

	U.S. DEPARTMENT OF THE INTERIOR OFFICE OF SURFACE MINING RECLAMATION AND ENFORCEMENT DIRECTIVES SYSTEM	Subject Code: INE-43
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		Date: NOV 12, 2008
Subject: Inspection of Durable Rock Fills Under Construction		
Approval: Brent Wahlquist		Title: Director

1. **Purpose.** Improper practices during the construction of durable rock fills have contributed to flooding, excessive sedimentation, slope instability, and mass movement during or immediately following precipitation events. In response, the Office of Surface Mining Reclamation and Enforcement (OSM) evaluated how unfinished durable rock fills should be inspected, within the existing regulatory framework, to assure that such fills remain stable and do not contribute excessive sedimentation and to promote the long-term stability of the fills. The purpose of this Directive is to formalize procedures developed from that evaluation for the inspection of durable rock fills under construction as OSM policy.
2. **Summary of Changes.** This is a new Directive.
3. **Definitions.**
 - a. **Certified reports.** Documentation of required inspections of excess spoil fill progress by a professional engineer (PE) or other qualified specialist under their direction detailed in 30 CFR §816/817.71(h) or state program counterparts.
 - b. **Crest.** The relatively horizontal top surface of an excess spoil fill. The crest is graded or “crowned” during all phases of construction so that water is not impounded on the crest during construction and surface runoff enters diversion channels at the sides of the fill and does not flow over the face of the fill. For durable rock fills, the crest is typically at the final design elevation, but may occur in intermediate stages.
 - c. **Construction.** All activities pertaining to the building and reclamation of a durable rock fill, including foundation preparation; excess spoil placement; regrading; drainage control installation; and vegetation of the fill.
 - d. **Diversion.** A conveyance to divert water defined in 30 CFR §701.5 and designed in accordance with 30 CFR §816/817.43 or state program counterparts.
 - e. **Durable rock fills.** A type of excess spoil disposal structure developed through gravity placement in single or multiple lifts in accordance with 30 CFR §816/817.73 as well as the applicable general excess spoil disposal requirements in 30 CR §816/817.71 or state program counterparts.

f. Face. The outslope of a regraded fill, located between the crest and the toe. On durable rock fills under construction, the active face progresses downstream to a designed location. During reclamation of the fill, the face is regraded to a slope no greater than two horizontal to one vertical (2:1). Regrading the face may include the establishment of terraces to help direct runoff from the fill face.

g. PE inspections. Periodic durable rock fill evaluation requirements by a qualified PE or other qualified professional specialist under direction of the PE required by 30 CFR §816/817.71(h) or state program counterparts.

h. Surface runoff. The flow of accumulated rainfall over the land and fill surfaces.

i. Toe. The lowest portion of the face of an excess spoil fill, usually in the valley bottom.

j. Underdrain. A structure in the lower portion of a fill designed consistent with 30 CFR §816/817.71(f)(3) and §816/817.73(e) or state program counterparts to effectively convey seepage away from the fill.

4. **Policy**. The concept of durable rock fills is that excess spoil going into the fill, when comprised of at least 80 percent durable rock, will result in a drainage blanket or underdrain adequate to meet regulatory requirements that forms naturally at the base of the fill face through gravity separation. That is, when new spoil material is dumped or pushed over the fill face, gravity segregation will cause larger rocks to roll to the base of the fill while finer particles remain in the higher elevations of the structure. The larger rocks form a free-draining blanket of coarse material in the lowermost part of the fill. Because a functional underdrain beneath the fill is essential to convey seepage from the base of the fill and prevent saturation of finer material at higher levels of the fill, an underdrain consisting of large blocky rock must be evident at all times during fill construction. If an adequate underdrain is not forming through gravity segregation, then a constructed underdrain must always be visible at the toe of the fill, including during those periods when the face of the fill is being regraded into its final configuration.

It is also very important that an adequate surface drainage system is in place during all phases of fill construction and reclamation and that surface runoff from areas adjacent to and above the fill will **not** flow over the face of the fill. When such runoff does flow onto the fill and over its face, severe erosion and mass movement may occur and can clog the underdrain at the toe of the fill. To prevent these problems from occurring, the fill crest must always be sloped so that water will flow off the structure into stabilized diversion channels.

When conducting an inspection of a surface coal mining operation that includes durable rock fills, as authorized by 30 CFR §816/817.73 or state counterpart regulations, and those fills are still under construction (final grading and revegetation have not been completed), inspections should be in compliance with the procedures contained in this Directive in order to assure that underdrains are adequate to prevent saturated zones high in the fill and that surface runoff is not directed onto the fill or over its crest and down the face.

