Promulgation History Abstract

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WEST VIRGINIA DEPARTMENT OF NATURAL RESOURCES

DIVISION OF RECLAMATION

COAL REFUSE DISPOSAL REGULATIONS

Legislative Rules, Chapter 20, Article 6

Series VII-A
(1985)

Dept. of Nat. Resources
Reclamation Division
Legislative Rules, Chapter 20
Article 6, Series VII-A (1985)
Section A

Title 38
Legislative Rules
Department of Energy
Series # 2A

COAL REFUSE DISPOSAL REGULATIONS

~~WEST VIRGINIA SURFACE MINING RECLAMATION REGULATIONS~~

~~Department of Natural Resources~~

~~Chapter 20-6~~
~~Series VII-A~~
~~(1985)~~

SUBJECT: Rules and regulations pertaining to definitions, requirements for permit applications and plans and specifications submittals, hazard classification, emergency procedures, hydrology, hydraulics, spillways, diversion channels, concrete structures, pipes, subsurface drainage, stability, abandoned mine openings, combustion control, underground coal refuse disposal, reprocessing of abandoned coal refuse areas, abandonment, and performance standards for signs and markers, ~~topsoil~~, water quality, drainage, sediment control, haulageways, diversions, spillways, acid producing and toxic materials, water monitoring requirements, site development, quality control, reporting requirements, materials removal, underground coal refuse disposal, and burning coal refuse piles.

Section 1 ~~A.~~ GENERAL

1.1 ~~A.01~~ Scope - These regulations establish general and specific rules for permit applications and plans and specifications submittals, hazard classification, emergency procedures, hydrology, hydraulics, spillways, diversion channels, concrete structures, pipes, subsurface drainage, stability, abandoned mine openings, combustion control, underground coal refuse disposal, reprocessing of abandoned coal refuse areas, abandonment, and performance standards for signs and markers, topsoil, water quality, drainage, sediment control, haulageways, diversions, spillways, acid producing and toxic materials, water monitoring requirements, site development, quality control, reporting requirements, materials removal, underground coal refuse disposal, and burning coal refuse piles.

1.2 ~~A.02~~ Applicability - These rules and regulations:

a. Apply to all coal refuse disposal areas operated after January 18, 1981. Operated means to enter upon a coal processing waste pile, or part thereof, for the purpose of disposing, depositing, dumping or removing coal processing wastes, or to employ a coal processing waste pile for retarding the flow of or for the impoundment of water.

b. Apply to all new and existing coal refuse reprocessing operations. Such operations must obtain a permit prior to commencing operations.

c. Operators of new coal refuse disposal areas after January 18, 1981, must submit a complete permit application in accordance with applicable parts of Chapter 20, Article 6 of the Code of West Virginia and these regulations. Owners of all operating coal refuse disposal areas must submit plans and specifications for approval in accordance with Chapter 20, Article 6, Section 13(f) of the Code of West Virginia and these regulations. Upon the expiration or lifting of the injunction in the civil action Allegheny Mining Corporation et al. v. David Callaghan et al. shall submit a complete permit application in accordance with Chapter 20, Article 6, Section 9 of the Code of West Virginia. The following table lists applicable sections of these regulations for impounding and nonimpounding structures:

TABLE

Non-Impounding	Impounding	Reprocessing Operations
A.	A.	A.
B.	B.	B.
C.01a	C.01b	C.01c
D.01	D.01	C.02
D.02	D.02	D.06
D.03	D.03	E.09
D.04	D.04	
D.05a2	D.05a	
D.05a3	D.05b	
D.05c	D.05c	
D.05d1	D.05d	
D.05d2(b)	D.05e	
D.05d2(c)	D.05f	
D.05d3	D.05g	
D.05e	D.05h	
D.05f	D.05i	
D.05g	D.05j	
D.05h	D.07	
D.05i	E.	
D.05j		
D.07		
E.		

1.3 ~~A.03~~ Authority - These regulations are issued under the authority of Article 6, Chapter 20, Code of West Virginia, as amended.

1.4 ~~A.04~~ Effective Date - These regulations become effective on the 13th day of June, 1985.

1.5 ~~A.05~~ Filing Date - These regulations were filed in the Office of the Secretary of State on the 13nd day of June, 1985. These regulations

Dept. of Nat. Resources
Reclamation Division
Legislative Rules, Chapter 20
Article 6, Series VII-A (1985)
Section A.03

These regulations become effective on the 13th day of June, 1985.

Section 2 B. DEFINITIONS - The following definitions refer specifically to these regulations and are valid unless the context in which used clearly requires a different meaning:

2.1 B.01 Abandoned Coal Refuse Disposal Area - means any coal refuse disposal area which is not being operated. This definition does not relieve any operator from his reclamation responsibility for the coal refuse disposal area.

B.02 Accepted Engineering Methods - means sound engineering practice based upon the technology currently applied by the engineering profession.

B.03 Acid Mine Drainage - means water with a pH of less than 6.0 discharged from active or abandoned mines and from areas affected by surface mining operations.

B.04 Acid-Forming Materials - means earth materials that contain sulfide minerals or other materials which may create acid mine drainage.

B.05 Act - means West Virginia Code, Chapter 20, Article 6.

B.06 Bearing Capacity - means the ability of a foundation material to support loads imposed by an embankment or other structure as determined by standard engineering evaluations.

B.07 Buffer Zone - means an undisturbed border along or around an intermittent or perennial stream.

B.08 Channel Protection - means any measures taken to prevent or control erosion, cavitation, or other destructive processes in channels such as diversion ditches and spillways.

B.09 Coal Refuse Disposal Area - means all deposits of coal processing waste or coal refuse on or buried in the earth.

B.10 Coal Refuse - means any waste coal, rock, shale, slurry, culm, gob, bone, slate, clay, and related materials associated with or near a coal seam, which are either brought above ground or otherwise removed from a mine in the process of mining coal, or which are separated from coal during the cleaning or preparation operations.

B.11 Coarse Coal Refuse - means coal refuse predominately within a size range greater than the #28 sieve size.

B.12 Combined Coal Refuse - means a mixture of coarse coal refuse and dewatered fine coal refuse.

B.13 Combustible Materials - means organic materials that are capable of burning by fire or through oxidation, accompanied by the evolution of heat and a significant temperature rise.

B.14 Compaction - means the densification of a soil or soillike material by means of mechanical manipulation.

B.15 Complete Application - means an application for a surface mining permit which contains all information required under the Act and all Rules and Regulations.

B.16 Construction Pore Pressures - means water pressures generated in foundation soils or embankments due to compression by loads imposed by construction of an embankment or other structure.

B.17 Density - means the weight of soil or soillike solids per unit of total volume of soil or similar mass.

B.18 Design Storm - means predicted precipitation of given intensity, frequency, and duration based on National Weather Service data.

B.19 Director and/or His Authorized Agent - means the director of the department of natural resources, deputy directors, the chief of the division of reclamation, the assistant chiefs of the division of reclamation, and all duly authorized engineers, geologists, surface mining reclamation supervisors, or inspectors and inspectors-intraining.

B.20 Diversion Ditch - means a designed channel constructed for the purpose of collecting and transmitting surface runoff from the design storm.

B.21 Downslope - means the land surface between the projected outcrop of the lowest coal seam being mined or any mining related construction and the valley floor.

B.22 Effective Height - means the difference in elevation in feet between the lowest open channel emergency spillway crest and the lowest point in the original cross section on the centerline of the dam.

B.23 Embankment - means a manmade deposit of earth or coal refuse materials, usually exhibiting at least one sloping face.

B.24 Emergency Spillway - means a hydraulic structure designed to discharge water in excess of that which an impoundment is designed to store or which cannot be passed through a principal spillway.

B.25 Engineer - means a professional engineer in accordance with Chapter 30, Article 13 of the Code of West Virginia (W.Va. State Registration Law for Professional Engineers).

B.26 Excess Material - means earth and rock not required to achieve the design configuration of the embankment or its appurtenances.

B.27 Fine Coal Refuse - means coal processing waste predominately within a size range less than the #28 sieve which may be disposed of in a slurry form or in a dewatered or treated state.

B.28 Foundation - means soil, bedrock, or other earth material on or against which an embankment or other structure is placed.

B.29 Freeboard - means 1) the vertical distance between the lowest point of the crest of the embankment of a dam and the reservoir water surface or 2) the vertical distance between the top of a ditch or channel and the water surface during the design flow.

B.30 Groundwater - means subsurface water in the zone of saturation.

B.31 Haulageway or Access Road - means any road constructed, improved, maintained or used by the operator with the exception of state owned roads.

B.32 Hazard Potential - means a classification rating assigned to a structure based on engineering evaluations and judgement predicting the damage to human life, property and environment should a failure of the structure occur.

B.33 Highway, Primary - means those roadways which are designated as interstates, U. S. numbered highways or West Virginia numbered highways.

B.34 Highway, Secondary - means those roadways which are designated by the West Virginia Department of Highways as county numbered routes.

B.35 Hydraulics - means the study of the physical behavior of liquids, especially water, in natural or manmade systems or processes.

B.36 Hydrological Analysis - means a determination, using standard engineering methods, to establish surface water runoff for a specified design storm.

B.37 Hydrologic Balance - means the relationship between the quality and quantity of water inflow to, water outflow from, and water storage in a hydrologic unit such as a drainage basin, aquifer, soil zone, lake, or reservoir. It encompasses the dynamic relationships among precipitation, runoff, evaporation, and changes in ground and surface water storage.

B.38 Hydrology - means the science that deals with the occurrence and behavior of water in the atmosphere, on the ground and underground.

B.39 Impoundment - means a closed basin constructed for the retention of water, sediment or coal refuse.

B.40 Inspection - shall mean a visual review of surface or other mining operations to insure complete compliance with any applicable law or rules and regulations or permit conditions under the jurisdiction of the director.

B.41 Leachate - means a liquid that has percolated through soil, rock, or waste and has extracted dissolved or suspended materials.

B.42 Liquifaction - means a phenomenon wherein a saturated granular soil or soil-like material loses strength due to the development of elevated porewater pressure commonly occuring during cyclic loading, such as in an earthquake. This loss of strength may result in limited movement or liquid-like flow.

B.43 Mine - means the shaft, slopes, drifts or inclines connected with excavations penetrating coal seams or strata and the surface structures which contributes directly or indirectly to the mining, preparation or handling of coal.

B.44 Natural Drainway - means any natural water course which may carry water to the tributaries and rivers of the watershed.

B.45 Occupied Dwelling - means any building that is currently being used on a regular or temporary basis for human habitation.

B.46 Peak Runoff - means the maximum flow at a specified location resulting from a design storm.

B.47 Phreatic Surface - means the upper surface of a zone of saturation where a body of groundwater is not confined by an overlying impermeable strata.

B.48 Piezometric Surface - means the surface to which the water from a given aquifer will rise under its pressure and elevation head.

B.49 Piping - means a process of internal erosion which occurs when water transports soil or soillike materials through unprotected exits, developing unseen channels or pipes through an embankment or its foundation.

B.50 Potential Hazard - means the existence of any condition or practice or any violation of a permit or other requirements of the Act in an operating or an abandoned coal refuse disposal area which might reasonably be expected to cause physical harm to persons, property, or the environment inside or outside the permit area.

B.51 Principal Spillway - means the hydraulic structure designed to discharge water stored between normal pool and the emergency spillway invert elevations.

B.52 Probable Maximum Precipitation - means the depth-duration-area rainfall for a particular area that represents the maximizing of the most critical meteorological conditions that are considered possible of occurrence.

B.53 Qualified Person - means a person deemed qualified by registration as a registered professional engineer, or certification by the MSHA as a coal refuse embankment and impoundment inspector, and designated by the operator to make examinations of coal refuse embankments and impoundments under the supervision of the operator's engineer.

B.54 Reclamation - means the process of converting disturbed land to a stable form for productive use.

B.55 Sediment - means solid material, both mineral and organic, resulting from the works of man that has been moved from its site of origin by water.

B.56 Safety Factor - means the ratio of the available shear strength to the developed shear stress, or the ratio of the sum of the resisting forces to the sum of the loading or driving forces, as determined by one or more accepted engineering methods of analysis.

B.57 Sediment Control Structure - means a primary structure designed, constructed and maintained in accordance with Section 4B of the Surface Mining regulations and includes barriers, dams, excavations or other structures placed in suitable locations which slows down water runoff to allow sediment to settle out, Provided that such secondary sediment control structures including hay or straw bales, check dams, riprap, or mulch are not considered primary sediment control structures.

B.58 Seepage - means 1) the appearance or disappearance of water at the surface of natural ground or embankments or 2) the movement of water through soil or soil-like materials.

B.59 Site - means the coal refuse disposal area, diversion ditches, sediment control structures, roads and all other surface disturbance within the permit area.

B.60 Slope Protection - means any measures taken to control erosion on slopes.

B.61 Slope Stability - means the degree of safety relative to the development of a structural failure in a slope or embankment as defined by one or more standard engineering methods of analysis.

B.62 Stabilize - means to control movement of soil, or soil-like material, spoil piles, or areas of disturbed earth by modifying geometric, physical or chemical properties.

B.63 Storm Water - means any water flowing over the surface of the ground caused by precipitation; generally, surface runoff.

B.64 Structure - means but is not to be limited to gas lines, water lines, towers, airports, coal facilities and dams.

B.65 Strength Parameters - mean those engineering values obtained from standard engineering shear strength tests of soil or soil-like material.

B.66 Sub-drainage System - means a designed and constructed system provided for the conveyance of subsurface water.

B.67 Subsidence - means a sinking, collapsing or cracking of a portion of the earth's surface resulting from the underground removal of a mineral subsequent to failure of support structures.

B.68 Surface Water - means water on the surface of the earth.

B.69 Topsoil - means the A horizon soil layer of the three major soil horizons.

B.70 Toxic-Forming Materials - means earth materials or wastes which, if acted upon by air, water weathering, or microbiological processes, are likely to produce chemical or physical conditions in soils, air or water that are detrimental to biota or uses of water.

B.71 Toxic Mine Drainage - means water that is discharged from active, abandoned and other areas affected by surface mining or prospecting operations and which contains a substance which through chemical action or physical effects, is likely to kill, injure, or impair biota commonly present in the area that might be exposed to it.

B.72 Zone of Saturation - means the zone below the piezometric surface in which all voids are filled with groundwater.

Section 3.2. PERMITS

3.1 ~~3.01~~ Standard Permits or Plans and Specifications
Standard permits or plans and specifications in accordance with the applicability section are required for all coal refuse disposal areas of the following types:

a. Non-impounding coal refuse areas - Submit the appropriate application forms and plans according to the applicable sections of these regulations.

b. Impounding Structures - Submit the appropriate application forms and plans with the following variations:

1. Impoundments defined as dams in Chapter 20, Article 5D of the Code of West Virginia (Dam Control Act) shall require a Certificate of Approval.

2. Impoundments capable of storing 20 acre feet and having an embankment greater than 5 feet in height measured at upstream toe or are 20 feet or more in height measured at the upstream toe must comply with these rules and regulations, regardless of construction materials.

3. All other impoundments not meeting the minimum criteria of C.01b1 or C.01b2 must meet minimum requirements of the Handbook for Surface Mining. Special approval may be given to short term, special purpose ponds for disposal of materials.

c. Plans for reprocessing or removal of materials from an approved coal refuse disposal area shall be included in the standard permit.

C.02 Special Permits - A special permit may be granted for reprocessing or removal of abandoned coal refuse disposal areas in accordance with Section D.06 and E.09 of these regulations.

