



BILL RICHARDSON
Governor

DIANE DENISH
Lieutenant Governor

**NEW MEXICO
ENVIRONMENT DEPARTMENT**

Hazardous Waste Bureau

**2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303
Phone (505) 476-6000 Fax (505) 476-6030
www.nmenv.state.nm.us**



RON CURRY
Secretary

SARAH COTTRELL
Deputy Secretary

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

December 23, 2010

George J. Rael, Manager
Environmental Projects Officer
U.S. Department of Energy/National
Nuclear Security Administration
Los Alamos Site Office
3747 West Jemez Road, MS A316
Los Alamos, NM 87544

Michael J. Graham
Associate Director Environmental Programs
Los Alamos National Security, L.L.C.
P.O. Box 1663, MS M991
Los Alamos, NM 87545

**RE: NOTICE OF APPROVAL WITH MODIFICATIONS
PUEBLO CANYON AGGREGATE AREA PHASE II INVESTIGATION REPORT
LOS ALAMOS NATIONAL LABORATORY
EPA ID #NM0890010515
HWB-LANL-10-076**

Dear Messrs. Rael and Graham:

The New Mexico Environment Department (NMED) has received the United States Department of Energy (DOE) and the Los Alamos National Security L.L.C.'s (LANS) (collectively, the Permittees) *Phase II Investigation Report* for *Pueblo Canyon Aggregate Area* (Phase II IR), dated September 2010 and referenced by LA-UR-10-6411 and EP2010-0384. NMED has reviewed the Phase II IR and hereby issues this Notice of Approval (NOA) With Modifications.

10R-EP-12.28.2010 - 311071

Site-specific Comments:

The following comments address the applicability of corrective action complete with or without controls.

1. Human Health Risk Assessments for all Phase II IR Sites:

In the human health risk assessments, 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) were detected in the vadose zone at all six Phase II IR sites. Prior to submittal of a request for a determination of whether corrective action is complete with or without controls at a particular site, 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 the Phase II IR sites in order to potentially qualify a site for the status of corrective action complete without controls.

2. Section 6.4.3.1, Soil Removal, fifth and sixth paragraphs, page 46, and Section 6.4.4, Summary of Human Health Risk-Screening at AOC 00-030(h), first paragraph, page 52:

The Permittees have included sample location PU-612252 in the evaluation of nature and extent of contamination but have excluded the results from the risk assessment. This was done primarily based on the Permittees' assertion that analytes found at that sample location were not representative of historic laboratory operations and that elevated polycyclic aromatic hydrocarbons (PAHs) were likely affected by runoff from the paved church parking lot. While the presence of PAHs in parking lot runoff is plausible, the area is located in a residential setting where it is realistic to assume children could be exposed to potentially contaminated soil. Other site-related chemicals of potential concern (COPCs) were also detected at this location and removal of the detections from the data set is not justified. The current residential risk estimate is $1.01E-5$ and inclusion of data from location PU-612252 will increase the calculated risk and hazard estimate. PAHs were detected at multiple sample locations at Area of Concern (AOC) 00-030(h), indicating that PAHs are pervasive throughout the AOC and that removal of the sample location containing the highest concentrations of PAHs is not justified.

Although the deepest samples at sample locations at and near the former septic tank 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 to the indoor air pathway. This pathway was not evaluated even though it is a complete exposure pathway at the Pueblo Canyon Aggregate Area. Considering the data from sample location PU-612252, AOC 00-030(h) would not meet the requirements for corrective action complete without controls.

3. COPC Evaluations at SWMU 00-018(a) and AOC 00-030(f)

Because the current and reasonably foreseeable future land use for the Pueblo Canyon Aggregate Area is residential and recreational, the Permittees evaluated a recreational receptor in the risk assessment. A residential receptor was also evaluated in the risk assessment in order to potentially 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 milligrams per kilogram (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 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 since any future development of the site must include special controls to mitigate potential inhalation exposures to a construction worker.

General Comments:

The following comments are provided for the Permittees' information since none of the items will significantly affect the results of the risk assessment.

1. United States Environmental Protection Agency (US EPA) Regional Screening Levels (RSLs):

The Permittees used the RSL for mercury (inorganic salts) for the residential scenario and the recreational SSL for mercury which was also based on inorganic salts. For future IRs, the Permittees must clarify whether analytical results define speciation of mercury, thus justifying the use of the RSLs and toxicity data for mercury salts.

2. Section 5.2.1, Distributional Comparisons, first paragraph, sixth sentence, page 15:

Permittees' Statement: "If the p-value is greater than 0.05, there is a statistical difference between data sets; if the p-value is less than 0.05, there is a statistical difference." NMED

understands that the correct statement should be "If the p-value is greater than 0.05, there is not a statistical difference between data sets; if the p-value is less than 0.05, there is a statistical difference."

3. Section 6.5.4, Summary of Human Health Risk-Screening at SWMU 31-001, third paragraph, page 59:

The Permittees state that Solid Waste Management Unit (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 $1.00E-5$. The risk estimate has been rounded to one significant figure and the actual risk estimate is $1.11E-5$. This exceeds the NMED target risk level of $1.00E-5$.

In general, the Permittees have rounded the risk and hazard results to one significant figure in the Phase II IR. Because some of the results are at or slightly above target levels, significant figures showing that results are actually slightly above target levels should have been included. In future IRs, the Permittees must include at least two significant figures in tables and text that present risk and hazard estimates.

