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Date: March 9, 2011
Refer To: ENV-RCRA-11-0042
LA-UR: 11-01468

Mr. John Kieling
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505

Dear Mr. Kieling:

SUBJECT: RESPONSE TO DISCUSSION POINTS ON OPEN BURNING AND OPEN DETONATION AT THE LOS ALAMOS NATIONAL LABORATORY EPA ID NM0890010515

The purpose of this letter is to transmit Los Alamos National Security's (LANS's) responses to inquiries from Mr. Steve Pullen of the New Mexico Environment Department- Hazardous Waste Bureau (NMED-HWB). Mr. Pullen's request was conveyed to LANS in an email dated September 28, 2010. Specifically, he requested information on the operation of open burning and open detonation treatment units at the Laboratory.

Enclosed with this letter is a response to each of the eighteen (18) questions or discussion points contained in the email from NMED-HWB; some of those responses reference supplemental information in the form of attachments. The responses, combined with the letter sent to your office September 30, 2010 (ENV-RCRA-10-183), outline the facility's plan for permitting certain open burning and open detonation units, and closure of other open burning and open detonation units listed in Table J-1 of the LANL Hazardous Facility Waste Permit (Permit). As stated in Section 1.4.1 of the Permit, all units operating under interim status as listed will have a closure plan or a permit modification request submitted within 180 days of the effective date of the Permit.

Further communications with your office are anticipated regarding the permit modification requests and closure plans. Please contact Mark Haagenstad at (505) 665-2014 of the Water Quality and RCRA Group (ENV-RCRA) if you have questions.

Sincerely,

A R Grieggs

Anthony R. Grieggs
Group Leader
Water Quality & RCRA Group (ENV-RCRA)

ARG:LVH/lm

Enclosure: a/s

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ENCLOSURE

Responses to Discussion Points on Open Burning and Open Detonation

Introduction

The following information is in response to the discussion points sent to the Los Alamos National Laboratory (LANL) by the New Mexico Environment Department – Hazardous Waste Bureau (NMED-HWB) via email on September 28, 2010. The discussion points address the interim status open burning (OB) and open detonation (OD) treatment units at LANL within Table J-1 of the LANL Hazardous Waste Facility Permit.

The table below and the responses to the discussion points included herein do not address the two OB units that operate under interim status at Technical Area (TA) 16 or the two storage shaft units at TA-54 listed as interim status and undergoing closure within Table J-1 of the Permit. These units will follow separate paths for permit modification request or closure than the units listed below. Responses to each of the discussion points take into account that a permit to treat waste through OD will be sought for TA-36-8 and TA-39-6 and closure will be sought for the units at TA-14-23 and TA-39-57. There are no active OB treatment activities addressed within this document and all future operations references do not take into account treatment activities at TA-14-23 or TA-39-57.

This submittal consists of responses to the eighteen (18) discussion points as well as attachments with additional information as referenced in the individual responses to the numbered discussion points. For ease of review, NMED-HWB's discussion points, as transmitted to LANL, are included in this document as italicized text.

The table below summarizes the location, type, brief history, and description of waste for each of the units listed as OB or OD units under Resource Conservation and Recovery Act (RCRA) interim status in Table J-1 of the Permit. A figure illustrating the approximate location of each of the units within the LANL boundary, addressed in this submittal, is located in Attachment A.

Interim Status Open Burning and Open Detonation Units Listed within the Permit[1]

Unit Description	Location	History	Type of Waste
Technical Area 14, Building 23 (TA-14-23) Burn Cage	Burn cage is located at TA-14 just south of structure 23.	Most recent permit application submitted in October 1997. The unit is not currently in use.	Used for open burning (OB) treatment of high explosives contaminated combustible wastes.
TA-14-23 Open Detonation Unit	Fire Mound 3 is located at TA-14 just south of structure 23.	Most recent permit application submitted in October 1997. The unit is not currently used for waste	Used for the open detonation (OD) treatment of high explosives and high explosives contaminated

Interim Status Open Burning and Open Detonation Units Listed within the Permit[1]

Unit Description	Location	History	Type of Waste
		treatment.	waste.
TA-36-8 Open Detonation Unit	The unit has been referred to as "Kappa 8" and is currently called "Minie." It is located north and west and south of structure 8 at TA-36.	Most recent permit application submitted in September 1999 and is currently used for waste treatment activities.	Used for the OD treatment of high explosives and high explosives contaminated waste.
TA-39-6 Open Detonation Unit	The unit is referred to as "Point 6" and is located directly west of structure 6 at TA-39.	Most recent permit application submitted in February 2000 and is currently used for waste treatment activities.	Used for the OD treatment of high explosives and high explosives contaminated waste.
TA-39-57 Open Detonation Unit, referred to as "Point 57"	The unit is referred to as "Point 57" and is located at TA-39 directly north of structure 57.	Most recent permit application submitted in October 1997. The unit is not currently used for waste treatment.	Used for the OD treatment of high explosives and high explosives contaminated waste.

[1] Los Alamos National Laboratory Hazardous Waste Facility Permit issued November 2010.

Discussion Points and Responses

1. *OD waste characterization*

    a. *Previous OD unit permit applications provide a table of waste explosives managed at the unit. The table is always qualified as being provided "for informational purposes only."*

        i. *Please indicate if the permit modification will include this qualifier, and if so, why you believe it is necessary to so imprecisely identify the types of explosive that will be treated.*

Response: LANL's OD permit application and modification request will explicitly identify the types of explosives to be treated in the table to be included as part of the waste characterization information for TA-36-8 and TA-39-6. This table will be submitted to the New Mexico Environment Department's Hazardous Waste Bureau (NMED-HWB) no later than June 28, 2011. The table has been revised and will not contain the statement "for informational purposes only."

ii. *Please indicate whether the permit modification will provide all chemical information associated with the wastes proposed to be treated.*

Response: The permit modification requests will include a description of all the waste characterization information gathered for each of the waste streams treated at the OD unit. Each of the waste streams accepted for treatment at the OD treatment units will be characterized in compliance with the waste analysis plan and federal regulations.

