WEST VIRGINIA

SECRETARY OF STATE

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OFFICE OF THE WEST VIRGINIA SECRETARY OF STATE

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

AGENCY: Department of Commerce, Labor and Environmental Resources, Division of Natural Resources TITLE NUMBER: 47

AMENDMENT TO AN EXISTING RULE: YES X, NO ____

IF YES, SERIES NUMBER OF RULE BEING AMENDED: 34

TITLE OF RULE BEING AMENDED: "Dam Safety Regulations"

IF NO, SERIES NUMBER OF NEW 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) Senate Bill 637 (1991)

SECTION §64-3-8(oo), PASSED ON March 9, 1991.

THIS RULE IS FILED WITH THE SECRETARY OF STATE. THIS RULE BECOMES EFFECTIVE ON THE FOLLOWING DATE: April 22, 1991

J. Edward Hamrick III
Director

TITLE 47
LEGISLATIVE RULES
DIVISION OF NATURAL RESOURCES
DEPARTMENT OF COMMERCE, LABOR AND ENVIRONMENTAL RESOURCES

SERIES 34
DAM SAFETY REGULATIONS

§47-34-1. General.

1.1. Scope and Purpose. -- This legislative rule establishes requirements relating to the design, placement, construction, enlargement, alteration, removal, abandonment, and repair of dams in this State that fall within the definition set forth in Section 2.6 of these regulations.

1.2. Authority. -- W. Va. Code §20-5D-4.

1.3. Filing Date. -- April 5, 1991.

1.4. Effective Date. -- April 22, 1991.

1.5. Repeal of Former Rule. -- This legislative rule repeals and replaces 47 C.S.R. 32 "Dam Control" that was filed on December 30, 1982 and became effective on January 1, 1983.

§47-34-2. Definitions.

2.1. "Abandonment" means to render a dam non-impounding by filling the reservoir created by that dam with solid materials and by diverting the natural drainway around the site.

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

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

2.3.1. Meets the definition of "dam" set forth in Section 2.6 of these regulations;

2.3.2. Is constructed across a natural drainway for the purpose of maintaining a pathway, railway, roadway, support structure, or other passageway for transporting persons, traffic, or other static or moving loads; and

2.3.3. Has an opening under the structure to provide for the passage of normal stream flow.

2.4. "Certificate of Approval" means the approval in writing issued by the director to a person 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 which such work is to be performed by the applicant.

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

2.6. "Dam" means an artificial barrier or obstruction -- including any works appurtenant to it and any reservoir created by it -- which is or will 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. The term "dam" does not include:

2.6.1. Any dam owned by the federal government;

2.6.2. Any dam for which the operation and maintenance thereof is the responsibility of the federal government;

2.6.3. Any slack water dam constructed and maintained in connection with public highways, streets, bridges, culverts, or viaducts;

2.6.4. Any farm pond constructed and used primarily for agricultural purposes -- including, but not limited, to livestock watering, irrigation, retention of animal wastes, and fish culture -- which has no potential to cause a loss of human life in the event of embankment failure; and

2.6.5. Any dam under the jurisdiction of the West Virginia Division of Energy pursuant to W. Va. Code §22-1-16.

2.7. "Dam Safety Office" means the Dam Safety Office of the Division of Natural Resources of the West Virginia Department of Commerce, Labor and Environmental Resources.

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

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

2.8.2. Harm to the public health or welfare; or

2.8.3. 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. "Director" means the director of the Division of Natural Resources of the West Virginia Department of Commerce, Labor and Environmental Resources or his authorized representative.

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

2.12. "Embankment" means a constructed deposit of earth or waste materials, usually exhibiting at least one sloping face.

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 W. Va. Code §30-13.

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

2.17. "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.

2.18. "Hazard Classification" means a classification rating assigned to a structure based upon engineering evaluations and judgments for predicting the danger to human life, property, and environment should a failure of the structure occur.

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

2.20. "Hydrologic Analysis" means a determination, using accepted engineering methods, to establish surface water runoff

for a given design storm.

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

2.22. "Impoundment" means a basin for the retention of water, sediment, or waste.

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

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

2.25. "Natural Drainway" means any natural watercourse which may carry water to the tributaries and rivers of the watershed.

2.26. "P100" means the rainfall amount based upon a one hundred (100) year frequency, six (6) hour duration rainfall event (i.e, a 100-year, 6-hour storm).

2.27. "Person" means any public or private corporation, institution, association, society, firm, organization or company organized or existing under the laws of this or any other state or country; the State of West Virginia; any state governmental agency; any political subdivision of the State or of its counties or municipalities; sanitary district; public service district; drainage district; soil conservation district; watershed improvement district; partnership; trust; estate; person or individual; group of persons or individuals acting individually or as a group; or any other legal entity whatever. The term "person," when used in these regulations, shall be understood to include and refer to any authorized agent, lessee or trustee of any of the foregoing or receiver or trustee appointed by any court for any of the foregoing.

2.28. "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.

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

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

2.31. "Probable Maximum Precipitation" or "PMP" means the

depth-duration-area rainfall event for a particular area that represents the maximization of the most critical meteorological conditions that are considered possible to occur.

2.32 "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.

2.33. "Roadfill" means a barrier or obstruction which:

2.33.1. Meets the definition of "dam" set forth in Section 2.6 of these regulations;

2.33.2. Is constructed across a natural drainway for the purpose of maintaining a roadway or similar crossing across that drainway; and

233.3. Has a culvert located in the drainway that is of sufficent size to prevent the normal impoundment of water.

2.34. "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.

2.35. "Secondary Highway" means those roadways which are designated by the West Virginia Division of Highways as county numbered routes.

2.36. "Sediment" means solid material, either mineral or organic, resulting from the works of man that has been moved from its site of origin by water.

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

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

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

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

§47-34-3. Classification of Dams.

3.1. Types of Dams.

3.1.1. For the purpose of these regulations, dams are divided into three general types:

3.1.1.a. Embankment Dams. Embankment dams are usually constructed of materials which exhibit rock-like or soil-like properties.

3.1.1.b. Gravity Dams. Gravity dams are usually constructed of concrete or masonry materials which form a rigid body.

3.1.1.c. Waste Disposal Dams. Waste disposal dams are usually constructed of waste materials such as fly ash or coal refuse. The reservoir is utilized to dispose of waste material, thereby creating a continuously decreasing freeboard condition.

3.1.2. In cases where a dam exhibits properties of more than one type, such as gabion structures or roller-compacted concrete, design techniques must be applied which are reasonably applicable to the particular structure involved.

3.2. Dam-Related Measurements.

3.2.1. Measuring 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. Gravity overflow dams must be measured to the highest level which is greater than ten percent (10%) of the total crest length of the dam. The height of dams with sloping crests shall be determined by a weighted-average height above the natural bed of the stream or watercourse, excluding spillways.

3.2.2. Measuring Reservoir Volume. For purposes of determining whether a dam meets the criteria set forth in Section 2.6 of these regulations as applied to reservoir volume calculations, the volume must be calculated at the crest elevation of the dam that is equivalent to the elevation used in determining the dam height.

3.2.3. Incised Reservoirs. The height of the embankment of an incised reservoir must be measured using the method set forth in Section 3.2.1 of these regulations. 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. That portion of the water stored below stream grade shall not be included in determining whether a dam meets the criteria set forth in Section 2.6 of these regulations; however, it must be reported in the application as part of the total reservoir volume.

3.3. Dams in Series. If the director 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 2.6 of these regulations 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, he may require the owner or owners of each impounding structure to comply with the requirements of these regulations.

3.4. Incidental Dams.

3.4.1. Roadfills.

3.4.1.a. If the director finds that a roadfill has become a hazard to human life or property through the frequent or continuous impoundment of water, he may order the owner of that roadfill to take all steps that are necessary to protect life or property in accordance with the emergency powers provided under W. Va. Code §20-5D-10.

3.4.1.b. A certificate of approval will not be required for roadfills.

3.4.2. Bridges.

3.4.2.a. If the director finds that a bridge has become a hazard to human life or property through the frequent or continuous impoundment of water, he 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 §20-5D-10.

3.4.2.b. A certificate of approval will not be required for bridges.

3.4.3. Diversions. A certificate of approval will be required for dikes or other structures used to divert water and otherwise meeting the definition of "dam" set forth in Section 2.6 of these regulations.

3.4.4. Stream Encroachments. If the director finds that a natural drainway has been restricted by filling or other artificial means so that the restriction can or does impound water, and the fill and resulting reservoir meets the height and storage requirements of a "dam" as defined in these regulations, he may order the fill removed or require a certificate of approval or both.

3.5. Classification of Dams. The applicant for a certificate of approval must propose the hazard classification for his dam based upon the classification guidelines listed in Section 3.5.2 of these regulations and the hazard evaluation performed pursuant to Section 3.5.3 of these regulations. The classification proposed by an applicant is subject to approval by the director.

3.5.1. Changes in Dam Classification. The director will periodically review the hazard classification of each dam subject to these regulations and may reclassify a dam if he determines that the hazard potential has changed. The owner shall be notified by the division of any hazard classification change.

3.5.2. Hazard Classifications.

3.5.2.a. Class A Dams. Class A dams are those dams located in rural or agricultural areas where failure may damage nonresidential and normally unoccupied buildings, rural or agricultural land, or secondary highways. Failure of a 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. Loss of human life resulting from failure of a Class A dam must be unlikely.

3.5.2.a.A. An impoundment exceeding forty (40) feet in height or two hundred (200) acre-feet storage volume shall not be classified as a Class A dam.

3.5.2.b. 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.

3.5.2.c. Class C Dams. Class C dams are those dams located where failure may cause a loss of human life or damage to homes, industrial and commercial buildings, important public utilities, primary highways, or main railroads. This classification must be used if failure may result in the loss of human life.

3.5.2.c.A. A waste disposal dam, the failure of which may cause significant harm to the environment, shall not be designed as a Class A dam.

3.5.3. Hazard Evaluation.

3.5.3.a. Downstream Hazards. 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.

3.5.3.b. 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.

3.5.3.b.A. The director may waive the downstream breach analysis required under Section 3.5.3.b of these regulations for a 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.