Section 4.0 SUBMITTAL REQUIREMENTS

4.1 ~~D.01~~ Submittals - Submittals for construction, operation, enlargement, modification, removal of materials, and abandonment of all coal refuse disposal areas shall be in accordance with these regulations. The submittal shall be prepared by or under the direct supervision of, and certified by, an engineer experienced in the design and construction of similar facilities.

The coal refuse disposal portion of the submittal shall contain the following information in order:

a. Narrative and Discussion

b. Emergency Procedures if required by Section D.05c of these regulations.

c. Hydrology and Hydraulics

1. Design data in graphical or tabular form

2. Hydrologic analysis shall include all supporting calculations, charts, graphics, tables.

3. Hydraulic analysis shall include all supporting calculations, cross sections, profiles, and results.

4. If computer analysis is used include input data and results used specifically in the design only.

d. Stability

1. Design data in graphical or tabular form.

2. Stability analysis shall include supporting calculations, charts, cross-sections and results.

3. If computer analysis is used include input data and results used specifically in the design only.

e. Haulageways and sediment control.

f. If applicable, plans and calculations concerning abandoned mine openings, combustion control, underground coal refuse disposal, and disposal of coal refuse or sludge from outside the permit area.

g. Abandonment plan.

h. Specifications

i. Maps and Drawings (reduced size if necessary for engineering drawings)

j. Separate from the other copies of the submittal, two sets of maps and plans on standard 24" by 36" size plan sheets shall be submitted.

D.02 Narrative and Discussion - A general narrative and discussion of the project shall be submitted to include as a minimum a discussion of existing site conditions, the design life of the facility, quantity and type of coal refuse to be placed, subsidence potential, design methodology backed up with design computations a~~d~~ data, method of operation to include clearing and grubbing, topsoil stockpiling, construction of surface and subsurface drainage facilities, phases of construction, method and location of coal refuse placement or removal, coal refuse placement during inclement weather, routine inspection and maintenance, possible abandonment prior to the planned design life, and a sequence for construction of drainage facilities, critical construction phases, reclamation and final abandonment procedures. In addition, a description of the duties, responsibilities and lines of communication of those persons responsible for the design and construction of the coal refuse disposal area shall be included.

D.03 Maps

a. Maps and plans shall be provided showing the site in relation to major highways, county seats, and major drainage. County highway maps may be used for this purpose.

b. A map showing the limits of the watershed with respect to the site shall be provided. The minimum mapping requirement shall be a 7 1/2 minute U.S.G.S. map with the site plotted on it.

c. A plan view of the site shall be provided showing detailed contours, limits of the coal refuse disposal area, all drainage facilities, location of springs, seeps, mine drainage and/or openings, location of the subdrain system, project stationing, location of cross-sections, location of borings, test pits and instrumentation and other pertinent data required for project control.

d. Cross-sections of the coal refuse disposal area transversely and longitudinally shall be provided showing original ground, subdrain location, elevations, benches, spillways, and other pertinent features of the site. A cross-section shall be provided for stability computations showing the site at critical areas with materials profile plotted.

e. Cross-sections and profiles of major drainage facilities shall be provided. Cross-sections shall be taken in all critical areas.

f. Construction drawings shall be provided for subdrains, spillways, antiseep mechanisms, and other pertinent structures at the site.

D.04 Specifications - Specifications for site development shall be provided to include as a minimum:

a. clearing and grubbing

b. topsoil stockpiling

c. excess material disposal

d. subdrain construction

e. slopes

f. grades

g. details of the coal refuse disposal area and drainage facilities

h. spreading and compaction requirements during placement

i. material and/or gradation requirements for subdrainage structures

j. water quality control from acid-forming or toxic-forming materials

k. pipes

l. concrete

m. anti-seep mechanisms

n. channel protection

o. installation and reading of monitoring devices

p. inspection and maintenance

q. topsoil redistribution

r. seeding and mulching

D.05 Pre-development Analysis

a. Hydrologic Balance

1. Structures meeting the requirements of ~~C.01 b.1~~ 3.1.b.1. and ~~C.01 b.2~~ 3.1.b.2. shall be prohibited unless the following can be demonstrated:

(a) The quality of the impounded water shall be suitable on a permanent basis for its intended use, and discharge of water from the impoundment must comply with the requirements of Section ~~6B.04~~ 6B.4 and ~~7B.04~~ 7B.4 of the surface mining regulations.

(b) The level of the water shall be sufficiently stable to support the intended use.

(c) Adequate safety and access to the impounded water shall be provided for proposed water users.

(d) Water impoundments shall not result in the diminution of the quality or quantity of water used by adjacent or surrounding landowners for agricultural, industrial, recreational, or domestic use.

(e) The design, construction and maintenance of dams and impoundments shall achieve the minimum design requirements applicable to structures constructed and maintained under the provisions of Sections ~~D~~ 4 and ~~E~~ 5 of these regulations. All other impoundments (as specified in ~~C.01 b.3.~~ 3.1.b.3.) must meet the minimum design requirements of the Handbook for Surface Mining.

(f) The size of the impoundment is adequate for its intended purposes.

(g) The impoundment will be suitable for the approved post-mining land use.

2. Sediment Control - Slope protection and vegetation shall be provided to minimize surface erosion at the site and sediment control measures shall be required where necessary to reduce the sediment leaving the site.

3.1.6.3

3. Excavations for special purpose ponds (~~C.01 b.3~~.) that will impound water during or after the mining operation shall have perimeter slopes that are stable and shall not be steeper than 2H:1V or shall meet the requirements of the Handbook for Surface Mining (Excavated Pond Section). Where surface runoff enters the impoundment area, the side slopes shall be protected against erosion.

3.1.6.1. 3.1.6.2.

b. Hazard Classification

1. Impoundments - The hazard potential of structures meeting the requirements of Sections ~~C.01b1~~ and ~~C.01b2~~ shall be determined by the applicant based on the potential loss that would result due to a failure and the classification determined as listed below:

(a) Class A--Impoundments located in rural or agricultural areas where failure may damage farm buildings, agricultural land, or secondary highways. Failure of the structure would cause only loss of the structure and loss of property use such as related roads, but with little additional damage to adjacent property. Any impoundment exceeding 25 feet in height measured at the downstream toe or 200 acre-feet storage volume or having a watershed exceeding 500 acres shall not be a Class A structure.

(b) Class B--Impoundments located in predominantly rural agricultural areas where failure may damage isolated homes, primary highways or minor railroads or cause interruption of relatively important public utilities. Failure of the structure may cause great damage to property and project operations.

(c) Class C--Impoundments located where failure may cause loss of life, serious damage to homes, industrial and commercial buildings, important public utilities, primary highways, or main railroads. This classification must be used if failure would cause possible loss of human life.

c. Emergency Procedures - For a Class C Structure or if a dangerous condition exists, notification and action procedures shall be formulated by the operator or owner, for public protection and remedial action in the event of an emergency. All emergency procedures must be submitted and become part of the approved plan. If adequate emergency procedures cannot, for whatever reason, be formulated by the owner or operator, then he must so notify the director in writing. The director may then notify the Office of Emergency Services and request that emergency procedures be developed for the coal refuse disposal area.

d. Hydrology and Hydraulics

1. Design Data Required - All data (precipitation, watershed characteristics, etc.), graphs, curves, etc. required for hydrologic and hydraulic design of coal refuse embankments and impoundments shall be presented.

2. Design Requirements

(a) Impoundments and Dams

(1) Design storm - All impoundments related to the surface effects of coal mining shall be designed to meet the following criteria based upon hazard classification. Precipitation values may be obtained from Technical Paper 40, U.S. National Weather Service.

(i) Class A Impoundments shall be designed for a minimum of $P_{100}+0.12\ (PMP-P_{100})$ inches of rainfall in six hours plus three feet of freeboard. If the storage times effective height is less than 3,000 (acre-feet)(feet) then Soil Conservation Service Pond Standard 378 may be substituted.

(ii) Class B impoundments shall be designed for a minimum of $P_{100}+0.40\ (PMP-P_{100})$ inches of rainfall in six hours plus three feet of freeboard.

(iii) Class C impoundments shall be designed for the probable maximum precipitation of the appropriate duration.

(2) Impoundment Requirements - All impoundments must be capable of passing that portion of the design storm that cannot be safely stored in the impoundment.

(i) Class A impoundments must be provided with an open channel spillway unless otherwise approved by the director. Ninety percent of the stored portion of the design storm must be discharged or removed within ten days after the storm event.

(ii) Class B impoundments shall be designed with either an open channel spillway only, or with an emergency spillway and a principal spillway together. Ninety percent of the stored portion of the design storm shall be discharged or removed within ten days after the storm event.

(iii) Class C dams may be designed in one of three ways:

-1- An impoundment designed without discharge structures shall be capable of storing a minimum of two 36 hour duration probable maximum storms. Water shall be removed from the impoundment to its lowest practical level by pumping or by other means if storm water reduces the storage capacity to one probable maximum storm or less.

-2- An impoundment designed with a decant or principal spillway only shall be capable of storing at least one 36 hour duration probable maximum storm. Ninety percent of the stored portion of the storm shall be discharged or removed within ten days after the storm event.

-3- An impoundment designed with either an open channel spillway only, or with an emergency spillway and principal spillway together shall be capable of discharging that portion of the six hour duration probable maximum storm that cannot be safely stored in the impoundment. Ninety percent of the stored portion of the storm shall be discharged or removed within ten days after the storm event.

(3) Spillways and Outlet Works

(i) Spillways - One or more spillways must be provided to pass that portion of the design storm that cannot be safely stored using standard engineering flood routing techniques and to draw down the stored portion of the design storm within the specified time. The outlets of all spillways must be carried safely beyond the toe of the dam to a natural drainway.

-1- Open Channel Spillways - All channels must comply with this Section, Section ~~D.05~~ 4.5 d.2.(c) and the following additional requirements:

-a- Any open channel spillway designed for less than 100% probable maximum precipitation shall be provided with freeboard above the maximum water surface as determined by the equation $1+.025vd^{1/3}$.

-b- Excess excavated material not needed to construct and maintain the spillway channel must be properly disposed of in the permit area unless otherwise approved by the director.

-c- Topsoil removed from channel excavation shall be handled in accordance with Section ~~E.02.~~ 6.2.

-2- Pipe Spillways - All pipe spillways must comply with the requirements of this Section and the following additional requirements.

-a- The pipe spillway inlet must be protected by a designed trash rack.

-b- All riser type spillways must be designed to prevent vortexing.

-c- A skimming device is required where floating pollutants exist or are anticipated.

-d- An adequate foundation and bedding shall be designed for all pipes and risers.

-e- all pipe spillways shall be designed to provide seepage control along the conduit.

-f- The pipe spillway shall be of sufficient strength to withstand the maximum load of the fill above it.

-g- All pipe spillways shall be constructed of suitable material to resist deterioration for the design life of the facility.

-h- The outlet of all pipes, where blockage by animals can occur, must be protected by an animal guard.

(ii) Drainpipes - ~~All~~ 3.1.6.1. freshwater impoundments 3.1.6.2. meeting the size requirements of Sections ~~C.01b1~~ and ~~C.01b2~~ constructed after the effective date of the Act must be designed with a gated drainpipe or principal spillway gate for draining the impoundment. All drain pipes must meet the requirements for pipe spillways.

(iii) Concrete Structures - Concrete structures shall be designed in accordance with standard engineering practice. Special design considerations should be provided where deterioration of the environment may be expected.

(b) Diversion Channels - The entire coal refuse embankment shall be protected from surface water runoff by diversion systems unless otherwise approved by the director.

(1) Design storm - All diversion ditches and stream channel diversions shall be designed to carry the peak runoff from a 100-year frequency, six hour duration rainfall.

(2) Freeboard - A freeboard equal to or greater than the formula $1+.025vd^{1/3}$ shall be added to the design flow depth of the diversion ditch to obtain the total depth of the diversion ditch.

(3) Additional Requirements - All ditches must comply with this Section, Section ~~D.05~~ 4.5 d.2.(c) and the following additional requirements:

(i) Each diversion ditch must be designed to carry the peak flow with freeboard from the contributing watershed area.

(ii) Diversions shall be designed, constructed, and maintained in a manner which prevents additional contributions of suspended solids to streamflow and to runoff outside the permit area to the fullest extent possible.

(iii) Excess excavated material not required for construction or maintenance of the diversion ditch must be properly disposed of in the permit area unless otherwise approved by the director.

(iv) Topsoil removed from the channel excavation shall be handled in accordance with Section ~~E.02.~~ 5.2.

(v) All diversion systems shall exit safely beyond the toe of the embankment in a natural drainway capable of carrying the design flow without excessive erosion.

(vi) All stream channel diversions must be designed to carry the design flow around the disturbed area. The diversions must outlet into the original channel or a natural channel of equal cross section without excessive erosion.

(vii) Diversions in refuse must be lined with soil or a suitable substitute unless sediment protection is provided.

(viii) Permanent diversion systems designed to convey water under a coal refuse embankment by means of a pipe or conduit are unacceptable. However, diversion by means of a pipe or conduit may be permitted during active operation provided that height or storage limits for impoundments as defined by Section ~~C.01~~ b.2 are not exceeded, the pipe or conduit is used in conjunction with surface ditches to meet applicable design storm requirements (Section ~~D.05~~ d.2.(b.)(1)), and the design of the pipe or conduit accounts for durability and design life, load limits, joint sealing, trash rack protection, and maintenance requirements throughout the operational life of the structure.

(c) Hydraulics All hydraulic structures shall be designed to safely control the flow using energy dissipators and/or channel protection based upon design flow velocity to prevent excessive erosion. Seepage control devices shall be used to prevent undercutting of nonflexible linings. The potential for landslides or slope failures shall be considered in the location of all hydraulic structures. Channels shall not be located on or near an existing landslide unless approved by the director. No surface runoff or slurry may be diverted into underground mines unless diverted in accordance with Section ~~D.05 i~~.

3. Hydrological and Hydraulic Analyses All hydrological and hydraulic design must be done using accepted engineering methods and meet the minimum requirements of this Section. The application shall include all design data and calculation results. If a computer analysis is used, only the input data and results used specifically in the design shall be submitted. If graphical flood routing techniques are used, all charts and graphs shall be included. Adequate cross sections and profiles shall be given for all hydraulic structures.

e. Subsurface Drainage - All springs, seepage, and groundwater flow observed or anticipated during wet conditions must be identified. If site conditions dictate necessity, a properly designed subdrainage system for the purpose of structural integrity and preservation of water quality shall be provided to:

1. Intercept all anticipated or observed groundwater sources and/or seepage;

2. Be constructed of durable rock consisting of non-degradable, non-acid or toxic forming rock such as natural sand or gravel, sandstone, or other durable rock that will not slake in water and will be free of coal, clay or shale. Limestone may not be utilized in any location where acid water conditions are observed or anticipated unless otherwise approved by the director. Subdrainage systems shall be protected by a properly designed filter zone or filter cloth where required;

3. Be designed and sized based upon measured or anticipated flows using standard engineering design techniques with field data and computations for design provided in the submittal.

4. The upstream end of the subdrain shall be covered by a filter medium during all phases so as to protect against contamination.

f. Stability - All coal refuse impoundments must be analyzed and/or designed in accordance with this Section. Non-impounding coal refuse embankments must be designed in accordance with this Section unless any proposed modifications to the design standards of this Section are justified through appropriate stability analysis. Where obvious site conditions indicate that failure will not occur, the director may waive the requirement for a stability analysis on non-impounding structures so long as all other design requirements of Section ~~D.05~~ 4.5.f.2 are met.

