DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Mining and Reclamation

DOCUMENT NUMBER: 563-2112-225

TITLE: Mine Site Approval for the Beneficial Use of Coal Ash

INTERIM FINAL EFFECTIVE DATE: Upon publication in the *Pennsylvania Bulletin*.

AUTHORITY: Pennsylvania's Solid Waste Management Act (35 P.S. §§6018.101 et seq.), 25 Pa. Code Chapter 287, Clean Streams Law (35 P.S. §§691.1 et seq.), Surface Mining conservation and Reclamation Act (52 P.S. §§1369.1 et seq.), and Noncoal Surface Mining Conservation and Reclamation Act (52 P.S. §§3301.1 et seq.).

POLICY: The Department provides for two beneficial uses of coal ash, placement and soil substitute or soil additive, that can be approved at mine sites as part of the Department's mine reclamation contracts or in other Department approved permitted projects.

PURPOSE: This document describes acceptable procedures for the beneficial uses of coal ash at mines.

APPLICABILITY: This guidance applies to generators of coal ash, mine operators, consultants, reclamation contractors, and Department staff who are involved in the beneficial use of coal ash at active surface and deep coal mines, coal refuse reprocessing sites, coal refuse disposal sites and abandoned coal mines.

DISCLAIMER: The policies and procedures outlined in this guidance are intended to supplement existing requirements. Nothing in the policies or procedures shall affect regulatory requirements.

The policies and procedures herein are not an adjudication or a regulation. There is no intent on the part of DEP to give the rules in these policies that weight or deference. This document establishes the framework within which DEP will exercise its administrative discretion in the future. DEP reserves the discretion to deviate from this policy statement if circumstances warrant.

PAGE LENGTH: 15 Pages

LOCATION: Vol. 12, Tab 59B (BMR/PGM Section II, Part 2, Subpart 25)

BACKGROUND

The Pennsylvania Solid Waste Management Act of 1980 was amended in December 1986 to allow for the beneficial use of coal ash. In July 1992, provisions describing standards for the beneficial use of coal ash were included in the residual waste management regulations. These regulations were revised in January 1997. These revised coal ash regulations in §§287.663 (Beneficial use of coal ash at coal mining activity sites as coal mining activities as defined in §86.1) and 287.664 (Coal ash beneficial use at abandoned coal and abandoned noncoal surface mine sites) required the development of guidance "to facilitate review of beneficial uses of coal ash at coal mining activities." This guidance is the fulfillment of that requirement. This guidance has been revised to include recommendations from the 2006 National Academy of Science report, "Managing Coal Combustion Residues in Mines" and to incorporate Department experience with the beneficial use of coal ash at mines.

INTRODUCTION

This guidance addresses the technical information required to obtain mine site approval for the beneficial use of coal ash. Coal ashes vary considerably in their chemical and physical properties depending on the fuel source, the combustion technology used, air pollution control practices, and ash handling procedures. These factors must be carefully weighed when evaluating the appropriateness of using a particular coal ash for a specific purpose at a given site. A use, such as alkaline addition, that is appropriate for a highly-alkaline, pozzolonic ash from a Fluidized Bed Combustion (FBC) boiler may be inappropriate for a neutral-pH ash from a conventional coal boiler. Both ashes may have legitimate beneficial uses at mine sites, but it is not a given that they are interchangeable. For example, the isolation distance from groundwater may be a far more important consideration for a coal ash with high permeability as compared to a low permeability ash. While TGD 563-2112-224 (Certification Guidelines for the Chemical and Physical Properties of Coal Ash Beneficially Used at Mines) addresses the acceptable physical and chemical characteristics of a particular ash for beneficial use (source approval), it is imperative that those proposing and reviewing proposals for a specific mine site consider the interplay between site-specific factors and ash-specific factors.

Beneficial use of coal ash at mine sites falls into two categories: placement, and use as a soil additive or substitute (§§287.663 and 287.664). Coal ash placement includes use for backfilling (reclamation), alkaline addition, and as low-permeability material. The coal ash used for these purposes must have chemical and physical characteristics that are consistent with beneficial use. Technical Guidance 563-2112-224 describes the chemical and physical characteristics necessary for an ash to be approved for beneficial use. The section of the beneficial use regulations (§287.661) concerning the use of coal ash as a structural fill does not apply to the use of coal ash on mine sites and is intended to regulate the use of coal ash in non-mining scenarios.

