minimize erosion potential and ensure structural stability drives these compaction requirements. However, overly compacting materials on surface mines have prevented the regrowth of the native hardwood forest. Improved rooting conditions would also benefit native grass plantings, including switchgrass biofuel plantings. The Service requests that the Department consult with surface mine reforestation experts to develop protective compaction specifications that will still enable deep root growth.

Subsection (e) (9) (i) permits the use of coal ash as an aquatard as part of an engineered stream channel restoration. The Service opposes the placement of coal ash within a stream channel restoration area. Coal ash is more likely to leach contaminants when it is in frequent contact with water. Other materials without risk of water or sediment contamination are available for use in streams.

Under Subsection (e) (9) (iii), a set back of 100 feet from a sinkhole or area draining into a sinkhole is established. If the sinkhole is a result of unstable geomorphic features, then establishing a distance from an existing sinkhole will not be protective when a new sinkhole develops under the coal ash. We recommend that coal ash not be used as fill unless the underlying geomorphic features are stable.

Subsection (e) (9) (vi) should include a 300-foot set back from exceptional value wetlands (§105.17), and Exceptional Value or High Quality waters (§ 93.4b).

Under subsection (e) (10) (i), coal ash may not be applied if the resultant concentrations would be detrimental to the environment. However, subsection (e) (10) (iii) refers to the maximum cumulative loading rates in subsection (f). As stated above, these rates would result in concentrations of boron, cadmium, chromium, copper, lead, selenium, and zinc in the 1-foot soil interval that exceed toxic thresholds for biota.

#### **§290.201. Coal ash certification.**

Subsection (a) (1) presents the maximum leachate levels required for certification as 25 times the waste classification standard for metals and other cations, while contaminants other than metals and cations must meet the classification standard. As metals are known toxins and more likely to migrate into groundwater than organic contaminants, it is unclear why acceptable levels would be set at 25 times standards based on the maximum contaminant level goal (MCLG). In contrast, for non-metal contaminants, which may be less likely to migrate, the MCLG must be met. We recommend that all contaminants be held to the waste classification standard.

In subsection (a) (2), the pH of coal ash for structural fill should also be held to the 7.0 minimum requirement.

Under subsection (b) (2), a certification exception may be granted if only the secondary MCLs are exceeded. These contaminants are likely to migrate into groundwater and ultimately, surface waters. Recent stream monitoring near coal mines has demonstrated that these ions can reach concentrations that are collectively toxic to aquatic life (Pond et al. 2008). The coal ash certification should require that these secondary MCLs are met to reduce risks to aquatic life.

In subsection (b) (3), if the operator can demonstrate that groundwater and surface water quality will not be adversely affected, then the Department can waive the standards. However, criteria are not listed for demonstrating that groundwater and surface water will not be contaminated. Based on the NAS findings (NAS 2006), prediction of the leaching potential is not likely to be reliable as it can take decades before any leaching would be evident. Since demonstrating

groundwater and surface water protection with high confidence is not currently feasible, exemptions should not be granted on these grounds.

**§290.301. Water quality monitoring.**

In subsection (g), the minimum duration of the water quality monitoring is set at ten years. According to the NAS (2006), leaching of contaminants may not occur for decades, warranting long term monitoring of the placement sites extending well beyond the 10 years typical of mine restoration bonds. Coal ash treated to raise the pH would not begin to leach until the lime or other amendment was exhausted by acid precipitation.

We recommend that the minimum monitoring period be set at 20 years.

**§290.302. Number, location and depth of monitoring points.**

In subsection (a) (2) and (b) (3), the downgradient monitoring points are described as being hydraulically connected to and within 200 feet of the area of ash placement. According to the NAS (2006), the most effective and expedient location for detecting migration of contaminants into groundwater is directly within the ash placement area. We recommend that at least one of the downgradient wells be within the placement area to provide early detection of contamination (subsection (d)).