1. Design Data Required - All data required for the structural analysis and/or design of coal refuse embankments and impoundments shall be presented in the submittal in graphical or tabular form.

(a) Subsurface Investigation - A subsurface investigation shall be performed unless obvious site conditions preclude the necessity of this requirement. The number, location, and depth of borings, test pits, and/or trenches shall be reasonable for the size, purpose, soils present, and foundation type of the structure. The investigation shall consider depth of soil to bedrock, field classification of soils, character of bedrock, in-situ testing, soil sampling, determination of groundwater location, and a soil profile for critical locations in the structure, hydraulic structures and other pertinent locations which may affect the safety of the structure. A geologic study shall also be conducted for impounding structures to evaluate landslides into the impoundment, bedrock discontinuities such as soft seams, joints, joint systems, bedding planes, and fault zones which may adversely affect the structure's performance. Past and future mining to include height of seam, depth and cover rock of the seam, and previous subsidence problems shall be considered where subsidence may affect the safety of the structure.

(b) Laboratory investigation - Laboratory tests shall be conducted on all foundation and embankment materials to include soil classification through hydrometer analysis, density, water content, compaction tests, shear strength, consolidation, and permeability unless the scope, characteristics, or design concept of the site make one or more of these requirements unnecessary.

2. Design Requirements

(a) Foundation stability - Potential subsidence and settlement and their consequences must be considered using standard engineering techniques. The foundation must have or must be treated to have adequate bearing capacity to support the embankment and any appurtenant works.

(b) Slope stability - Coal refuse embankments and impoundments must achieve a minimum static factor of safety of 1.5 and a seismic factor of safety of 1.2 for construction and longterm conditions under normal and proposed hydrostatic conditions using standard geotechnical engineering techniques. Any final graded slope shall be no steeper than 2H:1V between benches with a 20-foot wide bench for each 50 feet of change in elevation.

(c) Compaction - Compaction shall be specified for construction or modification of all coal refuse disposal areas to insure that future stability and prevention of combustion is attained. Minimum spreading and compaction requirements shall be a maximum of two foot horizontal lifts to achieve 90 percent Standard Proctor Density (AASHTO Specification T 99-74). Special compaction requirements shall be considered for approval for such cases as fine refuse (-28 mesh), combined refuse, coarse refuse where 30 percent of the material will not pass the 3/4 sieve, impervious zones, refuse placement over previously burning refuse, initial lifts over fine refuse, etc.

(d) Liquefaction - The potential for liquefaction must be considered. Safeguards against the development of this condition shall be provided where required.

(e) Instrumentation - Considerations for installation of instrumentation such as piezometers, settlement markers, slope indicators, and similar monitoring devices shall be included in the plan to monitor present hazardous conditions, construction conditions, and to verify design assumptions. A plan for monitoring these devices shall also be provided.

3. Stability Analyses - All stability analyses shall be done using standard engineering techniques. The submittal shall include cross-sections at critical locations in the embankment showing the materials profile, location of critical potential failure surfaces and their factors of safety, estimated or measured phreatic surfaces for construction and/or long term seepage conditions, and a tabulated listing of strength parameters used. If a computer analysis is used, only the input data and results used specifically in the design shall be submitted.

g. Abandoned Openings - Plans for sealing abandoned openings and covering the seal with four feet of an impermeable non-toxic material before placement of refuse over them shall be submitted to the director. Such plans shall consider prevention of water buildup behind the seals, toxicity of the refuse and mine strata, gradient of the opening, hydrologic balance and passage of any acid water to a treatment facility. If a mine seal is in the impoundment area of an impounding coal refuse disposal area, the seal shall be designed to safely withstand full hydrostatic head with a factor of safety of at least 1.5 against blowout. Higher factors of safety may be required where dictated by the consequences of failure. Calculations and cross-sections used in the analyses shall be submitted.

h. Combustion Control - Coal refuse fires shall be extinguished. Plans for the extinguishment of burning areas shall be submitted to the regulatory authority and shall contain, at a minimum, method of extinguishment, safety measures for equipment operators and persons working or living in the vicinity of the site, and a provision that only those persons authorized by the operator, and who have an understanding of the procedure to be used, shall be involved in the extinguishing operation.

i. Underground Refuse Disposal - Plans for underground refuse disposal shall be submitted to and approved by the director and the Mine Safety and Health Adminstration. All plans must include:

1. Method of disposal including a description of the source of the transport medium;

2. Maps of mines where coal refuse materials are to be disposed with a description of the percent of mine void to be filled;

3. Considerations to location of active workings including plans, specifications and methods of constructing underground retaining walls;

4. Potential areas of breakout in active mine workings and on the surface of the ground;

5. Effects of subsidence on the plan;

6. The effects on groundwater including a permanent monitoring well or station to be located in the lowest practical elevation of the backfill area;

7. Gradient of the mine from the backfill area;

8. Description of stratum underlying the mined coal, source and potential acid or toxic-forming quality of the waste, and the treatment of water if released to surface streams; and

9. A contingency plan formulated to alleviate or correct any hazardous conditions which may result from a blowout.

j. Any coal refuse materials or acid mine treatment sludge not previously approved for disposal at the site by the director may be disposed of in the permit area only if approved by the director. Approval shall be based on a showing by the person conducting surface or underground mining activities in the permit area using hydrologic, geologic, geotechnical, physical, and chemical analyses, that disposal of these materials does not:

1. Adversely affect water quality, water flows or vegetation;

2. Create public hazards;

3. Cause instability in the disposal areas.

4.6 ~~D.06~~ Reprocessing or Removal of Abandoned Coal Refuse Disposal Piles
A special permit may be obtained for reprocessing or removal of an abandoned coal refuse disposal area. This permit must accomplish a more desirable land use or have the effect of protecting the public and the environment. A bond of $1,000 per disturbed acre, $10,000 minimum, in the permit area shall be provided.

a. Application Requirements - An application for a special permit for removal of an abandoned refuse disposal area shall be submitted to the director for review. Plans and specifications for removal and reclamation shall be prepared by or under the direct supervision of an engineer. The application shall include two sets of maps and plans on standard 24" by 36" size plan sheets with seven copies of a submittal containing a project narrative, reclamation plan, specifications, supporting data, reduced maps and plans.

1. The project narrative shall include as a minimum a discussion of existing site conditions, how the operation will protect the public or environment or accomplish a more desirable land use, the design life of the operation, quantity and type of material to be removed, method of operation to include phases of removal, sequence of critical construction phases, and a description of the duties, responsibilities, and lines of communication between engineers and those persons responsible for construction of the operation.

2. The reclamation plan shall include as a minimum the location and capacity of sediment control facilities, and reclamation procedures and specifications for the revegetation and grading of the site.

3. Supporting data shall include as a minimum the assumptions and parameters used in the design of the operation, the calculations used in the operation design, and the results of any necessary design calculations for

sediment control facilities, removal of materials, diversion ditches, spillways, stability analysis, fire control and revegetation.

4. Maps and plans shall be provided to show the following information with the scale designated on the drawing:

(a) A location map showing the site in relation to major highways, nearest post office and major drainage. County highway maps may be used for this purpose.

(b) A map showing the limits of the watershed with respect to the site. The minimum requirement shall be a U.S.G.S. 7 1/2 minute map with the site plotted on it.

(c) A plan view of the site showing contours, limits and acreage of the permit area, location of drainage facilities, location of cross-sections, and other pertinent data for project control.

(d) Cross-sections and profiles of drainage facilities, sediment control devices, and any stability analysis cross-sections.

(e) A plot of inflow hydrographs and stage-storage curves as necessary for refuse impoundment and 100-year frequency, six hour duration diversion design only.

b. Design Requirements

1. General Requirements - All reprocessing or removal operations must be designed to:

(a) Provide sediment control facilities in accordance with the Handbook for Surface Mining requirements. Variances may be granted where the operator can show that insufficient space exists to meet the Handbook for Surface Mining requirements and that existing or proposed sediment structures will meet effluent standards.

(b) Provide diversion or discharge facilities in accordance with the requirements of this section.

(c) Provide for removal of refuse in successive horizontal lifts with a maximum elevation difference between working benches of twelve feet or removal down to a maximum 2H:1V slope from the top to the toe. No refuse may be removed from the toe of the original embankment until the final removal process.

(d) Provide a plan for fire control in present or unforeseen burning areas in accordance with Section ~~D.05.h.~~ 4.5.h.

(e) Provide wherever possible a final graded refuse slope no steeper than 2H:1V and a twenty foot wide bench for every 50 feet of change in elevation at completion of the operation. Natural slopes shall be stabilized as necessary.

(f) Provide adequate revegetation of refuse and natural ground slopes in accordance with Section 4F of the Surface Mining regulations. All refuse materials disturbed by the operation shall be provided with a minimum cover of non-toxic and non-combustible material sufficient to establish adequate vegetation.

2. Specific Requirements

(a) Non-impounding Refuse Areas

(1) Working surface ditches shall be designed where necessary based on the one year, 24 hour duration storm event as a minimum during the operation.

(2) Removal operations shall not create any impoundment of water through the life of the project.

(3) For partial removal within the permit area, a 100-year, 6-hour duration diversion ditch shall be provided for that part of the pile where refuse will remain. A stability analysis shall be performed as deemed necessary by the director to demonstrate an adequate factor of safety in critical areas where refuse will remain.

(b) Impounding Refuse Areas

(1) Sufficient storage and spillway capacity for the design storm shall be provided through the removal operation. The design storm shall be in accordance with Sections ~~D.05b~~ 4.5.b. and ~~D.05 d.2.~~ 4.5.d.2.

(2) A maximum five foot elevation difference is permitted between the elevation of slurry and the breach invert elevation unless otherwise approved by the director.

(3) Pumps, or pumps with ditches, must be provided to maintain the lowest possible water level in the impoundment.

(4) For partial removal within the permit area, the site shall be converted to a non-impounding fill at completion of the operation. A stability analysis shall be performed if deemed necessary by the director to demonstrate an adequate factor of safety in critical areas for the remaining refuse embankment. A 100-year, 6-hour duration diversion ditch shall be provided in accordance with Section ~~D.05~~ 4.5. d.2.(b).

3. Disposal of Reprocessing Coal Refuse Materials - If reprocessing coal refuse materials are to be disposed of in the special permit area, the refuse disposal area must, in addition to applicable general requirements, be designed to:

(a) Provide compaction of refuse in accordance with Section ~~D.05~~4.5.f2(c).

(b) Disposal of reprocessing coal refuse materials from outside the special permit area shall be in accordance with Section ~~D.05j.~~ 4.5.j.

D.07 Abandonment Requirements - The abandonment plan shall address the following requirements and include a schedule for their implementation:

a. No impoundment exceeding 10,000 cubic-feet of water shall remain upon constructed fills upon abandonment. Impoundments remaining upon abandonment must meet the requirements of Section ~~D.05(e)~~ 4.5 OK of the Surface Mining regulations.

b. No refuse embankment or impoundment may be abandoned until it meets the requirements of Sections ~~D.02~~ 4.2, ~~D.03~~ 4.3, ~~D.05~~ 4.5, Section 4F of the Surface Mining regulations, and has final bond release.

c. A timetable in working days and plans to remove each structure meeting the size requirements of ~~G.01-b.3~~ 3.1.b.3 shall be provided where appropriate.

d. The final top elevation of the refuse embankment must be higher than, and sloped into, the diversion ditch. Maximum slope of the top of the embankment to the diversion ditch shall be 5 percent unless otherwise approved by the director.

e. All pipes under refuse areas left as non-impounding fills shall be sealed with concrete at the upstream end prior to abandonment.

f. At abandonment all fine refuse disposal areas shall be covered with a minimum three foot layer of coarse refuse prior to final covering in accordance with Section ~~D.07g~~ 4.7.g. of the Surface Mining regulations unless otherwise approved by the director.

g. At abandonment all coal refuse shall be covered with a minimum of 4 feet of the best available non-toxic and non-combustible material in a manner that does not impede flow from sub-drainage systems. The director may allow less than 4 feet of cover material where it can be demonstrated that the requirements of Section 4F of the Surface Mining regulations shall be met.

h. A certificate of approval for completion of construction shall be issued upon completion of the above requirements. A certificate may be issued for fresh water impoundments after completion of construction has been certified.

Dept. of Nat. Resources
Reclamation Division
Legislative Rules, Chapter 20
Article 6, Series VII-A (1985)
Section E.

Section 5 E. PERFORMANCE STANDARDS

E.01 Signs and Markers

a. Permanent Monument - A permanent monument shall be posted at the entrance from public roads and highways and at other suitable locations. The monument shall consist of a sign constructed of wood, metal, or other suitable material 2' x 3' mounted on a two-inch diameter pipe driven three feet into the ground with four feet exposed. Any suitable equivalent substitute may be approved. The sign shall clearly indicate the company name, permit numbers, business address and telephone number.

b. Perimeter Marker - A two-inch diameter pipe or suitable substitute shall be driven into the earth with a minimum of three feet exposed to permanently mark the beginning and ending points of the area under permit. It shall be identified by painting the exposed portion of the pipe red. The assigned permit number shall be affixed to the permanent perimeter marker. Other markers will be used to delineate the boundaries of the proposed permit area.

c. Buffer Zone Markers - Appropriate markers will be established along a buffer zone. Markers shall consist of metal or wooden stakes or other suitable devices or methods.

d. Topsoil Markers - When topsoil of other vegetation supporting material is segregated and stockpiled, the stockpiled material shall be marked. Markers shall remain in place until the materials are removed.

e. Blasting Signs - If blasting is necessary during construction on the site, signs reading "Blasting Area" shall be displayed conspicuously at all approaches to the blasting site and along haulageways and access roads to the mining operation. The sign shall be two feet by three feet reading "Blasting Area" and explaining the blasting warning and the all clear signals and shall be posted at all entrances to the permit area.

E.02 Topsoil

a. Removal - The limits of topsoil removal shall be either within the refuse disposal area or in borrow sites as permitted by the director. Borrow areas for topsoil will not be approved unless insufficient topsoil is available at the coal refuse site. Prior to disturbance of an area topsoil shall be removed from the area to be disturbed in a separate layer and if not immediately redistributed, it shall be segregated and stockpiled in a separate stable location as specified in the plans.

1. Where the removal of vegetative material, topsoil, or other materials may result in excessive erosion, the director may limit the size of the area from which these materials are removed at any one time.

