# 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***

SUSANA MARTINEZ
Governor

JOHN A. SANCHEZ
Lieutenant Governor

DAVE MARTIN
Secretary

BUTCH TONGATE
Deputy Secretary


EP2012-5078

**CERTIFIED MAIL - RETURN RECEIPT REQUESTED**

March 27, 2012

Kevin W. Smith, Manager
Los Alamos Site Office
Department of Energy
3747 W. Jemez Rd., MS-A316
Los Alamos, NM 87544

Michael T. Brandt, Acting Associate Director
Environment, Safety, & Health
Los Alamos National Security, LLC
Los Alamos Research Park
P.O. Box 1663, MS K491
Los Alamos, NM 87545

**RE: NOTICE OF DISAPPROVAL**
**PERMIT MODIFICATION REQUEST**
**OPEN DETONATION UNITS AT TECHNICAL AREAS 36 AND 39**
**ATTACHMENTS E AND G**
**LOS ALAMOS NATIONAL LABORATORY**
**EPA ID# NM 0890010515**
**HWB-LANL-11-052**

Dear Messrs. Smith and Brandt:

The New Mexico Environment Department (Department) has received the *Permit Modification Request for Open Detonation Units at Technical Areas 36 and 39* (PMR), dated July 11, 2011, from the United States Department of Energy and Los Alamos National Security, LLC (collectively the Permittees). The Permittees seek to modify the Hazardous Waste Facility Permit (Permit) for Los Alamos National Laboratory (LANL) to include within the Permit hazardous waste open detonation treatment units at Technical Area (TA)-36-8 and TA-39-6. The Permittees submitted additional supplemental information on August 18, 2011.

The Department has completed its review of Attachment E, *Screening Level Air Modeling Analysis and Risk Evaluation for Open Detonation Operations for Los Alamos National Laboratory* and Attachment G, *Open Detonation Human-Health Risk Assessment* and hereby issues this Notice of Disapproval (NOD). This NOD provides comments related to the Department's review of Attachments E and G only. The Department may issue a second NOD

when it has completed its review of the remainder of the PMR. The Department is providing these comments to allow the Permittees additional time to address the deficiencies in Attachments E and G. The Department will determine a deadline for the Permittees to respond after completing a review of the entire PMR.

If you have any questions regarding this correspondence, please address them to Tim Hall of my staff at 476-6049 or at timothy.hall@state.nm.us.

Sincerely,

John E. Kieling
Acting Chief
Hazardous Waste Bureau

Attachment
1) Comments and Deficiencies

cc w/o attachment:
J. Davis, RPD, NMED
J. Kieling, HWB, NMED
T. Hall, HWB, NMED
L. King, EPA 6PD-N
T. Grieggs, ENV-RCRA, LANS, MS-K490
M. Haagenstad, ENV-RCRA, LANS, MS-K404
G. Turner, DOE-LASO, MS-A316

File: Reading and LANL Permit 2012

LANL-11-052

# ATTACHMENT

# NOTICE OF DEFICIENCY

# PERMIT MODIFICATION REQUEST FOR OPEN DETONATION UNITS AT TECHNICAL AREAS 36 AND 39 (TA-36-8 & TA-39-6) (JULY 19, 2011)

## ATTACHMENT E
## SCREENING LEVEL AIR MODELING ANALYSIS AND RISK EVALUATION FOR OPEN DETONATION OPERATIONS FOR LOS ALAMOS NATIONAL LABORATORY