APPLICABILITY OF THIS GUIDANCE

This guidance applies to active coal mine sites and the reclamation of abandoned coal and noncoal mines. The use of coal ash at active industrial mineral mines is not authorized under §287.663. The reclamation of abandoned coal or abandoned industrial mineral mines is carried out by contract at DEP's discretion and under the conditions of the contract.

This guidance also applies to Bureau of Waste Management (BWM) General Permits that allow for beneficial use at mines. Approval of a BWM general permit is not an automatic approval for use at mine sites. The ash covered under a general permit must meet the mining program's certification

guidelines as required by 25 Pa. Code Chapters 287, §§287.663 and 664, as well as applicable mining law, before such ash may be beneficially used at a mine site.

Pennsylvania's experience with the beneficial use of coal ash for placement is limited to its use at coal mines. Coal ash has been successfully used in these environments to reclaim dangerous abandoned pits and highwalls, reclaim formerly acid- and sediment-producing coal waste piles, and to restore positive drainage to drastically disturbed lands. The context of these sites is typically one of already degraded or polluted groundwater. To date we have not observed water quality degradation as a result of ash placement, and in some instances we have seen significant improvements in water quality.

This guidance is applicable to the use of coal ash to reclaim abandoned coal. Until such time that it can be determined that coal ash can be used in an environmentally safe manner at industrial mineral mines and means are developed that assure pollution will not occur at such sites, DEP should not issue contracts to reclaim abandoned industrial mineral mines with coal ash.

As mentioned above, coal ash at coal mine sites is typically being placed in areas where groundwater quality has already been impacted. Coal ash placement in proximity of more pristine aquifers, including those that serve as water supplies, should not be permitted unless it can be demonstrated that groundwater uses will be protected and groundwater quality will not be degraded. Coal ash should not be beneficially used within special protection watersheds unless it can be demonstrated that the use of the ash will improve water quality from a preexisting pollution problem. Special protection watersheds include those with streams classified as High Quality and Exceptional Value, watersheds with streams used for public water supplies, and watersheds with streams that support native trout.

INFORMATION REQUIREMENTS FOR MINE SITE APPROVAL

Site approval requires a demonstration that the beneficial use of coal ash can be accomplished in an environmentally safe manner. The following sections indicate the kinds of information necessary in order for the Department to make this determination.

A. Water Monitoring

The following discussion applies to water monitoring at sites where coal ash is used for placement (i.e., as fill material, alkaline addition and as low-permeability material). Because of the small volume of ash usually used as a soil amendment, water monitoring specific to coal ash parameters is generally not required for that beneficial use as long as the application rates are appropriate and are consistent with Section D of this document. Frequently, the standard monitoring points required for active coal mine sites are located such that they can provide accurate information on the effect of coal ash placement. However, if existing monitoring points are not sufficient to characterize effects from ash placement, additional monitoring points will need to be established prior to ash use. The location and adequacy of monitoring points must be discussed with and approved by the Department. Groundwater monitoring points normally include monitoring wells, springs, seeps, mine discharges, and abandoned mine shafts. Up-gradient groundwater monitoring points will normally be required. Up-gradient monitoring is especially important if up-gradient groundwater is contaminated or may become contaminated via some other source or activity. There are some cases where meaningful up-gradient monitoring is not possible, such as sites that are located at or near the up-gradient end of the groundwater flow system.

Typically, at least three groundwater monitoring points down-gradient from the active mine site are necessary. The 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, the size of the ash placement area, and the hydrogeologic conditions at the site. Groundwater monitoring must be sufficient to verify any influence of the coal ash on water quality. Groundwater discharges such as springs, seeps and mine discharges located directly downgradient of the ash utilization area can make excellent monitoring points. In some cases monitoring of surface water, such as small tributaries may be appropriate, but the influence of dilution on such monitoring points must be considered. Frequently monitoring wells will be necessary to adequately monitor the site. Because groundwater flow in Pennsylvania's coal fields is often controlled by fractures, applicants may find that they need to drill at multiple locations before finding good monitoring wells. Wells that are dry or that contain such small volumes of water as to make data collection and interpretation difficult will not be accepted as monitoring points. Where sites are underlain by or adjacent to deep mine pools, the monitoring plan must consider the horizontal and vertical location of the deep mine and associated mine pool, the flow path through the mine, location and influence of barrier pillars, and mine pool discharge points.