2. Topsoil or substitute materials not being immediately utilized shall be redistributed at a time when the physical and chemical properties of topsoil can be protected and erosion can be minimized; provided that the director may approve or require that other erosion control measures be utilized. Provided further, that unless approved by the director, stockpiled topsoil and other materials shall not be moved until required for redistribution on a regraded area.

b. Materials to be removed - If the topsoil is less than 6 inches, a 6-inch layer that includes the A horizon and the unconsolidated material immediately below the A horizon and all unconsolidated material if the total available is less than 6 inches, shall be removed and the mixture segregated and redistributed as the surface soil layer, unless topsoil substitutes are approved by the director pursuant to ~~E.02.e~~ 5.2.e. of this Section.

c. Segregation Requirements - Topsoil not being immediately utilized shall be protected from wind and water erosion and kept free of contamination by acid or toxic materials. Protective measures include, but are not limited to vegetative cover.

d. Redistribution - Topsoil and other materials shall be redistributed in a manner that:

1. Achieves an approximate uniform, stable thickness of at least six inches, consistent with the approved post mining land uses, contours and surface water drainage system;

2. Prevents excess compaction of topsoil; and

3. Protects the topsoil from wind and water erosion before and after it is seeded.

4. After final grading and before the replacement of topsoil and other materials segregated in accordance with this section, regraded land shall be scarified or otherwise treated as required by the director to eliminate slippage surfaces and to promote root penetration. If the person who conducts the surface mining activities shows, through appropriate tests, and the director approves, that no harm will be caused to the topsoil and vegetation, scarification may be conducted after topsoiling.

e. Top Soil Substitutes - If top soil is of insufficient quantity or of poor quality for sustaining vegetation, and if other strata can be shown to be more suitable for vegetation requirements, then the operator shall remove, segregate, and preserve in a like manner such other strata which is best able to support vegetation. Any material used for topsoiling must be capable of supporting and maintaining the approved post mining land use. This determination shall be based on the results of appropriate chemical and physical analyses of overburden and topsoil. These analyses shall include:

1. Determinations of pH, net acidity or alkalinity, nitrogen, phosphorus, potassium, calcium, manganese, texture class, and other analyses as may be required by the director. The director may also require, where he deems necessary, results of field-site tests or greenhouse tests be used to demonstrate the feasibility of using substitute materials;

2. Results of analyses, trials and tests shall be included in the pre-plan. Certification of trials and tests shall be made by a laboratory approved by the director stating that:

(a) The proposed substitute material is equal to or more suitable for sustaining the vegetation than is the available topsoil;

(b) The substitute material is the best available material to support the vegetation; and

(c) The trials and tests were conducted using standard testing procedures, the results of which shall be included in the pre-plan.

f. Nutrients and Soil amendments shall be applied to the redistributed surface soil layer in accordance with Section ~~4F.06~~, ~~4F.07~~ and ~~4F.08~~a of the Surface Mining regulations. 4F.6, 4F.7 4F.8a

E.03 Water Quality

a. Water Quality Control - All reasonable measures shall be taken to intercept all surface water by the use of diversions, culverts and drainage ditches or other methods to prevent water from entering the operational area. All water leaving the permit area will meet Federal and State water quality statutes, regulations, standards or effluent limitations. All surface drainage from the disturbed area must pass through a sediment pond or series of sediment ponds or other approved sediment or treatment control structures.

b. Effluent Limitations

1. Before grade release, discharge from the permit area must comply with the requirements of Section ~~6B.06a(2)~~ and ~~7B.07a(2)~~ of the Surface Mining regulations. 6B.6a(2) 7B.7a(2)

2. After grade release, assure that any leachate therefrom will not lower the water quality of the river, stream or drainway into which it is discharged.

c. Treatment Facilities - Adequate facilities shall be installed, operated, and maintained according to the approved pre-plan to treat any water discharged from the disturbed area so that it complies with all federal and state laws and regulations and the limitations of this section. Non-mechanical treatment systems may be utilized if flow is infrequent or small and timely and consistent treatment is assured.

d. Breakthrough

1. Any surface breakthrough of water caused by the operator during the course of his operations shall be sampled immediately and analyzed for total iron, total suspended solids and pH and if requested by the director, any other parameter characteristics of the discharge. Such analysis shall be made by a competent water analyst or chemist. The original and at least one copy of such analysis shall be retained by the operator, two copies shall be submitted to the chief of the division of reclamation.

2. Should said analysis indicate the water to be less than the applicable effluent limitations, seals shall be immediately constructed. These seals shall either:

(a) prevent any air from entering the underground mine by way of the breakthrough; or

(b) prevent any air from entering the breakthrough while allowing the water to flow from the breakthrough; or

(c) Seal the breakthrough of acid water so that it cannot flow. Such seals shall be constructed of stone, brick, block earth or impervious materials which are acid resistant.

3. Alternate methods of handling discharges from breakthroughs may be employed where it can be established that applicable effluent limitations can be met.

E.04 Drainage, Sediment Control and Haulageways - Shall be developed in accordance with Section 4A and Section 4B of the Surface Mining regulations.

E.05 Diversions and Spillways

a. All diversion and spillway construction must comply with Sections E.02a, E.04 and the following requirements:

1. Diversions and spillways shall be constructed according to the approved plans and specifications. Any changes and/or modifications must be approved by the director prior to implementation.

2. Diversion ditches shall be installed concurrently or after sediment structures are built and before other site preparation begins.

3. When downslope placement of fill material is used in the construction of diversion ditches, the fill material shall be compacted in layers to achieve the design configuration in accordance with the following requirements:

(a) All areas upon which the fill is to be placed shall first be progressively cleared of all trees, brush, shrubs, and other organic material. This material shall be removed from the fill area;

(b) Depositing and compacting the fill in layers shall begin at the toe of the fill. The layers shall be constructed approximately parallel with proposed finish grade. All material shall be deposited in uniform horizontal layers and compacted with haulage equipment.

(c) The thickness of the layers shall not exceed four feet.

4. Excess excavation material not needed to construct or maintain the spillway or diversion ditches must be properly disposed of in the permit area unless otherwise approved by the director.

5. If leakage or seepage occurs from the constructed diversion ditch, measures shall be taken to eliminate the seepage by sealing or other means.

6. All rip-rap material shall be of hard, durable rock which is not acid-forming or toxic-forming. Rip-rap shall be placed to prevent size segregation.

7. When bedding is used under rip-rap, the rock material shall be placed in a manner so as not to disturb or contaminate the bedding.

8. When protective channel linings are required, the linings shall be installed as soon as the ditch is constructed to grade.

9. When concrete is used in construction of spillways and diversion ditches, the concrete shall be placed and cured in accordance with AASHTO specifications. Standard engineering tests shall be performed to insure that the concrete meets the design specifications.

b. Maintenance

1. All spillways and diversions shall be maintained to operate according to the design plans and specifications.

2. Routine maintenance of diversion ditches and spillways shall be performed. Maintenance shall include removal of sediment, brush, trees, rocks and re-establishment of the structure to its original hydraulic design.

3. All failures resulting from landslides or slope failures which may have a potential adverse effect on public property, public health and safety, or the environment must be corrected immediately. Such failures must be reported immediately to the director.

4. Routine inspections shall be made by qualified persons of all hydraulic structures to insure proper operation. Special inspections shall be conducted whenever a significant storm flow through the structures has occurred.

5. All culvert pipes must be repaired or replaced when damaged, distorted, or otherwise fail to function property according to the approved design.

c. Certification - Each hydraulic structure shall be certified according to Section ~~E.08~~ 5.8d by an engineer. The certification shall affirm that the structure was constructed according to the approved plans and list any variations or discrepancies.

E.06 Acid Producing and Toxic Materials

a. Drainage from acid-forming and toxic-forming materials into ground and surface water shall be avoided by:

1. Identifying, burying, blending and/or treating where necessary, spoil or other materials that will be toxic to vegetation or that will adversely affect water quality. Such materials shall be handled in accordance with methods and a schedule as set forth in the approved preplan; and

2. Acid-forming or toxic-forming material shall not be buried or stored so as to cause or pose a threat of water pollution.

b. Treatment of Toxic Material - Any acid-forming, toxic-forming, combustible materials, or any other waste materials that are exposed, shall be provided with a minimum six inch cover of nontoxic and noncombustible material beneath the topsoil layer. If necessary, this material shall be treated to neutralize toxicity in order to prevent water pollution and sustained combustion and/or to minimize adverse effects on plant growth and land uses. Where necessary to protect against upward migration of salts, exposure by erosion, to provide an adequate depth for plant growth, or to otherwise meet local conditions, the director shall specify thicker amounts of cover using non-toxic material.

E.07 Water Monitoring Requirements - shall be in accordance with Sections 6B.04b, 6B.06, 7B.04b and 7B.07 of the Surface Mining regulations.

E.08 Site Development

a. Sediment control and diversion ditches shall be installed according to the approved plan before other site preparation or construction begins.

b. Progressive clearing and grubbing must be performed within the coal refuse disposal area, impoundment areas, topsoil borrow areas, and topsoil stockpile areas prior to construction unless otherwise approved by the director.

c. Embankment Construction

1. Foundation preparation to include keyways, installation of mine seals according to Section ~~D.05g~~ 4.5 g, subdrains, removal of soft areas, and similar site preparation operations dictated by the approved plan and site conditions shall be accomplished prior to the placement of coal refuse. Inspection of foundation preparation by the director is required before refuse may be placed.

2. Refuse materials shall be placed in accordance with the placement and compaction requirements in the approved plan for the particular site or minimum spreading and compaction requirements shall be a maximum of two foot horizontal lifts and 90 percent Standard Proctor Density (ASSHTO Specification T 99-74). It shall be unacceptable to place extraneous combustible materials such as wood, rags, trash and garbage, grease and oil, etc., in the coal refuse disposal area.

3. Grading

(a) The working surface and outslopes of a coal refuse fill shall be concurrently graded through all phases of embankment construction.

(b) Top of fill and benches shall be graded no flatter than two percent in any direction to divert surface runoff away from the face of the fill and into stabilized working surface diversion ditches.

(c) The top of the fill shall be graded in such a manner so as not to impound water unless specifically authorized by the director.

(d) Fill material shall be graded in such a controlled manner to allow surface and subsurface drainage to be compatible with natural surroundings and ensure a long term static factor of safety of 1.5.

(e) The face of the fill shall be graded no steeper than two horizontal to one vertical.

(f) The vertical difference between benches shall not exceed 50 feet.

(g) The width of the individual benches shall (be/not) less than 20 feet unless specifically approved by the director.

(h) In all cases final grading shall be conducted in such a manner as to follow approved plans and to provide a surface for placement of topsoil.

(i) When erosion creates rills or gullies 9 inches deep, or if refuse materials are exposed in finished or topsoiled slopes, the rills and gullies shall be filled, graded or otherwise stabilized and the area reseeded or replanted according to Reclamation specifications. The director may require that rills and gullies of lesser size be stabilized and the area reseeded or replanted if the rills or gullies result in excessive erosion.

(j) Where water will be impounded against the upstream face, the face may be riprapped or otherwise stabilized to protect against damage due to wave action.

(k) Routine maintenance of the embankment shall be performed during the mining operation. Vegetative growth shall be cut when necessary to facilitate inspection and repairs. Any combustible material present on the surface other than material such as mulch or dry vegetation used for surface stability shall be removed and all other appropriate maintenance procedures shall be followed.

4. Stability - Determination of Unstable Conditions - Inspections shall be made by a qualified person for signs of unstable conditions. The qualified person shall consider steepness of slopes, seepage, bulges, scarps, vertical displacement, excessive erosion, piping, sudden changes in monitoring devices and other visible factors which could indicate potential failure of the embankment, diversion structures, spillways, and other appurtanences. Inspections shall include such observations and tests as may be necessary to evaluate imminent or significant environmental harm. These considerations shall be documented in accordance with Section ~~E.08d.~~ 5.8d Inspection frequency will be in accordance with Section ~~E.08d. If an~~ 5.8d imminent danger to human life, property or the environment is determined, persons downstream must be warned of the hazard and any necessary emergency actions taken. The director must be immediately notified according to Section ~~E.08d 3(e)~~. 5.8d 3(e).

5. Freeboard - Freeboard for the stage of construction or operation shall be maintained at all times in accordance with the design storm criteria and the approved plan.

d. Quality Control

1. Plans, specifications and all previous inspection reports shall be available at or near the mine office nearest to the site for reference by construction personnel and the director.

2. Until construction has been completed and certified, a visual inspection for construction progress, determination of unstable conditions, and hydraulic structure performance shall be held at a minimum of every seven days for impoundments and at least quarterly for non-impounding areas by a qualified person unless more frequent inspections are required by the director based on specific site conditions. Inspections shall be held after heavy rainfall events to determine problems and remedial measures. Piezometers and other monitoring devices shall be monitored at intervals not exceeding seven days by a qualified person. Other monitoring devices should be monitored at intervals as specified in the approved plan. Inspections may include such observations and tests as may be necessary to evaluate the potential hazard to human life and property, to insure that all organic

4.7

material and topsoil have been removed and that proper construction and maintenance are occurring in accordance with the approved plans and specifications. Inspections may terminate when the coal refuse disposal area has been properly abandoned in accordance with Section ~~B.07~~, or at such a later time as the Director may require. A written record of all inspections and monitoring device readings shall be maintained at or near the mine office nearest the site for inspection.

3. Reporting Requirements

(a) A written report containing results of visual inspections of construction progress and determination of unstable conditions shall be submitted every thirty days for coal refuse structures if requested by the director. The report should include but not be limited to a summary of instrumentation data, testing data, freeboard, elevations, crest elevation, slurry elevation and specific construction problems. The underdrains and protective filters must be supported by color photographs.

(b) Plan and cross-section progress maps shall be submitted to the director if so ordered by the director.

(c) Certification of construction by an engineer on forms supplied by the director for each major portion of the construction sequence and each hydraulic structure shall be submitted as they are completed to the director. Upon completion of construction, and annually thereafter until the permit has final bond release, certification shall be provided by an engineer that the project is functioning as designed. The certification report shall include statements on:

(1) Existing and required monitoring procedures and instrumentation;

(2) The design depth and elevation of any impounded waters at the time of the initial certification report or the average and maximum depths and elevations of any impounded waters over the past year for the annual certification reports;

(3) Existing storage capacity of the dam or embankments;

(4) Any fires occurring in the construction material up to the date of the initial certification or over the past year for the annual certification reports; and

(5) Any other aspects of the dam or embankment affecting stability.

(d) Any change in construction sequence or other modification of the site must be reported to the director and any significant change must receive approval prior to implementation.

4.5c

(e) Should a condition occur which is dangerous to human life, property or the environment, the director shall be informed immediately. Immediate action shall be taken by the person owning, operating, or controlling the structure to alleviate the hazard. Emergency procedures developed in accordance with Section ~~D.05c~~ shall be implemented to protect life and property downstream. The site shall be inspected and monitored at least once every eight hours until the emergency situation is alleviated. Continuous monitoring may be required by the director when there is an imminent danger to the health or safety of the public.

E.09 Materials Removal

5.3, 5.4, 5.5

5.2a

a. Drainage control measures shall meet the requirements of Sections ~~E.03~~, ~~E.04~~ and ~~E.05~~ (except Section ~~E.02a~~). After grade release, discharges from the permit area shall not lower the water quality of receiving streams. Where existing roads are to be used for access or haulage and it can be demonstrated that reconstruction to meet the above requirements would result in greater environmental harm and the drainage and sediment control requirements of Section 4A of the Surface Mining regulations can otherwise be met, the requirements of Section 4A may be waived.

b. Method of Operation

1. Removal of refuse shall be accomplished in successive horizontal lifts with a maximum elevation difference between working benches of twelve feet or may be removed down a slope from the top to the toe provided that the slope is no steeper than 2H:1V. No refuse may be removed from the toe of the original embankment until the final removal process.

2. At all times during removal operations, care shall be exercised to protect the operating personnel, the public, and to insure long-term stability in accordance with the approved plan.

3. Where possible, final graded refuse slopes shall be no steeper than 2H:1V and at least one bench for every 50 feet of change in elevation shall be provided.

4. Should burning areas be encountered, the fires shall be extinguished in accordance with Section ~~E.11~~, and removal of refuse shall be done in a safe manner. 5.11

5. The total disturbed area shall be regraded in such a manner as to be compatible with the natural surroundings and shall be revegetated in accordance with Section 4F of the Surface Mining regulations. Such regrading and revegetation shall occur as contemporaneously as practicable with removal operations and as reflected in the reclamation plan.

