TA 16

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October 15, 2007

DCN 06280.170.ID.018

Mr. David Cobrain
State of New Mexico Environment Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East
Building One
Santa Fe, New Mexico 87505-6303

Reference: Work Assignment No. 06280.170.0002; State of New Mexico Environment Department, Santa Fe, New Mexico; LANL Permit Support; Technical Review of the Los Alamos National Laboratory Technical Area 16 Burn Ground Air Pathway Assessment Report, Revision 0, Los Alamos National Laboratory, Los Alamos, New Mexico dated August 2007, Task 2 Deliverable.

Dear Mr. Cobrain:

Enclosed please find the deliverable for the above-referenced work assignment. The deliverable consists of a technical review of the Los Alamos National Laboratory Technical Area 16 Burn Ground Air Pathway Assessment Report, Revision 0, Los Alamos National Laboratory, Los Alamos, New Mexico dated August 2007 (Air Assessment Report). TechLaw Inc. (TechLaw) reviewed the report against the recommendations for air modeling analyses of hazardous waste combustion units presented in the United States Environmental Protection Agency (EPA) 2005 revision of Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities, the EPA Region 3 Draft Final Open Burning/Open Detonation Permitting Guidelines, and against the assessment methodology proposed in the TA-16 Burn Ground Air Pathway Assessment Protocol (Air Assessment Protocol) and supplemental information related to the air pathway analysis submitted to the New Mexico Environment Department (NMED) Hazardous Waste Bureau (HWB) by Los Alamos National Laboratory (LANL). The air modeling was performed in general agreement with these references; however, TechLaw identified important discrepancies and information gaps in the Air Assessment Report and drafted general and specific comments accordingly.

Two significant deviations from the Air Assessment Protocol were implemented in the air pathway assessment:

- Use of on-site meteorological data from 1999 rather than the local meteorological dataset from 1995 originally proposed; and
- Use of the CALPUFF point source algorithm instead of the area source algorithm originally proposed for modeling the open burning processes at the TA-16 Burn Ground.

The technical review comments request that LANL furnish additional information, including air modeling and raw data files, in support of these changes in the assessment methodology.

Section 4.0 of the Air Assessment Report summarizes calculations performed by LANL to estimate the quantity of specific solvents that could be treated at TA-16-388 without exceeding applicable screening levels. It is TechLaw's understanding that the NMED HWB will not set permit limits for individual constituents in the waste streams treated at TA-16-388; rather limits will be set for the burning of bulk high explosives (HE) at TA-16-399, the burning of bulk HE at TA-16-388, and the burning of HE-contaminated wastes at TA-16-388. Thus, the purpose of the analysis described in Section 4.0 is unclear. Further, LANL proposed no emission factors specific to the open burning of solvents as part of the air pathway assessment; instead, a destruction efficiency of 95 percent (%) was assumed for treated solvents. No information supporting the assumed value was provided. Thus, the back calculation of allowable emission limits appears to reach beyond the intended purpose of the air pathway analysis. TechLaw recommends that NMED HWB not directly consider the solvent impacts analysis in setting permit limits for the TA-16 Burn Ground. Rather, Section 4.0 should be limited to serving as an additional information source on the burning of solvents at TA-16-388.

No air modeling files were reviewed as part of this effort. Given the limited information on air modeling parameter input values and flag settings contained in the Air Assessment Report and Air Assessment Protocol documents, a final determination of the adequacy of the air pathway assessment is premature. A specific comment has been included in the technical review to ensure that the information needed to finalize the determination is submitted to the NMED HWB.

This deliverable has been submitted in draft form so that the analysis can be refined and/or augmented to further characterize the impact of process emissions and to facilitate the development of draft permit conditions for the TA-16 Burn Ground.

The document is formatted in MS Word. The deliverable was emailed to you today at dave.cobrain@nmenv.state.nm.us and to Ms. Rebecca Kay at Rebecca.Kay@nmev.state.nm.us. A formalized hard (paper) copy of this deliverable will be sent via U.S. Mail. If you have any questions, please call me at (770) 752-7585, extension 105 or Michael S. Smith at (678) 765-0815.

