Attachment G-1

Waste Characterization Strategy Form and Final Amendment 1
(on CD included with this document)

Waste Characterization Strategy Form

Project Title	**DP Site Aggregate Area Investigation/Corrective Actions**
Solid Waste Management Unit or Area of Concern #	**See below: 'Description of Activity'**
Activity Type	**Surface/Subsurface Soil Sampling, Borehole Drilling, Removal of Structures, Soil Excavation**
Field Team Leaders	**Randy Vigil / Curtis Schultz, Portage Environmental**
Field Waste Management Coordinator	**Bret Cummins, Portage Environmental**
Completed by	**Tom Benson, Portage Environmental**
Date	**6/21/06**

Description of Activity:

This investigation identifies and describes the activities needed to complete the Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) for solid waste management units (SWMUs) and areas of concern (AOCs) located within Delta Prime (DP) Site, also known as Technical Area 21 (TA-21), at Los Alamos National Laboratory (the Laboratory or LANL). DP Site is located in the northern portion of the Laboratory, south of State Road 502 and east-southeast of the Los Alamos townsite (Figure 1.1-1 ER2004-0409). The SWMUs and AOCs in DP Site are collectively referred to as the DP Site Aggregate Area.

The primary objectives of the DP Site Aggregate Area (DPSAA) investigation and corrective actions activities are to:

- define the nature and extent of contamination and to determine whether additional corrective actions are necessary, and
- to collect information for planning and executing the structure removals as well as confirmatory investigations following structure removal.

Site History and Description: The DPSAA is located within TA-21. Based on past Laboratory activities, the SWMUs/AOCs listed may have the potential to contain hazardous and/or radioactive constituents. Each distinct site is described separately below. In depth descriptions of the units, previous sampling and remediation activities, and expected waste streams can be found in the Investigation Work Plan for Delta Prime Site Aggregate Area at TA-21 (ER2004-0409) and Revision 1 (ER2005-0192).

The DPSAA consists of 155 SWMUs and AOCs which are located within TA-21.

Some of the SWMUs and AOCs in the DPSAA have previously been investigated or remediated and are not addressed in this investigation. Other SWMUs and AOCs in the DPSAA are associated with the five material disposal areas (MDAs) at TA-21 and are not addressed in this investigation. A few other SWMUs and AOCs are associated with active operational facilities or facilities planned for decontamination and decommissioning (D&D) and are not addressed in this investigation.

The remaining SWMUs/AOCs in the DPSAA are addressed in this investigation and have been separated into two categories as follows:

Investigation Sites: The first category contains those sites where additional investigation is needed to determine the nature and extent of contamination and the potential need for corrective action (Figure 1.1-2 ER2004-0409). The Chemicals of Potential Concern (COPC) are also listed for each site.

- SWMU 21-013(c), a surface disposal area.

  The chemicals of potential concern (COPCs) identified are mercury, total uranium, bis(2-ethylhexyl)phthalate, di-n-butlyphthalate, 2,3-dinitrotoluene, 4-nitrophenol, pentachlorophenol, and the PAHs, americium-241, plutonium-238, plutonium-239, strontium-90, tritium, and uranium-235. The expected waste streams for this site are: soil and rock; PPE, plastic, and other IDW; and decontamination fluids.

- Consolidated SWMU 21-003-99 consisting of:

  -SWMU 21-003, a polychlorinated biphenyl container storage area,

  -SWMU 21-013(f), a surface disposal site.

  The COPCs identified are antimony, calcium, copper, lead, mercury, thallium, total uranium, zinc, acetone, isopropyltoluene(4-), toluene, bis(2-ethylhexyl)phthalate, di-n-octylphthalate, PCBs, PAHs, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene, americium-241, cesium-134, cesium-137, cobalt-60, plutonium-238, plutonium-239, strontium-90, and tritium. The expected waste streams for this site are: soil and rock; PPE, plastic, and other IDW; and decontamination fluids.

- SWMU 21-024(c), a septic system and associated outfall.