6. Regrading drainage control shall be provided in accordance with the approved reclamation plan.

E.10 Underground Coal Refuse Disposal - Coal refuse may be returned to underground mine workings only in accordance with an approved disposal plan in accordance with Section ~~D.05~~ 4.5; . Inspections shall be conducted by the operator to detect potential breakthroughs into active mine workings or breakouts on the surface at likely areas where breakout could occur. Breakouts, or potential breakouts, shall be immediately reported to the director and immediate action shall be taken to eliminate the hazard and protect persons living or working below the breakout.

E.11 Burning Refuse Piles - All coal refuse fires shall be extinguished. Extreme caution must be taken in all attempts to extinguish burning areas to insure that hazards are minimized to equipment operators and other persons working or living in the vicinity of the site. A plan for extinguishing coal refuse fires must be approved by the director and the Mine Safety and Health Administration. Only those persons authorized by the operator, and who have an understanding of the procedure to be used, shall be involved in the extinguishing operation.

6. Regrading drainage control shall be provided in accordance with the approved reclamation plan.

E.10 Underground Coal Refuse Disposal - Coal refuse may be returned to underground mine workings only in accordance with an approved disposal plan in accordance with Section ~~D.05~~ 4.5. Inspections shall be conducted by the operator to detect potential breakthroughs into active mine workings or breakouts on the surface at likely areas where breakout could occur. Breakouts, or potential breakouts, shall be immediately reported to the director and immediate action shall be taken to eliminate the hazard and protect persons living or working below the breakout.

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WEST VIRGINIA DEPARTMENT OF NATURAL RESOURCES

DIVISION OF RECLAMATION

COAL REFUSE DISPOSAL REGULATIONS

Legislative Rules, Chapter 20, Article 6

Series VII-A
(1985)

Dept. of Nat. Resources
Reclamation Division
Legislative Rules, Chapter 20
Article 6, Series VII-A (1985)
Section A

COAL REFUSE DISPOSAL REGULATIONS

WEST VIRGINIA SURFACE MINING RECLAMATION REGULATIONS

Department of Natural Resources

Chapter 20-6
Series VII-A
(1985)

SUBJECT: Rules and regulations pertaining to definitions, requirements for permit applications and plans and specifications submittals, hazard classification, emergency procedures, hydrology, hydraulics, spillways, diversion channels, concrete structures, pipes, subsurface drainage, stability, abandoned mine openings, combustion control, underground coal refuse disposal, reprocessing of abandoned coal refuse areas, abandonment, and performance standards for signs and markers, topsoil, water quality, drainage, sediment control, haulageways, diversions, spillways, acid producing and toxic materials, water monitoring requirements, site development, quality control, reporting requirements, materials removal, underground coal refuse disposal, and burning coal refuse piles.

A. GENERAL

A.01 Scope - These regulations establish general and specific rules for permit applications and plans and specifications submittals, hazard classification, emergency procedures, hydrology, hydraulics, spillways, diversion channels, concrete structures, pipes, subsurface drainage, stability, abandoned mine openings, combustion control, underground coal refuse disposal, reprocessing of abandoned coal refuse areas, abandonment, and performance standards for signs and markers, topsoil, water quality, drainage, sediment control, haulageways, diversions, spillways, acid producing and toxic materials, water monitoring requirements, site development, quality control, reporting requirements, materials removal, underground coal refuse disposal, and burning coal refuse piles.

A.02 Applicability - These rules and regulations:

a. Apply to all coal refuse disposal areas operated after January 18, 1981. Operated means to enter upon a coal processing waste pile, or part thereof, for the purpose of disposing, depositing, dumping or removing coal processing wastes, or to employ a coal processing waste pile for retarding the flow of or for the impoundment of water.

b. Apply to all new and existing coal refuse reprocessing operations. Such operations must obtain a permit prior to commencing operations.

c. Operators of new coal refuse disposal areas after January 18, 1981, must submit a complete permit application in accordance with applicable parts of Chapter 20, Article 6 of the Code of West Virginia and these regulations. Owners of all operating coal refuse disposal areas must submit plans and specifications for approval in accordance with Chapter 20, Article 6, Section 13(f) of the Code of West Virginia and these regulations. Upon the expiration or lifting of the injunction in the civil action Allegheny Mining Corporation et al. v. David Callaghan et al. shall submit a complete permit application in accordance with Chapter 20, Article 6, Section 9 of the Code of West Virginia. The following table lists applicable sections of these regulations for impounding and nonimpounding structures:

TABLE

Non-Impounding	Impounding	Reprocessing Operations
A.	A.	A.
B.	B.	B.
C.01a	C.01b	C.01c
D.01	D.01	C.02
D.02	D.02	D.06
D.03	D.03	E.09
D.04	D.04	
D.05a2	D.05a	
D.05a3	D.05b	
D.05c	D.05c	
D.05d1	D.05d	
D.05d2(b)	D.05e	
D.05d2(c)	D.05f	
D.05d3	D.05g	
D.05e	D.05h	
D.05f	D.05i	
D.05g	D.05j	
D.05h	D.07	
D.05i	E.	
D.05j		
D.07		
E.		

A.03 Authority - These regulations are issued under the authority of Article 6, Chapter 20, Code of West Virginia, as amended.

A.04 Effective Date - These regulations become effective on the 13th day of June, 1985.

A.05 Filing Date - These regulations were filed in the Office of the Secretary of State on the 13nd day of June, 1985. These regulations

These regulations become effective on the 13th day of June, 1985.

B. DEFINITIONS - The following definitions refer specifically to these regulations and are valid unless the context in which used clearly requires a different meaning:

B.01 Abandoned Coal Refuse Disposal Area - means any coal refuse disposal area which is not being operated. This definition does not relieve any operator from his reclamation responsibility for the coal refuse disposal area.

B.02 Accepted Engineering Methods - means sound engineering practice based upon the technology currently applied by the engineering profession.

B.03 Acid Mine Drainage - means water with a pH of less than 6.0 discharged from active or abandoned mines and from areas affected by surface mining operations.

B.04 Acid-Forming Materials - means earth materials that contain sulfide minerals or other materials which may create acid mine drainage.

B.05 Act - means West Virginia Code, Chapter 20, Article 6.

B.06 Bearing Capacity - means the ability of a foundation material to support loads imposed by an embankment or other structure as determined by standard engineering evaluations.

B.07 Buffer Zone - means an undisturbed border along or around an intermittent or perennial stream.

B.08 Channel Protection - means any measures taken to prevent or control erosion, cavitation, or other destructive processes in channels such as diversion ditches and spillways.

B.09 Coal Refuse Disposal Area - means all deposits of coal processing waste or coal refuse on or buried in the earth.

B.10 Coal Refuse - means any waste coal, rock, shale, slurry, culm, gob, bone, slate, clay, and related materials associated with or near a coal seam, which are either brought above ground or otherwise removed from a mine in the process of mining coal, or which are separated from coal during the cleaning or preparation operations.

B.11 Coarse Coal Refuse - means coal refuse predominately within a size range greater than the #28 sieve size.

B.12 Combined Coal Refuse - means a mixture of coarse coal refuse and dewatered fine coal refuse.

B.13 Combustible Materials - means organic materials that are capable of burning by fire or through oxidation, accompanied by the evolution of heat and a significant temperature rise.

B.14 Compaction - means the densification of a soil or soillike material by means of mechanical manipulation.

B.15 Complete Application - means an application for a surface mining permit which contains all information required under the Act and all Rules and Regulations.

B.16 Construction Pore Pressures - means water pressures generated in foundation soils or embankments due to compression by loads imposed by construction of an embankment or other structure.

B.17 Density - means the weight of soil or soillike solids per unit of total volume of soil or similar mass.

B.18 Design Storm - means predicted precipitation of given intensity, frequency, and duration based on National Weather Service data.

B.19 Director and/or His Authorized Agent - means the director of the department of natural resources, deputy directors, the chief of the division of reclamation, the assistant chiefs of the division of reclamation, and all duly authorized engineers, geologists, surface mining reclamation supervisors, or inspectors and inspectors-intraining.

B.20 Diversion Ditch - means a designed channel constructed for the purpose of collecting and transmitting surface runoff from the design storm.

B.21 Downslope - means the land surface between the projected outcrop of the lowest coal seam being mined or any mining related construction and the valley floor.

B.22 Effective Height - means the difference in elevation in feet between the lowest open channel emergency spillway crest and the lowest point in the original cross section on the centerline of the dam.

B.23 Embankment - means a manmade deposit of earth or coal refuse materials, usually exhibiting at least one sloping face.

B.24 Emergency Spillway - means a hydraulic structure designed to discharge water in excess of that which an impoundment is designed to store or which cannot be passed through a principal spillway.

B.25 Engineer - means a professional engineer in accordance with Chapter 30, Article 13 of the Code of West Virginia (W.Va. State Registration Law for Professional Engineers).

B.26 Excess Material - means earth and rock not required to achieve the design configuration of the embankment or its appurtenances.

B.27 Fine Coal Refuse - means coal processing waste predominately within a size range less than the #28 sieve which may be disposed of in a slurry form or in a dewatered or treated state.

B.28 Foundation - means soil, bedrock, or other earth material on or against which an embankment or other structure is placed.

B.29 Freeboard - means 1) the vertical distance between the lowest point of the crest of the embankment of a dam and the reservoir water surface or 2) the vertical distance between the top of a ditch or channel and the water surface during the design flow.

B.30 Groundwater - means subsurface water in the zone of saturation.

B.31 Haulageway or Access Road - means any road constructed, improved, maintained or used by the operator with the exception of state owned roads.

B.32 Hazard Potential - means a classification rating assigned to a structure based on engineering evaluations and judgement predicting the damage to human life, property and environment should a failure of the structure occur.

B.33 Highway, Primary - means those roadways which are designated as interstates, U. S. numbered highways or West Virginia numbered highways.

B.34 Highway, Secondary - means those roadways which are designated by the West Virginia Department of Highways as county numbered routes.

B.35 Hydraulics - means the study of the physical behavior of liquids, especially water, in natural or manmade systems or processes.

B.36 Hydrological Analysis - means a determination, using standard engineering methods, to establish surface water runoff for a specified design storm.

B.37 Hydrologic Balance - means the relationship between the quality and quantity of water inflow to, water outflow from, and water storage in a hydrologic unit such as a drainage basin, aquifer, soil zone, lake, or reservoir. It encompasses the dynamic relationships among precipitation, runoff, evaporation, and changes in ground and surface water storage.

B.38 Hydrology - means the science that deals with the occurrence and behavior of water in the atmosphere, on the ground and underground.

B.39 Impoundment - means a closed basin constructed for the retention of water, sediment or coal refuse.

B.40 Inspection - shall mean a visual review of surface or other mining operations to insure complete compliance with any applicable law or rules and regulations or permit conditions under the jurisdiction of the director.

B.41 Leachate - means a liquid that has percolated through soil, rock, or waste and has extracted dissolved or suspended materials.

B.42 Liquifaction - means a phenomenon wherein a saturated granular soil or soil-like material loses strength due to the development of elevated porewater pressure commonly occuring during cyclic loading, such as in an earthquake. This loss of strength may result in limited movement or liquid-like flow.

B.43 Mine - means the shaft, slopes, drifts or inclines connected with excavations penetrating coal seams or strata and the surface structures which contributes directly or indirectly to the mining, preparation or handling of coal.

B.44 Natural Drainway - means any natural water course which may carry water to the tributaries and rivers of the watershed.

B.45 Occupied Dwelling - means any building that is currently being used on a regular or temporary basis for human habitation.

B.46 Peak Runoff - means the maximum flow at a specified location resulting from a design storm.

B.47 Phreatic Surface - means the upper surface of a zone of saturation where a body of groundwater is not confined by an overlying impermeable strata.

B.48 Piezometric Surface - means the surface to which the water from a given aquifer will rise under its pressure and elevation head.

B.49 Piping - means a process of internal erosion which occurs when water transports soil or soillike materials through unprotected exits, developing unseen channels or pipes through an embankment or its foundation.

B.50 Potential Hazard - means the existence of any condition or practice or any violation of a permit or other requirements of the Act in an operating or an abandoned coal refuse disposal area which might reasonably be expected to cause physical harm to persons, property, or the environment inside or outside the permit area.

B.51 Principal Spillway - means the hydraulic structure designed to discharge water stored between normal pool and the emergency spillway invert elevations.

B.52 Probable Maximum Precipitation - means the depth-duration-area rainfall for a particular area that represents the maximizing of the most critical meteorological conditions that are considered possible of occurrence.

B.53 Qualified Person - means a person deemed qualified by registration as a registered professional engineer, or certification by the MSHA as a coal refuse embankment and impoundment inspector, and designated by the operator to make examinations of coal refuse embankments and impoundments under the supervision of the operator's engineer.

B.54 Reclamation - means the process of converting disturbed land to a stable form for productive use.

B.55 Sediment - means solid material, both mineral and organic, resulting from the works of man that has been moved from its site of origin by water.

B.56 Safety Factor - means the ratio of the available shear strength to the developed shear stress, or the ratio of the sum of the resisting forces to the sum of the loading or driving forces, as determined by one or more accepted engineering methods of analysis.

B.57 Sediment Control Structure - means a primary structure designed, constructed and maintained in accordance with Section 4B of the Surface Mining regulations and includes barriers, dams, excavations or other structures placed in suitable locations which slows down water runoff to allow sediment to settle out, Provided that such secondary sediment control structures including hay or straw bales, check dams, riprap, or mulch are not considered primary sediment control structures.

B.58 Seepage - means 1) the appearance or disappearance of water at the surface of natural ground or embankments or 2) the movement of water through soil or soil-like materials.

B.59 Site - means the coal refuse disposal area, diversion ditches, sediment control structures, roads and all other surface disturbance within the permit area.

B.60 Slope Protection - means any measures taken to control erosion on slopes.

B.61 Slope Stability - means the degree of safety relative to the development of a structural failure in a slope or embankment as defined by one or more standard engineering methods of analysis.

B.62 Stabilize - means to control movement of soil, or soil-like material, spoil piles, or areas of disturbed earth by modifying geometric, physical or chemical properties.

B.63 Storm Water - means any water flowing over the surface of the ground caused by precipitation; generally, surface runoff.

B.64 Structure - means but is not be limited to gas lines, water lines, towers, airports, coal facilities and dams.

B.65 Strength Parameters - mean those engineering values obtained from standard engineering shear strength tests of soil or soil-like material.

B.66 Sub-drainage System - means a designed and constructed system provided for the conveyance of subsurface water.

B.67 Subsidence - means a sinking, collapsing or cracking of a portion of the earth's surface resulting from the underground removal of a mineral subsequent to failure of support structures.

B.68 Surface Water - means water on the surface of the earth.

B.69 Topsoil - means the A horizon soil layer of the three major soil horizons.

B.70 Toxic-Forming Materials - means earth materials or wastes which, if acted upon by air, water weathering, or microbiological processes, are likely to produce chemical or physical conditions in soils, air or water that are detrimental to biota or uses of water.

B.71 Toxic Mine Drainage - means water that is discharged from active, abandoned and other areas affected by surface mining or prospecting operations and which contains a substance which through chemical action or physical effects, is likely to kill, injure, or impair biota commonly present in the area that might be exposed to it.

B.72 Zone of Saturation - means the zone below the piezometric surface in which all voids are filled with groundwater.

C. PERMITS

C.01 Standard Permits or Plans and Specifications
Standard permits or plans and specifications in accordance with the applicability section are required for all coal refuse disposal areas of the following types:

a. Non-impounding coal refuse areas - Submit the appropriate application forms and plans according to the applicable sections of these regulations.

b. Impounding Structures - Submit the appropriate application forms and plans with the following variations:

1. Impoundments defined as dams in Chapter 20, Article 5D of the Code of West Virginia (Dam Control Act) shall require a Certificate of Approval.

