WATER QUALITY MEMORANDUM
Utah Coal Regulatory Program

December 21, 2017

TO: Internal File

THRU: Steve Christensen, Permit Supervisor

FROM: Keenan Storrar, Hydrologist

RE: Second Quarter 2017 Water Monitoring, Bowie, Fossil Rock Mine, C/015/0009, Task ID #5532

The Fossil Rock Mine is idle. Task #4716 Reduction of Water Monitoring dropped a number of monitored sites. The task also updated the Water Monitoring Program table found in Appendix 7-1 of the APPENDICIES.pdf within the Trail Mountain MRP. The Deer Creek Mine Task #4782 'Transfer Well Monitoring' transferred monitoring wells CCCW – 1A, CCCW – 1S, CCCW – 2A, CCCW – 3A, CCCW – 3U, CCCW – 3L from the Deer Creek MRP to the Trail Mountain MRP. Well numbers ending in 'A' are screened in the alluvial deposits of Cottonwood Canyon Creek. Well CCCW-1A is down gradient of the Roans Canyon fault bisecting Cottonwood Canyon, while the other wells are located up gradient. It will be necessary to monitor these wells as the Cottonwood tract of Trail Mountain is actively mined (see Task #4762 for background). A significant drop in water level of CCCW-1A and a subsequent uptick in mine dewatering may indicate the mine is draining this fault zone.
The Fossil Rock Waste Rock site well has been added to the monitoring database. This well and monitoring information still needs to be incorporated into the MRP.

1. Were data submitted for all of the MRP required sites?

Springs YES ☒ NO ☐

Springs 17-25-1 (T-14) and 17-26-4 (T-10) are monitored for operational and field parameters in July and October and only field parameters in August and September.

Streams YES ☒ NO ☐

Stream sites SW-1, SW-2 and SW-3 in Cottonwood Canyon are monitored for flow the first two months of each quarter and for operational parameters the last month of each quarter.

UPDES YES ☒ NO ☐

The mine was sealed in June 2001 and there has been no reported discharge at UPDES UT23728–002 (the mine-water discharge into Cottonwood Creek) since May 2001.

Wells YES ☒ NO ☐

Well TM-1B is monitored for water level monthly and for operational parameters quarterly (Figure 1). Since July 2004, the water level in TM-3 has been reported as potentiometric head above the well casing by measuring the pressure on top of the sealed wellhead with a gauge (Figure 2). CCCW – 1A, CCCW – 1S, CCCW – 2A, CCCW – 3A, CCCW – 3U, CCCW – 3L are monitored for water level only (Figure

3 shows alluvial wells).

APPX incorrectly subtracted the depth to water measurements from the elevation of the casing to calculate the Water Level values. This means the 'Depth' water level measurement is correct, but WL or water level elevation is incorrect.

2. Were all required parameters reported for each site?

Springs	YES ☒	NO ☐
Streams	YES ☒	NO ☐
UPDES	YES ☒	NO ☐
Wells	YES ☒	NO ☐

3. Were any irregularities found in the data?

Listed parameters were more than two standard deviations.

