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Mr. David Cobrain
NMED - Hazardous Waste Bureau
2905 Rodeo Park Dr. E, Building 1
Santa Fe, NM 87505

RE: Draft Technical Evaluation of the *Phase II Investigation Report for Pueblo Canyon Aggregate Area*, Los Alamos National Laboratory, New Mexico, dated September 2010

Dear Mr. Cobrain:

Attached please find draft technical review comments on the risk assessments conducted for the *Phase II Investigation Report for Pueblo Canyon Aggregate Area*, Los Alamos National Laboratory (LANL), New Mexico (dated September 2010). Per request of Dan Comeau (email dated 12/7), comments have been structured to require minimal changes to the document.

Sample location PU-612252 at Area of Concern (AOC) 00-030(h) was included for the nature and extent investigation (Section 6.4.3.1), but was not included in the risk assessment evaluation. The text states that this sample location is not likely representative of site contamination since it is stratigraphically elevated compared to the former drain line and detections of polynuclear aromatic hydrocarbons (PAHs) are likely due to runoff from the parking lot. While it is plausible to assume that the PAHs are present due to runoff from parking structures, the area is located in a residential setting where it is realistic to assume that children could be exposed to potentially contaminated soil. The current risks are underestimated as they currently do not include detections of constituents of potential concern (COPCs) from sample location PU-612252. Inclusion of sample location PU-612252 in the risk assessment dataset will increase the risk and hazard estimates at AOC 00-030(h) resulting in a cancer risk above the NMED target risk level of 1E-5. Considering data from this sample, AOC 00-030(a) would not meet the requirements for corrective action complete without controls. NMED may wish to consider requesting that sample location PU-612252 is not excluded from evaluation in the risk assessment for the following reasons:

a. PAHs were detected during the Phase I investigation, and a limited removal action was recommended and approved because of the excess cancer risk under the residential scenario due to PAHs (Section 6.4.2.2);

b. One of the sampling objectives of the Phase II investigation was to better define the extent of the proposed soil removal area by sampling for COPCs, specifically, benzo(a)pyrene;

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c. Other site-related COPCs besides PAHs were detected at sample location PU-612252 and removal of these detections from the dataset is not justified;

d. PAHs are detected at multiple sampling locations at AOC 00-030(h), indicating that PAHs are pervasive throughout AOC 00-030(h) and that the removal of one sample location with the highest concentrations of PAHs is not justified;

e. Exposure to soil at AOC 00-030(h) via the ingestion, dermal, and inhalation pathways are complete, and human and ecological receptors would be exposed to all soil at AOC 00-030(h); and

f. The current residential risk estimate at AOC 00-030(h) (1.01E-5) already slightly exceeds the NMED target risk level of 1E-5.

LANL states that the extent of contamination of inorganic constituents at AOC 00-030(h) had been defined during the Phase I investigation. However, at sample location 00-04805, the concentrations of several inorganic constituents (beryllium, calcium, cobalt, lead, manganese, mercury, and zinc) increase with depth; further sampling at increasing depth may or may not reveal increasing concentrations of inorganics. It is recognized that the deepest sample collected at location 00-04805 was collected from 11.5-12 feet below ground surface (ft bgs), and a completed exposure pathway for potential receptors does not exist for inorganics that are present below 10 ft bgs. However NMED may wish to further evaluate the extent of contamination of inorganic constituents at AOC 00-030(h).

Also at AOC 00-030(h), LANL states that the extent of contamination of organic constituents had been defined during the Phase I investigation. However, there are many sampling locations where the data show increasing concentrations of organic constituents with increasing depth. In the area of the former septic tank, sample locations 00-04805, 00-04807, 00-04808, 00-04810, and 00-04816 show increasing concentrations of pesticides, PAHs, and other organic constituents with increasing depth. Further sampling may or may not reveal increasing concentrations with increasing depth. Although the deepest samples at these sample locations reveal concentrations that are relatively low (i.e., below residential soil screening levels), the residential soil screening levels (SSLs) do not take into consideration the volatilization into indoor air pathway. This pathway was not evaluated and it is a complete exposure pathway at Pueblo Canyon Aggregate Area.