2. Impoundments capable of storing 20 acre feet and having an embankment greater than 5 feet in height measured at upstream toe or are 20 feet or more in height measured at the upstream toe must comply with these rules and regulations, regardless of construction materials.

3. All other impoundments not meeting the minimum criteria of C.01b1 or C.01b2 must meet minimum requirements of the Handbook for Surface Mining. Special approval may be given to short term, special purpose ponds for disposal of materials.

c. Plans for reprocessing or removal of materials from an approved coal refuse disposal area shall be included in the standard permit.

C.02 Special Permits - A special permit may be granted for reprocessing or removal of abandoned coal refuse disposal areas in accordance with Section D.06 and E.09 of these regulations.

D. SUBMITTAL REQUIREMENTS

D.01 Submittals - Submittals for construction, operation, enlargement, modification, removal of materials, and abandonment of all coal refuse disposal areas shall be in accordance with these regulations. The submittal shall be prepared by or under the direct supervision of, and certified by, an engineer experienced in the design and construction of similar facilities.

The coal refuse disposal portion of the submittal shall contain the following information in order:

a. Narrative and Discussion

b. Emergency Procedures if required by Section D.05c of these regulations.

c. Hydrology and Hydraulics

1. Design data in graphical or tabular form

2. Hydrologic analysis shall include all supporting calculations, charts, graphics, tables.

3. Hydraulic analysis shall include all supporting calculations, cross sections, profiles, and results.

4. If computer analysis is used include input data and results used specifically in the design only.

d. Stability

1. Design data in graphical or tabular form.

2. Stability analysis shall include supporting calculations, charts, cross-sections and results.

3. If computer analysis is used include input data and results used specifically in the design only.

e. Haulageways and sediment control.

f. If applicable, plans and calculations concerning abandoned mine openings, combustion control, underground coal refuse disposal, and disposal of coal refuse or sludge from outside the permit area.

g. Abandonment plan.

h. Specifications

i. Maps and Drawings (reduced size if necessary for engineering drawings)

j. Separate from the other copies of the submittal, two sets of maps and plans on standard 24" by 36" size plan sheets shall be submitted.

D.02 Narrative and Discussion - A general narrative and discussion of the project shall be submitted to include as a minimum a discussion of existing site conditions, the design life of the facility, quantity and type of coal refuse to be placed, subsidence potential, design methodology backed up with design computations a d data, method of operation to include clearing and grubbing, topsoil stockpiling, construction of surface and subsurface drainage facilities, phases of construction, method and location of coal refuse placement or removal, coal refuse placement during inclement weather, routine inspection and maintenance, possible abandonment prior to the planned design life, and a sequence for construction of drainage facilities, critical construction phases, reclamation and final abandonment procedures. In addition, a description of the duties, responsibilities and lines of communication of those persons responsible for the design and construction of the coal refuse disposal area shall be included.

D.03 Maps

a. Maps and plans shall be provided showing the site in relation to major highways, county seats, and major drainage. County highway maps may be used for this purpose.

b. A map showing the limits of the watershed with respect to the site shall be provided. The minimum mapping requirement shall be a 7 1/2 minute U.S.G.S. map with the site plotted on it.

c. A plan view of the site shall be provided showing detailed contours, limits of the coal refuse disposal area, all drainage facilities, location of springs, seeps, mine drainage and/or openings, location of the subdrain system, project stationing, location of crosssections, location of borings, test pits and instrumentation and other pertinent data required for project control.

d. Cross-sections of the coal refuse disposal area transversely and longitudinally shall be provided showing original ground, subdrain location, elevations, benches, spillways, and other pertinent features of the site. A cross-section shall be provided for stability computations showing the site at critical areas with materials profile plotted.

e. Cross-sections and profiles of major drainage facilities shall be provided. Cross-sections shall be taken in all critical areas.

f. Construction drawings shall be provided for subdrains, spillways, antiseep mechanisms, and other pertinent structures at the site.

D.04 Specifications - Specifications for site development shall be provided to include as a minimum:

a. clearing and grubbing

b. topsoil stockpiling

c. excess material disposal

d. subdrain construction

e. slopes

f. grades

g. details of the coal refuse disposal area and drainage facilities

h. spreading and compaction requirements during placement

i. material and/or gradation requirements for subdrainage structures

j. water quality control from acid-forming or toxic-forming materials

k. pipes

l. concrete

m. anti-seep mechanisms

n. channel protection

o. installation and reading of monitoring devices

p. inspection and maintenance

q. topsoil redistribution

r. seeding and mulching

D.05 Pre-development Analysis

a. Hydrologic Balance

1. Structures meeting the requirements of C.01 b.1 and C.01 b.2 shall be prohibited unless the following can be demonstrated:

(a) The quality of the impounded water shall be suitable on a permanent basis for its intended use, and discharge of water from the impoundment must comply with the requirements of Section 6B.04 and 7B.04 of the surface mining regulations.

(b) The level of the water shall be sufficiently stable to support the intended use.

(c) Adequate safety and access to the impounded water shall be provided for proposed water users.

(d) Water impoundments shall not result in the diminution of the quality or quantity of water used by adjacent or surrounding landowners for agricultural, industrial, recreational, or domestic use.

(e) The design, construction and maintenance of dams and impoundments shall achieve the minimum design requirements applicable to structures constructed and maintained under the provisions of Sections D and E of these regulations. All other impoundments (as specified in C.01 b.3.) must meet the minimum design requirements of the Handbook for Surface Mining.

(f) The size of the impoundment is adequate for its intended purposes.

(g) The impoundment will be suitable for the approved post-mining land use.

2. Sediment Control - Slope protection and vegetation shall be provided to minimize surface erosion at the site and sediment control measures shall be required where necessary to reduce the sediment leaving the site.

3. Excavations for special purpose ponds (C.01 b.3.) that will impound water during or after the mining operation shall have perimeter slopes that are stable and shall not be steeper than 2H:1V or shall meet the requirements of the Handbook for Surface Mining (Excavated Pond Section). Where surface runoff enters the impoundment area, the side slopes shall be protected against erosion.

b. Hazard Classification

1. Impoundments - The hazard potential of structures meeting the requirements of Sections C.01b1 and C.01b2 shall be determined by the applicant based on the potential loss that would result due to a failure and the classification determined as listed below:

(a) Class A--Impoundments located in rural or agricultural areas where failure may damage farm buildings, agricultural land, or secondary highways. Failure of the structure would cause only loss of the structure and loss of property use such as related roads, but with little additional damage to adjacent property. Any impoundment exceeding 25 feet in height measured at the downstream toe or 200 acre-feet storage volume or having a watershed exceeding 500 acres shall not be a Class A structure.

(b) Class B--Impoundments located in predominantly rural agricultural areas where failure may damage isolated homes, primary highways or minor railroads or cause interruption of relatively important public utilities. Failure of the structure may cause great damage to property and project operations.

(c) Class C--Impoundments located where failure may cause loss of life, serious damage to homes, industrial and commercial buildings, important public utilities, primary highways, or main railroads. This classification must be used if failure would cause possible loss of human life.

c. Emergency Procedures - For a Class C Structure or if a dangerous condition exists, notification and action procedures shall be formulated by the operator or owner, for public protection and remedial action in the event of an emergency. All emergency procedures must be submitted and become part of the approved plan. If adequate emergency procedures cannot, for whatever reason, be formulated by the owner or operator, then he must so notify the director in writing. The director may then notify the Office of Emergency Services and request that emergency procedures be developed for the coal refuse disposal area.

d. Hydrology and Hydraulics

1. Design Data Required - All data (precipitation, watershed characteristics, etc.), graphs, curves, etc. required for hydrologic and hydraulic design of coal refuse embankments and impoundments shall be presented.

2. Design Requirements

(a) Impoundments and Dams

(1) Design storm - All impoundments related to the surface effects of coal mining shall be designed to meet the following criteria based upon hazard classification. Precipitation values may be obtained from Technical Paper 40, U.S. National Weather Service.

(i) Class A Impoundments shall be designed for a minimum of $P_{100}+0.12$ $(PMP-P_{100})$ inches of rainfall in six hours plus three feet of freeboard. If the storage times effective height is less than 3,000 (acre-feet)(feet) then Soil Conservation Service Pond Standard 378 may be substituted.

(ii) Class B impoundments shall be designed for a minimum of $P_{100}+0.40$ $(PMP-P_{100})$ inches of rainfall in six hours plus three feet of freeboard.

(iii) Class C impoundments shall be designed for the probable maximum precipitation of the appropriate duration.

(2) Impoundment Requirements - All impoundments must be capable of passing that portion of the design storm that cannot be safely stored in the impoundment.

(i) Class A impoundments must be provided with an open channel spillway unless otherwise approved by the director. Ninety percent of the stored portion of the design storm must be discharged or removed within ten days after the storm event.

(ii) Class B impoundments shall be designed with either an open channel spillway only, or with an emergency spillway and a principal spillway together. Ninety percent of the stored portion of the design storm shall be discharged or removed within ten days after the storm event.

(iii) Class C dams may be designed in one of three ways:

-1- An impoundment designed without discharge structures shall be capable of storing a minimum of two 36 hour duration probable maximum storms. Water shall be removed from the impoundment to its lowest practical level by pumping or by other means if storm water reduces the storage capacity to one probable maximum storm or less.

-2- An impoundment designed with a decant or principal spillway only shall be capable of storing at least one 36 hour duration probable maximum storm. Ninety percent of the stored portion of the storm shall be discharged or removed within ten days after the storm event.

-3- An impoundment designed with either an open channel spillway only, or with an emergency spillway and principal spillway together shall be capable of discharging that portion of the six hour duration probable maximum storm that cannot be safely stored in the impoundment. Ninety percent of the stored portion of the storm shall be discharged or removed within ten days after the storm event.

(3) Spillways and Outlet Works

(i) Spillways - One or more spillways must be provided to pass that portion of the design storm that cannot be safely stored using standard engineering flood routing techniques and to draw down the stored portion of the design storm within the specified time. The outlets of all spillways must be carried safely beyond the toe of the dam to a natural drainway.

-1- Open Channel Spillways - All channels must comply with this Section, Section D.05 d.2.(c) and the following additional requirements:

-a- Any open channel spillway designed for less than 100% probable maximum precipitation shall be provided with freeboard above the maximum water surface as determined by the equation $1+.025vd^{1/3}$.

-b- Excess excavated material not needed to construct and maintain the spillway channel must be properly disposed of in the permit area unless otherwise approved by the director.

-c- Topsoil removed from channel excavation shall be handled in accordance with Section E.02.

-2- Pipe Spillways - All pipe spillways must comply with the requirements of this Section and the following additional requirements.

-a- The pipe spillway inlet must be protected by a designed trash rack.

-b- All riser type spillways must be designed to prevent vortexing.

-c- A skimming device is required where floating pollutants exist or are anticipated.

-d- An adequate foundation and bedding shall be designed for all pipes and risers.

-e- all pipe spillways shall be designed to provide seepage control along the conduit.

-f- The pipe spillway shall be of sufficient strength to withstand the maximum load of the fill above it.

-g- All pipe spillways shall be constructed of suitable material to resist deterioration for the design life of the facility.

-h- The outlet of all pipes, where blockage by animals can occur, must be protected by an animal guard.

(ii) Drainpipes - All freshwater impoundments meeting the size requirements of Sections C.01b1 and C.01b2 constructed after the effective date of the Act must be designed with a gated drainpipe or principal spillway gate for draining the impoundment. All drain pipes must meet the requirements for pipe spillways.

(iii) Concrete Structures - Concrete structures shall be designed in accordance with standard engineering practice. Special design considerations should be provided where deterioration of the environment may be expected.

(b) Diversion Channels - The entire coal refuse embankment shall be protected from surface water runoff by diversion systems unless otherwise approved by the director.

(1) Design storm - All diversion ditches and stream channel diversions shall be designed to carry the peak runoff from a 100-year frequency, six hour duration rainfall.

(2) Freeboard - A freeboard equal to or greater than the formula $1+.025vd^{1/3}$ shall be added to the design flow depth of the diversion ditch to obtain the total depth of the diversion ditch.

(3) Additional Requirements - All ditches must comply with this Section, Section D.05 d.2.(c) and the following additional requirements:

(i) Each diversion ditch must be designed to carry the peak flow with freeboard from the contributing watershed area.

(ii) Diversions shall be designed, constructed, and maintained in a manner which prevents additional contributions of suspended solids to streamflow and to runoff outside the permit area to the fullest extent possible.

(iii) Excess excavated material not required for construction or maintenance of the diversion ditch must be properly disposed of in the permit area unless otherwise approved by the director.

(iv) Topsoil removed from the channel excavation shall be handled in accordance with Section E.02.

(v) All diversion systems shall exit safely beyond the toe of the embankment in a natural drainway capable of carrying the design flow without excessive erosion.

(vi) All stream channel diversions must be designed to carry the design flow around the disturbed area. The diversions must outlet into the original channel or a natural channel of equal cross section without excessive erosion.

(vii) Diversions in refuse must be lined with soil or a suitable substitute unless sediment protection is provided.

(viii) Permanent diversion systems designed to convey water under a coal refuse embankment by means of a pipe or conduit are unacceptable. However, diversion by means of a pipe or conduit may be permitted during active operation provided that height or storage limits for impoundments as defined by Section C.01 b.2 are not exceeded, the pipe or conduit is used in conjunction with surface ditches to meet applicable design storm requirements (Section D.05 d.2.(b.)(1)), and the design of the pipe or conduit accounts for durability and design life, load limits, joint sealing, trash rack protection, and maintenance requirements throughout the operational life of the structure.

(c) Hydraulics All hydraulic structures shall be designed to safely control the flow using energy dissipators and/or channel protection based upon design flow velocity to prevent excessive erosion. Seepage control devices shall be used to prevent undercutting of nonflexible linings. The potential for landslides or slope failures shall be considered in the location of all hydraulic structures. Channels shall not be located on or near an existing landslide unless approved by the director. No surface runoff or slurry may be diverted into underground mines unless diverted in accordance with Section D.05 i.

3. Hydrological and Hydraulic Analyses All hydrological and hydraulic design must be done using accepted engineering methods and meet the minimum requirements of this Section. The application shall include all design data and calculation results. If a computer analysis is used, only the input data and results used specifically in the design shall be submitted. If graphical flood routing techniques are used, all charts and graphs shall be included. Adequate cross sections and profiles shall be given for all hydraulic structures.

e. Subsurface Drainage - All springs, seepage, and groundwater flow observed or anticipated during wet conditions must be identified. If site conditions dictate necessity, a properly designed subdrainage system for the purpose of structural integrity and preservation of water quality shall be provided to:

1. Intercept all anticipated or observed groundwater sources and/or seepage;

2. Be constructed of durable rock consisting of non-degradable, non-acid or toxic forming rock such as natural sand or gravel, sandstone, or other durable rock that will not slake in water and will be free of coal, clay or shale. Limestone may not be utilized in any location where acid water conditions are observed or anticipated unless otherwise approved by the director. Subdrainage systems shall be protected by a properly designed filter zone or filter cloth where required;

3. Be designed and sized based upon measured or anticipated flows using standard engineering design techniques with field data and computations for design provided in the submittal.