Sincerely,

Jasmine Schliesmann-Merkle

Jasmine Schliesmann-Merkle
Vice President

Enclosure
cc: Ms. Rebecca Kay, NMED
Mr. Michael S. Smith, TechLaw

TASK 2 DELIVERABLE

TECHNICAL REVIEW OF THE LOS ALAMOS NATIONAL LABORATORY TECHNICAL AREA 16 BURN GROUND AIR PATHWAY ASSESSMENT REPORT, REVISION 0 LOS ALAMOS NATIONAL LABORATORY LOS ALAMOS, NEW MEXICO

DATED AUGUST 2007

LANL Permit Support

Submitted by:

TechLaw, Inc.
310 Maxwell Road, Suite 500
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Submitted to:

Mr. David Cobrain
State of New Mexico Environment Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East
Building One
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In response to:

Work Assignment No. 06280.170.0002

October 15, 2007

TECHNICAL REVIEW OF THE LOS ALAMOS NATIONAL LABORATORY TECHNICAL AREA 16 BURN GROUND AIR PATHWAY ASSESSMENT REPORT, REVISION 0 LOS ALAMOS NATIONAL LABORATORY LOS ALAMOS, NEW MEXICO

AUGUST 2007

GENERAL COMMENTS

1. Section 1.0, Introduction, of the Los Alamos National Laboratory Technical Area 16 Burn Ground Air Pathway Assessment Report, Revision 0, Los Alamos National Laboratory, Los Alamos, New Mexico dated August 2007 (Air Assessment Report) should be expanded to provide additional information on the open burning operations conducted at the TA-16 Burn Ground. Because the air pathway assessment does not attempt to model typical operations (the analysis is intended to illustrate that worst-case operations are protective of human health and the environment), the Air Assessment Report would benefit from an expanded discussion of:

   - Typical open burning operations at TA-16-388 and TA-16-399. This could be accomplished by referencing descriptions included in other permit documents [e.g., Attachment G, Technical Area (TA) 16 Open Burning Units Management, of the TA-16 Part B permit application]; and
   - The similarities and differences between typical open burn parameter values and the parameter values used in the air pathway assessment. This could be accomplished via text discussion and a comparative table.

   Please revise Section 1.0 of the Air Assessment Report to address this issue.

2. Section 1.1, Protocol Variances, states, "...the TA-16 Burn Ground Units are too small an area for CALPUFF to model as an area source, so they were modeled as point sources." Based on discussion with the Los Alamos National Laboratory (LANL) in addressing New Mexico Environment Department (NMED) comments on LANL's initial air modeling protocol, NMED expected LANL to model the open burning processes at TA-16 as area sources (NMED 2007). Thus, assuming that the processes are analogous to a point source represents a significant change in methodology and will require additional explanation and justification.

   First, an expanded discussion of the problem encountered with CALPUFF's area source algorithm should be provided as it is not clear if the size issue stemmed from data resolution issues, a size constraint built into the version of CALPUFF used by LANL, or some other origin. In addition to clearly identifying the issue, LANL should:

   - State the size limitations of the area source algorithm;

- Indicate if all available versions of CALPUFF are subject to these size limitations; and
- Identify and discuss the criteria considered in deciding to use the point source algorithm.

While it is possible to adequately model processes such as the open burning of bulk high explosives (HE) and HE-contaminated wastes using CALPUFF's point source algorithm, its application requires that the expected buoyant rise is adequately represented. As indicated in Section 2.4.6, Area Source Plume Rise, of the CALPUFF User's Guide, CALPUFF computes the plume rise for area sources by solving the mass, momentum, and energy equations free of the Bousinesq Approximation[1]. In addition, the area source plume rise calculation accounts for radiative heat loss. Appendix B of the CALPUFF User's Guide indicates that the calculation is performed by subroutine NUMRISE. Thus, LANL must demonstrate that the application of the CALPUFF point source algorithm in modeling the open burning processes at the TA-16 Burn Ground adequately models the buoyant rise of the actual burns by accounting for the difference in density between the plume and the ambient air and the effects of radiative heat loss.

