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FACT SHEET/STATEMENT OF BASIS
NEW MEXICO ENVIRONMENT DEPARTMENT
HAZARDOUS WASTE BUREAU
SANTA FE, NM 87505
NOVEMBER 27, 2006

INTENT TO APPROVE THE INVESTIGATION/REMEDIATION WORK PLAN FOR MATERIAL DISPOSAL AREA B SOLID WASTE MANAGEMENT UNIT 21-015 LOS ALAMOS NATIONAL LABORATORY LOS ALAMOS, NEW MEXICO EPA ID NO. NM0890010515

ACTION: The New Mexico Environment Department (NMED) intends to approve the United States Department of Energy (DOE) and the Los Alamos National Security, LLC's (LANS) (collectively, the Permittees) *Investigation/Remediation Work Plan for Material Disposal Area B, Solid Waste Management Unit 21-015, at Technical Area 21, Revision 1* (Work Plan), dated October 2006 and referenced by LA-UR-06-6918/EP2006-0783. By approving the Work Plan, NMED intends to approve site investigation activities and a proposed remedy for MDA B.

FACILITY: Los Alamos National Laboratory, Los Alamos, New Mexico

PERMITTEES: LANL is owned by the DOE and is co-operated by the Permittees. The Permittees are located at the following addresses: DOE/National Nuclear Security Administration (NNSA), Los Alamos Site Office, 528 35th Street, Mail Stop A316, Los Alamos, New Mexico 87544; Los Alamos National Security, LLC (LANS), Los Alamos National Laboratory P.O. Box 1663, MS M992, Los Alamos, New Mexico 87545. The Permittees' primary contact for this action is: Ms. Lorrie Bonds-Lopez, Los Alamos National Laboratory, P.O. Box 1663, MS J591, Los Alamos, New Mexico, 87544.

STATUTORY AND REGULATORY FRAMEWORK

The Resource Conservation and Recovery Act (RCRA), 42 U.S.C. §§ 6901 to 6992(k), provides for the regulation of hazardous waste. Congress waived the immunity of the United States for actions brought under state hazardous and solid waste laws as well as under RCRA. Pursuant to Section 3006 of RCRA, 42 U.S.C § 6926, the United States Environmental Protection Agency (EPA) delegated to NMED, on January 25, 1985, the authority to enforce the New Mexico Hazardous Waste Act (HWA) and its implementing regulations, the New Mexico Hazardous Waste Management Regulations (HWMR), in lieu of EPA enforcement through RCRA. NMED has maintained its delegation from EPA over hazardous waste management in New Mexico and has amended its state program to conform to statutory or regulatory changes in RCRA.

Corrective action for releases of hazardous waste or hazardous constituents at LANL is conducted under the March 1, 2005 Order on Consent (Consent Order)shall be conducted under the Order and not under the RCRA Permit, with few exceptions. On August 17, 2006, NMED issued a Notice of Disapproval (NOD) for the Investigation/Remediation Work Plan for Material Disposal Area B, Solid Waste Management Unit 21-015. On October 13, 2006 the Permittees submitted a Response to the NOD and the revised Investigation/Remediation Work Plan for Material Disposal Area B, Solid Waste Management Unit 21-015. Today, NMED issues this notice of its intent to approve the Investigation/Remediation Work Plan for MDA B and is providing the public opportunity to comment.

PHYSICAL SETTING AND OPERATIONS

LANL is located in Los Alamos, Los Alamos County, New Mexico. In operation since 1943, LANL was established by the United States Army Manhattan Engineer District for the development and assembly of an atomic bomb. Current and historic operations include nuclear weapons design and testing; high explosives research, development, fabrication, and testing; chemical and material science research; electrical research and development; laser design and development; and photographic processing.