Springs	YES ☐	NO ☒
Streams	YES ☐	NO ☒
UPDES	YES ☐	NO ☒
Wells	YES ☐	NO ☒

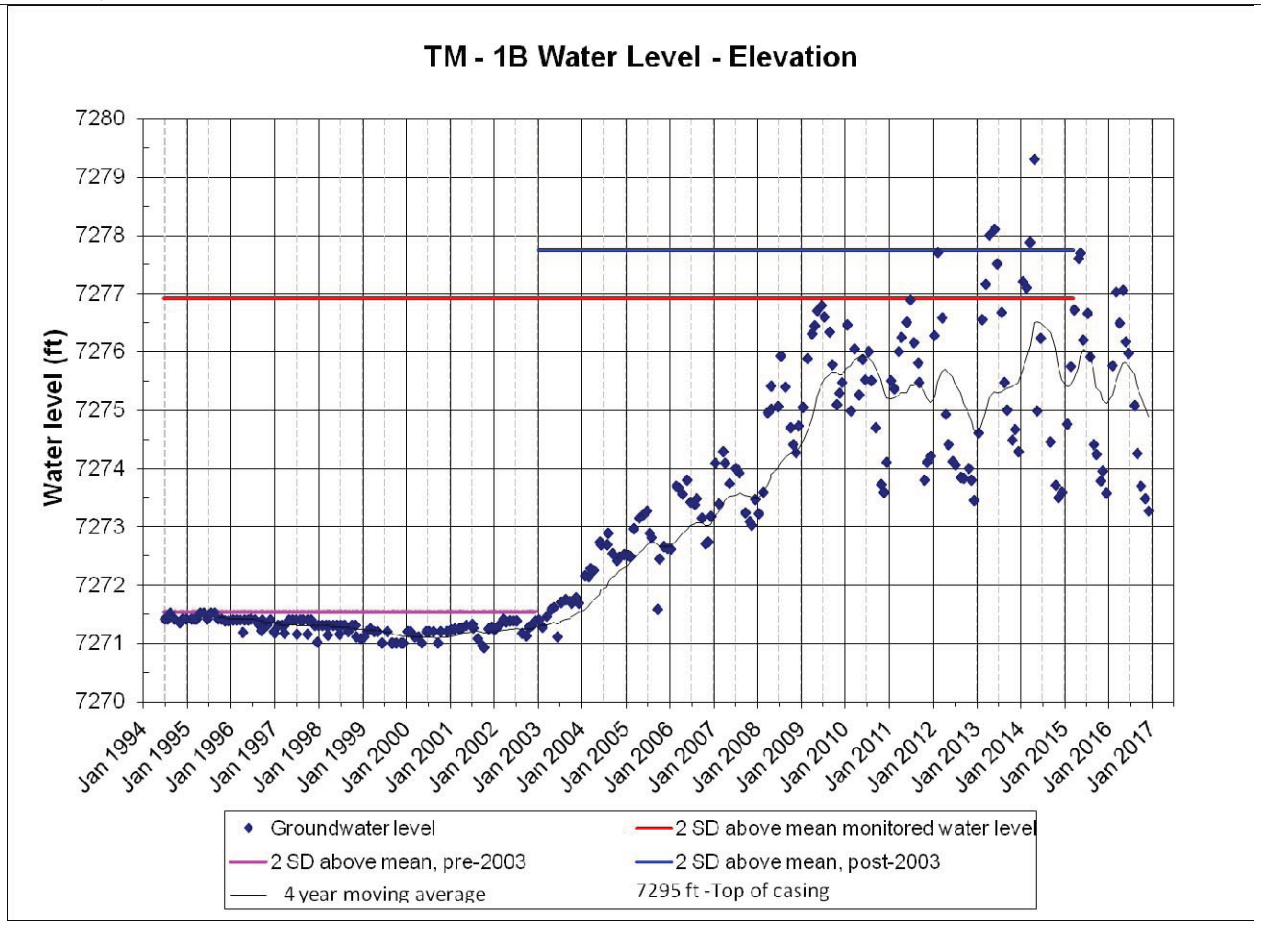

Figure 1. The water level in TM-1B has been rising since mine dewatering ceased in May 2001. It's difficult to say where the water level will come to rest. The well is completed in the Panther tongue of the Star Point sandstone below the mine workings. This sandstone tongue contacts the floor of the mine workings. Mine dewatering reduced the potentiometric head within the unit and the mine pool is probably recharging the unit. This graph will be updated when mining begins in the Cottonwood Track.