It is recommended that LANL perform sensitivity modeling runs using the CALPUFF point source algorithm to determine the impact on estimated plume rise due to variations in stack exit temperature, stack exit velocity, and stack cross-sectional area.

The plume rise produced by the actual open burn operations could be modeled using a version of CALPUFF not subject to the size constraint encountered by LANL (if available) or a source model with demonstrated capability for modeling the plume rise from an open burn operation (e.g., OBODM, POLU). The results of the sensitivity analysis should then be used to identify a set of input parameter values that will ensure that CALPUFF's point source algorithm mimics the plume rise obtained from the actual open burning operations (Strimaitis, 2007b).

If such a demonstration cannot be provided, the modeling analysis will need to be repeated using a suitable source model (e.g., OBODM, POLU). Note that CALPUFF provides "plug in" capabilities, allowing the plume rise to be modeled by another source model (e.g., OBODM, POLU) and the result used as an input to the CALPUFF dispersion and deposition routines (Strimaitis, 2007a). This type of "hybrid" application may offer an approach that reflects the inherent strengths of a dedicated source model and the air dispersion and deposition algorithms in CALPUFF. Revise the Air Assessment Report to address this issue.

3. It is assumed that LANL will actually treat a mix of the three types of burns addressed in the Air Assessment Report during each year covered by the permit. It is assumed that the 20,000 pounds per year and 15,000 gallons per year values agree with the values listed in the Part A Application and reflect an upper bound estimate of the quantities of HE, HE-contaminated waste, and propane that LANL wishes to treat at the TA-16 Burn Ground each year covered by the permit. LANL should ensure that these quantities are the values for which a permit is

[1] The Bousinesq Approximation, used in calculating plume rise in the CALPUFF point source algorithm, neglects the density difference between the ambient air and the rising plume except in the buoyancy equation.

sought. If the air pathway assessment successfully demonstrates that these quantities can be treated without negatively impacting human health and the environment, NMED will use them to set permit limits (e.g., annual treatment amounts) for the TA-16 Burn Ground.

TECHNICAL REVIEW OF THE
LOS ALAMOS NATIONAL LABORATORY TECHNICAL AREA 16 BURN GROUND
AIR PATHWAY ASSESSMENT REPORT, REVISION 0
LOS ALAMOS NATIONAL LABORATORY
LOS ALAMOS, NEW MEXICO

AUGUST 2007

SPECIFIC COMMENTS

1. **Section 1.1, Protocol Variances, Page 1 of 41**

   LANL has indicated that the air modeling analysis for the TA-16 Burn Ground was performed using a meteorological data set that differed from the one proposed in the TA-16 Burn Ground Air Pathway Assessment Protocol (Air Assessment Protocol):

   > "The 1995 meteorological data were not available in a format that could be processed by CALMET, the meteorological model associated with CALPUFF. Meteorological data from 1999 were available in a CALMET-processed file and were used."

   As such, LANL should provide NMED with the following information related to this new meteorological data set:

   - Identify the raw data sets used;
   - Identify any meteorological data preprocessors (e.g., CALMET) used to generate the model-ready meteorological data file for the air modeling analysis; and
   - Provide a brief summary of the procedures followed in converting the raw data into a model-ready file. This summary should include references to documents that provided detailed descriptions of the methods used to generate the model-ready meteorological data file (e.g., CALMET User's Guide).