  The COPCs identified are antimony, arsenic, cadmium, calcium, chromium, copper, lead, molybdenum, nickel, selenium, silver, zinc, americium-241, plutonium-238, plutonium-239, and tritium. The expected waste streams for this site are: drill cuttings; soil and rock; sewer line; septic tank; PPE, plastic, and other IDW; and decontamination fluids.

- SWMU 21-009, a waste treatment laboratory.

  No COPCs are identified. The expected waste streams for this site are: soil and rock; PPE, plastic, and other IDW; and decontamination fluids.

- AOC 21-002(b), a drum storage area.

  The COPCs identified are barium, calcium, chromium, copper, lead, selenium, silver, sodium, thallium, uranium, zinc, PAHs, cesium-137, plutonium-238, plutonium-239, ruthenium-106, strontium-90, and tritium. The expected waste streams for this site are: soil and rock; PPE, plastic, and other IDW; and decontamination fluids.

- SWMU 21-024(m), a septic system and associated outfall.

  No COPCs are identified. The expected waste streams for this site are: soil and rock; PPE, plastic, and other IDW; and decontamination fluids.

Corrective Actions Sites: The second category contains sites associated with corrective actions consisting of removing structures and contaminated soils (Figure 5.0-2 ER2005-0192).

- Consolidated SWMU 21-006(c)-99, consisting of;
  - SWMU 21-006(a), seepage pit
  - SWMU 21-006(b), seepage pit
  - SWMU 21-006(c), seepage pit
  - SWMU 21-006(d), seepage pit

The COPCs identified are antimony, lead, americium-241 and plutonium-239. The expected waste streams for this site are: Concrete/VCP, Metal Debris/Cast Iron Piping, Gravel, and Soil.

- SWMU 21-012(b), a dry well and associated septic system.

  No COPCs have been identified. The expected waste streams for this site are: Concrete/VCP, Metal Debris/Cast Iron Piping, and Soil.

- SWMU 21-022(f), a sump and pipeline.

  No COPCs have been identified. The expected waste streams for this site are: Concrete/VCP, Metal Debris/Cast Iron Piping, and Soil.

- Consolidated SWMU 21-022(h)-99, consisting of;
  - SWMU 21-022(h), sump, drainline, outfall
  - SWMU 21-022(l), sump
  - SWMU 21-022(j), sump

  The COPCs identified are antimony, barium, calcium, cobalt, copper, molybdenum, nickel, zinc, Bis(2-ethylhexyl)phthalate, 4-methyl-2-pentanone, 1,2-xylene, and xylene (total), americium-241, cesium-137, plutonium-238, plutonium-239, strontium-90,uranium-234, and uranium-235. The expected waste streams for this site are: Concrete/VCP, Metal Debris/Cast Iron Piping, and Soil.

- Consolidated SWMU 21-023(a)-99, consisting of;
  - SWMU 21-023(a), septic tank, drainlines
  - SWMU 21-023(b), septic tank, drainlines
  - SWMU 21-023(d), septic tank, drainlines

  No COPCs have been identified. The expected waste streams for this site are: Concrete/VCP, Metal Debris/Cast Iron Piping, and Soil.

- SWMU 21-024(a), a septic system.

  The COPCs identified are antimony, cadmium, calcium, chromium, copper, lead, lithium, molybdenum, nickel, selenium, sodium, strontium, zinc, americium-241, plutonium-238, plutonium-239, and tritium. The expected waste streams for this site are: Concrete/VCP and Soil.

- SWMU 21-024(b), a septic system.

  The COPCs are identified as antimony, calcium, copper, lead, selenium, strontium, zinc, americium-241, plutonium-238, plutonium-239, and tritium. The expected waste streams for this site are: Concrete/VCP and Soil.

- SWMU 21-024(d), a septic system.

  The COPCs are identified as antimony, arsenic, barium, calcium, chromium, copper, lead, selenium, silver, vanadium, zinc, americium-241, plutonium-238, plutonium-239, tritium, uranium-234, and uranium-238. The expected waste streams for this site are: Concrete/VCP and Soil.

- SWMU 21-024(e), a septic system.

  The COPCs are identified as antimony, cadmium, copper, lead, molybdenum, zinc, americium-241, cesium-137, europium-152, plutonium-238, plutonium-239, tritium, uranium-234, uranium-235, and uranium-238. The expected waste streams for this site are: Concrete/VCP, Metal Debris/Cast Iron Piping, and Soil.

