DIVISION OF ENVIRONMENTAL PROTECTION

CECIL H. UNDERWOOD
GOVERNOR

10 McJunkin Road
Nitro, WV 25143-2506

JOHN E. CAFFREY
DIRECTOR

To: OMR Supervisors

From: John E. Caffrey, Director

Subject: Coal Combustion By-Product Utilization Policy

Date: January 13, 1998

I. Applicable Provisions of State Law

The West Virginia Division of Environmental Protection's (DEP) Office of Mining and Reclamation (OMR) recognizes the need for guidance to the mining, utility, and manufacturing industries on the beneficial use of coal combustion by-products and the disposal of coal combustion wastes. The OMR further recognizes that coal combustion by-products and coal combustion wastes have both beneficial uses and the potential to provide positive impacts when properly managed. The following policy provides the necessary guidance and required criteria for the beneficial use of coal combustion by-products regulated under Articles 2, 3, or 4 of Chapter 22 of the West Virginia Code, so long as such placement is in conformance with an approved plan or permit issued pursuant to such provisions of the code.

Coal combustion by-products means the residuals, including fly ash, bottom ash, bed ash, boiler slag, and flue gas emission control waste produced by coal-fired or coal/gas-fired electrical or steam generating units which are beneficially used. Coal combustion wastes means these same materials which are disposed of and not beneficially used.

Coal combustion waste disposal and coal combustion by-product utilization are not defined as solid waste according to the Solid Waste Management Act Section 22-15-2.27 of the West Virginia Code, when placed on a facility regulated under Articles 2, 3, or 4. Coal combustion waste disposal and coal combustion by-product utilization are subject to the applicable Surface Coal Mining and Reclamation Act, the Surface Mining and Reclamation of Minerals Other than Coal Act, Abandoned Mine Lands and Reclamation Act, the Water Pollution Control Act, and the Groundwater Protection Act. This document addresses beneficial uses of coal combustion by-products. A document addressing the disposal of coal combustion wastes on mined areas may be developed at the discretion of the Director.

II. Permits, Revisions, and Modifications

The OMR may approve the utilization of coal combustion by-products for a beneficial use as described in an application for an Article 3 or 4 permit or revisions to existing permits. Coal combustion by-products may also be used when approved by the DEP Office of Abandon Mine Lands (AML) under Article 2.

For pre-approved uses, as described in this policy, a written notification shall be deemed sufficient to meet the permit revision application requirements. Pre-approved utilization notifications shall automatically, without further agency action, constitute an insignificant revision to the Article 3 or 4 permit and/or minor modification to the National Pollution Discharge Elimination System (NPDES) permit. Permit revisions for acceptable beneficial uses listed below will be subject to the provisions of the Code of State Regulations (CSR) 38-2-3.28 and will generally be handled as insignificant revision to the Article 3 and/or minor modification to the NPDES permit. Permit revisions of Article 4 and related NPDES permits will be subject to the provisions of CSR 47-10-9.2.

The beneficial use of coal combustion by-products on surface mining and quarry operations will be evaluated by the OMR in accordance with plans, design specifications, testing procedures, and monitoring requirements as set forth and submitted on the MR-36 form. The MR-36 form will serve as an element to both Article 3 or 4 permit application and the NPDES permit application. Coal combustion by-products may be utilized on a mining operation only within the permit area, or within such permit area as modified to accommodate the beneficial use of coal combustion by-products.

III. Beneficial Uses

Pre-approved uses and examples of acceptable beneficial uses are listed below. Beneficial uses other than those listed below will be evaluated by OMR on a case-by-case basis through the evaluation of plans, design specifications, results of testing and analysis of the coal ash, water quality sampling and analysis, overburden analysis, and conformity with the applicable laws and regulations of the State.