3.5.3.c. Upstream Hazards. No dam shall be constructed which, during maximum pool conditions, will flood upstream dwellings, public utilities, primary highways, or main railroads unless otherwise approved by the director based upon site-specific conditions.

3.5.4. Risk Assessment. The director 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. The director will not consider risk assessment based upon planned evacuation, probability of inhabitation, or monetary recovery of property damage.

§47-34-4. Certificates of Approval.

4.1. Certificate Required. A person must obtain a certificate of approval from the director in order to place, construct, enlarge, alter, breach, remove, abandon, or perform major repairs upon any dam in this State that falls within the definition set forth in Section 2.6 of these regulations.

4.2. Certificate Issuance.

4.2.1. Certificates 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.

4.2.2. The director will issue or refuse to issue a certificate of approval based upon the following:

4.2.2.a. The receipt of a complete application, including all applicable fees, in accordance with the provisions of Section 5.1 of these regulations;

4.2.2.b. The review of the application form and plan

package for sufficiency; and

4.2.2.c. The results of any hearings held in accordance with the provisions of W. Va. Code §20-5D-7.

4.2.3. Defective applications will be returned to the applicant by certified or registered mail, return receipt requested, in order that he may correct any defect. The applicant must send a corrected application to the director within thirty (30) days of the date of the applicant's receipt of the returned application. The director may extend the thirty-day period upon the receipt of a written request from the applicant.

4.2.4. Upon the receipt of written approval from the director of the sufficiency of the application, the applicant shall immediately publish a Class I legal advertisement in a qualified newspaper, as defined in W. Va. 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 director in his written approval.

4.3. Hearings Prior to Certificate Issuance. Any person, as defined in W. Va. Code §20-5D-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 director. A written request for a public hearing, detailing the specific objections to the issuance of the certificate of approval, must be sent to the director within fifteen (15) days of the publication of the ClassI legal advertisement required under Section 4.2.4 of these regulations. Hearings that concern specific objections to the issuance of a certificate of approval will be conducted in accordance with the provisions of W. Va. Code §20-5D-7 at a location and time set by the director.

4.4. Certificate Revocation or Suspension. The director may revoke or suspend a certificate of approval in accordance with the provisions of W. Va. Code §20-5D-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 director may find necessary for the construction or operation of the dam. These terms and conditions may be amended by the director in accordance with the provisions of W. Va. Code §20-5D-8.

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

4.6.1. Upon the receipt of a written petition from a dam

owner, the director may waive or modify the refilling approval requirement of Section 4.6 of these regulations 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 director may refuse to issue a certificate of approval or may delay issuing a certificate of approval if the applicant fails to obtain necessary approvals from State or federal agencies.

4.7.1. 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 State or federal agency approval prior to issuance of a certificate of approval by the director.

4.7.2. Wetlands. Construction of a dam which may inundate, drain, or otherwise adversely affect wetlands (i.e., swamps, marshes, bogs, and similar areas) may require State and federal agency approval.

§47-34-5. Application Procedures.

5.1. Application Preparation and Submission.

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

5.1.2. Applications shall be submitted on the forms provided by the director. Application forms must be completed in their entirety without unauthorized omissions, alterations, or additions. Applications shall be signed by the applicant and an engineer.

5.1.3. A complete application will consist of a completed and signed application form, all applicable fees, and a plan package containing the information required under Section 6.4 of these regulations.

5.1.4. Plans, reports, specifications, and design drawings shall be signed and sealed by an engineer in accordance with the provisions of Section 6.2 of these regulations.

5.2. Application Review.

5.2.1. Applications will be reviewed for sufficiency by the Dam Safety Office. The review will consider the completeness and technical accuracy of the information submitted and will evaluate all engineering plans and assumptions to determine the safety of the dam.

5.2.2. Applications which are incomplete or otherwise not in compliance with the requirements of these regulations will be

returned to the applicant for correction in accordance with the provisions of W. Va. Code §20-5D-7.

§47-34-6. 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 Sections 7 through 12 of these regulations.

6.2. Engineer's Signature and Seal Required. All plans and specifications shall be signed and sealed by an engineer. The engineer's signature and seal are required on each full-size plan sheet, even if the sheets are bound together, and are further required on the front page of any engineering report book and each unbound sheet of drawings or specifications included in appendices or pockets.

6.3. Engineering Practices. All plans and specifications for the placement, construction, enlargement, alteration, breaching, removal, abandonment, or repair of a dam shall be in the charge of an engineer.

6.3.1. Standard Practices. All engineering designs, procedures, processes, and analyses shall be based upon standard, accepted, and sound engineering practices. Practices which are questionable or difficult to prove analytically may be rejected by the director or returned for additional information.

6.3.2. Experimental Practices. Experimental design will not be approved by the director unless the experiment meets the following conditions:

6.3.2.a. Engineering analysis indicates the design is realistic and success is likely;

6.3.2.b. Failure of the experiment to perform properly will not endanger life and property or cause the failure of the dam; and

6.3.2.c. The engineer and dam owner agree to redesign and modify the experimental design if it does not perform properly.

6.4. Plan Package Organization. Each plan package submitted for approval shall contain the following information, arranged in the following order, unless an alternative submission format is approved by the director:

6.4.1. Project Narrative. A general narrative discussion of the project shall be included in the plan package to detail the following:

6.4.1.a. Existing site conditions;

6.4.1.b. Local geology and geotechnical considerations;

6.4.1.c. Design life of the dam and its appurtenances;

6.4.1.d. Subsidence potential;

6.4.1.e. Design techniques with associated design computations and data;

6.4.1.f. Environmental protection measures for the control of erosion and sedimentation and for the disposal of construction wastes;

6.4.1.g. Method of construction, including clearing and grubbing, topsoil stockpiles, and surface and subsurface drainage structures;

6.4.1.h. Phases of construction; and

6.4.1.i. Routine inspection and maintenance procedures and schedules.

6.4.2. Construction Sequence and Schedule. A proposed or recommended sequence of construction, with a schedule listing the anticipated number of working days necessary to accomplish each item in the sequence, shall be included in the plan package to cover the following general categories:

6.4.2.a. Sediment control measures;

6.4.2.b. Clearing and grubbing;

6.4.2.c. Road or utility relocations;

6.4.2.d. Development of borrow areas;

6.4.2.e. Placement of coffer dams or diversions;

6.4.2.f. Excavation of foundation areas;

6.4.2.g. Excavation of spillways;

6.4.2.h. Placement of embankment or structural materials;

6.4.2.i. Placement of spillways and appurtenances to spillways;

6.4.2.j. Seeding and mulching of the project area;

6.4.2.k. General cleanup of the project area; and

6.4.2.l. Other information as requested by the director.

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

6.4.3.a. Clearing and grubbing;

6.4.3.b. Soil stockpiles;

6.4.3.c. Subdrain construction;

6.4.3.d. Slopes;

6.4.3.e. Grades;

6.4.3.f. Surface drainage structures;

6.4.3.g. Spreading and compaction requirements, including lift thicknesses, moisture content, and degree of compaction;

6.4.3.h. Material and gradation requirements for sub-surface drainage structures;

6.4.3.i. Pipes;

6.4.3.j. Concrete, including testing and curing;

6.4.3.k. Anti-seep mechanisms;

6.4.3.l. Cutoff trenches;

6.4.3.m. Channel and slope protection (e.g., riprap);

6.4.3.m. Project quality control and testing;

6.4.3.o. Blasting;

6.4.3.p. Construction erosion and sediment control;

6.4.3.q. Construction waste disposal;

6.4.3.r. Dust abatement;

6.4.3.s. Revegetation;

6.4.3.t. Installation and reading of monitoring devices;

6.4.3.u. Inspection and maintenance; and

6.4.3.v. Other information as requested by the director.

6.4.4. Maps and Drawings.

6.4.4.a. Maps shall be included in the plan package showing the project area in relation to primary highways, county seats, and major drainages. County highway maps may be used for this purpose.

6.4.4.b. 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 7-1/2 minute United States Geological Survey topographic map with the project area plotted on it.

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

6.4.4.c.A. The location of the following items, if present, shall be plotted on the plan view map:

6.4.4.c.A.(a) Caves;

6.4.4.c.A.(b) Cemeteries and graves;

6.4.4.c.A.(c) Seeps;

6.4.4.c.A.(d) Springs;

6.4.4.c.A.(e) Mine drainage;

6.4.4.c.A.(f) Underground mine openings;

6.4.4.c.A.(g) Underground mine workings;

6.4.4.c.A.(h) Borings and test pits;

6.4.4.c.A.(i) Cross-sections;

6.4.4.c.A.(j) Project stationing;

6.4.4.c.A.(k) Reference points;

6.4.4.c.A.(l) Instrumentation;

6.4.4.c.A.(m) The subdrain system;

6.4.4.c.A.(n) Diversion channels;

6.4.4.c.A.(o) Surface water drainage channels;

6.4.4.c.A.(p) Spillway channels;

6.4.4.c.A.(q) Borrow source areas; and

6.4.4.c.A.(r) Proposed waste disposal areas.

6.4.4.c.B. Additional detailed plan views of the dam or its spillways and appurtenances may be required by the director.

6.4.4.d. Transverse and longitudinal cross-sections and profiles of the dam shall be included in the plan package showing original ground, subdrain locations, elevations, benches, spillways, and other pertinent features of the project area. A cross-section shall be provided for stability computations showing the dam at critical areas, with subsurface data plotted in accordance with the provisions of Section 7.4.2.a.C.(d) of these regulations.

6.4.4.e. Cross-sections and profiles of major drainage facilities shall be included in the plan package.

6.4.4.f. Construction drawings shall be included in the plan package showing subdrains, spillways, anti-seep mechanisms, and other pertinent structures.

6.4.5. Inventory of Protected Sites.

6.4.5.a. An inventory of sites protected under State or federal law must be conducted by each applicant seeking a certificate of approval to:

6.4.5.a.A. Construct a new dam; or

6.4.5.a.B. Alter or enlarge an existing dam whereby new areas will be disturbed or flooded.