2. **Section 1.1, Protocol Variances, Page 1 of 41**

   The discussion on Page 4 of Section 2.1, Unit/Waste-Specific Modeling Scenarios, notes that a burn rate of 1 gallon per minute (gpm) was assumed for the propane-only scenario at TA-16-388. This differs from the 25 gallons per hour (gph) per propane burner proposed in Section 3.2.5, Emission Factors for Open Burning of Propane, of the Air Assessment Protocol. For two burners, the total burn rate for propane in the Air Assessment Protocol document was 50 gph compared to the 60 gph (60 min/hr × 1 gal/min) used in the air pathway assessment. Additional information provided to NMED by LANL indicated that calculations performed for estimating 1-hour impacts from burning propane would use a burn rate of 100 gph (LANL 2007b). It does not appear that a burn rate of 100 gph was used in the 1-hour impact calculations. Please revise Section 1.1 to indicate that the burn rate for propane used in the air pathway assessment differed from that proposed in the Air

Assessment Protocol. In addition, explain why a 1 gpm burn rate was used in the assessment instead of the protocol value of 50 gph.

3. **Section 2.1, Unit/Waste-Specific Modeling Scenarios, Page 2 of 41**

   The first paragraph of Section 2.1 describes the modeling of bulk HE that burns rapidly at a relatively high temperature and the modeling of bulk HE that burns slower at a lower temperature so that upper bound and lower bound values for vertical plume velocity could be addressed in the air pathway assessment. The two cases were referred to as the maximum lofting scenario and the minimum lofting scenario, respectively. No mention of this approach was found in LANL's Air Assessment Protocol. For completeness and a transparent description of the modeling analysis, it is recommended that Section 1.1, Protocol Variances, be revised to indicate that although not proposed in the Air Assessment Protocol document, modeling of a maximum lofting scenario and a minimum lofting scenario was performed for the open burning of bulk HE at the TA-16 Burn Ground. Revise the Air Assessment Report to address this issue.

4. **Section 2.1, Unit/Waste-Specific Modeling Scenarios, Page 2 of 41**

   No information on the range of vertical velocities expected from the bulk HE burned at the TA-16 Burn Ground is provided in the Air Assessment Report. Please revise Section 2.1 to indicate whether or not the vertical velocities used in the air modeling effectively bracket the range of vertical velocities expected for the bulk HE treated at the TA-16 Burn Ground.

5. **Section 2.1, Unit/Waste-Specific Modeling Scenarios, Page 2 of 41**

   Please revise the Air Assessment Report to include a summary of the calculation performed in determining the vertical velocities presented in Table 2-1, Vertical Velocities for Unit/Waste Scenarios. Provide this information for Composition B (COMPB), PBX 9501, propane, and any other constituent for which a vertical velocity was needed.

6. **Section 2.1, Unit/Waste-Specific Modeling Scenarios, Page 2 of 41**

   In the second paragraph of Section 2.1, PBX 9502 is listed as an example of a less energetic bulk HE burned with propane. No other information related to the propane assisted burning of bulk HE is provided. Please revise the Air Assessment Report to include additional information on the types of bulk HE burned with propane. At a minimum, the revised Air Assessment Report should:

   - Identify the types of bulk HE expected to be treated during the life of the permit that require propane-assisted burning;
   - List the criteria applied in determining if bulk HE requires propane assistance during open burning;
   - Convey the frequency of bulk HE burns requiring propane assistance relative to burns that do not require assistance; and

- Convey a sense of the amount of bulk HE requiring propane assistance relative to the amount burned without assistance.

This information is needed to provide an understanding of typical treatment operations at the TA-16 Burn Ground. If bulk HE is frequently burned with propane, the requested information will also lend support to LANL's use of a single suite of worst-case emission factors in analyzing air quality impacts for all open burning operations at the TA-16 Burn Ground.

7. **Section 2.1, Unit/Waste-Specific Modeling Scenarios, Page 3 of 41**

The third bullet on Page 3 states that receptor elevations were taken from Digital Elevation Model (DEM) data. Section 1.0, Introduction, of the Air Assessment Protocol referenced the coordinates of the open burn pads to NAD27 projections. Please provide the datum used for the DEM data used in the air pathway assessment and confirm that the same datum was used for source locations and modeled receptor locations when the coordinates were entered into the CALPUFF input files.

