U.S. EPA Site Visit Report
Coal Combustion Waste Minefill Management Practices
- Pennsylvania -

Draft Final
March 19, 2003

OBJECTIVE

From September 2001 to October 2002, EPA conducted visits to selected states to collect information on coal combustion waste (CCW) minefill management practices. On June 12, 2002, EPA staff conducted an information collection visit to Pennsylvania. The purpose of this visit was to gather information regarding the regulation of CCW minefill practices within the State of Pennsylvania. The visit consisted of a meeting with Pennsylvania State regulators. This information collection visit did not consist of any mine site visits. The CCW Minefill Management Practices Discussion Guide developed by EPA was used as a guide during the visit. A completed version of the Discussion Guide is attached to this report.

SUMMARY OF MEETING WITH PENNSYLVANIA STATE REGULATORS

The meeting was conducted on June 12, 2002, at the Pennsylvania Department of Environmental Protection (PADEP), Bureau of Mining and Reclamation, Pottsville District Office in Pottsville, Pennsylvania. Among those in attendance were:

- Dennis Ruddy, U.S. EPA
- Randall Mills, U.S. Department of the Interior, Office of Surface Mines (OSM)
- Alfred Dalberto, PADEP
- Michael Menghini, PADEP
- Timothy Kania, PADEP
- Roger Hornberger, PADEP

The Pennsylvania Department of Environmental Protection (PADEP), Bureau of Mining and Reclamation completed the CCW Minefill Management Practices Discussion Guide prior to the meeting.

CCW MINEFILL MANAGEMENT PRACTICES DISCUSSION GUIDE*

Outline

I. General
Regulating agencies, program structure

II. Planning/Permitting
Permit requirements, type/source of CCW, number of permits, quantity of waste, acid/base balances, reclamation plans, operational plans, closure/post-closure plans, future uses

III. Waste Characterization
Timing (before/during placement), testing methods, parameters, performance standards/waste characterization limits

IV. Site Characterization
Types of data, hydrology, criteria for acceptability, liners

V. Risk Assessment
Formal assessment/modeling, methods/criteria

VI. Ground Water Monitoring
Monitoring system design, timing (during placement/post-closure), frequency, location, parameters, performance standards/enforceable limits

VII. Surface Water Monitoring
Monitoring system design, timing (during placement/post-closure), frequency, location, parameters, performance standards/enforceable limits

VIII. Placement Practices
Appropriate practices for: underground mines, surface mines, active mines, closed mines, proximity to water table, grouting, soil conditioning, mine sealing, subsidence control, spoil encapsulation

IX. Operational Requirements/Design Requirements
Dust controls, erosion/flooding controls, runoff controls, leachate collection, re-vegetation, access controls, post-closure maintenance

X. Corrective Action
Circumstances/triggers for action, action measures, existing damage cases

XI. Financial Assurance
Mechanisms, liability, bond release

XII. Reporting
Inspection frequency (pre-, during, and post-placement), monitoring data review, compliance evaluation

XIII. Public Participation
Availability of data (pre-, during, and post-placement), compliance participation

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* This document was prepared by the U.S. Environmental Protection Agency (EPA). It is being used to guide discussions with State and Tribal mining regulatory authorities on coal combustion waste (CCW) minefill management practices. This list of discussion items is part of an information collection effort. It is not a proposed model for CCW minefill regulation.

CCW MINEFILL MANAGEMENT PRACTICES DISCUSSION GUIDE
June 12, 2002 – Pennsylvania

Interviewee Names:	Alfred Dalberto Michael Menghini Timothy Kania Roger Hornberger
Interviewee Agency:	Pennsylvania Department of Environmental Protection, Bureau of Mining and Reclamation
Interview Date:	June 12, 2002

I General

1. Is there a distinction between disposal and beneficial use? **Yes, there is a distinction between disposal and beneficial uses at mine sites. For example, coal ash used beneficially must meet quality and quantity standards as listed in §§287.663 and 664. If there is disposal at a mine site, it would require a Bureau of Land Recycling and Waste Management (BLRWM) disposal permit under Chapter 288. Mine placement of coal ash is not allowed unless a beneficial use is demonstrated.**
   1.1 How is the distinction made (e.g., waste quantity, placement type)? **The distinction is made in definition of coal ash (§287.1), in accordance with the Solid Waste Management Act and the coal ash beneficial use residual waste management regulations (§§287.661-667), and the technical guidance documents (TGDs) (563-2112-206, 563-2112-224, and 563-2112-225).**

2. Under what program(s) does the state regulate mine placement (e.g., state SMCRA implementing regulations, state solid waste program)? **The Department's Bureau of Mining and Reclamation (BMR) regulates coal ash placement at mine sites under the Solid Waste Management Act and BLRWM residual waste management regulations, Pennsylvania Surface Mining Conservation and Reclamation Act (SMCRA), and federal Surface Mining Control and Reclamation Act (SMCRA). BMR has a MOU with BLRWM to approve the beneficial use of coal ash at mine sites. BMR coordinates coal ash beneficial use at mine sites with BLRWM.**

3. Are there differing requirements/policies applicable to different types of CCW (e.g., fly ash vs. FGD wastes)? **There are differences between coal ash and other ashes (see definition coal ash §287.1). Coal ash is defined as "fly ash, bottom ash or boiler slag resulting from the combustion of coal." Coal ash does not include flue gas desulfurization (FGD), which is a residual waste that may be beneficially used through a BLRWM general permit (§§287.501-287.652).**