## AND

## ATTACHMENT G
## OPEN DETONATION HUMAN-HEALTH RISK ASSESSMENT LOS ALAMOS NATIONAL LABORATORY

LOS ALAMOS NATIONAL LABORATORY
HAZARDOUS WASTE FACILITY PERMIT

**GENERAL COMMENTS**

1. The analyses described in Attachment E, Screening Level Air Modeling Analysis and Risk Evaluation for Open Detonation (OD) Operations, do not appear to incorporate key information from historical operations at Technical Area (TA)-36-8 and TA-39-6. Among the chemicals of potential concern (COPCs) addressed in the risk assessment of historical operations described in Attachment G, Open Detonation Human-Health Risk Assessment, but not addressed in Attachment E for the TA-36-8 open detonation unit (TA-36-8 OD Unit) are 10 carcinogens including 2,3,7,8-TCDD, and 13 non-carcinogens. In addition, 2 carcinogenic COPCs and 6 non-carcinogenic COPCs evaluated in Attachment G were addressed for deposition only in Attachment E. For the TA-39-6 OD Unit, it appears 6 carcinogens and 9 non-carcinogens addressed in Attachment G were not assessed in Attachment E. Further, one carcinogen and 7 non-carcinogens (including lead) were evaluated for deposition (i.e., soil concentration) only in Attachment E. Neither Attachment E nor Attachment G includes a discussion explaining why all COPCs detected in soils and attributed to historical operation of the two open detonation units were not addressed in Attachment E. Revise Attachment E to include an evaluation of all COPCs addressed in Attachment G that are not addressed in the current air modeling analysis and screening analysis. Alternatively, provide multiple lines of evidence for not evaluating the excluded COPCs in Attachment E.

2. LANL proposed and NMED HWB implemented a "worst-case" analysis of potential emissions from treatment operations at the TA-16 Open Burn units. This approach called for development of a suite of "worst case" emission factors for chemicals potentially emitted from open burning operations, regardless of the waste stream being burned, so the permit would not limit the wastes that could be burned at TA-16 to only those demonstrated as protective in the risk-based screening analysis. It is not clear that the emission analysis performed for the TA-36-8 and TA-39-6 OD Units is compatible with the analysis performed for the TA-16 Open Burn units. While it is known that the emissions analysis for the open detonation (OD) sites and the TA-16 Open Burn units were based on historical operational records and the primary source for emission factors in both cases was the emission tests summarized in EPA's 1998 Mitchell and Suggs report, Section 3.0, Emission Factors, and Attachment A of Attachment E do not furnish the level of detail needed to determine if the emissions analysis reflects a "worst case" approach. For example, it is assumed that the "categories" alluded to in the last sentence of the first paragraph of Section 3.0 are delineated by the rows highlighted in yellow and pink in Attachment A because this is not explained in the text or table endnotes. Further, while the categories appear to be self-explanatory, it is unclear how the list of emission products associated with the explosive hazardous wastes and explosives-contaminated wastes historically treated at the OD sites was developed. In fact, it is not clear that any emission products for the solid and liquid wastes treated at the OD sites have been included. Finally, there is no discussion of how the listed emission factors were calculated or what the actual numerical values represent (e.g., average for all items/chemicals included in a category or maximum emission factor for all items in a category). This type of information is essential to understanding how the emission analysis was performed and if the emission products and emission factors are sufficient to demonstrate the protectiveness of open detonation operations at the TA-36-8 and TA-39-6 OD Units. Revise Section 3.0 to provide additional details regarding the emission analysis described in the text of Attachment E and tabulated in Attachment A. At a minimum, ensure that all issues and concerns discussed above are addressed in the added discussion. Further, demonstrate that the emission analysis does, in fact,

represent worst-case conditions and is appropriate for demonstrating the protectiveness of OD operations at TA-36 and TA-39.

3. It is known that the Open Burn/Open Detonation Model (OBODM) does not calculate gravitational deposition in complex terrain. Further, OBODM calculates only gravitational deposition and does not address other components of dry particle or vapor deposition, although Volume II of the OBODM User's Guide outlines an approach for estimating dry deposition outside of the model itself based on an assumed deposition velocity and dosages predicted by OBODM (Bjorklund *et.al*, 1998b). Because the OD sites at LANL (i.e., TA-36-8 and TA-39-6) are located in complex terrain, the facility chose to determine deposition values using a methodology presented in *The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments* dated August 2003 prepared by the California Environmental Protection Agency (CALEPA). Thus the approach implemented in Attachment E does not reflect the approach used to characterize deposition in the Screening Level Air Modeling Analysis and Risk-Based Screening Analyses for the TA-16 Open Burn units. The approach is similar to that outlined in Section 1.1.6.3 of Volume II of the ISC User's Guide. While the ISC User's Guide states that the approach produces a conservative result when depletion is ignored, the depletion process and the conservatism inherent in the implemented approach to determine deposition are not addressed in Attachment E. Another level of conservatism can be introduced through specification of the particle deposition velocity labeled as "Dep-rate" in the CALEPA document. The Permittees have used the CALEPA recommended Dep-rate of 0.05 meters per second (m/sec) but has not discussed the level of conservatism this value represents when compared to the particle deposition velocities available in the scientific literature and, specifically, those for the emission products addressed in the air modeling analysis of the OD sites. Revise Attachment E to include a discussion of the conservatism in the implemented approach for determining deposition. The discussion is needed to document that the approach used in determining the deposition values produces conservative results when compared to obtaining these values from air deposition modeling. As part of the discussion, indicate if depletion was considered in calculating the deposition values and address the level of conservatism introduced through application of the CALEPA recommended value for Dep-rate.