A minimum of twelve (12) background samples from each monitoring point must be collected to establish pre-ash groundwater conditions. A sample is to be collected monthly, for each monitoring point until at least twelve samples have been collected. The samples must represent a full water year, and must be recent, i.e., sampling must have been completed within six months prior to submission of the application. Following approval of an ash site, the monitoring points are to be sampled quarterly. Background and monitoring samples at sites that receive ash for placement must be sampled for the following parameters:

- pH, alkalinity, acidity, field temperature, specific conductance (25°C), flow or static water level, sulfate, ammonia, nitrate and nitrite.

- Dissolved concentrations of aluminum, antimony, arsenic, boron, barium, beryllium, cadmium, calcium, chloride, chromium, cobalt, copper, fluoride, iron, lead, magnesium, manganese, mercury, molybdenum, nickel, potassium, selenium, silver, sodium, thallium, vanadium, and zinc.

- Additional parameters may be required by the Department on a case-by-case basis.

All sample collection and analysis will be in accordance with EPA's Test Methods for Evaluating Solid Waste, SW-846. Detection limits should be below drinking water standards. If this detection limit cannot be achieved an explanation must be provided to the Department. Monitoring wells are to be purged at least three well volumes or until specific conductance and pH stabilize. Samples for dissolved constituents must be field filtered through a 0.45 µm filter before "fixing" with acid.

The background and monitoring data is to be provided on form No. 5600-PM-MR0014 "Coal Ash Water Quality Monitoring Report." The monitoring data must be submitted quarterly to the Department, no later than 30 days after the end of the previous quarter.

Monitoring shall continue at coal ash sites for ten years after the completion of the coal ash placement. Monitoring will be quarterly for the first five years and yearly for the following five years. If after five years following completion of coal ash placement there is no evidence of

degradation of groundwater and no sign of increasing trends in contamination, the quarterly monitoring can be reduced to annual. After ten years if there is no evidence of groundwater degradation or increasing trends in contamination, monitoring may cease, but only after the permittee has demonstrated to the Department's satisfaction in writing that the monitoring data shows that contamination has not occurred. If there is evidence of water quality degradation or increasing trends in parameters that may indicate future contamination, then monitoring will continue on a quarterly basis. Monitoring would then continue quarterly until the site has returned to acceptable water quality parameters. An increase in monitoring rate may be necessary if the Department determines that more frequent samples are necessary to better define the pollution event or to better evaluate corrective actions. Corrective actions are discussed below under the section "Remediation"

B. Ash Placement and the Groundwater Table

The regulations addressing the beneficial use of coal ash (§§287.663 and 287.664) require the isolation distance between the bottom of coal ash and the top of the groundwater table elevation (defined in §287.1) to be at least eight feet (2.44 meters) unless otherwise approved by the Department. For the purpose of this guidance "groundwater table" is not limited to the regional water table, but includes perched water tables and mine pools. If the ash is to be placed within eight feet of the groundwater table, a study shall be submitted to the Department, which demonstrates that: (a) there will be an overall improvement to water quality or (b) groundwater will not be polluted and mine-related hazards will be reclaimed. At a minimum, this demonstration should address the proposed distance between the coal ash and the groundwater table, the volume of coal ash to be placed, the location of the down-gradient monitoring points relative to ash placement, and fluctuations in seasonal groundwater levels. There may be instances were groundwater or geochemical modeling is needed. Discussions in the study should include reference to relevant research. The analysis must show that the plan will meet the regulatory requirements.

C. Requirements for Coal Ash Used for Placement

Coal ash placement includes use as backfill material, alkaline addition, and low-permeable material. These uses are discussed below.

The permittee must control fugitive dust emission from the site. A water truck must be maintained on site (unless otherwise approved by the Department), and operational areas must be watered as needed to prevent fugitive dust. Coal ash may not be spread when wind conditions are likely to create fugitive dust emissions. Should fugitive dust become evident from the coal ash placement site, an intermediate layer of suitable cover material (three inches or more in depth) or other suitable dust control measures (approved by the Department) shall be applied to those areas associated with the fugitive dust problem.

The permittee is responsible for verifying that all ash delivered to the site is from the source(s) approved for beneficial use at the site. If the operator cannot verify the origin of the source the load must be refused and removed from the site to an authorized disposal area.