The following caveats apply to the information gathered for waste characterization purposes:

1) Documentation will not reflect specific modified or new formulations that could be developed in the future.
2) Documentation does not include classified information.
3) Documentation does not include information where release is controlled through other requirements (e.g. export-controlled).

iii. *Discuss the variability of the wastes streams to be treated.*

Response: Each of the waste streams currently treated through OD are briefly outlined in the table included as Attachment B of this document. The descriptions within Attachment B encompass the variability of the waste streams that are planned for treatment in the foreseeable future and do not necessarily include all of the waste types that have been treated in the past. The table includes general descriptions of the waste stream as well as information about the Environmental Protection Agency (EPA) Hazardous Waste Numbers that the waste stream may carry and other materials that may be present in or on the waste when it is treated. The waste stream table submitted with the permit modification requests for TA-36-8 and TA-39-6 will include more specific information.

iv. *EPA's OB/OD Guidance, Section 2.2.2, suggests U.S. DOT hazard classification codes "provide a basis for the selection of OB versus OD treatment of waste energetics." Previous OD permit applications do not address DOT hazard classification codes. Please discuss the applicability of these codes to LANL's OD procedures. If LANL uses another energetics classification, please describe.*

Response: The 2002 EPA OB/OD Permitting Guidelines (EPA, 2002) suggest that decisions to open burn or open detonate waste streams (munitions or ordnance) can be made utilizing the explosives' Department of Transportation (DOT) hazard classification codes. The DOT hazard classification Code of Federal Regulations, Title 40, Section 172.101 (40 CFR § 172.101) requirements are only applicable when storing, transporting, and packaging explosives. DOT explosives hazard classifications do not address physical state, additional waste constituents, or any treatment unit limitations that may be present. Therefore, the DOT classifications cannot be used as reliable guidance for the determination of open burn versus OD treatment technology. The selection of OB versus OD is determined after reviewing the type of explosive, physical state, additional waste

constituents (metals, plastics, cellulosics, solvents), and the EPA hazardous waste numbers present in addition to D003 (Reactivity).

2. *Materials testing operations associated with the waste treatment units:*

    a. *Describe the testing operations associated with each unit, both at the unit and those whose testing hazard zones encompass a unit, and the types and quantities of materials tested at the operations.*

Response: LANL's material testing operations are distinct from its waste treatment operations at TA-36-8 and TA-39-6. A RCRA permit is not required for material testing operations because under the Military Munitions Rule, these operations are conducted on an active military range, and involve materials that are specifically excluded from the definition of solid waste (e.g. military munitions used for its intended purpose under 40 C.F.R. § 266.202(A)(1)). LANL is seeking an OD permit to treat waste that includes used and unused military munitions that qualify as RCRA "solid waste" under the Military Munitions Rule. Although material testing operations are conducted at the waste treatment units, no materials remain after testing operations and prior to treatment by OD. For this reason, material testing operations do not impact waste treatment units. At closure all potentially contaminated soils will be examined and addressed through closure activities.

The testing operations associated with each OD unit and testing units whose hazard zones overlap the OD units are the same. Examples of experiments (testing operations) include long stand-off penetrator/jet development; small arms, sensitivity, equations of state, and failure diameter testing; and high explosives-driven pulse-power and non-shock methods of initiation. Diagnostics may include low energy radiography, fast framing and video cameras, dynamic stress measurements, and velocimetry. The types and quantities of materials tested at these sites are reported annually in expended materials reports that are included in Sections 2.6 and 2.7 of the LANL Site-Wide Environmental Impact Statement Yearbooks. All Yearbooks can be found on the LANL Environmental Webpage at http://www.lanl.gov/environment/nepa/sweis.shtml.

    b. *The Department understands that LANL's explosive testing operations and associated information may be classified or restricted.*

        i. *Describe these limits and whether the Department might be allowed special consideration similar to Unclassified Controlled Nuclear Information (UCNI) or if Department personnel with a Q-clearance may review information.*

Response: For the reasons stated above, LANL's material testing operations do not require a RCRA permit. LANL will provide all necessary information to obtain a RCRA permit for its waste treatment operations at OD units at TA-36-8 and TA-39-6. If questions or concerns arise about the waste treatment processes that are deemed confidential pursuant to the provisions of §§ 74-4-4.3(D) and (F) of the Hazardous Waste Act and 40 CFR §§ 260.2 and 270.12, the information will be made available to cleared personnel only on a need-to-know basis.

ii. *Describe LANL's proposed approach to how the Department will ensure adherence to the 40 CFR Part 264 Subpart X environmental media performance standards given the Department will be provided with limited information regarding the type and amount of possible contaminants resulting from testing operations. At a minimum, describe how hazard and chemical-impact from testing will be addressed during site monitoring and closure, and explain how to apportion contaminants at sites with both waste treatment and materials testing operations.*

Response: LANL intends to meet Subpart X performance standards for its OD units through its baseline assessment and monitoring program. Possible soil contamination resulting from all operations at the unit will be addressed at the time of closure and through a soil monitoring program. Also, both sites are subject to corrective action requirements under the 2005 LANL Compliance Order on Consent (CO). Initial characterization activities have been completed and final corrective actions under the CO will be implemented as part of closure of the sites. Maintenance and operation of the OD treatment units will be conducted in a manner that minimizes the possibility of exposure to toxic or hazardous pollutants that may result from treatment operations.

c. *Explain whether the current unit interim status operating record distinguishes between treatment and testing operations, including whether the record includes a listing of the associated materials tested and any mishaps associated with the two operations.*

Response: The operating records for each of the OD treatment units cover waste treatment events only. Testing activities that are co-located at the units would not be included within the treatment operating record because they are not hazardous waste treatment processes. The OD operating records include descriptions of materials treated. Lists of materials expended during testing operations are reported annually in expended materials reports that are included in Sections 2.6 and 2.7 of the LANL Site-Wide Environmental Impact Statement Yearbooks. All Yearbooks can be found on the LANL Environmental Webpage at http://www.lanl.gov/environment/nepa/sweis.shtml.

Abnormal conditions associated with testing operations are reported and documented through facility operations records. Mishaps (abnormal conditions) associated with the waste treatment operations are documented in the operating record and/or inspection record form as well as through facility operations records. This is consistent with other ranges where practice or testing activities may have been conducted at the same firing range used for waste treatment activities.

3. Treatment effectiveness:

a. EPA's OB/OD Guidance, Section 3.5 addresses how to demonstrate open detonation effectiveness. Previous LANL OD unit permit applications have not addressed this issue. Please explain the applicability of procedures referenced in Section 3.5 to the wastes managed at the OD units and your proposal regarding whether a demonstration should be submitted for the units.

Response: LANL does not use emission factors to calculate Theoretical Destruction and Removal Efficiency as described in Section 3.5 of the OB/OD Guidelines (EPA, 2002) because published emission factors from both EPA and other sources were obtained from studies conducted on OB/OD of munitions and ordnance. The majority of wastes treated by OD at the treatment units are excess explosives not munitions and ordnance. Detonation effectiveness at the hazardous waste treatment units is determined by firing site personnel by means of a visual examination of the treatment area to confirm that all wastes are consumed during the treatment event.

b. Please identify all publicly available, pier reviewed literature regarding atmospheric emissions associated with materials similar to those undergoing treatment at the OD units.

Response: Emission factors published by EPA in AP-42, Chapter 15, are specifically for treatment of munitions and ordnance. Emission factors published in other sources were also obtained from studies conducted on OB/OD of munitions and ordnance. The majority of wastes treated by OD at LANL are excess explosives, not munitions and ordnance. WebFIRE (database containing EPA's recommended emission estimation factors for criteria and hazardous air pollutants) contains information for only three materials treated by OD: Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX); 2,4,6-trinitrotoluene (TNT); and Pentaerythritol tetranitrate (PETN). Wastes treated by OD at LANL include many explosives in addition to these three, such as Octahydro; 1,3,5,7-tetranitro; 1,3,5,7-tetrazocine (HMX); Hexanitrostilbene (HNS); 1,3,5-triamino-2,4,6-trinitro-benzene (TATB); and nitroguanidine. Emissions related information associated with OD has been included electronically (files on a compact disc) in Attachment C.

c. *Please specify whether LANL evaluates the byproducts of high explosive detonation or combustion and whether this information is available to the Department.*

Response: By-products and/or residues from materials expended during testing operations are not assessed. For the two OD treatment units seeking to be permitted, an analysis of the migration of waste constituents in the air will be conducted through air modeling and monitoring and results from this monitoring will be submitted as part of the permit modification requests.