6.4.5.b. The minimum acceptable protected sites inventory shall include the following components:

6.4.5.b.A. A field survey shall be conducted by the applicant or his agents to ascertain the presence of any cave (i.e., a naturally occurring underground subterranean cavity such as a cavern or grotto) within the area to be disturbed or flooded by the project. The location of all caves must then be plotted on the plan view map required under Section 6.4.4.c of these regulations. If no caves are present in the area to be disturbed or flooded, that fact must be noted in a statement attached to the plan view map submitted to the director.

6.4.5.b.B. A field survey shall be conducted by the applicant or his agents to ascertain the presence of any cemetery or grave within the area to be disturbed or flooded by the project. The location of all cemeteries and graves must then be plotted on the plan view map required under Section 6.4.4.c of these regulations. If no cemeteries or graves are present in the area to be disturbed or flooded, that fact must be noted in a

statement attached to the plan view map submitted to the director.

6.4.5.b.C. A copy of the plan view map required under Section 6.4.4.c of these regulations shall be sent by the applicant to the West Virginia Division of Natural Resources, Nongame Wildlife Program, P.O. Box 67, Elkins, West Virginia 26241. A letter of transmittal that briefly explains the nature of the applicant's project must accompany the map so that State officials may have the opportunity to assess whether the applicant's project will adversely impact any animal or plant species that is listed by the federal government as endangered or threatened in 50 C.F.R. Part 17. A copy of the applicant's letter of transmittal must be included in the plan package submitted to the director; and

6.4.5.b.D. A copy of the plan view map required under Section 6.4.4.c of these regulations shall be sent by the applicant to the West Virginia Division of Culture and History, Historic Preservation Unit, Building 9, State Capitol Complex, Charleston, West Virginia 25305. A letter of transmittal that briefly explains the nature of the applicant's project must accompany the map so that State officials may have the opportunity to assess whether the applicant's project will adversely impact any historic site that is listed by the West Virginia Division of Culture and History on the State Register of Historic Places. A copy of the applicant's letter of transmittal must be included in the plan package submitted to the director.

6.4.5.c. If either artifacts of historical significance or human remains are uncovered by construction or related activities, the Dam Safety Office must be contacted immediately. The director may suspend activities in the vicinity of such artifacts or remains until appropriate investigations have been conducted.

§47-34-7. Design Requirements.

7.1. Hydrologic Considerations.

7.1.1. General Hydrologic Requirements.

7.1.1.a. Hydrologic Investigation.

7.1.1.a.A. A survey shall be conducted to evaluate soil types, land use, land slope, watershed area, runoff curve number, and any other 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.

7.1.1.a.B. A stream flow analysis shall be conducted to evaluate stream flow quantity and quality as it affects the dam

and its appurtenances.

7.1.1.b. Design Storm Requirements. All dams shall be designed to meet the following minimum hydrologic criteria based upon hazard classification:

7.1.1.b.A. Class A Dams. Class A dams shall be designed for a minimum of P100+0.12(PMP-P100) inches of rainfall in six (6) hours.

7.1.1.b.B. Class B Dams. Class B dams shall be designed for a minimum of P100+0.40(PMP-P100) inches of rainfall in six (6) hours.

7.1.1.b.C. Class C Dams. Class C dams shall be designed for the probable maximum precipitation of six (6) hours in duration.

7.1.1.c. 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 director.

7.1.1.d. 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.

7.1.2. Specific Hydrologic Requirements.

7.1.2.a. Embankment Dams.

7.1.2.a.A. Storage and Discharge.

7.1.2.a.A.(a) Class A dams must be designed with either an open channel spillway only or a combination of principal and emergency spillways. A Class A dam shall be capable of passing that portion of the design storm that cannot be safely stored in the impoundment. The design of a Class A dam must assure that ninety percent (90%) of the stored volume of the design storm will be discharged within ten (10) days after the storm event.

7.1.2.a.A.(b) Class B dams must be designed with either an open channel spillway only or a combination of principal and emergency spillways. A Class B dam shall be capable of passing that portion of the design storm that cannot be safely stored in the impoundment. The design of a Class B dam must

assure that ninety percent (90%) of the stored volume of the design storm will be discharged within ten (10) days after the storm event.

7.1.2.a.A.(c) Class C dams designed with either an open channel spillway only or with an emergency spillway and a principal spillway together must be capable of discharging that portion of the probable maximum precipitation that cannot be safely stored in the impoundment. Class C dams designed with a decant or principal spillway only must be capable of storing the volume of water generated by a PMP rainfall event of six (6) hours in duration. The design of a Class C dam must assure that ninety percent (90%) of the stored volume of the design storm will be discharged within ten (10) days after the storm event.

7.1.2.a.B. 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 an embankment in a natural drainway capable of carrying the design flow without excessive erosion. The 50-year, 6-hour rainfall event shall be used as the design storm for surface drainage systems.

7.1.2.a.C. Spillway Frequency of Operation. Outlet works that incorporate vegetated earth or unlined earth emergency spillways shall be designed so that the average frequency of operation is no greater than the following recurrence schedule, based upon a 6-hour rainfall event:

7.1.2.a.C.(a) Class A Dams. Once in twenty-five (25) years.

7.1.2.a.C.(b) Class B Dams. Once in fifty (50) years.

7.1.2.a.C.(c) Class C Dams. Once in one hundred (100) years.

7.1.2.a.D. Overtopping Embankments. Regardless of their hazard classification, dams designed to overtop in accordance with the provisions of Section 7.4.2.a.D of these regulations shall not overtop more frequently than once in one hundred (100) years, based upon a 6-hour rainfall event.

7.1.2.b. Gravity Dams. Gravity dams may be designed in the same manner as the corresponding hazard classes of embankment type dams in Section 7.1.2.a.A of these regulations except that designed overtopping of the dam may be substituted for the emergency spillway requirements.

7.1.2.c. Waste Disposal Dams.

7.1.2.c.A. Storage and Discharge. The following storage and discharge systems may be used in design of waste disposal dams:

7.1.2.c.A.(a) Open Channel Only or Emergency Spillway with Principal Spillway. A dam designed with either an open channel spillway only or with an emergency spillway and a principal spillway together shall be capable of discharging that portion of the design storm that cannot be safely stored in the impoundment. This type of design must assure that ninety percent (90%) of the stored volume of the design storm will be discharged within ten (10) days after the storm event. Slurry impoundments shall be provided with a means of removing water to maintain the lowest practical water level.

7.1.2.c.A.(b) Principal Spillway or Decant Only. A dam designed with a decant or principal spillway only shall be capable of storing the volume equivalent to a minimum of one (1) design storm. This type of design must assure that ninety percent (90%) of the stored volume of the design storm will be discharged within ten (10) days after the storm event. Slurry impoundments shall be provided with a means of removing water to maintain the lowest practical water level.

7.1.2.c.A.(c) No Outlet Works. A dam designed without discharge structures shall be capable of storing the volume equal to a minimum of two (2) design storms. Water shall be removed from the impoundment to its lowest practical level by pumping or other means if storm water reduces the storage capacity to one (1) design storm or less.

7.2. Hydraulic Considerations.

7.2.1. General Hydraulic Requirements.

7.2.1.a. Hydraulic Analysis. 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 slopes 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 dissipators.

7.2.2. Specific Hydraulic Requirements.

7.2.2.a. Open Channels. Open channels, including open channel spillways, shall be analyzed for flow depth, velocity, nonuniform flow conditions, superelevation, and hydraulic jumps.

7.2.2.a.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.

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

7.2.2.a.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.

7.2.2.a.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-section where nonuniform flow occurs, the transition through critical flow shall be as rapid as possible.

7.2.2.a.E. Superelevation. Channel walls shall be designed to contain superelevated flows in curves. Where curves occur in spillway channels, the director may approve superelevation wall height based upon one-half of the design flow, but not less than the P100 design flow, provided the excess overflow will impinge on natural ground and will not endanger the dam, human life, or property.

7.2.2.b. Closed Conduit Systems. Closed conduit systems including principal spillways, risers, and pipes shall be analyzed to determine the controlling limits of weir, orifice, and pipe flows.

7.2.2.b.A. 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.

7.2.2.b.B. 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 calculations.

7.2.2.b.C. Slug Flow. Conduit systems shall be designed to avoid formation of alternating partial and full pipe flow conditions through proper selection of pipe slope and headwater or tailwater conditions.

7.3. Geotechnical Considerations.

7.3.1. Geotechnical Investigation. A geotechnical investigation shall be performed. The quantity, location, and depth of borings, test pits, or trenches must be adequate for the evaluation of the bearing capacity and subsurface conditions for the proposed structure and may vary based upon the height, impoundment volume, and hazard classification of the dam. Factors to be considered include depth of soil, characteristics of bedrock, and determination of groundwater location. Results of in-situ testing and soil sampling shall be reported in the plan package. Soil profiles shall be utilized for critical foundation locations of the structure, spillways, and other pertinent locations which affect the safety of the structure. A geological study shall also be conducted to evaluate stratigraphy, landslides, 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 including thickness of coal seams, depth and type of rock above the coal seam, and previous or expected subsidence problems shall be considered where subsidence may affect the safety of the structure.

7.3.1.a. Project Area Survey. A project area survey shall be conducted to establish baselines and elevations of the dam embankments, reservoir and borrow areas, and appurtenant structures. The survey shall locate all test pits, borings, gas wells, oil wells, water wells, mine openings, landslides, and areas of natural seepage.

7.3.1.b. Borrow Areas. Borrow areas shall be evaluated for appropriate construction materials and required volume. Borrow areas and excavation materials shall be tested to determine the suitability of material for use in embankments or drains.

7.3.2. Laboratory Testing. Laboratory tests shall be conducted on a sufficient number of samples of foundation and embankment materials to provide an accurate representation of soil conditions. Tests shall include, but not be limited to, a complete soil classification including grain size, sieve, hydrometer analysis, Atterberg limits, density, water content, compaction tests, shear strength, consolidation, and permeability where applicable. Compaction and proctor curves shall be developed for all fill materials as appropriate.

7.3.3. 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.

7.3.3.a. 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 director 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 zones during construction.

7.3.3.a.A. 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. Material used in grouts shall be specified in accordance with the provisions of Section 7.4.1.a.B of these regulations.

