

**WEST VIRGINIA
SECRETARY OF STATE
JOE MANCHIN, III
ADMINISTRATIVE LAW DIVISION**

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Form #6

OFFICE WEST VIRGINIA
SECRETARY OF STATE

**NOTICE OF FINAL FILING AND ADOPTION OF A LEGISLATIVE RULE AUTHORIZED
BY THE WEST VIRGINIA LEGISLATURE**

AGENCY: Department of Environmental Protection TITLE NUMBER: 38

AMENDMENT TO AN EXISTING RULE: YES NO

IF YES, SERIES NUMBER OF RULE BEING AMENDED: 4

TITLE OF RULE BEING AMENDED: Coal Dam Safety Rule

IF NO, SERIES NUMBER OF RULE BEING PROPOSED: _____


TITLE OF RULE BEING PROPOSED: _____

THE ABOVE RULE HAS BEEN AUTHORIZED BY THE WEST VIRGINIA LEGISLATURE.

AUTHORIZATION IS CITED IN (house or senate bill number) HB 2603

SECTION §64-3-1(j), PASSED ON March 6, 2003

THIS RULE IS FILED WITH THE SECRETARY OF STATE. THIS RULE BECOMES EFFECTIVE ON THE
FOLLOWING DATE: June 1, 2003


Authorized Signature

TITLE 38
ADMINISTRATIVE RULES
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF MINING AND RECLAMATION

SERIES 4
COAL RELATED DAM SAFETY RULES

§38-4-1. General.

1.1. Scope. -- These rules establish general and specific rules for design, placement, construction, enlargement, repair, removal, or abandonment of dams in this State that are also regulated under West Virginia Surface Mining Reclamation Control Act 22-3 and West Virginia Surface Mining Reclamation Rules 38 CSR-2 by the Department of Environmental Protection, Division of Mining and Reclamation.

1.2. Authority - These rules are issued under the authority of Article 14, Chapter 22, Code of West Virginia.

1.3. Filing Date –

1.4. Effective Date – June 1, 2003

§38-4-2. Definitions.

2.1. "Abandonment" means to render a dam non-impounding by eliminating the reservoir created by that dam and by re-establishing the natural drainage around or through that site.

2.2. "Appurtenances" means any ancillary part of a dam or reservoir system which contributes to the operation and construction of the dam.

2.3. "Breach" means partial removal of a dam, creating a channel through the dam.

2.4. "Bridge" means a structure, including any abutments or supports appurtenant to that structure, which:

2.4.a. meets the definition of "dam" set forth in Section 2.7 of these rules;

2.4.b. is constructed across a natural drain way for the purpose of maintaining a pathway, railway, roadway support structure, or other static or moving loads; and

2.4.c. has an opening under the structure to provide for the passage of normal stream flow.

2.5. "Certificate of Approval" means the approval in writing issued by the Secretary to an applicant who has applied for certification authorizing such person to place, construct, enlarge, alter, remove, abandon or repair a dam and which specifies the conditions or limitations under such work is to be performed by the applicant. Such an approval shall also be required whenever there is a change in ownership or control of dam whether such a dam is active or inactive or being abandoned.

2.6. "Channel Protection" means any measure to prevent or control erosion, cavitation, or other destructive processes in channels such as diversion ditches and spillways.

2.7. "Dam" means an artificial barrier or obstruction including works appurtenant to it and be placed, constructed, enlarged, altered or repaired so that it does or will impound or divert water and is or will be twenty-five (25) feet or more in height from the natural bed of a stream or watercourse measured at the downstream toe of the barrier and which does or can impound fifteen (15) acre-feet or more of water or is or will be six (6) feet or more in height from the natural bed of such stream or watercourse measured at the downstream toe of the barrier and which does or can impound fifty (50) acre-feet or more of water.

2.8. "Dangerous Condition" means any structural or hydraulic condition of a dam or its appurtenances which may lead to:

2.8.a. Failure of the dam and possible loss of human life or substantial loss of property;

2.8.b. Harm to the public health or welfare, or

2.8.c. Significant harm to the environment.

2.9. "Design Storm" means predicted precipitation of given intensity, frequency, and duration based upon national weather service data that is required to be considered in the design of a dam.

2.10. "Diversion Ditch" means a designed channel constructed for the purpose of collecting and transmitting surface runoff resulting from a given design storm.

2.11. "Embankment" means a man made deposit of earth or waste materials, usually exhibiting at least one sloping face, that is raised above the natural surface of the land.

2.12. "Embankment Stability" means the degree of safety relative to structural failure of the embankment.

2.13. "Emergency Condition" means an imminently dangerous condition where failure of the dam is possible at any time.

2.14. "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.

2.15. "Engineer" or "Registered Professional Engineer" means a person who by reason of his knowledge of mathematics, the physical sciences, and the principles of engineering, acquired by professional education and practical experience, is qualified to engage in the practice of professional engineering and holds a current certificate of registration issued by the State granting its licensee the privilege of practicing professional engineering in accordance with the provisions of WV Code 30-13.

2.16. "Foundation" means soil, bedrock or other earth material on or against which an embankment or other structure is placed.

2.17. "Freeboard" means the vertical distance between the lowest point of the crest of the embankment and the reservoir water surface.

2.18. "Geotechnical Engineering" means the application of soil mechanics, rock mechanics, and geology to the solution of problems involving engineering structures and their interaction with surrounding earth materials.

2.19. "Hazard Classification" means a classification rating assigned to a structure based upon engineering evaluation and judgment predicting the potential damage to human life, property and environment should a failure to the structure occur.

2.20. "Hydraulics" means the study of the physical behavior of liquids, especially water, in natural or man-made systems or process.

2.21. "Hydrologic Analysis" means a determination, using accepted engineering methods, to establish surface water runoff for a given design storm.

2.22. "Hydrology" means the science that deals with the occurrence and behavior of water in the atmosphere, on the ground, and underground.

2.23. "Impoundment" means a basin constructed for the retention of water, sediment, slurry or other liquid or semi-liquid material.

2.24. "Incised Reservoir" means an impoundment, or that portion of an impoundment, which has been excavated below the natural stream level into natural ground.

2.25. "Natural Bed" means the lowest elevation of stream, intermittent stream, or channel created by nature which has not been altered or change by the actions of man.

2.26. "Natural Drain Way" means any natural watercourse which may carry water to the tributaries and rivers of the watershed.

2.27. "P100" means the rainfall amount based upon a one hundred (100) year frequency, twenty-four (24) hour duration rainfall event (i.e., a 100-year, 24 hour storm).

2.28. "Peak Runoff" means the maximum flow in a specified geographic location resulting from a given design storm.

2.29. "Piping" means progressive internal erosion of earth material or adjacent unaltered material caused by water movement through embankment material with sufficient force to move soil particles, leading to the development of a channel or a hole.

2.30. "Pore Pressures" means water pressures generated in foundation soils or embankments due to compression by loads imposed by construction of an embankment or other structures.

2.31. "Primary Highway" means those roadways which are designated as interstate routes, United States numbered routes, or West Virginia numbered routes.

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

2.33. "Probable Maximum Precipitation" or "PMP" means the depth-duration-area rainfall event for a particular area that represents the maximum of the most critical meteorological conditions that are considered possible to occur.

2.34. "Project Area" means all areas physically affected by the construction of a dam including, but not limited to, the dam and its appurtenances, the reservoir area, construction zones, permanent or temporary access roads, borrow areas, materials storage areas staging areas, and waste disposal areas.

2.35. "Road Fill" means a barrier or obstruction which:

2.35.a. Meets the definition of "dam" set forth in Section 2.7 of these rules.

2.35.b. Is constructed across a natural drain way for the purpose of maintaining a roadway or similar crossing across that drain way; and

2.35.c. Has a culvert located in the drain way that is of sufficient size to prevent the normal impoundment of water.

2.36. "Safety Factor" or "Factor of Safety" means the ratio of the sum of the forces or moments resisting mass movement to the sum of the forces or moments tending to produce mass movement.

2.37. "Secretary" means the Secretary of the Department of Environmental Protection or his authorized representative.

2.38. "Sediment" means solid material that is either in suspension, is being transported, or has been moved from its site of origin and has come to rest on the earth's surface.

2.39. "Serious Problem" means a situation which left uncorrected may lead to a dangerous condition.

2.40. "Significant Harm to the Environment" means the degradation of public or private source water supply, the alteration of habitat that adversely affects wildlife, or the reduction of productivity of agricultural land.

2.41. "Site" means the location of a dam, including the dam and its appurtenances, the reservoir area, diversion ditches, and sediment control facilities.

2.42. "Slope Protection" means measures taken to control erosion on slopes.

2.43. "Slope Stability" means the relative degree of safety from the development of a landslide in a slope, as defined by one or more standard engineering methods of analysis.

2.44. "Stabilization" means to control movement of soil, spoil piles or areas of disturbed earth.

2.45. "Strength Parameters" mean those engineering values obtained from standard engineering shear strength tests of soil or soil like material.

2.46. "Subsidence" means sinking, collapsing, or cracking of a portion of the earth's surface resulting from the presence of a void or voids beneath the surface.

2.47. "Transfer or Sale of Rights" means a change in ownership pursuant to 38CSR2-2.131. of the WV Surface Mining Reclamation Rules or other effective control over the right granted in a approval

2.48. "Zone of Saturation" means the zone below the piezometric surface in which all voids are filled with groundwater.