- SWMU 21-024(g), a septic system.

The COPCs are identified as antimony, arsenic, cadmium, copper, lead, selenium, silver, zinc, acetone, americium-241, plutonium-239, and tritium. The expected waste streams for this site are: Concrete/VCP, Metal Debris/Cast Iron Piping, Gravel, and Soil.

- SWMU 21-024(h), a septic system.

  The COPCs are identified as antimony, selenium, silver, acetone, bis(2-ethylhexyl)phthalate, methylene chloride, americium-241, plutonium-238, plutonium-239, tritium, and uranium-235. The expected waste streams for this site are: Concrete/VCP and Soil.

- SWMU 21-024(i), a septic system inlet line.

  No COPCs have been identified. The expected waste streams for this site are: Concrete/VCP and Soil.

- SWMU 21-024(j), a septic system.

  The COPCs identified are aluminum, barium, calcium, cobalt, copper, nickel, selenium, americium-241, plutonium-239, and tritium. The expected waste streams for this site are: Concrete/VCP and Soil.

- SWMU 21-024(k), a septic system.

  The COPCs identified are aluminum, barium, calcium, lithium, selenium, strontium, bis(2-ethylhexyl)phthalate, americium-241, plutonium-238, plutonium-239, tritium, and uranium-234. The expected waste streams for this site are: Concrete/VCP, Metal Debris/Cast Iron Piping, Gravel, and Soil.

- Consolidated SWMU 21-024(l)-99, consisting of;
  - SWMU 21-022(a), sump
  - SWMU 21-024(l), an aboveground storage tank and associated lines
  - AOC 21-004(a), an outfall.

  The COPCs identified are antimony, lithium, acetone, methylene chloride, americium-241, plutonium-238, and plutonium-239. The expected waste streams for this site are: Concrete/VCP, Metal Debris/Cast Iron Piping, and Soil.

- SWMU 21-024(n), pipelines and outfalls.

  The COPCs identified are antimony, chromium, copper, zinc, acetone, diethylphthalate, and americium-241. The expected waste streams for this site are: Concrete/VCP, Metal Debris/Cast Iron Piping, and Soil.

- SWMU 21-024(o), a pipeline and outfall.

  The COPCs identified are antimony, lead, zinc, americium-241 and plutonium-239. The expected waste streams for this site are: Concrete/VCP and Soil.

- Consolidated SWMU 21-026(a)-99, consisting of;
  - SWMU 21-013(a), surface disposal area for waste sand from drying area
  - SWMU 21-026(a), inactive sewage treatment plant
  - SWMU 21-026(b), drying beds
  - AOC 21-026(c), dosing siphon chamber
  - AOC 21-026(d), outfall.

  The COPCs identified are aluminum, antimony, barium, calcium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, zinc, acetone, dichlorodifluoromethane, americium-241, cesium-137, plutonium-238, plutonium-239, strontium-90, tritium, and

uranium-235. The expected waste streams for this site are: Concrete/VCP, Gravel, and Soil.

- SWMU 21-027(a), surface drainage and an outfall.

  The COPCs identified are antimony, cadmium, chromium, copper, lead, lithium, nickel, selenium, silver, strontium, zinc, acetone, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, methylene chloride, phenanthrene, pyrene, tetrachloroethene, americium-241, plutonium-238, plutonium-239, tritium, uranium-234, uranium-235, and uranium-238. The expected waste streams for this site are: Concrete/VCP, Metal Debris/Cast Iron Piping, and Soil.

- SWMU 21-027(c), a pipeline and outfall. The COPCs identified are antimony, calcium, copper, lead, zinc, acetone, americium-241, plutonium-238, and plutonium-239. The expected waste streams for this site are: Concrete/VCP and Soil.

The primary objectives of the DP Site Aggregate Area (DPSAA) investigation and corrective actions activities are to:

- define the nature and extent of contamination and to determine whether additional corrective actions are necessary, and
- to collect information for planning and executing the structure removals as well as confirmatory investigations following structure removal.