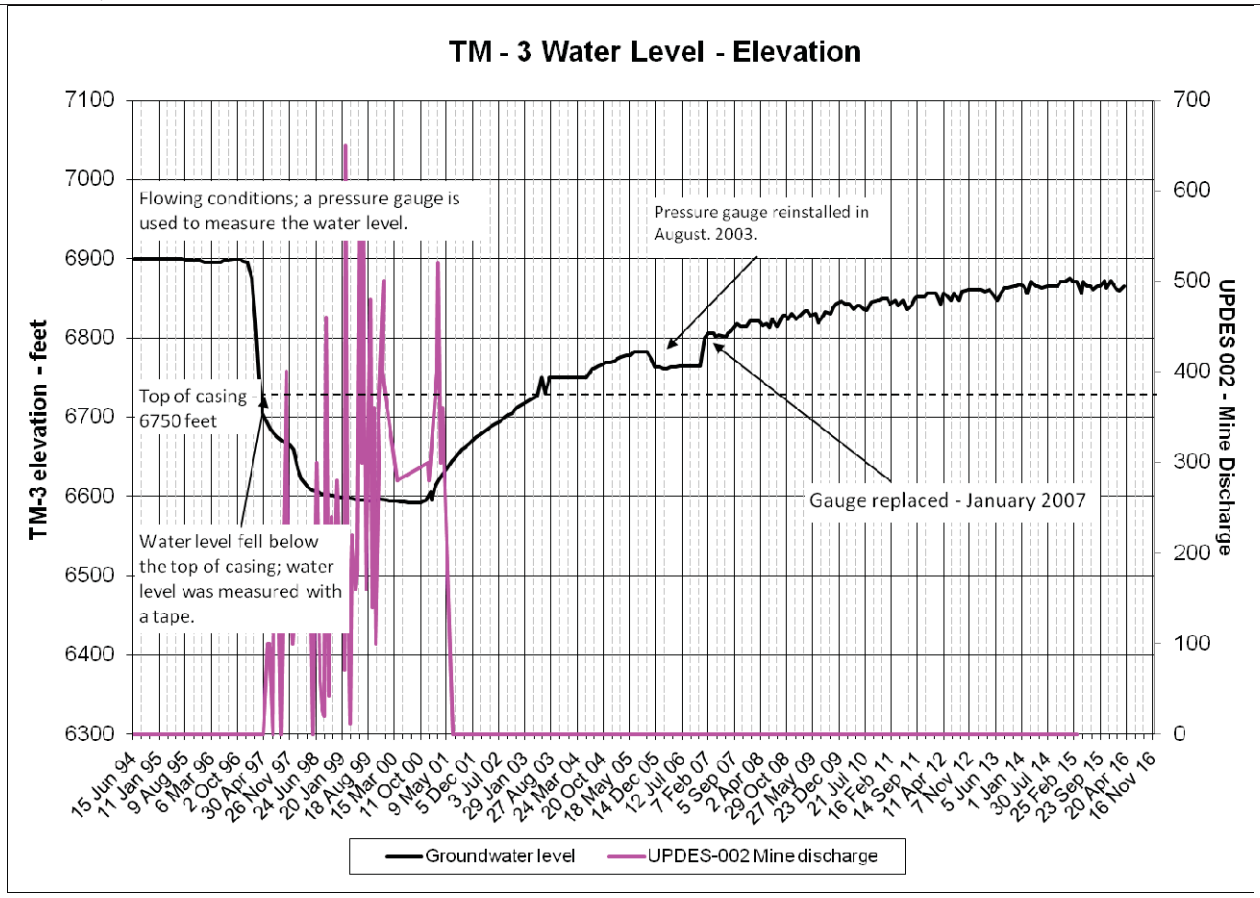

Figure 2. TM-3 water elevation peaked in June 2005, remained steady through October, dropped 18.5 ft in November and December 2005 and remained virtually unchanged during 2006. The pressure gauge was replaced in January 2007 and values jumped to approximately match the pre-2006 curve. During the first half of 2007 the curve was relatively flat, but it has been steadily climbing. The outgoing document Reduce Hydrologic Monitoring Sites, PacifiCorp, Deer Creek, C/015/0018, Task ID #4332 stipulates this well should not be released until 6,900 ft is reached. This graph will be updated when mining begins in the Cottonwood Track.

