

# TECHNICAL MEMORANDUM

## Utah Coal Regulatory Program

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October 14, 2003

TO: Internal File

THRU: Daron Haddock, Permit Supervisor

FROM: David Darby, Sr. Reclamation Specialist

RE: Update to PHC, Consolidation Coal Company, Emery Deep Mine, C/015/0015, Task #1654

### **SUMMARY:**

A review of the Mining and Reclamation Plan (MRP) during the 4<sup>th</sup> East Portal Amendment Review revealed that hydrologic functions associated with groundwater storage and movement could have changed from the original plan approved in 1990. Many of the surveys and studies upon which the original plan was approval were conducted over 12 years ago.

The renewed mining brought Consolidation Coal Company's Emery Deep Mine back into production after an extensive shutdown. A review of the Mining and Reclamation Plan (MRP) revealed that hydrologic conditions could have changed during the period of inactivity in the mine. Although monitoring had continued during the shutdown, the data had not been compile into a useful form to identify trends and the status of hydrologic resources with respect to the recharge zones and aquifers.

A Division Order (DO) was issued on March 27, 2003 requiring Consolidation Coal Company (Consol) to update the Probable Hydrologic Consequences (PHC) section of their Emery Deep Mine, Mining and Reclamation Plan (MRP). The permit application will contain a determination of the PHC of the coal mining and reclamation operation upon the quality and quantity of surface and ground water under seasonal flow conditions for the proposed permit and adjacent areas. The DO will ensure that the MRP describes the hydrologic regime and complies with federal and state regulations.

PURSUANT to **R645-301-121.100**, the DIVISION ORDERS the PERMITTEE, Consolidation Coal Company, to make the requisite permit changes enumerated in the findings of Permit Deficiency in order to be in compliance with the State Coal Program. These findings are to be remedied in accordance with R645-303-220.

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Division received an update to Consolidation Coal Company's PHC on August 18, 2003. The update describes changes to the hydrologic regime between the years, 1990 to 2002.

**TECHNICAL ANALYSIS:**

## **ENVIRONMENTAL RESOURCE INFORMATION**

Regulatory Reference: Pub. L 95-87 Sections 507(b), 508(a), and 516(b); 30 CFR 783., et. al.

## **HYDROLOGIC RESOURCE INFORMATION**

Regulatory Reference: 30 CFR Sec. 701.5, 784.14; R645-100-200, -301-724.

**Analysis:**

### **Probable Hydrologic Consequences Determination**

The operator has continued pumping (dewatering) the mine during the period of inactivity. The permittee identifies six zones in the stratigraphic column that act as perched aquifers. Bluegate Shale, Upper Ferron Sandstone, "I" coal seam, Middle Ferron sandstone, "A" coal seam and Lower Ferron sandstone. Hydrographs are submitted showing the plotted water levels in wells completed in the respective zones. Wells have been monitored according to the water monitoring plan.

The hydrographs indicate most of the levels in the wells have been stable since 1993-1994. Only a couple wells show a slight increase since the mine became idle. These wells appear at higher levels in the stratigraphic column. Since Consol continued pumping water from the mine during the shutdown period, it was not expected that the levels in wells of the Ferron Sandstone would rebound significantly. Table 2 shows the annual average water discharge rates from the mine from 1989 to 2002.

### *Quitcupah Creek Alluvial Aquifer*

Hydrographs from Wells RDA 2, RDA 3, RDA 4, RDA 5, and RDA 6 are shown in Figure 3. The levels in all the wells have changed very little over the past ten years. The alluvial aquifers tend to reflect the stream flow and precipitation conditions on the surface.

### *Blue Gate Shale Aquifer*

Figure 4 shows the hydrographs of the wells AA-BG, H-BG, T1-BG, T2-BG USGS3-1 and USGS S4-1. All these wells except I-BG and R2-B are consistent in their levels. Well I-BG shows a decrease from 6070 feet in November 1990 to 6040 feet in November 2002, while Well R2-BG increased slightly.