SWMU 21-015 (MDA B) is located at Technical Area (TA) 21 on DP Mesa just west of the fenced area of TA-21 and south of commercial businesses on DP Road. TA-21 was comprised of two operational areas, DP West and DP East. These areas produced liquid and solid radioactive wastes. Operations at DP West included plutonium processing and operations at DP East included weapons initiator production. MDA B is one of five MDAs at TA-21 (MDAs, A, B, T, U, and V) that received wastes from operations at DP West and DP East. Occupying approximately 6 acres, MDA B consists of the following three areas:

- A small soil-covered, unpaved area at the extreme western end of MDA B (approximately 105 feet by 150 feet);
- A large asphalt-paved area occupying the long western leg and the central portion of the site (approximately 1500 feet long by 120 feet wide); and
- An unpaved area occupying the eastern leg of MDA B (approximately 600 feet long by 150 feet wide)

MDA B was a subsurface waste disposal site for DP East and DP West operations from 1945 to 1948. Most of the process waste produced at TA-21 was disposed of at MDA B during that time, but no formal waste inventory was maintained. Limited volumes of liquid waste are believed to have been emplaced in at least one chemical disposal trench at the eastern end of MDA B. Rogers (1977) indicated that wastes were emplaced by the truckload in piles filling the entire trench depth and width rather than filling the trenches in vertical layers. The material was subsequently covered weekly with fill dirt using a bulldozer.

Hazardous chemicals may be present at MDA B. While commenting on a fire that occurred in 1948, Drager (1948) reported there was some evidence that chemicals had been disposed of in MDA B in cardboard containers used for the regular disposal of common laboratory waste. In the fire, several cartons of waste caused minor explosions, and on one occasion, a cloud of pink gas arose from the debris in MDA B. According to employee interviews (DOE, 1986), chemical disposal occurred at the east end of MDA B. Chemicals disposed of included old bottles of organic chemicals, including perchlorate, ethers, and solvents. The 1986 document also stated that lecture bottles, mixtures of spent chemicals, old chemicals, and corrosive gases may be in the trench(es) at the east end of MDA B.

The principle radioactive contaminants at MDA B consist of plutonium, polonium, uranium, americium, curium, radioactive lanthanum, actinium, and waste products from the boiler reactor (Meyer 1952). Approximately 90 percent of the waste consisted of radioactively contaminated paper, rags, rubber gloves, glassware, and small metal apparatuses placed in cardboard boxes by the waste originator and sealed with masking tape. The remainder of material consisted of metal, including air ducts and large metal apparatuses. The latter type of material was placed in wood boxes or wrapped with paper (Meyer 1952). At least one truck, contaminated with fission products from the Trinity Test, is buried in MDA B (DOE 1986).

The stratigraphy beneath TA-21 (DP Mesa) consists of Bandelier Tuff (Qbt) overlain by a layer of alluvium and soil. The Bandelier Tuff is composed of two members (the uppermost is the Tshirege Member and the lowermost is the Otowi Member) that were erupted as a series of ash flows. The Tshirege Member is a compound cooling unit divided into four distinct cooling units (units 4, 3, 2, 1v/1g) (Broxton et al. 1995). The bedrock directly underneath TA-21 is cooling unit 3 (Qbt3) of the Upper Tshirege, a cliff-forming tuff that is non-welded to partially welded. Below MDA B, the Otowi and Tshirege Members are separated at about 300 feet below ground surface (bgs) by the Cerro Toledo (Qct) interval, a 10 to 40-feet-thick sequence of volcaniclastic sediments deposited in stream systems (LANL 2006a). The Bandelier Tuff and Cerro Toledo deposits are derived primarily from explosive volcanic eruptions in the Valles Caldera approximately 1.2 million years ago (Goff 1995). The basal Guaje Pumice Bed of the Otowi Member separates the Bandelier Tuff from the underlying clastic fanglomerate sediments of the Puye Formation (Tp) (LANL 2006a). This feature may be locally absent in portions of TA-21 (LANL 2006a).

