

TECHNICAL MEMORANDUM

Utah Coal Regulatory Program

JK

January 3, 2008

TO: Internal File

THRU: Pamela Grubaugh-Littig, Permit Supervisor *pgl*

FROM: *JK* Steve Christensen, Environmental Scientist II

RE: Refuse Drainage to Pond 8, Consol Coal Company, Emery Deep, C/015/0015, Task ID #2877

SUMMARY:

The Division of Oil, Gas and Mining (the Division) issued Consol Coal Company (the Permittee) a violation relative to the temporary refuse pile. Division inspector Karl Houskeeper issued the violation (#10005) upon observing the limited capacity of the receiving drainage channels that accept storm runoff from the refuse pile.

On September 10th, 2007, the Permittee submitted information in response to the violation. On October 31st, 2007, the Division concluded it's first technical review of the submittal and mailed a letter to the Permittee that identified several deficiencies that needed to be addressed (Task ID #2852). The Permittee submitted a response to those deficiencies on November 9th, 2007. This memo provides the second hydrologic analysis for Violation #10005.

Upon review of the November 9th submittal, the following hydrologic deficiencies were identified and need to be addressed prior to vacating Violation #10005:

Deficiencies:

R645-301-512.100, -742.324: Engineering Certification

- The Permittee must demonstrate that the design of the diversion ditches, culverts and pond inlet have been certified by a qualified registered professional engineer as meeting the performance standards of the R645-State of Utah Coal Mining Rules. A stamp may be provided on the initial page of the hydrologic calculations in the submittal with a statement that specifies which pages/calculations the certification pertains to. In addition, all submitted maps and plates must be certified by a registered professional engineer.

TECHNICAL MEMO

R645-301-746.200: Refuse Pile

- The Permittee must provide further drainage information relative to Pond No. 8. Chapter VI, Appendix VI-6, Page 26 of 38 provides an overview figure of the HEC-HMS Hydrologic Model utilized in calculating peak storm volumes and discharges associated with the refuse pile and adjacent area. The modeling calculation stops at Culvert B. However, upon review of the submitted *Pond No. 8 Plan View and Drainage Map* figure in Appendix VI-7, it appears that the discharge from Culvert A and Culvert B ultimately reports to what's labeled as a "24" CMP" located approximately 400' to the east. The 24" CMP east of Culverts A and B is not labeled and does not appear to be included in the HEC-HMS modeling run. According to the aforementioned figure, Area E is 8.6 acres and reports to the 24" CMP along with Culverts A and B. In addition, no ditch alignment is depicted north of the mine-access road. Based on the submitted information, there is no demonstration as to what happens to the storm runoff after discharging from culverts A and B. Additional information/clarification is needed in order to assess whether the 24" CMP located approximately 400' east of Culverts A and B is adequately sized to handle the storm runoff from Areas A, B, C, D as well as Area E as depicted on *Pond No. 8 Plan View and Drainage Map*. It should be noted that the currently approved *Pond No. 8 Plan View and Drainage Map* depicts the 24" culvert as an 18" CMP. The revisions box on the recently submitted drawing outlines this in item No. 1. No discussion is provided to clarify whether it's an 18" CMP or a 24" CMP.
- Chapter VI, Appendix VI-6 Page 26 of 38 states, "Pond No. 8 was sized using results from a HEC-1 computer model presented in Appendix IV-9 – Sediment Pond No. 8". Appendix IV-9 deals with the 4th East portal excavation blasting plan not sediment pond design. The Permittee should correct this typo so as to accurately cite the information for Sediment Pond No. 8.
- No design plans or drawings were submitted depicting the inlet to Pond 5. The Permittee must modify Plate VI-17, *Pond No. 5 Plan View & Cross Section*, to depict the inlet design that will be constructed to convey the runoff (generated from the permanent refuse pile) from the drainage ditch into Pond 5.
- The Permittee must reconcile several discrepancies between the submitted information and the approved MRP. The newly submitted Appendix VI-6, *Permanent Waste Disposal Site Ditch, Plan, Profile, Cross Section Reclamation Phase*, Figure 1 (Figure 1) depicts an entirely different alignment/configuration for the proposed permanent development waste disposal site as what's depicted on the newly submitted Appendix VI-7, *Pond No. 8 Plan View and Drainage Map* (Pond No. 8 figure). The Pond No. 8 figure depicts a proposed permanent waste disposal site that is approximately twice as large as what's depicted in the Appendix VI-6, Figure 1 plate. Upon reviewing the two figures, it's not possible to ascertain what configuration is the correct one.