A. Pre-approved uses include:

1. Subsidence control as part of a confined cementitious mixture.

2. Abatement of underground mine fires as part of a cementitious mixture.

Pre-approved uses will require written notification at least 30 days prior to initiation of such use. The notification will include a description of the use, start and completion dates, a map showing the area where the use will occur, details on the proposed mix including components and proportions, and the estimated amount of coal combustion by-product to be used. The 30-day notification period may be waived at the discretion of the Director.

B. Acceptable beneficial uses include:

1. Coal combustion by-products may be used as a soil amendment, subject to the provisions of applicable regulations.

2. Coal combustion by-products may be used as a source of alkaline addition to neutralize potentially acid-producing materials in the following: (a) coarse coal refuse, fine coal refuse, and combined coal refuse disposal sited (b) backfills, conventional excess spoil disposal fills, and (c) to line pit floors subject to the applicable regulations and the following criteria.

   a. Coal combustion by-products used for neutralizing potentially acid-producing materials in coarse coal refuse, fine coal refuse, and combined coal refuse disposal sites shall comply with the following requirements:

      i. The net neutralization potential of the coal combustion by-product(s) shall be greater than or equal to 5 tons per 1000 tons $CaCO_3$ equivalent, and

      ii. The minimum application of coal combustion by-product will be determined by the formula:
      Where:

A	=	Required amendment (in tons)
W	=	Amount of waste rock: refuse to be neutralized (in tons)
%S	=	Percent sulfur in waste rock, e.g. 2% = 2 tons per 100 tons of rock
%NNP	=	Percent net neutralization potential of amendment, e.g. %NP - %MPA (NP = Neutralization Potential, MPA = Maximum Potential Acidity)

$$A = \left(\frac{W \times \%S \times 3.125}{\%NNP} \right) \times 1.1$$

Notes:

Pyritic sulfur may be substituted for total sulfur.

The S and NNP are percentages which make them tons per 100 rather than tons per 1000. The formula was provided by Paul Ziemkiewicz of the National Mine Land Reclamation Center at West Virginia University.

iii. The ratio of coal combustion by-product(s) to refuse shall not exceed 8:1 calculated on a weight basis.

b. Coal combustion by-products used for neutralizing potentially acid-producing materials in backfills and conventional excess spoil disposal fills shall comply with the following requirements:

i. The net neutralization potential of the coal combustion by-product(s) shall be greater than or equal to 5 tons per 1000 tons $CaCO_3$ equivalent, and

ii. The minimum application of coal combustion by-product will be determined by the formula:
Where:

A	=	Required amendment (in tons)
W	=	Amount of waste rock: spoil to be neutralized (in tons)
%S	=	Percent sulfur in waste rock, e.g. 2% = 2 tons per 100 tons of rock
%NNP	=	Percent net neutralization potential of amendment, e.g. %NP - %MPA (NP = Neutralization Potential, MPA = Maximum Potential Acidity)

$$A = \left(\frac{W \times \%S \times 3.125}{\%NNP} \right) \times 1.1$$

Notes:

Pyritic sulfur may be substituted for total sulfur.

The S and NNP are percentages which make them tons per 100 rather than tons per 1000. The formula was provided by Paul Ziemkiewicz of the National Mine Reclamation Center at West Virginia University.

The addition of coal combustion by-products for alkaline addition will not be allowed if it will significantly increase the volume of excess spoil.

Neutralization potential of the spoil or backfill material may be considered in certain cases at the discretion of the OMR.

c. Coal combustion by-products used for lining pit floors shall comply with the following requirements:

i. The net neutralization potential of the coal combustion by-product(s) shall be greater than or equal to 20 tons per 1000 tons $CaCO_3$ equivalent, or

ii. The coal combustion by-product(s) must exhibit pozzolanic properties.

Coal combustion by-products proposed as a source of alkaline addition not meeting the above criteria may be evaluated by the OMR on a case-by-case basis. The application of coal combustion by-products as an alkaline additive should be uniformly mixed/blended throughout the material to be neutralized.