### *Upper Ferron Aquifer*

Figure 5 shows the well levels for AA-U, Bryant, H-U, 12-U Lewis, Muddy1, Muddy 2, R2, T1, T2, TP, and USGS1-2. Wells H-U, Muddy 1 and 2, USGS1-2, and Bryant all appear to have stable levels, since September 1990. Well TP-2 is decreasing in September 1990 from a level of 5640 feet to a level of 5595 feet in Sept 2002, and Well AA-U shows a decline in water level from 5760 feet to 5740 feet. Three wells no longer show levels. Well R2 does not have a level since September 1990, Well T1 does not show a level since September 1992 and Well I2-U does not show a level since May 1994. All wells currently showing water levels are consistent since September 1996.

It is noted from data shown prior to 1990 that wells R2 and TP have had the dramatic declines. The level in R2 dropped from a level of 6040 in 1979 to a level of 5550 in September 1990, and the water level in Well TP dropped from a level of 1915 in 1981 to a level of 5600 feet in September 2002. Well T1 has fluctuated dramatically from 1983 to present from a low of 5660 feet to a high of 5760 feet.

### *Middle Ferron Aquifer*

Figure 6 identifies the water levels in wells AA(M), H(M), I(M) and R2(M). The wells all show consistent water levels since 1990, at 5880 feet, 5820 feet, 5870 feet and 5630 feet, respectively. Prior to 1990 all the well show a great decline in water levels. Well R2(M) showed the greatest decline from a high of 6160 feet in 1984 to 5630 feet in 1990, a decline of 530 feet. No levels are recorded for R2(M) since 1999. Wells H(M) declined from 6180 feet in 1984, a decline of 360 feet in 1990. Well I(M) declined 80 feet from 1985 to 1990, and Well AA(M) declined 100 feet from 1979 to 1990.

### *Lower Ferron Aquifer*

Figure 7 shows well levels for Wells AA-L, H-L, I-L, Kemmer, R1-L WW1-L and ZZ-L. Wells AA-L, I-L, WW1-L and ZZ-L show consistent flow prior to 1990 through current monitoring. The Kemmer well and Well H-L have declined in level gradually over the years, but now show consistent levels at 6340 feet and 6145 feet respectively. Well R1-L shows high fluctuation from 1985 at 6330 feet until 1993 at 6095 feet, but is at a consistent level from 1994 to present, at 6090 feet.

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The water level data submitted by the permittee indicate there were greater influences of drawdown in some wells in the upper and middle and lower Ferron aquifers prior to 1990. Water levels in many wells were on a gradual decline from 1990 until 1993. After 1993 most wells appear to have reached a level of equilibrium or the base level, close to which they remain.

The permittee submitted water quality data in Tables 1 and 3 showing there was not a significant change in water quality in selected monitoring wells and water discharged from the mine from pre-idling to post-idling of the mine.

**Findings:**

The permittee has submitted sufficient information to update the Probable Hydrologic Consequences Determination in the Hydrologic Resource Information section of the MRP.

**MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE INFORMATION**

Regulatory Reference: 30 CFR 783.24, 783.25; R645-301-323, -301-411, -301-521, -301-622, -301-722, -301-731.

**Analysis:**

**Mine Workings Maps**

Mine working maps are submitted on Plates VI-4, VI-5, VI-7, VI-8 and VI-9. The plates show the relationship between the mine, potentiometric surfaces for specified years, well locations, permit boundary and topography.

**Monitoring and Sampling Location Maps**

Plate VI-3 in the MRP identifies the location of well, from which water samples were collected, permit boundary topography, stream channels and UPDES sites, from which the mine discharges were sampled, UPDES 001 and UPDES 002.

**Findings:**

The permittee has submitted sufficient information to update the Maps, Plans and Cross-sections of Resource Information in the Hydrologic Resource Information section of the MRP.

Recommendation:

It is recommended the information submitted for to update the PHC by Consolidation Coal Company be accepted as sufficient to identify the current status of the groundwater resources and water quality of the aquifers associated with the mine area in accordance with the requirements of the Division Order, issued on March 27, 2003.