5. **Responsibilities.**

a. The Assistant Director, Program Support, is responsible for ensuring that National Technical Training Program courses are consistent with this Directive.

b. The Regional Directors are responsible for actively promoting consistent adherence to this Directive in accordance with approved state or Federal regulatory programs.

c. The Division Chief responsible for technical support within each regional office will provide technical support, as required, to assure reclamation specialists (inspectors) understand the technical justification for this Directive and to assist in further mine site evaluations when inspectors identify on-the-ground concerns.

d. Field Office Directors/Field Division Chiefs are responsible for ensuring that OSM reclamation specialists fully understand and perform their duties consistent with this Directive.

e. OSM Reclamation Specialists are responsible for conducting inspections consistent with the policy and procedures of this Directive whenever they are inspecting mine sites where durable rock fills are under construction.

6. **Procedures.** Inspections of durable rock fills under construction should include the following:

a. Review of certified reports. OSM inspections of durable rock fills should begin with a review of the critical phase certifications and recent (at least the last two) quarterly certified reports required by 30 CFR §816.71(h) or state program counterparts. This review must always include an analysis of the color photographs required by 30 CFR §816.71(h)(3)(ii) and (iii) or state program counterparts to determine whether the underdrain construction is in compliance with the requirements of §816.73(e) or state program counterparts.

b. Inspection of field conditions. The OSM inspection must include review of site conditions sufficient to answer the following questions in the affirmative:

(1) Is the durable rock fill configuration (location, size, volume, length, crest elevation, etc.) consistent with the approved design?

(2) If revisions to the original mining plan that decrease or increase excess spoil generation were approved, were commensurate changes to the fill design (i.e., fill size, new stability analysis, etc) also approved?

(3) Is there an evident underdrain consisting of large, blocky rock, that has either formed through gravity separation or been separately constructed in advance of the fill?

(4) If there is water discharging from the underdrain, is the underdrain discharge free of fine particles that would indicate internal erosion of the fill material?

(5) Is the fill face free of symptoms of mass instability such as ground cracks, scarps, and hummocky terrain?

(6) Is the fill face free of seeps, springs, changes in spoil color, or growth of vegetation indicative of inadequate drainage or saturated zones within the fill?

(7) If excess spoil placement has stopped and the face is in the process of final reclamation, is the underdrain adequately protected from clogging from erosion, sedimentation, regrading, etc.?

(8) Does the crest of the fill slope back (away from the fill face), so that runoff from precipitation landing on the fill crest or within any drainage area above the fill will drain around the fill; will not impound; and will **not** flow over the face of the fill?

(9) Are temporary or permanent diversion channels in place around the fill?

(10) Do diversions and siltation structures associated with the fill conform to the approved drainage control plan (e.g., pertaining to fill location, size, and slope; and channel/discharge protection [linings, hydraulic controls, etc.]?)

(11) Is the fill face free of signs of excessive erosion that may indicate water flowing over the crest onto the face and/or evidence that the fill face has been exposed to the elements without regrading for an unwarranted length of time?

(12) Are areas within the footprint of the designed fill but downslope of the advancing toe free of excessive sedimentation?

(13) Is material being actively placed or was it recently placed in the fill? If not, is there still active mining in the area that would indicate the likelihood of additional material being placed in the fill?

(14) If the spoil placement is completed, has regrading of the fill face commenced?

(15) Is adequate progress on fill face regrading and revegetation occurring to ensure timely completion of the approved reclamation plan?

(16) If fill placement is neither active nor recent, is there approval of a temporary cessation plan with the appropriate measures prescribed to assure stability and drainage control until mining and reclamation recommence?

c. Inspection report. The OSM inspector must prepare a report documenting the results of review procedures for the elements of 6.a. and 6.b., above. The OSM inspector's report must include photographs (including suitable objects for relative scale comparisons) of conditions observed.

7. **Reporting Requirements.** None
8. **Effects on Other Documents.** None
9. **References.**
 - a. Surface Mining Control and Reclamation Act, Public Law 95-87
 - b. 30 CFR §§701.5, 780.35, 816/817.43, 816/817.71, 816/817.73, 816/817.100
 - c. Disposal of Excess Spoil from Coal Mining and the Surface Mining Control and Reclamation Act of 1977. Committee on Disposal of Excess Spoil, Board on Mineral and Energy Resources, Commission on Natural Resources, National Research Council, National Academy of Sciences, 207 p., 1981
 - d. Design Manual for Water Diversions on Surface Mine Operations. United States Department of the Interior, Office of Surface Mining Reclamation and Enforcement, 212 p., 1982
 - e. Engineering and Design Manual for Disposal of Excess Spoil. United States Department of the Interior, Office of Surface Mining Reclamation and Enforcement, 293 p., 1983
10. **Effective Date.** Upon issuance
11. **Distribution.** By electronic format
12. **Appendices.** None

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