3. Coal combustion by-products may be utilized to encapsulate potentially toxic material. Coal combustion by-products exhibiting a low hydraulic conductivity (less than or equal to 1×10^{-5} cm/sec) may be used to provide a low permeability zone around toxic materials.

4. Coal combustion by-products may be utilized to replace coal refuse removed from a coal refuse pile, where the removal of the coal refuse is for the purpose of fueling a coal-fired or coal refuse-fired electric power generating facility. Only the coal combustion by-products generated from the facility may be utilized. The utilization of coal combustion by-products shall be subject to the provisions of CSR 38-2-22 provided that the moisture content of the coal combustion by-products as specified in the application is within the range required to achieve suitable compaction, and is placed in one foot lifts and compacted to ninety percent standard proctor.

5. Coal combustion by-products may be utilized to fill underground voids or to reduce acid mine drainage discharges or otherwise improve water quality in permitted or abandoned sites in accordance with the applicable regulations.

6. Coal combustion by-products may be used to improve the stability and/or enhance the material handling characteristics of coal refuse disposal facilities subject to the provisions of the applicable regulations and section III(B)(2)(a) of this policy.

7. Coal combustion by-products may be used to prevent and control spontaneous combustion or to otherwise control burning of coal refuse disposal facilities subject to the provisions of the applicable regulations.

8. Coal combustion by-products may be used to return disturbed areas to approximate original contour (AOC), where additional fill is required to

properly reclaim the site, only after using all available spoil material subject to the provisions of the applicable regulations.

9. Coal combustion by-products (bottom ash or boiler slag) may be used as anti-skid material, if such use is consistent with West Virginia Division of Highways specifications.

10. Coal combustion by-products may be used as a partial replacement for soil in covering coal refuse disposal facilities (coarse coal refuse piles, combined coal refuse disposal facilities, and coal refuse slurry impoundments) subject to the provisions of the applicable regulations.

11. Coal combustion by-products may be used to construct base material for roads, parking areas, storage areas, etc., to stabilize foundation soils.

12. Coal combustion by-products may be used in accordance with the plan, as approved, on abandoned mine land (AML) reclamation and no cost reclamation projects subject to the requirements of Article 2. Coal combustion by-products may be used for Special Reclamation Projects subject to the requirements of Article 3 & 4.

13. Coal combustion by-products may be used in demonstration projects. The DEP encourages demonstration projects which will allow monitoring of beneficial use applications of coal combustion by-products and the collection of data to allow the evaluation of beneficial use performance.

14. Coal combustion by-products may be used for the construction of liner systems. The evaluation of the liner system shall be included in the application and shall include engineering analysis and laboratory testing. The acceptability of liner systems shall be determined on a case-by-case basis.

15. Coal combustion by-products may be used for sealing of underground mine openings.

More than one coal combustion by-product may be utilized on a permit so long as the overall coal combustion by-product mixture is determined to meet the criteria in Items 1 through 15 above.

C. Coal combustion by-products may be used in other applications as approved by the Director.

IV. Water Quality

Surface and ground water monitoring stations for the purpose of monitoring coal combustion by-product leachates at coal combustion by-product facilities may be established at appropriate locations so as to satisfy the requirements of both the Surface Mining Act (SMCRA)

and the NPDES program. In the event that discharge points are established at different locations than the designated monitoring stations, analysis of water at the discharge point will include the same chemical parameters as for the monitoring station.

V. Coal Combustion By-Product Assay

The coal combustion by-products or wastes to be utilized on a surface mining or quarry operation will be analyzed and tested by the applicant for the parameters and properties set forth in the MR-36 form. Periodic retesting of the coal combustion by-products may be required from time to time by the OMR, provided that the Toxicity Characteristic Leaching Procedure (TCLP) test (for metals only) shall be performed, at least annually.