§38-4-3. Classification of Dams.

3.1. Types of Dams

3.1.a. Embankment dams are usually constructed of material which exhibits rock-like or soil-like properties.

3.1.b. Coal waste disposal dams are usually constructed of coal refuse and are utilized for impoundment of coal slurry from coal preparation plants.

3.1.c. Road Fills: If the secretary finds that a road fill has become a hazard to human life or property through the frequent or continuous impoundment of water, he or she may order the owner of that road fill to take all steps that are necessary to protect life or property in accordance with the emergency powers provided under W. Va. Code 22-14-10.

3.1.c.1. A certificate of approval will not be required for road fills.

3.1.d. Bridges: If the secretary finds that a bridge has become a hazard to human life or property through the frequent or continuous impoundment of water, he or she may order the owner of that bridge to take all steps that are necessary to protect life or property in accordance with the emergency powers provided under W. Va. Code 22-14.10.

3.1.d.1. A certificate of approval will not be required for bridges.

3.1.e. Stream Encroachments: If the owner proposes to restrict a natural drain way by filling or by other artificial means such that restriction can or will impound water, and the fill and resulting reservoir will meet the height and storage requirements of a 'dam' as defined in these rules, the owner is responsible for obtaining a certificate of approval prior to its placement.

3.2. Dam Related Measurements

3.2.a. Dam Height: The height of a dam is measured from the crest or uppermost point on the dam to the lowest point in the natural bed of the stream or watercourse at the downstream toe of the dam.

3.2.b. Measuring Reservoir Volume: For purposes of determining whether a dam meets the criteria set forth in section 2.7 of these rules as applied to reservoir volume calculations, the volume must be calculated at the crest elevation of the dam.

3.2.c. Incised Reservoirs: The height of embankment of an incised reservoir must be measured from the crest of or uppermost point on the dam to the lowest point in the natural bed of the stream or watercourse at the downstream toe or the dam. Reservoir volume must be calculated from the crest of the embankment to the elevation of the lowest point in the natural bed of the stream or watercourse at the downstream toe.

3.3. Dams in Series: If the Secretary determines that a series or combination of water-impounding structures within the same watercourse or within the tributaries of such watercourse, which cumulatively meet the definition of "dam" set forth in section 2.7 of these rules constitute a hazard to human life, and failure of one or more of the impounding structures may induce failure of any or all of the remaining impounding structures, the Secretary may require the owner or owners of each impounding structure to comply with the requirements of these rules.

3.4. Hazard Classification of Dams: The applicant for a certificate of approval must propose the hazard classification based upon classification guidelines listed in Section 3.4.b of these rules and the hazard evaluation performed pursuant to this Section of these rules. The classification proposed by an applicant is subject to approval by the Secretary.

3.4.a. Changes in Dam Classification: The Secretary will periodically review the hazard classification of each dam subject to these rules and may reclassify a dam if the determines that the hazard potential has changed. The owner shall be notified by the Department of any hazard classification change.

3.4.b. Hazard Classifications

3.4.b.1. Class A Dams: Class A dams are those dams located in rural or agricultural areas where failure may damage non-residential and normally unoccupied buildings, rural or agricultural land, or secondary highways. Failure of Class A dam would cause only a loss of the dam itself and a loss of property use, such as use of related roads, with little additional damage to adjacent property. Any impoundment exceeding twenty-five (25) feet in height measured at the downstream toe or two hundred (200) acre-feet storage volume or having a watershed exceeding five hundred (500) acres should not be class A dam.

3.4.b.2. Class B Dams: Class B dams are those dams located in predominantly rural or agricultural areas where failure may damage isolated homes, primary highways, or minor railroads or may cause the interruption of public utility services. Failure of a Class B dam may cause great damage to property and project operations. Loss of human life resulting from failure of a class B dam must be unlikely.

3.4.b.3. Class C Dams: Class C dams are those dams located where failure may cause a loss of human life or serious damage to homes, industrial and commercial buildings, important public utilities, primary highways or main haul roads. This classification must be used if failure would cause possible loss of human life.

3.4.c. Assessment of Hazards and Consequences of Failure. All new Applications and expansions to existing impoundments must submit a complete Assessment of Hazards and Consequences of Failure (AHCF) in narrative form, certified by a Registered Professional Engineer (RPE), that addresses potential risk and impacts resulting from failure that could occur from the construction and/or operation of the facility and addresses the following:

3.4.c.1. Downstream Hazard: In evaluating the hazard potential of a dam in order to determine its hazard classification, a complete evaluation of the downstream area which will be affected in the event of dam failure must be performed. A sudden flooding of inhabited land, a water flow with damaging velocity, a wall of water, or the flooding of inhabited structures will all be deemed to have the potential to result in a loss of human life. The planned or potential future development of downstream areas must also be considered when evaluating hazard classification.

3.4.c.2. Dam Break Analysis: A downstream breach analysis must be performed to evaluate and map the downstream inundation area under assumed normal conditions and

overtopping failure conditions. The Secretary may waive the downstream breach analysis for class A or class B dam where downstream conditions prevent any future introduction of new facilities or residences that thereby change the hazard classification of the dam.

3.4.c.3. Risk Assessment: The Secretary may consider a risk assessment for justifying a reduced structure hazard classification based upon failure of the dam by overtopping. The applicant for a certificate of approval must demonstrate through appropriate calculations that all affected dwellings will be inundated and evacuated prior to the dam failure and that property damage and potential loss of human life resulting from the dam failure will not be significantly increased from that which occurred immediately prior to the dam failure.

3.4.c.4. Emergency Planning: For a class C high hazard 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 approved.

§38-4-4. Certificate of Approval.

4.1. Certificate Required: The owner must obtain a certificate of approval from the Secretary in order to place, construct, enlarge, alter, breach, remove, abandon, perform major repairs upon any dam that falls within the definition set forth in Section 2.7 of these rules. A certificate of approval shall be required on sale or transfer of a dam by the owner of the dam to the new owner.

4.2. Certificate of Approval Issuance.

4.2.a. Certificate of approval may constitute full and final approval of a dam or be issued for alterations or repairs, in which case such certificate may or may not constitute final approval of the dam.

4.2.b. The Secretary may issue or deny issuance of a certificate of approval based upon the following:

4.2.b.1. The receipt of a complete application, including all applicable fees, in accordance with provisions of Section 5.1 of these rules;

4.2.b.2. The review of the application form and plan package for sufficiency; and

4.2.c.3. The results of any hearing held in accordance with provisions of WV Code 22-14-7.

4.2.c. Defective applications will be returned to the applicant in order that the applicant may correct any deficiencies. The applicant must send a corrected application to the Secretary within thirty (30) days of the date of the applicant's receipt of the returned application. The Secretary may extend the thirty-day period upon the receipt of a written request from the applicant.

4.2.d. Upon receipt of written approval from the Secretary of the sufficiency of the application, the applicant shall immediately publish a Class 1 legal advertisement in a qualified newspaper, as defined in WV Code 59-3-1, serving the county in which the proposed dam is to be located or in which the existing dam is located. Such notice shall include the name and address of the applicant the location of the dam for which the application was filed, and such other information as may be specified by the Secretary in his written approval.

4.3. Hearings prior to issuance of Certificate of Approval: Any person, as defined in WV Code 22-14-3, whose life or property may be adversely affected by the issuance of a certificate of approval shall have a right to a hearing before the Secretary. A written request for a public hearing, detailing the specific objections to the issuance of the Certificate of Approval, must be sent to the Secretary within

fifteen (15) days of the publication of Class 1 legal advertisement required section 4.2.d of these rules. Hearings that concern specific objections of the issuance of a certificate of approval will be conducted in accordance with the provisions of WV Code 22-14-7 at a location and time set by the Secretary.

4.4. Certificate Revocation or Suspension: The Secretary may revoke or suspend a certificate of approval in accordance with the provision of WV Code 22-14-8 if he determines that a dam for which such certificate was issued constitutes a danger to life and property.

4.5. Certificate Terms and Conditions: A certificate of approval may include such terms and conditions as the Secretary may find necessary for the construction or operation of the dam. These terms and conditions may be amended by the Secretary in accordance with the provisions of WV Code 22-14-8.

4.6. Approval to Impound Water: No person may cause a reservoir to initially fill with water or slurry, or refill a drained reservoir, without written approval from the Secretary.

4.6.a. Upon receipt of a written request from a dam owner, the Secretary may waive or modify the refilling approval requirement in a case where frequent draining and refilling of a reservoir is the intended purpose and normal operation of the owner's dam.

4.7. Other Approvals: The Secretary may refuse to issue a certificate of approval or may delay issuing a certificate of approval if the applicant fails to obtain other necessary approvals from state or federal agencies.

4.7.a. Waterways Under State or Federal Jurisdiction: Construction of a dam across a waterway which is under the jurisdiction of the state or federal government may require a state or federal agency approval prior to issuance of a certificate of approval by the Secretary.

§38-4-5. Application Procedures.

5.1. Application Preparation and Submission.

5.1.a. Applications for a certificate of approval will be prepared by or under the direct supervision of an engineer.