4. Given the uncertainties associated with emissions, air modeling, and risk-based screening analyses for open detonation units, it is important that the sources be identified and discussed. The Permittees have not included a discussion of uncertainties related to these analyses in Attachment E. For example, Attachment E does not identify any limitations or uncertainties associated with the method employed to estimate deposition to soil. Attachment E should identify all the components of dry deposition flux represented by the method extracted from the *The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments* and discuss the uncertainties introduced into the analysis. Revise Attachment E to include a discussion of the uncertainties associated with the emissions, air modeling, and risk-based screening analyses.

5. Although small mammal investigations (i.e., population investigation and uptake analysis) were conducted at the proposed OD Units at TAs 36-8 and 39-6 (Attachments H and I), risks/hazards to other ecological receptors found at these sites were not assessed. Include a baseline ecological risk assessment of potential risks/hazards to all potential ecological receptors from exposure to COPCs under current conditions at the proposed OD sites.

6. Exposure to COPCs by residential receptors were considered at TAs 36-8 and 39-6 by: 1) conducting a baseline human health risk assessment (HHRA) from exposure to current levels of COPCs at TAs 36-8 and 39-6 (Attachment G); and 2) comparing future modeled soil and air concentrations of contaminants related to proposed OD treatment operations with corresponding screening levels (Attachment E). After the occurrence of OD treatment operations, receptors at the proposed OD Units would be exposed to current levels of COPCs and future levels of contaminants (10-year soil concentrations). The HHRA must include a cumulative estimate of risks/hazards from exposure to all COPCs; current and future. Modify the HHRA to include an evaluation of the risks/hazards that current and future COPCs would pose for the receptors evaluated in the risk assessment. Determine if current conditions added together with future modeled conditions of soil would pose unacceptable risks/hazards for receptors evaluated in the HHRA.

**SPECIFIC COMMENTS**

1. **Attachment E, Section 1.1, Description of the OD Unit and Operations, Page 1.** Section 1.2 provides a brief description of the characteristics of the area surrounding both the TA-36-8 and TA-39-6 OD Units. According to the text, a concave area is located in the western portion of the TA-36-8 OD Unit to minimize fragment dispersion. The discussion of the TA-39 area indicates it is located in a canyon bottom with steep canyon walls that rise to over 100 feet. Because these features may influence local meteorological conditions, it is important that stakeholders are aware that the Permit Modification Request (PMR) contains additional discussion and depiction of the topography surrounding both OD units. Such information is not provided in Section 1.2 although additional descriptions and topographic maps (e.g., Figures 2.4, 2.6 and figures in Attachment B) are included in the PMR and accompanying attachments. Revise Section 1.2 to reference the locations of descriptions and maps of the topography surrounding the two OD units within the PMR and accompanying attachments.

