Attachment C-1

Waste Characterization Strategy Form
(on CD included with this document)

Environmental Programs (EP)
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Waste Characterization Strategy Form

Project Title	**Upper Los Alamos Canyon Aggregate Area Phase II**
Solid Waste Management Unit and AOC Numbers	SWMUs: 01-001(a), 01-001(d), 01-001(f), 01-001(g), 01-001(o), 01-001(s), 01-003(a), 01-003(b), 01-01-007(a),006(a), 01-006(b), 01-006(c), 01-006(e), 01-006(h), 01-006(n), 01-007(a), 01-007(b), 01-007(c), 03-038(a), 03-038(b), 03-055(c), 32-002(a), 32-002(b), 32-004, 61-007, AOC: C-00-044, 01-006(e), 32-003, C-43-001
Activity Type	Characterization Sampling and Environmental Remediation
LATA Field Team Leader	Ali Furmall
Waste Management Coordinator	Mike Le Scouarnec
Completed by	Kim Oman
Date	September 1, 2011

Description of Activity:

The objectives of the proposed investigation and remediation activities for the Upper Los Alamos Aggregate Area Phase II are to collect confirmation samples and to define the lateral and vertical extent of contaminants in AOCs/SWMUs which were previously sampled in Phase I. Additionally, remediation activities (excavation) will be performed on sites which were determined to contain contamination during the Phase I investigation activities. The work will be performed in accordance with Phase II Investigation Work Plan for Upper Los Alamos Canyon Aggregate Area EP2010-0398. The following waste streams are expected to be generated during investigation activities:

- Municipal Solid Waste
- Drill Cuttings
- Excavated Environmental Media
- Contact Waste
- Decontamination Fluids (potential)
- Petroleum Contaminated Soils (potential)

All wastes will be managed in accordance with P-409, *Waste Management*; EP-SOP-5238, *Characterization and Management of Environmental Program Waste*; P-930-1, *LANL Waste Acceptance Criteria;* P-930-2, *Waste Certification Program*, and approved work plans.

Trained and qualified Field Waste Management Technician(s) (FWMT), Waste Sampling Personnel (SP), and Hazardous Materials Packaging and Transportation (HMPT) personnel will be assigned to perform the duties outlined in EP-SOP-5238.

This WCSF will be implemented before any waste generating activity is undertaken. An amendment to this WCSF will be prepared and submitted for review and approval if any of the waste streams changed in description or characterization approach or unanticipated waste streams are generated. The generation of no path forward wastes must be approved by the Department of Energy (DOE) prior to generation of the waste.

Investigation activities will be conducted in a manner that minimized the generation of waste. Waste minimization will be accomplished by implementing the most recent version of the "Los Alamos National Hazardous Waste Minimization Report" (LANL 2008, 104174). Waste streams will be recycled/reused, as appropriate.

Relevant Site History and Description:

Phase II investigations will be conducted at sites located within TA-00, former TA-01, TA-03, former TA-32, TA-43, and TA-61.

TA-00 includes all Laboratory-related operations and sites outside former or current Laboratory boundaries. These sites are geographically separated and scattered across the Pajarito Plateau in the northern part of Los Alamos County and in adjacent Santa Fe County. The TA-00 sites included in Upper Los Alamos Canyon Aggregate Area are located in Los Alamos Canyon and the Los Alamos town site.

Former TA-01 was the Laboratory's first technical area. Beginning in 1943, it housed the Laboratory administration, theoretical division, plutonium chemistry, and physics research. Between 1943 and 1945, much of the theoretical, experimental, and production work in developing the atomic bomb took place at former TA-01. From 1946 to 1965, these activities were moved elsewhere in the Laboratory and the site underwent decontamination and decommissioning (D&D) in 1966. The site of former TA-01 lies within the current townsite of Los Alamos, on the north and south sides of Trinity Drive surrounding Ashley Pond. The properties are owned privately, by Los Alamos County, and by DOE.

TA-03 is located on South Mesa between Los Alamos Canyon to the north and Twomile Canyon to the south and is the Laboratory's main technical area. It contains most of the Laboratory's administrative buildings and public and corporate access facilities. In addition, TA-03 houses several Laboratory activities such as experimental sciences, special nuclear materials, theoretical/computations, and physical support operations.

Former TA-32 was a small medical research facility consisting of three laboratories, an office building, a warehouse, and a valve house. Work at the site included biological research involving radionuclides. The site of former TA-32 is located within the current townsite of Los Alamos, approximately 400 ft east of Knecht Street and 400 ft south of Trinity Drive. Various Los Alamos County buildings and operations now occupy the area on the mesa-top, and DOE owns the land below the mesa top.

TA-43 is located on East Mesa next to the Los Alamos Medical Center. In the past, TA-43 was used for industrial hygiene research; currently, it is used for biomedical research.

TA-61 is located on Sigma Mesa, which is bounded by Los Alamos Canyon on the north and Sandia Canyon on the south. It includes physical support and infrastructure facilities, such as a municipal sanitary landfill, Los Alamos County's Eco Station trash and recycling facility, sewer pump stations, general storage sheds, and general warehouse storage for maintenance activities performed throughout the Laboratory.