To accomplish the primary objectives set forth in this field investigation, the main field activities to be performed include:

- collecting surface and subsurface soil/tuff samples
- drilling boreholes
- removing septic tanks and drainlines and excavating contaminated soil, if necessary

A conclusive delineation of the vertical and lateral extent of contamination could not be determined from historical sampling investigations within the proposed aggregate area. Additional sampling is proposed for each site at designated historical locations and at new locations, to further define the nature and extent of contamination.

Surface and borehole soil and tuff samples will be analyzed for one or more of the analytical suites:

- target analyte list metals
- volatile organic compounds
- semi-volatile organic compounds
- radionuclides
- pH
- moisture
- nitrates
- cyanide
- perchlorate

Septic tanks, drainlines, and potentially contaminated soil are proposed for excavation and removal to facilitate subsurface sampling and characterization. If removal of a tank is not possible, sampling beneath the tank will be conducted using angled boreholes. The exact

location of each borehole will be determined utilizing geodetic surveying methods. It is not anticipated that any zones of elevated moisture content, localized saturation, and groundwater will be encountered. However, if saturation is encountered before reaching total depth, drilling will be stopped to determine whether sufficient water volume (approximately 0.5 to 1.0 L) is available for analyzing the water quality. In some cases, a hand-held power auger and/or manual hand-auger may be used to collect shallow subsurface soil samples (less than 6 ft) following the current version of ENV-ECR-SOP-06.10, "Hand Auger and Thin-Wall Tube Sampler." If removal of drainlines is not possible, sections of only the steel lines will be pressure-grouted with concrete and left in place. All samples will be continuously field-screened for gross alpha, gross beta/gamma radiation and for organic vapors. A Photoionization Detector (PID) will be utilized for field-screening organic vapors. Final waste disposition of investigation-derived waste (IDW), from field activities, will be dependent on release surveys, site characterization sampling, and waste-acceptance criteria for a LANL-approved disposal facility.

Characterization Strategy:

Waste #1: *Decontamination water.* This waste stream may potentially accumulate washing liquids generated from the decontamination of sampling and heavy equipment. Following waste minimization practices, the majority of equipment decontamination will be performed using dry techniques in accordance with LANL ER-SOP-01.08, R1, "Field Decontamination of Drilling and Sampling Equipment." Therefore, if generation of less than six gallons of decontamination water per day is accumulated, then the washing liquids will be discharged on-site in accordance with LANL ER-SOP-01.06, R2, "Management of Environmental Restoration Project Waste," provided the discharges do not generate leachate that will move directly or indirectly into groundwater and provided that New Mexico Water Quality Control Commission groundwater protection is met. Decontamination water meeting these conditions may be discharged onto the ground without submitting a Notice of Intent. If volumes exceed six gallons per day the decontamination water will be stored in drums, managed accordingly, and will be disposed of at either the Radioactive Liquid Waste Treatment Facility (RLWTF) or the Sanitary Waste Water Systems (SWWS) depending on characterization results. Based on previous site investigations, LANL expects the waste stream to be non-hazardous, but will be managed in a conservative manner in a hazardous waste storage area at a designated location, pending analytical results from direct sampling.

Waste #2: *Borehole drill cuttings.* This waste stream will be generated during characterization drilling activities at DPSAA. Characterization will be based on analytical data gathered during site characterization activities and additionally from direct sampling results, if necessary. From core samples, the maximum detected concentrations of radionuclides will be compared to background/fallout values. If the maximum concentrations are above background/fallout values, the waste stream will be designated as low-level radioactive waste. The potential for listed hazardous waste will be evaluated based on knowledge of processes that generated the wastes. From core samples, compared with 20 times the TCLP regulatory level, if concentrations are less than 20 times regulatory level, the drill cuttings will be designated non-hazardous waste. If concentrations exceed 20 times the regulatory level, then the drill cuttings will be directly sampled as confirmation for designation of a hazardous waste. Based on previous site investigations, LANL expects the waste stream to be non-hazardous, but will be managed in a conservative manner, in drums, in a hazardous waste storage area at a designated location, pending analytical results. The estimated volume is approximately 10 yd^3 (Note: Volume may change). If characterized as hazardous, the drill cuttings will be disposed of at an off-site LANL-approved hazardous waste disposal facility. If characterized as low-level radioactive, the drill cuttings will be disposed of on-site at TA-54, East. If characterized as non-hazardous, the drill cuttings will be disposed of at an off-site LANL-approved industrial disposal facility.

