



TECHNICAL NOTE

Mailing List 1

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Bureau of Land Management U.S. DEPARTMENT OF THE INTERIOR

Subjects: Acid Mine Drainage, Prevention and Control
Acid Mine Water, Prevention and Control
Coal, Acid Mine Water
Water Pollution, Acid Mine Drainage

Reference: Coal Industry Advisory Committee, Ohio River Valley Water Sanitation Commission (ORSANCO), 350 Hochberg Road, Monroeville, Pennsylvania 15146, Principles and Guide to Practices in the Control of Acid Mine-Drainage. Supplemented by Case Histories, March 1964, and additional case histories later.

Data:

Discusses the formation of acid mine-drainages, practices to control the problem, gives case histories and includes a bibliography. While acid mine water has not been a major problem in the West, because of lack of water and the coals do not contain as much acid producing material (pyrites, etc.), the practices appear to have wide applicability and have been approved by industry. Therefore, they should be considered as coal lease stipulations.

A summary of the approved practices follows:

- 1(a) "Surface waters and groundwaters shall be diverted where practicable to prevent the entry or reduce the flow of water into and through workings."

This involves such things as:

Determination of the source of mine water from:

- 1a- 1 Water-bearing strata overlying the coal
- 2 Water-bearing strata underlying the coal
- 3 Cracks to the surface
- 4 Adjoining mines and mine workings
- 5 Shaft, drift or slope openings

Efforts made to control water inflow
by:

- 6 Filling surface cracks with earth
- 7 Grouting methods
- 8 Diverting surface water around openings
- 9 Sealing openings
- 10 Maintaining diversion ditches above high wall
- 11 Diverting stream water flows from surface mining operations

1(b) "Water that does gain entry to the workings shall be handled in a manner which will minimize the formation and discharge of acid mine-drainage to streams." This involves such things as:

- 1b- 1 Acceptable underground water drainage
- 2 Unacceptable underground water drainage
- 3 Other underground water storage facilities
- 4 Piping of mine drainage underground
- 5 Piping of mine drainage in surface mines
- 6 Underground water drainage ditches free from acid-producing materials
- 7 Surface water drainage ditches free from acid-producing materials
- 8 Unsuitable drainage ditches
- 9 Local pick-up or suction stations for feeding central water disposal system
- 10 Good housekeeping techniques with respect to acid-producing materials, both surface and underground

2 "Refuse from the mining and processing of coal shall be handled and disposed of in a manner which will minimize discharge of acid mine-drainage therefrom to streams. Where acid-producing materials are encountered in the overburden in stripping operations, these materials shall be handled so as to prevent or minimize the production of acid mine-drainage, taking into consideration the need for stream pollution prevention and all economic factors involved." This involves such things as:

- 2-1 Compaction of coal refuse in a refuse pile
- 2 Crushing or other control of coal refuse size consist
- 3 Channeling of run-off water away from coal refuse pile
- 4 Piping of water under or through coal refuse pile
- 5 Inundation of coal refuse
- 6 Burial of coal refuse in strip pits and/or other depressions
- 7 Covering and seeding coal refuse pile
- 8 Conditions resulting from improper use of coal refuse for road surfacing

3 "Discharge of acid mine-drainage to streams shall be regulated insofar as practicable to equalize the flow of daily accumulations throughout a 24-hour period." This involves such things as:

- 3-1 Adjustment of pump size to fit discharge requirements
- 2 Adjustment of pump discharge to fit discharge requirements
- 3 Controlled release from lagoon or reservoir

4 "Upon discontinuance of operations of any mine all practicable mine-closing measures consistent with safety requirements, shall be employed to minimize the formation and discharge of acid mine-drainage." This involves such things as:

- 4-1 Mine working plans
- 2 Mine sealing which inundates the coal seam and other acid-producing strata
- 3 Watertight seals
- 4 Removal, burial or submergence of acid-producing refuse in strip or auger operations.
(NOTE: This also reduces the possibility of coal outcrop fires.)
- 5 Covering of coal faces in surface mining
- 6 Submergence of coal faces in surface mining

5 "Under appropriate circumstances, consideration shall be given to the treatment of acid mine-drainage by chemical or other means in order to mitigate its polluttional properties." This involves such things as:

- 5-1 Emergency circumstances requiring chemical treatment for protection of downstream water quality
- 2 Emergency circumstances requiring chemical treatment within mining operation

Titles of the Case Histories include:

- 1a-1 Use of dyes to locate source of mine water
- 1a-7 Chemical growing to prevent inflow of water
- 1a-8 Diversion ditch maintained above high wall
- 1b-1 Acceptable underground water drainage
- 2-1 Compaction of coal refuse

- 2-3 Channeling run-off water away from coal refuse pile
- 2-7 Covering refuse pile with soil and seeding
- 3-2 Adjustment of pump discharge to fit discharge requirements
- 1a-11 Stream water inflow controlled by compaction and backfilling (strip and underground mine)
- 1a-12 Sealing surface subsidence holes (from underground mine) with dirt
- 1a-13 Sealing surface subsidence holes (from underground mine) with water barrier compound
- 2-5 Inundation of coal refuse to minimize acid drainage
- 2-6 Disposal of coal preparation plant refuse (in bottom of strip pit)
- 2-6.1 Same as above
- 2-7.1 Terracing, covering and planting of coal refuse to minimize acid drainage
- 3-4 Prevention of water pollution by surface drainage control
- 4-7 Submergence of coal faces in auger mining
- 4-8 Furrow grading to enhance reclamation, reduce run-off and control reclamation. (A special technical note on this case history will be prepared.)

Please send any additional references on this subject or other minerals subjects to DSC (D-310). If the complete article or publication is needed, DSC (D-310) will attempt to obtain a copy or a loan for you.