4. Site contamination:

a. Please provide current knowledge for each unit including the results of investigation performed under the Consent Order and any interim status monitoring procedures.

The following is the status of the most current CO investigations:
TA-14 – Canyon de Valle Aggregated Area w/ TAs 14 and 15 – investigation report due December 2012
TA-36 – Potrillo/Fence Canyon Aggregate Area - investigation report due

December 2010
TA-39 – North Ancho Canyon Aggregate Area - investigation report completed September 2009, investigation (phase 2) workplan due December 2010.

Response: The Work Plan for the Cañon de Valle Aggregated Area was submitted, as indicated in LANL's response to the NMED-HWB's approval with modifications. The investigation reports for sites in TA-14 and TA-15 are due January 15, 2012 and June 15, 2012, respectively to the NMED-HWB. No samples have been collected to date. Sampling of the drainage and bone yard at the Potrillo/Fence Canyon Aggregate Area has been completed and the Investigation Report is due in May 2011. Data is currently being evaluated. Nature and extent sampling was conducted within the North Ancho Canyon Aggregate Area and the Phase II Investigation Work Plan was submitted in December 2010. Additional sampling and remediation is needed at several sites. Seven sites granted Certificates of Completion by NMED-HWB for Corrective Action Complete without Controls and further corrective actions are necessary at these seven sites. The Phase II Investigation Work Plan identifies and describes the activities needed to complete the investigation and/or remediation of the remaining five SWMUs [SWMUs 39-001(a); 39-002(a), Area 1; 39-006(a), inactive components; 39-007(a); and 39-010] and one AOC [AOC 39-002(b)]. The Phase II Investigation Work Plan also includes the abandonment of 5 shallow wells and 12 angled boreholes at SWMUs 39-001(a) and 39-001(b), and final removal of remaining waste and contaminated media at SWMUs 39-001(a) and 39-001(b). The Phase II Work Plan activities are proposed for 2012.

b. Describe the possibility of there being buried ejecta at the units. Describe methods of demonstrating the presence or absence of buried ejecta and the difficulty of performing these demonstrations at the units.

Response: For the purpose of this response, "ejecta" is considered to be unexploded ordnance or munitions expelled from the treatment area during the waste treatment operation. The likelihood of finding buried unexploded ordnance at any of the OD units is extremely low because the majority of the wastes treated at these units are excess explosives, not ordnance or munitions. Also, underground detonations were not the practice at the OD units. Physically demonstrating the presence or absence of buried ejecta at these sites can be difficult with current technologies. It is anticipated that at the time of closure for these units technological advances may allow for investigation of buried ejecta.

c. CO Section IV.A.5 discusses "firing sites" and "testing hazard zones." Please define these terms, explain how kick-out factors into these definitions, provide the most recent map of these sites and zones (we have LA-UR-05-5816, Map # PMR05049A), describe the hazard zones associated with the hazardous waste management units, and explain whether the boundary of each unit encompasses the area within the calculated kick-out zone of that unit.

Response: Maps "Los Alamos National Laboratory Deferred and Non-Deferred Sites Within Testing Hazard Zones" and "Los Alamos National Laboratory Open Burn and Detonation Sites" (both part of LA-UR-08-06740) were updated/created in October 2008 and have been included to illustrate the location of each of the treatment units and their interrelation with other sites at the Facility. None of the "testing hazard zone" information from MAP# PMR05049A has been revised as the maps included in Attachment D, only the legend entries and text was updated/revised. The boundary of each of the OD treatment units is a smaller designated area within one of the "testing hazard zones". These unit boundaries are depicted on the contour maps within the TA-14, TA-36 and TA-39 tabs of the most recent LANL General Part A Permit Application, Revision 6.0 (LANL, 2009). The term "firing site" within the 2005 LANL Compliance Order on Consent (CO) refers to a single unit whereas the "testing hazard zone" refers to the greater area that could have been affected by all historical and ongoing operations at the unit. The "testing hazard zone" within the CO is consistent with the reference to the kick-out zone in the discussion point above.

d. Ejected material may be hazardous. Describe your position with respect to the applicability to this material of 40 CFR Part 266 Subpart M (Military Munition), particularly the terms active range, military, military munitions, military range, unexploded ordnance, and the § 266.202 definition of solid waste.

Response: The OD treatment units at LANL operate within an active military range and treat wastes that are defined as military munitions under 40 CFR Part 266 Subpart M. All military munitions defined as solid waste under 40 CFR § 266.202 are managed as solid waste and dispositioned in accordance with waste management requirements. Ejected material may be considered a "solid waste" under Part 266 when transported off-range or from the OD site (40 CFR § 266.202(c)). In addition, ejected material that are recovered, collected or cleared and that is not re-used but transported off-site for disposal will be considered a solid waste and managed in accordance with applicable requirements. LANL does not manage waste military munitions that would qualify for hazardous waste regulation such as waste chemical munitions or storage of solid waste military munitions.

e. Describe the presence of alluvial groundwater at or near each unit.

Response: Alluvial ground water at or near TA-36-8 and TA-39-6 is unlikely.

From the Investigation Report for Potrillo and Fence Canyons (LA-UR-10-8316): "Potrillo and Fence Canyons are classified as dry canyons, as described by Birdsell et al. (2005, 092048). Dry canyons generally head on the Pajarito Plateau, have relatively small catchment areas (less than 13 km^2), experience infrequent surface flows, and have limited or no saturated alluvial systems. The hydrologic conditions yield little down-canyon near-surface contaminant migration and are characterized by very slow unsaturated water flow from the surface to the regional aquifer. Because surface-water flow is infrequent and shallow alluvial groundwater is not common, contaminants largely remain near their original sources, including in sediment. Net infiltration beneath dry canyons is low, with rates generally believed to be less than tens of millimeters per year and commonly on the

order of 1 mm/yr or less (similar to dry mesas). Finally, transport times to the regional aquifer beneath dry canyons are expected to exceed hundreds of years.

From the Investigation Work Plan for North Ancho Canyon Aggregate Area (LA-UR-5947): "The vadose zone of the Pajarito Plateau is very thick and consists mostly of Bandelier Tuff. The vadose zone of most interest is the unsaturated alluvium of the canyon bottoms because all of the North Ancho Canyon SWMUs and AOCs potentially affect this zone. Three exploratory boreholes (locations 39-1120, 39-1134, and 39-1135) ranging in depth from 25 to 126 ft were drilled in the vicinity of the two landfills [SWMUs 39-001(a) and 39-001(b)] during the 1997 RFI (LANL 1997, 055633, pp. 5-1 to 5-7) and completed as monitoring wells. No formation water has been observed in these wells, indicating that no perched-alluvial groundwater is present in these areas. However, saturated conditions were observed in three angled boreholes (ASC-15, ASC-16, and ASC-18) beneath SWMU 39-001(b), indicating a buried stream channel deposit that could potentially be a perched-intermediate groundwater body under the landfills (LANL 1997, 055633, p. 2-3). None of the other boreholes drilled to similar depths indicated saturated conditions; therefore, any perched intermediate groundwater is not likely extensive."