Table 1 provides a summary of the areas, site descriptions and proposed activities which are addressed in this WCSF:

Table 1
Upper Los Alamos Canyon Aggregate Area

Consolidated Unit	SWMU/AOC	Site Description	Proposed Activities
TA-00			
	SWMU 00-017	Industrial waste lines	Additional sampling for extent
	AOC C-00-044	Surface contamination associated with Omega Bridge	Sampling for extent
TA-01			
01-001(a)-99, Miscellaneous TA-01	SWMU 01-001(a)	Septic tank 134, served Warehouse 19 from 1949 to 1964	Additional sampling for extent
	SWMU 01-001(d)	Septic tank 138, served buildings K (chemical stock room), V (uranium and beryllium machining), and Y (physics laboratory)	Additional sampling for extent; soil removal to reduce mercury and plutonium-239/240
	SWMU 01-001(f)	Septic tank 140, served the buildings HT (heat treat and machining) and FP (foundry)	Additional sampling for extent; removal of Aroclor-1254 performed during interim action in 2009–2010.
	SWMU 01-001(g)	Septic tank 141, served building X (radioactive target testing)	Additional sampling for extent; removal to reduce plutonium-239/240
	SWMU 01-001(o)	Sanitary waste line, served buildings J (laboratory) and ML (medical laboratory)	Additional sampling for extent; removal to reduce Aroclor-1254
	SWMU 01-001(s)	Western sanitary waste line, main line	Additional sampling for extent
	SWMU 01-003(a)	Bailey Bridge landfill, used for disposal of demolition debris	Additional sampling for extent; removal to reduce Aroclor-1254 and lead
	SWMU 01-003(b)	Surface disposal area, used for surface disposal of construction debris	Additional extent sampling
	SWMU 01-003(d)	Surface disposal site: Can Dump Site, empty paint and solvent cans from paint and carpentry operations	Additional sampling for extent
	SWMU 01-006(a)	Cooling tower drainline and outfall, served Cooling Tower 80	Additional sampling for extent
	SWMU 01-006(b)	Drainline and outfall, served building D (plutonium processing)	Additional sampling for extent; soil removal to reduce plutonium-239/240
	AOC 01-006(e)	Drainlines and outfalls to Ashley Pond, served building P (personnel offices) and the cleaning plant	Additional sampling for extent
	SWMU 01-006(h)	Stormwater drainage system, served buildings R (plumbing, carpentry, etc.) and Y (physics laboratory)	Additional sampling for extent; soil removal to reduce mercury and plutonium-239/240
	SWMU 01-006(n)	Stormwater drainage system, served building D	Additional sampling for extent
	SWMU 01-007(a)	Suspected subsurface soil radiological contamination near building D	Additional sampling for extent

Consolidated Unit	SWMU/AOC	Site Description	Proposed Activities
	SWMU 01-007(b)	Suspected subsurface soil radiological contamination near building D-2	Additional sampling for extent
	SWMU 01-007(c)	Suspected subsurface soil radiological contamination, northwest of building D	Additional sampling for extent
TA-03			
	AOC 03-008(a)	Former firing site	
03-038(a)-00, Tanks and/or Associated Equipment	SWMU 03-038(a) SWMU 03-038(b)	Acid-neutralizing and pumping building Steel 28,500-gal. acid waste holding tank	Additional sampling for extent
	SWMU 03-055(c)	Outfall, previously served fire station floor drains; currently handles stormwater from roads and parking lots	Additional sampling for extent
TA-32			
	SWMU 32-002(a)	Septic tank (former) and drainlines; served medical research facility laboratory from 1944 to 1953	Additional sampling for extent; soil removal to reduce lead and arsenic completed in 2010 ACA.
TA-43			
	AOC C-43-001	Storm drain outfall from the HRL loading dock; may also receive overflow from a sanitary sewer lift station	Additional sampling for extent
TA-61			
	SWMU 61-007	Transformer site: systematic leak; PCB-only site	Additional sampling for extent; soil removal to reduce Aroclor-1260

Characterization Strategy:

The characterization strategy for investigation derived waste (IDW) generated during site investigation activities is based upon direct sampling of the waste and/or acceptable knowledge (AK) data/documentation associated with the sampling location. AK includes review of existing analytical data (i.e., soil, sediment, cuttings, and/or groundwater data) in the vicinity of the sampling locations, historical documentation associated with the AOCs or SWMUs (i.e., RFI Work Plans, Investigation Reports, Historical Investigation Reports, etc.), and may also include source term/process identification performed to identify whether listed hazardous waste may be present (i.e., due diligence review).

Based upon the AK Reviews for the Potential Release Sites (PRSs) being investigated in Phase II, the IDW may be managed as non-hazardous until analytical data are available to make a final waste determination. A final waste determination will be completed using investigation sampling data or by direct sampling of the IDW. If the waste is directly sampled, it will be sampled within 10 days of generation, and a 21 day turnaround time for analyses will be requested. A final waste determination must be made within 30 days of generation of the waste.

Based upon historical data/documentation, the IDW may be designated as radioactive. Once waste has been determined to be radioactive *and* does not meet land application standards, the IDW will be managed in a registered radioactive waste staging or storage area.

Based upon historical data/documentation, the IDW may be designated as PCB-contaminated. If the source of PCB contaminated IDW is greater than 50 ppm, the IDW is designated PCB-contaminated and must be managed in a registered PCB storage area. If there is no known source and the PCB concentration is less than 50 ppm, then the IDW may be managed as non-PCB contaminated. Finally, if the PCB concentration in the IDW is greater than 50 ppm and there is no known source of contamination, the IDW must still be managed as PCB-contaminated and stored in a registered PCB storage area.

Note: Waste determinations will be made in a timely manner so that if the waste is determined to be hazardous, radioactive, mixed low-level or PCB-contaminated it can be managed expeditiously. A Waste Acceptance Criteria (WAC) waste exception form (WEF) can be used if the generator does not meet the 30 day deadline. Waste accumulation area postings, regulated storage duration, and inspection requirements will be based on the type waste and its regulatory classification. The selection of waste containers will be based on U.S. Department of Transportation requirements, waste types, and estimated volumes of IDW to be generated. Immediately following containerization, each waste container will be individually labeled with a unique identification number and with information such as waste classification, contents, radioactivity, and date generated, if applicable. For non-hazardous IDW, a non-hazardous waste label, date of generation, the generator's name, and container contents will be placed on non-hazardous waste containers as a best management practice. Waste streams with the same regulatory classification that are destined for the same receiving facility may be combined into a single container for disposal (e.g. contact waste with drill cuttings).