2. **Attachment E, Section 1.2, Waste Treated Through Open Detonation, Page 5.** The second paragraph of Section 1.2 indicates that liquid hazardous explosive waste may be treated at the OD units. Section 2.4.1, Waste Description, of the PMR also notes that liquid hazardous explosives may be open detonated. Further, Section 2.4.3, Verification Frequencies, states sampling is not usually conducted because formulations are "closely controlled and well known." Additional descriptions and/or characterizations of these liquid hazardous and wet explosives were not found in the PMR. Additional information is needed to characterize these liquid and wet explosive wastes. Further, any special procedures followed when these wastes are detonated should be discussed. Depending on the amount of liquid present in these wastes, it may be necessary to include a liquid hazardous explosive waste stream in the air modeling analysis to demonstrate that treatment of such wastes by open detonation will be protective of human health and the environment. Revise Section 1.2 to include additional information describing the liquid hazardous and wet explosives that may be treated by open detonation at LANL. Specifically identify the liquids present (e.g., water, solvent); provide a qualitative description of the level of moisture in the wastes (e.g., free standing liquids, slurry, saturated solid explosives); and estimate the moisture content of these wastes, if possible. Further, describe the procedures followed in treating liquid and wet explosives in the OD Units. Finally, demonstrate that the liquid contained in this waste stream has no impact on the effective treatment of the waste stream and the dispersion and deposition of the emitted compounds. If such a demonstration cannot be made, revise the air modeling analysis to include detonation of a liquid hazardous explosive waste stream to illustrate that the treatment operation is protective of human health and the environment.

3. **Attachment E, Section 1.2, Waste Treated Through Open Detonation, Pages 5 and 6.** The last paragraph on Page 5 indicates that firing site debris is one possible component of the explosives-contaminated waste that can be treated in the OD Units. Further, the last sentence on Page 5 (and continuing onto Page 6) states that firing site debris could include corrective action wastes and wastes generated in future remedial investigations and remediation efforts. Treatment of these waste streams is beyond the scope of the RCRA operating permit. Under RCRA, these wastes could be treated in a Corrective Action Management Unit (CAMU). Regulatory actions involving the use of the TA-36-8 OD Unit and/or the TA-39-6 OD Unit as CAMUs should be addressed outside of the RCRA

operating permit for these units. Revise Section 1.2 to remove the sentence at the bottom of Page 5 (and continued onto Page 6) regarding the potential treatment of corrective action wastes and wastes generated from future investigations and remedial efforts in TA-36-8 and TA-39-6.

4. **Attachment E, Section 1.2, Waste Treated Through Open Detonation, Pages 5 and 6.** Section 1.2 provides a brief description of the types of wastes treated at the TA-36-8 and TA-39-6 OD Units. The discussion lacks the level of detail needed to establish the basis for the emissions analysis described in Section 3.0, Emission Factors. Additional details are available in the text and tables referenced in Section 2.4.1, Waste Description, of the PMR. Revise Section 1.2 of Attachment E to include a reference to Section 2.4.1 of the PMR.

5. **Attachment E, Section 2.4, Meteorological Data, Page 8.** As noted in Section 2.4, the meteorological data set used in air modeling dispersion from open detonation operations is the same set that was used to model dispersion and deposition for the TA-16 Open Burn units. However, the locations of the TA-36-8 and TA-39-6 OD Units may influence local meteorological conditions and produce different dispersion patterns than those predicted using the TA-6 meteorological tower data set. Section 2.4 does not present information that assists in characterizing the potential differences in dispersion if a meteorological data set based on local meteorological conditions had been used rather than the data set based on meteorological conditions measured at the TA-6 station tower or demonstrate that the TA-6 data set sufficiently represents local conditions for the purposes of air dispersion modeling. At a minimum, Section 2.4 should be revised to include the following information:

    1. A wind rose for the TA-6 meteorological tower data set;
    2. A reference to the discussion in Section 2.3.4.1, Meteorological Assessment and Potential Releases from the OD Units, of the PMR;
    3. A discussion comparing the meteorological conditions represented in the TA-6 meteorological tower data set to the meteorological conditions at the unit locations;
    4. A comparison of the plume rise predicted by OBODM to the height of the canyon walls at the TA-39-6 OD Unit;
    5. A discussion of the land use and land cover surrounding the TA-6 meteorological tower, the TA-36-8 OD Unit, and the TA-39-6 OD Unit focused on potential differences in surface roughness length for the three sites;
    6. The ground elevation at the location of the TA-36-8 OD Unit, the TA-39-6 OD Unit, and the TA-6 meteorological data tower;
    7. A summary of any meteorological data (e.g., wind speed, wind direction, air temperature) collected at the OD units and a comparison of the conditions represented by that data to the conditions represented in the TA-6 meteorological tower data set; and
    8. Any other information necessary to understand the uncertainty introduced into the air dispersion modeling by using the TA-6 data to represent local meteorological conditions.

