Enclosure
Staff Comments on Mount Lucas Draft Completion Review Report

1) Page 2

   In Table 1, the numbers presented are the numbers in 30 TAC 336.364, however, the numbers used by NRC, which are not in NRC regulations (but are in NUREG-1569) are different for Ra-226 and Ra-228 by a factor of 10.

   Please revise table to include the corrected values for Ra-226 and Ra-228.

2) Page 4

   It states in paragraph 4, “However, an exception to the typical sequence of events involved decommissioning of the ion exchange satellite plant on the Mt. Lucas-West operation. Equipment from the Mt. Lucas -West plant were removed and transferred to another of the Licensee’s facilities (Tex-1 Project) in 1987, before production and groundwater restoration had been achieved in all of the Mt. Lucas-West wellfields.”

   Please elaborate on the exception to the sequence of events.

3) Page 6

   It states in Section 3, “Thus, the referenced correspondence from TNRCC to Everest Exploration, Inc. demonstrates that the wells at the Mt. Lucas site have been closed and plugged to meet applicable standards and requirements (30 TAC §331.46), with the exception of 11 wells which were transferred to the landowner.”

   Please elaborate on the exception of 11 wells which were transferred to the landowner.

4) Page 7

   It states in Section 4, “However, it cannot be definitively stated that this was always the case. Since no record was found in the inspection reports available for review to indicate a violation for failure to make a record of such transfers, the assumption is made that such records were made as required by rule.”

   Please clarify the above statement.

5) Page 8

It states in Section 5 under the subsection Phase II and III Irrigation Areas, “The authorized method of soil homogenization, referred to as *in situ* soil homogenization, involved laterally distributing areas where Ra-226 concentration in soil exceeded 13 pCi/g to other areas within the irrigation area. The license condition prohibited the Licensee from bringing soil from outside the irrigation area into the irrigation area for blending with the soil in areas that exceeded 13 pCi/g. The Licensee was required to conduct a survey following lateral distribution to demonstrate that no area exceeded 13 pCi/g of radium.”

Please discuss the difference between the use of in situ homogenization and ex situ homogenization required by the licensee with regard to the decommissioning on the site.

6) Page 16

It states in Section 5 under subsection E Wellfield, “Regarding all of the wellfields, the TCEQ acknowledges that the Licensee failed to sample and examine the six (6) inch to 12 inch soil horizon for Ra-226 concentration, and failed to analyze for uranium concentration in the soil samples collected. However, this will be addressed in the section of this CRR pertaining to what the TCEQ did to confirm that the Mt. Lucas site meets release criteria.”

Please elaborate on the above statement.

7) Page 20

It states in Section 6 under the heading General Information, “However, the TCEQ staff found a flaw in the Licensee’s procedure in that it did not take into consideration the dose from the 15 pCi/g component of Ra-226 in the six (6) inch to 12 inch soil depth in deriving the radium benchmark dose. The radium benchmark dose used by the TCEQ use a summation of both dose from the the 5 pCi/g of Ra-226 in the surface to six (6) inch depth soil layer and the dose from the 15 pCi/g of Ra-226 in the six (6) inch to 12 inch soil depth layer. This results in a radium benchmark dose of 61.1 mrem/yr. The summed dose from the Ra-226 concentration and the natural uranium (i.e., U-238, U-235 and U-234) concentration in each of the surface to six (6) inch and six (6) inch to 12 inch soil depth layers from either TCEQ confirmatory soil samples or the Licensee’s verification soil samples are divided by the radium benchmark dose to determine if unity has been exceeded. In certain instances where the Licensee has failed to collect a sample in the six (6) inch to 12 inch soil depth interval, an assumption is made that the concentration of Ra-226 and natural uranium in the surface to six (6) inch soil depth interval is the same in the six (6) inch to 12 inch soil depth interval. Such an assumption is the case for the evaluation of unity with the Phase IV Irrigation Area results obtained in 1997.”

Please elaborate on the above statement.

8) Page 21

   a) It states in Section 6 under the heading Specific Site Features under the subheading Irrigation Areas under the bullet Phase II and III Irrigation Areas, “Furthermore, it is noted that this release to unrestricted use by the TDH was done without obtaining concurrence of the NRC. No documentation was found in the license file regarding why the site was released without NRC concurrence, or why this was never brought to the agency’s attention during the course of NRC’s review of the agency’s program. It is possible that “partial license terminations” were not subject to NRC approval at that time since SA-900 “Termination of Uranium Milling Licenses in Agreement States” may not have been distributed to Agreement States until after the licensing action to release Phase II and III Irrigation Areas had been completed.”

   b) It states in Section 6 under the heading Specific Site Features under the subheading Wellfields, “The method used by the Licensee to select verification sample locations was noted. However, it was also noted that the Licensee collected verification soil samples to a depth of only six (6) inches, and analyzed only for Ra-226. Given that the Mt. Lucas Project is an *in situ* leach uranium recovery operation, the probability of by-product material below a soil depth of six (6) inches is considered to be low to non-existent, unlike at a conventional mill facility were much greater quantities of by-product material are generated and may exist outside a tailings impoundment. Furthermore, a sampling depth of six (6) inches in an area which has been homogenized is as likely to detect contamination as a sampling depth to 12 inches. The lack of an analysis for natural uranium is also considered reasonable again given that the site is an *in situ* leach uranium recovery facility.”

   Please elaborate on the above statements.

9) Page 27

   It states in Section 6 under the heading Specific Site Features under the subheading Wellfields under the bullet E Wellfield, “Results of the verification survey, sample analysis and radium benchmark dose assessment support the release of the South J Wellfield to unrestricted use.”

   This appears to be a typo. It appears the above should state, “Results of the verification survey, sample analysis and radium benchmark dose assessment support the release of the E Wellfield to unrestricted use.”

10) Page 29

   It states in Section 6 under the heading Specific Site Features under the subheading Irrigation Area Phase I off-site area referred to by the Licensee as the “Annex”, “A sample was collected at this location. Sample results of 3.0 and 2.8 pCi/g of Ra-226 at the surface to six (6) inch and six (6) to 12 inch depths, respectively, and natural uranium concentrations of 35.6 and 37.7 pCi/g at the surface to six (6) inch and six (6) to 12 inch depths, respectively, were obtained.”

   It states in the third paragraph of the same subsection, “On November 13, 2012, TCEQ staff collected three (3) additional samples in the area of the “Annex” previously

surveyed, but not sampled, and four (4) additional samples from areas trending south southeast from the Annex surveyed area, The four (4) additional samples were collected following a swale in the land and terminating at a gate in a dike, constructed to control flow of water from the general area into the nearby lake. Results of the samples indicated that radium-226 concentrations in soil did not exceed the soil concentration criteria specified at 30 TAC §336.1115(e)(1) and natural uranium concentrations were not sufficient to exceed unity with the radium benchmark dose."

Please discuss in section 6 the results regarding the individual concentrations and how they were used to calculate the radium benchmark dose. Specifically, is there an issue related to the 35.6 pCi/g natural uranium concentration result quoted above?