Samples will be collected using the methods described in this WCSF by trained and qualified sampling personnel. Sampling personnel will record waste sampling information in accordance with EP-ERSS-SOP-5058, *Sample Control and Field Documentation* and EP-ERSS-SOP-5181, *Documentation for Waste and Environmental Services Technical Field Activities*. The field notebook will be used to document sample collection activities (e.g., equipment and sampling methods used, number and location of samples, etc.). Sampling personnel will also record field conditions, problems encountered, local sources of contamination (e.g., operating generators or vehicles), the personnel involved, equipment and supplies used, wastes generated, and field observations.

Waste #1: Municipal Solid Waste (MSW) - This waste stream primarily consists of non-contact trash, including, but not limited to, paper, cardboard, wood, plastic, food and beverage containers, empty solution containers, and other non-contact trash. It is estimated that less than 1 cubic yard of MSW will be generated.

Anticipated Regulatory Status: MSW

Characterization Approach: MSW will be characterized based on acceptable knowledge (AK) of the waste materials (including Material Safety Data Sheets) and methods of generation.

Management and Disposal Method: MSW will be segregated from all other waste streams. It is anticipated that the waste will be stored in plastic trash bags or other appropriate containers and transferred/disposed of at the County of Los Alamos Solid Waste Transfer Station or other authorized off-site solid waste facility.

Waste # 2: Drill Cuttings (IDW) - Drill cuttings consist of soil and rock sediments produced during the drilling of boreholes. This may include small chips of unused core samples collected with a hollow-stem auger core barrel. Cuttings will not contain residue of drilling additives (drilling mud or foam) as only dry drilling will be used. It is estimated that approximately 20 cubic yards of borehole cuttings will be generated during this investigation.

Anticipated Regulatory Status: Reusable (land applied), Industrial, Low-level waste (LLW), Hazardous, Mixed Low Level Waste (MLLW), PCB

Characterization Approach: Waste characterization will be based upon the analytical results obtained from direct sampling of containerized waste or on the results from core samples collected during drilling, if appropriate. If direct sampling is used for characterization, a representative sample of the cuttings will be taken within 10 days of generation and submitted for analysis with a 21 day turnaround time. A hand auger or thin-wall tube sampler will be used to collect waste material from each container, in accordance with SOP-06.10, *Hand Auger and Thin-Wall Tube Sampler.* Auguring from the surface to the bottom of the waste will be employed in a sufficient number of locations to obtain a representative sample. Drill cuttings from a single potential release site (PRS) may be combined into a single container before sampling, but cuttings from different PRSs will not be combined before sampling. If container sizes are small, the representative sample may be collected from more than one container (e.g., one sample for every 20 cy^3 generated from a single potential release site). Samples will, at a minimum, be analyzed for volatile organic compounds (VOCs); semi-volatile organic compounds (SVOCs); radionuclides (by alpha and gamma spectroscopy); isotopic uranium, isotopic plutonium, americium-241, tritium, and strontium-90; total metals; toxicity characteristic (TCLP) metals; perchlorates, nitrate, and total cyanide. HE will be analyzed only if the work plan requires HE analysis for investigation samples from the potential release site. If process knowledge, odors, or staining indicate the cuttings may be contaminated with petroleum products, the materials will also be analyzed for total petroleum hydrocarbons (TPH [DRO/GRO]) and polychlorinated biphenyls (PCBs). Other constituents may be analyzed as necessary to meet the WAC for a receiving facility.

Storage and Disposal Method: The cuttings will be containerized at the point of generation, if feasible, in LANL approved 55-gallon steel drums or other containers appropriate for the quantity of waste generated. Due to the nature of this project, cuttings may have to be stored at a centrally located staging area, on LANL property, as opposed to the point of generation. Wastes will be stored in secure, designated non-hazardous waste areas. For nonhazardous IDW, the non-hazardous waste label, date of generation (i.e., initial placement in the container), as well as the generator's name and container contents will be placed on the non-hazardous waste containers as a best management practice. Based upon validated analytical data, the cuttings will be evaluated, using the Automated Waste Determination (AWD) system, for land application in accordance with ENV-RCRA-QP-11.0 *Land Application of Drill*

Cuttings. If the cuttings meet the criteria for land application, the cuttings will be land applied in accordance with ENV-RCRA-QP-11.0. If the cuttings are characterized as LLW (exceeding the land application criteria) they will be managed in a radioactive waste staging or storage area until they can be shipped for disposal. If the cuttings are characterized as PCB-contaminated, the cuttings will be managed in a registered PCB storage area until they can be shipped for disposal. Cuttings that cannot be land applied will be treated and/or disposed of at authorized off-site facilities appropriate for the waste classification.

Waste # 3: Excavated Environmental Media

Contaminated soil and tuff will be excavated from SWMUs 01-001 (d, f, g, and o), 01-003(a), 01-006 (b, h) to remove soil that exceeds cleanup objectives. Manmade debris is not expected but small amounts may be encountered during soil removal and if possible, will be segregated from the soil and managed appropriately, based upon AK of the soil. The total amount of media removed is expected to be approximately 30yd^3.

Anticipated Regulatory Status: Industrial, Hazardous, Mixed Low-Level waste (MLLW), Low-level waste (LLW), PCB, Fill

Characterization Approach: A minimum of one composite sample will be collected from each 50 yd^3 or each container, of material excavated and submitted for laboratory analyses.). More frequent samples will be collected if screening or visual observations indicate areas with potentially higher contamination. The incremental samples will be collected in accordance with SOP-06.10, *Hand Auger and Thin-Wall Tube Sampler,* SOP-06.09, *Spade and Scoop Method for Collection of Soil Samples* or other appropriate LANL approved SOP sampling method. The type of sampling equipment used will be appropriate for the waste and properly operated in accordance with Chapter 7 and Appendix E of the RCRA Waste Sampling Draft Technical Guidance (EPA 530-D-02-002, August 2002, http://www.epa.gov/osw/hazard/testmethods/sw846/pdfs/rwsdtg.pdf). Samples will, at a minimum, be analyzed for volatile organic compounds (VOCs); semi-volatile organic compounds (SVOCs); radionuclides (by alpha and gamma spectroscopy); isotopic uranium, isotopic plutonium, americium-241, tritium, and strontium-90; total metals; toxicity characteristic (TCLP) metals; perchlorates, nitrate, and total cyanide. HE will be analyzed only if the work plan requires HE analysis for investigation samples from the potential release site. If process knowledge, odors, or staining indicate the cuttings may be contaminated with petroleum products, the materials will also be analyzed for total petroleum hydrocarbons (TPH [DRO/GRO]) and polychlorinated biphenyls (PCBs). Other constituents may be analyzed as necessary to meet the WAC for a receiving facility. A final waste determination will be made using the automated waste determination tool (AWD) in accordance with SOP 5238, *Characterization and Management of Environmental Program Waste.* Each borehole location will use a different sampling event number to simplify AWD evaluations.