6. **Attachment E, Section 2.5, Receptors, Page 8.** Table 2-2, Public Receptors, lists the easting and northing Universal Transverse Mercator (UTM) coordinates of the roadways, recreation areas, schools, hospitals, and tribal land addressed in the air dispersion modeling analysis. Because both

OD units are located in areas of complex terrain, the z-coordinate (i.e., elevation) should also be presented in the table. Revise Table 2-2 to include the elevation for each public receptor location addressed in the air modeling analysis.

7. **Attachment E, Section 2.5, Receptors, Page 8.** Attachment E does not identify the datum on which the coordinate system used in the air dispersion modeling analysis is based. Revise Section 2.5 to indicate that locations were specified in UTM coordinates in the air dispersion modeling analysis and identify the datum on which the coordinates are based (e.g., NAD83).

8. **Attachment E, Section 2.6, Model Methodology Description, Pages 11 and 12.** Section 2.6 references Table 2-3, Model Scenarios, for a summary of the four scenarios modeled in the air dispersion modeling analysis. The last column of Table 2-3 identifies the OBODM input and output file for each scenario by name. However, there is no indication that any of the air dispersion modeling files have been submitted to NMED HWB. Revise Section 2.6 to indicate that the OBODM input and output files along with the accompanying hourly source strength files, and the model-ready meteorological data file were submitted to NMED HWB in electronic format.

9. **Attachment E, Section 2.7, Model Results, Page 12.** Section 2.7 references Table 2-4, Maximum Ground Level Concentrations and Locations, for a listing of the maximum ground level concentrations predicted by OBODM for both OD sites. The last column of Table 2-4 lists the maximum ground level concentration from among all public receptors for the units and averaging periods listed in the far left-hand column. Revise Table 2-4 to add a column identifying the public receptor location exhibiting the highest ground level concentration.

10. **Attachment E, Section 2.7, Model Results, Page 12.** No graphical depiction of the OBODM modeling results has been included in Attachment E. Plot the locations exhibiting the highest ground level concentrations presented in Table 2-4 on site figures to provide stakeholders with a visual presentation of the air modeling results. Revise Attachment E to address this issue.

11. **Attachment E, Section 3.0, Emission Factors, Page 13.** The second paragraph of Section 3.0 discusses the results of research performed at the Naval Air Warfare Center at China Lake, California on the fate of metals during OD treatment operations. While the document describing this research is referenced, the actual document is not provided as part of Attachment E. Provide the document since it is used as technical support for excluding metals, including metal compounds contained in the explosives treated by open detonation, from the dispersion analysis (although they are addressed in the deposition analysis). Revise Attachment E to include the referenced research report and/or technical information that adequately supports the exclusion of metals, including metal compounds contained in detonated explosives, from the dispersion analysis.

12. **Attachment E, Section 3.0, Emission Factors, Page 13.** It is not clear why particle phase air concentrations have not been calculated in the air modeling analysis, especially for off-site receptors. While larger particles may deposit close to the source, smaller particles, especially metals in compounds that are constituents of the explosives and/or the explosives-contaminated solid and liquid waste streams, may remain in the air for some time before settling on the ground surface. Revise Attachment E to demonstrate that particle phase air concentrations do not result in potential health

impacts for off-site receptors. This demonstration should be based on the results of air dispersion modeling and subsequent health-based screening of the results or other lines of evidence that are not currently discussed in the second paragraph of Section 3.0.

13. **Attachment E, Section 3.0, Emission Factors, Page 13.** The last sentence in the second paragraph of Section 3.0 requires reference citations so all stakeholders can access the information needed to judge the validity of the assertions made concerning the emission factor for metal compounds and the exclusion of metal compounds from the air dispersion (i.e., air concentration) analysis. Revise Section 3.0 to include references to the documents that specify an emission factor of 2.6E0-01 for metal compounds in energetics and provide the technical justification for the exclusion of metal compounds from the air dispersion modeling analysis. In addition, specify the units for the emission factor provided in the last sentence (e.g., pound of compound emitted per pound of energetic treated).