5.1.b. Application for certificate of approval shall be submitted in a form prescribed by the Secretary. The application shall be signed by the applicant and an engineer.

5.1.c. A complete application will consist of a completed and signed application form, applicable fees, design report and a plan package containing information required under Section 6.4 of these rules.

5.1.d. Plans, design report, specifications and design drawings shall be signed and sealed by an engineer in accordance with the provisions of Section 6.2 of these rules.

5.2. Application Review

5.2.a. Application of certificate of approval will be reviewed for completeness and technical accuracy of information submitted, an evaluation of all engineering plans and assumptions to determine the safety of the dam and the impoundment.

5.2.b. Applications which are incomplete or otherwise not in compliance with the requirements of these rules will be returned to the applicant for correction in accordance with the provisions of WV Code 22-14-7.

§38-4-6. Plans and Specifications.

6.1. Plans and Specifications: Plans and specifications relating to the design, placement, construction, enlargement, alteration, removal, abandonment, or repair of a dam must be prepared in accordance with the requirements of Section 6 through 12 of these rules.

6.2. Engineers' Signature and Seal: All plans and specifications shall be signed and sealed by an engineer, the engineers' signature and seal are required on each plan sheet and front page of engineering report.

6.3. Standard Practices: All engineering designs, procedure processes, and analysis shall be based upon standard accepted, and sound engineering practices. Practices which are questionable or difficult to prove analytically may be rejected by the Secretary or returned for additional information.

6.4. Plan Package: Each plan package submitted for approval shall contain the following information, arranged in the following order:

6.4.a. Project Narrative: A general narrative discussion of the project shall be included in the plan package and detail the following:

- 6.4.a.1. Existing site conditions;
- 6.4.a.2. Local geology and geotechnical considerations;
- 6.4.a.3. Design life of dam and its appurtenances;
- 6.4.a.4. Subsidence potential;
- 6.4.a.5. Design techniques with associated design computations and data;
- 6.4.a.6. Environmental protection measures for the control of erosion and sedimentation and for the disposal of construction wastes;
- 6.4.a.7. Method of construction, including clearing and grubbing, topsoil stockpiles, surface and subsurface drainage structures;
- 6.4.a.8. Phases of construction, and
- 6.4.a.9. Routine inspection and maintenance procedures and schedules.

6.4.b. Construction Sequence and Schedule: A proposed or recommended sequence of construction, with a schedule listing the completion date for each milestone, shall be included in the plan package to cover the following general categories:

- 6.4.b.1. Sediment control measures;
- 6.4.b.2. Clearing and grubbing;
- 6.4.b.3. Road or utility relocations;
- 6.4.b.4. Development of borrow areas;
- 6.4.b.5. Placement of coffer dams or diversions;
- 6.4.b.6. Excavation of foundation areas;
- 6.4.b.7. Excavation of spillways;
- 6.4.b.8. Placement of embankment or structural materials;
- 6.4.b.9. Placement of spillways and appurtenances to spillways;
- 6.4.b.10. Seeding and mulching;
- 6.4.b.11. General cleanup;
- 6.4.b.12. Abandonment;
- 6.4.b.13. Other information requested by the Secretary.

6.4.c. Project Specifications: Specifications shall be included in the plan package to detail the following:

- 6.4.c.1. Clearing and grubbing;
- 6.4.c.2. Soil stockpiles;
- 6.4.c.3. Sub drain construction;

6.4.c.4. Slopes;

6.4.c.5. Grades;

6.4.c.6. Surface drainage structures;

6.4.c.7. Spreading and compaction requirements including lift thickness, compaction density testing, moisture content;

6.4.c.8. Material and gradation requirements for sub-surface drainage structures;

6.4.c.9. Pipe quality, pipe installation and pressure testing requirements;

6.4.c.10. Concrete including testing and curing;

6.4.c.11. Anti-seep mechanisms or graded filter;

6.4.c.12. Cut-off trenches;

6.4.c.13. Channel and slope protection;

6.4.c.14. Project quality control including inspection frequency, certification and reporting requirements;

6.4.c.15. Blasting;

6.4.c.16. Construction erosion and sediment control;

6.4.c.17. Construction waste disposal;

6.4.c.18. Dust abatement;

6.4.c.19. Revegetation including soil amendment;

6.4.c.20. Installation and instrument monitoring;

6.4.c.21. Maintenance;

6.4.c.22. Abandonment;

6.4.c.23. Other information requested by the Secretary.

6.4.d. Maps and Drawings:

6.4.d.1. Maps shall be included in the plan package showing the project area in relation to primary highways, county routes, and major drainages. County highways maps may be used for the purpose.

6.4.d.2. A map showing the limits of the watershed with respect to the project area shall be included in the plan package. The minimum map scale meeting this requirement is a 7-½ minute United States Geological Survey Topographic map with project area plotted in it.

6.4.d.3. A plan view of the project area that shows all disturbed and reservoir areas shall be included in the plan package showing detailed contour intervals (i.e., five foot maximum interval).

6.4.d.3.A. The location of following items, if present shall be plotted on the plan view map:

- 6.4.d.3.A.1. Caves;
- 6.4.d.3.A.2. Cemeteries and graves;
- 6.4.d.3.A.3. Seeps;
- 6.4.d.3.A.4. Springs;
- 6.4.d.3.A.5. Underground mine openings;
- 6.4.d.3.A.6. Mine drainage;
- 6.4.d.3.A.7. Underground mine workings;
- 6.4.d.3.A.8. Cross-sections borings and test pits;

6.4.d.3.A.9. Reference points and permanent stations;

6.4.d.3.A.10. Instrumentation such as piezometers, settlement markers and slope indicators;

6.4.d.3.A.11. Diversion channels;

6.4.d.3.A.12. Subdrain system;

6.4.d.3.A.13. Surface water drainage channels;

6.4.d.3.A.14. Borrow areas;

6.4.d.3.A.15. Waste disposal areas;

6.4.d.3.A.16. Plan views of each stage of construction of dam and corresponding profiles indicating minimum factor to safety;

6.4.d.3.A.17. Plan views of spillways and appurtenances and corresponding profiles;

6.4.d.3.A.18. Transverse and longitudinal cross-sections and profiles of dam shall be included in the plan package showing original ground, sub drain locations, elevations, benches, spillways. Cross-sections at critical locations in the facility shall be provided showing the materials profile, location of critical potential failure surfaces and their factor of safety, estimated or measured phreatic surfaces for construction and/or long term seepage conditions, and a tabulated listing of strength parameters used for stability analysis;

6.4.d.3.A.19. Cross-sections and profiles of major drainage facilities shall be included in the plan package;

6.4.d.3.A.20. Construction drawings shall be included in the plan package showing sub-drains, spillways, anti-seep mechanisms, and other pertinent structures.

§38-4-7. Design Requirements.

7.1. General Hydrologic Requirements

7.1.a. Hydrologic Investigation: A survey shall be conducted to evaluate soil types, land use, and slope watershed area, runoff curve number, and any of the factors needed to establish watershed characteristics. A summary of all hydrologic and hydraulic data compiled in the initial site investigation and used in the analysis shall be included in table or figure form in the plan package.

7.1.b. A stream flow analysis shall be conducted to evaluate stream flow quantity and quality as it affects the dam and its appurtenances.

7.1.c. Design Storm Requirements:

7.1.c.1. All dams shall be designed to meet the following minimum hydrological criteria based upon hazard classification:

7.1.c.1.A. Class A impoundments shall be designed for a minimum of $P 100 + 0.12$ (PMP-P 100) inches of rainfall in six (6) hours.

7.1.c.1.B. Class B impoundments shall be designed for a minimum of $P 100 + 0.40$ (PMP-P 100) inches of rainfall in six (6) hours.

7.1.c.1.C. Class C impoundment shall be designed for a probable maximum precipitation (PMP) of a six (6) hour or greater event plus three feet of freeboard.

7.1.d. Antecedent Moisture Conditions: Where applicable to the development of a hydrograph, antecedent moisture condition II

(AMC II) may be used unless a different condition class is required by the Secretary.

7.1.e. Flood Routings: An analysis shall be performed for the reservoir and spillways which includes inflow hydrographs, stage storage curves, stage discharge curves, and routings. The spillways must be able to safely discharge that portion of the design storm that is not stored in the reservoir. If a computer analysis is used, the input data and output results must be clearly labeled and identified. Trial calculations or intermediate results not relevant to the final results may be omitted from the plan package.

7.1.f. Specific Flood Routing and Storage Requirements:

7.1.f.1. Class A dams must be designed with an open channel spillway unless otherwise (90) percent of the stored portion of the design storm must be discharged or removed within ten (10) days after the storm event.

7.1.f.2. Class B dams must be designed with either an open channel spillway only, or with an emergency spillway and a principal spillway together. Ninety (90) percent of the stored portion of the design storm shall be discharged or removed within ten (10) days after the storm event.

7.1.f.3. Class C dams may be designed in one of three ways:

7.1.f.3.A. An impoundment designed without discharge structures shall be capable of storing a minimum of two (2) six (6) hour duration probable maximum storms. A system shall be designed to dewater the impoundment of the probable maximum storm in ten (10) days by pumping or by other means. The requirements of 25.14 shall also be met. For existing structures exceeding the minimum 2 PMP volume requirement, the dewatering system shall be installed when the containment volume is reduced to 2 PMPs.