7.3.3.b. 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 would lead to cracking of the dam. Spillway pipes on compressible foundations shall be protected from damage due to settlement.

7.3.3.c. Landslides. The potential for landslides, as determined in the initial project area investigation, shall be evaluated by the engineer. If landslides noted in the project area could 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 conditions shall be corrected to a minimum static safety factor of 1.5.

7.4. Structural Considerations.

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

7.4.1.a. Structural Materials. Materials selected for use in the dam 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.

7.4.1.a.A. 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 breakdown. 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.

7.4.1.a.B. Concrete Design. Concrete shall be designed in accordance with standard engineering practices. Concrete design specifications shall include materials, proportioning, form-work, reinforcement, joints and embedded items, production, placing, repair of surface defects, finishing, curing and protection, testing, evaluation and acceptance, and allowable tolerances for acceptance.

7.4.1.a.B.(a) Concrete Specifications. The engineer shall specify the nature of concrete to be used with sufficient detail for on-site quality control. The concrete may be specified by specific mix, aggregate, 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.

7.4.1.a.B.(b) Concrete Placement. The engineer shall specify methods and limits of placement of the 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 vibrating devices, and allowable ambient air temperatures and concrete temperatures.

7.4.1.a.B.(c) Concrete Curing. The engineer shall specify the method of curing the concrete including moist curing or membrane curing, wetting, types of covering, acceptable curing temperature range of the concrete, any anticipated cold weather curing specifications or methods such as protection from freezing and insulation methods, hot weather placement methods and limitations, and curing time.

7.4.1.a.B.(d) Concrete Finishing. The engineer shall specify the type of finishing to be applied to the concrete and the acceptable temperature range.

7.4.2. Specific Structural Requirements.

7.4.2.a. Embankment Dams.

7.4.2.a.A. Selection of Materials. Material selected for construction of embankments shall be select earth material that is free from roots, brush, organic matter, construction waste, and other debris. The material must not be subject to breakdown or chemical reaction. Unless otherwise approved by the director, the selected material must be thoroughly tested for density, shear strength, liquid and plastic limits, and 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.

7.4.2.a.B. Zoned Embankments.

7.4.2.a.B.(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. Drain outlets shall be visible, not submerged under normal conditions, unobstructed, and protected with an animal guard where conduits are utilized.

7.4.2.a.B.(a)(A) 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 permeable relative to the surrounding embankment material.

7.4.2.a.B.(a)(B) 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.

7.4.2.a.B.(a)(C) Durability. The material used in the filter shall be hard, durable material that is not subject to slaking, breakdown, or chemical reaction.

7.4.2.a.B.(a)(D) Conduits. Perforated pipes may be used in the filter drain to increase capacity. Perforations shall be compatible with the filter gradations so that 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 pipe shall not be used in critical areas of the embankment or in any areas where the pipe is not reasonably accessible for replacement.

7.4.2.a.B.(a)(E) Filter Cloth. Filter cloth shall not be used in critical areas of the embankment or in any areas where the cloth is not reasonably accessible for replacement.

7.4.2.a.B.(b) Diaphragm Cutoff Walls. When concrete cutoff 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.

7.4.2.a.C. Embankment Stability.

7.4.2.a.C.(a) Embankment Safety Factors. Slope stability shall be analyzed to show that the embankment design achieves the following factors of safety under the conditions

listed:

7.4.2.a.C.(a)(A) A safety factor of 1.5 for the embankment loading conditions specified in Section 7.4.2.a.C.(c) of these regulations;

7.4.2.a.C.(a)(B) An end of construction safety factor of 1.3;

7.4.2.a.C.(a)(C) A rapid drawdown safety factor of 1.2; and

7.4.2.a.C.(a)(D) An earthquake safety factor under steady-state seepage conditions of 1.2 using seismic loading appropriate to the geological site conditions.

7.4.2.a.C.(b) Appurtenance Structural Stability. 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.

7.4.2.a.C.(c) Embankment Loading Conditions. 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 embankment dams without spillways.

7.4.2.a.C.(d) Stability Analyses. All slope stability analyses shall be performed using standard engineering practices. Exceptions to this requirement will be allowed by the director only where there is sufficient evidence to indicate that slope failures will not occur.

7.4.2.a.C.(d)(A) Critical cross-sections of the dam using equal X and Y axes scales shall be provided in the plan package. The cross-sections shall show the 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.

7.4.2.a.C.(d)(B) A listing of soil zone unit weights, angles of internal friction, and cohesion values for each soil shown on the cross-section shall be provided in the plan package. If an alternative analysis is utilized, assumed soil values of the analysis shall be shown.

7.4.2.a.D. Overtopping Embankments.

7.4.2.a.D.(a) Rock-Covered Embankments. Rock-covered embankments shall be designed so that the rocks selected will be sized to withstand the maximum depth and velocity of the

overtopping flow and be individually placed to maximize the interlocking effect. A minimum of two (2) layers of boulders is required. Boulders shall cover the crest, downstream face, and necessary areas of the upstream face of the dam and extend beyond the dam abutments to the extent necessary to contain the overtopping flow depth. Graded smaller rock shall fill the voids where the boulders contact the embankment to prevent erosion due to flow through the voids. The rock cover may be covered with soil and vegetated, provided that the equipment used to place the soil will not break the rock.

7.4.2.a.D.(b) Roller-Compacted Concrete Embankments. Roller-compacted concrete lift thickness and width shall be sized to withstand the maximum anticipated loading and uplift forces. Filter drains and weep holes shall be provided to relieve hydrostatic pressure behind roller-compacted concrete facings. The roller-compacted concrete may be covered with soil and vegetated.

7.4.2.b. Gravity Dams.

7.4.2.b.A. Stability Loading Conditions. Loading conditions for the stability analysis shall assume maximum overflow head from the design storm.

7.4.2.b.B. Gravity Dam Stability.

7.4.2.b.B.(a) Overturning. The reaction of all forces must act within the middle one-third of the base. This requirement may be modified by the director if detailed computations prove that overturning will not occur.

7.4.2.b.B.(b) Sliding. The dam shall have a factor of safety against sliding of at least 3.0 for normal loading conditions and 1.5 for maximum loading conditions.

7.4.2.b.B.(c) Bearing. The factor of safety against bearing failure shall be at least 1.5 for maximum stress at the downstream toe.

7.4.2.c. Waste Disposal Dams. The potential for liquefaction must be considered and the design shall include safeguards against the development of this condition.

7.4.2.d. Spillways. All spillways shall be designed to discharge an adequate distance beyond the downstream toe of the dam in a natural drainway to prevent erosion of the downstream toe or other detrimental effects to the dam structure.

7.4.2.d.A. Conduit Spillways. Inlets shall be protected by a designed trash rack and riser type spillways shall be designed to prevent detrimental vortexing. Risers shall have adequate weight to be non-buoyant and shall be of sufficient

strength to withstand maximum dynamic water and ice forces. Foundations for risers shall be designed to support the riser without serious movement or deformation.

7.4.2.d.A.(a) Conduits. Pipe conduits shall be placed on a designed foundation and bedding of sufficient strength to minimize settlement and other detrimental effects to the conduit. Anti-seep or anti-piping mechanisms shall be provided for all conduits passing through the dam, foundation, or abutments to control seepage along the pipe. Design allowances shall be made to compensate for differential settlement, elongation, and movement of the pipe conduit if the cradle is placed on a yielding foundation. Pipe conduits shall be of sufficient strength to support the maximum external loads and the maximum internal hydraulic pressure without leaking, and shall resist uplift pressures. The pipe conduit shall be constructed of material which will not deteriorate during the design life of the structure.

7.4.2.d.A.(a)(A) Use of Corrugated Metal Pipes. Corrugated metal pipes, whether coated or uncoated, shall not be used in new Class B or new Class C dams. Corrugated metal pipes in existing dams must be either replaced with new pipe or retrofitted with an appropriate liner if the director determines that the existing pipe constitutes a hazard to the proper operation of the dam because the pipe has developed leaks, has deteriorated, or has otherwise ceased to function properly.

7.4.2.d.A.(b) Outlets. Pipe conduits shall be designed to outlet in a natural drainway or a designed channel leading to a natural drainway. An energy dissipator shall be provided to eliminate erosion at the pipe outlet and be designed for maximum pipe flow. If pipe blockage by animals may occur, the pipe outlet shall be protected by an animal guard.

7.4.2.d.A.(c) Gated Drain Pipe Required. All new freshwater dams shall have a gated drainpipe for draining the impoundment. The gate shall be located in the reservoir or upstream of the cutoff wall or impermeable zone. If the gate is located within the embankment or structure, a service well shall be provided. The elevation of the gate system shall be such that the reservoir will be drained completely to original stream level. The drain system shall be designed to drain ninety percent (90%) of the volume of stored water at normal pool in ten (10) days including normal base flow and have a minimum capacity of three (3) times the normal base flow for the watershed with a headwater-to-diameter (HW/D) ratio of 1.5, unless otherwise approved by the director. The drain conduit shall meet the requirements for conduits set forth in Section 7.4.2.d.A.(a) of these regulations. A designed trash rack shall be provided at the inlet of the drain. The controls to operate the drain gate shall be accessible without the use of specialized equipment or of divers. The drawdown rate for reservoir storage volumes in excess of two thousand (2000)

acre-feet may be established by the director.

7.4.2.d.A.(d) The term "gate" as used in these regulations is a general term referring to a device used for controlling water flow.

7.4.2.d.B. Open Spillways. Unless specifically excluded, spillways of this type include the various designs of open type spillways including open channel, side channel, chute, labyrinth, and ogee.

7.4.2.d.B.(a) Earth Spillways. Spillways that are constructed of or in earth material shall be designed to pass the maximum design flow without excessive erosion. Earth spillways shall not be constructed over dam embankment fill material.

7.4.2.d.B.(a)(A) Flexible Linings. Vegetation, rock riprap, soil reinforcement, or other flexible linings may be used to increase flow quantities and velocities in earth spillways within design limits.

7.4.2.d.B.(b) Concrete Spillways.

7.4.2.d.B.(b)(A) Concrete. The engineer shall specify the grade and strength of concrete to be used in the spillway construction. The concrete structure shall be of sufficient strength to withstand the maximum design applied load.