5. *Dioxins and furans - The Part A permit applications for these units reference halogenated compounds or solvents being managed at the units. Indicate how the Permittees propose to address the production, investigation, evaluation, and cleanup of dioxins and furans at these units.*

Response:
The high temperatures and pressures resulting when explosives are detonated would not result in the formation of dioxins and furans. An open detonation is at a minimum a dual-reaction process, during the first reaction temperatures generally range from 5400°F to 9000°F, which are temperatures that would typically destroy dioxins/furans. The second reaction is the afterburning reaction, where temperatures typically range from 1300°F to 3100°F; resulting in the conversion of incomplete detonation/combustion products to stable nontoxic products. (Zellmer et al. 2004, pp. 64–65). Both hazardous waste management units have been used for detonation activities; therefore, sampling for dioxins/furans is not applicable as part of the assessment of treatment activities.

For the baseline assessment that is being conducted for TA-36-8 and TA-39-6, soil samples were collected and were analyzed for dioxin/furan congeners to assess the current state within the unit boundary. Potential contamination at these sites will be investigated, evaluated and cleaned up as part of closure activities in the future as appropriate.

6. *Closure*

   a. *EPA's OB/OD Guidance, Section 3.9, discusses the possibility of delaying closure of OD units where those units are within areas where testing operations remain active. Discuss the applicability of this guidance to the LANL OD units.*

Response: EPA's OB/OD Guidelines (EPA, 2002) in Section 3.9 state that delayed closure is appropriate under 40 CFR § 264.113(b)(1)(ii)(C) and (b)(2) as long as closure of the hazardous waste management unit would be incompatible with continued operation of the site and steps are taken to prevent threats to human health and the environment from the unclosed but non-operating unit. The EPA refers to this as "administrative closure" and states that it is considered to be a temporary deferral of closure activities and appropriate for active military ranges so long as the delay would not endanger human health or the environment. This approach is warranted when current and future activities preclude an effective RCRA closure and public access to the unit is restricted. Delay of closure is applicable to LANL's OD units as described below at the response to discussion point 6.b.

b. If LANL anticipates a delayed closure for an OD unit, please provide:

i. the regulatory and legal basis for delaying closure, and

ii. a revised closure schedule that demonstrates how a delayed closure would differ from the schedule for the open burn units in the July 2009 draft Renewal Permit, i.e., procedures and time frame.

Response: The closure plan for each of the units will include a discussion on the clean closure of the unit consistent with that in the LANL Hazardous Waste Facility Permit. LANL intends to request a delay of closure activities for the OD units until such time when the entire range is closed. The regulatory and legal basis can be found at 40 CFR § 264.113(b)(1)(ii) and EPA's OB/OD guidance (see response 6.a). Several firing sites within the range area remain active, and pose potential risk from additional potential releases as a result of on-going range activities. Potential contaminant transport from the general range site area will be characterized under the corrective action activities associated with the CO. LANL intends to show that a delay will not endanger human health and the environment based on soil sampling and controlled access to the units and the range area.

c. Describe the likelihood of attaining clean closure (defined in Part 9 of the Renewal Permit) considering unit investigation results to date and the possibility of there being buried ejecta.

Response: Each of the closure plans will be written to assume the attainment of clean closure standards as outlined in the Permit. See the response to discussion point 4.b. regarding the potential for encountering buried unexploded ordnance at the sites.

d. *Discuss how corrective action under the CO and unit closure might integrate.*

Response: Corrective action at certain firing sites, as listed in the CO, has been deferred unless it is found that conditions resulting from a specific site may present an immediate threat to human health or the environment. The active OD units that are also subject to the CO were characterized during CO investigations to determine whether contaminants had migrated from the sites at concentrations exceeding screening levels. No such

contaminant migration was detected and further characterization of these sites is deferred until closure. Deferral of investigation and corrective action activities may continue until such time as the firing site (used to delineate the relevant area) is closed, or is inactive and DOE has determined it will not be reactivated. This is consistent with LANL's request to delay clean closure activities for the hazardous waste management units used for OB and OD treatment activities at TA-14, TA-36, and TA-39.

7. Background

a. *The 2000 TA-39 Part B Closure Plan references the collection of "background soils samples" and "baseline data." Please distinguish between these terms, state whether either of them have been established, and explain how they will be used during monitoring and at closure.*

Response: LANL was not clear about where the references to the collection of "background soil samples" and "baseline data" occurred within the 2000 TA-39 Part B Closure Plan. However, the corrective action process at LANL utilizes the report "Inorganic and Radionuclide Background Data for Soils, Canyon Sediments, and Bandelier Tuff at Los Alamos National Laboratory" (LA-UR-98-4847) that outlines "background data" collected for soils, canyon sediments, and Bandelier Tuff in the area of Los Alamos National Laboratory. These data are used in the LANL RCRA corrective action process to distinguish between contaminated and uncontaminated media. There are no background data for organic compounds; therefore, all detections of organic compounds are compared to a screening level if one exists. This is consistent with Part 9 of the Permit and with the anticipated application of "background" at closure of the OD units. There is no plan to collect "background soil samples" at any of the units. Although the term "baseline data" may have been used in the 2000 permit application, it was not intended to be identical to the term "background data" as used as described above.

LANL intends to clarify these terms in its permit modification requests for TA-36-8 and TA-39-6. A "baseline assessment" will be defined to address environmental performance standards within 40 CFR Part 264 Subpart X. This baseline assessment will address the existing or baseline condition (i.e., pre-permit modification) for each OD unit, including information on the current surface contamination, soil sampling data, human health assessments, small mammal populations assessment, and the potential for mammal contaminant uptake.

8. Risk assessment

a. Previous OD unit permit applications include risk assessments performed in association with air dispersion and deposition modeling results. The Permittees have explained that that revised permit applications would include revised risk assessments. Please describe how these assessments will have changed, how they take into account site testing operations, how they address possible buried explosive material, and how they address dioxins.

Response: Rather than submitting a standard risk assessment with each of the permit modification requests for TA-36-8 and TA-39-6, a baseline assessment is being developed for each of the units. See the response to discussion point 7.a. for more information regarding the baseline assessment. Also see response to 5 for dioxins.

b. *Depleted uranium (DU) – The Permittees' SOP for OD units (WFO-PRO-WM-1088) states that "DU is the only radioactive material accepted for treatment in the HE treatment process." Please describe how the Permittees propose to address DU in risk assessments for the OD units.*

Response: Generally, isotopic analysis of a media is conducted to determine the type of uranium present at the site followed by a dose assessment using the isotopic data. This practice is the most appropriate method for assessing the potential risk from depleted uranium at a hazardous waste management unit. This method will be included as part of the baseline assessment in the permit modification requests.