A report of the volume (cubic yards) and weight (in tons) of each source of coal ash used on the mine site during the previous calendar year must be reported annually to the Bureau of Mining and Reclamation in Harrisburg. This should be submitted by January 31 of each year.

1. Placement Fill

All coal ash conveyed or hauled to the coal ash placement area must be spread and compacted into lifts of two (2) feet or less within 24 hours of on-site placement, unless otherwise approved by the Department. The mining and reclamation plan must be carried out such that, upon delivery to the site, ash is placed and spread at its final location. Coal ash used as fill material must be consistent with the mine reclamation plan, including requirements for meeting approximate original contour.

Coal ash used for placement fill must be compacted to a minimum of 90% of the maximum dry density as determined by the Modified Proctor Test or 95% of the maximum dry density as determined by the Standard Proctor Test. The coal ash must be delivered to the ash placement site within the optimum moisture content range as determined by the Standard or Modified Proctor test.[1]

The permittee shall perform semiannual, or more frequently if requested by the Department, field density tests (minimum of one test per acre of active coal ash placement areas) to ensure that proper field compaction is being achieved within the coal ash placement area. If multiple ash sources are used, the sampling must be representative of the ash being received at the site. Tests are to be conducted by a certified testing laboratory. The results of these tests are to be submitted to the Department with the second and fourth quarter water monitoring reports. Examples of where greater than semiannual testing may be appropriate are sites that are experiencing problems with achieving compaction guidelines or sites receiving a variety of ashes with varying compaction properties.

Where coal ash is used to fill pits because of an absence of available spoil, such as occurs in the Anthracite Region, a cover material of at least four-feet thick must be placed above the ash that will be adequate to support plant growth. The lower 3 feet of this cover material should be composed of spoil or other suitable, non-acidic material. The upper one foot shall consist of the best available material that will promote plant growth. This upper material should be dominantly 6-inches or less in size and supplemented, if necessary with other approved additives (such as biosolids) to assure successful revegetation.

Coal ash used as fill at coal refuse disposal sites can occur by placing the coal ash in layers which are then compacted, or by mixing the coal ash with coal refuse which is then compacted. The compaction must achieve at least 90% of the maximum dry density as determined by the Modified Proctor Test or 95% of the maximum dry density as determined by the Standard Proctor Test.

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[1] That is, the minimum and maximum moisture contents are determined by the Proctor Test Standard Procedure, which includes a plot of dry density vs. moisture content. The acceptable range is the moisture content taken from this plot at 90 or 95% dry density, depending on which method is used. (See Owen, T.D., et al., 2004. Chapter 3. Engineering practices of coal ash placement. In: Coal Ash Beneficial Use in Mine Reclamation and Mine Drainage Remediation in Pennsylvania. Dept. of Environmental Protection and Penn State Materials Research Institute, p. 53-70).

2. Alkaline Addition

The beneficial use of coal ash as alkaline addition must be approved by the Department as part of the permitting process or as part of an abatement plan. The use must be consistent with the technical guidance "Alkaline Addition for Surface Coal Mines," (563-2112-217). The volume of coal ash imported to a site cannot interfere with the reclamation plan. The location and method of application of the coal ash will depend upon the location of the acid-forming materials.

Coal ash is not acceptable as a stand-alone alkaline additive. The Department has observed cases where acid mine drainage occurred when coal ash was the sole alkaline addition additive. Coal ash may be used in addition to more conventional alkaline additives, such as limestone, hydrated lime and quick lime. Any alkaline deficiency at a mine must be fully addressed using conventional materials. Coal ash may be used to supplement these conventional materials and used to provide a "safety factor." For example, if the calculated alkaline addition rate is 550 tons of calcium carbonate per acre, this rate must be met using a conventional material. Coal ash may be used in addition to the conventional material.

Coal ash is not to be mixed with the conventional alkaline materials, but must be spatially separated from the conventional alkaline materials. Mixing may increase the likelihood of the ash becoming cementicious and reduce the neutralizing ability of the ash and the conventional material. The ash placement plan must demonstrate that measures will be taken to assure that the ash will not "set up" (i.e., become like concrete), and thus reduce its alkalinity-generating potential.