4. Are there differing requirements/policies applicable for different types of placement? **Yes, there are different requirements for placement. For example, coal ash may be mixed with overburden, it may be placed in layers and compacted, it may be used for alkaline addition, and it may be used for an impervious layer. Also, it may be used as a structural fill if approved under §287.661 by the BLRWM residual waste management program. Also, there are requirements for coal ash beneficial use as a soil substitute/soil additive (§§287.662-287.664). Only a very small quantity of coal ash is used as a soil substitute/soil additive at mine sites. Coal ash is allowed for mine placement, but not FGD, under the coal ash beneficial use regulations 287.663 & 664. (Refer to two DEP guidance memos on mine placement of ash.)**

5. Are there differing requirements/policies applicable for different kinds of mines (e.g., coal vs. non-coal mines such as quarries)? **Yes, there are different requirements for coal ash beneficial use at different kinds of mines. Coal ash beneficial use at permitted coal mine sites is addressed under §287.663 of the residual waste management regulations. Coal ash beneficial use at abandoned mine sites is addressed under §287.664 of the residual waste management regulations. However, it is possible under a BLRWM general waste management permit for other coal ash related materials, e.g., ash from petroleum coke burned with coal or FGD material to be beneficially used in Pennsylvania. Coal ash beneficial use at noncoal mines would be handled on a case-by-case basis. Any approval at noncoal mines is site-specific by a joint BLRWM/BMR mine review. Coal ash cannot go to post-1972 noncoal mine pits under the coal ash beneficial use regulations 287.663 & 664.**

II Planning/Permitting

1. Are mine facilities required to obtain permits for CCW placement? **Yes, approval for coal ash beneficial use is provided under the coal mining permit at active mine sites. Coal ash beneficial use at abandoned mines requires an approval with the Department, e.g., consent order or agreement. The approval process would entail the same level of review as for a permitted mine site.**

2. Who issues the appropriate permits? **District Mining Offices (DMOs) approve the coal ash beneficial use under the mining permit as part of the reclamation plan. The Bureau of Abandoned Mine Reclamation (BAMR) would normally approve a contract that beneficially uses coal ash at abandoned coal mines. However, the review for approval usually is conducted by BAMR, DMO, and BLRWM.**

3. Do the permits contain project-specific conditions or requirements? **Yes, the beneficial use of coal ash at mine sites has to comply with all of §§287.663-664 regulations and the specific site permit conditions are added as a result of mining permit application review.**

4. Are there environmental justice considerations in the permitting process? **Yes. There is no specific requirement for coal ash beneficial use regarding environmental justice. However, the surface mining permit reviews would trigger environmental justice evaluations in accordance with the Department's environmental justice policy (available in EPA docket files). The first environmental justice screen is to see if the facility is within a designated environmental justice geographical area.**

5. Is the operator required to identify:
   - 5.1 The type of CCW to be minefilled? **Yes.**
   - 5.2 The source of the CCW? **Yes.**
   - 5.3 The quantity of CCW to be minefilled? **Yes.**

6. How many permits have been authorized in the State for CCW mine placement? **There are about 120 mine sites permitted for coal ash beneficial use.**

7. What is the total quantity of CCW minefilled in the State per year? **The amount of coal ash beneficially used at Pennsylvania mine sites during the past three years is: 2000 – 6,460,000 tons; 1999 – 5,960,000 tons; and 1998 – 6,068,000 tons. The 2001 data is being compiled.**

8. Are operators required to address acid/base balances prior to placement? **Coal ash has to have a pH above 7.0 for placement at a mine site. Acid/base balancing is not routinely done, except when the coal ash beneficial use is alkaline addition.**
   - 8.1 What procedures are used to conduct acid/base balances? **If used for alkaline addition, an acid/base accounting procedure on the rock overburden is used, as discussed in Chapter 11 of Coal Mine Drainage Prediction and Pollution Prevention in Pennsylvania.**
     - 8.1.1 What are the shortcomings of these procedures, if any? **Acid/base accounting for rock overburden makes assumptions that all sulfur will produce acidity and that all alkalinity will be used to neutralize acidity (see Coal Mine Drainage Prediction and Pollution Prevention in Pennsylvania, Chapter 11 – Interpretation of Acid-Base Accounting, and Chapter 13 – Alkaline Addition). However, it has been successfully used on Pennsylvania mine sites for over 20 years.**
     - 8.1.2 What is the long-term reliability of these procedures? **The long term reliability of acid-base accounting is good for overburden predictions but is less well known for coal ash placement sites.**

9. Is a reclamation plan required? **Yes, a reclamation plan is required for mine sites. (It is part of the permit as modules 25 and 27.)**
   - 9.1 Is the plan required to specifically address the use of CCW? **Yes, coal ash beneficial use is specifically addressed in the reclamation plan.**

9.2 What must the plan include? **Module 25 of the Anthracite and Bituminous Surface Mine Permit Applications requires information about the location, quantities, and placement techniques for the coal ash use and the final site grading plan for the coal ash use. Module 25 addresses coal ash beneficial uses as placement, alkaline addition and low-permeability material. Also attached is Module 27 of the Anthracite and Bituminous Surface Mine Permit Applications, which requires similar information for beneficial use of coal ash as a soil substitute/soil additive. DEP has not observed any problems to date with ash use for soil substitute/soil additive.**