7.4.2.d.B.(b)(B) Foundation. Concrete shall be placed on a prepared foundation and bedding capable of sustaining the applied loads without excessive deformation.

7.4.2.d.B.(b)(C) Drains. Designed filter drains and water pressure relief devices shall be provided under concrete slabs and walls to collect and safely convey water from seepage or leakage of construction joints and to relieve uplift pressure from seepage conditions.

7.4.2.d.B.(b)(D) Joints. Construction joints shall be made watertight by use of a sealant material. Sliding joints shall be supported by slabs to maintain alignment.

7.4.2.d.B.(b)(E) Cutoff Barriers. Cutoff barriers keyed into the foundation shall be provided to prevent or reduce seepage flows under the spillway.

7.4.2.d.B.(b)(F) Energy Dissipators. An energy dissipator shall be provided to reduce the hydraulic energy at the end of the spillway. The dissipator shall be designed to function properly for flows of at least one-half of the design spillway flow. Flows in excess of the design capacity of the energy dissipator shall not endanger the dam or its appurtenances and may result only in erosion.

7.4.2.d.B.(c) Nonstandard Spillway Design. The director may reject any spillway design if such design is of a nonstandard or untested nature and it is not possible to analytically predict the performance of the spillway or the detrimental effects of cross-waves, eddies, vortices, super-elevation, or hydraulic jumps within the spillway system.

7.4.2.e. Water Supply Pipes. Water supply pipes through a dam shall be constructed of a long-life, high-strength material. Welded joints or mechanical joints with sealing rings, or an alternative sealing method approved by the director, shall be utilized. Pipes shall be properly bedded to reduce differential settling or elongation. Anti-seep mechanisms or filter drains shall be provided to prevent piping along the exterior of the pipe. If the pipe is enclosed in or passes through concrete, the relative coefficients of expansion shall be considered. Anti-corrosive measures shall be employed if soil tests indicate corrosion may be a problem. An upstream shutoff valve shall be installed on all new dams or when upgrading existing dams where reservoirs are to be drained as part of the upgrading. The section of the pipe through the dam shall be capable of withstanding a minimum pressure of twice the maximum reservoir head. The pipe shall be pressure-tested for leaks at maximum reservoir head pressure prior to the final covering of the pipe installation.

7.5. Miscellaneous Considerations.

7.5.1. Erosion and Sediment Control. Erosion and sediment control measures sufficient to comply with the provisions of Section 8.1.13 of these regulations shall be included in the project design.

7.5.2. Waste Disposal Areas. The engineer shall delineate locations in the project area which are to be used as waste disposal areas.

7.5.3. Instrumentation. The engineer shall recommend instrumentation as necessary to monitor and measure performance of new dams or modifications to existing dams. The engineer shall specify the types and purpose of the recommended instrumentation.

7.5.3.a. Piezometers or Observation Wells. Piezometers or observation wells may be required by the director on embankment type dams to monitor phreatic level and water pressures in critical areas of the embankment and, if necessary, the foundation or abutments. All piezometer or well heads shall be anchored in concrete and protected from vandalism with a locking metal cylinder surrounding the piezometer or well pipe.

7.5.3.b. Survey Monuments. Survey monuments may be required by the director on embankment and gravity dams to monitor displacement, settlement, rotation, and deformation. Survey

monuments on earth dams shall be sufficiently embedded into the structure to prevent localized movement of the monument. Protective casings shall be installed if necessary to prevent damage or forced movement of the survey point.

7.5.4. Staged Construction. Waste disposal dams designed in stages of construction shall be capable of storing or passing the design storm specified in Sections 7.1.1.b and 7.1.2.a.A of these regulations during all stages of construction except during the initial start-up period, unless otherwise approved by the director. During the initial start-up period, the dam shall be capable of storing or passing the P100 rainfall event as soon as possible. Construction shall increase storm capacity, reaching the full design storm capacity within two (2) years.

§47-34-8. Construction or Modification of a Dam.

8.1. Construction Requirements.

8.1.1. Notification of the 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 director of the following:

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

8.1.1.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 Dam Safety Office and for receiving inspections reports and legal notifications.

8.1.2. Conformance with Plans. All work undertaken in the construction or modification of a dam shall be in strict conformance with the plans and specifications contained in the plan package submitted under Section 5.1 of these regulations and approved by the director. Any changes to the approved plans and specifications shall be submitted to and approved by the director prior to implementation.

8.1.3. On-Site Documents. A copy of the certificate of approval, the approved plans and specifications, all outstanding notices or orders to comply that have been issued by the director, and the monitoring and emergency action plans prepared in accordance with the provisions of Sections 15.6 and 15.7 of these regulations shall be available at the project area office for reference by construction personnel and the director.

8.1.4. 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 plan package.

8.1.5. Clearing and Grubbing. Clearing and grubbing shall be performed in the foundation, borrow, and soil stockpile areas. Clearing is required in the maximum permanent pool area unless otherwise approved by the director.

8.1.6. Foundation Preparation. Foundation preparation shall include installation of keyways and subdrains, removal of soft areas, and similar project area preparation operations dictated by the approved plans and specifications and by project area conditions. The foundation shall be inspected by the director prior to placement of embankment materials. If foundation problems are discovered during this inspection, additional foundation preparation may be required by the director.

8.1.7. Placement of Materials.

8.1.7.a. All fill shall be placed in accordance with the approved plans and specifications.

8.1.7.b. Compaction testing shall be completed as specified in the approved specifications; the results of such testing shall be reported in accordance with the provisions of Section 8.4.1 of these regulations.

8.1.7.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 8.4.1 of these regulations. Filter materials shall be placed to prevent segregation and contamination and shall be concurrently covered to prevent contamination or damage.

8.1.8. Grading.

8.1.8.a. All fill shall be graded in accordance with the approved plans and specifications.

8.1.8.b. The working surface and outslopes of the fill shall be concurrently graded through all phases of embankment construction.

8.1.8.c. The top of the fill shall be crowned to provide positive drainage during construction.

8.1.8.d. Final grading shall be conducted in order to facilitate revegetation.

8.1.9. Spillways and Appurtenances.

8.1.9.a. Spillways and appurtenances shall be

constructed in accordance with the approved plans and specifications.

8.1.9.b. When downslope placement of fill material is used in the construction of spillways, the fill material shall be compacted in horizontal layers to achieve the design configuration.

8.1.9.c. All riprap material shall be of hard, durable rock which is not acid-forming or toxic. Riprap shall be placed to prevent size segregation.

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

8.1.9.e. 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.

8.1.9.f. When concrete is used in construction of spillways and appurtenances, the concrete shall be placed, cured, and finished in accordance with the provisions of Sections 7.4.1.a.B.(b) through 7.4.1.a.B.(d) of these regulations. Standard engineering tests shall be performed in accordance with the provisions of Section 8.2.2.a of these regulations and reported in accordance with the provisions of Section 8.4.1 of these regulations.

8.1.9.g. 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 8.4.1 of these regulations. Sufficient fill shall be placed over pipes so as to prevent damage by heavy equipment.

8.1.10. Minimum Stream Flow. An adequate flow of water may be required by the director in the stream below the dam during construction and reservoir filling to maintain water quality in the stream and to support fish and other aquatic life. The director may require stream flow augmentation in accordance with the provisions of Section 15.3.2 of these regulations.

8.1.11. Blasting. Blasting may only be utilized in accordance with and as specified in the approved plans and specifications. Blasting based upon unforeseen project area conditions not covered in the approved plan package shall not be performed prior to approval by the engineer with the concurrence of the director.

8.1.12. Storm Water Discharge. 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 approved by the director shall be in place.

8.1.13. Erosion and Sediment Control.

8.1.13.a. General Requirements. Erosion and sedimentation must be controlled to prevent a degradation of land and streams below the dam or project area, including visible deposits of sediment, and 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 reference manuals and apply to the entire project area.

8.1.13.b. Specific Requirements. Cleared areas, borrow areas, disturbed areas along stream channels and waterways, and fills, whether complete or in progress, must be equipped with erosion and sediment control devices (i.e., diversions, waterways, sediment basins, straw bale dikes, or silt fences).

8.1.13.b.A. Location of Sediment Control Devices. Erosion and sediment control devices must be located as close to the disturbed area as practical. Effort must be made to contain the sediment load within the disturbed area in order to prevent the entry of sediments into the natural drainway or stream.

8.1.13.b.B. Removal of Sediment Control Devices. Erosion and sediment control devices must remain in place until permanent vegetation is established or the area is otherwise stabilized. Prior to the removal of the devices, trapped sediment must be removed and placed in a location approved by the director. Straw bale dikes and silt fences must be removed when no longer needed; sediment basins or ponds must be abandoned in a manner approved by the director. Barren and denuded areas remaining after the removal of a control device must be revegetated.

8.1.13.b.B.(a) The director may modify or waive the requirements of Section 8.1.13.b.B of these regulations for erosion and sediment control devices that are located within the impoundment area of the dam.

8.1.13.b.C. Cleaning Frequency. Sediment control diversions, silt fences, straw bale dikes, and waterways must be inspected once each week, and after each rainfall, and accumulated sediment must be removed in order to maintain design capacity. Sediment ponds, basins, and traps must be restored to design capacity when sediment accumulation approaches sixty percent (60%) of design capacity, or more frequently if so specified by the director in writing.

8.1.13.b.D. Temporary Seeding and Mulching. Temporary seeding and mulching shall be utilized on bare areas where no construction activity is anticipated for a period of three (3) or more weeks. Areas that shall receive seeding and mulching include the reservoir area, borrow areas, soil stock piles, and steep fill slopes where no further work is planned prior to final grading. Where seeding is not feasible due to severe slope or time of year, the director may approve mulching alone at a rate of three (3) tons of straw or hay per acre, or equivalent.

8.1.13.b.E. Water Routing. Water that is pumped or drained from work areas (e.g., excavations, foundations, and below grade fills) must be routed to properly-sized sediment control devices so that any sediment contained in the 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.

