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MAR 2008
NMED Hazardous Waste Bureau

March 27, 2008

DCN: NMED-2008-4

Mr. David Cobrain
Hazardous Waste Bureau
2905 Rodeo Park Dr. E/Bldg 1
Santa Fe, NM 87505

RE: Los Alamos National Laboratory, Technical Review of the Risk Assessment for the *Bayo Canyon Aggregate Area Investigation Report*, dated March 2008.

Dear Mr. Cobrain:

As requested in an email dated March 10, 2008 from Kathryn Roberts, I reviewed the above-referenced document focusing on the human health and ecological risk assessments contained within Appendix I. The attached contains the technical comments noted during this review.

The hazard indices (HIs) for the construction worker for Consolidated Units 10-001(a)-00 and 10-002(a)-99 and Solid Waste Management Unit (SWMU) 10-004(a) are approximately 2.0, which exceeds the New Mexico target hazard level of 1.0. The primary driver for the elevated HI is manganese. Detected concentrations of manganese at these three areas are slightly higher than the New Mexico soil screening level (SSL) for the construction worker. However, the exposure point concentrations for these areas as well as the maximum detected concentrations are within ranges for background levels for manganese as cited in *Inorganic and Radionuclide Background Data for Soils, Canyon Sediments, and Bandelier Tuff at Los Alamos National Laboratory*, EM/ER 98-372. Due to the uncertainty associated with background, it is reasonable to assume that if a more detailed site attribution analysis was conducted, manganese would most likely fall out of the risk assessment due to concentrations not being significantly different from background. Therefore the conclusions presented in Appendix I, Section I-4.5, that there is no potential unacceptable risks/doses to human health for the construction scenarios appears reasonable.

If you have any questions, please call me at (801) 451-2864 or contact me via email at paigewalton@msn.com.

Sincerely,

Paige Walton

Paige Walton
Senior Scientist, AQS

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Enclosure

cc: Joel Workman, AQS (electronic)
Kathryn Roberts, NMED (electronic)

Technical Review Comments Los Alamos National Laboratory
Bayo Canyon Aggregate Area Investigation Report
Dated March 2008

Comments

1. As noted in the Executive Summary, "The radiological surveys indicated the presence of small areas of elevated activity resulting from strontium-90 at Consolidated Unit 10-002(a)-99 and uranium-238 at Consolidated Unit 10-001(a)-99 and AOC 10-009. Little or no correlation was found between the results of the radiological survey and the geophysical survey for shrapnel, indicating the remaining shrapnel is not radioactive." Please note that Appendix M states, "The radiological survey data indicate elevated radiation is present within the soil surface in Bayo Canyon at select and isolated areas. Because of the transect spacing and the speed of the walk-over survey, it is possible other areas where sources are present on the surface were not observed in this survey. The survey is not capable of detecting smaller source values buried beneath the surface (approximately more than 3 in.)." Given the uncertainties associated with the radiological survey (i.e., instrumentation could only detect radiation up to three inches below ground surface) no conclusions can be drawn, with any certainty, concerning the potential radioactivity of shrapnel at a depth of more than three inches. Provide additional lines of evidence (such as uniformity of shrapnel regardless of depth) to support the conclusion that all shrapnel is free of radiological contamination and that the proposed administrative/engineering controls are sufficient to mitigate exposure to potentially contaminated shrapnel in soil below three inches.

2. Consolidated Unit 10-001(a)-99 consisted of two former firing sites as well as a sand detonation area. It is noted on page 4 of the Investigation Report that the Environmental Protection Agency (EPA) cleared these areas for no further action. As part of the investigation process summarized in this report for the consolidated unit, visual inspections of shrapnel and geophysical surveys were conducted. It is not clear whether any unexploded ordnance (UXO) investigations have been conducted (either as part of the EPA clearance or this investigation) to ensure that the area is free of potentially hazardous UXO. Please clarify what investigations/surveys have been done to ensure that no UXO is present within this unit.

3. Section 2.1.2 Operational History of TA-10 [Technical Area 10] and Subsequent Decommissioning, Page 5. As noted in the text, "SWMU [Solid Waste Management Unit] 10-006 is believed to consist of multiple locations where burning operations at TA-10 were conducted, primarily in the 1950s and early 1960s; ...Contaminants associated with open burning could have included uranium, strontium-90, and HE [high explosive]." A by-product of burning is often the production of dioxins/furans. Clarify whether dioxins/furans were included in analyses of samples collected in association with SWMU 10-006.

4. Table 5.0-1, Summary of Applicable SSLs for Inorganic and Organic COPCs and SALs for Radionuclide COPCs at Bayo Canyon Aggregate Area, Page 92. The recreational soil screening level (SSL) for uranium is footnoted "c", which is defined as "no value". Clarify this footnote for uranium.

5. Appendix I, Table I-3.1-1, page I-53. The Kd for chromium is noted as being representative of trivalent chromium. However, the screening level for chromium is based upon hexavalent chromium. As noted in the Technical Background Document (listed reference EPA 2006

059902), any presence of hexavalent chromium will lower the Kd and if a mixture is assumed or if the speciation of chromium is unknown, the Kd for hexavalent chrome should be used. Given that the SSL for hexavalent chromium was applied for the risk screening, it appears that there is some uncertainty for the speciation of chromium. Discuss the appropriateness for using the Kd for trivalent chromium for assessing potential for migration.

6. Section I-3.1 of Appendix I provides several lines of rationale as to why the use of the soil to groundwater screening levels (SSLs) are not appropriate for use at the Bayo Canyon Aggregate Area. In lieu of using SSLs, a discussion of vertical extent and partition coefficients (K_d or K_{ow}) is provided for justification that site contaminants are not present at levels sufficient enough to pose a concern for migration to groundwater. As noted in the Appendix I discussion, the facility proposes that since the SSLs assume uniform contamination from the source to the water table; site data provide an understanding of the vertical extent of contamination and there is a clear delineation of contamination in near surface soil well-above the saturated zone. It is agreed that the generic SSLs have been developed using some simplifying assumptions, as the generic SSLs are a screening tool. These assumptions include an infinite source, uniform contamination throughout the zone of contamination, and no attenuation. Federal guidance (*Soil Screening Guidance: Technical Background Document*, EPA/540/R95/128) does allow for flexibility in using SSLs, including development of site-specific SSLs and incorporation of unsaturated zone models. We conducted a quick comparison of the exposure point concentrations (EPCs) provided in the Appendix I tables to the SSLs (dilution attenuation factor of 20), mainly for organics. EPCs were less than SSLs, further providing evidence that it is unlikely that site contaminants could migrate to groundwater. Therefore, we concur with the exclusion of a formal comparison to SSLs and the conclusion that site contaminants are most likely not a threat to the deep aquifer.

7. Appendix J presents seven corrective action alternatives for TA 10. The second alternative includes the use of herbicides to control deep-rooted vegetation. It is not clear whether these herbicides would be granular (solid) or liquid-based. However, consideration should be given to how continued application of liquid herbicides could result in more complex chemistry and potentially increased mobilization of contaminants in subsurface soil. Given the disadvantages listed in the text, as well as unknowns as to how continued application of an herbicide could impact mobility of constituents of potential concern, it is recommended that Alternative 2 not be further considered as a viable option.