9.3 What are the standards for reclamation (i.e., how is the end-point of reclamation defined)? **The reclamation standard involves regrading and planting in accordance to the coal mining regulations and mine permit. End-point of reclamation is the Stage 2 bond release, at which time the mine site is stable and supporting adequate vegetation. However, the mine is still bonded (Stage 3 bond) a minimum of five years after seeding and vegetation required with the reclamation plan. Ground-water monitoring stops at the end of Stage 2 unless there are questions about ground-water degradation.**

10. Is an operational plan required? **Yes, an operation plan is required for surface coal mining (Modules 9 and 10) and coal ash beneficial use.**

10.1 Is the plan required to specifically address the use of CCW? **Module 25 specifically addresses coal ash beneficial use (attached). Also, Module 27 specifically addresses coal ash use as a soil substitute/soil additive (attached).**

10.2 What must the plan include? **The site preparation, sediment and erosion controls, as well as unloading stockpiling, and placement of the coal ash are required. Also, coal ash testing, coal ash quality and ground-water monitoring is addressed.**

11 Is a closure plan and/or post-closure plan required? **We do not use the terms "closure plan" and "post-closure plan" as they are residual waste landfill terms. We have the land reclamation plan for the coal ash beneficial use in our Anthracite and Bituminous Surface Mine Permit Applications: Module 18- Land Use and Reclamation Map, Module 19-Land Use/Vegetation/Fish and Wildlife/Prime Farmland and Module 20-Postmining Land Use. These modules identify present land uses, land use classifications, and vegetation. Then, the postmining land uses are identified for each premining land use. Any change in land use must have a landowner-written statement, governmental or planning agency comments, and a demonstration that it is possible to accomplish. Also, Module 10-Operation Plan has to be modified to include coal ash beneficial use. Closure would be covered under Stage 2.**

11.1 Is the plan required to specifically address the use of CCW? **Yes, coal ash beneficial use is addressed as part of the postmining land use in general.**

Specifically, closure is identified for coal ash beneficial use in Beneficial Use of Coal Ash at Active Mine Site Guidance (563-2112-206), and it occurs upon the completion of backfilling and establishment of vegetation for placement, alkaline addition and low-permeability material.

11.2 What must the plan include? **There is a post mining land use that is part of the mine reclamation plan that must be approved as part of the permit on a site-specific basis. This includes information in Module 25, which includes the minimum grade of three percent for capping material and the amount of material for capping.**

12. Are there procedures and criteria for determining what future uses are acceptable following closure? **Yes, procedures and criteria for future land uses as established by the state (SMCRA), the federal (SMCRA), and utilization of the coal ash by the landowner.**

12.1 How is the public involved in this determination? **Public is notified through newspaper notice about the application and copies of the application are at public offices and the Department (§86.51). The beneficial use of coal ash review, which identifies most ash uses and changes in land use, is part of the mine application review process.**

12.2 If use is restricted, what protects against inappropriate uses? **The mining sites are inspected under SMCRA. The final land use is inspected for approval.**

Other: Sections 315 and 316 of the Penna. Clean Streams Law and the Solid Waste Management Act provides authorities for DEP to seek reparations after final bond release.

III Waste Characterization

1. Is characterization of the CCW conducted prior to placement? **Yes, coal ash and its leachate are analyzed prior to coal ash beneficial use at mine sites. Note Module 25, §§287.663 and 287.64, TGD 561-2112-224 (attached).**

1.1 What analytes are measured? **The following constituents of the coal ash must be determined: pH, aluminum, arsenic, antimony, barium, boron, cadmium, chromium, copper, iron, lead, manganese, mercury, molybdenum, nickel, selenium and zinc. The following constituents of the coal ash's leachate must be determined: pH (initial and final), aluminum, arsenic, antimony, barium, boron, cadmium, chromium, copper, iron, lead, manganese, mercury, molybdenum, nickel, selenium, zinc, sulfate, chloride and sodium, and neutralization potential is also performed when the alkaline use of coal ash is required. See attached Module 25, beneficial coal ash use regulations, and technical guidances.**

1.2 What is the testing method used? **The testing method for coal ash is based upon EPA's Test Methods for Evaluating Solid Waste, SW-846, or a comparable test method approved by the EPA or the Department (563-2112-**

224). The leaching method required is the Synthetic Precipitation Leaching Procedure (SPLP), EPA's Test Methods for Evaluating Solid Waste, SW-846, Method 1312 (563-2112-224).

1.3 Are there numerical waste acceptance/rejection criteria? **Yes, there are numerical standards for coal ash beneficial acceptance/rejection. (See the 4-30-98 DEP policy memo.)**

1.3.1 If so, what are they? **Numerical limits to reject coal ash are in excess of the Maximum Acceptable Leachate Concentration of the Coal Ash and Leachate Analyses (563-2112-224). (up to 10x for non-metals; up to 25x for metals; see Title 75, p. 287-20, "Waste Classification Standard".) However, secondary maximum contaminant levels (i.e., aluminum, iron, manganese, sulfate and zinc) may be granted a contingency for a specific site based on a demonstration (Certification Guidelines for Beneficial Use of Coal Ash, 563-2112-224). In addition, there are numerical standards for beneficial uses, i.e., coal ash pH has to be between 7.0 and 12.5 at the coal ash generator's site, coal ash for alkaline addition has to have the calcium carbonate equivalency of 10% or greater, low-permeability coal ash has to be $1x10^{-6}$ cm/sec or less (563-2112-224).**

1.3.2 If not, how are waste characteristics considered in pre-placement and planning? **In addition to coal ash characteristic limits, there are mine site criteria review (Module 25).**

2. Is ongoing waste characterization required during placement? **Yes, coal ash and its leachate are analyzed every six months after initial approval (Module 25).**

2.1 How do the analytes, testing methods, or waste acceptance/rejection criteria differ from those used prior to placement? **No difference; the analytes, test methods, and approval criteria for coal ash beneficial use are exactly the same for initial approval before placement as well as ongoing coal ash beneficial use.**

2.2 What is the required frequency of characterization? **Analytic results of the coal ash are submitted for review every six months**.