8.1.13.b.F. In-Stream Treatment. Barriers, such as silt fences or straw bales, located in the natural drainway or stream will not be considered acceptable as the primary means of sediment control for the project area. Properly designed sediment basins or ponds may be used for sediment control in the natural drainway or stream if the location of the basin or pond does not cause significant additional disturbance in undisturbed downstream areas. Use of a starter dike or the dam under construction may be considered appropriate for sediment control of the reservoir area provided the necessary detention time is achieved.

8.1.13.b.G. Sediment Control During Construction. Erosion and sediment control measures must be in place prior to the beginning of dam construction activities. Clearing and grubbing or sediment control measures not specified for the beginning of construction must be implemented in a timely manner as needed.

8.1.13.b.H. Permanent Erosion Measures. Permanent measures (e.g., vegetation, grading, diversions, waterways, and outlet structures) shall 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.

8.1.14. Disposal of Construction Wastes.

8.1.14.a. General Disposal Requirements. All waste materials that result from construction activities shall be disposed of in a manner approved by the director.

8.1.14.b. Specific Disposal Requirements.

8.1.14.b.A. Surplus Waste Materials. Surplus soil

and rock materials shall be deposited in waste disposal areas delineated in the approved plans.

8.1.14.b.B. Organic Waste Materials. Trees, brush, root masses, and construction-related wood materials may be either buried in waste disposal areas delineated in the approved plan package or burned in accordance with local burning ordinances and State air pollution control regulations.

8.1.14.b.C. Concrete Waste Materials. New or old waste concrete materials may be disposed of in areas approved by the director for surplus soil and rock materials. New, unset waste concrete shall not be deposited in a location where it will enter watercourses, either directly or indirectly as a result of runoff. After it has set, the new waste concrete may be moved to waste disposal areas delineated in the approved plans.

8.1.14.b.D. Other Waste Materials. Chemicals, petroleum products, plastics, garbage, sewage, and any associated containers shall be disposed of in a manner approved by the director.

8.1.14.b.E. Off-Site Waste Materials. No waste materials or soil waste may be transported to the project area for disposal.

8.1.15. Dust Abatement. The contractor shall fully suppress dust on haul and access roads and as necessary within the project area. Water, or an alternative dust pallative approved by the director, shall be used for dust suppression; the use of oil or waste oil is prohibited.

8.1.16. Access Roads. A permanent access road shall be provided to each dam site. The road must be adequate for emergency vehicular traffic. Single lane unpaved roads are acceptable provided the roads are properly maintained. The access road must be designed and located as to not be unduly affected by stream or spillway flows during heavy rainfall events. The road may be secured with a locked gate provided that the key is available to dam monitors and State and local emergency personnel for emergency response.

8.2. Quality Control.

8.2.1. Construction Monitoring.

8.2.1.a. All construction activities shall be monitored by an engineer or his designated representative. Construction monitoring shall not be the responsibility of the construction contractor unless specifically approved by the director in writing.

8.2.1.b. Responsibility for assessing the quality of the

workmanship and ascertaining compliance with the approved plans and specifications shall be vested primarily in the owner's engineer. The Dam Safety Office shall also monitor construction activities and workmanship in order to ascertain compliance with the approved plans and specifications, in accordance with the provisions of W. Va. Code §20-5D-9.

8.2.1.c. Critical phases of construction shall be monitored by the engineer or his designated representative constantly during active construction; noncritical phases of construction shall be checked at least once per day during active construction.

8.2.1.d. Additional supervision or testing will be required by the director if evidence of inadequate construction supervision exists.

8.2.2. Materials Testing. Construction materials shall be periodically tested on-site to ascertain compliance with design specifications in the approved plan package. Final quality control testing shall not be the responsibility of the construction contractor.

8.2.2.a. Concrete Testing. Routine tests of slump, air entrainment, and temperature shall be performed on each truck delivery. Cylinder samples for compression testing shall be taken each day or every twenty-five (25) cubic yards of delivered concrete, whichever is more frequent, unless otherwise required by the director.

8.2.2.b. Earth Fill Testing. Earth fill materials shall be tested for compaction and moisture content every alternate layer or each one thousand (1,000) 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.

8.2.2.c. Filter Materials Testing. 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 director to determine durability and soundness of the filter material.

8.3. Construction Inspections.

8.3.1. Inspections During Construction.

8.3.1.a. A visual inspection for construction progress, unstable conditions, quality control, and conformance with the approved plans and specifications shall be held at least once each working day (or more frequently as determined by the engineer). The inspection shall be performed by an engineer or a person under

the direct supervision of the engineer. The frequency of inspection may be changed by the director depending upon specific project area conditions.

8.3.1.b. Additional inspections shall be held after each heavy rainfall event in order to detect problems and propose remedial measures. These inspections shall be performed by an engineer or a person under the direct supervision of the engineer.

8.3.1.c. Instrumentation shall be monitored every seven (7) days unless otherwise specified by the engineer. Monitoring shall be performed by an engineer or a person under the direct supervision of the engineer. The frequency of monitoring may be changed by the director depending upon specific project area conditions.

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

8.3.3. Acceptance of Construction. When the dam owner is advised by the director that the construction appears satisfactory, the owner shall submit to the director 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 director. This certification shall be submitted within ninety (90) days of the director'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. If substantial modifications of the original specifications have been made during the construction period, the director may require that a corrected application form be submitted. Upon the receipt of the engineer's certification with the as-built drawings (and a corrected application form, if necessary), a letter of acceptance will be issued by the director.

8.3.4. Completed Dams. After acceptance of construction by the director, the dam and its appurtenances shall be inspected annually for a period of three (3) years by an engineer experienced in such inspections. The director reserves the right to attend any inspection and require prior notification of the inspection by the owner of the dam. A report of each inspection shall be prepared and filed with the director in accordance with the provisions of Section 15.5.1 of these regulations.

8.4. Construction Reporting Requirements.

8.4.1. Monthly Progress Reports During Construction. A written report containing the results of each inspection of

construction progress shall be submitted to the director 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. Upon the completion of the construction or modification of the dam, notice shall be given by the dam owner to the director so that a final construction inspection can be made in accordance with the provisions of Section 8.3.2 of these regulations.

8.4.2. Post-Construction Inspection Reports. A report shall be submitted to the director by the dam owner reporting the findings of the final construction inspection required under Section 8.3.2 of these regulations. Certification by an engineer shall be submitted to the director 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.

§47-34-9. Breaching of a Dam.

9.1. Application to Breach a Dam. The owner of a dam must obtain a certificate of approval from the director prior to the breaching of the dam. A complete application in accordance with the provisions of Section 5.1 of these regulations must be submitted to and approved by the director prior to the commencement of breaching activities.

9.1.1. Plan Package Requirements. The plan package submitted in order to breach a dam shall be in accordance with the applicable requirements of Section 6 of these regulations and must also include the specific requirements delineated in Sections 9.2 through 9.10 of these regulations. Narratives, plans, or specifications required under Section 6 of these regulations which are clearly not applicable to the proposed breaching activities may be omitted from the submittal; however, the director reserves the right to specify those items which must be included in the breaching plan package.

9.2. 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 2.6 of these regulations. 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.

9.3. Breach Channel. The embankment shall be breached with a designed channel having the capacity to carry the peak runoff from the design storm corresponding to the dam's hazard classification.

The channel created by the breach shall have an erosion-preventive lining adequate to withstand the depth and velocity of the peak flows from a P100 rainfall event. The channel side slopes shall achieve a minimum stability factor of safety of 1.5.

9.4. Safety. Reservoirs shall be completely drained before breaching operations begin. Breaching work shall be scheduled during dry weather using National Weather Service advice and proceed quickly to reduce the potential for impounding water.

9.5. Blasting. If blasting is to be used in the breaching of a dam, a blasting plan shall be submitted to the director for approval. The plan shall include the distance to 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 director.

9.6. Erosion and Sediment Control. Erosion and sediment control measures sufficient to comply with the provisions of Section 8.1.13 of these regulations shall be implemented during the breaching operation. The following measures shall also be implemented:

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

9.6.2. Silt deposits and barren areas in the reservoir shall be stabilized and revegetated.

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

9.6.4. A channel in the reservoir sediment may be required by the director in order to reestablish a stream channel.

9.6.5. Permanent sediment basins, subject to ongoing maintenance, may be required by the director if the dam owner cannot demonstrate the effectiveness of other structural and vegetative measures in stabilizing the reservoir area and dam site.

9.7. 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 director.

9.8. Placement of Non-Earthen Material. Concrete rubble and other rock material 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 prohibited. The requirements of Section 8.1.14 of these regulations shall apply to the disposal of any other waste materials generated by the breaching operation.

9.9. Galleries and Drains. The effect of flows through the breach and backwater pressure on galleries and drains shall be evaluated. The galleries and drains shall be vented or sealed as necessary to prevent failure of the remaining structure.

9.10. Safety of Remaining Structure. The remaining structure shall have sufficient strength to support the maximum hydraulic loading without failure. The engineer shall attempt to reduce or eliminate hazards associated with an "attractive nuisance."

9.11. Construction Practices. The requirements of Section 8 of these regulations shall apply when breaching a dam unless clearly not applicable to the breaching operation; however, the director reserves the right to specify which requirements are applicable.

§47-34-10. Removal of a Dam.

10.1. Application to Remove a Dam. The owner of a dam must obtain a certificate of approval from the director prior to the removal of the dam. A complete application in accordance with the provisions of Section 5.1 of these regulations must be submitted to and approved by the director prior to the commencement of removal activities.

10.1.1. 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 regulations and must also include the specific requirements delineated in Sections 10.2 through 10.8 of these regulations. Narratives, plans, or specifications required under Section 6 of these regulations which are clearly not applicable to the proposed removal activities may be omitted from the submittal; however, the director reserves the right to specify those items which must be included in the removal plan package.

10.2. Removal Requirements. Removal of a dam shall consist of the 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 director, the removal of a dam shall consist of complete removal of the structure to approximate original contour. A total of no more than ten percent (10%) of the length of the structure may remain at the abutment areas.

10.3. Safety. Reservoirs shall be completely drained before removal operations begin. Removal work shall be scheduled during dry weather using National Weather Service advice and proceed

quickly to reduce the potential for impounding water.

10.4. Blasting. If blasting is to be used in the removal of a dam, a blasting plan shall be submitted to the director for approval. The plan shall include distance to 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 necessary.