8. **Section 2.1, Unit/Waste-Specific Modeling Scenarios, Page 4 of 41**

The first bullet at the top of Page 4 lists burn times for calculating the vertical velocities of COMPB, PBX 9502, and propane. Section 4.2, Meteorology and Source Specific Input, of the Air Assessment Protocol indicated that air dispersion and deposition modeling of open burning processes at the TA-16 Burn Ground would simulate a 1-hour burn time. To eliminate potential confusion please revise Section 2.1 of the Air Assessment Report to indicate the burn time simulated in the CALPUFF dispersion and deposition modeling for open burns conducted at the TA-16 Burn Ground. If that time differs from the burn times used to calculate the vertical velocities employed in the analysis, revise the Air Assessment Report to include a discussion of the impact of using different burn times to calculate vertical velocities and to simulate the open burning processes on the output of the CALPUFF model.

9. **Section 2.1, Unit/Waste-Specific Modeling Scenarios, Page 4 of 41**

According to the text on Page 4, COMPB chip burn time and temperature data were adjusted based on the differences observed in the data for chip and solid PBX 9501 and PBX 9502. The basis for making such an adjustment should be established within the discussion. Please revise Section 2.1 to establish the similarity between COMPB, PBX 9501, and PBX 9502. Then, show that adjusting COMPB chip burn time and temperature data based on similar data for PBX 9501 and PBX 9502 is a technically sound and accepted approach. If the approach cannot be justified, please identify it as a source of uncertainty in the analysis and discuss the impact of its use on the results of the air pathway assessment. Revise the Air Assessment Report to address this issue.

10. **Section 2.1, Unit/Waste-Specific Modeling Scenarios, Page 4 of 41**

The information on T_s values presented in the fifth bullet on Page 4 includes a short discussion on the modification of COMPB chip temperature data based on PBX 9501 and PBX 9502 solid HE temperature measurements. While the discussion indicates that the COMPB data were modified similarly to burn time data for chips, the modifier(s) are not specifically stated. Please revise this discussion to include additional information on how the chip data were modified. The information should be similar to the "...2 to 4 times..." mentioned in the discussion of modifying chip burn times based on burn times for solid HE.

11. **Section 2.1, Unit/Waste-Specific Modeling Scenarios, Page 5 of 41**

The discussion at the top of Page 5 indicates that the release height for the burn tray at TA-16-399 is 2.38 meters (m) based on a tray base height of 1 m. Page G-5 Section G.1.2, TA-16-399 HE Burn Tray, of Attachment G of the TA-16 Part B Permit Application for the TA-16 Burn Ground lists the leg height of the TA-16-399 burn tray as 1.5 feet (0.46 m). The discussion also states that the TA-16-399 burn tray is lined with firebrick; however, not enough information is available to determine the actual height of the tray base. Please revise Section 2.1 to include additional information showing that the appropriate tray base height for TA-16-399 is 1 m.

12. **Section 2.1, Unit/Waste-Specific Modeling Scenarios, Page 5 of 41**

Given the addition of maximum and minimum lofting scenarios, the use of a meteorological dataset other than the set proposed in the Air Assessment Protocol document, and the limited technical discussion of CALMET and CALPUFF input parameter values contained in the Air Assessment Report and Air Assessment Protocol document, it is imperative that LANL ensure that all modeling input and output files and all model-ready ancillary files (e.g., meteorological, terrain) used in executing the air pathway assessment are submitted to NMED in electronic form. The files contain the detailed information needed to determine the adequacy of the air modeling effort and will also be used for verification purposes.