2.3 How often is the waste characterization data reviewed by the appropriate regulatory agency? **The six-month submittals of the coal ash are reviewed by either the District Mining Offices who granted permit approval or by the Bureau of Mining and Reclamation in Harrisburg for statewide coal ash approval of the coal ash quality.**

3. What is the basis for any numerical acceptance/rejection criteria? **The maximum acceptable leachate concentration limits are based on the Pennsylvania residual waste regulations for Class III waste landfills. They are 25 times the waste classification standard for metals and cations and up to 10 times the waste classification standard for nonmetals. The waste classification standard is defined**

in §287.1 as maximum contamination level goal (MCLG). If MCLG does not exist or is zero, then it is maximum contamination level (MCL) under the Safe Drinking Water Act. If no MCL exists, then it is secondary maximum contaminant level (SMCL) under the Safe Drinking Water Act. The other contaminant levels are based upon EPA's IRIS modeling. (See also Solid Waste Sec. 288.623.)

IV Site Characterization

1. Is characterization of the site required prior to placement? **Yes, site characterization is done before placement.**
   - 1.1 What factors are examined in characterizing a site? **Since it is part of the mine permit application, the geology, surface and ground water, soils and overburden, and all environmental features are reviewed (Modules 25 and 27).**
   - 1.2 What are the criteria for accepting/rejecting a site? **Approval of coal ash is based on achieving an overall improvement in water quality or preventing the degradation of water quality from the mining and reclamation activity (Module 25). Most coal ash beneficial use at mine sites occurs on remining sites to reclaim abandoned mine lands.**

2. Is consideration of the site hydrology (e.g., a probable hydrologic consequences determination under SMCRA) required? **Yes, hydrologic consequences are included in the coal ash beneficial use review because it is part of the mine permit application.**
   - 2.1 Does this consideration specifically address the use of CCW? **Yes, the effect of coal ash placement on water quality is considered.**
   - 2.2 What are the hydrologic criteria for site acceptance/rejection? **Coal ash may not be placed within eight feet of the regional ground-water table unless Department approval is given. There may be no pollution discharges, no off-site ground-water contamination, and no degradation of water supplies.**
   - 2.3 Does consideration of site hydrology specifically address both ground water and surface water? **Yes, both ground water and surface water are considered.**
   - 2.4 What time period does PHC determination or other consideration of site hydrology address? **Yes, the PHC address the time periods before, during and after the mining activity.**

3. Is background ground-water monitoring data required prior to placement? **Yes, background ground-water data is required, except when used solely as a soil substitute/soil additive at a mine site.**
   - 3.1 What analytes are measured? **The required data from monitoring points shall be obtained monthly or at six-week periods prior to coal ash placement and shall include the following parameters: static water elevation (for monitoring wells), flow (for springs, seeps or mine discharges), pH (field and laboratory), specific conductance, alkalinity, acidity, iron, manganese,**

sulfate, total dissolved solids, total suspended solids, aluminum, arsenic, cadmium, calcium, chloride, chromium, copper, lead, magnesium, mercury, nickel, potassium, selenium, sodium, and zinc (Module 25).

3.2 How are the sampling locations selected? **Monitoring points typically associated with active coal mine sites are, in most instances, capable of providing information on the effect of coal ash placement. These points are chosen because they are hydrologically connected to the mine site and will show any influence from the mine site. Monitoring points normally include monitoring wells, springs, seeps, mine discharges and abandoned mine shafts. Upgradient ground-water monitoring points are not required unless there is a need to characterize the ground water coming onto the placement sites because of concerns unrelated to the mine sites being monitored. For example, there may be other activities that could impact ground-water quality which are located close to the mine site.**

There must be at least one downgradient ground-water monitoring point from the active coal mine site. The actual number of downgradient monitoring points and their locations will depend upon the configuration of the coal ash placement area, the volume of coal ash placed, and the ground-water conditions at the mine site. Sufficient ground-water monitoring must be performed in order to provide an assessment of the impact of coal ash on the ground water. The assessment must address its areal extent as well as any changes to water quality (Module 25).

