Technical Reclamation Memorandum

TRM # 1

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Kentucky Department for Surface Mining Reclamation and Enforcement

Subject: Existing Structures

An existing structure can be approved in the permanent program permit under certain conditions if the applicant can demonstrate that the structure will meet the performance standards of the permanent program, irrespective of whether the structure meets the design standards of the permanent program. However, if the existing structure is in violation of the interim program performance standards, the permit cannot be issued until the structure has been reconstructed to meet both the design and performance standards of the permanent program.

If the existing structure is in compliance with the interim program performance standards, but will not comply with the performance standards of the permanent program, the permanent program permit can be issued if the application contains a compliance plan demonstrating, among other things, that the structure will be modified to comply with the permanent program performance standards. The structure will not have to be modified to meet design standards. There are two exceptions to this: 1) coal waste dams must be modified to meet both design and performance standards, 2) permanent program design standards that were required under the interim program will always have to be complied with by existing structures. (See 405 KAR 7:040E, Section 4 for further details on existing structures.)

Therefore, the Department has established which requirements are performance standards and which are design standards. In addition to performance and design standards the regulations contain other requirements which must be met.

Performance standard means a requirement that defines the desired result to be achieved by the design and operation of the structure. Performance standards can be one of several types:

1) A general statement of goals such as: "not cause damage to fish, wildlife, and related environmental values" and "not cause additional contributions of suspended solids to streamflow."

2) A numerical measure that establishes the degree or extent of performance required such as a factor of safety of 1.5, hydrologic capacities, and effluent limitations.

3) A specific requirement that is absolutely necessary to achieve the desired performance of the structure such as: to provide sufficient detention time for the sedimentation pond to meet effluent limitations and to provide a non-clogging dewatering device.

Design standard means a requirement that is not absolutely required in order to meet the performance goals, but is incorporated into the overall design to assure that the performance standard will be met. Examples are slope limitations and placing spoil in four foot lifts.

Other requirements are standards involving such items as certification, inspection scheduling, construction practices, maintenance requirements, etc., which will not affect the design of the existing structure; but are always required during construction and normal operation of the structure.

This memorandum contains an analysis of the regulations for structures, identifying the performance standards, design standards, and other requirements. Also included is a brief discussion of requirements for the compliance demonstration required by 405 KAR 8:030E, Section 25. The analysis presented here is for Title 405, Chapter 16; however, Chapter 18 will be applied in the same manner.

405 KAR 16:080E Diversions

PERFORMANCE STANDARDS	DESIGN STANDARDS	OTHER REQUIREMENTS
Sec. 1(1) (2) (3) (4) (6) (6)(a) (6)(b) Protection for transition flows and critical areas. (6)(c) (7) Sec. 2(1)(a) (1)(b) (1)(c) (2)(a) (2)(b) (3) (4)(a) (4)(b) (4)(c)	Sec. 1(6)(b) freeboard requirement of 0.3 feet	Sec. 1(5) (6)(d) (6)(e)

COMPLIANCE DEMONSTRATION

Under Section 1, (overland flow, shallow ground water flow and ephemeral streams) the storm event has changed from a 1 year to a 2-year frequency event. Therefore all old diversion ditch designs should be checked for the newer event. The storms are close numerically so compliance should not present a major problem. Loss of some freeboard may result, but as long as overtopping of the channel does not occur then the design should be acceptable.

Under Section 2, (stream channel diversions) the storm event for meeting performance has not been changed, therefore compliance should be readily shown. Because the Division of Water was responsible for permitting stream channel changes in the past (using the 100 year - 6 hour storm) a copy of their permit and assurance that it was constructed as approved and compliance history should demonstrate compliance.

405 KAR 16:090E Sedimentation Ponds

PERFORMANCE STANDARDS	DESIGN STANDARDS	OTHER REQUIREMENTS
Sec. 1(2) Sec. 2 The sediment storage volume and appropriate clean out and maintenance measures must be adequate to achieve compliance. Sec. 3 Sec. 4 Sec. 5(1) (2) (5) (9) Slopes shall be designed to be stable. (13) (15) (19) (20)	Sec. 2 0.125 acre-feet/acre of disturbed land. Sec. 5(3) (6) (7) (8) (9) Combined slopes shall not be less than 1V:5H, with neither slope steeper than 1V:2H.	Sec. 1(1) (3) (4) Sec. 5(4) (10) (11) (12) (14) (16) (17) (18)