Storage and Disposal Method: During the excavation process, the excavated material will be field screened and examined for visible evidence of contamination. If contamination is not detected during screening, the excavated environmental media will be containerized at the point of generation, if feasible, in DOT approved 55-gallon steel drums or other containers appropriate for the quantity of waste generated. Note: Due to the nature of this project, excavated environmental may have to be stored at a centrally located staging area, on LANL property, as opposed to the point of generation. If the excavated media are determined to be suitable for reuse (i.e., is not hazardous waste and meets residential soil screening levels [SSLs] or screening action levels [SALs]), the evacuated environmental media will be will be used to backfill the excavations. If the excavated media do not meet residential SSLs/SALs or are determined to be hazardous waste, they will be treated/disposed of at an authorized facility appropriate for the waste regulatory classification. **Note:** Excavated environmental media generated in SWMU 61-007 *must* be initially managed as TSCA waste, and managed in a registered PCB storage area, until they are characterized as non-PCB contaminated or are shipped for disposal.

Waste #4: Contact IDW - This waste stream is comprised of PPE, sampling equipment and other materials that contacted or potentially contacted contaminated environmental media and cannot be decontaminated. This includes, but is not limited to plastic sheeting (e.g., tarps and liners), gloves,

coveralls, booties, paper towels, plastic and glass sample bottles, and disposable sampling supplies. It is estimated that approximately 1 cubic yard of contact IDW will be generated during this investigation.

Anticipated Regulatory Status: Industrial, LLW, PCB, Green is Clean

Characterization Approach: Contact waste will be characterized using AK based on data from the media with which they came into contact, as follows:

- If generated during drilling, data from the associated drill cuttings will be used.
- If generated during hand auguring, associated investigation sample data will be used.
- If generated during excavations, data from the associated excavated environmental media will be used.

All contact waste will be inspected before being placed in containers to determine if environmental media or staining is present, indicating contamination. If staining is present, an estimate of the portion or percentage of the item stained will be recorded. Results from the analytical data will be weighted by the extent of contamination for determining whether wastes are characteristic. If the material with which the contact waste came into contact is listed, the contact waste will be assumed to be listed unless a "contained-in" approval is obtained.

Storage and Disposal Method: The contact waste may be separately containerized in drums or placed into the same containers as the media with which it is contaminated. Contact waste will be stored in secure, designated non-hazardous waste areas. For nonhazardous IDW, the non-hazardous waste label, date of generation (i.e., initial placement in the container), as well as the generator's name and container contents will be placed on the non-hazardous waste containers as a best management practice.. If analytical data changes the waste classification, the waste will be stored in an area appropriate for the type of waste. For disposal, the separately containerized contact waste may also be combined with the material from which they originated (the WPF will document the decision to combine the waste streams). Wastes will be treated and/or disposed of in authorized on- or off-site facilities appropriate for the waste classification.

Waste #5: Decontamination fluids (potential) - This waste stream consists of liquid wastes generated from the decontamination of excavation, sampling and drilling equipment. This waste stream will be generated only if dry decontamination methods are not effective. It is estimated that less than 10 gallons of decontamination fluids will be generated from this activity.

Anticipated Regulatory Status: Industrial, Hazardous, Low-level waste (LLW), Mixed low-level waste (MLLW), TSCA

Characterization Approach: The decontamination water will be characterized based upon AK of the media with which it came into contact or using analytical results obtained from direct sampling of the containerized fluids. Representative waste characterization samples will be sampled within 10 days of generation and submitted for analysis with a 21 day turnaround time. A final waste determination will be made within 30 days of generation. Samples, if needed to meet a disposal facility WAC or due to poor AK, will be collected from the container in accordance with LANL SOP-06.15, *COLIWASA Sampler for Liquids and Slurries.* If the container does not permit COLIWASA or bailer sampling, the type of sampling equipment used will be appropriate for the waste container and properly operated in accordance with Chapter 7 and Appendix E of the RCRA Waste Sampling Draft Technical Guidance (EPA 530-D-02-002, August 2002, http://www.epa.gov/osw/hazard/testmethods/sw846/pdfs/rwsdtg.pdf). Samples will at a minimum be analyzed for TAL metals; radionuclides (by alpha and gamma spectroscopy); isotopic uranium, isotopic plutonium, americium-241, tritium, and strontium-90; VOCs; SVOCs; oil/grease; TSS; pH; explosive compounds; PCB; cyanide; nitrates/nitrites; and perchlorates; and pesticides/herbicides. Other constituents may be analyzed as necessary to meet the WAC of the disposal facility. Note that decontamination fluids destined for LANL's sanitary plant (SWS) must be sampled by a qualified sample

technician, or ENV-RCRA, for microtox analysis, total suspended solids (TSS), total dissolved solids (TDS), oil and grease, and pH. Submit a request for analysis at https://esp-esh-as01-f5.lanl.gov/~esh19/databases/rfa_form.shtml.

Storage and Disposal Method: These wastes will be containerized in drums at the point of generation and will initially be stored as nonhazardous/non-radiological pending review of analytical results to determine final waste characterization. Due to the nature of this project, decontamination waters may have to be stored at a centrally located staging area, on LANL property, as opposed to the point of generation. For nonhazardous IDW, the non-hazardous waste label, date of generation (i.e., initial placement in the container), as well as the generator's name and container contents will be placed on the non-hazardous waste containers as a best management practice.