3.3 How much data is required before placement? **At active coal mine sites, six background samples from each monitoring point taken monthly or at six-week periods are normally necessary to adequately characterize ground-water quality prior to coal ash placement. Any proposal for using less than six background samples must be justified by the applicant and be approved by the Department (Module 25).**

4. Is background surface water monitoring data required prior to placement? **Yes, but surface water monitoring is done as part of the mine permit. In addition, springs and seeps are monitored as part of the mine permit.**

4.1 What analytes are measured? **The following are monitored: pH, specific conductance, alkalinity, acidity, iron, manganese, aluminum, sulfate, suspended solids and total dissolved solids.**

4.2 How are the sampling locations selected? **They are usually the streams receiving drainage from proposed operations.**

4.3 How much data is required before placement? **Six complete chemical samples taken at monthly intervals.**

5. Is the use of liners considered in site characterization? **No, liner use is not considered. If the site or coal ash is not suitable without a liner, then coal ash may not be used.**
   5.1 If a site is determined to be unacceptable for CCW placement, can it be made acceptable through the use of liners? **No, as answered above.**

6. Are there any restrictions on the type of sites that can accept CCW? **Yes, as previously mentioned, coal ash beneficial use is to improve or to not degrade water quality. Therefore, coal ash may not be used if there is a possibility to degrade. Mine sites in close proximity to public water supplies are avoided.**

V Risk Assessment

1. Is a formal risk assessment performed? **No formal risk assessment is performed. However, risk assessment considerations are an inherent part of the coal mine permitting process. Issues such as downstream water uses, local ground-water uses, pre-permitting ground and surface water background water quality, and the potential for correcting or abating existing environmental problems are all considered during the permitting process.**
   1.1 Is it based on site-specific, regional or other (please specify) data? ***Question not applicable.***
   1.2 Describe the steps taken in this assessment. ***Question not applicable.***
   1.3 Who conducts the assessment? ***Question not applicable.***

2. Are specific air, surface water, and ground-water models, equations, etc., used to assess risk or impacts? **See response in V.5.**
   2.1 What models are used?
   2.2 What is the State's experience with these models (e.g., ease of use, value of results)

3. How are the risk assessment results expressed? {e.g., monetization of potential damages, calculated incremental health risks (illness, deaths), negative risk (i.e., benefits outweigh negative impacts), rationalization (e.g., aquifer is not potable anyway), comparative (current/future use of the resource)}. **See response in V.5.**

4. How are the results interpreted to determine the level and acceptability of impacts to receptors? **See response in V.5.**
   4.1 Who is responsible for interpreting the results?

5. If no risk assessment is completed, is there a presumption that placement is acceptable if certain criteria are met? (e.g., leachate characteristics, distance to ground water, liner placement, historical experience of the regulatory authority). **During the regulatory development process, the Department used a ground-water model and risk assessment concept to obtain maximum acceptable leachate concentrations so that**

leachates from coal ash could be evaluated. The Department's historical ground-water quality data, which has been compiled since 1970, along with site-specific data and existing mine site and water quality conditions are all used in assessing the risk of permitting a mine and the use of coal ash for mine reclamation. In addition, the Department requires the pH of the coal ash as generated (or processed at the generation site) to be basic (7.0-12.5) in nature. For coal ash placement for reclamation purposes, the Department requires a minimum isolation distance of eight feet between the coal ash and the top of the regional ground-water table. Also, coal ash capping requires a minimum three percent final grade and needs to improve existing water quality. In reviewing all the above pertinent information and data, the DMO technical staff always attempts to ensure that the benefits of using coal ash outweigh the potential harms of such use.

5.1 Please list the pass/fail criteria below. ***Question not applicable.***

VI Ground-Water Monitoring

1. Is a ground-water sampling and analysis plan required? **Yes, a ground-water sampling and analysis plan is required.**

2. Is ground-water monitoring required during placement? **Yes, ground-water monitoring is required during placement.**

   2.1 What analytes are measured? **Once this beneficial use begins at active coal mine sites, ground-water monitoring must be performed quarterly for the following parameters: static water elevation (for monitoring wells), flow (for springs, seeps or mine discharges), pH (field and laboratory), specific conductance, alkalinity, acidity, iron, manganese, sulfate, total dissolved solids and total suspended solids. Ground-water monitoring must be performed annually for the following parameters: aluminum, arsenic, cadmium, calcium, chloride, chromium, copper, lead magnesium, mercury, nickel, potassium, selenium, sodium and zinc.**

   2.2 How are the number of wells, well locations, and screening zones selected? **Monitoring points typically associated with active coal mine sites are, in most instances, capable of providing information on the effect of coal ash placement. However, ground-water monitoring points should be discussed and approved by the Department prior to placement of coal ash.**

   2.3 What is the frequency of monitoring? **The frequency is mentioned above in item 2.1.**

3. Is post-closure ground-water monitoring required? **Yes, there is ground-water monitoring after coal ash placement ceases. (Up to the end of Stage 2 unless there are questions about ground-water degradation.)**

   3.1 If so, how does it differ from ground-water monitoring conducted during placement (analytes monitored, frequency, etc.)? **This ground-water monitoring**

is the same as ground-water monitoring prior to and during coal ash placement.

4. Can ground-water monitoring be discontinued? **Yes, normally when the site has successfully revegetated. (Stage 2 ends.)**
   4.1 What are the criteria for discontinuing ground-water monitoring? **Ground-water monitoring ceases when the mine site receiving coal ash is backfilled and vegetation is established. Ground-water monitoring would not cease at this time if there was an indication of ground-water degradation or questions about quality.**

5. How is ground-water monitoring designed to specifically detect/distinguish the effects of CCW placement? **The ground-water monitoring reflects coal ash leachate parameters for mine sites where coal ash is used. The mining permit includes Module 25, which includes the additional parameters that can reflect degradation due to the coal ash.**

6. How are large expanses dealt with? **As previously mentioned above in item VI.2.2, the number of monitoring wells/points is increased or located where required for monitoring, i.e., deep mine complexes. (Always a site-specific decision.)**