14. **Attachment E, Section 3.0, Emission Factors, Page 13.** The third paragraph of Section 3.0 discusses the results of research performed at the Naval Air Warfare Center at China Lake, California on the formation of dioxins during OD treatment operations. While the document describing this research is referenced, the actual document is not provided as part of Attachment E. Further, Attachment G, Open Detonation Human-Health Risk Assessment, indicates dioxins/furans were detected in the vicinity of the OD sites and these detections were evaluated as part of the risk assessment associated with historical open detonation operations. These detections are not mentioned in Attachment E. The discussion of dioxins/furans should be expanded to account for all information available including the detection of such compounds in the vicinity of the modeled OD sources. Revise Attachment E to include the referenced document since it is currently used as the sole technical support for excluding dioxins and furans from the air modeling analysis. In addition, discuss the detections of dioxin/furans in the vicinity of the modeled sources as well as any procedural changes or control measures implemented to minimize the deposition of dioxin/furans from current and future open detonations. If adequate protection of human health and the environment cannot be demonstrated through a qualitative discussion, include dioxins/furans in the air modeling analysis and subsequent risk-based screening analyses.

15. **Attachment E, Section 3.0, Emission Factors, Page 13.** The last sentence in the third paragraph of Section 3.0 requires a reference to assist all stakeholders in locating information used in determining the validity of the assertion concerning the exclusion of dioxins/furans from the air modeling analysis. Revise Section 3.0 to include a reference to *Emissions from the Energetic Component of Energetic Wastes During Treatment by Open Detonation*, NAWCWD TP 8603, dated 2005.

16. **Attachment E, Section 3.0, Emission Factors, Pages 13 and 14.** The last paragraph of Section 3.0 indicates that emission factors for constituents other than those listed in Table 3-1, Emission Products and Emission Factors Used in Screening Analysis for OD Operations, were "...developed and have been used in the health screening analysis where practicable." It is not clear how these additional constituents were identified, how the emission factors were determined, why the constituents were not listed in Table 3-1, and what criteria were applied to determine if inclusion in the health screening analysis was "practicable." Revise Section 3.0 to provide additional information regarding constituents not included in Table 3-1 but included in the health screening analysis. Further, include these additional constituents in Table 3-1 or list them in a similar but separate table.

17. **Attachment E, Table 3-1, Emission Products and Emission Factors Used in Screening Analysis for OD Operations, Page 14.** The last column of Table 3-1 lists the units for the emission factors. However, the units should be more specifically identified. Revise the units to be more specific. Indicate if the denominator represents the total weight of explosive treated (lb emitted/lb of explosive treated) or represents the net explosive weight treated (lb emitted /lb of NEW treated).

18. **Attachment E, Section 5.0, Results, Page 15.** The fourth bulleted item in Section 5.0 indicates soil concentrations were calculated from deposition values and compared to NMED Human Health residential Soil Screening Levels (SSLs) and LANL-derived ecological screening levels (ESLs). While it is known that deposition values were not determined through air deposition modeling, the text of Attachment E does not explain how deposition values were estimated for use in calculating soil concentrations. Attachment B, EXCEL Tables Used for Modeling Results Evaluation, of Attachment E outlines the methodology and presents the equation used to calculate deposition values from an assumed value of deposition velocity and the air dispersion modeling results. Due to the importance of deposition in demonstrating the protectiveness of OD operations and the use of an approach that differs from the approach implemented in the screening level air modeling analysis and risk-based screening analyses performed for the TA-16 Burn Grounds, the methodology used in Attachment E should be presented and discussed within the main text. Revise Attachment E to include a detailed discussion addressing the methodology used to calculate deposition values for the OD units. The discussion should explain why this approach was used, and present the equations and assumed parameter values used in performing the calculation. Ensure the discussion references *The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments* and the document is listed in the References Section of Attachment E. In addition, the methodology for calculation of the 10-year soil concentration should be presented, discussed, and appropriately referenced within the main text of Attachment E.