If the decontamination water is characterized as LLW it will be managed in a radioactive waste staging or storage area it can be shipped for disposal. Radioactive waste staging and storage area registration and set up must be coordinated with the assigned LANL WMC. If the decontamination water is characterized as Hazardous or MLLW (with D-codes for characteristic waste) it will be managed in a less than 90-Day Storage Area (with a start date equal to the earliest date of generation by container) until it can be shipped for disposal. Decontamination water may be disposed of on-site at the SWWS or the RLWTF if the facility WAC requirements are met. If the non-hazardous waste fails to meet the RLWTF WAC only due to high COD, if approved by the ENV-RCRA Group, it can be treated (e.g., addition of 30% hydrogen peroxide) to bring down the COD level to the RLWTF limit of 250 mg/l so that the waste can be disposed of at that facility (see Work Instruction –Treatment of Wastewater with High Level of Chemical Oxygen Demand (COD)). If the waste cannot be disposed of at either of these facilities, due to operational limitations or inability to meet the WAC, it will be solidified and sent to an authorized off-site facility for disposal.

Waste #6: Petroleum Contaminated Soils (PCS) (potential) - PCS may be generated from releases of products such as hydraulic fluid, motor oil, unleaded gasoline, or diesel fuel (e.g. from the rupture of hydraulic or fuel hoses, or spills during maintenance or filling equipment) onto soil. Absorbent padding, paper towels, spill pillows or other absorbent material used to contain the released material may be added to the PCS waste for storage and disposal. It is estimated that less than one cubic yard of PCS will be generated.

***Anticipated Regulatory Status*:** New Mexico Special Waste (NMSW), Industrial, Hazardous, Mixed Low-Level waste (MLLW), Low-level waste (LLW), PCB

***Characterization Approach*:** The contaminated soil may either be sampled in-place (by gridding the spill location and collecting and combining incremental samples into one sample) or after containerization in accordance with SOP-06.10, Hand Auger and Thin-Wall Tube Sampler. If the spill is shallow (in-place sampling) or containers are small, Spade and Scoop Method for Collection of Soil Samples (SOP-06.09) may also be appropriate. If the spill is new, it must be immediately reported to ENV-RCRA and the contaminated material must be containerized the same day it is spilled unless permission is received from ENV-RCRA to leave it longer (generally only granted for large spills). Representative samples of containerized waste will be collected within 10 days of generation and submitted for analysis with a 21 day turnaround time. Samples will be analyzed for TPH (DRO/GRO), volatile organic compounds (VOCs); semi-volatile organic compounds (SVOCs); radionuclides (by alpha and gamma spectroscopy); isotopic uranium, isotopic plutonium, americium-241, tritium, and strontium-90; total metals; toxicity characteristic (TCLP) metals; perchlorates, nitrate, total cyanide and polychlorinated biphenyls (PCBs). HE will be analyzed only if the work plan requires HE analysis for investigation samples from the potential release site. Other constituents must be analyzed as needed to meet the receiving disposal facility's WAC.

***Storage and Disposal Method*:** PCS will be containerized at the point of generation on the same day that the spill occurred. If AK for the site indicates that the soil will not be contaminated with radioactive or hazardous materials, the PCS will be managed as NMSW and the NMSW start date will be the date the container is completely full or the date in which no additional NSW will be added to the container. If AK

for the site indicates that the soil could be contaminated with radioactive or hazardous materials the PCS will be stored in a clearly marked and constructed waste accumulation area appropriate to the anticipated waste type. Waste accumulation area postings, regulated storage duration, and inspection requirements will be based upon the waste classification. The following provides the management and disposal pathways for PCS that has a final waste determination:

1. PCS that is not contaminated with radioactive or hazardous materials will be managed as NMSW if one or more of the following conditions are met:

    - If the sum of benzene, toluene, ethylbenzene, and xylene isomer concentrations are greater than 50 mg/kg.
    - If benzene individually is equal to or greater than 10 mg/kg (Note: If benzene concentrations are equal to or greater than 0.5 mg/L, based upon TCLP, it is a hazardous waste, not a NMSW).
    - If TPH (DRO + GRO) concentration is greater than 100 mg/kg.

    PCS that is characterized as NMSW will remain in the registered NMSW area until it is shipped for disposal to an authorized off-site facility.

2. PCS that is not contaminated with radioactive or hazardous materials will be managed as industrial waste if the contaminant levels are less than the NMSW and/or PCB regulatory levels. PCS that is characterized as industrial waste will be removed from the registered NMSW area and stored as industrial waste until it is shipped for disposal to an authorized off-site facility.

3. PCS that is characterized as LLW will be moved to a radioactive waste staging or storage area it can be shipped for disposal to an authorized off-site facility.

4. PCS characterized as Hazardous or MLLW will be managed in a less than 90-Day Storage Area (with a start date equal to the earliest date of generation by container) or in a Satellite Accumulation area if less than 55 gallons, until it can be shipped for disposal to an authorized off-site facility.

