STATE OF NEW MEXICO
BEFORE THE WATER QUALITY CONTROL COMMISSION

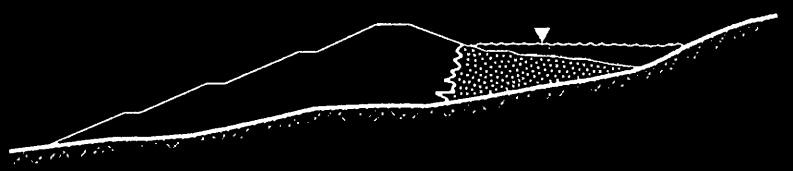
In the Matter of:	)	
PROPOSED AMENDMENT TO 20.6.2 NMAC (Copper Rule)	)	**No. WQCC 12-01(R)**

EXHIBIT SCOTT – D-16

U.S. Department of Labor
Mine Safety and Health Administration

ENGINEERING AND DESIGN MANUAL

COAL REFUSE DISPOSAL FACILITIES



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NOTE: Instructions for using this DVD version of the Manual are provided on the next page

MSHA

Prepared by:

amount of runoff, the design storm criteria for the impoundment may need to be applied to the ditch design in order to protect the embankment from erosion during a severe flood.

5.6.2 Open-Channel Spillway Performance Considerations

Many impoundments are designed such that the reservoir storage capacity and decant system discharge capacity provide for design storm runoff management, but sometimes a separate open-channel spillway is also required. These should be designed with a capacity that will allow routing of the design storm flow through the impoundment while maintaining adequate freeboard. Open-channel spillways are less commonly employed at refuse disposal embankments because of staged development. The following should be considered in the design of open-channel spillways:

- Hydraulic capacity (head versus discharge capacity) and minimum freeboard for the approach channel, control section, and discharge channel or conduit so that sufficient capacity is available for releases up to the design peak outflow. Measures to control floating debris or hillside trees that could cause obstructions may be required at the approach channel.
- Channel geometry, including considerations for transition sections (e.g., contraction section), changes in alignment (e.g., super-elevation at bends), and grade (e.g., sufficient capacity for hydraulic jumps).
- Stable channel conditions, considering excavation slopes as well as potential for erosion due to water flow associated with velocity/tractive force/duration on the channel lining. Channel linings require suitable foundation and drainage systems and should be designed for tractive and uplift forces.
- Energy dissipation structures at the spillway outlet.

If large-diameter conduits are used in conjunction with open channels or in place of an open channel, material selection, inlet design, alignment and grade, backfill, seepage control, and outlet design issues are similar to those for decant systems.

5.7 SURFACE DRAINAGE CONTROLS

Surface drainage controls at coal refuse disposal embankments typically consist of drainage ditches and channels, bench and haul road gutters, and culverts that collect and convey runoff to downstream structures.

5.7.1 Permanent Drainage Controls

Permanent drainage controls are structures that will be in service during operation of the disposal facility and following reclamation and abandonment of the facility. These structures should be designed for the 100-year-recurrence-interval storm. Typically, the 100-year, 24-hour-duration storm is used for design, consistent with state regulatory criteria.

The design of permanent drainage controls should be based upon the following considerations:

- Hydraulic capacity considering the peak discharge rate from the design storm for the contributing drainage area.
- Channel geometry, including accommodation for transition sections and changes in alignment (e.g., super-elevation at bends) and grade (e.g., additional capacity for hydraulic jumps in subcritical flow sections).
- Stable channel conditions, considering flow velocity/tractive force/uplift/duration for the channel lining, if the channel is not excavated in competent rock.
- Energy dissipation structures at channel outfalls.