13. **Section 2.2, Air Quality Impacts Calculations, Page 5 of 41**

The discussion in Section 2.2 states: "The annual averaging period assumes that 20,000 lb of waste and 15,000 gal of propane are burned at the most conservative unit and the burn size is not considered in calculating impacts." It is not clear how an impact presented in Section 2.2 with units of micrograms of pollutant per cubic meter of air ($\mu g/m^3$) can be obtained from the air modeling results (in units of $\mu g/m^3$ per gram of pollutant emitted per second) without consideration of the amount of waste treated. Please clarify this statement and provide a numerical example illustrating the calculation of the annual average impacts presented in Table 2-3. Revise the Air Assessment Report to address this issue.

14. **Section 2.2, Air Quality Impacts Calculations, Page 5 of 41**

The discussion in Section 2.2 states: "Because the fuel amount burned at TA-16-399 is four times higher than at TA-16-388, the TA-16-399 conversion factors were multiplied by 4 and compared to the TA-16-388 conversion factors." The text does not clearly explain why the TA-16-399 conversion factors must be multiplied by 4. Please revise Section 2.2 to include a numerical example clearly illustrating the impact calculation for TA-16-399. Within the calculation, show that the term 1000 lb_{waste}/hr can be represented as 4 times 250 lb_{waste}/hr. Then show that when comparing calculated impacts, the comparison is made between 4 times the corrections factor for TA-16-399 and the correction factor for TA-16-388. Revise the Air Assessment Report to address this issue.

15. **Section 2.2, Air Quality Impacts Calculations, Page 6 of 41**

The discussion at the top of Page 6 indicates that in calculating impacts for 3-, 8-, and 24-hour averaging periods, "...the equation doesn't change because the amount of fuel doubles...in the numerator and the number of seconds...doubles in the denominator..." The meaning of this statement is not clear. In determining the impacts for the 3-, 8-, and 24-hour averaging periods, the total mass emitted over the time period considered should be divided by the total time period considered. For example, to calculate an 8-hour average impact, two one-hour burns would occur and the following equation would be applied:

$$EF\ g_{pollutant}/g_{waste} \times 454\ g_{waste}/lb_{waste} \times 250\ lb_{waste}/hr \times 2\ hr \times (1\ hr/3600\ sec) \times (1/8\ hr) \times [CF\ \mu g/(m^3 \cdot g/sec)]_{8\text{-hour}} = [I\ \mu g/m^3]_{8\text{-hour}}$$

Please review the text at the top of Page 5 and revise as necessary. Further, revise the emission rates presented in Tables 2-4 and 2-5 if necessary. Finally, provide a numerical example illustrating the impact calculation for the 3-, 8-, and 24-hour averaging periods listed in Table 2-3.

16. **Section 2.2, Air Quality Impacts Calculations, Page 6 of 41**

At the end of the first paragraph on Page 6, the discussion states: "Annual emissions were averaged over 508 hours, the number of meteorological hours modeled..." The meaning of this statement is not clear. To determine actual annual averages (as would be experienced by receptors at the modeled locations), the total mass of pollutant emitted over a calendar year should be averaged over the total number of hours in a calendar year. Please review the information presented at the end of the first paragraph on Page 6 and revise as necessary. Ensure that the numerical example provided illustrating the calculation of annual average impacts shows the correct parameter values for calculating the total mass emitted during a year and shows the correct number of hours over which the total emissions are averaged. Further, revise the emission rates presented in Table 2-6, Contaminant-Specific Emissions for the Annual Averaging Period, if necessary.

17. **Section 2.2, Air Quality Impacts Calculations, Page 6 of 41**

The third paragraph on Page 6 discusses the worst-case on-site and worst-case off-site impact receptors and indicates that other receptors have lower impacts than the worst-case impact receptors. This implies that the worst-case on-site and worst-case off-site impact receptors represent those locations where the maximum on-site CALPUFF modeling result and the maximum off-site CALPUFF modeling result, respectively, occurred. However, the text does not explain how the worst-case on-site and worst-case off-site locations were determined. Please revise Section 2.2 to describe how the worst-case on-site and off-site receptor locations were determined.