Waste Description	Waste #1 MSW	Waste #2 Drill Cuttings	Waste #3 Excavated Environmental Media	Waste #4 Contact IDW	Waste #5 Decon Fluids
Estimated Volume	1 CY	20 CY	30 CY	1 CY	< 10 gallons
Packaging	DOT approved containers	DOT approved containers	DOT approved containers	DOT approved containers	DOT approved containers
Regulatory classification:					
Radioactive Waste		X	X	X	X
Reusable Material or Green is Clean (GIC)		X		X	
Municipal Solid Waste (MSW)	X				
Waste destined for LANL's SWWS or RLWTF or HEWTF[1]					X
Hazardous Waste		X	X		X
Mixed (hazardous and radioactive) Waste		X	X		X
Polychlorinated Biphenyls-Contaminated Waste (PCBs)		X	X	X	X
New Mexico Special Waste					
Industrial Waste		X	X	X	X
Characterization Method					
Acceptable knowledge (AK): Existing Data/Documentation	X		X	X	X
AK: Site Characterization		X	X	X	X
Direct Sampling of Waste		X	X		X
Analytical Testing					
Volatile Organic Compounds (VOCs) (EPA 8260-B)		X	X		X
Semivolatile Organic Compounds (SVOCs) (EPA 8270-C)		X	X		X
Organic Pesticides (EPA 8081-A)		X	X		X
Organic Herbicides (EPA 8151-A)		X	X		X
PCBs (EPA 8082)		X[3]	X[3]		X
Total Metals (EPA 6010-B/7471-A or EPA 6020)		X	X		X
Total Cyanide (EPA 9012-A)		X	X		X
High Explosives Constituents (EPA 8330/8321-A)		X[3]	X[3]		X[3]
Asbestos (EPA 600M4 or equivalent)					
Total petroleum hydrocarbon (TPH)-GRO (EPA 8015-M)		X[3]	X[3]		X
TPH-DRO (EPA 8015-M)		X[3]	X[3]		X
Toxicity characteristic leaching procedure (TCLP) Metals (EPA 1311/6010-B)		X	X		
Radium 226 and 228 (EPA 9320)		X	X		X
Gross Alpha (alpha counting) (EPA 900)		X	X		X
Gross Beta (beta counting) (EPA 900)		X	X		X
Tritium (liquid scintillation) (EPA 906.0)		X	X		X
Gamma spectroscopy (EPA 901.1)		X	X		X
Isotopic plutonium (Chem. Separation/alpha spec.) (HASL-300)		X	X		X
Isotopic uranium (Chem. Separation/alpha spec.) (HASL-300)		X	X		X
Total uranium (EPA 6020)		X	X		X
Strontium-90 (EPA 905)		X	X		X
Americium-241 (Chem. Separation/alpha spec.) (HASL-300)		X	X		X
Isotopic Thorium		X	X		X
Perchlorates (EPA 6850)		X	X		X
Nitrates/Nitrites (EPA 300.09-soil or 343.2-water)		X	X		X
Oil / Grease (EPA 1665)					X
Fluorine, Chorine, Sulfate (EPA 300)					X
Total Suspended & Dissolved Solids (TSS) and Total Dissolved Solids (TDS) (EPA 160.1 and 160.2)					X
Chemical Oxygen Demand (COD) (EPA 410.4)					X
pH (EPA 904c)					X
Microtox or Biological Oxygen Demand (BOD)[2]					X[2]

Waste Description	Waste #6 PCS
Estimated Volume	< 1 CY
Packaging	DOT approved containers
Regulatory classification:	
Radioactive Waste	X
Reusable Material or Green is Clean (GIC)	
Municipal Solid Waste (MSW)	
Waste destined for LANL's SWWS or RLWTF or HEWTF[1]	
Hazardous Waste	X
Mixed (hazardous and radioactive) Waste	X
Polychlorinated Biphenyls-Contaminated Waste (PCBs)	X
New Mexico Special Waste	X
Industrial Waste	X
Characterization Method	
Acceptable knowledge (AK): Existing Data/Documentation	X
AK: Site Characterization	X
Direct Sampling of Waste	X
Analytical Testing	
Volatile Organic Compounds (VOCs) (EPA 8260-B)	X
Semivolatile Organic Compounds (SVOCs) (EPA 8270-C)	X
Organic Pesticides (EPA 8081-A)	
Organic Herbicides (EPA 8151-A)	
PCBs (EPA 8082)	X
Total Metals (EPA 6010-B/7471-A or EPA 6020)	X
Total Cyanide (EPA 9012-A)	X
High Explosives Constituents (EPA 8330/8321-A)	X[3]
Asbestos (EPA 600M4 or equivalent)	
Total petroleum hydrocarbon (TPH)-GRO (EPA 8015-M)	X
TPH-DRO (EPA 8015-M)	X
Toxicity characteristic leaching procedure (TCLP) Metals (EPA 1311/6010-B)	X
Radium 226 and 228 (EPA 9320)	X
Gross Alpha (alpha counting) (EPA 900)	X
Gross Beta (beta counting) (EPA 900)	X
Tritium (liquid scintillation) (EPA 906.0)	X
Gamma spectroscopy (EPA 901.1)	X
Isotopic plutonium (Chem. Separation/alpha spec.) (HASL-300)	X
Isotopic uranium (Chem. Separation/alpha spec.) (HASL-300)	X
Total uranium (EPA 6020)	X
Strontium-90 (EPA 905)	X
Americium-241 (Chem. Separation/alpha spec.) (HASL-300)	X
Isotopic Thorium	X
Perchlorates (EPA 6850)	X
Nitrates/Nitrites (EPA 300.09-soil or 343.2-water)	X
Oil / Grease (EPA 1665)	
Fluorine, Chorine, Sulfate (EPA 300)	
Total Suspended & Dissolved Solids (TSS) and Total Dissolved Solids (TDS) (EPA 160.1 and 160.2)	
Chemical Oxygen Demand (COD) (EPA 410.4)	
pH (EPA 904c)	
Microtox or Biological Oxygen Demand (BOD)[2]	

[1] In addition to other analytes needed to characterize the waste (e.g., VOC, SVOC, total metals), analyze for TSS, TDS, Oil and Grease, gross alpha gross beta, tritium, and pH for liquids destined for the LANL sanitary waste water system (SWWS). For wastes destined for the RLWTF additional constituents include TTO, TSS, COD, pH, total nitrates/nitrites, and gross alpha, gross beta (not including tritium), and gross gamma or the sum of individual alpha-, beta-, and gamma-emitting nuclides.

[2] If Microtox analysis is not available, requires BOD.

[3] As Needed

Note: Section 1.2 of the TCLP method 1311 states "If a total analysis of the waste demonstrates that individual analytes are not present in the waste, or that they are present but at such low concentrations that the appropriate regulatory levels could not possibly be exceeded, the TCLP need not be run." The methodology for using total waste analyses determination for the 40 TC constituents is as follows;

Liquids – Wastes containing less than 0.5% filterable solids do not require extraction and therefore by filtering the waste and measuring the total constituent levels of the filtrate and comparing those levels to regulatory levels is appropriate.