Waste #3: *Septic tank structures, inlet/outlet pipes, and culverts.* This waste stream will consist of concrete reinforced with steel rebar (septic tank structures), vitrified clay piping and cast iron piping (septic/sewer piping) and corrugated metal piping (culverts). Characterization will be based on analytical data gathered during site characterization activities. From core samples, the maximum detected concentrations of radionuclides will be compared to background/fallout values. If the maximum concentrations are above background/fallout values, the waste stream will be designated as low-level radioactive waste. From core samples, compared with 20 times the TCLP regulatory level, if concentrations are less than 20 times regulatory level, the waste stream will be designated non-hazardous waste. If concentrations exceed 20 times the regulatory level, then the waste stream will be directly sampled as confirmation for designation of a hazardous waste. Based on previous site investigations, LANL expects the waste stream to be non-hazardous, but will be managed in a conservative manner, in roll-off bins, in a hazardous waste storage area at a designated location, pending analytical results. If characterized as hazardous, this waste stream will be disposed of at an off-site LANL-approved hazardous waste disposal facility. If characterized as low-level radioactive, this waste stream will be disposed of on-site at TA-54, East. If characterized as non-hazardous, this waste stream will be disposed of at an off-site LANL-approved industrial disposal facility. The estimated volume is approximately 1026 yd^3 (Note: Volume may change).

Waste #4: *Septic tank contents and contaminated debris.* This waste stream will consist of mainly septic tank sludge and debris from within the tank structures. Characterization will be based on analytical data gathered during site characterization activities. From core samples, the maximum detected concentrations of radionuclides will be compared to background/fallout values. If the maximum concentrations are above background/fallout values, the waste stream will be designated as low-level radioactive waste. From core samples, compared with 20 times the TCLP regulatory level, if concentrations are less than 20 times regulatory level, the drill cuttings will be designated non-hazardous waste. If concentrations exceed 20 times the regulatory level, then the drill cuttings will be directly sampled as confirmation for designation of a hazardous waste. Based on previous site investigations, LANL expects the waste stream to be mixed low-level waste and will be managed in a conservative manner, in drums, at a designated location, pending analytical results. The estimated volume is approximately 20 yd^3 (Note: Volume may change). If characterized as hazardous, or mixed low-level waste, this waste stream will be disposed of at an off-site LANL-approved hazardous or mixed low-level waste disposal facility. If characterized as low-level radioactive, this waste stream will be disposed of on-site at TA-54, East. If characterized as non-hazardous, this waste stream will be disposed of at an off-site LANL-approved industrial disposal facility.

Waste #5: *Septic tank liquids.* This waste stream will consist of septic tank liquids from within the tank structures. Characterization will be based on analytical data gathered during characterization of the septic tank sludge/debris and direct characterization sampling, if necessary. Based on previous site investigations, LANL expects the waste stream to be mixed low-level waste, and will be managed in a conservative manner, in drums, at a designated location, pending analytical results from direct characterization sampling. The estimated volume is approximately 300 gallons (Note: Volume may change). If characterized as hazardous, or mixed low-level waste, this waste stream will be disposed of at an off-site LANL-approved hazardous or mixed low-level waste disposal facility. If characterized as low-level radioactive, this waste stream will be disposed of at the Radioactive Liquid Waste Treatment Facility (RLWTF). If characterized as non-hazardous, non-radioactive, this waste stream will be disposed of at the Sanitary Waste Water Systems (SWWS).