3. Low-Permeability Material

Coal ash used beneficially as low-permeability material at active coal mine sites has to be addressed as part of the mining plan in the mining permit. Examples of using coal ash as low-permeability material would be to isolate acid- and toxic-forming materials by preventing infiltration of surface water through these materials. Another low-permeability use would be capping of a site to limit infiltration into an area that has produced or has the potential to produce acid mine drainage.

The coal ash used beneficially to provide a low-permeability layer should have a minimum thickness of 2 feet (0.61 meters), unless otherwise approved by the Department. The volume of coal ash and method of application must be part of the permit application, or if part of an abatement plan, must be incorporated into that plan and approved by the Department. If the ash is modified to achieve a lower permeability the modification must be described to the Department.

If ash is used as a low-permeability cap, consideration must be given to the final post-mining land use. To be effective long term it generally would not be desirable for the cap to be placed in the root zone of the post-mining vegetation. This would likely impede vegetation growth, increase the impact of drought conditions, and the effectiveness of the cap may be compromised. Applicants proposing capping a site with ash generally will

need to plan their operations so as to reserve a minimum of four feet of cover material to go over the ash cap.

Ash used as a low permeability material must meet the requirements, including hydraulic conductivity requirements, specified in TGD 563-2112-224 "Certification Guidelines for the Chemical and Physical Properties of Coal Ash Beneficially Used at Mines."

D. Coal Ash as Soil Substitute or Additive

Coal ash may be used as a soil substitute or as a soil additive to replace soil that is no longer available at the site, to enhance soil properties, or to enhance plant growth. The use must take into consideration the site-specific beneficial needs at the mine. The method of application, which includes the amount and type of equipment to be used, should be addressed in the reclamation plan of the mine permit. Typically water monitoring, beyond that required for the mine permit, is not necessary for coal ash used as a soil substitute or additive. The permittee must control fugitive dust emission from the site and take measures to assure that fugitive dust is not an issue.

The operator is responsible for verifying that all ash delivered to the site is from the source(s) approved for beneficial use at this site. If the operator cannot verify the origin of the source the load must be refused and removed from the site to an authorized disposal area.

1. Requirements for Use

The final pH of the coal ash and soil/spoil mixture must be in the range 6.5 to 8.0, unless otherwise approved by the Department. The applicant must demonstrate that coal ash chemical constituents will not cause pollution or adversely impact plant growth. If coal ash is used as a lime substitute or other nutrient substitute, the calcium carbonate or other nutrient of the coal ash should be based on the chemical equivalence needed to substitute for lime or other chemical constituents.

Coal ash used as a soil substitute should be mixed with other vegetative supporting material, such as spoil or DEP approved biosolids. The depth of this soil substitution should not exceed three feet (0.91 meters), unless otherwise approved by the Department.

Coal ash used as a soil additive should be mixed with existing soil to a depth not greater than one foot (0.30 meters), unless otherwise approved by the Department.

2. Loading Rates

The soil or spoil top cover must be sampled and analyzed to determine appropriate application rates for coal ash that will be used as a soil substitute or soil additive. These background analyses are also needed to characterize the soil or spoil top cover.

Loading rates for coal ash and blends of coal ash and sewage sludge used as a soil substitute may not exceed the values in the below table. Samples must be analyzed in accordance with EPA's Test Methods for Evaluating Solid Waste, SW-846. The constituents that must be analyzed and the limiting loading rates are shown in the below table.

Contaminant	Cumulative Contaminant Loading Rate[2]
arsenic	36 lbs/acre
boron	60 lbs/acre
cadmium	34 lbs/acre
chromium	2672 lbs/acre
copper	1320 lbs/acre
lead	264 lbs/acre
mercury	15 lbs/acre
nickel	379 lbs/acre
selenium	88 lbs/acre
zinc	2454 lbs/acre
Nitrogen	See note below

Nitrogen: Nitrogen loading rates will be determined site specifically based on site soil chemistry and the needs of the proposed vegetation. For mine reclamation sites, the one-time application rate is typically large enough to supply nutrients for several years. Typical "safe" loading numbers for nitrogen are 100 to 150 pounds per acre per year for agricultural use or top dressing. A reclamation project lacking soil or lacking soil with adequate nutrients may require 500-1,000 lbs. N/acre.

PERMITTING PROCEEDURES FOR BENEFICIAL USE OF COAL ASH AT ACTIVE COAL MINE SITES

The following describes processes and procedures for obtaining and maintaining permit approval for an active coal mine site beneficially using coal ash.