7. How is existing ground-water contamination dealt with as part of the monitoring program? **Background water monitoring establishes existing ground-water conditions. Additionally, upgradient monitoring can aid in establishing existing conditions.**

8. What water quality standards/criteria must be met? **Existing water quality is used as the basis for determining degradation.**

9. Are alternative monitoring methods allowed? **Yes, alternative monitoring is allowed.**
   9.1 What alternative monitoring methods are allowed? **Alternative monitoring is based on hydrologic conditions.**

VII Surface Water Monitoring

1. Is a surface water sampling and analysis plan required? **Yes, it is required as part of the mining permit. The need to include coal ash related parameters as part of permitting is determined by site-specific considerations. If it is required as part of normal surface mine permitting for coal ash placement, we are assuming surface water means a stream or NPDES discharges. (Heavy metals are typically not monitored.)**

2. Is surface water monitoring required during placement? **Refer to responses in VI 2-7. Again assuming surface water means stream or NPDES discharge point, it is required in our mining permit.**
   - 2.1 What analytes are measured?
   - 2.2 How are sampling locations selected?
   - 2.3 What is the frequency of monitoring?

3. Is post-closure surface water monitoring required? **Refer to responses in VI 2-7. Again assuming surface water means stream or NPDES discharge point, it is required in our mining permit.**
   - 3.1 How does it differ from surface water monitoring conducted during placement (analytes monitored, frequency, etc.)?

4. Can surface water monitoring be discontinued? **Refer to responses in VI 2-7. Again assuming surface water means stream or NPDES discharge point, it is required in our mining permit.**
   - 4.1 What are the criteria for discontinuing surface water monitoring?

5. How is surface water monitoring designed to specifically detect/distinguish the effects of CCW placement? **Refer to responses in VI 2-7. Again assuming surface water means stream or NPDES discharge point, it is required in our mining permit.**

6. How is background surface water quality assessed? **Refer to responses in VI 2-7. Again assuming surface water means stream or NPDES discharge point, it is required in our mining permit.**

7. What water quality standards/criteria must be met? **Refer to responses in VI 2-7. Again assuming surface water means stream or NPDES discharge point, it is required in our mining permit.**

VIII Placement Practices

1. What types of CCW placement are allowed (i.e., into active mines, closed mines, surface mines, underground mines, etc)? **We allow placement (as backfill/reclamation material), alkaline addition and low-permeability material into active and abandoned coal mine sites and abandoned noncoal sites as reclamation (563-2112-225). Also, coal ash may be beneficially used as soil substitute/soil additive on these sites.**

2. Is placement into the water table allowed? **No, not under the beneficial use of coal ash regulations. However, under the residual waste management regulations, the Department can approve demonstration projects. Under these regulations, the Department has approved several demonstration projects using coal ash. Another**

factor considered is the potential to correct/improve existing environmental liabilities at abandoned surface mine sites.

2.1 If so, under what conditions? **The beneficial use of coal ash in a mine pool which is the ground water requires a demonstration under the residual waste management regulations. This approval requires much site-specific detail and information. (Limited RD&D-type permit.)**

2.2 If not, how close to the water table is placement allowed? **Under the coal ash beneficial use regulations (§§287.663 and 287.664), coal ash may not be placed within eight feet of the regional ground-water table unless approved by the Department.**

2.3 If a liner is required beneath the CCW, what are the design/performance standards for the liner? **The Department has not approved a coal ash beneficial use that used a liner. If coal ash needed a liner, it has to be approved under Chapter 288. Also, on alkaline addition sites, liners would defeat the purpose of the coal ash beneficial use.**

3. Is placement into mine pools allowed? **There are several demonstration projects at mine sites, but this is a site-specific approval by the Department.**

3.1 What placement techniques are used? **The coal ash is either pushed or slurried into the mine pool. There is compaction and stability testing.**

3.2 Are there additional/special monitoring requirements after placement into a mine pool? **Yes, there are more stringent monitoring requirements with evaluations that if the coal ash is not setting up and the mine water quality is not improving, the project would then be stopped.**

4. Are there specific design/operational requirements for the following types of projects and, if so, what are they? **Yes, the coal ash beneficial use is a specific mine site approval.**

4.1 Placement into underground mines? **Yes, but the requirements are project specific.**

4.2 Placement into surface mines? **Yes, placement into surface mines has been previously discussed in item I.4.**

4.3 Grouting? **Yes, the beneficial use as a grouting material has to be designed to have a specific compression strength and hydraulic conductivity.**

4.4 Acid mine drainage remediation? **Yes, we use the alkalinity in coal ash (particularly FBC ash) to neutralize acidic conditions.**

4.5 Soil conditioning? **Yes, the soil conditioning is usually a mix of on-site subsoil which is usually poor material with coal ash. Adding coal ash to the on-site material (typically 50:50 proportions) produces a substance upon which vegetation can be established. Soil analyses and contaminant loading rates for the coal ash are used.**

4.6 Mine sealing? **Yes, coal ash is used in the construction of mine seals, especially in construction of abandoned mine shaft seals.**

4.7 Subsidence control? **Yes, coal ash can be used in subsidence control if it meets the specifications of material that is to be pumped into mine voids. (The alternative is to use coal refuse material.)**

4.8 Spoil encapsulation? **Yes, coal ash use as encapsulation would have to meet the low-permeability requirements (at least $1x10^{-6}$ cm/sec). (Fairly small use in Pennsylvania.)**