Within the excavation area at AOC 00-030(h), data from sample locations 00-25455 and PU-612252 show increasing concentrations of several organic constituents with increasing depth. In addition, data from sample location 00-25458 suggests that the contamination that has migrated down through Acid Canyon may not be defined. It appears that the contamination that has migrated down through Acid Canyon decreases downgradient, but then begins to increase again as revealed in the furthermost sample collected (sample location 00-25458). Additional sampling may or may not reveal increasing levels of contamination migrating downgradient through Acid Canyon.

Overall at AOC 00-030(h), it appears that the extent of inorganic and organic contamination may not be defined vertically and laterally. NMED may wish to further evaluate the nature and extent of contamination at AOC 00-030(h).

In Section 6.5.4, LANL states that SWMU 31-001 meets the requirements of corrective action complete without controls and the results of the residential risk assessment reveal that the estimated risk level (1E-5) is at the NMED target risk level of 1E-5. The risk estimate has been rounded to one significant figure and the actual risk estimate is 1.11E-5. This is above the NMED target risk level of 1E-5. On Figures 6.5.2 and 6.5.3, it appears that contamination associated with SWMU 31-001 has migrated downgradient along the former sewer line. The figures show the foot print of the sewer line extending into a Los Alamos County parcel with a residential structure depicted on the figure. As the data indicate increasing concentrations away from the property delineation, there is concern that greater residual contamination may be present along the sewer line contained within this residential parcel. It is strongly suggested that NMED evaluate the nature and extent of contamination along this section of the sewer line associated with SWMU 31-001 to determine if additional characterization is warranted to ensure there are no unacceptable risks to residents from uncharacterized waste.

There were several ecological receptors with hazard indices above the target level of one, even after refined analyses using toxicity reference values based on lowest-observed adverse effect levels (LOAELs) and population area use factors. While a comparison of exposure point concentrations to background was conducted, and for the most part, site data were not too different from background, statistically analyses did indicate the contaminants to be greater than background. It is suggested that additional monitoring of ecological impact be conducted to ensure there are not adverse effects long-term.

It is noted that updates to the Regional Screening Levels (RSLs) were made available in November. As the report was drafted prior to the release of these updates, reviews were conducted using the May 2010 RSLs. However, for future reports, LANL should be aware of the revised RSLs.

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

Thank you,

Paige Walton

Paige Walton
AQS Senior Scientist and Program Manager

Enclosure

cc: Dan Comeau, NMED (electronic)
Joel Workman, AQS (electronic)
Sunny McBride, AQS (electronic)

Draft Technical Evaluation of the *Phase II Investigation Report for Pueblo Canyon Aggregate Area*, Los Alamos National Laboratory, New Mexico, dated September 201

General Comments

1. As the current and reasonably foreseeable future land use for the Pueblo Canyon Aggregate Area is recreational, the permittees evaluated a recreational receptor in the risk assessment. Per the Consent Order, a residential receptor was also evaluated in the risk assessment in order to qualify for the status of corrective action complete without controls. In order to qualify for the status of corrective action complete without controls, the risk assessment must demonstrate that no potential unacceptable risks and/or hazards exist for all possible receptors. An evaluation of residential risk does not always equate to an assumption of protectiveness for all receptors. In several cases, the screening levels for metals for a construction worker are more conservative than those for a resident. For example, the construction worker soil screening level (SSL) for manganese (463 mg/kg) is more conservative than the residential SSL of 10,700 mg/kg. Manganese was identified as a constituent of potential concern (COPC) in the 0-10 foot exposure interval at solid waste management unit (SWMU) 00-018(a) and area of concern (AOC) 00-030(f).

   At SWMU 00-018(a), the exposure point concentration (EPC) for manganese (348.3 mg/kg) in the 0-10 foot exposure interval is less than the construction worker SSL (463 mg/kg) and would not affect the results of the risk assessment. However, at Area of Concern (AOC) 00-030(f), the EPC for manganese (475.6 mg/kg) in the 0-10 foot exposure interval is slightly above the construction worker SSL of 463 mg/kg and would result in a hazard quotient greater than the NMED target hazard quotient of one. As such, AOC 00-030(f) currently does not meet the requirements for corrective action complete without controls as any future development of the site should include special controls to mitigate potential inhalation exposures to a construction worker. Unless the permittees can demonstrate that the area currently denoted s AOC 00-030(f) will not be developed at any time in the future, they must demonstrate that no potential unacceptable risks or hazards exist at AOC 00-030(f) and that the risk assessment is protective of all receptors.