19. **Attachment E, Section 5.0, Results, Page 16.** An examination of Tables 5-1 and 5-2 indicates that the air concentration for lead has not been compared to the quarterly National Ambient Air Quality Standard (NAAQS) of 0.15 $\mu g/m^3$. Revise Section 5.0 to demonstrate that the air concentration for lead emitted from each OD unit complies with the NAAQS of 0.15 $\mu g/m^3$ (rolling 3-month average).

20. **Attachment E. Tables 5.3 and 5.4, Pages 17 and 18**. Residential soil screening levels are inconsistent with those found in NMED (2009) or RSL (USEPA, 2011) tables (adjusted to 1E-5 risk level for carcinogens) for the following contaminants: ammonium perchlorate, nitrocellulose, nitroguanidine, nitromethane, acrylonitrile, dibutyl phthalate, dinitrotoluene, dioctyladiapate, dioctylphthalate, and diphenylamine. It appears that in some cases the industrial SSL was used, and also not adjusted to the risk level of 1E-5 for carcinogens. It is noted that the predicted concentrations of these contaminants would still be below the corrected soil screening levels and would not change the conclusions. However, modify Tables 5.3 and 5.4 and all subsequent tables that would be affected to display the correct SSLs. In addition, clarify the sources for the SSLs for bis(2-ethylhexyl)adipate and BDNPA, because there are no SSLs for these chemicals listed in NMED (2009) or the RSL (USEPA, 2011) table. The Permittees are advised that the 2009 NMED Technical Background Document for Development of Soil Screening Levels was replaced by an updated guidance document

in February 2012 (NMED, 2012), which also does not contain SSLs for bis(2-ethylhexyl)adipate and BDNPA.

21. **Attachment G, Section 1.1, Conceptual Site Model, Page 1.** Section 1.1 does not discuss the potential uses of groundwater beneath the TA-36-8 or TA-39-6 OD Units. Thus, it is unclear if soil to groundwater migration should be assessed in the screening level risk analysis described in Attachment G. Revise Section 1.1 to discuss the potential use of groundwater from beneath the two OD sites so it can be determined if historical soil concentrations should be compared to soil-to-groundwater migration screening values. If the potential exists for groundwater exposure to occur, revise Attachment G to include such a comparison.

22. **Attachment G. Section 1.2.1 Sampling, Page 1.** The bulleted list indicates that high explosives were analyzed per methods SW-846-8321A and SW-846-8321A-MOD. Because explosives are also measured by method SW-846-8330, provide further clarification on methods SW-846-8321A and SW-846-8321A-MOD and the target analytes that are quantified via these methods.

23. **Attachment G, Section 1.2.2, Evaluation of Inorganic Chemicals, Page 2.** The second paragraph of the discussion entitled TA-36-8 indicates that the concentrations of six inorganic chemicals were statistically compared to background data. While the statistical tests and the test results are addressed in the discussion, no information on the background data is provided. Revise Section 1.2.2 to specify the locations from which background data were obtained in relation to the TA-36-8 and TA-39-6 OD Units. In addition, state whether these locations were impacted by deposition from historical operation of the two OD units or other firing sites.

24. **Attachment G, Section 2.1, Screening Evaluation, Pages 3 and 4.** The last sentence on Page 3 and continuing on to Page 4 indicates that radionuclide exposure point concentrations (EPCs) were determined using Version 6.5 of LANL's residual radioactive (RESRAD) model. The reference "LANL 2009" is cited for the model. However, this reference is not included in Section 4.0, References, of Attachment G. Further, there is no indication in Section 2.1 that the input and output files for the RESRAD modeling runs applicable to the Open Detonation Units Human Health Risk Assessment were (or will be) submitted to NMED. Revise Attachment G to include a bibliographic citation in Section 4.0 for the RESRAD model. Further, revise Section 2.1 to indicate that electronic copies of all RESRAD input and output files pertinent to the calculated radionuclide EPCs will be submitted to NMED HWB.

25. **Attachment G, Section 2.1, Screening Evaluation, Page 4.** The discussions entitled TA-36-8 and TA-39-6 on Page 4 refer to Tables 2.1-5 through 2.1-14 for the results of the screening evaluations. An EXCEL workbook was used to verify the entries for some of these tables. While no errors related to the results reported in the text were found, some errors were discovered in the COPC-specific cancer risks and hazard quotients listed in the tables (e.g., for Styrene, Table 2.1-11: hazard quotient listed as 7.6E-09 but calculated as 6.6E-09 by the workbook). Review all tables and ensure all entries are correct.