COMPLIANCE DEMONSTRATION

Many of the performance standards are related to compliance with the effluent limitations promulgated by U.S. EPA in 40 CFR 434. Compliance with these limitations can be demonstrated by the use of computer modeling (i.e Deposits, Sedimont II, etc.) or recognized engineering techniques or the use of field data collected during significant storm events and correlated to the 10-year, 24-hour storm event. Past compliance history will be taken into account in the evaluation. It should be noted that flow through the emergency spillway during the 10-year, 24-hour event will be allowed as long as effluent limitations are met and as long as flow through the emergency spillway is not so frequent that the spillway would deteriorate. Reconstruction or modification of the pond should be avoided wherever possible. Measures such as straw dikes, check dams, sediment fences, vegetative filters, etc. to reduce the sediment concentration in the inflow to the pond are recommended. When modeling, take into account any reclamation and revegetation that has occurred in the drainage area.

The remaining performance standards are related to safety (hydrologic capacities and structural stability) and must be shown to be adequate. A floodrouting should be performed to show that the structure is not overtopped by passage of the design storm; either the 25 year - 24 hour or 100 year - 24 hour, depending on structure size. (The requirement for a freeboard allowance is not necessary for existing structures, only that overtopping will not occur).

A compliance demonstration for stability of structures less than 20 feet in height (measured from the upstream toe of the embankment to the crest of the emergency spillway) and having a storage volume less than 20 acre-feet need only show the slopes to be stable. In lieu of a stability analysis, if the slopes are 2h:1v and inspections indicate no apparent problems with stability then the pond will be considered in compliance for stability. For those structures larger than 20 feet (from upstream toe to emergency spillway crest) or 20 acre-feet as indicated above, a stability evaluation must be submitted showing a safety factor of at least 1.5.

Note: In 405 KAR 16:090E, Sec. 5(5), as a condition of primacy, guidelines concerning single spillway ponds must be developed. These will be addressed in a separate document and will not be covered at this time.

405 KAR 16:100E Permanent and Temporary Impoundments

PERFORMANCE STANDARDS	DESIGN STANDARDS	OTHER REQUIREMENTS
Sec. 1 (1)(a) (1)(b) (1)(c) (1)(d) (1)(e) Refers to SCS-TR60 and SCS-PS378, depending on size and/or storage capability. These contain both performance and design standards.* (1)(f) (1)(g) (2) Refer to discussion of 405 KAR 16:090E, Sec. 5. (3) Perimeter slopes shall be stable. Slopes where runoff enters pool shall be protected against erosion. (4) Sec. 2 (1)	Sec. 1 (1)(e) Refers to SCS-TR60 and SCS-PS378, depending on size and/or storage capability. These contain both performance and design standards.* Sec. 1 (3) Perimeter slopes shall not be steeper than 1v:2h.	Sec. 2 (2) (3) (4) (5)

*See Compliance Demonstration for further explanation

COMPLIANCE DEMONSTRATION

Moderate (B) hazard and high (C) hazard impoundments must meet all performance and design standards adopted pursuant to KRS 151.250, (401 KAR 4:030). A permit for construction from the Division of Water or DSMRE under 401 KAR 4:030, as-built drawings and the compliance history should demonstrate compliance.

Section 1(1)(e) of the regulation states that based on impounding capability, structures must comply with either SCS-TR60 or SCS-PS378 (Kentucky version). This will apply to class A structures only. All hydrologic and stability performance standards of these documents, in addition to the performance standards of this regulation, must be met. (Because of the length of the SCS guidelines, a break-down of performance vs. design standards was not performed. Apply the definitions of these terms as noted above to determine the performance standards).

Structures which can impound to an elevation of 5 feet or more above the upstream toe and can have a storage volume of 20 acre-feet or more; or if it can impound to an elevation of 20 feet or more above the upstream toe, must meet SCS-TR60. If neither of the two size conditions exist, then use SCS-PS378 (Kentucky version).

Compliance demonstration must include as-built drawings, the compliance history, flood routings and water quality data. Those subject to TR-60 should include a stability evaluation.

405 KAR 16:130E Excess Spoil Fills

This regulation is essentially the same as the interim program regulation; therefore all design and performance standards must be met. Compliance should already exist as demonstrated by as-built drawings, existing engineering data and analysis, and compliance history.