Solids – Constituent concentrations from the extraction fluid of wastes that are 100% physical solids are divided by 20 (reflecting the 20 to 1 ratio of TCLP extraction) and then compared to the regulatory levels. If the theoretical levels do not equal or exceed the regulatory levels, the TCLP need not be run. If the levels do equal or exceed the regulatory levels, the generator will run TCLP analyses.

References

LANL (Los Alamos National Laboratory). "Los Alamos National Laboratory Hazardous Waste Minimization Report," (LANL, 2009).

LANL (Los Alamos National Laboratory), October 2010. "Phase II Investigation Work Plan for Upper Los Alamos Canyon Aggregate Area" Los Alamos, New Mexico. (LA-UR-10-6327, EP2010-0398)

Upper LA Canyon AK Documents

61-007	CU-001(a)-99_Aggregate B
32-002(a)	CU-001(a)-99_Aggregate C
32-002(b)	CU-001(a)-99_Aggregate D
32-003	CU-001(a)-99_Aggregate E
32-004	CU-001(a)-99_Aggregate F
00-17	CU-001(a)-99_Aggregate G
C-00-0044	CU-001(a)-99_Aggregate H
41-001	CU-001(a)-99_Aggregate J
C-43-001	CU-001(a)-99_Aggregate K
03-038(a)	CU-001(a)-99_Aggregate L
03-038(b)	CU-001(a)-99_Aggregate P
03-055(c)	CU-001(a)-99_Aggregate N
AOC 03-008(a)	CU-001(a)-99_Aggregate A

Review/Approval	
ADEP Representative:	**Date:** 9-26-11
ENV-RCRA Environmental Professional	**Date:** 9-27-11

Signatures	Date
Project Manager (~~John McCann~~) KAO 9/26/11 Todd Haagenstad	9/26/11
Preparer (Kim Oman)	9/26/11
Waste Management Coordinator (Mike Le Scouarnec)	9-26-11
ENV-RCRA Representative (Jocelyn Buckley)	9/26/11
Waste Certification Program Representative (Randy J. Martinez)	9/26/11
Waste Acceptance (Andy Elicio)	09/26/2011

Environmental Programs (EP)
Document Signature Form

Catalog Number: EP2011-0411

Document Title/Subject: Amendment #1 Upper Los Alamos Canyon Agg Area

Project Manager: Todd Haagenstad

Author: Kim Oman

Editor:

Compositor:

LA-UR-#(s):

Date Due:

See attached approval signatures

Reviewer Signatures: By signing below, the reviewer indicates that he/she **reviewed** and **approves** the document.

Doc Reviewers Name (Print reviewer's name under title)	Signature	Date
Technical Reviewer		
Project Manager		
Regulatory Strategy		
Engineering Technology		
Program Director		
DOE/LASO		

1.0 AMENDMENT #1 Upper Los Alamos Canyon Aggregate Area	

Reason for Change:

Amendment #1 to WCSF Upper Los Alamos Canyon Aggregate Area (original EP2011-0325) is to add an additional AOC to the WCSF and to revise **Waste #1: Municipal Solid Waste (MSW)** to include asphalt for recycle in the waste description.

The Area of Contamination (AOC) which is to be added to WCSF Upper Los Alamos Canyon Aggregate Area is C-00-041.

Waste Description:

Waste #1: Municipal Solid Waste (MSW) - This waste stream primarily consists of non-contact trash, including, but not limited to, paper, cardboard, wood, plastic, food and beverage containers, empty solution containers, other non-contact trash and **asphalt for recycle.** It is estimated approximately 3 cubic yards of MSW will be generated.

Anticipated regulatory status, characterization, management and disposal:

The Anticipated Regulatory Status, Characterization Approach and Storage, Management and Disposal Method will remain unchanged.

Signatures	Date
Project Manager (Todd Haagenstad) Todd Haagenstad	12/9/2011
Preparer (Kim Oman) John Branch For Kim Oman	12-9-11
Waste Management Coordinator (Ron DeSotel) RLD	12-9-11
ENV-RCRA Representative (Jocelyn Buckley) Jocelyn Buckley	12-9-11
Waste Certification Program Representative (Randy J. Martinez) N/A / NON-RAD MATERIAL RJM 12-9-11	
Waste Acceptance (Andy Elicio) Joe Mottice for Andy Elicio	12-9-11

Environmental Programs (EP)
Document Signature Form

Catalog Number: EP2013-0130
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Project Manager: Ron DeSotel
Author: Ron DeSotel
Editor:
Compositor:
LA-UR-#(s): Signatures on final WCSF.
Date Due: 6/28/2013

Reviewer Signatures: By signing below, the reviewer indicates that he/she **reviewed** and **approves** the document.

Doc Reviewers Name (Print reviewer's name under title)	Signature	Date
Technical Reviewer		
Project Manager		
Regulatory Compliance		
Engineering		
Program Director		
DOE/LA Field Office		

Amendment #2
Upper Los Alamos Canyon Aggregate Area

Reason for Change:

Amendment #2 to WCSF Upper Los Alamos Canyon Aggregate Area (original EP2011-0325) is to revise waste sampling requirements for Waste #3: Excavated Environmental Media, in accordance with Exhibit "D", Purchase Request No. 280363. In addition, EP-DIR-SOP-10021, R0, Characterization and Management of Environmental Programs Waste, has replaced Waste Management, EP-SOP-5238.

Waste Description:

Waste #3: Excavated Environmental Media:
Contaminated soil and tuff that exceeds cleanup objectives will be removed. Manmade debris is not expected, but small amounts may be encountered during soil removal and if possible, will be segregated from the soil and managed appropriately, based upon AK of the soil. The total amount of media to be removed is expected to be approximately 3385 yd3.

Anticipated Regulatory Status: Industrial, Hazardous, Mixed Low-Level waste (MLLW), Low-level waste (LLW), PCB.

Characterization Approach:

Note: If container sizes are small, a representative sample may be collected from more than one container (e.g., one sample for every 20 cy^3 generated from a single potential release site).