IX Operational Requirements/Design Requirements

1. How is the potential for flooding/washout addressed? **The erosion and sediment control plans for the coal ash beneficial use addresses storage, handling and placement activities, which address flooding/washouts. Specifically, there are upslope diversions. In addition, coal surface mine regulations (Chapters 87 and 88) and Module 12 (Erosion & Sediment Controls) address this.**

2. Are runoff controls used/required? **Yes, runoff controls are covered under the erosion and sediment control plan as mentioned in item IX.1.**

3. Are leachate collection systems used or required? **No, leachate collection is not required.**
   - 3.1 Under what conditions? ***Question not applicable.***
   - 3.2 What are the design criteria? ***Question not applicable.***

4. Is waste conditioning required? **Coal ash is only allowed to be conditioned by the addition of alkaline material to raise its pH at its power plant source. The conditioning by the addition of water is also usually done at the power plant. Additional water is often added at the mine site to improve the handling of the coal ash and as a dust suppressant.**
   - 4.1 What waste conditioning methods are allowed? **A pH conditioner like lime can be added to raise the pH to at least 7.0 at the coal ash generator's site. Water addition at power plant's site usually occurs before the transporting.**
   - 4.2 What design criteria exist for waste conditioning? **For pH adjustment, the design criteria is usually bench tests to determine the proper amount of alkali material needed to raise the coal ash pH level to above 7.0. The amount of water added is determined by experience, which usually is determined using the moisture amounts from the Standard Proctor or Modified Proctor moisture-density tests.**

5. What fugitive dust controls are used or required: **Yes, fugitive dust is addressed in transportation and on the placement site.**
   - 5.1 During transport and discharge from transport vehicles? **Prior to transport, water is used. This is done at the power plant's site. Truck tarps are generally required through local ordinances.**

5.2 During/following placement? **Water trucks will control dust on the haul roads. Fugitive dust control is addressed in Chapters 121 and 123 (air quality regulations).**

6. Is a cover or cap required over the CCW? **Yes, there is a soil cover placed over the coal ash placement. When coal is beneficially used as a soil amendment, no additional cover is needed.**
   - 6.1 What are the design/performance criteria? **The soil cover is usually four feet thick. This is a specific site approval to obtain the best available material for cover. Little natural soil is available at refuse pile locations, so this is a site-specific evaluation.**
   - 6.2 What kind of cover materials are required? **The cover material would be vegetative cover required by the postmining land use.**
   - 6.3 What minimum/maximum slopes are allowed for final cover? **The final slopes are a minimum of three percent to a maximum slope of 35 percent.**
   - 6.4 What compaction criteria/standards apply to the cover/cap? **There is no compaction requirement for cover.**
   - 6.5 What are the maintenance standards for covers/caps? **The maintenance standards are for establishing erosion and sediment control and establishing successful vegetation.**

7. Is re-establishment of surface streams required? **In some cases where streams were eliminated by abandoned mine operations and the area is being restored by remining with the beneficial use of coal ash.**
   - 7.1 What determines when it is appropriate and how it should be done? **The site-specific mining plan.**
   - 7.2 What are the design criteria? **Any re-established stream channel must not leak and should include considerations such as pool-to-riffle ratio. Geo-synthetic liners have been used.**

8. Is contouring of waste so water drains away from the fill required? **Yes, placement is conducted so that there is drainage from the activities area. As previously mentioned, slope from three to 35 percent.**
   - 8.1 When is it appropriate to contour wastes? **Yes, coal ash is contoured and as much as drainage as possible is diverted around the coal ash activity.**
   - 8.2 What are the minimum slope and compaction criteria? **The minimum slope is three percent and compaction would be site-specific.**

9. Is re-vegetation required? **Yes, revegetation is required.**
   - 9.1 What are the design criteria? **The SMCRA post-mining land use determines the vegetative cover.**

9.2 What kinds of plants are used? **The standard surface mine reclamation grasses and trees.**

9.3 What kinds of topsoil/compost are required? **Topsoil that is saved is used on the mine site. However, the final cover for the mine site is determined on a case-by-case basis (e.g., various soil/ash mixtures).**

10. Is the operator required to restrict public access to the waste and facility? **Yes, the mining permit, which includes coal ash beneficial use, restricts access to the mine site.**

10.1 What design/performance standards or criteria apply? **Posting no trespassing signs and enforcement of the regulatory requirements.**

11. What are the post-closure maintenance requirements (e.g., maintaining cover integrity and effectiveness, slopes, vegetation, etc.)? **See the previous discussion about cover or cap.**

12. How long is the owner/operator responsible for post-closure maintenance? **As previously stated, the operator is responsible for the coal ash placement until final bond release five years after the seeding (i.e, 70 % + ground cover established and no erosion evident).**

13. What other operational requirements exist? **Previously discussed.**

X Corrective Action

1. Under what circumstances are corrective actions required/what is the trigger for a corrective action? **Corrective actions can occur when the coal ash being used no longer meets the standards for coal ash beneficial use, or when the ground-water monitoring parameters which are quarterly and/or annual are exceeding the background ground-water parameters. In addition, any violation of the mine permit that addresses coal ash beneficial use would require corrective action.**