2. The permittees utilized the USEPA Regional Screening Level (RSL) for mercury (inorganic salts) for the residential scenario, and the recreational SSL for mercury was based on inorganic salts. In the future, the permittees must clarify whether analytical results define speciation of mercury, thus justifying the use of the RSLs and toxicity data for mercury salts.

3. In the human health risk assessment, the permittees did not evaluate the vapor intrusion pathway into indoor air under a residential scenario. In order to qualify for corrective action complete without controls, all possible exposure pathways must be evaluated. Organic constituents that are referred to as volatile organic compounds (VOCs) through varying sets of criteria were detected in the vadose zone at all six sites at Pueblo Canyon Aggregate Area. The permittees must evaluate the vapor intrusion pathway into indoor air and demonstrate, either quantitatively or if appropriate qualitatively, that no potential unacceptable risks or hazards are present at Pueblo Canyon Aggregate Area in order to qualify for the status of corrective action complete without controls.

4. The permittees have rounded the risk and hazard results to one significant figure. Because some of the results are at or slightly above target levels, significant digits showing that results are actually slightly above target levels should be included. In the future, the permittees must include at least two significant digits in tables and text showing risk and hazard estimates.

Specific Comments

1. Table I-2.2-4. The permittees calculated 95% upper confidence limits (UCLs) as EPCs for calcium, lead, and zinc for the recreational scenario at AOC 00-030(eS). The datasets for calcium, lead, and zinc for the recreational scenario contained fewer than eight (8) samples (i.e., number of analyses). The ProUCL User's Guide advises that, "Datasets with fewer than 8 to 10 observations cannot be considered representative and reliable enough to make important cleanup and remediation decisions". In addition, Section 5.2 of this report specifically states that statistical analyses are not valid if there are fewer than 10 datapoints. Since fewer than eight samples are included in these datasets, maximum detected concentrations for calcium, lead and zinc should have been used as EPCs at AOC 00-030(eS). Although the current risks and hazards have been underestimated for the recreational scenario at AOC 00-030(eS), use of the maximum detected concentrations would not affect the results of the risk assessment. In the future, the permittees must ensure that at least 8 samples are contained in a dataset in order to calculate a 95% UCL for an EPC.

2. Table I-2.2-1. At SWMU 00-018(a), the permittees included the maximum detected concentration of barium (394 mg/kg) (which was detected in sludge from 0-1 feet below ground surface) in the datasets for the ecological and residential exposure intervals, but did not include it in the dataset for the recreational scenario. It is noted that: 1) barium was only identified as a COPC in tuff at SWMU 00-018(a); 2) barium was not identified as a COPC in sludge (i.e., soil); and 3) the use of the maximum detected concentration of barium in the datasets for the ecological and residential exposure intervals is conservative. In the future, the permittees must be consistent in determining which media specific data to include in the risk assessment datasets.

3. Tables 6.3-2 and 6.3-3. The permittees did not include historical sample locations 45-01702, 45-25461, and 45-25464 in the dataset for AOC 00-030(f). According to Plates 4 and 5, it appears that these sample locations are located along the associated drain line and outfall at AOC 00-030(f) and are representative of site conditions. It is noted that the detections in sample locations 45-01702, 45-25461, and 45-25464 are less than the maximum detected concentrations of COPCs in other sample locations at AOC 00-030(f) and inclusion of data from these sample locations would not affect the results of the risk assessment. In the future, the permittees must include all relevant (e.g., current and historical) data in the datasets.

4. Table I-2.2-9. The permittees listed Americum-241 twice, instead of listing Americum-241 and cesium-137. This typographical error does not affect the subsequent tables, as the correct radionuclide COPCs were evaluated at SWMU 00-030(f). In the future, the permittees must ensure accuracy in the presented tables.

5. Table I-4.2-17. The permittees utilized an EPC for Americum-241 of 0.0483 pCi/g. This EPC is inconsistent with the maximum detected concentration of 0.701 pCi/g listed on Tables

6.3.4 and I-2.2-9. Americum-241 was identified as a COPC in soil and tuff, and the maximum detected concentration of 0.701 pCi/g detected in tuff is within the exposure interval for a resident. It is noted that the use of the maximum detected concentration (0.701 pCi/g) would not affect the results of the risk assessment since it would result in a dose less than the target dose limit of 15 mrem/year. In the future, the permittees must ensure that the correct EPCs are used.