9. Air modeling

a. *The 2000 TA-39 Part B refers to the AP-42 EPA air model. Please explain whether the Permittees will be redoing air modeling to be consistent with models performed in association with the TA-16 open burn units, i.e., utilizing the OBODM. Please briefly compare the usefulness of air modeling associated with open detonation and open burn units. Indicate how past site sampling efforts have been used to evaluate the validity of past deposition modeling.*

Response: Air modeling will be conducted for the OD units at TA-36-8 and TA-39-6. Modeling for these units will be conducted using the Open Burn/Open Detonation Dispersion Model and will model the current and potential future treatment operations at each of the units to assess the potential for adverse effects due to migration of waste constituents in the air. Air modeling will not be conducted for the OD units at TA-14-23 or TA-39-57 or for the OB unit at TA-14-23 because these units will undergo closure. To date, there has been no comparison of any sampling and analysis efforts and deposition modeling at any of the OD treatment units at LANL.

10. Soil monitoring

a. *Please indicate if the 2000 TA-39 Part B, Attachment K, Proposed Soil Monitoring Program and Post-Detonation Soil Sampling and Analysis Plan get implemented. If not, please explain. If so, please describe the results.*

Response: The soil sampling and analysis plan within the 2000 permit application was designed to be implemented when the unit was permitted; therefore, a plan has not been implemented at this time. Implementation of a soil monitoring program is anticipated for future operations at TA-36-8 and TA-39-6 under a RCRA Permit.

11. Off-site migration

a. *The TA-14 Part B, Section 4.1 describes berms to be constructed to control runoff. Please indicate if these berms were constructed. If so, please reiterate how they are described in the TA-14 application.*

Response: The permit modification request will include an updated and accurate description of runoff control measures at the units that are seeking a permit. The treatment units at TA-14 are intended to be closed, and run-on/run-off controls will be discussed within the closure plan. Storm water control measures at this unit are also maintained and inspected in accordance with 40 CFR Part 122 and LANL's National Pollution Discharge Elimination System (NPDES) permit. Specific-controls for off-site migration will be assessed for each of the units. Additionally, these specific sites are covered under the LANL Individual Storm Water Permit (IP) and have specific controls as prescribed within that Permit.

12. Corrective action wastes

a. TA-14 Part B, Section 4.5 references the treatment of corrective action wastes. Please elaborate on the volumes, frequencies, chemical composition, and need to treat these wastes.

Response: The reference in the 1997 permit application discusses a waste stream that was mentioned as a prospective future waste stream. There is no evidence that any corrective action waste was ever treated through OB or OD at TA-14.

13. Donor charge

a. *EPA's OB/OD Guidance says "the quantity of donor charge used is frequently equal to the NEW (net explosive weight) of the munitions to be treated but may vary depending on the type of waste treated. Please describe the Permittees' use of donor charges. Please indicate if the donor charge weight factored into the maximum per-event weight in the permit modification. Identify if the donor charge constituents were included in the soil screening or site impact assessment.*

Response: The quantity, type, and form of fuel (or donor charge) used in OD waste treatment is dependent on the physical form of the waste and additional constituents in the waste stream. The fuel to waste ratio may be as low as 0.001 to 1 or as high as 50 to

1 depending on the waste stream to be treated. (Refer to table of waste streams treated through OD in Attachment B)

Fuel is not waste and is not included in the weight of the waste treated in the operating record for treatment events. Wastes treated by OD may at times be used as fuel; therefore, there is no way to chemically differentiate contributions of fuel from waste constituents in soil, air, or water samples.

14. Annual soil monitoring

a. *The 1997 Part B, Section 4.6.3 states that soil sampling performed at TA-14 in 1993 suggests level of contaminants do not pose a "significant" risk to human health and "overall ecological risks … are expected to be low." The permit application proposed to perform additional soil sampling and risk assessment. Please identify the levels of risk identified in the 1997 application and clarify whether the additional soil sampling and risk assessment was this ever performed.*

Response: The levels of risk that were referred to in the 1997 TA-14 permit application cannot be clarified at this time because reference information for the statement is not available within the 1997 TA-14 permit application. The soil monitoring plan within the application was designed to be implemented when the unit was permitted and has not been implemented at this time. Implementation of a soil monitoring program is anticipated for future operations at TA-36-8 and TA-39-6 under a RCRA Permit. Additionally, soil sampling and analysis activities are anticipated to be conducted during closure of the units at TA-14-23 and TA-39-57. As part of the permit modification request for the units at TA-36-8 and TA-39-6, the baseline assessment for each of these units will assess the present state for each of the units so that a soil monitoring program under a permit can be used to assess additive effects of treatment operations.

15. Alternatives Assessment

a. Title 40 CFR § 265.382 states "[o]pen burning of hazardous waste is prohibited except for the open burning or detonation of waste explosives. Waste explosives include waste which has the potential to detonate and bulk military propellants which cannot be safely disposed of through other modes of treatment." The Permittees' SOP for OD units (WFO-PRO-WM-1088) defines waste explosives as "waste which has the potential to detonate, and bulk military propellants, which cannot safely be disposed of through other modes of treatment (40 CFR 265.382)." Please explain the Permittees' efforts to determine which wastes "cannot safely be disposed of through other modes of treatment." The Department learned during the hearing for the TA-16 OB units that less than half of the wastes treated at these units in the past would be considered "unstable" and therefore unsafe for off-site transport. Please estimate what percentage of wastes treated by open detonation is generally considered unstable.

Response: An alternatives assessment fully discussing "other modes of treatment" will be included with the permit modification requests for TA-36-8 and TA-39-6. The decision to treat waste onsite through OD takes into account many factors. As mentioned within the 2002 EPA OB/OD Permitting Guidelines, safety hazards as well as site-specific feasibility factors for alternative treatment technologies necessitate the use of OD treatment. The waste to be treated must be detonable as stated in 40 CFR § 265.382 and cannot safely be disposed of through other modes of treatment. The term "safely" in that statement takes into account all site-specific considerations such as hazard potential, environmental impact potential, technical feasibility of other treatment techniques, and transportation considerations. Guidance for both OB and OD treatment operations only uses the term "unstable" when discussing emergency treatment activities. "Safing" or emergency treatment activities are considered beyond the scope of waste treatment operations. Therefore, the stability of a waste stream is not necessarily a factor taken into consideration when deciding a treatment method with respect to waste treatment.

b. *EPA's OB/OD Guidance, Section 3.4 states that a waste minimization plan should be provided in the permit application for an OD unit. Please describe LANL's OD waste minimization program and the degree to which LANL sends reactive wastes off-site for treatment.*

Response: A plan for waste minimization will be included in the permit modification requests as part of the alternatives assessments. For the purposes of this response "waste minimization" means a preferred hierarchical approach that includes source reduction, recycling, energy recovery, treatment, and lastly, disposal. LANL implements waste minimization practices for explosives operations in accordance with explosives safety standards that require the minimization of all waste generated from any explosive operation as much as technically and economically feasible. The principles of waste minimization, including material substitution, source reduction, hazard segregation, reuse, and good housekeeping must be incorporated into all LANL explosives operations. Multiple process improvements have been implemented in explosives process activities at LANL that have reduced the volume of waste that must be treated onsite through OD or OB.