4. The upstream end of the subdrain shall be covered by a filter medium during all phases so as to protect against contamination.

f. Stability - All coal refuse impoundments must be analyzed and/or designed in accordance with this Section. Non-impounding coal refuse embankments must be designed in accordance with this Section unless any proposed modifications to the design standards of this Section are justified through appropriate stability analysis. Where obvious site conditions indicate that failure will not occur, the director may waive the requirement for a stability analysis on non-impounding structures so long as all other design requirements of Section D.05.f.2 are met.

1. Design Data Required - All data required for the structural analysis and/or design of coal refuse embankments and impoundments shall be presented in the submittal in graphical or tabular form.

(a) Subsurface Investigation - A subsurface investigation shall be performed unless obvious site conditions preclude the necessity of this requirement. The number, location, and depth of borings, test pits, and/or trenches shall be reasonable for the size, purpose, soils present, and foundation type of the structure. The investigation shall consider depth of soil to bedrock, field classification of soils, character of bedrock, in-situ testing, soil sampling, determination of groundwater location, and a soil profile for critical locations in the structure, hydraulic structures and other pertinent locations which may affect the safety of the structure. A geologic study shall also be conducted for impounding structures to evaluate landslides into the impoundment, bedrock discontinuities such as soft seams, joints, joint systems, bedding planes, and fault zones which may adversely affect the structure's performance. Past and future mining to include height of seam, depth and cover rock of the seam, and previous subsidence problems shall be considered where subsidence may affect the safety of the structure.

(b) Laboratory investigation - Laboratory tests shall be conducted on all foundation and embankment materials to include soil classification through hydrometer analysis, density, water content, compaction tests, shear strength, consolidation, and permeability unless the scope, characteristics, or design concept of the site make one or more of these requirements unnecessary.

2. Design Requirements

(a) Foundation stability - Potential subsidence and settlement and their consequences must be considered using standard engineering techniques. The foundation must have or must be treated to have adequate bearing capacity to support the embankment and any appurtenant works.

(b) Slope stability - Coal refuse embankments and impoundments must achieve a minimum static factor of safety of 1.5 and a seismic factor of safety of 1.2 for construction and longterm conditions under normal and proposed hydrostatic conditions using standard geotechnical engineering techniques. Any final graded slope shall be no steeper than 2H:1V between benches with a 20-foot wide bench for each 50 feet of change in elevation.

(c) Compaction - Compaction shall be specified for construction or modification of all coal refuse disposal areas to insure that future stability and prevention of combustion is attained. Minimum spreading and compaction requirements shall be a maximum of two foot horizontal lifts to achieve 90 percent Standard Proctor Density (AASHTO Specification T 99-74). Special compaction requirements shall be considered for approval for such cases as fine refuse (-28 mesh), combined refuse, coarse refuse where 30 percent of the material will not pass the 3/4 sieve, impervious zones, refuse placement over previously burning refuse, initial lifts over fine refuse, etc.

(d) Liquefaction - The potential for liquefaction must be considered. Safeguards against the development of this condition shall be provided where required.

(e) Instrumentation - Considerations for installation of instrumentation such as piezometers, settlement markers, slope indicators, and similar monitoring devices shall be included in the plan to monitor present hazardous conditions, construction conditions, and to verify design assumptions. A plan for monitoring these devices shall also be provided.

3. Stability Analyses - All stability analyses shall be done using standard engineering techniques. The submittal shall include cross-sections at critical locations in the embankment showing the materials profile, location of critical potential failure surfaces and their factors of safety, estimated or measured phreatic surfaces for construction and/or long term seepage conditions, and a tabulated listing of strength parameters used. If a computer analysis is used, only the input data and results used specifically in the design shall be submitted.

g. Abandoned Openings - Plans for sealing abandoned openings and covering the seal with four feet of an impermeable non-toxic material before placement of refuse over them shall be submitted to the director. Such plans shall consider prevention of water buildup behind the seals, toxicity of the refuse and mine strata, gradient of the opening, hydrologic balance and passage of any acid water to a treatment facility. If a mine seal is in the impoundment area of an impounding coal refuse disposal area, the seal shall be designed to safely withstand full hydrostatic head with a factor of safety of at least 1.5 against blowout. Higher factors of safety may be required where dictated by the consequences of failure. Calculations and cross-sections used in the analyses shall be submitted.

h. Combustion Control - Coal refuse fires shall be extinguished. Plans for the extinguishment of burning areas shall be submitted to the regulatory authority and shall contain, at a minimum, method of extinguishment, safety measures for equipment operators and persons working or living in the vicinity of the site, and a provision that only those persons authorized by the operator, and who have an understanding of the procedure to be used, shall be involved in the extinguishing operation.

i. Underground Refuse Disposal - Plans for underground refuse disposal shall be submitted to and approved by the director and the Mine Safety and Health Adminstration. All plans must include:

1. Method of disposal including a description of the source of the transport medium;

2. Maps of mines where coal refuse materials are to be disposed with a description of the percent of mine void to be filled;

3. Considerations to location of active workings including plans, specifications and methods of constructing underground retaining walls;

4. Potential areas of breakout in active mine workings and on the surface of the ground;

5. Effects of subsidence on the plan;

6. The effects on groundwater including a permanent monitoring well or station to be located in the lowest practical elevation of the backfill area;

7. Gradient of the mine from the backfill area;

8. Description of stratum underlying the mined coal, source and potential acid or toxic-forming quality of the waste, and the treatment of water if released to surface streams; and

9. A contingency plan formulated to alleviate or correct any hazardous conditions which may result from a blowout.

j. Any coal refuse materials or acid mine treatment sludge not previously approved for disposal at the site by the director may be disposed of in the permit area only if approved by the director. Approval shall be based on a showing by the person conducting surface or underground mining activities in the permit area using hydrologic, geologic, geotechnical, physical, and chemical analyses, that disposal of these materials does not:

1. Adversely affect water quality, water flows or vegetation;

2. Create public hazards;

3. Cause instability in the disposal areas.

D.06 Reprocessing or Removal of Abandoned Coal Refuse Disposal Piles
A special permit may be obtained for reprocessing or removal of an abandoned coal refuse disposal area. This permit must accomplish a more desirable land use or have the effect of protecting the public and the environment. A bond of $1,000 per disturbed acre, $10,000 minimum, in the permit area shall be provided.

a. Application Requirements - An application for a special permit for removal of an abandoned refuse disposal area shall be submitted to the director for review. Plans and specifications for removal and reclamation shall be prepared by or under the direct supervision of an engineer. The application shall include two sets of maps and plans on standard 24" by 36" size plan sheets with seven copies of a submittal containing a project narrative, reclamation plan, specifications, supporting data, reduced maps and plans.

1. The project narrative shall include as a minimum a discussion of existing site conditions, how the operation will protect the public or environment or accomplish a more desirable land use, the design life of the operation, quantity and type of material to be removed, method of operation to include phases of removal, sequence of critical construction phases, and a description of the duties, responsibilities, and lines of communication between engineers and those persons responsible for construction of the operation.

2. The reclamation plan shall include as a minimum the location and capacity of sediment control facilities, and reclamation procedures and specifications for the revegetation and grading of the site.

3. Supporting data shall include as a minimum the assumptions and parameters used in the design of the operation, the calculations used in the operation design, and the results of any necessary design calculations for

sediment control facilities, removal of materials, diversion ditches, spillways, stability analysis, fire control and revegetation.

4. Maps and plans shall be provided to show the following information with the scale designated on the drawing:

(a) A location map showing the site in relation to major highways, nearest post office and major drainage. County highway maps may be used for this purpose.

(b) A map showing the limits of the watershed with respect to the site. The minimum requirement shall be a U.S.G.S. 7 1/2 minute map with the site plotted on it.

(c) A plan view of the site showing contours, limits and acreage of the permit area, location of drainage facilities, location of cross-sections, and other pertinent data for project control.

(d) Cross-sections and profiles of drainage facilities, sediment control devices, and any stability analysis cross-sections.

(e) A plot of inflow hydrographs and stage-storage curves as necessary for refuse impoundment and 100-year frequency, six hour duration diversion design only.

b. Design Requirements

1. General Requirements - All reprocessing or removal operations must be designed to:

(a) Provide sediment control facilities in accordance with the Handbook for Surface Mining requirements. Variances may be granted where the operator can show that insufficient space exists to meet the Handbook for Surface Mining requirements and that existing or proposed sediment structures will meet effluent standards.

(b) Provide diversion or discharge facilities in accordance with the requirements of this section.

(c) Provide for removal of refuse in successive horizontal lifts with a maximum elevation difference between working benches of twelve feet or removal down to a maximum 2H:1V slope from the top to the toe. No refuse may be removed from the toe of the original embankment until the final removal process.

(d) Provide a plan for fire control in present or unforeseen burning areas in accordance with Section D.05.h.

(e) Provide wherever possible a final graded refuse slope no steeper than 2H:1V and a twenty foot wide bench for every 50 feet of change in elevation at completion of the operation. Natural slopes shall be stabilized as necessary.

(f) Provide adequate revegetation of refuse and natural ground slopes in accordance with Section 4F of the Surface Mining regulations. All refuse materials disturbed by the operation shall be provided with a minimum cover of non-toxic and non-combustible material sufficient to establish adequate vegetation.

2. Specific Requirements

(a) Non-impounding Refuse Areas

(1) Working surface ditches shall be designed where necessary based on the one year, 24 hour duration storm event as a minimum during the operation.

(2) Removal operations shall not create any impoundment of water through the life of the project.

(3) For partial removal within the permit area, a 100-year, 6-hour duration diversion ditch shall be provided for that part of the pile where refuse will remain. A stability analysis shall be performed as deemed necessary by the director to demonstrate an adequate factor of safety in critical areas where refuse will remain.

(b) Impounding Refuse Areas

(1) Sufficient storage and spillway capacity for the design storm shall be provided through the removal operation. The design storm shall be in accordance with Sections D.05b and D.05 d.2.

(2) A maximum five foot elevation difference is permitted between the elevation of slurry and the breach invert elevation unless otherwise approved by the director.

(3) Pumps, or pumps with ditches, must be provided to maintain the lowest possible water level in the impoundment.

(4) For partial removal within the permit area, the site shall be converted to a non-impounding fill at completion of the operation. A stability analysis shall be performed if deemed necessary by the director to demonstrate an adequate factor of safety in critical areas for the remaining refuse embankment. A 100-year, 6-hour duration diversion ditch shall be provided in accordance with Section D.05 d.2.(b).

3. Disposal of Reprocessing Coal Refuse Materials - If reprocessing coal refuse materials are to be disposed of in the special permit area, the refuse disposal area must, in addition to applicable general requirements, be designed to:

(a) Provide compaction of refuse in accordance with Section D.05f2(c).

(b) Disposal of reprocessing coal refuse materials from outside the special permit area shall be in accordance with Section D.05j.

D.07 Abandonment Requirements - The abandonment plan shall address the following requirements and include a schedule for their implementation:

a. No impoundment exceeding 10,000 cubic-feet of water shall remain upon constructed fills upon abandonment. Impoundments remaining upon abandonment must meet the requirements of Section 4B.05(e) of the Surface Mining regulations.

b. No refuse embankment or impoundment may be abandoned until it meets the requirements of Sections D.02, D.03, D.05, Section 4F of the Surface Mining regulations, and has final bond release.

c. A timetable in working days and plans to remove each structure meeting the size requirements of C.01 b.3 shall be provided where appropriate.

d. The final top elevation of the refuse embankment must be higher than, and sloped into, the diversion ditch. Maximum slope of the top of the embankment to the diversion ditch shall be 5 percent unless otherwise approved by the director.

e. All pipes under refuse areas left as non-impounding fills shall be sealed with concrete at the upstream end prior to abandonment.

f. At abandonment all fine refuse disposal areas shall be covered with a minimum three foot layer of coarse refuse prior to final covering in accordance with Section D.07g of the Surface Mining regulations unless otherwise approved by the director.

g. At abandonment all coal refuse shall be covered with a minimum of 4 feet of the best available non-toxic and non-combustible material in a manner that does not impede flow from sub-drainage systems. The director may allow less than 4 feet of cover material where it can be demonstrated that the requirements of Section 4F of the Surface Mining regulations shall be met.

h. A certificate of approval for completion of construction shall be issued upon completion of the above requirements. A certificate may be issued for fresh water impoundments after completion of construction has been certified.

E. PERFORMANCE STANDARDS

E.01 Signs and Markers

a. Permanent Monument - A permanent monument shall be posted at the entrance from public roads and highways and at other suitable locations. The monument shall consist of a sign constructed of wood, metal, or other suitable material 2' x 3' mounted on a two-inch diameter pipe driven three feet into the ground with four feet exposed. Any suitable equivalent substitute may be approved. The sign shall clearly indicate the company name, permit numbers, business address and telephone number.

b. Perimeter Marker - A two-inch diameter pipe or suitable substitute shall be driven into the earth with a minimum of three feet exposed to permanently mark the beginning and ending points of the area under permit. It shall be identified by painting the exposed portion of the pipe red. The assigned permit number shall be affixed to the permanent perimeter marker. Other markers will be used to delineate the boundaries of the proposed permit area.

c. Buffer Zone Markers - Appropriate markers will be established along a buffer zone. Markers shall consist of metal or wooden stakes or other suitable devices or methods.

d. Topsoil Markers - When topsoil of other vegetation supporting material is segregated and stockpiled, the stockpiled material shall be marked. Markers shall remain in place until the materials are removed.

e. Blasting Signs - If blasting is necessary during construction on the site, signs reading "Blasting Area" shall be displayed conspicuously at all approaches to the blasting site and along haulageways and access roads to the mining operation. The sign shall be two feet by three feet reading "Blasting Area" and explaining the blasting warning and the all clear signals and shall be posted at all entrances to the permit area.

E.02 Topsoil

a. Removal - The limits of topsoil removal shall be either within the refuse disposal area or in borrow sites as permitted by the director. Borrow areas for topsoil will not be approved unless insufficient topsoil is available at the coal refuse site. Prior to disturbance of an area topsoil shall be removed from the area to be disturbed in a separate layer and if not immediately redistributed, it shall be segregated and stockpiled in a separate stable location as specified in the plans.

1. Where the removal of vegetative material, topsoil, or other materials may result in excessive erosion, the director may limit the size of the area from which these materials are removed at any one time.

2. Topsoil or substitute materials not being immediately utilized shall be redistributed at a time when the physical and chemical properties of topsoil can be protected and erosion can be minimized; provided that the director may approve or require that other erosion control measures be utilized. Provided further, that unless approved by the director, stockpiled topsoil and other materials shall not be moved until required for redistribution on a regraded area.

b. Materials to be removed - If the topsoil is less than 6 inches, a 6-inch layer that includes the A horizon and the unconsolidated material immediately below the A horizon and all unconsolidated material if the total available is less than 6 inches, shall be removed and the mixture segregated and redistributed as the surface soil layer, unless topsoil substitutes are approved by the director pursuant to E.02 e. of this Section.

c. Segregation Requirements - Topsoil not being immediately utilized shall be protected from wind and water erosion and kept free of contamination by acid or toxic materials. Protective measures include, but are not limited to vegetative cover.

d. Redistribution - Topsoil and other materials shall be redistributed in a manner that:

1. Achieves an approximate uniform, stable thickness of at least six inches, consistent with the approved post mining land uses, contours and surface water drainage system;

2. Prevents excess compaction of topsoil; and

3. Protects the topsoil from wind and water erosion before and after it is seeded.

4. After final grading and before the replacement of topsoil and other materials segregated in accordance with this section, regraded land shall be scarified or otherwise treated as required by the director to eliminate slippage surfaces and to promote root penetration. If the person who conducts the surface mining activities shows, through appropriate tests, and the director approves, that no harm will be caused to the topsoil and vegetation, scarification may be conducted after topsoiling.

e. Top Soil Substitutes - If top soil is of insufficient quantity or of poor quality for sustaining vegetation, and if other strata can be shown to be more suitable for vegetation requirements, then the operator shall remove, segregate, and preserve in a like manner such other strata which is best able to support vegetation. Any material used for topsoiling must be capable of supporting and maintaining the approved post mining land use. This determination shall be based on the results of appropriate chemical and physical analyses of overburden and topsoil. These analyses shall include:

1. Determinations of pH, net acidity or alkalinity, nitrogen, phosphorus, potassium, calcium, manganese, texture class, and other analyses as may be required by the director. The director may also require, where he deems necessary, results of field-site tests or greenhouse tests be used to demonstrate the feasibility of using substitute materials;

2. Results of analyses, trials and tests shall be included in the pre-plan. Certification of trials and tests shall be made by a laboratory approved by the director stating that:

(a) The proposed substitute material is equal to or more suitable for sustaining the vegetation than is the available topsoil;

(b) The substitute material is the best available material to support the vegetation; and

(c) The trials and tests were conducted using standard testing procedures, the results of which shall be included in the pre-plan.

f. Nutrients and Soil amendments shall be applied to the redistributed surface soil layer in accordance with Section 4F.06, 4F.07 and 4F.08a of the Surface Mining regulations.