A. Permit Applications and Revisions

The beneficial use of coal ash for placement purposes at new mine sites (site approval) must be addressed as part of a new permit application. Adding ash placement to an existing permit is a major permit revision. Major permit revisions are subject to the requirements of 25 Pa. Code 86, §86.32 (Opportunity for submission of written comments or objections on the permit application), and §86.52 (Permit revisions). Coal ash used only as a soil substitute or additive is a minor permit revision.

Major revisions also include these examples: changing coal ash use from soil substitution/additive to placement uses, ash volume increases greater than 50% where ash is used for placement, and extending placement use to other watersheds that were not originally identified or described in a permit application and public notice.

Minor permit revisions include these examples: ash volume increases of less than 50% to be used for placement, a change in the amount of ash to be used as a soil substitute or amendment, a change in or addition to the area to be affected by coal ash use (if it remains in the same

[2] Contaminant loading rates are cumulative and apply to both initial placement of coal ash or blends of coal ash and sewage sludge as well as future use of beneficially used materials at the site.

watershed), the addition of another beneficial placement use (such as adding alkaline addition as a use when use as fill is already approved), or addition of an approved coal ash source.

B. Site Approval through Permit Application Modules and Forms

Site approval is obtained by means of completion of Modules 25 (use as placement material) and/or 27 (use as a soil additive or substitute) as part of the permit application that is reviewed by the District Mining Office.

Ashes used at a mine site must have "source approval." The ash source approval process is described in the technical guidance document 563-2112-224 "Certification Guidelines for the Chemical and Physical Properties of Coal Ash Beneficially Used at Mines." Ash sources are approved through the Bureau of Mining and Reclamation office in Harrisburg. The mine site permittee or the facility operator source may initiate the request for source approval. Source approval is not a blanket approval whereby an ash can be used anywhere and for any purpose. A site approval must be obtained before any ash can be brought to the site.

C. Public Notice Requirements

Request for site approval requires public notice pursuant to §§86.31 and 86.54. Coal ash beneficial use as placement (which includes backfilling, alkaline addition, and low-permeability material) must be advertised. A public notice is not required for the beneficial use of coal ash as a soil substitute or soil additive. Major permit revisions require public notice; minor revisions do not. The Department notifies local municipalities of new coal mining permits and major revisions; when coal ash beneficial use placement is proposed, the notification to the local municipality will specify that coal ash placement is proposed.

D. Landowner Consent

Proposals for using coal ash must include the consent of the owner(s) of the land where the coal ash will be applied. The Contractual Consent of Landowner for Beneficial Use of Coal Ash form (5600-PM-MR0149) must be signed by the landowner and be recorded in the appropriate Recorder of Deeds office. This document should be complete or in the process of being recorded when the site approval application package is submitted to the District Mining Office.

E. Bonding Requirements

Bonding must be consistent with TGD 563-2504-001 "Conventional Bonding for Land Reclamation - Coal," including the section "Coal Ash Placement," which deals with costs associated with final cover materials and revegetation. Typically, there will be no additional bonding requirements for coal ash that is beneficially used for placement or used as a soil substitute or soil additive. Additional bond may be required if, for example, coal ash beneficial use requires long- term appurtenances, such as a stationary pug mill, that would require demolition costs.

F. Closure

Stage III reclamation bonds will be held for ten years following the completion of vegetative planting on the site. Planting will in the normal course of operations occur after final placement

of coal ash. If pollution of groundwater is not observed as determined by following the guidelines found in Section I.A. of this document, bonds may be released and the site will be considered closed upon Stage III bond release.

CORRECTIVE ACTIONS

Corrective action is obviously not a desirable outcome for any entity involved in beneficial use of coal ash. The permitting and certification guidelines are designed to avoid a remediation scenario. Although remediation is not anticipated to be needed, this section is included so that should pollution occur as a result of beneficial use, procedures will be in place to address the issue.

Corrective action involves two phases. First, the mine operator will be given an opportunity to evaluate whether pollution from coal ash has occurred through submittal of an assessment plan to the Department. If it is determined by the Department that pollution has occurred, then the mine operator will be asked to submit an abatement plan. The typical procedures for this process are outlined below.

