

10% Review Comments

Document Reviewed: RS10A Hydrogeological – Drill Hole Monitoring and Data Collection – Phase 3 (March 15, 2007)

Reviewer: Jim Kunkel, Cory Conrad

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Section	Comment
2.1.1 Pumping Test	<p>A TABLE SHOULD BE ADDED LISTING CONSTRUCTION DETAILS FOR ALL WELLS, FORMATIONS(S) SCREENED OR OPEN, AND DISTANCES FROM THE PUMPING WELL.</p> <p>NOTE THAT THE ANNOTATIONS ON FIGURE 4 ARE NOT WELL EXPLAINED – PRESUMABLY 50M REFERS TO RADIAL DISTANCE FROM PUMPING WELL.</p>
2.2.1, 2 nd Paragraph, p. 6	<p>“With the exception of 20P, the deep piezometer located closest to the pumping well, the decrease in water levels in the piezometers are not attributed to pumping.” THIS STATEMENT IS NOT JUSTIFIED IN THE DOCUMENT. AN ALTERNATIVE INTERPRETATION IS POSSIBLE GIVEN THE DISTANCE OF THE PIEZOMETERS FROM THE PUMPING WELL AND CONNECTIVITY TO THE BEDROCK.</p> <p>“The decrease in water levels in the piezometers generally began on October 17, two days before the pump was turned on, and continued without a discernable change in trend following the start of pumping.” THIS IS NOT A REASON FOR NO IMPACT ON THE WELLS DURING PUMPING. THIS PRE-PUMPING DECREASE WAS A GENERAL OVERALL DECREASE FOR ALL WELLS ACCORDING TO FIGURE 4.</p> <p>“When the pump was turned off, water levels in piezometers 2P, 12, 12P, and 20 continued to decrease for the remaining 10 days of the test.” THIS IS TYPICAL OF LONG-TERM PUMPING TESTS WHERE THE CONE OF DEPRESSION REACHS FAR-FIELD WELLS LATER IN TIME AND SOMETIMES DAYS AFTER THE SECESSION OF PUMPING. DISTANCE AND CONNECTIVITY BOTH ARE FACTORS IN THIS PHENOMENON.</p> <p>THE BOTTOM LINE IS THERE <u>WAS</u> SOME IMPACT ON THE WETLANDS AND MOST LIKELY OTHER SURFACE WATER BODIES FOR THIS RELATIVELY SHORT-TERM TEST. CAN THE MODFLOW MODEL INCLUDE A CONDUCTANCE FACTOR FOR SURFACE-WATER GROUND-WATER INTERACTION? CAN THE MODFLOW MODEL BE USED TO CALCULATE IMPACTS TO SURFACE WATER DURING MINE DEWATERING? IF NOT, WE NEED A BETTER CONCEPTUAL MODEL.</p>
2.2.1, 3 rd Paragraph, p. 6	<p>ANALYSIS SHOULD BE EXPANDED TO INCLUDE DISTANCE-DRAWDOWN TO DEMONSTRATE AT WHICH</p>

	<p>DISTANCES AND WHEN THE BEDROCK WAS SUFFICIENTLY STRESSED TO HAVE INDUCED ANY VERTICAL GRADIENT. IF THERE WAS NO DRAWDOWN IN THE BEDROCK AT THE PEIZO LOCATIONS, THE POSSIBLE LACK OF RESPONSE MAY BE MEANINGLESS.</p> <p>IN THE INTERPRETATION IT SHOULD BE NOTED THAT AQUIFER SPECIFIC PARAMETERS. SUCH AS VERTICAL HYDRAULIC CONDUCTIVITY BETWEEN SURFICIAL DEPOSITS AND BEDROCK WERE NOT DETERMINED. THE ONLY QUANTITATIVE PARAMETERS DETERMINED WERE FOR BEDROCK.</p>
<p>3.2 First and Last Paragraphs</p>	<p>“the [isotope] data from pumping well P-2 suggests...aquifer recharge and not seepage from surface water features, such as ..Pit or ... wetlands” WHAT IS THE SOURCE OF AQUIFER RECHARGE OTHER THAN THROUGH THE WETLANDS? IS THERE DATA SHOWING THAT THE WATERS FROM WETLANDS HAVE AN EVAPORATIVE SIGNATURE? IS THERE DATA SHOWING THE LOCAL PITS HAVE AN EVAPORATIVE SIGNATURE?</p> <p>“concentrations of calcium, magnesium, iron, manganese and strontium increased ... while concentrations of sulfate decreased. The data suggest suggest a decreasing redox potential for source water..likely older water...” DIFFERING SULFATE AND CATION CONCENTRATIONS MAY SUGGEST DIFFERENT WATERS, NOT DIFFERENT REDOX POTENTIALS. WHAT DO THE REDOX MEASURMENTS SAY ABOUT REDOX POTENTIALS? WHAT IS THE REDOX POTENTIAL CONSIDERED ASSOCIATED WITH WETLANDS?</p> <p>THE ENTIRE GEOCHEMICAL DISCUSSION IS LOOSE AND SHOULD BE CONSIDERED FOR DELETION UNTIL A COMPHRENSHIVE EVALUATION OF GROUNDWATER GEOCHEMISTRY IS PREPARED. IF GEOCHEMICAL INTERPRETATION IS INCLUDED HERE, THE ISOTOPE DATA SHOULD BE INTEGRATED WITH A FIGURE SUCH AS PIPER DIAGRAM AND FIELDS FOR OTHER WATERS IN THE AREA TO PROVE A POINT.</p>
<p>4 Summary and Conclusions</p>	<p>SEE ABOVE COMMENTS ABOUT “BOTTOM LINE” IMPACT TO WETLANDS.</p> <p>IT SHOULD BE NOTED THAT AQUIFER SPECIFIC PARAMETERS SUCH AS VERTICAL HYDRAULIC CONDUCTIVITY BETWEEN SURFICIAL DEPOSITS AND BEDROCK WERE NOT DETERMINED, AND THAT THE QUESTION OF IMPACTS TO THE WETLANDS IS BOTH POSITIVE AND NEGATIVE BASED ON THESE TESTS.</p>