

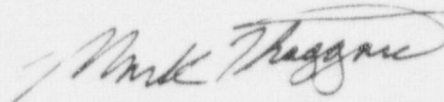
SEP 14 1990

NOTE TO: Sandy Wastler
FROM: Mark Thaggard
SUBJECT: PRELIMINARY REVIEW OF THE DRAFT NATURITA REMEDIAL
ACTION PLAN

Attached are my comments from a preliminary review of the draft Naturita RAP. It is my understanding that although we will not be making a site visit at this time, we will still provide DOE our preliminary review comments.

Please let me know when you have scheduled the telephone conference with DOE so that I can plan on attending.

Since I was not involved with the Lowman or Gunnison reviews, please let me know if I need to change the format of my comments. Also be sure to let me know if you have any questions on their content.



Mark Thaggard

cc: J. Surmeier
M. Fliegel
D. Gillen
F. Ross

DRAFT NATURITA RAP

Review Comments

1. DOE indicates that at the processing site, the strong upward-vertical hydraulic gradient between the alluvial aquifer and the Salt Wash aquifer (i.e., 0.040 ft/ft) and the large thickness and low hydraulic conductivity of the confining unit (i.e., the Brushy Basin Member) separating the two aquifers should result in no downward migration of groundwater. Accordingly only two wells were installed, at the site, into the Salt Wash aquifer. Both of these wells are considered by DOE, in characterizing the water quality of the aquifer, to be up-gradient wells.

DOE is correct in their assessment about the small possibility of downward migration of groundwater, if it is assumed that the confining units have similar characteristics throughout the region, which has not been proven or supported. Accordingly, I recommend that DOE install at least one additional monitoring well within the Salt Wash aquifer to further characterize groundwater quality conditions. This well should be drilled in the area of where the tailing were formerly located.
2. In characterizing the water quality in the alluvial and the Salt Wash aquifers at the processing site, DOE did not test for nitrite even though it is one of the constituents listed in Table 8.1 of the Technical Approach Document (TAD). No explanation is given as to why it was not tested for. DOE should either test for nitrite or provide justification for why no testing is needed.
3. DOE indicated that from 1977 through 1979, tailings at the processing site were removed to a new heap leaching reprocessing plant located along Colorado State Highway 90, about three miles southwest of the intersection of State Highways 141 and 90; however, no information is provided on whether or not this site should be included in consideration with the processing and disposal sites, and whether or not this site is contaminated. DOE needs to clarify this issue.
4. In describing the groundwater use within the area of the processing site, DOE admits that there are two wells down-gradient from the site, but indicates that there is no potential for contamination of these wells. It is unclear as to whether the basis for this assessment is 1) because of the wells location with respect to the river; 2) because of the wells are pumping from different aquifers; or 3) because the wells are at a great distance from the site (note: no map is provided of the wells location with respect to the processing site). DOE needs to clarify this issue by 1) providing a map of the well locations with respect to the processing site; 2) identify which units the wells are receiving their water from;

and 3) clearly state the basis for their conclusion that there is no potential for contamination of these wells.

5. In characterizing the extent of groundwater contamination within the alluvial aquifer at the processing site, DOE has not considered possible contamination of the aquifer on the east side of the San Miguel River, in as much as no wells or boreholes were installed over there. DOE should characterize the groundwater quality in that area since wind blown contaminants have been identified on that side of the river.
6. DOE's basis for meeting proposed concentration limits at the POC, at the disposal site, is the isolation of the uppermost aquifer (i.e., the Salt Wash Member). DOE has concluded that this aquifer is isolated based upon 1) the large thickness of the confining units (i.e., the Brushy Basin Member) and 2) the low hydraulic conductivity of the confining unit.

Although DOE is probably correct in their assessment that the thickness (i.e. >200 feet) of the confining unit will increase contaminant travel times (note: DOE has provided no travel time estimates), there is no basis to conclude that the Brushy Basin Member has a low hydraulic conductivity. DOE claims that the confining properties of the Brushy Basin Member is evidenced by the potentiometric surface rising 100 to 150 feet above the top of the Salt Wash Member; however, this is only evident in one well (since the other well was dry). To further support their argument that the Salt Wash Member aquifer is isolated, DOE should provide information on the hydraulic properties of the Brushy Basin Member and documentation that clearly shows that the unit is uniformly thick throughout the region. Further, DOE needs to provide travel time calculations to show that contaminants will not reach this unit within the 1000 years design life of the disposal pile.

7. In characterizing the hydrogeologic system at the disposal site, DOE has concluded that the groundwater system in the Dakota/Burro Canyon (D/BC) is not the upper-most aquifer because it is a perched system of limited extent, with a permeability insufficient to deliver 150 gallons per day.

While I agree that the permeability of the material is what one would expect from a aquitard and not an aquifer, permeability alone is insufficient to determine the expected yield to a well. Further, only two of the wells drilled into the D/BC units were dry, which may only indicate that the groundwater system has a linear pattern. Accordingly, DOE needs to provide more information to support their claim that this should not be considered the upper-most aquifer. This information could include well yields and/or drawdown data from observation wells.

8. In describing the Salt Wash Member aquifer, at the processing site, DOE indicates that this aquifer is a major regional groundwater system, and then on the other hand indicate that because of its low hydraulic conductivity it may not be capable of yielding an adequate supply of water to a domestic well. This contradiction needs to be clarified.
9. DOE has indicated their intentions to use the background groundwater quality of the Salt Wash Member, at the processing site, as the background groundwater quality of the Salt Wash Member at the disposal site. No information has been provided to support the conclusion that the water quality at these two locations should be similar. Further, at least one of the two wells (i.e., well 502) at the processing site should not be considered an up-gradient well, since it is drilled within an area that could be influenced by contamination of the mill yard.
10. In assessing drainage through the base of the pile, DOE used a hydraulic conductivity of $1E-4$ cm/s for the upper 60 feet of the Dakota Sandstone. The $1E-4$ cm/s value was determined from packer test results. In reviewing the geologic cross sections of the area, there are a number of isolated shale and claystone units within the upper 60 feet of the Dakota Sandstone; some of these units appear to extend laterally for a long distance. I have serious reservations that the permeability of these units are anywhere close to $1E-4$ cm/s. DOE needs to provide adequate documentation to show that these units were adequately represented in their the zones that they ran their tests on.

Further, packer tests are suitable only for determining hydraulic conductivity in a lateral direction. While this may be appropriate for sandstone units (if the sandstone units have fairly uniform characteristics), it is totally inappropriate for a layered unit, such as claystone or shale. Therefore, DOE needs to either demonstrate that these units are of very limited extent throughout the area or run tests appropriate for determining the vertical hydraulic conductivities of these units (laboratory tests of cores would be appropriate).

11. In analyzing existing contamination within the processing area, DOE provided water quality data for only one of three surface water sampling locations. The information provided doesn't state which of the stations the data was derived from. DOE needs to provide water quality data from all three stations. Further, the streamflow should be measured at the most down-gradient station each time that samples are collected.

DOE also should provide the basis for their selection of the sampling locations. Sample location no. 533 appears to be located too far down-stream to provide any useful information.