6. Table I-2.2-15. The permittees indicate that the EPCs listed for the following COPCs are based on maximum detected concentrations: tetrachloroethene, fuoranthene, phenanthrene, pyrene, and toluene. The values presented on Table I-2.2-15 are inconsistent with the maximum detected concentrations listed on Table 6.5-3. It appears that the data may have been shifted on Table I-2.2-15. It is noted that these inaccuracies are not repeated in subsequent tables and calculations and do not affect the results of the risk assessment. In the future, the permittees should ensure that the correct values are presented on all tables.

7. Tables I-2.2-15 and I-4.2-18. The EPC (based on the maximum detected concentration) for cesium-137 (0.609 pCi/g) presented on Tables I-2.2-15 and I-4.2-18 at SWMU 31-001 is inconsistent with the maximum detected concentration of cesium-137 presented on Table 6.5-4 (0.19 pCi/g). The more conservative of the two values was used in the residential radionuclide screening evaluation and therefore does not affect the results of the risk assessment at SWMU 31-001. In the future, the permittees must utilize the correct EPCs in the risk screening evaluations.

8. Table I-4.2-10. The permittees calculated a hazard quotient for cadmium at AOC 00-030(eS). According to Section 6.2.2.3, cadmium is not a COPC at AOC 00-030(eS), and an EPC for cadmium is not listed on Table I-2.2-6. It is noted that the inclusion of cadmium in the residential screening evaluation is conservative and removal of cadmium from the screening evaluation would not affect the results of the risk assessment. In the future, the permittes must ensure that the constituents evaluated are consistent with the lists of identified COPCs.

9. Table I-4.2-9. The EPC for chloroform (0.000578 mg/kg) is based on a maximum detected concentration and is inconsistent with the maximum detected concentration of 0.000604 mg/kg presented on Tables I-2.2-6 and 6.2-3. Because there is little difference between the two numbers, the results of the risk assessment are not affected. In the future, the permittees must ensure that the correct EPCs are utilized in the risk and hazard calculations.

10. Table I-4.2-22. The EPC for dibenzofuran (0.053 mg/kg) inconsistent with the EPC of 0.0814 mg/kg listed on Table I-2.2-12. Although the usage of 0.053 mg/kg is less conservative, the overall results of the risk assessment are not affected. In the future, the permittees must ensure that the correct EPCs are utilized in the risk and hazard calculations.

11. Table I-4.2-22. The EPC for zinc (116.8 mg/kg) is inconsistent with the EPC of 95.53 mg/kg listed on Table I-2.2-12. The value that was used in the hazard calculation is the greater of the two values and results in a more conservative risk assessment, and does not affect the overall results. In the future, the permittees must ensure that the correct EPCs are utilized in the risk and hazard calculations.

12. Table I-4.2-2. Dichloroethene[1,1-] was not included as a noncarcinogen on Table I-4.2-2. The hazard index has been slightly underestimated at SWMU 00-018(a) for the recreational scenario as it currently does not include dichloroethene[1,1-]. It is noted that addition of dichloroethene[1,1-] to the hazard index calculation would not affect the overall conclusions of the risk assessment at SWMU 00-018(a) since it would contribute only a small percentage to the hazard index. In the future, the permittees must include all COPCs for each receptor in the risk and hazard calculations.

13. Table I-4.2-5. The permittees do not include references for the SSLs that were used for endosulfan sulfate, di-n-octylphthalate, and endrin aldehyde. It is assumed that the following surrogate values for SSLs were used: 1) endosulfan was used for endosulfan sulfate; 2) di-n-butylphthalate was used for di-n-octylphthalate; and 2) endrin was used for endrin aldehyde. In the future, the permittees must include footnote references for any surrogate toxicity values used.

14. Table I-4.2-22. The permittees indicate in the footnote that the SSL for di-n-octylphthalate was taken from USEPA (2007) Region 6 SSL tables. The USEPA (2007) Region 6 SSL tables are outdated and Region 6 currently refers to Region 3 or Region 9 for risk-based media specific screening levels. It is noted that a surrogate value for di-n-octylphthalate could be used, as noted in the previous comment above, which would not change the SSL for di-n-octylphthalate and the results of the risk assessment would not be affected. In the future, the permittees must use current toxicity data utilizing the hierarchy presented in NMED (2009).