GROUNDWATER AT TA-21

Groundwater in the Los Alamos area occurs in three forms: 1) alluvial, 2) perched intermediate, and 3) regional. Alluvial groundwater is found in the shallow alluvium and underlying tuff. The thickness of the alluvium in upper and middle Los Alamos Canyon varies seasonally from a few feet in the winter months to 25 feet in the spring and summer months (LANL 1998). Localized perched intermediate groundwater may exist where a sufficient water source is present to maintain saturation and where a less permeable stratigraphic unit impedes water infiltration. Perched groundwater can be maintained through infiltration from surface water and alluvial groundwater. The regional groundwater aquifer is believed to be recharged mainly from sources west of LANL, with contributions from mesa top and canyon infiltration (LANL 1998).

Borings were advanced through the Cerro Toledo Interval to investigate for the presence of groundwater at well LADP-4, which is immediately north of TA-21 in DP Canyon. No groundwater was observed. Perched intermediate groundwater has been observed in some locations on the Pajarito Plateau, including at well LADP-3, well R-7, and Otowi-4. LADP-3 and R-7 located south of TA-21 in Los Alamos Canyon and Otowi-4 located on the eastern base of DP Mesa, east of TA-21 (LANL 2006a).

The regional aquifer beneath Los Alamos rises westward from the Rio Grande within the Santa Fe Group and into the Puye Formation beneath the central and western portion of the plateau (LANL 2006a). The aquifer decreases in depth from about 1200 feet along the western edge of the plateau to about 600 feet along the eastern edge. The regional aquifer was encountered in deep wells near MDA B at 5870 feet above sea level (asl) in R-7, at 5850 feet asl in well Otowi-4, and at 5835 feet asl in well R-8, resulting in an approximate 1260-feet depth to regional groundwater at MDA B (LANL 2006). Groundwater in the main aquifer is separated from alluvial or perched groundwater by approximately 350-620 feet of tuff and volcanic sediments (Purtymun 1995).

CONTAMINATION AT SWMU 21-015

The most recent subsurface investigation was conducted as part of a RCRA Facility Investigation (RFI). Seven angled boreholes were drilled beneath the disposal trenches. Three of the boreholes were advanced beneath the trenches in the western leg of MDA B, two were advanced beneath either end of the trench in the eastern leg, one was drilled beneath what was thought to be the location of the chemical pit, and one was advanced under the extreme western end of MDA B where additional trenches were expected, but not found by geophysical survey. Location 21-10554, a borehole placed to investigate beneath the chemical pit, may have penetrated the bottom corner of the pit at approximately 8 feet bgs. Metal shavings observed in the core were analyzed and determined to be beryllium metal. Field screening of core obtained from a depth of 15 to 20 feet indicated elevated gross alpha activity of 250 counts per minute (cpm) and gross beta/gamma activity of 160 cpm over instrument background. Field personnel reported a vinegar-like odor in core obtained from the 22 to 25 feet interval and field screening of the core for organic vapors detected organic vapors at 5.9 parts per million (ppm).

Plutonium-239 was detected above background levels (0.044 to 43.5 pCi/g) in borehole 21-10554 and at two intervals (0.05 pCi/g at 39-40 feet below ground surface (bgs) and 0.078 pCi/g

at 49-50 feet bgs) in borehole 21-10555 (LANL 2006a). Data from borehole 21-10554 suggests a minor release of plutonium.

Tritium was detected above background in six of the seven angled boreholes and ranged in concentration from 0.05 to 269 pCi/g. Borehole 21-10556 was the only borehole with no detections of tritium above background levels (LANL 2006a). Tritium concentrations in borehole 21-10554 showed a slight increasing trend; however, there was a decrease in the detected concentration (0.1 pCi/g) (LANL 2006a) in the deepest sample. Based on these data it was evident that there was a tritium release.

Several inorganic constituents were detected above background at MDA B. Lead was detected at concentrations above background at several depths in borehole 21-10577 (12 to 61 mg/kg) and at one depth in borehole 21-10551 (13 mg/kg at 89-90 feet bgs), but there was a decreasing trend (LANL 2006a) in boring 21-10577. Arsenic was detected at concentrations above background at one depth in borehole 21-10557 (3.3 mg/kg at 29-30 feet bgs) and at two depths in borehole 21-10556 (3.7 mg/kg at 69-70 feet bgs and 2.9 mg/kg at 79-80 feet bgs) (LANL 2006a). Cadmium (37 mg/kg), mercury (0.13 mg/kg), and zinc (110 mg/kg) were detected at concentrations above background at 23-24 feet bgs in borehole 21-10554, which was located beneath what was thought to be the chemical pit (LANL 2006a).