Waste #6: *Plastics, Personal Protective Equipment, and Sampling Wastes.* This waste stream will include various types of plastics (e.g., tarps, liners, and/or contamination control covers), disposable gloves, shoe covers, coveralls, and sampling supplies such as plastic scoops, plastic bags, jars, and dry decontamination waste. Plastics, personnel protective equipment, and sampling-related wastes have the potential to become contaminated through direct contact with contaminated environmental media and debris. Because this waste is generated only during field activities, it is assumed that the waste contaminants will be identical to the contaminants found in the environmental media with which it has been in contact. Characterization will be based on analytical data gathered during site characterization activities. Based on previous site investigations, LANL expects the waste stream to be non-hazardous, but will be managed in a conservative manner, in drums, at a designated location, pending analytical results. The estimated volume is approximately 10 yd^3 (Note: Volume may change). If characterized as hazardous, this waste stream will be disposed of at an off-site LANL-approved hazardous waste disposal facility. If characterized as low-level radioactive, this waste stream will be disposed of on-site at TA-54, East. If characterized as non-hazardous, this waste stream will be disposed of at an off-site LANL-approved industrial disposal facility.

Waste #7: *Excavated soil, rock, gravel, and sand.* This waste stream will consist of the excavated material (rock, gravel, sand) associated with septic tanks, piping, and related structures during remediation activities. Characterization will be based on analytical data gathered during site characterization activities and additionally from direct sampling results, if necessary. Based on the characterization soil samples, the maximum detected concentrations of radionuclides will be compared to background/fallout values. If the maximum concentrations are above background/fallout values, the waste stream will be designated as low-level radioactive waste. The potential for listed hazardous waste will be evaluated based on knowledge of processes that generated the wastes. Based on the characterization soil samples, compared with 20 times the TCLP regulatory level, if concentrations are less than 20 times regulatory level, the waste will be designated non-hazardous waste. If concentrations exceed 20 times the regulatory level, then the waste will be directly sampled as confirmation for designation of a hazardous waste. Based on previous site investigations, LANL expects the waste stream to be non-hazardous, low-level radioactive waste, but will be managed in a conservative manner, in roll off bins, in a hazardous waste storage area at a designated location, pending analytical results. The estimated volume is approximately 1900 yd^3 (Note: Volume may change). If characterized as hazardous, the excavated material will be disposed of at an off-site LANL-approved hazardous waste disposal facility. If characterized as low-level radioactive, the excavated material will be disposed of on-site at TA-54, East. If characterized as non-hazardous, the excavated material will be disposed of at an off-site LANL-approved industrial disposal facility.

Waste #8: Lead collars. This waste stream will consist of lead collars historically used in cast iron and VCP joints. The lead collars will be segregated and decontaminated to below free-release criteria for radionuclides and managed, in drums, as hazardous waste to minimize waste volumes. The estimate volume is approximately 1 yd^3. This waste stream will be disposed of at an off-site LANL-approved hazardous waste disposal facility.

Waste #9: *Miscellaneous construction and demolition (C&D) debris.* This waste stream will consist of miscellaneous C&D debris such as building debris, asphalt, and fence posts with footers. Characterization will be based on analytical data gathered during site characterization activities. From core samples, the maximum detected concentrations of radionuclides will be compared to background/fallout values. If the maximum concentrations are above

background/fallout values, the waste stream will be designated as low-level radioactive waste. From core samples, compared with 20 times the TCLP regulatory level, if concentrations are less than 20 times regulatory level, the waste stream will be designated non-hazardous waste. If concentrations exceed 20 times the regulatory level, then the waste stream will be directly sampled as confirmation for designation of a hazardous waste. Based on previous site investigations, LANL expects the waste stream to be non-hazardous, but will be managed in a conservative manner, in roll-off bins, in a hazardous waste storage area at a designated location, pending analytical results. If characterized as hazardous, this waste stream will be disposed of at an off-site LANL-approved hazardous waste disposal facility. If characterized as low-level radioactive, this waste stream will be disposed of on-site at TA-54, East. If characterized as non-hazardous, this waste stream will be disposed of at an off-site LANL-approved industrial disposal facility. The estimated volume is approximately 50 yd^3 (Note: Volume may change).

