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(c) Name, signature, and certification number of the blaster conducting the blast.

(d) Identification, direction, and distance, in feet, from the nearest blast hole to the nearest dwelling, public building, school, church, community or institutional building outside the permit area, except those described in §816.67(e).

(e) Weather conditions, including those which may cause possible adverse blasting effects.

(f) Type of material blasted.

(g) Sketches of the blast pattern including number of holes, burden, spacing, decks, and delay pattern.

(h) Diameter and depth of holes.

(i) Types of explosives used.

(j) Total weight of explosives used per hole.

(k) The maximum weight of explosives detonated in an 8-millisecond period.

(1) Initiation system.

(m) Type and length of stemming.

(n) Mats or other protections used.

(o) Seismographic and airblast records, if required, which shall include—

(1) Type of instrument, sensitivity, and calibration signal or certification of annual calibration;

(2) Exact location of instrument and the date, time, and distance from the blast;

(3) Name of the person and firm taking the reading;

(4) Name of the person and firm analyzing the seismographic record; and

(5) The vibration and/or airblast level recorded.

(p) Reasons and conditions for each unscheduled blast.

[48 FR 9809, Mar. 8, 1983, as amended at 52 FR 29181, Aug. 6, 1987; 81 FR 93392, Dec. 20, 2016; 82 FR 54979, Nov. 17, 2017]

§816.71 Disposal of excess spoil: General requirements.

(a) General. Excess spoil shall be placed in designated disposal areas within the permit area, in a controlled manner to—

(1) Minimize the adverse effects of leachate and surface water runoff from the fill on surface and ground waters;

(2) Ensure mass stability and prevent mass movement during and after construction; and

(3) Ensure that the final fill is suitable for reclamation and revegetation compatible with the natural surroundings and the approved postmining land use.

(b) Design certification. (1) The fill and appurtenant structures shall be designed using current, prudent engineering practices and shall meet any design criteria established by the regulatory authority. A qualified registered professional engineer experienced in the design of earth and rock fills shall certify the design of the fill and appurtenant structures.

(2) The fill shall be designed to attain a minimum long-term static safety factor of 1.5. The foundation and abutments of the fill must be stable under all conditions of construction.

(c) Location. The disposal area shall be located on the most moderately sloping and naturally stable areas available, as approved by the regulatory authority, and shall be placed, where possible, upon or above a natural terrace, bench, or berm, if such placement provides additional stability and prevents mass movement.

(d) Foundation. (1) Sufficient foundation investigations, as well as any necessary laboratory testing of foundation material, shall be performed in order to determine the design requirements for foundation stability. The analyses of foundation conditions shall take into consideration the effect of underground mine workings, if any, upon the stability of the fill and appurtenant structures.

(2) Where the slope in the disposal area is in excess of 2.8h:1v (36 percent), or such lesser slope as may be designated by the regulatory authority based on local conditions, keyway cuts (excavations to stable bedrock) or rock toe buttresses shall be constructed to ensure stability of the fill. Where the toe of the spoil rests on a downslope, stability analyses shall be performed in accordance with §780.35(c) of this chapter to determine the size of rock toe buttresses and keyway cuts.

(e) Placement of excess spoil. (1) All vegetative and organic materials shall be removed from the disposal area

prior to placement of the excess spoil. Topsoil shall be removed, segregated and stored or redistributed in accordance with §816.22. If approved by the regulatory authority, organic material may be used as mulch or may be included in the topsoil to control erosion, promote growth of vegetation or increase the moisture retention of the soil.

(2) Excess spoil shall be transported and placed in a controlled manner in horizontal lifts not exceeding 4 feet in thickness; concurrently compacted as necessary to ensure mass stability and to prevent mass movement during and after construction; graded so that surface and subsurface drainage is compatible with the natural surroundings; and covered with topsoil or substitute material in accordance with §816.22 of this chapter. The regulatory authority may approve a design which incorporates placement of excess spoil in horizontal lifts other than 4 feet in thickness when it is demonstrated by the operator and certified by a qualified registered professional engineer that the design will ensure the stability of the fill and will meet all other applicable requirements.

(3) The final configuration of the fill shall be suitable for the approved postmining land use. Terraces may be constructed on the outslope of the fill if required for stability, control of erosion, to conserve soil moisture, or to facilitate the approved postmining land use. The grade of the outslope between terrace benches shall not be steeper than 2h: 1v (50 percent).

(4) No permanent impoundments are allowed on the completed fill. Small depressions may be allowed by the regulatory authority if they are needed to retain moisture, minimize erosion, create and enhance wildlife habitat, or assist revegetation; and if they are not incompatible with the stability of the fill.

(5) Excess spoil that is acid- or toxic-forming or combustible shall be adequately covered with nonacid, nontoxic and noncombustible material, or treated, to control the impact on surface and ground water in accordance with §816.41, to prevent sustained combustion, and to minimize adverse effects

on plant growth and the approved postmining land use.