2. What types of corrective action measures are appropriate? **The corrective action for the first situation would be that this coal ash would no longer be approved for use at the mine site. The corrective action for the second situation is that all coal ash beneficial use would stop until the reason for the degradation is determined. This would include the possibility that coal ash would not be beneficially used at the mine site, if coal ash was determined to be the source of the degradation. Permit violations regarding the beneficial use of coal ash would be processed under SMCRA and surface mining regulations (Chapters 86 and 90).**

3. Does the state have any damage cases? **We have no damage cases where coal ash on mine sites has caused water quality degradation related to coal ash placement.**

XI Financial Assurance

1. Is financial assurance required? **Yes, the financial assurances required are the financial assurances required under the mining permit and SMCRA.**
   1.1 What types of financial assurance mechanisms are allowed? **The financial assurances are surety bonds, collateral bonds, self bonding, and a combination of the previously mentioned bonding instruments.**

2. What is the period of liability? **The period of liability for the coal ash placement, alkaline addition, and low-permeability material is a minimum of five years after the regrading and seeding for release of final bonds. However, the period of liability for water quality is indefinite because Department requirements under the Clean Stream Law and the Solid Waste Management Act. (These statutes are referred to in the permit boiler plate language.)**

3. What is the amount of financial assurance required? **The amount of financial assurance is determined by operational parameters for mine sites. The amount is now evaluated annually.**

4. What are the conditions for bond release? **The conditions of release are: there is no water quality degradation, the mine site properly reclaimed, and there are no outstanding site violations.**

5. Is there a separate State liability fund? **No, there is no separate state liability fund.**
   5.1 What is the source of money for this fund? ***Question not applicable.***

XII Reporting

1. How frequently is monitoring data on wastes, ground and surface water reported to the government? **The characterization of the coal ash is submitted every six months after its approval. Ground-water monitoring after coal ash beneficial use begins must be submitted quarterly for the following parameters: static water elevation (for monitoring wells), flow (for springs, seeps or mine discharges), pH (field and laboratory), specific conductance, alkalinity, acidity, iron, manganese, sulfate, total dissolved solids, and total suspended solids. Ground-water monitoring after beneficial use begins must be submitted annually for the following parameters: aluminum, arsenic, cadmium, calcium, chloride, chromium, copper, lead, magnesium, mercury, nickel, potassium, selenium, sodium and zinc. (Module 25 specifies these requirements.)**

2. Is the data maintained at the facility? **The coal ash characterization data is not required to be at the mine site. However, it would be at the mine operator's office, which could be the mine site. Ground-water data would be available at the mine operator's office, also.**

3. How often are sites inspected? **Mine sites have a monthly inspection frequency, as required by the OSM and Pennsylvania surface mining regulatory program.**

4. How often is compliance with permit requirements, performance standards, enforceable limits, etc., evaluated? **Compliance is determined during each inspection.**
   4.1 Who is responsible for this evaluation? **Compliance is handled by the DEP District Mining inspectors and technical staff.**

5. What are the post-closure reporting requirements? **As previously mentioned, these have to continue until Stage 2 bond release, which is conditioned on regrading of the site and successful establishment of vegetation. The Stage 3 bond release is a minimum of five years after planting if there are no violations.**

6. How frequently does the regulatory authority inspect the closed facility, and what are the criteria for terminating inspection? **Mine sites having coal ash beneficial use are inspected monthly until Stage 2 bond release. Mine sites are inspected quarterly between Stage 2 and Stage 3 bond release.**

XIII Public Participation

1. Prior to permit issuance, does the public have an opportunity to review and comment on monitoring (surface and ground-water) and/or modeling data and Probable Hydrologic Consequences determination? **Yes, there is public participation required under SMCRA and the mine permit regulations (§86.31). This includes local newspaper publication, publication in Pennsylvania Bulletin, and letter notification to the local municipality. In addition, there is notification under Acts 67 and 68 (state and local government coordination).**
   1.1 What other opportunities for public involvement are there in the permitting process? **The public can review all the application data at a public location designated in the newspaper notice or at the DEP District Mining Office. The public can request an informal conference or public hearing.**

2. Is monitoring data available to the public? **Monitoring data is available for public review at both locations during the permit application review. After the permit is issued, this information is available at the District Mining Office. Also, the public can use the DEP website to become aware of mining applications under review. In general, monitoring data is available to the public as soon as DEP receives it.**

3. What opportunity does the public have to participate in overseeing compliance at the site? **Yes, the public can review all the inspection reports and compliance actions at the DEP District Mining Office. Also, there is some compliance information about the site within the DEP website under eFACTS information. The public can file a complaint request to do a site inspection. (DEP escorts the site visit).**

4. How does the public have access to post-closure reports? **Yes, monitoring data and bond release data is available. Notification of bond release must be published in newspaper and identified to adjacent land owners.**

5. Are citizen actions allowed? **Yes, citizen actions are allowed.**
   - 5.1 What types of actions are allowed (e.g., petitions, suits)? **The following citizen actions are allowed: citizens may appeal any permitting decision of the Department, including decisions approving the coal ash beneficial use on a mine site, and bond releases.**
   - 5.2 Who adjudicates citizen actions (e.g., permitting agency, administrative law judge, State court, federal court)? **The following adjudications are allowed: appeals must be filed with the Environmental Hearing Board (EHB) within 30 days of the Department's action. (Actions include: initial permit issuance, 5 year permit renewal actions, major permit modifications, each stage of bond release.) The EHB is equivalent to an administrative law judge. Appeals of EHB decisions are heard by Commonwealth Court, i.e., state court.**