18. **Section 2.2, Air Quality Impacts Calculations, Page 7 of 41**

To avoid confusion, the first full sentence on Page 7 should be revised to read: "The annual off-site impacts are compared with 0.1 times the EPA's PRGs and long-term AAQS in Table 2-10."

19. **Table 2-3, Unit/Waste Scenarios Creating Maximum Impacts by Averaging Periods, Page 9 of 41**

The far left column of Table 2-3 lists the receptors considered in the presentation of maximum impacts by averaging period. While identified by a text descriptor, the modeled location, described by its x, y, and z coordinates is not provided. Please revise Table 2-3 to include the modeled location for the receptors listed in the far left column.

20. **Table 2-3, Unit/Waste Scenarios Creating Maximum Impacts by Averaging Periods, Page 9 of 41**

The footnote to Table 2-3 indicates: "TA-16-388 propane was never the most conservative weighted conversion factor." The parameter TA-16-388 propane is not defined. Please revise the Air Assessment Report to define the parameter TA-16-388 propane.

21. **Table 2-9, Annual On-Site Impacts, Pages 21 and 22 of 41**

The far right column of Table 2-9 lists and identifies the EPA Region 9 Preliminary Remediation Goals (PRGs) as the screening level for assessing annual on-site impacts. According to Section 4.1.2, Step 2- Identify Criteria, of the Draft Final Open Burning/Open Detonation Permitting Guidelines, annual impacts should be screened against 0.1 times the EPA Region 9 PRGs. Revise Table 2-9 to list and identify 0.1 times the EPA Region 9 PRGs as the screening criteria for annual on-site impacts.

22. **Table 2-10, Annual On-Site Impacts, Pages 23 and 24 of 41**

The far right column of Table 2-10 lists and identifies the EPA Region 9 PRGs as the screening level for assessing annual off-site impacts. According to Section 4.1.2, Step 2- Identify Criteria, of the Draft Final Open Burning/Open Detonation Permitting Guidelines,

annual impacts should be screened against 0.1 times the EPA Region 9 PRGs. Revise Table 2-10 to list and identify 0.1 times the EPA Region 9 PRGs as the screening criteria for annual off-site impacts.

23. **Section 3.0, Deposition Modeling Results, Page 29 of 41**

The discussion at the end of the first paragraph of Section 3.0 states that CALPUFF default parameters for particulate matter, oxides of nitrogen, and toluene were used as surrogates for the constituents considered in the deposition analysis. Specifically, the text indicated:

- Particulate matter would represent total suspended particulate and PM_{10};
- Oxides of nitrogen would represent inorganic gaseous pollutants such as carbon monoxide and nitrogen dioxide; and
- Toluene would represent emissions of gaseous hydrocarbons.

No information supporting these assumptions was provided. Please revise Section 3.0 to include information supporting the use of CALPUFF default parameter values as surrogates for those constituents addressed in the deposition analysis. The information provided should:

- Demonstrate that the use of the identified surrogates is a technically sound approach and will lead to conservative results for the constituents that they represent; and
- Characterize the uncertainty related to the use of surrogate data so that its impact on the results of the deposition analysis is clear.

24. **Section 3.0, Deposition Modeling Results, Page 29 of 41**

While the discussion at the end of the first paragraph of Section 3.0 indicated that CALPUFF default parameters for particulate matter were used to represent total suspended particulate and PM_{10} in the deposition analysis, a surrogate for the metals addressed in the analysis was not identified. Based on information contained in Table 3-3, it appears that the CALPUFF default parameters for particulate matter were used. Please revise Section 3.0 to identify the surrogate used for the metals addressed in the deposition analysis.

25. **Section 3.0, Deposition Modeling Results, Page 29 of 41**

The first sentence in Section 3.0 indicates that deposition modeling was performed for the same worst-case unit/waste scenarios addressed in Section 2.0. The third paragraph of Section 3.0 notes that the worst-case unit depositions factors are shown in Table 3-1, Deposition Fluxes. Neither the text nor Table 3-1 explains how the unit deposition factors listed in the table were selected from among the CALPUFF output to represent the worst-case on-site and worst-case off-site deposition fluxes. Please revise Section 3.0 to describe how the worst-case on-site and off-site deposition rates listed in Table 3-1 were chosen.