EPA defines waste minimization as the use of source reduction and/or environmentally viable recycling methods prior to energy recovery, treatment or disposal of wastes. Waste minimization does not include waste treatment (for example compacting, diluting, and incineration) as a waste minimization practice. Waste minimization requires implementation of processes, practices, and procedures to reduce the volume of explosives that must be ultimately managed as hazardous wastes. Therefore, transport of explosive wastes (or any other hazardous wastes) from a potential onsite treatment unit to an offsite waste treatment facility is not considered waste minimization under current EPA guidelines. Consequently, while both waste minimization and offsite transport reduce the quantity of waste that is treated onsite, they are not equally weighed practices. Both of these practices as well as the availability of alternative types of technology will be discussed within the alternatives analysis to be included in each of the permit modification requests for TA-36-8 and TA-39-6.

16. Wildfire protection zone

a. *Please describe the proposed wildfire protection zone for each unit and it was established.*

Response: LANL has Fuel Prescription standards and an inspection program for each of the active firing sites. Compliance with these standards is being incorporated into firing site operational plans. The design criteria used was based on fire models allowing onsite response personnel up to 1 hour to respond and suppress a fire that started off the mound. Fuel loading and or access routes would allow firefighters direct response capabilities within the predetermined conditions standard. This effort is not designed to prevent a fire from starting, but to prevent an uncontrolled wildland fire.

17. Ejecta limitation berms

a. *Have the Permittees constructed ejecta limitation berms as prescribed in U.S. government manuals, e.g., HNC-ED-CS-S-98-7, CEHNC, Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions. If so, please describe them. If not, please explain why.*

Response: For the purpose of this response, "ejecta" is considered to be unexploded ordnance or munitions expelled from the treatment area during the waste treatment operation. The majority of wastes treated at these units are excess explosives, not ordnance or munitions. Other structural and procedural practices are used to mitigate blast and fragmentation effects, including treatment pits with sloping wall, mounded berms, selection of fuel, and treatment shot configuration. Firing site personnel are cautious about using sandbags or other combustibles in the immediate vicinity of the waste treatment pits because of the potential for fabric/jute sandbag covers to ignite.

18. Unit descriptions

a. Briefly describe any operational or physical changes to the units than those described in the permit modification.

Response: There have been no physical changes to the OD units other than those described in the older permit modifications and as required to maintain compliance with the MSGP and IP (storm water). Modifications required to maintain compliance with the MSGP and IP include installation and maintenance of best management practices (BMPs) to control storm water run-on/runoff. Changes associated with storm water requirements will be discussed in the permit modification requests for TA-36-8 and TA-39-6.

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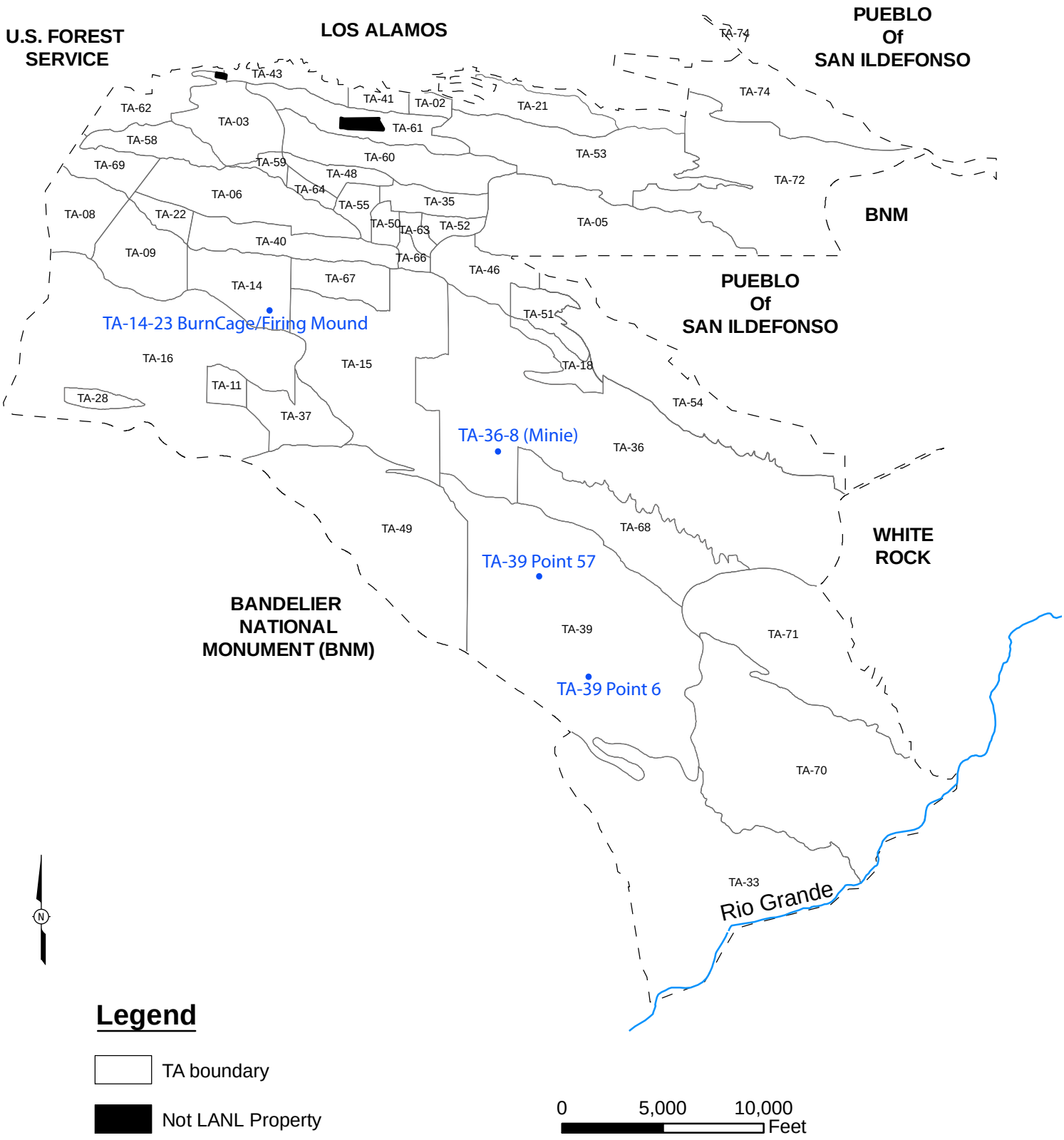
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Attachment A

Location Map of Open Detonation Units at Los Alamos National Laboratory



Figure

Location Map of Open Detonation Units at Los Alamos National Laboratory (LANL)

