SUSANA MARTINEZ
Governor
JOHN A. SANCHEZ
Lieutenant Governor

NEW MEXICO ENVIRONMENT DEPARTMENT

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

RYAN FLYNN
Secretary
BUTCH TONGATE
Deputy Secretary

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February 26, 2015

Pete Maggiore, Assistant Manager
Environmental Projects Office
National Nuclear Security Administration
Los Alamos Field Office, MS A316
3747 West Jemez Road
Los Alamos, NM 87544

Michael T. Brandt, Associate Director
Environment, Safety, Health
Los Alamos National Laboratory
P.O. Box 1663, MS K491
Los Alamos, NM 87545

RE: REVIEW
DERIVATION AND USE OF RADIONUCLIDE SCREENING ACTION LEVELS, REVISION 3, DECEMBER 2014
EPA ID #NM0890010515
HWB-LANL-14-075

Dear Messrs. Maggiore and Brandt:

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) *Derivation and Use of Radionuclide Screening Action Levels*, Revision 3 dated December 10, 2014 and referenced by ADESH-14-139/LAUR-14-29225. NMED has reviewed the document and provides the following comments.

1. **Section 4, Selection of Target Dose Limit. Page 3**: In previous versions of these screening levels, the driving regulatory document that the Permittees followed was the National Nuclear Security Administration Service Center (NNSA SC), which dictated that site-specific radiation dose not exceed 15 millirem per year (mrem/yr). In addition, the use of a 15 mrem/yr dose was demonstrated by the EPA as being equivalent to an approximate increased lifetime cancer risk of 1×10^{-4}. However, more recent scientific information reflected in EPA's Federal Guidance Report (FGR) No. 13 risk estimates show that 12 mrem/yr is now considered to correspond approximately to 3×10^{-4} excess lifetime cancer risk (OSWER Directive 9285.6-20). Revision 3 of the radionuclide SALs follows the

guidance outlined in 2011 Department of Energy (DOE) Order 458.1 (http://nnsa.energy.gov/sites/default/files/nnsa/inlinefiles/doe%20order%20458.1.pdf).

Following DOE Order 458.1, a site-specific modeled radiation dose up to 25 mrem/yr for cleanup guidelines and the release of real property is allowed. However, the Order also specifies that the principles of As Low As Reasonably Achievable (ALARA) also be applied. The Permittees have proposed that for sites where public access is or will be available and the radiological dose is above 3 mrem/yr and equal to or below 25 mrem/yr, a quantitative ALARA analyses is conducted.

In researching EPA's position with the DOE Order 458.1, it appears that EPA's understanding is that ALARA will achieve cleanup levels that will be within the risk range EPA considers protective (http://pbadupws.nrc.gov/docs/ML0126/ML012670035.pdf). The EPA risk range, as established in the 1990 revisions to the National Contingency Plan and EPA guidance under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) for cleanups and remedial actions under the Superfund program, is 1×10^{-4} to 1×10^{-6} excess lifetime cancer risk from all radiological and non-radiological carcinogens. EPA has strongly suggested that DOE meet the Superfund/EPA risk range.

While the use of a 25 mrem/yr dose limit does result in less conservative radiological SALs, the guidance specifically states that "if the analysis determines the dose is not ALARA, additional remediation is warranted to lower the dose further or an alternative scenario may be used to restrict activity and land use for that property, if transferred." The application of ALARA should ensure adequate evaluation and assessment of risk is conducted and provide for flexibility in requiring additional actions and/or controls on sites to be released for public use.

2. **Section 6.1.1, Residential Scenario Variable Exposure Parameters, page 6**, indicates the plant ingestion rate used in determining the radionuclide screening action levels (SALs) for the residential exposure scenario are determined as the "age-weighted body-weight normalized sum of mean per capita fruit and vegetable ingestion rates..." Environmental Protection Agency (EPA)'s *Exposure Factors Handbook: 2011 Edition*, specifically Tables 13-1 and 8-1, is referenced as the source of the data used in the ingestion rate calculation. While Revision 3 does not present the specific methodology used in calculating the child and adult plant ingestion rates [reported as 14 and 22.1 kilograms per year (kg/yr), respectively], examination of the methodology used by EPA to calculate fruit and vegetable ingestion rates in the 2014 revision of the Preliminary Remediation Goals for Radionuclides (http://epa-prgs.ornl.gov/radionuclides/whatsnew.html) indicates that similar approaches were applied in both cases, although some details differed (e.g., choice of data, age range for child and adult receptors). EPA employed "Consumers Only, Unadjusted"[1] age-specific data from Table 13-1 of the Exposure Factors Handbook while LANL used "Per Capita for Populations That

1 Not adjusted to account for preparation or post-cooking losses.

Garden or Farm, Adjusted"[2] data from the same table. Thus, the child and adult plant ingestion rates calculated by EPA are expected to exceed the rates calculated by LANL (e.g., the produce ingestion rate for adults 21 to 65 years old based on the data used by EPA is 53 kg/yr compared to the rate of 22.1 kg/yr calculated by LANL for ingestion of fruit and vegetables). To ensure that users of the LANL SALs understand that SALs reflecting ingestion of fruits and vegetables are based on ingestion rates lower than those obtained using EPA's approach, it is recommended that Section 6.1.1 of the text be revised to include additional details regarding the derivation of the child and adult plant ingestion rates reported in the text.

3. **Section 6.1.1, page 6**, states that the age ranges for calculating child and adult plant ingestion rates are 0 to less than 21 years for a child receptor and 21 to 65 years for an adult receptor. However, it is not clear why these age ranges were chosen. In addition, the reported plant ingestion rate for child receptors could not be verified unless the age range was limited to 0 to less than 16 years; thus, this calculation should be reviewed to ensure that the rate was calculated as described in the text. In addition, it is recommended that information supporting the use of the age ranges stated in Section 6.1.1 be added to the text to ensure that users of the LANL SALs understand the basis of the reported plant ingestion rates. The information supporting the stated age ranges should be similar to that provided in Section 6.1.4, Recreational Scenario Variable Exposure Parameters, in support of the age range (6 to less than 12 years) for child recreational receptors.

4. NMED has recently posted a revised version of the *Risk Assessment Guidance for Site Investigations and Remediation*, dated December 2014 (SSG), to its guidance web page:

   http://www.nmenv.state.nm.us/HWB/guidance.html.

   Where the information referenced in the 2012 version of the SSG remains available in the 2014 version, it is recommended that the references be revised to reflect the 2014 version of the document.

2 Adjusted for preparation and post-cooking losses.

Please contact Neelam Dhawan at (505) 476-6042, if you have any questions.

Sincerely,

John E. Kieling
Chief
Hazardous Waste Bureau

cc: D. Cobrain, NMED HWB
N. Dhawan, NMED HWB
S. Yanicak, NMED DOE OB, MS J993
T. Skibitski, NMED DOE OB
L. King, EPA 6PD-N
C. Rodriguez, DOE NA-00-LA, MS A316
R. Mirenda, EP-CAP, MS M992

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