26. **Attachment G. Table 2.1-5, Page 13.** The industrial SSL for TATB listed on Table 2.1-5 (2700 mg/kg) is based on 1,3,5-trinitrobenzene and is inconsistent with the industrial SSL for 1,3,5-

trinitrobenzene of 270,000 mg/kg (adjusted to a cancer risk level of 1E-5) listed on the regional screening level (RSL) table (USEPA, 2011). Although the SSL that was used is more conservative and correction would not affect the results of the risk assessment, modify Table 2.1-5 to include the correct industrial SSL for TATB.

27. **Attachment G. Table 2.1-11, Page 17**. Correct the typographical error on Table 2.1-11 which lists the industrial SSL for HMX (34,300 mg/kg) to 56,800 mg/kg per NMED (2012). It is noted that correction of the industrial SSL would not affect the results of the risk assessment.

28. **Attachment G. Table 2.1-12, Page 18**. Correct the typographical error on Table 2.1-12 which lists the residential SSL for 4-isopropyltoluene (3,120 mg/kg) to 2,430 mg/kg per NMED (2012). It is noted that correction of this residential SSL would not affect the results of the risk assessment.

**REFERENCES**

Bjorklund, J. R., J. F. Bowers, G.C. Dodd. and J.M. White, 1998a. Open Burn/Open Detonation Model (OBODM) User's Guide, Volume I, User's Instructions, DPG Document No. DPG-TR-96-008a, February.

Bjorklund, J. R., J. F. Bowers, G.C. Dodd. and J.M. White, 1998b. Open Burn/Open Detonation Model (OBODM) User's Guide, Volume II, Technical Description, DPG Document No. DPG-TR-96-008b, April.

California Environmental Protection Agency (CALEPA), 2003. Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments. Office of Environmental Health Hazard Assessment, August 2003.

United States Environmental Protection Agency (EPA), 1998. Emission Factors for the Disposal of Energetic Materials by Open Burning and Open Detonation (OB/OD). EPA/600/R-98/103, William Mitchell and Jack Suggs, MD-46, Research Triangle Park, NC 27711, August 1998.

EPA Region 3. 2002. "Draft Final Open Burning/Open Detonation Permitting Guidelines," February 2002. (http://www.epa.gov/reg3wcmd/OBOD_Guidelines.pdf)

EPA, 2005. Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities, Office of Solid Waste and Emergency Response, EPA530-R-05-006, September 2005.

EPA, 2011. Regional Screening Levels. http://www.epa.gov/region9/superfund//prg/index.html

Los Alamos National Laboratory (LANL), 2010. ECORSK Database (Release 2.5). On CD, LA-UR-10-6898, Los Alamos National Laboratory, Los Alamos, New Mexico, October 2010.

LANL, 2011. Los Alamos National Laboratory Permit Modification Request for Open Detonation Units at Technical Areas 36 and 39 (TA-36-8 & TA-38-6) Revision 0, LA-UR-11-03642, Los Alamos National Laboratory, Los Alamos, New Mexico, July.

NAVAIR, 2004. Metals Emissions from the Open Detonation Treatment of Energetic Wastes. NAWCWD TP 8528, Naval Air Warfare Center Weapons Division, China Lake, California, October. http://dodreports.com/pdf/ada433712.pdf

New Mexico Environment Department (NMED), 2009. New Mexico Environment Department Technical Background Document for Development of Soil Screening Levels, Hazardous Waste Bureau and Ground Water Quality Bureau Voluntary Remediation Program, Revision 5.0, December. http://www.nmenv.state.nm.us/hwb/documents/NMED_SSG_August_2009_Dec09TableA-1_clean.pdf.

**REFERENCES (Cont.)**

New Mexico Environment Department (NMED), 2012. New Mexico Environment Department Risk Assessment Guidance for Site Investigations and Remediation. February. http://www.nmenv.state.nm.us/HWB/documents/NMED_RA_Guidance_for_SI_and_Remediation_Feb_2012_.pdf.