Created by EP-WES-EDA GIS TEAM. Map Number 06-0108 November 13, 2008
State Plane Coordinate System New Mexico Central Zone North American Datum 1983 (ft)
This map was created for work processes associated with the Environmental &Remediation Support Services. All other uses for this map should be confirmed with LANL EP-WES staff.
Boundary of Department of Energy Property I Around the Los Alamos National Laboratory; Los Alamos National Laboratory, SSMO Site Planning & Project Initiation; infrastructure Planning Office. 04 June 2008
Boundary of Department of Energy Property In and Around the Los Alamos National Laboratory; Los Alamos National Laboratory, SSMO Site Planning & Project Initiation; 04 June 2008

LA-UR-08-07493

Attachment B
Waste Streams Treated Through Open Detonation

Waste Streams Treated Through Open Detonation

Waste Stream	Waste Stream Description	Potential EPA Hazardous Waste Numbers[1]	% of Total Waste Treated[2]	Potential Explosives[3]	Estimated Fuel to Waste Ratio	Other Potential Materials
Excess explosives	Large, laboratory sized, or small amounts of excess standard explosives or developmental energetics. Explosives may be in the form of flakes, granules, crystals, powders, pressings, plastic bonded, putties, rubberized solids, extrudable solids, or liquids. Developmental energetic materials are synthesized in small quantities in HE chemical labs. Explosives infrequently contain barium or ammonium nitrate mixed with more than 0.2% combustible substances. Approximately 3-7% of the explosives in this waste stream contain depleted uranium.	D001 D003 D005 D030	50 -90	cyclotetramethylene tetranitramine (HMX), cyclotrimethylene trinitramine (RDX), pentaerythritol tetranitrate (PETN), triamino trinitrobenzene (TATB), 4,4-diamino-3,3-azoxyfurazan (DAAF), (2,6-Bis[picrylamino]-3,5-dinitropyridine) PYX, Nitroguanidine (NQ), Nitrocellulose, Hexanitrostilbene (HNS), Tripentaerythritol octanitrate (TriPEON), Detasheet, plastic-bonded explosives (PBXs or LXs), Comp B, 2,4,6-trinitrotoluene (TNT), Boracitol, Cyclotol, HBX-1, Octol, Pentolite, Tritonal, Baratol	0.001:1 to 5:1	Plastic bags, plastic wrapping, plastic casings, cardboard, paper, paper bags, and/or fiberboard containers. Small potential for aluminum, stainless steel, steel, and/or copper.

Waste Streams Treated Through Open Detonation (continued)

Waste Stream	Waste Stream Description	Potential EPA Hazardous Waste Numbers[1]	% of Total Waste Treated[2]	Potential Explosives[3]	Estimated Fuel to Waste Ratio	Other Potential Materials
Detonators, initiators, and mild detonating fuses	Detonators, initiators and/or mild detonating fuses containing standard explosives. Explosives may be in metal or plastic casings and may contain lead based primaries or be in a lead sheath. Typically nitromethane is used as fuel for treatment activities. This waste stream may include manufactured articles removed from fire protection systems.	D003 D008	1-2	PETN, HMX, RDX, TATB, lead azide, lead styphnate, PBXs	2:1 to 50:1	Plastic bags, plastic wrapping, cardboard, paper, paper bags, and/or fiberboard containers. Possible aluminum, lead, stainless steel, steel, or copper present as well.
Shaped charges and test assemblies	Shaped charges consisting of cores of explosives with metal sheaths or metal liners or high explosives test assemblies consisting of standard explosives in plastic or metal holders. Assemblies may contain lead metal.	D003 D008 D030	1-2	PETN, RDX, HMX, PBXs and LXs	2:1 to 3::1	Plastic components, plastic bags, plastic wrapping, cardboard, paper, paper bags, and/or fiberboard containers. Aluminum, copper, lead, stainless steel, brass, and/or copper may be present.
Projectiles and munitions larger than 50 caliber	Projectiles and munitions larger than 50 caliber that may contain depleted uranium.	D003 D008	1-2	Munitions/ projectiles	2:1 to 3:1	Plastic bags, plastic wrapping, fiberglass, cardboard, paper, fiberboard drums, lead, brass, steel, stainless steel, copper, and/or aluminum.
Pressing molds	Adiprene (urethane) pressing molds contaminated with explosives.	D003 D030	1-2	TNT	3:1 to 5:1	Adiprene, plastic bags, plastic wrapping, cardboard, paper, and/or paper bags.

Waste Streams Treated Through Open Detonation (continued)

Waste Stream	Waste Stream Description	Potential EPA Hazardous Waste Numbers[1]	% of Total Waste Treated[2]	Potential Explosives[3]	Estimated Fuel to Waste Ratio	Other Potential Materials
Explosives contaminated debris	Explosives contaminated debris generated in laboratories and prep rooms. Debris can include filters removed from laboratories or may contain solvents. The most common solvents used are ethanol and acetone. Rarely this waste stream also contains depleted uranium.	D001 D003 D018 D022 D028 D029 D030 D035 D040 F001 F002 F003 F004 F005	<1	HMX, RDX, PETN, Cyclotol, Octol, TATB, DAAF, PYX, TNT, PBXs and LXs	3:1 to 5:1	Plastic bags, plastic wrapping, weigh boats, gloves, vials, cardboard, paper, paper bags, fiberboard containers, kimwipes, rags, swabs, flasks, watch glasses, tubing, and/or rods. Possible aluminum, stainless steel, steel, and/or copper. When solvents are present, may contain trace amounts of ethanol, acetone, methanol, ethyl acetate, toluene, cyclohexanone, benzene, chloroform, 1,2-dichloroethane, 1,2-dichloroethylene, methyl ethyl ketone, or trichloroethylene.
Small caliber ammunition	This small caliber ammunition (<50 cal) has unknown properties as a result of testing activities or damage. These materials are managed as explosives which present a special risk in storage and/or transportation in accordance with DOE M440.1 ESM[4].	D003 D008	<1	Ammunition	3:1 to 5:1	Plastic bags, plastic wrapping, cardboard, paper, paper bags, boxes, steel, brass, copper, lead, and/or zinc.

Waste Streams Treated Through Open Detonation (continued)

Waste Stream	Waste Stream Description	Potential EPA Hazardous Waste Numbers[1]	% of Total Waste Treated[2]	Potential Explosives[3]	Estimated Fuel to Waste Ratio	Other Potential Materials
Black powder or gunpowder	Black powder or gunpowder, standard commercial and military grades, potassium or sodium nitrate based	D003	<1	Black powder	2:1 to 3:1	Plastic bags, plastic wrapping, plastic containers, cardboard, paper, paper bags, and/or fiberboard containers.

[1] Potential EPA Hazardous Waste Numbers do not include all of the possible waste numbers that may be treated at the unit, only those currently expected to be treated.

[2] Estimated percentage of the waste stream treatment by weight of all waste treated at the units.

[3] Potential explosives do not include all of the possible explosives that may be treated at the units, only those currently expected to be treated as part of the waste stream.

