

RAI-1 Lack of procedures/Insufficient Language in the Proposed License Condition

Description of the Deficiency

The proposed license condition includes the following phrases: “wellfield-specific conditions ... demonstrates a lower density is justified” and “no viable underlying aquifer exists or there is more than 50 feet of shale between the OZ and next continuous sandstone interval no monitoring of the underlying aquifer will be required.” The proposed license condition is unacceptable by staff because it provides no methodology for determining the wellfield-specific conditions. Furthermore, the second phrase is not worded properly should the procedures be found to be sufficient. The phrase should be worded as follows: “no viable DM aquifer exists **and** there is more than 50 feet of shale between the OZ aquifer and next **underlying** sandstone interval, **or, more than 50 feet of shale exist between the OZ aquifer and the DM unit**, no monitoring of the underlying aquifer will be required.”

Basis for the Request

Strata’s request addressed the four topics listed in section 5.7.8.3(3) of NUREG-1569 that an applicant and/or reviewer should consider in determining the appropriateness of excluding monitoring of the lower aquifer. On page 10 of the request Strata states “properties of DM interval measured within MU1 and MU2 are typical of what will be encountered in future mine units ... [t]herefore, flexibility in monitoring the DM interval in future mine units using the criteria used to evaluate the DM in MU1 and MU2 is appropriate.” However, Strata’s request did not explicitly state the methodology to be used. As discussed in RAI-2, some of rationale for the methodologies used to evaluate the data from MU1 and MU2 was not clear or was inconsistent with analyses previously conducted by the applicant in other documents. Staff is unclear of what methodology it is approving.

Request for Additional Information

Please provide a clear procedure that Strata proposes to use to determine whether or not the DM unit is a viable aquifer.

RAI-2 Inconsistent and Insufficient Description for the Data in Table 1

Description of the Deficiency

In Table 1 of the request, Strata summarizes data used to estimate the well yields for the DM wells in mine units 1 and 2. The data is inconsistent with data previously reported for mine units 1 and 2, or provides insufficient description for the source of the data for the NRC Staff to properly review.

Basis for the Request

Inconsistent Data -

- The reported hydraulic conductivity (K, second column) for several wells in Mine Unit 1 differ from that reported in the Mine Unit Wellfield Data Package. The wells include MU1-DM2, MU1-DM5, MU1DM6, MU1DM7, MU1-DM8, MU1-DM10, MU1-DM11, MU1-DM13 and MU1-DM14.
- For several wells, the reported Aquifer Thickness (third column) differs from the aquifer thickness and screen length in the slug analysis in Attachment 5 of the respective mine unit data package and inconsistent with the difference between the top of screen interval and bottom of the screen interval as reported in the well completion tables in Attachment 3 of the respective mine unit data package.
- The Top Completion Interval (fifth column) differs from data reported in the well completion table (Attachment 3) of the Mine Unit 1 Wellfield Data Package.

Insufficient Description-

- Strata did not provide a basis for using Hvorslev (1951) for the slug test analysis versus other methods. The NRC staff agrees with Strata that slug tests rather than traditional pumping tests are appropriate for determining hydraulic properties, if appropriate data is obtained. It is difficult to estimate storativity of an aquifer using single well slug tests; however any analysis on well yield will likely need to include a value for storativity. Other methods, such as Cooper et al. (1967) and Papadopoulos et al. (1973), incorporates storativity in their models and may be more appropriate for low yielding wells.
- For Mine Unit 2, the slug test data for many wells is comprised of only two data points. Furthermore, although swabbing may not be an “instantaneous removal” of water (an assumption of all slug test curves), the NRC staff agrees in principal that duration of swabbing may be considered instantaneous if recovery occurs over several days.

However, the duration of the swabbing is not reported, and the timing of the reported initial head measurement relative to completion of swabbing is not reported.

- The request states that the available head is based on 20 feet above a pump if one were installed. The Available Head (column 7) appears to be the top completion interval minus static – 40 feet), the 40 feet being 20 feet above the pump and the pump 20 feet above the top of the completion interval. The request does not state the level of the pump.
- The 24 Hr Yield (column 8) is based on 24 hours pumping and a storativity of 1×10^{-5} . The request provided no information on the rationale or justification for these values.

Request for Additional Information

Please provide corrected information or rationale or justification for the above.

RAI-3 Distribution of Drillholes to BFS2

Description of the Deficiency

The request states that few historic drillholes penetrate to the DM unit consistent with guidance in NUREG-1569 on evaluation the appropriateness for discontinued monitoring of the lower aquifer. However, the limited number is not consistent with data in the original application for the Ross property.

Basis for the Request

On Page 5 of its request, Strata states that 6.3 percent of the historic drillholes (which equates to 122 drillholes) penetrate to or through the DM unit, and 2.3 percent penetrate further to the underlying sandstone. Further, Strata states “it is reasonable to suggest that few boreholes penetrate the aquitard”. However, in its original application for the Ross license, Strata attributed albeit slight responses by the DM well at two of six locations subject to largely a single-well, short-duration, low-yielding pumping test to historic drillholes. At a third location, the responses at the DM well were unknown but not attributed to historic drillholes because none were drilled to the DM interval. At a fourth location, no responses were detected at the DM well because the historic drillholes were re-abandoned.

If one were to assume that at least one borehole at the third location was incorrectly interpreted as to not extend to the DM interval, then one could conclude that a high percentage of the pumping test locations (4 of the 6 locations) may have had at least one drillhole to the DM

interval. This high percentage appears to be inconsistent with the low percentage reported in the request.

Request for Additional Information

Please explain the discrepancy between the low percentage of drillholes reported in this request and the high percentage of pumping test locations that may have been affected by the few drillholes.

RAI-4 Use of 20 GPM for a Pattern Unit

Description of the Deficiency

In its evaluation of the potential for downward migration of mining solutions, Strata uses a rate of 20 gallons per minute (gpm) per production unit but does not provide basis for this rate.

Basis for the Request

Strata's evaluation of the downward migration of fluid was intended to evaluate the environmental impacts over a selected range of variables. However, Strata did not provide the basis for selecting the production unit rate.

Request for Additional Information

Please provide the rationale or basis for selecting the production unit rate.