A. Groundwater Assessment Plans

The Department will generally employ the following approach with respect to requiring corrective actions at mine sites where coal ash has been placed.

A mine operator will be required to prepare and submit to the Department a groundwater assessment plan within 60 days after one of the following occurs: (1) data obtained from monitoring by the Department or the mine operator indicates a significant change in the quality of groundwater or surface water from background levels at any downgradient monitoring point; or (2) laboratory analysis of one or more public or private water supplies indicates groundwater or surface water contamination that could reasonably be attributed to the coal ash placement.

The Department will generally not require a mine operator to conduct an assessment if one of the following applies: (1) within 10 working days after receipt of sample results indicating groundwater degradation, the mine operator resamples the affected monitoring points and analysis from resampling shows, to the Department's satisfaction, that groundwater degradation has not occurred; or (2) within 20 working days after receipt of sample results indicating groundwater degradation, the mine operator demonstrates that the degradation was caused entirely by seasonal variations or activities unrelated to coal ash placement.

Groundwater assessment plans should specify the manner in which the person will determine the existence, quality, quantity, areal extent and depth of groundwater degradation and the rate and direction of migration of contaminants in the groundwater. The Department will require that a groundwater assessment plan be prepared and sealed by an expert in the field of hydrogeology who is a licensed professional geologist in the Commonwealth. The Department will generally require the plan to contain the following information:

1. For wells, lysimeters, borings, pits, piezometers, springs, seeps, mine discharges and other assessment structures or devices, the number, location, size, casing type and depth, as appropriate. Well construction details will have to be approved by the Department before installation.

2. The sampling and analytical methods for the parameters to be evaluated.

3. The evaluation procedures, including the use of previously gathered groundwater quality and quantity information, to determine the concentration, rate and extent of groundwater degradation from the facility.

4. An implementation schedule.

5. Identification of the abatement standard that will be met.

Upon approval by the Department of the groundwater assessment plan, the Department will require that the plan be implemented in accordance with the approved implementation schedule. The Department will generally require that the plan be completed in a reasonable time not to exceed 6 months. If the Department determines that the proposed plan is inadequate, it may modify the plan and approve the plan as modified.

If the groundwater assessment indicates that contamination is leaving the coal ash placement site, the Department will require that the mine operator notify, in writing, each owner of a private or public water supply located within 1/2-mile downgradient of the coal ash placement area that an assessment has been initiated.

Following completion of the groundwater assessment plan, the Department will require a mine operator to submit a report containing the new data collected, analysis of the data and recommendations on the necessity for abatement.

If the Department determines after review of the groundwater assessment report that implementation of an abatement plan is not appropriate, a revised groundwater monitoring plan will have to be submitted by the mine operator to the Department for approval that contains any necessary changes to the plan and an application for permit modification, if applicable.

B. Abatement plans

When a groundwater assessment plan shows the presence of groundwater degradation for one or more contaminants at one or more monitoring points and the analysis indicates that an abatement standard will not be met, the Department will require a mine operator to prepare and submit an abatement plan to the Department.

When monitoring at a coal ash site shows the presence of an abatement standard exceedance from one or more compliance points, the Department will require a mine operator to prepare and submit an abatement plan to the Department even if a groundwater assessment plan has not been completed.

The Department will generally not require a person to implement an abatement plan if the following apply: (1) within 10 days after receipt of sample results showing an exceedance of an abatement standard at a point of compliance described, the person resamples the affected monitoring points; and (2) analysis from resampling shows to the Department's satisfaction that an exceedance of an abatement standard has not occurred.

Abatement plans shall be prepared and sealed by an expert in the field of hydrogeology who is a licensed professional geologist in the Commonwealth. The Department will generally require an abatement plan to contain the following information:

1. The specific methods or techniques to be used to abate groundwater degradation at the facility;

2. The specific methods or techniques to be used to prevent further groundwater degradation from the facility; and

3. A schedule for implementation.

Implementation of an abatement action will typically necessitate a demonstration of compliance with one or more of the following standards at the identified compliance points:

1. For constituents for which statewide health standards exist, the statewide health standard for that constituent at and beyond 500 feet of the perimeter of the permitted coal ash placement area or at and beyond the property boundary, whichever is closer.