4. Tables 6.3-2 and 6.3-3, Inorganic and Organic Chemicals above BVs at AOC 00-030(f), Respectively, pages 117 and 118:

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 future IRs, the Permittees must include all relevant (i.e., current and historical) data in the datasets and must demonstrate that no potential unacceptable risks or hazards exist at AOC 00-030(f) and that the resulting risk assessment is protective of all potential receptors.

5. Table I-2.2-1, EPCs for SWMU 00-018(a) for the Recreational Scenario, pages I-45 through I-47:

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 future IRs, the Permittees must be

consistent in determining which media specific data to include in the risk assessment datasets.

6. Table I-2.2-4, EPCs for AOC 00-030(eS) for the Recreational Scenario, pages I-54 and I-55:

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 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 the Phase II IR specifically states that statistical analyses are not valid if there are fewer than 10 data points. 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 significantly affect the results of the risk assessment. In future IRs, the Permittees must ensure that at least eight samples are contained in a dataset in order to calculate a 95% UCL for an EPC.

7. Table I-2.2-9, EPCs for AOC 00-030(f) for the Residential Scenario, pages I-64 and I-65:

The Permittees listed americium-241 twice, instead of listing americium-241 and cesium-137. This typographical error does not affect the subsequent tables, since the correct radionuclide COPCs were evaluated at SWMU 00-030(f). In future IRs, the Permittees must ensure accuracy in all tables.

8. Table I-2.2-15, EPCs for SWMU 31-001 for the Residential Scenario, pages I-76 and I-77:

The Permittees indicate that the EPCs listed for the following COPCs are based on maximum detected concentrations: tetrachloroethene, fluoranthene, 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 future IRs, the Permittees must ensure that the correct values are presented in all tables.

9. Tables I-2.2-15 and I-4.2-18, EPCs for SWMU 31-001 for the Residential Scenario, pages I-76 and I-77 and Recreational Carcinogenic Screening Evaluation for AOC 00-030(f), page I-101:

The EPC (based on the maximum detected concentration) for cesium-137 (0.609 picocuries per gram (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 future IRs, the Permittees must use the correct EPCs in the risk screening evaluations.

10. Table I-4.2-2, Recreational Noncarcinogenic Screening Evaluation for SWMU 00-018(a), page I-90:

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 because 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 future IRs, the Permittees must include all COPCs for each receptor in the risk and hazard calculations.

11. Table I-4.2-5, Residential Noncarcinogenic Screening Evaluation for SWMU 00-018(a), page I-92:

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 3) endrin was used for endrin aldehyde. In future IRs, the Permittees must include footnote references for any surrogate toxicity values used.

12. Table I-4.2-9, Residential Carcinogenic Screening Evaluation for AOC 00-030(eS), page I-95:

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 future IRs, the Permittees must ensure that the correct EPCs are utilized in the risk and hazard calculations.

13. Table I-4.2-10, Residential Noncarcinogenic Screening Evaluation for AOC 00-030(eS), page I-96:

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 significantly affect the results of the risk assessment. In future IRs, the Permittees must ensure that the constituents evaluated are consistent with the lists of identified COPCs.

14. Table I-4.2-22, Residential Noncarcinogenic Screening Evaluation for AOC 00-030(h), page I-104:

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

15. Table I-4.2-22, Residential Noncarcinogenic Screening Evaluation for AOC 00-030(h), page I-104:

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 estimate, but does not affect the overall results. In future IRs, the Permittees must ensure that the correct EPCs are used in the risk and hazard calculations.

16. Table I-4.2-22, Residential Noncarcinogenic Screening Evaluation for AOC 00-030(h), page I-104:

The Permittees indicate in the footnote that the SSL for di-n-octylphthalate was taken from US EPA (2007) Region 6 SSL tables. The US EPA (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, which would not change the SSL for di-n-octylphthalate and the results of the risk assessment estimate would not be affected. In future IRs, the Permittees must use current toxicity data utilizing the hierarchy presented in NMED's SSL guidance (August 2009).

17. Table I-4.2-17, Residential Radionuclide Screening Evaluation for AOC 00-030(f), page I-101:

The Permittees utilized an EPC for americium-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. Americium-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 estimate since it would result in a dose less than the target dose limit of 15 millirem per year (mrem/year). In future IRs, the Permittees must ensure that the correct EPCs are used.

18. Ecological Receptors:

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 greatly different from background, statistical analyses did indicate the contaminants are greater than background. Additional monitoring of ecological impact will ensure there are not adverse effects in the long-term.

In summary, NMED will deny Permittee requests for determinations that corrective action is complete without controls until and unless the Permittees provide an adequate evaluation of the vapor intrusion pathway at AOCs and SWMUs discussed in the Phase II IR. Once an evaluation is completed, NMED will consider this type of Permittee request. In addition, requests for this type of determination will not be considered by NMED when potential future development of an AOC or SWMU will require special controls to mitigate potential inhalation exposures to future construction workers.

Please contact Daniel Comeau at (505) 476-6043, if you have any questions.

Sincerely,



James P. Bearzi
Chief
Hazardous Waste Bureau

cc: J. Kieling, NMED HWB
D. Cobrain, NMED HWB
N. Dhawan, NMED HWB
M. Dale, NMED HWB
D. Comeau, NMED HWB
S. Yanicak, NMED DOE OB, MS J993
T. Skibitski, NMED DOE OB
L. King, EPA 6PD-N
B. Coel-Roback, EP-CAP, MS M992
C. Rodriguez, DOE-LASO, MS A316

File: 2010 -- LANL, Pueblo Canyon Aggregate Area Phase II IR (dated September 2010)