In the event that the source of the coal combustion by-products or wastes being utilized or disposed of on a permit area changes, prior approval for the change must be requested on an updated , MR-36 form and all required testing and analysis shall be performed on the coal combustion by-products from the new source.

Coal Combustion by-products, which exhibit potentially toxic or potentially acid producing characteristics will not be approved for beneficial use.

Coal combustion by-products may be modified by the generator prior to shipment. If this is the case, the modified coal combustion by-products or wastes shall be analyzed and reported on the application form as such.

VI. Permitting Decision

The decision on issuance or denial of an application for a permit and revision or modification of an existing permit will be in accordance with Chapter 22, Articles 3 and 4 of the Code of West Virginia. This decision will be based on an interpretation of: the mining and reclamation plan; sampling, testing, and analytical data; and other information known or made available to the Director. The Director's decision will be in favor of minimizing risk to the environmental integrity of the State's air, land, and water.

STATE OF WEST VIRGINIA
DIVISION OF ENVIRONMENTAL PROTECTION
OFFICE OF MINING AND RECLAMATION

APPLICATION FOR COAL ASH UTILIZATION

MR-36 1/94

Part I: Applicant Information

NOTE: This application must be completed for each application or permit in which coal ash is to be utilized. Surface Mining Permit Revisions will be subject to the provisions of CSR 38-2-3.27 (Code of State Regulations).

Applicant/ Permittee _____ **SMA/ Permit #** _____ **NPDES #** _____

1. Mailing Address: _____
   Street Address:
   (if mailing address is a Post Office Box) _____
   City _____ State _____ Zip _____ Telephone No. _____

2. Type of Operation: *(Check all applicable types)*

   ☐ Surface

   ☐ Underground

   ☐ Other *(Specify)*: _____

   ☐ Coal ash utilization on existing permitted site

   ☐ Coal ash utilization on new site

   ☐ Change in coal ash source

3. a. Generator of Coal Ash: _____
   (Company Name)

   Mailing Address: _____
   Street Address:
   (if mailing address is a Post Office Box) _____
   City _____ State _____ Zip _____ Telephone No. _____

   Name and location of generating facility if different from mailing address:

   Name _____
   Location _____
   Company Contact Person _____
   Title _____ Telephone No. _____

b. Type of plant (Boiler) or Process Generating the Ash:

- ☐ Pulverized Coal-Fired Furnace;
- ☐ Cyclone Furnace;
- ☐ Stoker-Fired Furnace *(Specify type)*: _____
- ☐ Bubbling Fluidized Bed;
- ☐ Circulating Fluidized Bed;
- ☐ Wet Scrubber;
- ☐ Dry Scrubber;
- ☐ Other *(Specify)* _____

c. If available, list SIC Codes: _____

_____

_____

NOTE: *Where any of the information received in Part I, Item 3 changes, or where the applicant receives and utilizes coal ash from additional generators, the applicant will promptly update the application and provide testing and analysis data as required in Part II, Items 4 and 5 of this form.*

4. Maximum Rates of Coal Ash to be Utilized on the Permit Area:

Tons/Day: _____ Tons/Month: _____ *OR* Tons/Year _____

Part II: Coal Ash Utilization Plan

1. Provide a detailed narrative describing the following on a separate attachment:
   a. Site preparation;
   b. Unloading and stockpiling areas;
   c. Sequence of mining/utilization techniques;
   d. Phases of utilization:
      (1) Compaction of coal ash;
      (2) Equipment to be used to achieve compaction;
      (3) Thickness of lifts; and
      (4) Methods of utilization.
   e. Application of cover material;
   f. Revegetation procedure;
   g. Dust control methods;
   h. Final slopes and closure (abandonment) procedures; and
   i. Life of facility.