7.1.f.3.B. An impoundment designed with a decant or principal spillway only shall be capable of storing at least one (1) six (6) hour duration probable maximum storm. Ninety (90) percent of the stored shall be discharged or removed within ten (10) days after the storm event.

7.1.f.3.C. 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 (6) hour duration probable maximum storm that cannot be safely stored in the impoundment. Ninety (90) percent of the stored portion of the storm shall be discharged or removed within ten (10) days after the storm event.

7.1.g. Surface Drainage Control: Surface drainage control devices (e.g., vegetated slopes, benches, groin ditches, and collection channels) shall be provided as necessary to protect the dam and its appurtenances from the effects of erosion. Riprap or other erosion protection measures shall be included where excessive velocity is anticipated or experienced. All surface drainage control devices must be designed to exit safely beyond the downstream toe of the embankment in a natural drain way and be capable of carrying the design flow without excessive erosion. Any open channel spillway designed for less than one hundred (100) percent probable maximum precipitation shall be provided with freeboard above the maximum water surface as determined by the equation $1 + 0.025 vd^{1/3}$.

7.1.h. Hydraulic Considerations: Using standard engineering practices, a hydraulic analysis shall be performed for the spillways and surface drainage system. Typical cross section design techniques may be used where constant shapes are encountered. All hydraulic structures shall be designed to safely control the velocity of water in order to prevent excessive erosion. Accepted engineering practices shall be used to design riprap, non-

flexible channel linings, bedding, and energy dissipaters.

7.1.h.1. Specific Hydraulic Requirements: Open channels, including open channel spillways, shall be analyzed for flow depth, velocity, non-uniform flow conditions, super-elevation, and hydraulic jumps.

7.1.h.1.A. Stage Discharge: Where an open channel is used as a spillway, a stage discharge rating shall be developed using standard engineering practices for the type and shape of the spillway. In developing the rating, increase in upstream water depth due to change in velocity head must be considered.

7.1.h.1.B. Water Surface Profiles: Where channel slopes or cross-sections vary and non-uniform flow conditions result, a water surface profile may be necessary in order to analyze the channel flow depths and the location of hydraulic jumps.

7.1.h.1.C. Hydraulic Jumps: Where hydraulic jumps will occur, channel sidewall height shall be sufficient to contain the jump. The channel lining shall be designed to withstand the hydraulic jump without damage.

7.1.h.1.D. Critical Flows: Channels shall be designed so that water will not flow at critical depth for extended distances. In channels of varying slope or cross-sections where non-uniform flow occurs, the transition through critical flow shall be as rapid as possible.

7.1.h.1.E. Super Elevation: Channel walls shall be designed to contain super elevated flows on curves.

7.1.i. Closed Conduit Systems: Closed Conduit Systems including principal spillways, risers and pipes shall be analyzed to determine the controlling limits for weir, orifice, and pipe flows.

7.1.j. Risers and Drop Inlets: Risers shall be protected with a designed trash rack and anti-vortex device. The drop inlet shall be sized to provide a rapid transition from partial to full pipe flow conditions.

7.1.k. Stage Discharge: When a closed conduit system is used as a principal system, a stage discharge rating shall be developed using standard engineering practices for weir, orifice, and pipe flow conditions.

7.1.l. An adequate foundation and bedding shall be designed for all pipes and risers.

7.1.m. All pipe spillways shall be designed to provide seepage control along the conduit.

7.1.n. Use of Corrugated Metal Pipes - Corrugated metal pipes, whether coated or uncoated, shall not be used in new or unconstructed refuse impoundments or slurry cells. If an existing corrugated metal pipe has developed leaks or otherwise deteriorated so as to cause the pipe to not function properly and such deterioration constitutes a hazard to the proper operation of the impoundment, the Secretary will require the corrugated metal pipe to be either repaired or replaced. Provided, however, sediment control or other water retention structures used for the treatment of effluent and designated as Class A Dams under 3.4.b of this rule are exempt from this prohibition.

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

7.1.p. The pipe spillway shall be of suitable material to resist deterioration for the design life of the facility.

7.1.q. The pipe spillway must be designed to avoid formation of alternating partial and full pipe flow conditions through

proper selection of pipe slope and headwater or tail water conditions.

7.1.r. The outlet of all conduits where blockage by animals can occur must be protected by an animal guide.

7.1.s. Landslide Potential: When locating all hydraulic structures the potential for landslides or slope failures as determined in the initial site investigation shall be evaluated according to Section 10.6.

§38-4-8. Subsidence Evaluation.

8.1. A subsidence evaluation of the site and the dam and its storage area will be required considering past and proposed mining. No dams shall be constructed over underground workings or other voids unless those underground workings or other voids have been stabilized or it has been demonstrated that the coal pillars, roofs and floor are strong enough to withstand the superincumbent weight of the strata above the workings or are otherwise capable of preventing significant subsidence impacts in accordance with 8.2 and 8.3 of this rule.

8.2. No plan shall be approved unless there is a minimum safe cover to be determined by the Secretary, based on test holes drilled by the applicant in a manner to be prescribed by the Secretary. Such permits shall require in accordance with a plan to be approved by the Secretary, a safety zone be established beneath and adjacent to the impoundment storage area.

8.2.a. Basin. There shall be no underground mining in a safety zone that extends horizontally 200 feet from the high water mark of an impoundment and vertically to a depth that provides for a minimum thickness of 100 feet of solid strata between the bottom of the pool and any mining. The presence of any mine workings within this safety zone is prohibited unless the potential subsidence effects are mitigated by injection grouting or otherwise filling the mine related voids completely.

Alternately, such risk can be mitigated by providing a combination of constructed barriers and grouting to establish equivalent distances that will comply with the safety zone dimensions. Coal extraction of 80 percent or more is prohibited unless at a depth greater than 60 times the coal extraction thickness or at a depth where the maximum tensile strain at original ground is less than 5.0 mm/m (0.5%), whichever is greater. The Secretary may impose other limitations as specified by BM IC 8741, barrier analysis, other pertinent analysis or due to conditions such as fracturing, which may require a larger safety zone or further limitations in coal extraction.

8.2.b. Embankment. There shall be no mining in a safety zone under the structural embankment measured outward 200 feet in all directions, downward 350 feet and then outward at a dip of 65° from the horizontal, unless acceptable pillar stability and/or strain effects are confirmed by a design evaluation to be certified by an RPE. Also, the related AHCF must clearly demonstrate that the facility will have a low risk of impact to the public and the environment. Existing mine workings within this safety zone having the potential to cause significant subsidence impacts are prohibited unless those effects are mitigated by grouting, filling the mine related voids or providing comparable protection. Additional underground mining may be subsequently approved in the embankment safety zone only if a design evaluation, certified by an RPE, demonstrates that no significant impacts from subsidence can result.

8.2.c. Existing Impoundments. Existing impoundments that currently have mining within the safety zones must be evaluated in accordance with this section and 3.4.c. of this rule. Remedial measures shall be implemented as necessary to eliminate or reduce the potential impact on the public and/or the environment. Remedial measures may include, but are not limited to, constructed barriers, grouting of underground works and back stowing of mines.

8.3 . Safety Factor Applicable to new, revised, and existing impoundment facilities a detailed engineering design evaluation of the embankment and impoundment basin areas shall be conducted to assure protection of the environment and public. The engineering design analysis shall demonstrate that appropriate safety factors exist. Major design considerations of this engineering analysis are embankment stability, pillar design, outcrop barrier design, and any other design aspects as necessary to manage risk. The adequacy of calculated safety factors should be determined by applying appropriate regulatory standards. For design applications where regulatory standards do not exist, the AHCF should be the basis used to derive acceptable safety factors.

§38-4-9. Breakthrough Potential Evaluation.

9.1. Where there has been underground mining in the vicinity of the dam and impoundment storage areas, a breakthrough potential evaluation of the impoundment into underground workings shall be required.

9.2. No application for certificate of approval for a dam will be approved unless the applicant has provided a design to prevent a breakthrough to above and below drainage underground mine workings. All barriers and mine seals shall be designed and constructed to withstand maximum hydraulic head of water that is likely to be developed as a result of breakthrough. All auger holes shall be stowed or plugged to prevent breakthrough to adjoining underground workings.

§38-4-10. Geotechnical Considerations.

10.1. Geotechnical Investigation: A geotechnical investigation shall be performed for each site. The subsurface investigation shall be performed by a registered professional engineer or engineering geologist. 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 site testing, soil sampling, determination of groundwater flow and location of seeps and springs, and a soil profile for critical locations in the structure, hydraulic structures and after pertinent locations which may affect the safety of the structure. The number, depth and location of boreholes shall be based on the quantity of material to be impounded and subsurface conditions. A geologic study shall be also 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. Where underground mining has been done in the past and reliable maps are not available, additional investigation including geophysical surveying and mapping techniques including bore scope observations may be required.

10.1.a. Laboratory tests shall be conducted on all foundation and embankment materials to include soil classification through grain size analysis hydrometer analysis, Atterberg limits, 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. Compaction and proctor curves shall be developed for all fill materials as appropriate.

10.2. Geotechnical Evaluation: A summary of all geotechnical data determined in the initial site geotechnical investigation and used in the analysis shall be included in table or figure form in the plan package.