[4] DOE M440.1 ESM = United States Department of Energy Explosives Safety Manual 440.1.

Attachment C

References on Emissions from Open Detonation

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Attachment D

Maps of Open Burning/Open Detonation Treatment Units, Other Firing Sites, and Testing Hazard Zones

Los Alamos National Laboratory Deferred and Non-Deferred Sites Within Testing Hazard Zones

LA-UR-05-5816

Legend

- Safety & security buffer for LANL's explosives operations
- Testing hazard zone
- Non Deferred Site, with identification
- Deferred Site, with identification
- Other Potential Release Site
- Edge of Road, surfaced
- Structure
- Elevation contour, feet
- Technical Area (TA) boundary

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Structures; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; Development Edition of 22 June 2005.

0 500 1,000 2,000 3,000 4,000 5,000

Feet

1:18,000

State Plane Coordinate System, New Mexico, Central Zone, US ft

North American Datum 1983

Contour Interval 100 ft

National Geodetic Vertical Datum of 1929

Los Alamos National Laboratory

Map Extent

27 July 2005
Map Number PMR05049A

Los Alamos National Laboratory
Environmental Stewardship Division
Environmental Remediation & Surveillance Program
Los Alamos, NM 87545

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Map created by H Nicholas Plannerer

Los Alamos National Laboratory
Open Burn and Detonation Sites

Legend

- AIRNET air sampling station
- FFCA storm water station
- MSGP gage station
- 39-57 RCRA open burn or detonation site
- Safety & security buffer for LANL's explosives operations
- Testing hazard zone
- Edge of road, surfaced
- Structure
- Elevation contour, 100 ft interval
- Technical Area (TA) boundary

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Feet
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State Plane Coordinate System, New Mexico, Central Zone, US ft
North American Datum 1983

Contour Interval 100 ft
National Geodetic Vertical Datum of 1929

Los Alamos National Laboratory

Map Extent

17 October 2008
Map Number PMR05049C

Los Alamos National Laboratory
Environmental Programs
Waste and Environmental Services Division
Los Alamos, NM 87545

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LA-UR-08-06740

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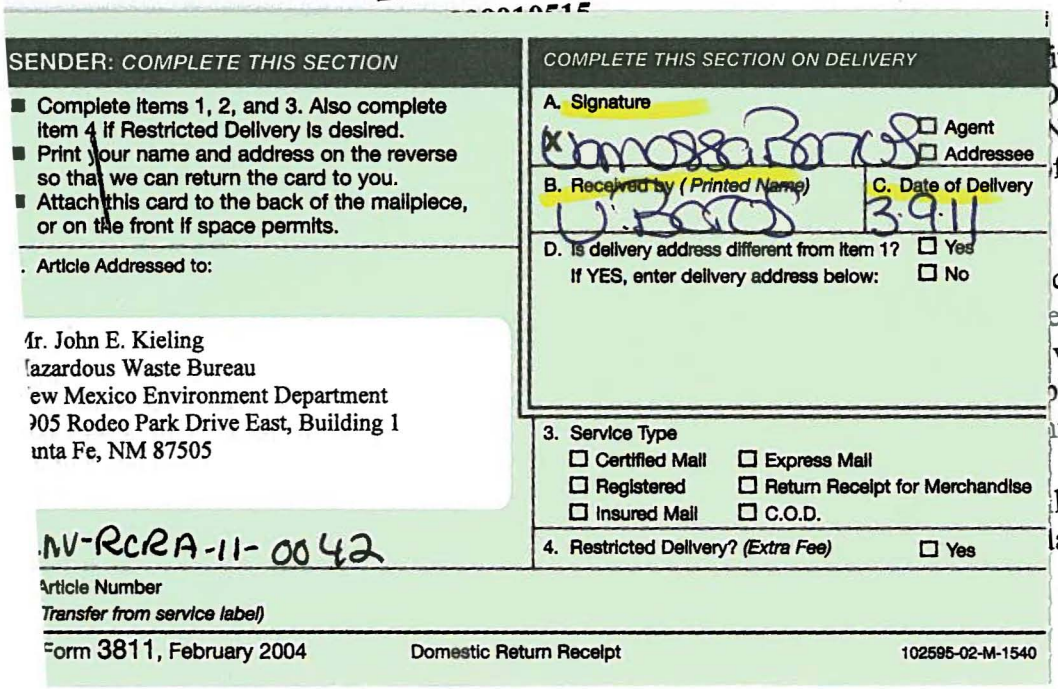
Date: March 9, 2011
Refer To: ENV-RCRA-11-0042
LA-UR: 11-01468



Mr. John Kieling
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505

Dear Mr. Kieling:

SUBJECT: RESPONSE TO DISCUSSION POINTS ON OPEN BURNING AND OPEN DETONATION AT THE LOS ALAMOS NATIONAL LABORATORY EPA ID


SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Mr. John E. Kieling
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505

ENV-RCRA-11-0042

Article Number
(Transfer from service label)

COMPLETE THIS SECTION ON DELIVERY

A. Signature — X — ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* — C. Date of Delivery: 3.9.11

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
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Form 3811, February 2004 Domestic Return Receipt 102595-02-M-1540

ity's (LANS's) responses to
Department- Hazardous Waste
NS in an email dated September
f open burning and open

questions or discussion points
es reference supplemental
with the letter sent to your office
plan for permitting certain open
ning and open detonation units
(Permit). As stated in Section 1.4.1
l have a closure plan or a permit
late of the Permit.

External Correspondence Traveler

Los Alamos NATIONAL LABORATORY — EST. 1943

Document Identification				
ENV-DO. #:		Enclosures:	Attachments:	LAUR No.
ENV-Group:	ENV-RCRA	Yes: X	Yes: ☐	11-01468
Doc. #:	11-0042	No: ☐	No: ☐	
Is this a response to an action item		Yes: ☐	No: X	

Email	☐	Document Date:	~~03/07/2011~~ 3/9/11
Memo	☐	Due Date:	~~N/A~~ 3/10/11
Letter	X		

To:	John Kieling, NMED-HWB
Subject:	Response to Discussion Points on Open Burning and Open Detonation
Action:	
Background / Issues	Discussion points were transmitted by Steve Pullen of NMED-HWB on September 28, 2010. Answers have been drafted coordinated with WFO and WX and legal.

Authorizing Official	***Name***		**Date**
From (Ghost Writer)	Luciana Vigil-Holterman	Luciana Vigil-Holterman	3/7/2011
Author	Anthony R. Grieggs		
Group Leader	Anthony R. Grieggs	ARG	3/8/11
Deputy Group Leader	Tina Marie Sandoval		
Division Leader	Dennis L. Hjeresen		
ADC Review			
DUSA / SAFE-7			
LC-LESH Review			
Coordinated with Facility or Program	Mark Haagenstad		3/7/2011
Comments:	Hand deliver 3/9/11 COB		

Hand Deliver: ☒ **Express Mail:** ☐ **FedEX:** ☐ **CRRR:** ☐ **Regular Mail Service:** ☐

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Time: 2:40	**Date:** 3-10-11	E-File sent	