(f) *Drainage control.* (1) If the disposal area contains springs, natural or man-made water courses, or wet weather seeps, the fill design shall include diversions and underdrains as necessary to control erosion, prevent water infiltration into the fill, and ensure stability.

(2) Diversions shall comply with the requirements of §816.43.

(3) Underdrains shall consist of durable rock or pipe, be designed and constructed using current, prudent engineering practices and meet any design criteria established by the regulatory authority. The underdrain system shall be designed to carry the anticipated seepage of water due to rainfall away from the excess spoil fill and from seeps and springs in the foundation of the disposal area and shall be protected from piping and contamination by an adequate filter. Rock underdrains shall be constructed of durable, nonacid-, nontoxic-forming rock (*e.g.*, natural sand and gravel, sandstone, limestone, or other durable rock) that does not slake in water or degrade to soil material, and which is free of coal, clay or other nondurable material. Perforated pipe underdrains shall be corrosion resistant and shall have characteristics consistent with the long-term life of the fill.

(g) *Surface area stabilization.* Slope protection shall be provided to minimize surface erosion at the site. All disturbed areas, including diversion channels that are not ripped or otherwise protected, shall be revegetated upon completion of construction.

(h) *Inspections.* A qualified registered professional engineer, or other qualified professional specialist under the direction of the professional engineer, shall periodically inspect the fill during construction. The professional engineer or specialist shall be experienced in the construction of earth and rock fills.

(1) Such inspections shall be made at least quarterly throughout construction and during critical construction periods. Critical construction periods shall include at a minimum:

(i) Foundation preparation, including the removal of all organic material and

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topsoil; (ii) placement of underdrains and protective filter systems; (iii) installation of final surface drainage systems; and (iv) the final graded and revegetated fill. Regular inspections by the engineer or specialist shall also be conducted during placement and compaction of fill materials.

(2) The qualified registered professional engineer shall provide a certified report to the regulatory authority promptly after each inspection that the fill has been constructed and maintained as designed and in accordance with the approved plan and this chapter. The report shall include appearances of instability, structural weakness, and other hazardous conditions.

(3)(i) The certified report on the drainage system and protective filters shall include color photographs taken during and after construction, but before underdrains are covered with excess spoil. If the underdrain system is constructed in phases, each phase shall be certified separately.

(ii) Where excess durable rock spoil is placed in single or multiple lifts such that the underdrain system is constructed simultaneously with excess spoil placement by the natural segregation of dumped materials, in accordance with §816.73, color photographs shall be taken of the underdrain as the underdrain system is being formed.

(iii) The photographs accompanying each certified report shall be taken in adequate size and number with enough terrain or other physical features of the site shown to provide a relative scale to the photographs and to specifically and clearly identify the site.

(4) A copy of each inspection report shall be retained at or near the mine site.

(i) *Coal mine waste.* Coal mine waste may be disposed of in excess spoil fills if approved by the regulatory authority and, if such waste is—

(1) Placed in accordance with §816.83;

(2) Nontoxic and nonacid forming; and

(3) Of the proper characteristics to be consistent with the design stability of the fill.

(j) *Underground disposal.* Excess spoil may be disposed of in underground mine workings, but only in accordance with a plan approved by the regulatory

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authority and MSHA under §784.25 of this chapter.

[48 FR 32925, July 19, 1983, as amended at 48 FR 44780, Sept. 30, 1983; 73 FR 75883, Dec. 12, 2008; 79 FR 76231, Dec. 22, 2014; 81 FR 93392, Dec. 20, 2016; 82 FR 54979, Nov. 17, 2017]

### §816.72 Disposal of excess spoil: Valley fills/head-of-hollow fills.

Valley fills and head-of-hollow fills shall meet the requirements of §816.71 and the additional requirements of this section.

(a) *Drainage control.* (1) The top surface of the completed fill shall be graded such that the final slope after settlement will be toward properly designed drainage channels. Uncontrolled surface drainage may not be directed over the outslope of the fill.

(2) Runoff from areas above the fill and runoff from the surface of the fill shall be diverted into stabilized diversion channels designed to meet the requirements of §816.43 and, in addition, to safely pass the runoff from a 100-year, 6-hour precipitation event.

(b) *Rock-core chimney drains.* A rock-core chimney drain may be used in a head-of-hollow fill, instead of the underdrain and surface diversion system normally required, as long as the fill is not located in an area containing intermittent or perennial streams. A rock-core chimney drain may be used in a valley fill if the fill does not exceed 250,000 cubic yards of material and upstream drainage is diverted around the fill. The alternative rock-core chimney drain system shall be incorporated into the design and construction of the fill as follows.

(1) The fill shall have, along the vertical projection of the main buried stream channel or rill, a vertical core of durable rock at least 16 feet thick which shall extend from the toe of the fill to the head of the fill, and from the base of the fill to the surface of the fill. A system of lateral rock underdrains shall connect this rock core to each area of potential drainage or seepage in the disposal area. The underdrain system and rock core shall be designed to carry the anticipated seepage of water due to rainfall away from the excess spoil fill and from seeps and springs in the foundation of the disposal area.