10.5. Erosion and Sediment Control. Erosion and sediment control measures sufficient to comply with the provisions of Section 8.1.13 of these regulations shall be implemented during the removal operation. The following measures shall also be implemented:

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

10.5.2. Silt deposits and barren areas in the reservoir shall be stabilized and revegetated.

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

10.5.4. A channel in the reservoir sediment may be required by the director in order to reestablish a stream channel.

10.5.5. Permanent sediment basins, subject to ongoing maintenance, may be required by the director if the dam owner cannot demonstrate the effectiveness of other structural and vegetative measures in stabilizing the reservoir area and dam site.

10.6. 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 director.

10.7. Placement of Non-Earthen Material. Concrete rubble and other rock material 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 prohibited. The requirements of Section 8.1.14 of these regulations shall apply to the disposal of any other waste materials generated by the removal operation.

10.8. Safety of Remaining Structure. If any portion of the structure remains, that portion shall have sufficient strength to support the maximum hydraulic loading without failure. The

engineer shall attempt to reduce or eliminate hazards associated with an "attractive nuisance."

10.9. Construction Practices. The requirements of Section 8 of these regulations shall apply when removing a dam unless clearly not applicable to the removal operation; however, the director reserves the right to specify which requirements are applicable.

§47-34-11. Abandonment of a Dam.

11.1. Application to Abandon a Dam. The owner of a dam must obtain a certificate of approval from the director prior to the abandonment of the dam. A complete application in accordance with the provisions of Section 5.1 of these regulations must be submitted to and approved by the director prior to the commencement of abandonment activities.

11.2. Reservoir Elimination. The reservoir area shall be completely filled to the crest elevation of the dam with approved material to eliminate the impoundment of water. The maximum impounding capacity upon completion of final grading shall not exceed one (1) acre-foot of impounding capacity. The final top elevation of the reservoir fill shall be higher than, and sloped into, the diversion system required under Section 11.4 of these regulations.

11.3. Embankment Stability. The remaining embankment shall be shown to achieve a minimum factor of safety in accordance with the provisions of Section 7.4.2.a.C of these regulations.

11.4. Diversion System. A diversion system designed for a P100 rainfall event shall be provided to capture the stream at the upstream end of the reservoir and convey stream water and embankment runoff water around the site. The diversion system shall outlet safely beyond the downstream toe of the embankment in a natural drainway capable of carrying the design storm without excessive erosion. The director may require the installation of an energy dissipator in accordance with the provisions of Section 7.4.2.d.B.(b)(F) of these regulations.

11.5. Sealing Conduits. All conduits through the embankment, with the exception of underdrain conduits, shall be sealed with concrete at the upstream end prior to elimination of the reservoir. The director may require pressure testing of conduits to determine seal adequacy.

11.6. Erosion and Sediment Control. Erosion and sediment control measures sufficient to comply with the provisions of Section 8.1.13 of these regulations shall be implemented during the abandonment operation.

11.7. Soil and Vegetative Cover. A sufficient layer of

topsoil shall be provided to permit long-term growth of vegetation. A seeding and mulching mixture shall be proposed in the abandonment application to accomplish revegetation of the project area.

11.8. Retention of Jurisdiction. The director shall retain jurisdiction over the site for a minimum period of five (5) 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 director 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.

11.9. Final Approval of Abandonment. At the completion of the five-year period, a final joint inspection by the engineer and the director shall be conducted to determine the effectiveness of the abandonment design and the potential need for continued maintenance. Should the director 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 director determine as a 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.

§47-34-12. Reduction or Enlargement of a Dam.

12.1. Reduction of Dam Height To Less Than Jurisdiction.

12.1.1. A person 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 2.6 of these regulations must obtain a certificate of approval from the director.

12.1.2. A complete application in accordance with the provisions of Section 5.1 of these regulations must be submitted to and approved by the director 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.

12.1.2.a. Plan Package Requirements. 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 regulations and must also include the specific requirements delineated in Sections 12.1.3 and 12.1.4 of these regulations. Narratives, plans, or specifications required under Section 6 of these regulations which are clearly not applicable to the proposed reduction may be omitted from the submittal; however, the director reserves the right to specify those items which must be included in the reduction plan package.

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

12.1.4. The remaining structure shall achieve a factor of safety in accordance with the provisions of Section 7.4.2.a.C or 7.4.2.b.B of these regulations as appropriate to the type of structure.

12.1.5. The requirements of Section 8 of these regulations shall apply when reducing the height of a dam unless clearly not applicable to the reduction operation; however, the director reserves the right to specify which requirements are applicable.

12.1.6. The director shall retain jurisdiction over the remaining structure until the reduction operation is completed and a letter of acceptance has been issued by the director.

12.2. Enlargement of a Structure to Jurisdiction.

12.2.1. A person planning to enlarge an existing structure so that the completed structure will meet the definition of "dam" set forth in Section 2.6 of these regulations must obtain a certificate of approval from the director.

12.2.2. A complete application in accordance with the provisions of Section 5.1 of these regulations must be submitted to and approved by the director prior to the commencement of enlargement activities.

12.2.2.a. Plan Package Requirements. 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 regulations. Narratives, plans, or specifications required under Section 6 of these regulations which are clearly not applicable to the proposed enlargement may be omitted from the submittal; however, the director reserves the right to specify those items which must be included in the enlargement plan package.

12.2.3. The director will require adequate drilling and testing of the existing structure and foundation to ascertain in-place conditions.

12.2.4. The requirements of Section 8 of these regulations shall apply when enlarging a structure to jurisdiction unless clearly not applicable to the enlargement operation; however, the director reserves the right to specify which requirements are applicable.

§47-34-13. Dams Completed Before July 1, 1973.

13.1. Complete Application Required. An application for a

certificate of approval shall be submitted to the director for all dams completed before July 1, 1973 which meet the definition of "dam" set forth in Section 2.6 of these regulations. If the engineer can demonstrate that the dam meets the design requirements specified in these regulations, an application for approval of an existing dam shall be submitted. If the dam requires modification to meet the requirements, an application for modification of an existing dam shall be submitted. If the above options are not exercised by the dam owner, an application to breach, remove, or properly abandon the dam pursuant to these regulations shall be submitted.

13.2. Performance Requirements. To receive a certificate of approval, all dams completed before July 1, 1973 shall meet the applicable design requirements of Section 7 of these regulations. Those dams which do not meet the design requirements of Section 7 of these regulations shall be modified, breached, removed, or properly abandoned pursuant to the provisions of these regulations.

13.3. Plan Package Requirements. The plan package submitted for approval or modification of an existing dam shall be in accordance with applicable requirements of Section 6 of these regulations, except that testing and analysis results may be substituted for design specifications. If as-built drawings are not available, the engineer may substitute drawings prepared by him which represent the existing conditions at the dam as determined through the testing and analysis program.

§47-34-14. Sale or Transfer of a Dam.

14.1. Notification and Documentation. Within thirty (30) days after the sale or transfer of a dam, the director must be notified of that transaction by the person who was issued the certificate of approval for the dam.

14.1.1. The seller of a dam must provide the following documentation to the director:

14.1.1.a. The name and address of new owner;

14.1.1.b. A copy of the signed agreement between the previous and new owner acknowledging certificate of approval responsibility and including any warranties, insurance coverage, or liability agreements between the parties;

14.1.1.c. The effective date of the ownership or responsibility transfer; and

14.1.1.d. Documentation that a copy of the certificate of approval -- or the most recent Dam Control Act Notice or Order if a valid certificate of approval does not exist -- has been entered in the deed or land records of the county in which the dam

is located.

14.1.2. The director may reissue a corrected certificate of approval reflecting the sale or transfer of a dam upon the receipt of appropriate documentation and fees.

§47-34-15. Dam Operations and Safety.

15.1. Safe Operations. The owner of a dam shall ensure that his dam is operated in a safe and responsible manner so as not to endanger life or property.

15.2. Operations Plan. Owners of dams which require the operation of gates, penstocks, or other means of regulating the reservoir level or downstream flow shall develop and submit an operations plan to the director for approval.

15.2.1. Plan Contents. The operations plan shall include, but not be limited to, normal and seasonal operational procedures for gates, penstocks, and other reservoir or downstream flow regulating devices. The name, address, and telephone number of each individual authorized to operate the dam shall also be included in the plan.

15.2.2. Plan Implementation. The operations plan shall be implemented immediately upon approval by the director and shall be updated periodically as necessary to reflect any changes in personnel or operation procedures.

15.3. Releasing Water. The owner of a dam may release water or lower the reservoir elevation through the use of gates without prior approval of the director provided that the release of water will not adversely affect the dam structure, property, or water quality or pose a hazard to human life.

15.3.1. Emergency Releases of Water. Under emergency conditions, the owner of a dam may release water at a rate which may violate the criteria established under Section 15.3 of these regulations provided that such emergency release will not pose an unjustifiable hazard to human life. Notification must be given of a pending emergency release of water in accordance with the provisions of Section 15.8.1 of these regulations. In accordance with the provisions of W. Va. Code §20-5D-13, this regulatory provision shall not relieve the owner of the dam of any liabilities resulting from an emergency release of water.

15.3.2. Low Flow Augmentation. The director may require the owner of a dam to maintain a specified stream flow below the dam or to augment the stream flow for appropriate in-stream uses.

15.4. Dam Safety Inspections. Periodic inspections of dams shall be performed to monitor and assess the condition of the dam. These scheduled safety inspections of completed dams shall be in

the charge of an engineer.

15.4.1. Inspections by the Dam Owner. The owner of a dam or his agent shall perform safety inspections monthly or more frequently. Such inspections must survey the dam and its appurtenances to check for problems or changes since the last inspection. The owner or his agent shall inspect the dam more frequently than once per month during adverse weather conditions. The owner shall report any observed problems to the director.

15.4.2. Inspections by the Director. The director may inspect any dam at any time in accordance with the provisions of W. Va. Code §20-5D-4(i).