- The Permittee must reconcile discrepancies between the submitted maps/plates with the approved MRP where the watershed boundaries for the proposed permanent waste disposal site are depicted. The watershed boundary depicted in the aforementioned Appendix VI-6, Figure 1 drawing does not match the boundary depicted in the Pond No. 8 drawing or Plate VI-10, *Surface Drainage Control Map*. The recently submitted Figure 1 drawing from Appendix VI-6 depicts a watershed boundary that encompasses the entire proposed permanent waste disposal site. The Pond No. 8 drawing depicts a watershed boundary that essentially bi-sects the proposed permanent refuse site. Plate VI-10 depicts a watershed boundary that tri-sects the proposed permanent waste disposal site. These discrepancies must be rectified and made clear to the reader as to what watershed boundary and what proposed alignment/layout of the permanent refuse site is correct. The submitted information and approved MRP are at odds with one another in terms of watershed boundaries for the permanent waste disposal site. It's not clear which watershed boundary is correct. All maps and plates that depict watershed boundaries in the area of the proposed permanent waste disposal site must be consistent with each other.
- The Permittee must provide a demonstration that Pond No. 5 has the capacity to accept the drainage from the proposed permanent waste disposal site. The demonstration should include a reference to the appropriate maps/plates depicting watershed boundaries as well as a reference to the calculations that take the permanent waste disposal site area into consideration. Upon reviewing Plate VI-10 of the approved MRP, it appears that Pond No. 5 currently accepts drainage from most of the proposed permanent waste disposal site. Once the aforementioned deficiencies regarding watershed boundaries are resolved, the Permittee should also provide a reference on Page 29 in Chapter VI of Appendix VI-7 to the figure that accurately depicts the watershed that reports to Pond No. 5 and was utilized in the design calculations for the pond.

TECHNICAL ANALYSIS:

OPERATION PLAN

SPOIL AND WASTE MATERIALS

Regulatory Reference: 30 CFR Sec. 701.5, 784.19, 784.25, 817.71, 817.72, 817.73, 817.74, 817.81, 817.83, 817.84, 817.87, 817.89; R645-100-200, -301-210, -301-211, -301-212, -301-412, -301-512, -301-513, -301-514, -301-521, -301-526, -301-528, -301-535, -301-536, -301-542, -301-553, -301-745, -301-746, -301-747.

Analysis:

Refuse Piles

TECHNICAL MEMO

The application does not meet the Spoil and Waste Materials requirements as outlined in R645-301-745, -746 and -747.

It is the intention of the Permittee (as outlined in the submittal) for the existing coalmine waste pile to remain in its current location as the active refuse pile until mining activity ceases. The existing coalmine waste pile is often referred to in the approved MRP as the 'northwest coal stockpile area'.

Upon the completion of mining activity, the Permittee intends to remove the existing refuse pile and bury it in the previously approved permanent development waste disposal site located directly east of the existing location (See Plate II-1, *Structures and Facilities Main Portal Area*). The permanent disposal area is approximately 2 acres and located at a gravel borrow pit area east of the northwest coal stockpile area. Chapter IV.C4 Figure 1, *Existing Coal Mine Waste Pile Plan and Cross-Sections*, provides three cross-sections of the current waste rock pile.

Drainage designs are provided in Chapter VI Appendix VI-6. The Permittee utilized a 100-year 24-hour storm event for the design of drainage ditches receiving runoff from the refuse pile areas (both the existing site as well as the permanent refuse location). R645-301-746.212 requires refuse ditch design to utilize a 100-year, 6-hour event. The Permittee utilized the SCS method as well as the HEC-HMS computer model in determining peak flow rates generated from the refuse pile drainage areas. The ditches were designed to maintain flow velocities below 4.0 feet per second (fps) for earthen channels and less than 12 fps for rock channels during the 100-year 24-hour storm event. The Permittee commits to utilizing rip rap where necessary (Chapter VI, Appendix VI-6, Page 1 of 38).

Existing Refuse Pile

Pages 1-38 of Chapter VI, Appendix VI-6 provide the peak flow calculations utilized for the existing refuse pile's ditch designs. A description/narrative of the design considerations for each of the drainage ditches is also provided with the exception of what is presumably a drainage ditch that conveys drainage from Culverts A and B. Appendix VI-7 provides the design considerations and calculations for the mine's sediment ponds. Drainage from the existing refuse pile is diverted and ultimately discharged to Pond 8 (See Appendix VI-7, *Pond No. 8 Plan View and Drainage Map*). *Pond No. 8 Plan View and Drainage Map* of Appendix VI-7 depicts the watershed boundaries of the existing refuse site as well as the sub-watershed boundaries utilized during the design of the various elements of the areas drainage network (i.e. ditches, culverts).