10.3. Seepage Analysis: An analysis of seepage and its detrimental effects on structural integrity shall be made. The analysis shall include consideration of potential piping in the embankment, foundations, and abutments. Seepage control measures shall be specified as

necessary in order to enhance the stability of the embankment and adjacent area. Drainage systems shall be designed and constructed using a material approved by the Secretary and shall be protected by a properly designed filter zone using standard geotechnical engineering design practices. The design shall specify methods for sealing or controlling seepage encountered in foundation zone during construction.

10.4. Foundation Treatment: If analysis indicates a highly fractured foundation, the engineer shall specify necessary treatment of the foundation zone including, but not limited to, foundation grout curtains, dental concrete treatment of fractures or overhangs, and detailed methods of foundation zone cleaning.

10.5. Foundation Stability: The foundation must be designed to have adequate bearing capacity to support the embankment and any appurtenant works. Potential subsidence and settlement and their consequences shall be considered using standard engineering practices. Special attention shall be given to differential settlement which lead to cracking of the dam. Spillway pipes on compressible foundations shall be protected from damage due to settlement.

10.6. Landslides: The potential for landslides, as determined in the initial project area investigation, shall be evaluated by the engineer. If landslides noted in the dam site or reservoir areas will cause instability of the dam or appurtenant structures, blockage of spillways and other critical drainage structures or overtopping of the dam by displacement of water in the reservoir area, such landslides shall be corrected to a minimum static safety factor of 1.5.

§38-4-11. Structural Considerations.

11.1. All structures shall be designed to perform as intended for the design life of the dam with proper maintenance or replacement.

11.1.a. Structural materials: Materials selected for use in dam construction shall be of adequate quality and durability for the intended purpose of the structure. All structures shall be designed to have sufficient strength plus an adequate safety factor against failure during maximum anticipated loading conditions.

11.1.b. Earth materials: Earth materials selected for use in dam construction shall be free from roots, brush, organic materials, construction waste, and other debris. Where rock or rock fill is specified, the rock shall be durable and not subject to slaking or breaking. Size gradations of the earth materials shall be specified to perform as planned. Compaction requirements for earth materials shall be specified in the plan package.

11.1.c. The application shall specify the nature of concrete to be used with sufficient detail for on-site quality control. The concrete will be of specific mix, water content, additives, compressive strength, slump, and air entrainment or by reference to specific standards of concrete quality. If published standard specifications are referenced, a copy of the standard or pertinent sections of the standard shall be included in the plan package.

11.1.d. The application shall specify methods and limits of placement of concrete including foundation preparation, maximum lift height, maximum time allowed between mixing and placement, methods of working into forms and corners, methods of consolidation and use of vibratory devices, and alliable ambient air temperatures and concrete temperatures.

11.1.e. The application shall specify the method of curing the concrete, wetting, types of covering acceptable curing temperature range, any anticipated cold weather curing specifications or methods such as protection from freezing and insulation methods, hot weather placement methods and curing time.

11.1.f. The application shall specify the type of finishing to be applied to the concrete and the acceptable temperature range.

11.2. Specific structural requirements for embankment dams:

11.2.a. Materials selected for construction of embankment dams shall be free from roots, brush, organic matter, construction waste and other debris. Where rock fill is specified the rock shall be durable and must not slake or breakdown. Unless otherwise approved by the Secretary, the selected materials must be thoroughly tested for density, shear strength, liquid and plastic limits, optimum moisture content. The source of the material and available quantities shall be identified and adequate sampling performed in order to attain consistent quality and soil characteristics.

11.2.b. Where coal refuse as defined by 38CSR2 is used for construction of a dam and the dam is used to impound coal slurry waste from a coal preparation plant, such facilities shall comply with 38CSR2-22 of WV Surface Mining Reclamation Rules, Chapter 22 Article 3 of the WV Code and any state or federal laws and regulations.

11.2.c. Coarse coal refuse Materials: All coal refuse materials must be analyzed and tested to include soil classification, density, water content, compaction tests, shear strength and permeability. Only such parameters shall be used in the design of the facility. Procedures for spreading and compaction of refuse material during placement shall be specified. Coarse Refuse shall be compacted in layers not exceeding two(2) feet in thickness and shall not have any slope exceeding two horizontal to one vertical, except that the Secretary may approve construction of a refuse pile in compacted layers exceeding two(2) feet in thickness, where engineering data substantiates that both a minimum static factor safety factor of 1.5 and minimum seismic safety factor of 1.2 will be attained. provided, that the operator shall submit plans for the Secretary's approval, and shall also

provide documentation showing prior approval by MSHA pursuant to federal regulations at 30 CFR 77.215(h) for the alternate, without which documentation the plans will not be approved.

11.2.d. Instrumentation: a description of installation of instrumentation such as piezometers, settlement markers, slope indicators, extensometers 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 devices shall be provided. The monitoring results shall be analyzed by a registered professional engineer.

11.2.e. All upstream and downstream stages of construction shall be analyzed for liquefaction potential and provide safeguards against the development of this condition.

11.3. Zoned Embankments:

11.3.a. Filter drains: Filter drains shall be used in embankment zones where necessary to intercept seepage, reduce phreatic level, and reduce potential for internal erosion.

11.3.b. Gradations: The gradations of the filter material shall be sized to prevent or resist the migration of embankment material into the voids of the filter. The filter shall be permissible relative to the surrounding material.

11.3.c. Size: The filter drain shall be capable of passing the maximum anticipated seepage flows without excessive pore pressure. The combination of filter permeability and area shall be considered in sizing the drain.

11.3.d. Durability: The material used in the filter shall be hard, durable material that is not subject to slaking, breakdown or chemical reaction.

11.3.e. Perforated pipes may be used in the filter drains to increase capacity. Perforation shall be compatible with the filter gradations so

that the filter material will not enter the pipe. The pipe shall be capable of supporting the fill load and shall be of a material which will last for the design life of the structure. Corrugated metal pipes shall not be used in critical areas of the embankment or in any areas where the pipe is not reasonably accessible for replacement.

11.3.f. Filter cloth if used in a drainage application must be able to retain the protected soil to prevent piping, have sufficient permeability to prevent the build-up of water pressure, not become clogged and have sufficient strength to survive construction procedures.

11.3.g. Diaphragm Cut-off Walls: When concrete cut-off walls are used as an impermeable barrier, the concrete wall shall be placed upon an adequate foundation and be constructed of reinforced concrete. Where pipes pass through the concrete wall, adequate support for the pipe shall be provided to prevent differential settlement and pipe shearing.

11.4. Embankment Stability

11.4.a. Slope stability shall be analyzed to show that the embankment design achieves the following factors of safety under the conditions listed:

11.4.a.1. A safety factor of 1.5 for embankment loading conditions shall assume a long term steady-state condition with the phreatic surface originating at the elevation of the emergency spillway crest for embankment dams with emergency spillways or at a maximum design pool elevation for embankments without spillways.

11.4.a.2. A rapid draw down safety factor of 1.2 and

11.4.a.3. An earthquake safety factor under steady-state seepage conditions of 1.2 using seismic loading appropriate to the geological site conditions.

11.4.a.4. Embankments constructed as part of an appurtenant structure where failure will lead to a dangerous condition in the dam shall achieve a static safety factor of 1.5.

11.4.b. Slope Stability Analyses shall be performed using standard engineering practices. Critical cross-sections of dam indicating embankment limits, foundation zones, soil zones, phreatic line, assumed reservoir elevation, stability arcs or failure planes through the dam and resulting safety factors for each critical arc or failure plane shown.

11.4.b.1. A listing of soil zone unit weights, angles of internal friction, and cohesion values for each soil zone shown on the cross-section shall be provided in the plan package.

§38-4-12. Construction or Modification of a Dam.

12.1. Notification of Commencement of Construction: Prior to the commencement of construction activities in the project area, the person who has been issued a certificate of approval, or his representative, shall notify the Secretary of the following:

12.1.a. The intent of the contractor to start construction in the project area and the date of such start-up.

12.1.b. The name, address, and telephone number of the owner's authorized contact person at the project-area who is responsible for communicating with the Secretary's regional dam control representative and for receiving inspection reports and legal notifications.

12.2. Conformance with plans: All work undertaken in the construction or modification of a dam shall be in conformance with approved plans and specifications. Any changes to the approved plans and specifications shall be submitted to and approved by the Secretary prior to implementation.

12.3. On-Site Documents: A copy of the certificate of approval, the approved plans and specifications, all outstanding notices or orders issued by the Secretary, and the monitoring the emergency action plans prepared in accordance with the provisions of Sections 32 and 33 of these rules shall be available at the project area office for reference by the construction personnel and the Secretary's representative.

12.4. Adverse Weather Conditions: Construction work shall be suspended on all or part of the project when adverse weather conditions (e.g. prolonged precipitation, extreme temperatures) jeopardize the performance of work in conformance with the approved plans.

12.5. Clearing the Grubbing: Clearing and grubbing shall be performed in the foundation, stockpile and pool area.

12.6. Foundation Preparation: Foundation preparation shall include installation of keyways and subdrains, removal of soil and those project areas where preparation is dictated by the approved plans and specifications. The foundation shall be inspected by a registered professional engineer experienced in the construction of dams. The foundation shall also be inspected by the Secretary's representative prior to placement of embankment materials. If foundation problems are discovered during these inspections, additional foundation preparation may be required by the Secretary.