Soil Sampling and Removal at SWMU 01-001(f) Sample ev2168 / ev529 (LLW) potential TSCA
SUBCONTRACTOR shall collect one waste composite sample from each roll off container. All waste characterization samples will be submitted for analysis of PCBs. Existing site characterization data are sufficient for waste characterization of all other potential hazardous constituents. The amount of media to be removed is expected to be approximately 6.9 yd3. **Reference WPF 41592 & WPF 41600**

Soil Sampling and Removal at SWMU 01-001(g) AK from Phase I ev3639, ev539
SUBCONTRACTOR shall collect one waste composite sample from each roll off container. All waste characterization samples will be submitted for analysis of isotopic plutonium. Existing site characterization data are sufficient for waste characterization of all other potential hazardous constituents and radionuclides. The amount of media to be removed is expected to be approximately The amount of media to be removed is expected to be approximately 19.9 yd3..

Soil Sampling and Removal at SWMU 01-001(o) WSTLA-12-1542
SUBCONTRACTOR shall collect one waste composite sample from each roll off container. All waste characterization samples will be submitted for analysis of PCBs (may not be necessary based on low concentration of PCBs). Existing site characterization data are sufficient for waste characterization for all other potential hazardous constituents and radionuclides. The amount of media to be removed is expected to be approximately 23 yd3.

Soil Sampling and Removal at SWMUs 01-001(d) and 01-006(h) ev524 (AWD ev524_3445)
SUBCONTRACTOR shall collect one waste composite sample from each roll off container. All waste characterization samples will be submitted for analysis of isotopic plutonium and TCLP mercury. Existing site characterization data are sufficient for waste characterization of all other potential hazardous constituents and radionuclides. The amount of media to be removed is expected to be approximately 1157.3 yd3.

Soil Sampling and Removal at SWMU 61-007 WSTLA-12-1562 (TSCA)
Existing site characterization data are sufficient for waste characterization for all other potential hazardous constituents and radionuclides. The amount of media to be removed is expected to be approximately 189 yd3.

Soil Sampling and Removal at SWMU 01-003(a) WSTLA-12-1543/AK from Phase I
SUBCONTRACTOR shall collect one waste composite sample from each roll off container. All waste characterization samples will be submitted for analysis of PCBs (may not be necessary based on low concentration of PCBs based on sampling of site prior to soil removal). Existing site characterization data are sufficient for waste characterization of all other potential hazardous constituents and radionuclides. The amount of media to be removed is expected to be approximately 574 yd3.

Soil Sampling and Removal at SWMU 01-003(b) ev3648, ev541
SUBCONTRACTOR shall collect one waste composite sample from each roll off container. All waste characterization samples will be submitted for analysis of toxicity characteristic leaching procedure (TCLP) metals (may not be necessary based on concentrations of arsenic and thallium from soil sampling prior to soil removal). Existing site characterization data are sufficient for waste characterization of all other potential hazardous constituents and radionuclides. The amount of media to be removed is expected to be approximately 46.3 yd3.

Soil Sampling and Removal at SWMU 01-003(d) ev3649, 542
SUBCONTRACTOR shall collect one waste composite sample from each roll off container. All waste characterization samples will be submitted for analysis of isotopic plutonium. Existing site characterization data are sufficient for waste characterization of all other potential hazardous constituents and radionuclides. The amount of media to be removed is expected to be approximately 9.3 yd3.

Soil Sampling and Removal at SWMU 01-007(a) WSTLA-12-1560
SUBCONTRACTOR shall collect one waste composite sample from each roll off container. All waste characterization samples will be submitted for analysis of isotopic plutonium. Existing site characterization data are sufficient for waste characterization of all other potential hazardous constituents and radionuclides. The amount of media to be removed is expected to be approximately 9.2 yd3.

Soil Sampling and Removal at SWMU 01-007(b) WSTLA-12-1545
SUBCONTRACTOR shall collect one waste composite sample from each roll off container. All waste characterization samples will be submitted for analysis of isotopic plutonium. Existing site characterization data are sufficient for waste characterization of all other potential hazardous constituents and radionuclides. The amount of media to be removed is expected to be approximately 58 yd3.

Soil Sampling and Removal at AOC C-43-001 ev3644, ev559
SUBCONTRACTOR shall collect one waste composite sample from each roll off container. All waste characterization samples will be submitted for analysis of TCLP metals (lead). Existing site characterization data are sufficient for waste characterization of all other potential hazardous constituents and radionuclides. The amount of media to be removed is expected to be approximately 1,111 yd3.

Soil Sampling and Removal at SWMU 32-002(b2) AWD 32-002(b2)
SUBCONTRACTOR shall collect one waste composite sample from each roll off container. All waste characterization samples will be submitted for analysis of TCLP metals (chromium and lead). Existing site characterization data are sufficient for waste characterization of all other potential hazardous constituents and radionuclides. The amount of media to be removed is expected to be approximately 153 yd3.

Soil Sampling and Removal at SWMU 01-006(b) ev3664, ev549
SUBCONTRACTOR shall collect one waste composite sample from each roll off container. All waste characterization samples will be submitted for analysis of isotopic plutonium. Existing site characterization data are sufficient for waste characterization of all other potential hazardous constituents and radionuclides. The amount of media to be removed is expected to be approximately 27.8 yd3.

Storage and Disposal Method:

No change except for;

SWMU 61-007
Initial site characterization identified PCB's in excess of 2000 ppm. This waste will be characterized and managed based on source PCB concentration of >500 ppm and disposed of under **LANL WSP 36196.**

Signatures	Date
LANL Project Manager (Todd Haagenstad)	6/18/13
LATA Project Manager (John Branch)	6/24/13
Waste Management Coordinator (Ron DeSotel)	6/18/13
ENV-RCRA Representative (Jocelyn Buckley)	6/18/13
Waste Certification Program Representative (Randy J. Martinez)	6/18/13
Waste Acceptance (Andy Elicio) Joe Molter for Andy Elicio.	6/18/13