

Response to NDEP's Comments dated May 17, 2010 on BRC's Technical Memorandum – Correlation of Radon Activities in Indoor Air and Shallow Zone Groundwater, BMI Common Areas (Eastside), Clark County, Nevada dated March 25, 2010

1. General comment, soil and/or groundwater can be a source for radon gas as a vapor intrusion (VI) issue.
 - a. The vertical separation of groundwater from the foundation and intervening soil characteristics becomes important given the half-life of radon-222 of 3.8 days.
 - b. Given the depth to water and the concentrations of radon-222 in groundwater it appears that the contribution from groundwater to indoor air is negligible.
 - c. It appears that BRC could support a working hypothesis such that, if soil conditions are consistent with background and the depth to the water is at least “x” feet, that radon is not likely to be a VI concern. NDEP suggests BRC revise the Deliverable to address this.

Response: The technical memorandum will be revised to more clearly reflect that both soil and groundwater are potential sources of radon gas. The baseline assumption in the technical memorandum was that soils in the sampling locations were not impacted beyond background levels, and that the primary contribution to radon gas would be from groundwater. This would presumably also be the case for post-soil remediation conditions at Eastside properties being evaluated for closure.

As discussed with NDEP, BRC feels that a working hypothesis would be more credible with a larger dataset of radon measurements in groundwater, representing a range of groundwater depths and applicable to each of the Eastside sub-areas. Therefore, BRC is proposing to collect radon data from 14 shallow zone wells across the Eastside property. The proposed sampling locations are presented in the attached figure (Figure 1). Well construction details and recent measured depths to water for these 14 wells are provided in the attached table (Table 1).

BRC proposes to conduct this sampling event in June 2010. After receipt of the radon data, BRC will revise the technical memorandum to incorporate those results and present a working hypothesis along the lines of what is presented in NDEP's comment.

2. General comment, the references herein to either an USEPA MCL or Alternative MCL pertain to the use of groundwater as a domestic water supply, which implies potential exposure to water via ingestion where incidental vapor inhalation may occur. BRC should revise the text to make the clearly define the derivation and use of these metrics as they are not directly relevant to VI exposure scenario.

Response: BRC will revise the text in response to NDEP's comment (i.e., either removing the references to MCLs or explaining that these limits are not directly relevant to vapor intrusion evaluations).

3. General comment, the indoor air radon-222 samples are useful for comparison to other measurements made within the same geographic region (Clark County, NV) and provide a line of evidence that the working hypothesis discussed above is valid.

Response: Agreed. BRC will evaluate this line of evidence in the revised technical memorandum.

4. General comment, if the reference to indoor air radon-222 samples and groundwater remain within this document; then, there should be a discussion of depth to groundwater and soil physical properties at each location. This geology discussion should also be used in formulating the working hypothesis above.

Response: As noted in the response to Comment #1, the technical memorandum will be expanded to include a working hypothesis along the lines of what is presented in that comment. The memorandum discussion will be expanded to include site-specific information regarding depth to groundwater and soil characteristics in support of the working hypothesis.