12.7. Placement of Materials

12.7.a. All fill materials shall be placed in accordance with approved plans and specifications.

12.7.b. Compaction testing shall be conducted as specified in approved specifications; the results of such testing shall be reported in accordance with the provisions of Section 17.5 of these rules.

12.7.c. Filter drains shall be constructed in accordance with the approved plans and

specifications. Filter material shall be tested for compliance with design gradations; the results of such testing shall be reported in accordance with the provisions of Section 17.5 of these rules. Filter materials shall be placed to prevent segregation and contamination and shall be concurrently covered to prevent contamination or damage.

12.7.d. Grading: All fill materials shall be graded in accordance with the approved plans and specifications. The working surface and outslopes shall be concurrently graded through all phases of embankment construction. The top of the fill shall be crowned to provide positive drainage during construction. Final grading shall be conducted in order to facilitate revegetation.

12.8. Spillways and Appurtenances

12.8.a. Spillways and appurtenances shall be constructed in accordance with the approved plans and specifications.

12.8.b. All riprap material shall be of hard, durable rock which if not acid-forming or toxic riprap shall be placed to prevent size segregation.

12.8.c. When bedding is used under riprap, the rock material shall be placed in a manner so as not to damage or contaminate the bedding.

12.8.d. When protective channel linings are specified the linings shall be installed as soon as the channel is constructed to grade in accordance with the approved plans and specifications.

12.8.e. When concrete is used in construction of spillways and appurtenances, the concrete shall be placed, cured and finished in accordance with the provisions of Section 11 of these rules. Standard tests shall be performed in accordance with the provisions of Section 18.5 of these rules and reported in accordance with the provisions of Section 30 of these rules.

12.8.f. All pipes, risers and appurtenances shall be installed in accordance with the approved plans and specifications. Compaction testing shall be completed to ascertain that fill material around pipes, risers and appurtenances has been placed in accordance with the approved plans and specifications, the results of such testing shall be reported in accordance with the provisions of Section 17.5 of these rules. Sufficient fill shall be placed over pipes so as to prevent damage by heavy equipment.

12.8.g. All freshwater dams that have gated drainpipe for draining the impoundment shall have a gated valve located in the reservoir or in the saturated zone upstream of the cutoff wall or impermeable barrier. The elevation of the gate system shall be such that the reservoir can be drained completely to original stream level. The drain system shall be able to drain ninety percent (90%) of the volume of stored water at normal pool in ten(10) days including normal base flow.

12.8.h. Minimum Stream Flow: An adequate flow of water in the stream below the dam during construction and reservoir filling will be required to maintain water quality in the stream and to support fish and other aquatic life.

§38-4-13. Blasting.

13.1. Blasting is to be done in accordance with the applicable rules and approved plans and specifications. If unforeseen conditions are encountered in the project area and blasting is required in areas not covered in the approved plan package, an approval for blasting in those areas will be required from the Secretary's authorized representative. The blasting plan shall explain how the applicant will comply with blasting requirements of the WVSCMRA 22-3 Act, WVSMRR, and the terms and conditions of the permit. This plan shall include, at a minimum, information setting forth the limitations the operator will meet with the ground and air blast vibrations, the basis for those limitations, and the methods to be applied

in controlling the adverse effects of blasting operations.

13.2. Blast Record: A blasting record shall be maintained at the site in accordance with the applicable rules

13.3. Seismic monitoring of ground vibrations shall be conducted if there is any surface mining or construction blasting within .8 of a mile of the dam.

§38-4-14. Storm Water Discharge.

14.1. The sequence of construction work shall be planned to maximize the safe discharge of storm water while minimizing the amount of water retained in the impoundment. Either the principal spillway structures, including inlets and outlets, shall be operable prior to placement of construction material above the original valley elevation or diversion channels as required under 38CSR 2 Section 5.3 of WV Surface Mining Reclamation Rules will be in place.

§38-4-15. Erosion and Sediment Control.

15.1. Erosion and sedimentation must be controlled to prevent a degradation of land and streams below the dam or project area to prevent any violation of state water quality standards. Erosion and sediment control measures shall, at the minimum, conform with current erosion and sediment control manuals and apply to the entire project area.

15.2. Temporary seeding and mulching shall be utilized on areas where no construction activity is anticipated for a period of three (3) or more weeks.

15.3. Water Routing: Water that is pumped or drained from work areas such as excavations and foundations must be routed to properly sized sediment control devices so that any sediment contained in water is removed prior to discharge of the water from the project area. Pump discharges may not cause erosion or suspension

of additional solids. No untreated water may be pumped or drained to the natural stream or stream diversion channel.

15.4. Permanent Erosion measures: Permanent measures e.g. Vegetation, grading, diversion waterways and outlet structures all be included on all completed or existing dams, where applicable to prevent the erosion of embankments, abutments, stream channels and waterways during the life and operation of the dam.

§38-4-16. Disposal of Construction Wastes.

16.1. All surplus soil and rock materials shall be deposited in waste disposal areas delineated in the approved plans.

16.2. Trees, brush, roots and construction related wood materials may be either buried in waste disposal areas delineated in the approved plan package.

16.3. New or old waste concrete materials may be disposed of in areas approved by the Secretary for surplus soil and rock materials. Chemicals, petroleum products, plastics, garbage, sewage sludge and any associated containers shall be disposed of in a manner approved by the Secretary.

§38-4-17. Dust Control.

17.1. Dust shall be suppressed on haul and access roads and as necessary within the project area. Water, or an alternative dust palliative approved by the Secretary shall be used for dust suppression, the use of oil and waste oil is prohibited.

§38-4-18. Construction Quality Control.

18.1. All construction activities shall be monitored by owners' engineer or his designated representative. Construction monitoring shall not be the responsibility of the construction contractor.

18.2. The owners' engineer will be responsible for assessing the quality of workmanship and ascertaining compliance with approved plans and specifications. Secretary's representatives will also monitor construction activities and workmanship in order to ascertain compliance with approved plans and specification in accordance with provisions of WV Code 20-5D-9.

18.3. Critical phases of construction shall be monitored by the engineer or his designated representative constantly during active construction, non-critical phases of construction shall be checked at least once per day during active construction.

18.4. Additional supervision or testing will be required by the Secretary if evidence of inadequate construction supervision exists.

18.5. Routine tests of slump, air entertainment and temperature shall be performed as specified in the approved plan. Cylinder samples for compression testing shall be taken each day for every 25 cubic yards of delivered concrete; whichever is more frequent unless otherwise required by the Secretary.

18.6. Earth fill materials shall be tested for compaction and moisture content every alternate layer or each one thousand (1000) cubic yards, whichever is more frequent. Random fill shall be evaluated for compliance with approved gradation specifications. Critical fill areas shall have gradation tests performed to evaluate compliance with the approved specifications.

18.7. Gradation Tests. Gradation tests shall be performed on filter materials. Close visual observation for signs of material segregation shall be performed. Additional tests may be required by the Secretary to determine durability of filter materials.

§38-4-19. Breaching of a Dam.

19.1. The owner of a dam must obtain a certificate of approval from the Secretary prior

to breaching of the dam. A complete application in accordance with the provisions of Section 5.1 of these rules must be submitted to and approved by the Secretary prior to commencement of breaching activities. The application must include a plan package in accordance to applicable requirements of Section 6 and specific requirements delineated in this section of these rules. Narratives, plans, or specifications required under Section 6 of these rules which are clearly not applicable to the proposed breaching activities may be omitted from the submittal; however, the Secretary reserves the right to specify those items must be included in the breaching plan package.

19.2. Breach Dimensions: The breach opening in the dam shall be designed so that any water resulting from design storm inflows that is temporarily impounded behind the residual structure shall be less than the height and storage requirements of a "dam" set forth in Section 2.7 of these rules. The breach shall be to original stream bottom level, except that a small impoundment of less than one (1) acre-foot storage may be retained for sediment control purposes.

19.3. Breach Channel: The embankment shall be breached with a designed channel having the capacity to conduct the peak runoff from the design storm. The channel created by the breach shall have an erosion-preventive lining adequate to withstand the depth and velocity of peak flows from the design storm. The channel side slopes shall achieve a minimum stability factor of safety of 1.5.

19.4. Safety: The impoundment shall be completely drained before the commencement of breaching operations. Breaching work shall be scheduled during dry weather using National Weather Service advice and will be completed quickly to reduce the potential of any risk to life and property from failure of dam.

19.5. Blasting: If blasting is to be used in the breaching of a dam, a blasting plan shall be submitted to the Secretary for approval. The

plan shall include the distance to the existing structures and the measures that will be taken to minimize air blast and flying materials. A pre-blast survey of existing nearby structures and water wells which may be affected by blasting may be required by the Secretary.

19.6. Erosion and Sediment Control: Measures sufficient to comply with erosion and sediment control provisions in WV Surface Mining Reclamation Rules 38CSR2 shall be implemented during the breaching operation. The following measures shall also be implemented after breaching operations:

19.7. Reservoir areas and sediment deposits therein shall be protected from erosion after the impounding capability has been eliminated by breaching of the dam.