26. **Table 3-1, Deposition Fluxes, Page 31 of 41**

Table 3-1 lists the pollutant type and the worst-case on-site and worst-case off-site deposition rates obtained from the CALPUFF deposition modeling. The locations corresponding to the listed deposition rates are not provided. Please revise Table 3-1 to include the modeled location, described by its x, y, and z coordinates, for each deposition rate listed in Table 3-1. If a text descriptor (e.g., Sombrillo Nursing Care) is associated with the modeled location, the descriptor should be provided as well.

27. **Table 3-1, Deposition Fluxes, Page 31 of 41**

Table 3-1 does not identify the scenario corresponding to the worst-case on-site and worst-case off-site deposition rates listed in the table. Please revise Table 3-1 to include the modeled scenario (e.g., TA-16-388 HE Min) that generated each listed deposition rate.

28. **Table 3-2, Soil Input Concentrations, Page 31 of 41**

Similarly to Table 3-1, Table 3-2 lists the worst-case on-site and worst-case off-site soil input concentrations by pollutant type but does not identify the corresponding modeled locations. Please revise Table 3-2 to include information that identifies the modeled locations associated with the listed soil concentrations. The locations can be described by their x, y, and z coordinates, by text descriptor (e.g., Sombrillo Nursing Care), or both.

29. **Section 4.0, Regulated Solvent Impacts Analysis, Page 37 of 41**

The second paragraph of Section 4.0 indicates that no bulk solvents have been treated at the TA-16 Burn Ground in several years. The meaning of bulk solvents as related to open burning operations at the TA-16 Burn Ground is not clear. Please revise Section 4.0 to define the term bulk solvent. Further, provide a comparison of a bulk solvent to an HE-contaminated solvent as they relate to open burning operations at the TA-16 Burn Ground.

30. **Section 4.0, Regulated Solvent Impacts Analysis, Page 37 of 41**

The fourth paragraph of Section 4.0 indicates a destruction efficiency of 95% was assumed in the regulated solvent impacts analysis. No information was furnished in support of this value. Please revise Section 4.0 to include information supporting the use of a destruction efficiency of 95% in the regulated solvent impacts analysis. The information provided should include a technically defensible argument supporting a 95% (or higher) destruction efficiency for the open burning of HE contaminated solvents at the TA-16 Burn Ground. Numerical and/or observational data from the LANL process or other similar processes (i.e., open burning of solvents where the burn is assisted by an auxiliary fuel source) should be presented and/or referenced as needed. Further, the uncertainty of estimating solvent emissions from the LANL process should be discussed to place the regulated solvent impacts analysis in the proper context.

31. **Section 4.0, Regulated Solvent Impacts Analysis, Page 37 of 41**

Examination of Table 4-1, Short-Term and Annual Solvents Impacts Estimation, revealed several aspects of the analysis that were not discussed in the text. These include:

- EPA Region 9 PRGs were used as the chronic screening level rather than 0.1 times the PRGs;
- Deposition was not considered in the calculation of annual solvent limits; and
- The calculated annual solvent limits assume open burning of solvents during 508 hours per year.

The text of Section 4.0 should be revised to include a description and numerical example of the calculation of annual solvent limits. Further, the uncertainties associated with the methodology employed in the analysis should be identified and characterized so that the results of the regulated solvent impacts analysis are placed in the proper context. Revise the Air Assessment Report to address this issue.

REFERENCES

Los Alamos National Laboratory (LANL), 2007a. "TA-16 Burn Ground Air Pathway Assessment Protocol, Los Alamos National Laboratory, Los Alamos, New Mexico, March 2007.

LANL, 2007b. Additional information related to the Air Pathway Assessment, Los Alamos National Laboratory, Los Alamos, New Mexico, May 2007.

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