Direct runoff from the existing refuse pile is routed through ditches 2A and 2B. The drainage from these two ditches is routed into Ditch 1B. The combined runoff is diverted primarily through a 24" corrugated metal pipe (CMP) labeled Culvert B on *Pond No. 8 Plan*

View and Drainage Map of Appendix VI-7. The discharge then flows approximately 400' east to another 24" CMP as depicted on *Pond No. 8 Plan View and Drainage Map*.

The Permittee must provide further drainage information relative to Pond No. 8. Chapter VI, Appendix VI-6, Page 26 of 38 provides an overview figure of the HEC-HMS Hydrologic Model utilized in calculating peak storm volumes and discharges associated with the refuse pile and adjacent area. The modeling calculation stops at Culvert B. However, upon review of the submitted *Pond No. 8 Plan View and Drainage Map* figure in Appendix VI-7, it appears that the discharge from Culvert A and Culvert B ultimately reports to what's labeled as a "24" CMP" located approximately 400' east north of the mine access road. The 24" CMP east of Culverts A and B is not labeled and does not appear to be included in the HEC-HMS modeling run. According to the aforementioned figure, Area E is 8.6 acres and reports to the 24" CMP along with Culverts A and B. In addition, no ditch alignment is depicted north of the mine-access road. Based on the submitted information, there is no demonstration as to what happens to the storm runoff after discharging from culverts A and B. Additional information/clarification is needed in order to assess whether the 24" CMP located approximately 400' east of Culverts A and B is adequately sized to handle the storm runoff from Areas A, B, C, D as well as Area E as depicted on *Pond No. 8 Plan View and Drainage Map*. It should be noted that the currently approved *Pond No. 8 Plan View and Drainage Map* depicts the 24" culvert as an 18" CMP. The revisions box on the recently submitted drawing outlines this in item No. 1. No discussion is provided to clarify whether it's an 18" CMP or a 24" CMP.

Chapter VI, Appendix VI-6 Page 26 of 38 states, "Pond No. 8 was sized using results from a HEC-1 computer model presented in Appendix IV-9 – Sediment Pond No. 8". Appendix IV-9 deals with the 4th East portal excavation blasting plan not sediment pond design. The Permittee should correct this typo so as to accurately cite the information for Sediment Pond No. 8.

The Permittee must demonstrate that the design of the diversion ditches and culverts have been certified by a qualified registered professional engineer as meeting the performance standards of the R645-State of Utah Coal Mining Rules. A stamp may be provided on the initial page of the hydrologic calculations with a statement that specifies which pages it pertains to. In addition, a professional engineer must certify the Appendix VI-7, *Pond No. 8 Plan View and Drainage Map* as well.

The previous technical analysis (Task ID #2852) identified a deficiency with R645-301-746.212. R645-301-746.212 states that uncontrolled surface drainage may not be diverted over the outslope of the refuse pile. Chapter VI, Appendix VI-6, Page 26G discusses the surface runoff generated from the top of the existing refuse pile. Peak runoff from the surface of the refuse pile for the 100-year is approximately 1.0 cubic feet per second (cfs). Due to the minimal runoff generated from the design storm event, runoff controls are not necessary for the surface of the refuse pile.

TECHNICAL MEMO

Permanent Refuse Disposal Site

R645-301-746.212 also requires that runoff generated from areas above the refuse pile and runoff from the surface of the refuse pile will be diverted into stabilized diversion channels designed to meet the requirements of R645-301-742.300 to safely pass the runoff from a 100-year, 6-hour precipitation event. The figure initially submitted to the Division in response to the violation, *Pond No. 8 Plan View and Drainage Map* (September 10th, 2007 Task ID #2852), depicted a proposed permanent development waste disposal site east of the existing refuse pile. Upon review of the approved MRP and submitted materials, hydrologic calculations for the permanent development waste site were not provided.

The Permittee has submitted drainage design information for the permanent waste disposal site. The Permittee proposes to divert runoff generated from the permanent waste disposal site to the north and route it to Pond No. 5. As required per R645-301-746.200, a 100-year, 6-hour design storm event was utilized in designing the drainage channel. The ditch will begin on the north side of the permanent waste disposal site in a natural drainage channel. As the terrain flattens out down gradient from the pile, a ditch will be excavated to contain the runoff. In the upper section of the ditch, natural bedrock is present that will prevent erosion. In areas where the bedrock is not adequate, the Permittee commits to placing riprap in the bottom of the channel. Chapter VI, Appendix VI-6, Pg. 41 provides a summary of the ditch geometry to be constructed at the site. In addition, Chapter VI, Appendix VI, Figure 1, *Permanent Waste Disposal Site Ditch, Plan, Profile, Cross Section Reclamation Phase*, provides a plan view, profile and cross sections of the drainage ditch and drainage area.