No SVOCs were detected in the tuff samples collected in 1998. Pore-gas samples were collected for VOCs at depths of 35 feet, 75 feet, and 100 feet bgs in each of the seven boreholes. The highest detected concentrations of VOCs were at trace levels [parts per billion per volume (ppbv)], with the highest being 1,1,1-trichloroethane (1,1,1-TCA) at 190 ppbv and trichloroethene (TCE) at 120 ppbv (LANL 2006a).

PROPOSED APPROACH

The activities proposed in the Permittees' Investigation/Remediation Work Plan include the removal of all buried waste and contaminated soil/tuff above residential New Mexico Soil Screening Levels (SSLs) at MDA B, and the investigation of the soil and bedrock beneath the trenches to determine the nature and extent of residual contamination. Activities will also include removing the remaining sections of the TA-21 Acid Waste Line, which runs along the south side of MDA B.

The disposal trenches will be completely excavated, and all waste and other excavated material (including soil, overburden material, and tuff) will be removed, characterized, segregated, and processed for disposal at an offsite treatment, storage, and disposal facility (TSDF). An estimated 38,600 cubic yards of waste and other excavated material will be removed from the disposal trenches. Because of the close proximity to the town and potential for nearby residential construction, all contaminated material will be removed to achieve residential SSLs. Confirmatory samples will be collected from the bottom and sidewalls of the excavation. The analytical results will be evaluated to determine if additional excavation is necessary and if residual contamination poses any unacceptable risk to human health or the environment. If residential cleanup levels cannot be achieved, the Permittees will submit a demonstration to

NMED that cleanup to residential cleanup levels are impracticable, pursuant to Section VIII.E of the Consent Order.

Following removal of buried waste and any other material above residential SSLs, the Permittees will develop a proposal to investigate the vertical and lateral extent of residual contamination. The proposal will include the analytical results from confirmatory sampling, a summary of excavation activities and how they pertain to choosing borehole locations, a map showing proposed borehole locations, the field screening and laboratory analyses proposed for investigation samples, and sampling intervals. The proposal will be reviewed and approved by NMED to ensure that, when implemented, it will accomplish the goal of defining the extent of contamination. Based on the results of the investigation, NMED will determine whether further corrective action is necessary at MDA B.

In order to provide adequate protection for workers, the public, and the environment all field activities associated with MDA B will be conducted within an engineered enclosure designed to prevent the release of contamination, particularly airborne contamination, most likely through negative air pressure. Any removed waste or material above residential SSLs will be staged, characterized, and appropriately packaged within the designated materials-handling area within the engineered enclosure. Activities within the enclosure will be monitored using real-time continuous air monitoring (CAM) systems. The CAMs will survey airborne radioactive particles inside the work zone and outside the enclosure at specific locations around the site (LANL 2006a). Levels of VOCs and airborne particulates will also be monitored. Monitoring stations will be located along DP Road to detect any possible offsite releases.

Once excavation activities commence, transportation of waste will occur daily, at a rate of approximately four shipments per day. Waste packaging and transportation will depend on the designation of the individual waste stream. All waste shipments from MDA B will be Department of Transportation (DOT) compliant; therefore no road closures are anticipated. LANL is currently evaluating the most appropriate travel routes for waste shipments.