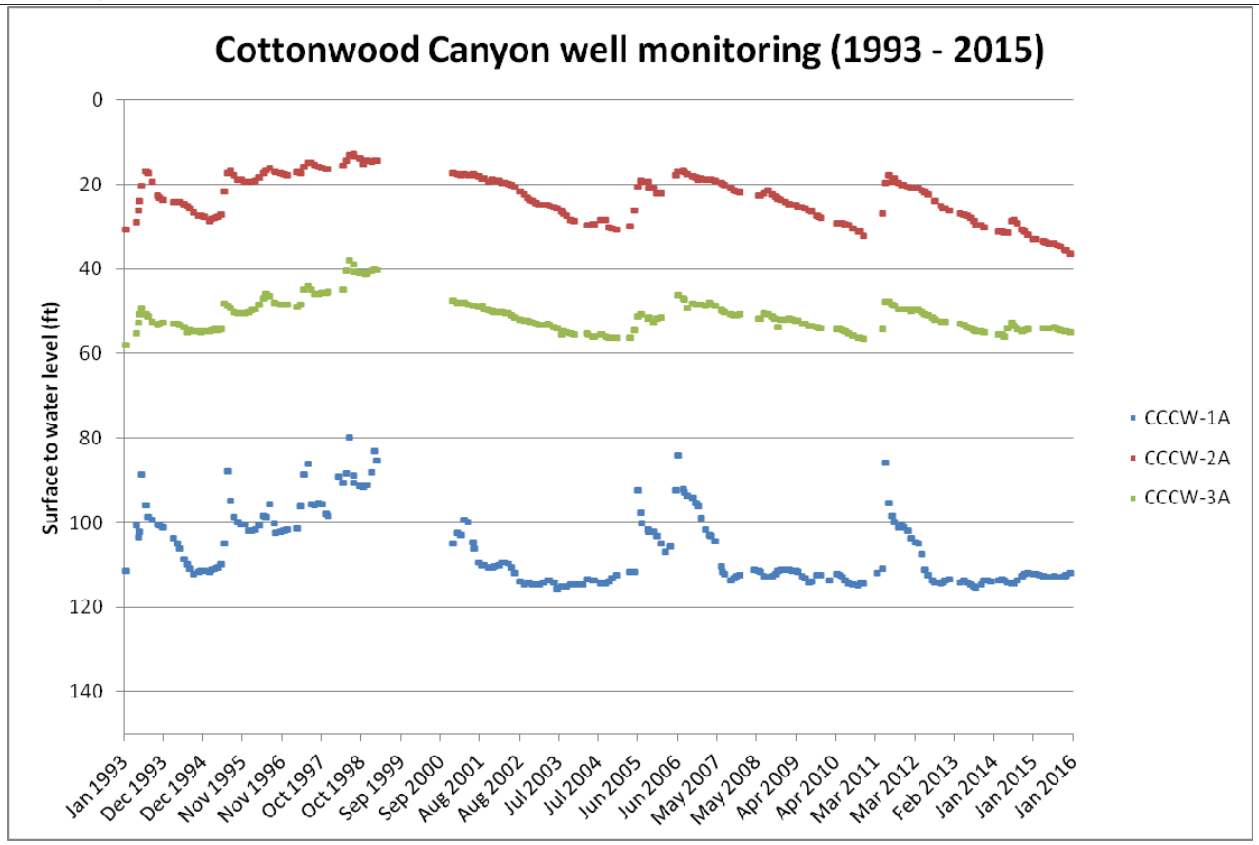

Figure 3. Alluvial aquifer water levels in the Cottonwood Canyon Creek monitoring wells. The drill hole data is found in Trail Mountain MRP Appendix C p. 23. This graph will be updated when mining begins in the Cottonwood Track. At this time the wells are primarily responding to climatic variability.

4. On what date does the MRP require a five-year resampling of baseline water data.

Baseline analyses were performed in 2001, 2006, 2011 and 2016. Analyses for baseline parameters will be repeated every 5 years and will be conducted in 2021.

5. Based on your review, what further actions, if any, do you recommend?

6. Does the Mine Operator need to submit more information to fulfill this quarter's monitoring requirements? YES ☐ NO ☒

7. Follow-up from last quarter, if necessary. NA ☒

8. Did the Mine Operator respond adequately to queries about missing or irregular data? YES ☐ NO ☐ NA ☒

Note: The mine operator needs to submit Depth and WL for all well measurements.

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