19.8. Disturbed areas, including faces on any remaining embankment must be protected by vegetation or other means approved by the Secretary.

19.9. A channel in the reservoir may be required by the Secretary in order to re-establish a stream channel.

19.10. Placement of earthen material: Material removed from the dam shall be placed in waste disposal areas delineated in the approved plan package. The material shall be graded and compacted as necessary and stabilized from erosion by vegetation or other means approved by the Secretary.

19.11. Placement of non-earthen material: Concrete rubble and rock materials shall be placed in waste disposal areas delineated in the approved plan package. The material shall be placed in a manner to reduce hazardous conditions, protruding metal, wire, or bars are not allowed.

19.12. Construction Practices: The requirements of Section 8 of these rules shall apply when breaching a dam unless they are not applicable to breaching operations. All

applicable requirements will be specified in the plan package submittal.

19.13. Safety of remaining structure. The remaining structure shall have sufficient strength to withstand the maximum hydraulic loading without failure.

§38-4-20. Removal of a Dam.

20.1. Application for removal of dam: The owner of a dam must obtain a certificate of approval from the Secretary prior to the removal of the dam. A complete application in accordance with provisions of Section 5.1 of these rules must be submitted to and approved by the Secretary prior to the commencement of removal activities.

20.2. Plan Package Requirements: The plan package submitted in order to remove a dam shall be in accordance with the applicable requirements of Section 6 of these rules and must also include specific requirements of this section of these rules.

20.3. Removal Requirements: Removal of a dam shall consist of complete removal of the structure to the original ground except in special cases where it may be necessary or advantageous to leave small sections of the structure. Unless otherwise approved by the Secretary, the removal of a dam shall consist of complete removal of the structure to approximate original contour.

20.4. Safety: Reservoir shall be completely drained before removal operations. Removal work shall be scheduled during dry weather using National Weather Service advice and proceed quickly to reduce the potential for impounding water.

20.5. Blasting: If blasting is to be used in the removal of a dam, a blasting plan shall be submitted to the Secretary for approval. The plan shall include distance to existing structures and the measures that will be taken to minimize airblast and ground vibrations and flying

materials. A pre-blast survey of nearby structures and water wells which may be necessary. Blasting requirements are to comply with all applicable state and federal laws in the use of explosives.

20.6. Erosion and Sediment Control: Erosion and sediment control measures sufficient to comply with provisions of Section 8.13 of these rules shall be implemented during the removal operation. The following measures shall also be implemented:

20.7. Reservoir areas, and the sediment deposits there in shall be protected from erosion after impounding capability has been eliminated by the removal of the dam. Disturbed areas, including the faces on any remaining embankment must be protected by vegetation or other means approved by the Secretary.

20.8. A channel in the reservoir sediment may be required by the Secretary in order to re-establish a stream channel. Permanent sediment basins, subject to ongoing maintenance, may be required by the Secretary, if the dam owner cannot demonstrate the effectiveness of other structural and vegetative measures in stabilizing the reservoir area and dam site.

20.9. Placement of earthen material: Material removed from the dam shall be placed in waste disposal areas delineated in the approved plan package. The material shall be graded and compacted as necessary and stabilized from erosion by vegetation or other means approved by the Secretary.

20.10. Placement of non-earthen material concrete rubble and other rock material shall be placed in waste disposal areas delineated in approved plan. The material shall be placed in a manner to reduce hazardous conditions, protruding metal, wire or bars are prohibited.

20.11. Safety of remaining structure: The remaining portion of the structure must have

sufficient strength to support the maximum hydraulic loading without failure.

20.12. Construction practices: The requirements of Section 8 of these rules shall apply when removing a dam unless clearly not applicable to the removal operation; however, the Secretary reserves the right to specify which requirements are applicable.

§38-4-21. Abandonment of a Dam.

21.1. The owner of a dam must obtain a certificate of approval from the Secretary prior to the abandonment of the dam. A complete application in accordance with the provisions of Section 5.1 of these rules must be submitted to and approved by the Secretary prior to the commencement of abandonment activities.

21.2. The reservoir area shall be completely filled to the crest elevation of the dam with approved material to eliminate the impoundment of water. The final top elevation of the 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 five (5) percent unless otherwise approved by the Secretary.

21.3. The embankment shall be shown to achieve a minimum long-term factor of safety in accordance with the applicable provisions of Section 11 of these rules.

21.4. Diversion System: A diversion system designed to conduct a 100 year 24 hour storm shall be provided to capture the stream at the upstream end of the reservoir and convey stream water and runoff from the surface of embankment around the site. The diversion system shall outlet safely beyond the downstream toe of the embankment in a natural drain way capable of carrying the design storm without excessive erosion.

21.5. All conduits through the embankment with the exception of under drain conduits shall be sealed with concrete at the upstream end prior

to elimination of the reservoir. The Secretary may require pressure testing of conduits to determine seal adequacy.

21.6. Erosion and sediment control measures sufficient to comply with the provisions of rules shall be implemented during the abandonment operation.

21.7. A sufficient layer of topsoiling material shall be provided to insure a long-term vegetation.

21.8. The Secretary shall retain jurisdiction over the site for a minimum period of five years after abandonment, during which time the dam and its appurtenances shall be inspected annually by an engineer experienced in such inspections. A report shall be filed with the Secretary detailing the findings of each inspection and describing intended maintenance work. Should a major storm occur a similar report shall be filed to detail the resultant condition of the structure.

21.9. At the completion of five year period, a final joint inspection by the engineer and the Secretary's representative shall be conducted to determine the effectiveness of the abandonment design and the potential need for continued maintenance. Should the Secretary determine as a result of this inspection that an additional inspection time period or maintenance work is required, a letter detailing these requirements shall be sent to the owner. Should the Secretary determine as result of the inspection that the abandonment design has been effective, a letter of acceptance shall be issued stating that the dam has been properly abandoned and the reclamation bond of the permittee shall be released.

§38-4-22. Reduction of Dam Height to less than Jurisdiction.

22.1. An operator planning to reduce the height of a dam so that the remaining structure will no longer meet the definition of "dam" set

forth in Section 2.7 of these rules must obtain a certificate of approval from the Secretary.

22.2. A complete application in accordance with the provisions of Section 5.1 of these rules must be submitted to and approved by the Secretary prior to the Commencement of reduction activities. The application must also contain information showing that the remaining impounding structure will not cause loss of life or appreciable property damage downstream should that structure fail.

22.2.a. The plan package submitted in order to reduce the height of a dam shall be in accordance with the applicable requirements of Section 6 of these rules and must also include the specific requirements indicated under this section of these rules. Narratives, plans or specifications which are clearly not applicable to the proposed reduction may be omitted from the submittal; however, the Secretary reserves the right to specify those items which must be in the reduction plan package.

22.3. The remaining structure shall have a properly designed spillway system capable of passing a class A design storm without overtopping.

22.4. The remaining structure will achieve a factor of safety in accordance with the relevant provisions of Section 11 of these rules as appropriate to the type of structure.

22.5. The requirements of Section 12 of these rules shall apply when reducing the height of a dam unless clearly not applicable to the reduction operation; however, the Secretary reserves the right to specify which requirements are applicable.

§38-4-23. Enlargement of a Structure to Jurisdiction.

23.1. An operator planning to enlarge an existing structure so that the completed structure will meet the definition of "dam" set forth in

Section 2.7 of these rules must obtain a certificate of approval from the Secretary.

23.2. A complete application in accordance with the provisions of Section 5.1 of these rules must be submitted to and approved by the Secretary prior to the commencement of enlargement activities. The plan package submitted in order to enlarge a structure to jurisdiction shall be in accordance with the applicable requirements of Section 6 of these rules. Narratives, plans or specifications required under Section 6 of these rules which are clearly not applicable to the proposed enlargement may be omitted from the submittal; however, the Secretary reserves the right to specify those items which must be included in the enlargement plan package.

23.3. The Secretary will require adequate drilling and testing of the existing structure and foundation to ascertain in place conditions.

23.4. The requirements of Section 12 of these rules shall apply when enlarging a structure to jurisdiction unless clearly not applicable to the enlargement operation; however, the Secretary reserves the right to specify which requirements are applicable.

§38-4-24. Sale or Transfer of Dam.

24.1. No sale or transfer of dam is permitted unless a certificate of approval has been obtained from the Secretary. An application for certificate of approval must be submitted 30 days prior to sale.

24.2. The transfer of a dam will be handled under WV Surface Mining Reclamation Rules 38-CSR-2-3.25.

24.3. The Secretary may reissue a certificate of approval reflecting sale or transfer of a dam upon receipt of fees and appropriate documentation.

§38-4-25. Operation and Maintenance.

25.1. All spillways and appurtenances shall be maintained to operate according to design plan and specifications.

25.2. Routine maintenance of spillways shall be performed. Maintenance shall include removal of sediment, brush, trees, rocks, rocks in stilling basins, and re-establishment of the structure to its original hydraulic design.

25.3. All failures resulting from landslides or slope failures must be corrected immediately if they significantly affect the safety or design capacity of the dam or its appurtenances. Failures must be reported to the Secretary.

25.4. Routine inspections shall be made of all hydraulic structures to insure operation. Special inspection shall be conducted whenever a significant flow through the structures has occurred.

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

25.6. Leakage through joints, fissures, cracks through or under the spillway channel shall be immediately investigated and repaired.