**§290.304. Assessment plan.**

In subsection (a)(1), an operator will be required to submit an assessment plan if a significant change in the quality of groundwater or surface water is observed. The criterion for determining if the change is “significant” is not provided. If sufficient data exist, then a statistical analysis should be used to evaluate the change. If insufficient data are available, then the qualitative criterion that will be used should be defined.

If surface water quality is degraded, then biological stream monitoring must be included in the assessment plan. Stream monitoring should be performed according to the protocols provided by the Department’s Office of Water Management. The results of the monitoring will demonstrate whether or not the degraded water quality has impaired the aquatic community.

Under subsection (b) (2), an exemption from the assessment plan is granted if the operator can demonstrate within 20 days that the degradation was caused entirely by seasonal variations. As seasonal variations occur over a three to four month period, it is unclear how seasonal variations can be documented in a 20-day period.

**§290.305. Abatement plan.**

Subsection (c) sets forth a list of standards that must be met by the abatement plan. The list does not include ambient water quality criteria for aquatic life, which would be the appropriate standards for surface water abatement. It is not defensible to assume that using standards based on human health will be protective of other organisms. If the aquatic community were impaired, then biological stream monitoring must be used to demonstrate that the abatement successfully restored the aquatic community to reference conditions.

The Service acknowledges that site conditions will dictate the appropriate abatement strategy. However, the chapter provides no guidance on successful abatement techniques. If hundreds of acres are to be filled over the next 10 years, then it is prudent to know in advance that techniques are available to curtail contaminant leaching from coal ash over large areas in a cost-effective manner. In addition, the cost of curtailment techniques must be calculated in order to set bonds high enough to ensure funding if curtailment is needed.

**§290.403. Surface and groundwater protection.**

Subsection (c) should also prohibit storage in a manner that causes surface water degradation.

In subsection (a) (5), a set back of 100 feet from a sinkhole or area draining into a sinkhole is established. If the sinkhole is a result of unstable geomorphic features, then establishing a distance from an existing sinkhole will not be protective when a new sinkhole develops. We recommend that coal ash not be stored in an area unless the underlying geomorphic features are stable.

Subsection (a) (7) should include a 300-foot set back from exceptional value wetlands (§105.17) and Exceptional Value and High Quality waters (§ 93.4b).

Subsection (b) (3) should include a 300-foot set back from exceptional value wetlands (§105.17) and Exceptional Value and High Quality waters (§ 93.4b).

**§290.405. Storage piles—general requirements.**

Section (b) provides for a waiver of the 4-foot water table separation distance for storage piles. Piles of coal ash that are not stabilized or compacted have a much greater potential for leaching. Thus, the 8 feet minimum separation from groundwater should not be relaxed for storage piles.

Section (d) should require water quality monitoring for all storage piles that lack a liner or storage pad.

**§290.410. Storage impoundments—design requirements.**

Subsections (10) (i) and (vii) set the design requirements to prevent overtopping for a 24-hour event on the 25-year cycle. However, climate change models and recent data indicate that storms will occur of greater intensity than we have experienced in the past century. It is likely that the volume of water that used to be associated with a 25-year event will be seen much more frequently. To ensure the overtopping will not occur for newly-constructed impoundments, the Department should require sufficient freeboard for the predicted 25% increase in peak flows and two additional storm events per year with greater than 2 inches of rain (Sheffield 2008).

**§290.411. Storage impoundments—operating requirements.**

Subsection (c) outlines the fencing requirements to prevent unauthorized access. The bottom 2 feet of the fence should be made impermeable to wildlife using a tightly-woven material such as

silt fencing. This barrier is necessary to prevent amphibians from breeding in contaminated water in the impoundments.

Thank you for the opportunity to provide these comments. Please direct any questions to Kathleen Patnode of my staff at 304-234-0238.

Sincerely,



Cindy Tibbott  
Acting Supervisor

#### Literature Cited

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