The following deficiencies have been identified relative to the drainage design for the permanent refuse disposal site and must be addressed:

- No design plans or drawings were submitted depicting the inlet to Pond 5. The Permittee must modify Plate VI-17, *Pond No. 5 Plan View & Cross Section*, to depict the inlet design that will be constructed to convey the runoff (generated from the permanent refuse pile) from the drainage ditch into Pond 5.
- There are several discrepancies between the submitted information and the approved MRP. The newly submitted Appendix VI-6, *Permanent Waste Disposal Site Ditch, Plan, Profile, Cross Section Reclamation Phase*, Figure 1 (Figure 1) depicts an entirely different alignment/configuration for the proposed permanent development waste disposal site as what's depicted on the newly submitted Appendix VI-7, *Pond No. 8 Plan View and Drainage Map* (Pond No. 8 figure). The Pond No. 8 figure depicts a proposed permanent waste disposal site that is approximately twice as large as what's depicted in the Appendix VI-6, Figure 1 plate. Upon reviewing the two figures, it's not possible to ascertain what configuration is the correct one.

- The watershed boundary depicted in the aforementioned Appendix VI-6, Figure 1 drawing does not match the boundary depicted in the Pond No. 8 drawing or the Plate VI-10, *Surface Drainage Control Map*. The recently submitted Figure 1 drawing from Appendix VI-6 depicts a watershed boundary that encompasses the entire proposed permanent waste disposal site. The Pond No. 8 drawing depicts a watershed boundary that essentially bi-sects the proposed permanent refuse site. Plate VI-10 depicts a watershed boundary that tri-sects the proposed permanent waste disposal site. These discrepancies must be rectified and made clear to the reader as to what watershed boundary and what proposed alignment/layout of the permanent refuse site is correct. The submitted information and approved MRP are at odds with one another in terms of watershed boundaries for the permanent waste disposal site. It's not clear which watershed boundary is correct. All maps and plates that depict watershed boundaries in the area of the proposed permanent waste disposal site must be consistent with each other.
- Upon reviewing Plate VI-10 of the approved MRP, it appears that Pond No. 5 currently accepts drainage from most of the proposed permanent waste disposal site. Once the aforementioned deficiencies regarding watershed boundaries are resolved, the Permittee should provide a reference on Page 29 in Chapter VI of Appendix VI-7 to the figure that accurately depicts the watershed that reports to Pond No. 5.

Findings:

The submittal does not meet the Refuse Pile requirements of R645-301-746.212. The following deficiencies should be addressed prior to vacancy of the violation:

R645-301-746.212-

- The Permittee must provide further drainage information relative to Pond No. 8. Chapter VI, Appendix VI-6, Page 26 of 38 provides an overview figure of the HEC-HMS Hydrologic Model utilized in calculating peak storm volumes and discharges associated with the refuse pile and adjacent area. The modeling calculation stops at Culvert B. However, upon review of the submitted *Pond No. 8 Plan View and Drainage Map* figure in Appendix VI-7, it appears that the discharge from Culvert A and Culvert B ultimately reports to what's labeled as a "24" CMP" located approximately 400' east north of the mine access road. The 24" CMP east of Culverts A and B is not labeled and does not appear to be included in the HEC-HMS modeling run. According to the aforementioned figure, Area E is 8.6 acres and reports to the 24" CMP along with Culverts A and B. In addition, no ditch alignment is depicted north of the mine-access road. Based on the submitted information, there is no demonstration as to what happens to the storm runoff after discharging from culverts A and B. Additional information/clarification is needed in order to assess whether the 24" CMP located approximately 400' east of Culverts A and B is adequately sized to handle the storm runoff from Areas A, B, C, D as well as Area E as depicted

TECHNICAL MEMO

on *Pond No. 8 Plan View and Drainage Map*. It should be noted that the currently approved *Pond No. 8 Plan View and Drainage Map* depicts the 24" culvert as an 18" CMP. The revisions box on the recently submitted drawing outlines this in item No. 1. No discussion is provided to clarify whether it's an 18" CMP or a 24" CMP.

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the calculations that take the permanent waste disposal site area into consideration. Upon reviewing Plate VI-10 of the approved MRP, it appears that Pond No. 5 currently accepts drainage from most of the proposed permanent waste disposal site. Once the aforementioned deficiencies regarding watershed boundaries are resolved, the Permittee should provide a reference on Page 29 in Chapter VI of Appendix VI-7 to the figure that accurately depicts the watershed that reports to Pond No. 5.

RECOMMENDATIONS:

Violation #10005 should not be vacated at this time. The Permittee should adequately address the identified deficiencies relative to drainage control/diversions associated with the refuse pile.