405 KAR 16:140E Disposal of Coal Processing Waste

PERFORMANCE STANDARDS	DESIGN STANDARDS	OTHER REQUIREMENTS
Sec. 1 (1) (1)(a) See discussion of Sec. 4 (1) (1)(b) (2) Sec. 3 (1) (2) (3) (4) Sec. 4 (1) Refers to 405 KAR 16:130 Sec. 1(1) (4) (5) (6) (7) [Safety Factor of 1.5 (8)] [Superseded by 16:140 (12)] (13) Sec. 2(1) [Superseded by 16:140 (2)] [Superseded by 16:140 (3)] (4) (6) Sec. 4 (2) (4)	Sec. 1 (1)(a) See discussion of Sec. 4 (1) Sec. 4 (1) Refers to 405 KAR 16:130 Sec. 1, [Slope requirement (8)] (9) Sec. 2 (5) (7) Sec. 4 (3)	Sec. 2 Sec. 4 (1) Refers to 405 KAR 16:130 Sec. 1(2) (3) (10) (11) (14) Sec. 5 Sec. 6 Sec. 7

COMPLIANCE DEMONSTRATION

The main concern for coal waste banks is their stability. Most of the performance and design standards reflect this concern. Therefore compliance demonstrations should show that the factor of safety has been met by the present design. The stability analysis should be based on actual laborabory testing of the material. (If material was unavailable during the original design and soil parameters were assumed, then some testing may be required to verify those assumptions.) Data submitted under 405 KAR 7:050E will be utilized along with inspections and compliance history to determine compliance. For those structures constructed without an underdrain system, analysis of the phreatic surface may be required if a questionable condition of saturation exists. Assumptions should not be used unless it is deemed conservative by the Department.

If a 1.5 safety factor cannot be established then the following steps should be used: (some of these steps may not be required to achieve the 1.5 safety factor)

1. Flatten the outslopes by regrading.

2. Buttress the fill with a rock buttress.

3. Installation of a horizontal drainage system (for high phreatic surfaces).

In addition to checking the fill itself, the adequacy of the diversion above the fill should also be checked (see above discussion on diversions).

405 KAR 16:160E Coal Processing Waste Dams and Impoundments

All such structures must meet both design and performance standards.

For class B and C structures all design and performance standards of 401 KAR 4:030 must be met. A permit for construction from the Division of Water or DSMRE under 401 KAR 4:030, as-built drawings, and compliance history should demonstrate compliance.

Compliance for class A structures may be demonstrated by as-built drawings, engineering data and analysis, and compliance history.

405 KAR 16:220E Roads

PERFORMANCE STANDARDS	DESIGN STANDARDS	OTHER REQUIREMENTS
Sec. 1(1)	Sec. 3(2)	Sec. 1(3) Certification
(2)	(8)(b) Keyway dimensions	Sec. 3(8)(a)
(3) Alternative specifications	(8)(d) slope limitations	(8)(c)
(4)	Sec. 4 (5)(a)3	Sec. 6
Sec. 2(1)	(5)(b)1	Sec. 7
(2)	(5)(b)2	
(3)	(5)(b)3	
Sec. 3(1)		
(3)		
(4)		
(5)		
(6)		
(7)		
(8)(b) Stable fill		
(8)(d) Stable slopes		
(8)(e)		
(8)(f)		
(8)(g)		
(8)(h)		
(8)(i)		
Sec. 4(1)		
(2)		
(3)		
(4)		
(5)(a)1		
(5)(a)2		
(5)(a)4		
(5)(b)4		
Sec. 5		

COMPLIANCE DEMONSTRATION

There are relatively few differences between this regulation and the interim program road regulations, especially considering the performance standard portions. Therefore, a road complying with the interim program should comply with the performance standards of this regulation. Furthermore, since this regulation provides for approval of alternative specifications yielding an equivalent result, existing roads may comply under that provision. Therefore, it is unlikely that any existing road presently complying with the interim program will need any significant modification.

Compliance evaluations will be based upon typical ditch, culvert and bridge hydrologic capacity calculations, as-built drawings, and compliance history.

405 KAR 16:250E Other Facilities

PERFORMANCE STANDARDS	DESIGN STANDARDS	OTHER REQUIREMENTS*
Sec. 1(1) (2) (3) (4) (5) Sec. 2(1) (2)		

COMPLIANCE DEMONSTRATION

Descriptions of these facilities will be included in the Mining and Reclamation Plan. Compliance evaluations will be based upon a site-by-site review and upon the compliance history.