25.7. If erosion on the embankment face or abutments occurs, the area must be regraded and be provided with adequate drainage control and/or revegetation to prevent future occurrences.

25.8. Gates (if any) must be serviced and operated at regular intervals to insure proper functioning.

25.9. All concrete structures and channel linings must be maintained according to design and specifications. All cracks located in concrete channels shall be sealed immediately with a sealant approved by the Secretary.

25.10. Access roads must be maintained to insure access for emergency inspections.

25.11. All monitoring devices shall be routinely inspected and repaired or replaced as necessary to insure proper functioning of the devices.

25.12. The embankment shall be kept clear of burrowing animals.

25.13. The embankment shall be kept clear of trees and shrubs. The downstream toe and abutments of the dam shall be cleared to natural ground for a lateral distance of at least twenty five (25) feet.

25.14. Storm water in the impoundment shall be removed as specified in the design requirements. In addition, the slurry impoundment pool shall be maintained at the lowest practical pool level based upon the design requirements and the AHCF. The mechanical storm dewatering system shall be installed as designed and maintained properly with the system being tested monthly.

§38-4-26. Inspection, Reporting and Certification Requirements.

26.1. Inspection during construction:

26.1.a. Plans, specifications and all inspection reports shall be available at the construction site office for reference by construction personnel and the representatives of the Secretary.

26.1.b. A visual inspection for construction progress, determination of unstable conditions, conformance plans, and quality control shall be done on a regular basis and at least once each working day. The inspection shall be done by a registered engineer or a person under the direct supervision of the registered engineer. Inspections shall be done after heavy rainfall events to determine problems and remedial measures.

26.1.c. Instrumentation shall be monitored once in every seven days unless otherwise specified in approved plans. Monitoring of instrumentation shall be done by approved persons. The frequency of monitoring may be changed by the Secretary upon specific project area conditions.

§38-4-27. Completion of Construction.

27.1. Upon completion of the construction or modification of a dam, a joint inspection shall be conducted by the Secretary and the engineer. The purpose of inspection is to verify that all work has been accomplished in accordance with approved plan.

27.2. Acceptance of construction: When the dam owner is advised by the Secretary that construction appears satisfactory, the owner shall submit to the Secretary a certification by an engineer that all construction was in substantial conformance with the approved plans and specifications, including any modifications that have been approved by the Secretary. This certification shall be submitted within ninety (90) days of the Secretary's advisement. As-built drawings, including all variations from the original specifications and changes in location of borrow or waste disposal areas, shall be submitted with the engineer's certification. Upon the receipt of the engineer's certification with the as-built drawings, a letter of acceptance will be issued by the Secretary.

§38-4-28. Inspection of Completed Dams.

28.1. After acceptance of construction by the Secretary, the dam and its appurtenances shall be inspected annually until removal or abandonment of the structure. Upon abandonment, the dam shall be inspected by the owner's engineer annually until bond required under WV Surface Coal Mining and Reclamation Act 22-3 is released.

§38-4-29. Inspection of Dams With Serious Problems.

29.1. The Secretary may establish frequency of inspection of dams with serious problems. The inspection of a dam with serious problems shall include monitoring of slopes, bulges, scarps, vertical displacement, excessive erosion, piping, sudden changes in readings of monitoring devices, and other visible factors which could include potential failure of the embankment, spillways or other appurtenances. The Secretary reserves the right to attend any inspection and require prior notification of the inspection by the owner of the dam.

§38-4-30. Reporting Requirements.

30.1. Monthly progress reports during construction: A written report containing the results of each inspection of construction progress shall be submitted to the Secretary every month while the dam and its appurtenances are under construction. The report shall include, but not be limited to, specific instrumentation readings, test results, freeboard, crest elevation, and specific construction or quality control problems with documentation of implemented solutions. The report on the drainage system and protective filters shall include color photographs taken during and after construction, but before underdrains are covered with material. If the underdrain system is constructed in phases, each phase shall be certified separately.

30.2. Post construction inspection report: A report shall be submitted to the Secretary by the dam owner reporting the findings of the final construction inspection required under Section 27 of these rules. Certification by an engineer shall be submitted to the Secretary with the inspection report to verify that the dam and its appurtenances were constructed in substantial conformance with the approved plans and specifications and that the dam and its appurtenances are functioning as designed.

30.3. Inspection reports for dams with serious problems: A written report containing the observations of each inspection required shall be submitted to the Secretary by the dam owner within thirty (30) days of the inspection.

§38-4-31. Inspection and Certification Requirements.

31.1. Inspection of all coal related dams shall be made by a qualified registered engineer or other qualified professional specialist under the direction of the professional engineer. The registered engineer shall provide a certification at least quarterly during construction, on final completion of construction and at least yearly until removal of the structure or release of the performance bond. The certification by the engineer shall be submitted to the Secretary with the inspection report to verify that the dam and its appurtenances have been constructed and maintained in conformance with the approved plans and specifications and these rules.

§38-4-32. Monitoring Plans.

32.1. Owners of Class C dams shall formulate and submit a monitoring plan to the Secretary for approval. Owners of Class A and Class B dams may be required by the Secretary to formulate and submit a monitoring plan for approval.

32.2. The monitoring plan developed by the dam owner must follow the format of the example plan provided by the Secretary and shall include, but not limited is the following:

32.2.a. A description of the dam, including appropriate drawings and location maps;

32.2.b. A listing of problems and deficiencies and any implemented repairs;

32.2.c. The inspection frequency under varying weather conditions;

32.2.d. A description of areas or items to be inspected;
Corrective actions to be taken;

32.2.e. The responsible person's name's addresses and telephone numbers;

32.2.f. The method of notification of the Secretary and county emergency services authorities;

32.2.g. Other items required by the Secretary based upon site specific conditions.

32.3. Monitoring plans shall be updated annually. More frequent updating of the plans may be required by the Secretary based upon rapidly changing personnel or site conditions. The monitoring plan shall be implemented immediately by the dam owner upon the approval of the plan by the Secretary.

§38-4-33. Emergency Warning Plans.

33.1. Owners of Class C dams shall formulate and submit an emergency action plan to the Secretary for approval. The emergency warning plan will include notification and action procedures 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 notify the Secretary in writing. The Secretary may then notify the office of Emergency Services and request that emergency procedures be developed for the site.

33.2. The emergency warning plan developed by the dam owner must follow the format of the example plan provided by the Secretary.

33.3. The dam owner shall coordinate with county emergency service authorities in the development of the emergency action plan. The dam owner must provide copies of the

inundation maps required under Section 3.4.3.2 of these rules to those authorities.

33.4. The dam owner will provide county emergency services authorities with a copy of the monitoring plan, and all updates of that plan approved by the Secretary.

§38-4-34. Emergency Procedures.

34.1. Emergency Condition: If the owner of a dam determines that an emergency exists, he shall immediately notify any person who may be endangered if the dam should fail and then notify the appropriate county emergency services authorities and the Secretary. After providing notification of the emergency condition, the owner shall immediately take any remedial action, such as an emergency release of water, that is necessary to protect life and property. The Secretary may waive the requirement for a certificate of approval where it is necessary to accomplish repairs under emergency conditions.

34.2. Dangerous Condition:

34.2.a. Should a dangerous condition develop, the Secretary shall be informed immediately. The owner of the dam shall immediately take any remedial action necessary to protect life and property. Emergency procedures developed in accordance with the provisions of Sections 33 and 34 of these rules shall be implemented to protect life and property on the downstream side of the dam.

34.2.b. The site shall be inspected and monitored at least once every eight (8) hours until the emergency situation is alleviated. Continuous monitoring may be required by the Secretary when there is imminent danger to the health, safety or welfare of the public.

34.2.c. Evaluation of dangerous conditions: If a dangerous condition develops, an emergency evaluation shall be initiated as soon as possible to formulate a plan for permanent correction of the dangerous condition. The evaluation and corrective action

plan shall be submitted to and approved by the Secretary prior to implementation.

34.3. Dam owner not relieved of responsibility: The Secretary's approval of a monitoring plan or updates to such a plan, pursuant to Section 32 of these rules or his approval of an emergency action plan pursuant to Section 33 of these rules shall not relieve the dam owner of this legal duties, obligations or liabilities under WV Code 22-14-10 and 22-14-12

§38-4-35. Inspection and Enforcement.

35.1. All coal related dams will be subject to Inspection and Enforcement requirements of Section 20 of 38CSR2 [WV Surface Mining Reclamation Rules.]

§38-4-36. Application Fee for Certificate of Approval of a Dam.

36.1. Each application submitted to place, construct, enlarge, alter, repair, breach, remove or abandon a dam shall include application fee. The following application fees shall apply:

36.1.a. The application fee for placement, construction of a new dam shall be three hundred dollars (\$300.00).

36.1.b. The application fee for modification of a dam to include enlargement, alteration and repairs shall be three hundred dollars (\$300.00).

36.1.c. The application fee for breaching, abandonment or removal of a dam shall be three hundred dollars (\$300.00).

36.1.d. The fee for sale or transfer of dam shall be three hundred dollars (\$300.00)

36.1.e. The annual registration fee shall be one hundred dollars (\$100.00). This fee is required at the yearly anniversary date of the certificate of approval.