2. a. Provide a map of the coal utilization area at a minimum scale of 1"=500' and locate the following:
      (1) Extent of the area proposed for coal ash utilization;
      (2) Location of initial placement;
      (3) Location of collection and treatment facilities;
      (4) Location of discharge points;
      (5) Location of proposed groundwater monitoring points;
      (6) Location of surface water monitoring points;
      (7) Location of all test holes and borings used to obtain information on overburden, geology, and groundwater;
      (8) Location of all surface and ground water users within 1/2 mile of the coal ash utilization or disposal site(s), or ground or surface water discharges therefrom; and
      (9) Location of all discharge points and all streams receiving surface or ground water flows from the coal ash utilization or disposal area.

   b. Provide a cross-section map showing the following:
      (1) Relation of utilization area to mining activity;
      (2) Groundwater table;
      (3) Highwalls, mine pools, mine workings, etc.; and
      (4) Aquifer(s) to be monitored by the well.

   c. A description of how the coal ash utilization is consistent with or alters the hydrologic regime, as proposed in the permit application, or as modified in the case of a significant revision to an existing permit.

   d. A description of how the coal ash utilization will alter the mining and reclamation plan and the post-mining land use as proposed in the permit application or significant revision to an existing permit.

   e. Unless otherwise available, provide an acid-base accounting and the soil types or rock lithotypes of the material which will be associated with the coal ash once in place.

3. Provide water quality sampling and analysis of all surface and ground water which will be associated with the coal ash. Analysis will be for the following parameters:
   a. pH (S.U.)
   b. Alkalinity (mg/l)
   c. Hardness (mg/l
   d. Total Dissolved Solids (mg/l)
   e. Total Suspended Solids (mg/l)
   f. Total Iron (mg/l)
   g. Total Manganese (mg/l)
   h. Total Aluminum (mg/l)
   i. Chloride (mg/l)
   j. Sulfate (mg/l)
   k. Phenolics (mg/l)
   l. Arsenic (mg/l)
   m. Selenium (mg/l)
   n. Lead (mg/l)
   o. Silver (mg/l)
   p. Cadmium (mg/l)
   q. Copper (mg/l)
   r. Antimony (mg/l)
   s. Boron (mg/l)

4. Provide the results of analysis of leachate studies or analyses, performed on the coal ash, the material blended with or associated with the coal ash, and a representative mixture of both materials in amounts which approximate the proportional ratios once in place. Analysis of the leachate will include the following parameters:
   a. pH (S.U.)
   b. Alkalinity (mg/l)
   c. Hardness (mg/l
   d. Antimony (mg/l
   e. Arsenic (mg/l)
   f. Cadmium (mg/l)
   g. Copper (mg/l)
   h. Lead (mg/l)
   i. Nickel (mg/l)
   j. Selenium (mg/l)
   k. Thallium (mg/l)
   l. Zinc (mg/l)
   m. Manganese (mg/l)
   n. Iron (mg/l)
   o. Aluminum (mg/l)
   p. Silver (mg/l)
   q. Boron (mg/l)
   r. Sulfate (mg/l
   s. Chromium (mg/l)

5. Provide Toxicity Characteristic Leaching Procedure (TCLP) results for metals only.

6. For Items 3, 4, and 5 above, list the names, addresses, and phone numbers of the individuals, firms, or laboratories performing the analysis. Give a description of the analytical methods and Detection Limits used and a description of the leachate testing procedures used.

7. Provide an affidavit from the ash generating facility certifying that only coal ash will be loaded and supplied to the trucks and/or railroad cars bound for the permitted facility.

CERTIFICATION OF APPLICATION:

I, _____, having been duly sworn, depose and attest that all the representations contained in this application are true and correct to the best of my knowledge, that I am a principal executive officer (President/Vice President) of the applicant and that this application for coal ash utilization is being executed with my consent and has been executed by the person required by law.

State	
County	Signature of Principal Officer (President/Vice-President)
Sworn and Subscribed to Before Me This _____ Day of ,	
	Typed Name
Notary Public	Official Title
Commission Expiration Date	Date