15.4.3. Inspections by the Owner's Engineer. An engineering inspection shall be conducted annually for three (3) years after the completion of any dam, in accordance with the provisions of Section 8.3.4 of these regulations. Upon the conclusion of this three-year period, the dam shall be inspected by the owner's engineer at the frequency specified in Sections 15.4.3.a through 15.4.3.c of these regulations as appropriate to the hazard classification of the dam. The director may require additional inspections based upon site conditions. The director reserves the right to attend any inspection and require prior notification of the inspection from the owner of the dam.

15.4.3.a. Class A dams shall be inspected at least once every five (5) years.

15.4.3.b. Class B dams shall be inspected at least once every three (3) years.

15.4.3.c. Class C dams shall be inspected at least once every two (2) years.

15.4.4. Inspection of Dams with Serious Problems. The director may establish the frequency of inspection of dams with serious problems for both inspections by the dam owner under Section 15.4.1 of these regulations and inspections by the owner's engineer under Section 15.4.3 of these regulations. The inspection of a dam with serious problems shall monitor slopes, seepage, bulges, scarps, vertical displacement, excessive erosion, piping, sudden changes in monitoring devices, and other visible factors which could indicate potential failure of the embankment, spillways, or other appurtenances. The director reserves the right to attend any inspection and require prior notification of the inspection by the owner of the dam.

15.5. Dam Safety Inspection Reports.

15.5.1. Inspection Reports for Completed Dams. A written report containing the observations of each inspection that is required under Sections 8.3.4 and 15.4.3 of these regulations

shall be submitted to the director by the dam owner within thirty (30) days of the inspection. The report shall also describe maintenance work to be performed as a result of the inspection findings. Should a storm equal to or greater than a 50-year, 6-hour rainfall event occur, a similar report shall be filed to detail the resultant condition of the structure. Certification by an engineer shall be submitted to the director with each inspection report to verify that the dam and its appurtenances are functioning as designed.

15.5.2. Inspection Reports for Dams with Serious Problems. A written report containing the observations of each inspection required under Section 15.4.4 of these regulations shall be submitted to the director by the dam owner within thirty (30) days of the inspection.

15.6. Monitoring Plans. Owners of Class C dams shall formulate and submit a monitoring plan to the director for approval. Owners of Class A and Class B dams may be required by the director to formulate and submit a monitoring plan for approval.

15.6.1. The monitoring plan developed by the dam owner must follow the format of the example plan provided by the director and shall include, but not be limited to, the following:

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

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

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

15.6.1.d. A description of areas or items to be inspected;

15.6.1.e. Corrective actions to be taken;

15.6.1.f. The responsible persons' names, addresses, and telephone numbers;

15.6.1.g. The method of notification of the director and county emergency services authorities; and

15.6.1.h. Other items required by the director based upon site-specific conditions.

15.6.2. Monitoring plans shall be updated annually. More frequent updating of the plans may be required by the director 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 director.

15.7. Emergency Action Plans. Owners of Class C dams shall formulate and submit an emergency action plan to the director for approval. Owners of Class A and Class B dams may be required by the director to formulate and submit an emergency action plan for approval.

15.7.1. The emergency action plan developed by the dam owner must follow the format of the example plan provided by the director.

15.7.2. 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 3.5.3.b of these regulations to those authorities.

15.7.3. The dam owner shall provide county emergency services authorities with a copy of the monitoring plan, and all updates of that plan, approved by the director pursuant to Section 15.6 of these regulations.

15.8. Emergency Procedures.

15.8.1. 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 director. 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 director may waive the requirement for a certificate of approval, as required under Section 4 of these regulations, where it is necessary to accomplish repairs under emergency conditions.

15.8.2. Dangerous Condition. Should a dangerous condition develop, the director 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 15.6 and 15.7 of these regulations shall be implemented to protect life and property downstream. 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 director when there is an imminent danger to the health, safety, or welfare of the public.

15.8.3. Evaluation of Dangerous Conditions. If a dangerous condition develops, an engineering 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 director prior to implementation.

15.9. Dam Owner Not Relieved of Responsibility. The director's approval of a monitoring plan, or updates to such a plan, pursuant to Section 15.6 of these regulations or his approval of an emergency action plan pursuant to Section 15.7 of these regulations shall not relieve the dam owner of his legal duties, obligations, or liabilities under W. Va. Code §§20-5D-10 and 20-5D-13.

§47-34-16. Dam Maintenance.

16.1. General Maintenance Requirements.

16.1.1. Required Maintenance. Each dam shall be maintained in accordance with the plans and specifications approved under the applicable certificate of approval. The director may require maintenance to be performed on a dam, whether or not a certificate of approval has been issued for that dam.

16.1.2. Maintenance Plan. Owners of dams shall formulate and submit a written maintenance plan to the director for approval. The maintenance plan shall include, but not be limited to, schedules for maintaining embankments, concrete structures, vegetative or rock covers, gates, gate mechanisms, penstocks, or other reservoir-regulating devices, spillways, and appurtenances. The maintenance plan shall be implemented immediately by the dam owner upon the approval of the plan by the director. The maintenance plan shall be updated periodically as necessary to reflect changing site conditions.

16.2. Specific Maintenance Requirements.

16.2.1. All spillways and appurtenances shall be maintained to operate in accordance with the plans and specifications approved under the applicable certificate of approval.

16.2.2. All failures resulting from landslides or slope failures shall be corrected immediately if the failures significantly affect the safety or design capacity of the dam or its appurtenances. All failures shall be reported to the director.

16.2.3. All pipes shall be repaired or replaced when damaged, distorted, or if they otherwise fail to function properly in accordance with the plans and specifications approved under the applicable certificate of approval.

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

16.2.5. Any new gate which has been installed in a new dam or in the repair or modification of an existing dam, or any gate which has been opened within five (5) years prior to inspection by the director, shall be opened to at least thirty-three percent (33%) of its maximum capacity at least once annually. Gates not meeting the above requirements may remain closed until operated for the purposes of the owner or to alleviate an emergency condition and shall thereafter be opened at least once annually. All gate mechanisms shall be lubricated annually regardless of the operational status of the gate.

16.3. Routine Maintenance.

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

16.3.2. Routine inspections shall be made of all hydraulic structures in order to maintain proper operation. Special inspections shall be conducted whenever a significant flow through the structures has occurred.

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

16.3.4. All concrete structures and channel linings shall be maintained in accordance with the plans and specifications approved under the applicable certificate of approval. All cracks located in concrete channels shall be sealed immediately with a sealant approved by the director.

16.3.5. Access roads shall be maintained in order to provide access for emergency inspections, vehicles, and equipment.

16.3.6. The embankment or concrete structure of a dam 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. All dams with vegetative covers shall be mowed at least once annually. Grazing by farm animals shall be controlled to prevent animal trails or other damage to the vegetative cover.

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

16.3.8. All monitoring devices shall be routinely inspected and repaired or replaced as necessary so that the devices function properly.

§47-34-17. Dam Repairs.

17.1. General Repair Requirements. The director may require repairs to be performed on a dam, whether or not the dam has a certificate of approval. Major repairs shall require a certificate of approval, issuance of which may or may not constitute final approval of the dam, as determined by the director.

17.1.1. Routine Repairs (No Certificate Required). Repairs conducted in accordance with the provisions of Section 16.3 of these regulations shall not normally require an application for a certificate of approval; however, the director may require such an application based upon site-specific conditions.

17.1.2. Major Repairs (Certificate Required). Any repairs to a dam other than routine repairs listed in Section 16.3 of these regulations shall require an application for a certificate of approval in accordance with the provisions of these regulations.

17.2. Specific Repair Requirements.

17.2.1. Removal of Trees and Tree Roots. All trees shall be removed from the embankment and abutment areas, unless otherwise approved by the director based upon site-specific conditions. Small trees with a base diameter of four (4) inches or less may be removed without removing the root system unless specific problems with the root system are evident. Larger trees may require special care in removal. The director may require the removal of root systems of large trees if the potential for seepage along the root system exists. If removal of root systems requires extensive excavation of the embankment, the removal shall be considered a major repair requiring a complete application for a certificate of approval.

KEN HECHLER
Secretary of State

MARY P. RATLIFF
Deputy Secretary of State

A. RENEE COE
Deputy Secretary of State

CATHERINE FREROTTE
Executive Assistant

Telephone: (304) 558-6000
Corporations: (304) 558-8000

STATE OF WEST VIRGINIA

SECRETARY OF STATE

Building 1, Suite 157-K
1900 Kanawha Blvd., East
Charleston, WV 25305-0770

WILLIAM H. HARRINGTON
Chief of Staff

JUDY COOPER
Director, Administrative Law

DONALD R. WILKES
Director, Corporations

(Plus all the volunteer help we can get)

TO: Frank Pleurie

AGENCY: Division of Natural Resources

FROM: JUDY COOPER, DIRECTOR, ADMINISTRATIVE LAW DIVISION

DATE: August 28, 1992

THE ATTACHED RULE RECENTLY FILED BY YOUR AGENCY HAS BEEN ENTERED INTO OUR COMPUTER SYSTEM. PLEASE REVIEW, PROOF AND RETURN IT WITH ANY CORRECTIONS. IF THERE ARE NO CORRECTIONS, PLEASE SIGN THIS MEMO AND RETURN IT TO THIS OFFICE. YOU WILL BE SENT A FINAL VERSION OF THE RULE FOR YOUR RECORDS.

PLEASE RETURN EITHER THE CORRECTED RULE OR THIS FORM WITHIN TEN (10) WORKING DAYS OF THE DATE YOU RECEIVED THIS REQUEST. CALL IF YOU HAVE ANY QUESTIONS.

SERIES: 34 TITLE: 47 Division of Natural Resources

* THE ATTACHED RULE HAS BEEN REVIEWED AND IS CORRECT.

SIGNED: _____

TITLE OF PERSON SIGNING: _____

DATE: _____

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* THE ATTACHED RULE HAS BEEN REVIEWED AND NEEDS CORRECTING. THE CORRECTIONS HAVE BEEN MARKED.

SIGNED: Frank Pleurie

TITLE OF PERSON SIGNING: Administrator Regulatory Affairs

DATE: 9/11/92

NOTE: IF YOU ARE NOT THE PERSON WHO HANDLES THIS RULE, PLEASE FORWARD TO THE CORRECT PERSON.