Complete removal of the disposal trenches is considered the most protective of human health and the environment because it eliminates the possibility of future exposure and eliminates further environmental degradation. Complete removal of contaminated soil is also effective at achieving the residential SSLs/SALs established as part of the Investigation/Remediation Work Plan approval. NMED agreed to this proposed approach because it involves removing the source of contamination, making it effective and reliable in the short-term (during implementation) and long-term (following implementation). The removal action also removes the primary obstacle to further site investigation. The implementation of this approach poses few risks to the public's health or the surrounding businesses because the primary hazards will be contained within an engineered enclosure. Radionuclides, VOCs, and airborne particulates will be continuously monitored. Source removal is practical and is considered an effective approach. The approach can be implemented in a reasonable amount of time for the amount of work (removal of 35,000 cubic yards of potentially hazardous/radioactive material) to be completed safely. The Investigation/Remediation Report is scheduled for submittal in December 2010, approximately 4 months earlier than the Remedy Completion Report due date in Table XII-3 of the Consent Order. The cost of implementation of the presumptive remedy will be approximately

$47,000,000.00. The cost assumes 10 months of readiness (procedures, training, reviews, and site preparation) and 12 months of actual removal activities. The cost estimate also assumes that 35,000 cubic yards of material will be removed and 27,000 cubic yards will be disposed as waste.

PUBLIC REVIEW OF THE ADMINISTRATIVE RECORD

Availability of Additional Information: The Administrative Record for this proposed action consists of this Fact Sheet, a Public Notice, and other relevant correspondence and documents. The Administrative Record may be reviewed at the following location during the public comment period:

New Mexico Environment Department - Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303
Phone: (505) 428-2500
Monday – Friday: 8:00 a.m. to 5:00 p.m.
Contact: Pam Allen

The Public Notice, Fact Sheet, Work Plan, and Consent Order are also available on the NMED website at http://www.nmenv.state.nm.us/hwb/lanlperm.html under MDA B Investigation/Remediation Work Plan (SWMU 21-015). To obtain a copy of the Administrative Record or a portion thereof, please contact Pam Allen at (505) 428-2531, via electronic mail (e-mail) at pam.allen@state.nm.us, or at the NMED address given above. NMED will provide copies, or portions thereof, of the Administrative Record at a cost to the requestor.

Comment Period and Environment Department Contact: NMED issued a public notice on **November 27, 2006**, to announce the beginning of a 60-day comment period that will end at **5:00 p.m., January 26, 2007.** Any person who wishes to comment on this action should submit written or electronic mail (e-mail) comment(s) with the commenter's name and address to the address below. Only comments received on or before **5:00 p.m., January 26, 2007** will be considered.

John E. Kieling, Program Manager
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Or via e-mail: john.kieling@state.nm.us
Reference: LANL MDA B Investigation/Remediation Work Plan (SWMU 21-015)

Written comments must be based on information available for review and include, to the extent practicable, all referenced factual materials. Documents in the Administrative Record need not be re-submitted if expressly referenced by the commenter.

Final Decision: NMED must ensure that the approved Work Plan is consistent with the Hazardous Waste Act, the Hazardous Waste Management Regulations, and the Consent Order. All written comments submitted on this matter will become part of the administrative record, be considered in formulating a final decision, and may cause the Work Plan to be modified. NMED will respond in writing to all written public comments. NMED's response to comments will specify which sections, if any, of the Work Plan have been changed in the final decision, the reasons for the change, and will briefly describe and respond to all public comments on the Work Plan received during the public comment period. NMED's response to comments will also be posted on the NMED website in addition to being sent to all persons who submitted written comments.

After consideration of all the written public comments received, NMED will approve, disapprove, or approve the Work Plan with modifications. In all cases, the Permittees will be provided by certified mail a written notice in accordance with Section III.M.2 of the Consent Order. NMED will make the notice available to the public.

Arrangements for Persons with Disabilities: Any person with a disability requiring assistance or auxiliary aid to participate in this process should contact Judy Bentley at the following address: New Mexico Environment Department, Room N-4030, P.O. Box 26110, 1190 St. Francis Drive, Santa Fe, New Mexico 87502-6110, (505) 827-9872. TDD or TDY users please access Judy Bentley's number via the New Mexico Relay Network. Albuquerque users may access Ms. Bentley's number at (505) 275-7333.

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