2. The background standard for constituents at and beyond 500 feet of the perimeter of the permitted coal ash placement area or at and beyond the property boundary, whichever is closer. Load-based standards at groundwater discharge points will be acceptable if the permit was issued under Chapter 87, Subchapter F or Chapter 88, Subchapter G (relating to surface coal mines: minimum requirements for remining areas with pollutional discharges; and anthracite surface mining activities and anthracite bank removal and reclamation activities: minimum requirements for remining areas with pollutional discharges).

3. For constituents for which no primary MCLs under the Federal and State Safe Drinking Water Acts (42 U.S.C.A. §§ 300f-300j-18; and 35 P. S. §§ 721.1-721.17) exist, the risk-based standard at and beyond 500 feet of the perimeter of the permitted coal ash placement area or at and beyond the property boundary, whichever is closer, under the following conditions:

    a. The risk assessment used to establish the standard assumes that human receptors (that is, water supply users) exist at the property boundary.

    b. The level is derived in a manner consistent with Department guidelines for assessing the health risks of environmental pollutants.

    c. The level is based on scientifically valid studies conducted in accordance with good laboratory practice standards (40 CFR Part 792 (relating to good laboratory practice standards)) promulgated under the Toxic Substances Control Act (15 U.S.C.A. §§ 2601-2692) or other scientifically valid studies approved by the Department.

    d. For carcinogens, the level represents a concentration associated with an excess lifetime cancer risk level of 1×10^{-5} at the property boundary.

For measuring compliance with secondary contaminants, the Department may approve a compliance point beyond 500 feet on land owned by the owner of the coal ash placement area.

If the Department determines that the proposed abatement plan is inadequate, the Department may modify the plan and approve the plan as modified or require the submission of an approvable modification. Generally, the Department will require an abatement plan to be implemented within 60 days of approval by the Department.

After plan approval or implementation, the Department finds that the plan is incapable of achieving the groundwater protection contemplated in the approval, the Department may issue one or more of the following: (1) an order requiring the person to submit proposed modifications to the abatement plan; (2) an order requiring the person to implement the abatement plan as modified by the Department; (3) another order the Department deems necessary to aid in the enforcement of the acts.

RECLAMATION OF ABANDONED MINE SITES USING COAL ASH

The reclamation of abandoned coal or abandoned industrial mineral mines is carried out by contract at DEP's discretion and under the conditions of the contract and must be consistent with the requirements of §287.664. To the extent practicable, the beneficial use of coal ash at abandoned mines should conform to the guidelines discussed above for active mines.

The items below address some differences in procedure between approvals for active mines versus contracts for abandoned mines.

A. Contracts

The beneficial use of coal ash for placement purposes at abandoned mine sites must be addressed as part of the mine reclamation contract. The environmental requirements of §287.664 are essentially the same as those for §287.663. Thus the requirements of this guidance for active mines are applicable to abandoned mines and will be incorporated, as appropriate, in the reclamation contract.

B. Public Notice Requirements

The regulations do not require public notice for the beneficial use of coal ash for placement purposes used in a reclamation project. However, the Department may provide or require the contractor to provide public notice in a local newspaper of the intent to use coal ash. If ash is beneficially used at Government Financed Construction Contracts sites, public notice will be provided indicating the beneficial use of coal ash.

C. Landowner Consent

Proposals for using coal ash must include the consent of the owner(s) of the land where the coal ash will be applied. The Contractual Consent of Landowner for Beneficial Use of Coal Ash form (5600-PM-MR0149), or similar form appropriate for mine reclamation contracts, must be signed by the landowner and be recorded in the appropriate Recorder of Deeds office.

D. Coordination of Permit Review with Local Authorities

The host or local municipality will be notified by the Department and given an opportunity to review and comment on the proposed beneficial use of coal ash.

E. Bonding Requirements

Bonding for coal ash placement on abandoned coal or abandoned industrial mineral mine reclamation contracts will be included in the performance bond for the contract as established in the contract conditions.

F. Post-Completion Monitoring and Performance Requirements

Monitoring shall typically continue for a minimum of 5 years after completion of reclamation activities under the contract. If pollution occurs, or a trend is detected that suggests that degradation may be occurring, monitoring will continue until it is determined that pollution is not occurring or until the problem is abated. Sample frequency and other monitoring requirements will be the same as those for active coal mine sites. A performance bond will be held until termination of all monitoring obligations. The reclamation contract will include language holding the contractor liable for abating any adverse effects to the environment due to coal ash use.