E.03 Water Quality

a. Water Quality Control - All reasonable measures shall be taken to intercept all surface water by the use of diversions, culverts and drainage ditches or other methods to prevent water from entering the operational area. All water leaving the permit area will meet Federal and State water quality statutes, regulations, standards or effluent limitations. All surface drainage from the disturbed area must pass through a sediment pond or series of sediment ponds or other approved sediment or treatment control structures.

b. Effluent Limitations

1. Before grade release, discharge from the permit area must comply with the requirements of Section 6B.06a(2) and 7B.07a(2) of the Surface Mining regulations.

2. After grade release, assure that any leachate therefrom will not lower the water quality of the river, stream or drainway into which it is discharged.

c. Treatment Facilities - Adequate facilities shall be installed, operated, and maintained according to the approved pre-plan to treat any water discharged from the disturbed area so that it complies with all federal and state laws and regulations and the limitations of this section. Non-mechanical treatment systems may be utilized if flow is infrequent or small and timely and consistent treatment is assured.

d. Breakthrough

1. Any surface breakthrough of water caused by the operator during the course of his operations shall be sampled immediately and analyzed for total iron, total suspended solids and pH and if requested by the director, any other parameter characteristics of the discharge. Such analysis shall be made by a competent water analyst or chemist. The original and at least one copy of such analysis shall be retained by the operator, two copies shall be submitted to the chief of the division of reclamation.

2. Should said analysis indicate the water to be less than the applicable effluent limitations, seals shall be immediately constructed. These seals shall either:

(a) prevent any air from entering the underground mine by way of the breakthrough; or

(b) prevent any air from entering the breakthrough while allowing the water to flow from the breakthrough; or

(c) Seal the breakthrough of acid water so that it cannot flow. Such seals shall be constructed of stone, brick, block earth or impervious materials which are acid resistant.

3. Alternate methods of handling discharges from breakthroughs may be employed where it can be established that applicable effluent limitations can be met.

E.04 Drainage, Sediment Control and Haulageways - Shall be developed in accordance with Section 4A and Section 4B of the Surface Mining regulations.

E.05 Diversions and Spillways

a. All diversion and spillway construction must comply with Sections E.02a, E.04 and the following requirements:

1. Diversions and spillways shall be constructed according to the approved plans and specifications. Any changes and/or modifications must be approved by the director prior to implementation.

2. Diversion ditches shall be installed concurrently or after sediment structures are built and before other site preparation begins.

3. When downslope placement of fill material is used in the construction of diversion ditches, the fill material shall be compacted in layers to achieve the design configuration in accordance with the following requirements:

(a) All areas upon which the fill is to be placed shall first be progressively cleared of all trees, brush, shrubs, and other organic material. This material shall be removed from the fill area;

(b) Depositing and compacting the fill in layers shall begin at the toe of the fill. The layers shall be constructed approximately parallel with proposed finish grade. All material shall be deposited in uniform horizontal layers and compacted with haulage equipment.

(c) The thickness of the layers shall not exceed four feet.

4. Excess excavation material not needed to construct or maintain the spillway or diversion ditches must be properly disposed of in the permit area unless otherwise approved by the director.

5. If leakage or seepage occurs from the constructed diversion ditch, measures shall be taken to eliminate the seepage by sealing or other means.

6. All rip-rap material shall be of hard, durable rock which is not acid-forming or toxic-forming. Rip-rap shall be placed to prevent size segregation.

7. When bedding is used under rip-rap, the rock material shall be placed in a manner so as not to disturb or contaminate the bedding.

8. When protective channel linings are required, the linings shall be installed as soon as the ditch is constructed to grade.

9. When concrete is used in construction of spillways and diversion ditches, the concrete shall be placed and cured in accordance with AASHTO specifications. Standard engineering tests shall be performed to insure that the concrete meets the design specifications.

b. Maintenance

1. All spillways and diversions shall be maintained to operate according to the design plans and specifications.

2. Routine maintenance of diversion ditches and spillways shall be performed. Maintenance shall include removal of sediment, brush, trees, rocks and re-establishment of the structure to its original hydraulic design.

3. All failures resulting from landslides or slope failures which may have a potential adverse effect on public property, public health and safety, or the environment must be corrected immediately. Such failures must be reported immediately to the director.

4. Routine inspections shall be made by qualified persons of all hydraulic structures to insure proper operation. Special inspections shall be conducted whenever a significant storm flow through the structures has occurred.

5. All culvert pipes must be repaired or replaced when damaged, distorted, or otherwise fail to function property according to the approved design.

c. Certification - Each hydraulic structure shall be certified according to Section E.08d by an engineer. The certification shall affirm that the structure was constructed according to the approved plans and list any variations or discrepancies.

E.06 Acid Producing and Toxic Materials

a. Drainage from acid-forming and toxic-forming materials into ground and surface water shall be avoided by:

1. Identifying, burying, blending and/or treating where necessary, spoil or other materials that will be toxic to vegetation or that will adversely affect water quality. Such materials shall be handled in accordance with methods and a schedule as set forth in the approved preplan; and

2. Acid-forming or toxic-forming material shall not be buried or stored so as to cause or pose a threat of water pollution.

b. Treatment of Toxic Material - Any acid-forming, toxic-forming, combustible materials, or any other waste materials that are exposed, shall be provided with a minimum six inch cover of nontoxic and noncombustible material beneath the topsoil layer. If necessary, this material shall be treated to neutralize toxicity in order to prevent water pollution and sustained combustion and/or to minimize adverse effects on plant growth and land uses. Where necessary to protect against upward migration of salts, exposure by erosion, to provide an adequate depth for plant growth, or to otherwise meet local conditions, the director shall specify thicker amounts of cover using non-toxic material.

E.07 Water Monitoring Requirements - shall be in accordance with Sections 6B.04b, 6B.06, 7B.04b and 7B.07 of the Surface Mining regulations.

E.08 Site Development

a. Sediment control and diversion ditches shall be installed according to the approved plan before other site preparation or construction begins.

b. Progressive clearing and grubbing must be performed within the coal refuse disposal area, impoundment areas, topsoil borrow areas, and topsoil stockpile areas prior to construction unless otherwise approved by the director.

c. Embankment Construction

1. Foundation preparation to include keyways, installation of mine seals according to Section D.05g, subdrains, removal of soft areas, and similar site preparation operations dictated by the approved plan and site conditions shall be accomplished prior to the placement of coal refuse. Inspection of foundation preparation by the director is required before refuse may be placed.

2. Refuse materials shall be placed in accordance with the placement and compaction requirements in the approved plan for the particular site or minimum spreading and compaction requirements shall be a maximum of two foot horizontal lifts and 90 percent Standard Proctor Density (ASSHTO Specification T 99-74). It shall be unacceptable to place extraneous combustible materials such as wood, rags, trash and garbage, grease and oil, etc., in the coal refuse disposal area.

3. Grading

(a) The working surface and outslopes of a coal refuse fill shall be concurrently graded through all phases of embankment construction.

(b) Top of fill and benches shall be graded no flatter than two percent in any direction to divert surface runoff away from the face of the fill and into stabilized working surface diversion ditches.

(c) The top of the fill shall be graded in such a manner so as not to impound water unless specifically authorized by the director.

(d) Fill material shall be graded in such a controlled manner to allow surface and subsurface drainage to be compatible with natural surroundings and ensure a long term static factor of safety of 1.5.

(e) The face of the fill shall be graded no steeper than two horizontal to one vertical.

(f) The vertical difference between benches shall not exceed 50 feet.

(g) The width of the individual benches shall be not less than 20 feet unless specifically approved by the director.

(h) In all cases final grading shall be conducted in such a manner as to follow approved plans and to provide a surface for placement of topsoil.

(i) When erosion creates rills or gullies 9 inches deep, or if refuse materials are exposed in finished or topsoiled slopes, the rills and gullies shall be filled, graded or otherwise stabilized and the area reseeded or replanted according to Reclamation specifications. The director may require that rills and gullies of lesser size be stabilized and the area reseeded or replanted if the rills or gullies result in excessive erosion.

(j) Where water will be impounded against the upstream face, the face may be riprapped or otherwise stabilized to protect against damage due to wave action.

(k) Routine maintenance of the embankment shall be performed during the mining operation. Vegetative growth shall be cut when necessary to facilitate inspection and repairs. Any combustible material present on the surface other than material such as mulch or dry vegetation used for surface stability shall be removed and all other appropriate maintenance procedures shall be followed.

4. Stability - Determination of Unstable Conditions - Inspections shall be made by a qualified person for signs of unstable conditions. The qualified person shall consider steepness of slopes, seepage, bulges, scarps, vertical displacement, excessive erosion, piping, sudden changes in monitoring devices and other visible factors which could indicate potential failure of the embankment, diversion structures, spillways, and other appurtanences. Inspections shall include such observations and tests as may be necessary to evaluate imminent or significant environmental harm. These considerations shall be documented in accordance with Section E.08d. Inspection frequency will be in accordance with Section E.08d. If an imminent danger to human life, property or the environment is determined, persons downstream must be warned of the hazard and any necessary emergency actions taken. The director must be immediately notified according to Section E.08d 3(e).

5. Freeboard - Freeboard for the stage of construction or operation shall be maintained at all times in accordance with the design storm criteria and the approved plan.

d. Quality Control

1. Plans, specifications and all previous inspection reports shall be available at or near the mine office nearest to the site for reference by construction personnel and the director.

2. Until construction has been completed and certified, a visual inspection for construction progress, determination of unstable conditions, and hydraulic structure performance shall be held at a minimum of every seven days for impoundments and at least quarterly for non-impounding areas by a qualified person unless more frequent inspections are required by the director based on specific site conditions. Inspections shall be held after heavy rainfall events to determine problems and remedial measures. Piezometers and other monitoring devices shall be monitored at intervals not exceeding seven days by a qualified person. Other monitoring devices should be monitored at intervals as specified in the approved plan. Inspections may include such observations and tests as may be necessary to evaluate the potential hazard to human life and property, to insure that all organic

material and topsoil have been removed and that proper construction and maintenance are occurring in accordance with the approved plans and specifications. Inspections may terminate when the coal refuse disposal area has been properly abandoned in accordance with Section D.07, or at such a later time as the Director may require. A written record of all inspections and monitoring device readings shall be maintained at or near the mine office nearest the site for inspection.

3. Reporting Requirements

(a) A written report containing results of visual inspections of construction progress and determination of unstable conditions shall be submitted every thirty days for coal refuse structures if requested by the director. The report should include but not be limited to a summary of instrumentation data, testing data, freeboard, elevations, crest elevation, slurry elevation and specific construction problems. The underdrains and protective filters must be supported by color photographs.

(b) Plan and cross-section progress maps shall be submitted to the director if so ordered by the director.

(c) Certification of construction by an engineer on forms supplied by the director for each major portion of the construction sequence and each hydraulic structure shall be submitted as they are completed to the director. Upon completion of construction, and annually thereafter until the permit has final bond release, certification shall be provided by an engineer that the project is functioning as designed. The certification report shall include statements on:

(1) Existing and required monitoring procedures and instrumentation;

(2) The design depth and elevation of any impounded waters at the time of the initial certification report or the average and maximum depths and elevations of any impounded waters over the past year for the annual certification reports;

(3) Existing storage capacity of the dam or embankments;

(4) Any fires occurring in the construction material up to the date of the initial certification or over the past year for the annual certification reports; and

(5) Any other aspects of the dam or embankment affecting stability.

(d) Any change in construction sequence or other modification of the site must be reported to the director and any significant change must receive approval prior to implementation.

(e) Should a condition occur which is dangerous to human life, property or the environment, the director shall be informed immediately. Immediate action shall be taken by the person owning, operating, or controlling the structure to alleviate the hazard. Emergency procedures developed in accordance with Section D.05c shall be implemented to protect life and property downstream. The site shall be inspected and monitored at least once every eight hours until the emergency situation is alleviated. Continuous monitoring may be required by the director when there is an imminent danger to the health or safety of the public.

E.09 Materials Removal

a. Drainage control measures shall meet the requirements of Sections E.03, E.04 and E.05 (except Section E.02a). After grade release, discharges from the permit area shall not lower the water quality of receiving streams. Where existing roads are to be used for access or haulage and it can be demonstrated that reconstruction to meet the above requirements would result in greater environmental harm and the drainage and sediment control requirements of Section 4A of the Surface Mining regulations can otherwise be met, the requirements of Section 4A may be waived.

b. Method of Operation

1. Removal of refuse shall be accomplished in successive horizontal lifts with a maximum elevation difference between working benches of twelve feet or may be removed down a slope from the top to the toe provided that the slope is no steeper than 2H:1V. No refuse may be removed from the toe of the original embankment until the final removal process.

2. At all times during removal operations, care shall be exercised to protect the operating personnel, the public, and to insure long-term stability in accordance with the approved plan.

3. Where possible, final graded refuse slopes shall be no steeper than 2H:1V and at least one bench for every 50 feet of change in elevation shall be provided.

4. Should burning areas be encountered, the fires shall be extinguished in accordance with Section E.11, and removal of refuse shall be done in a safe manner.

5. The total disturbed area shall be regraded in such a manner as to be compatible with the natural surroundings and shall be revegetated in accordance with Section 4F of the Surface Mining regulations. Such regrading and revegetation shall occur as contemporaneously as practicable with removal operations and as reflected in the reclamation plan.

6. Regrading drainage control shall be provided in accordance with the approved reclamation plan.

E.10 Underground Coal Refuse Disposal - Coal refuse may be returned to underground mine workings only in accordance with an approved disposal plan in accordance with Section D.05i. Inspections shall be conducted by the operator to detect potential breakthroughs into active mine workings or breakouts on the surface at likely areas where breakout could occur. Breakouts, or potential breakouts, shall be immediately reported to the director and immediate action shall be taken to eliminate the hazard and protect persons living or working below the breakout.

E.11 Burning Refuse Piles - All coal refuse fires shall be extinguished. Extreme caution must be taken in all attempts to extinguish burning areas to insure that hazards are minimized to equipment operators and other persons working or living in the vicinity of the site. A plan for extinguishing coal refuse fires must be approved by the director and the Mine Safety and Health Administration. Only those persons authorized by the operator, and who have an understanding of the procedure to be used, shall be involved in the extinguishing operation.