Waste #10: *Mixed vegetation debris.* This waste stream will consist of tree stumps, slash and wood debris. Characterization will be based on analytical data gathered during site characterization activities. From core samples, the maximum detected concentrations of radionuclides will be compared to background/fallout values. If the maximum concentrations are above background/fallout values, the waste stream will be designated as low-level radioactive waste. From core samples, compared with 20 times the TCLP regulatory level, if concentrations are less than 20 times regulatory level, the waste stream will be designated non-hazardous waste. If concentrations exceed 20 times the regulatory level, then the waste stream will be directly sampled as confirmation for designation of a hazardous waste. Based on previous site investigations, LANL expects the waste stream to be non-hazardous, but will be managed in a conservative manner, in roll-off bins, in a hazardous waste storage area at a designated location, pending analytical results. If characterized as hazardous, this waste stream will be disposed of at an off-site LANL-approved hazardous waste disposal facility. If characterized as low-level radioactive, this waste stream will be disposed of on-site at TA-54, East. If characterized as non-hazardous, this waste stream will be disposed of at an off-site LANL-approved industrial disposal facility. The estimated volume is approximately 16 yd^3 (Note: Volume may change).

Waste Characterization Strategy Form

CHARACTERIZATION TABLE

Waste Description	Waste # _1_ Decontamination Water	Waste # _2_ Drill Cuttings	Waste # _3_ Tank structures, inlet/outlet pipes, and culverts	Waste # _4_ Tank content soils
Approximate Volume	<6 gallons per day	10 yd³	1026 yd³	20 yd³
Packaging	Metal drum(s)	Metal drum(s)	Roll-offs	Metal drum(s)
Regulatory classification:				
Radioactive	X (see note)	X (see note)	X (see note)	X (see note)
Solid		X	X	X
Hazardous	X (see note)	X (see note)	X (see note)	X (see note)
Mixed (hazardous and radioactive)	X (see note)	X (see note)	X (see note)	X (see note)
Toxic Substances Control Act (TSCA)				
New Mexico Special Waste				
Industrial	X (see note)	X (see note)	X (see note)	X (see note)
Characterization Method				
Acceptable knowledge (AK): Existing Data/Documentation		X	X	X
AK: Site Characterization		X	X	X
Direct Sampling of Containerized Waste	X			
Analytical Testing				
Volatile Organic Compounds (EPA 8260-B)	X			
Semivolatile Organic Compounds (EPA 8270-C)	X			
Organic Pesticides (EPA 8081-A)	X			
Organic Herbicides (EPA 8151-A)				
PCBs (EPA 8082)	X			
Total Metals (EPA 6010-B/7471-A)	X			
Total Cyanide (EPA 9012-A)	X			
High Explosives Constituents (EPA 8330/8321-A)				
Asbestos				
Total petroleum hydrocarbon (TPH)-GRO (EPA 8015-M)				
TPH-DRO (EPA 8015-M)				
Toxicity characteristic leaching procedure (TCLP) Metals (EPA 1311/6010-B)				
TCLP Organics (EPA 1311/8260-B & 1311/8270-C)				
TCLP Pest. & Herb. (EPA 1311/8081-A/1311/8151-A)				
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			

Waste Description	Waste # 1 Decontamination Water	Waste # 2 Drill Cuttings	Waste # 3 Tank structures, inlet/outlet pipes, and culverts	Waste # 4 Tank content soils
Isotopic uranium (chem. separation/alpha spec.) (HASL-300)	X			
Total uranium (6020 inductively coupled plasma mass spectroscopy [ICPMS])				
Strontium-90 (EPA 905)	X			
Americium-241 (chem.. separation/alpha spec.) (HASL-300)	X			
Waste Profile Form #				

Waste Characterization Strategy Form (continued)

CHARACTERIZATION TABLE

Waste Description	Waste #5 Septic tank liquids	Waste #6 Plastics, PPE, and sampling wastes	Waste #7 Soil, rock, gravel, sand	Waste #8 Lead collars	Waste #9 Misc. C&D	Waste #10 Mixed veg. debris
Approximate Volume	300 gallons	10 yd^3	1900 yd^3	1 yd^3	50 yd^3	16 yd^3
Packaging	Metal drum(s)	Metal drum(s)	Roll-offs	Metal drum(s)	Roll-offs	Roll-offs
Regulatory classification:						
Radioactive	X (see note)	X (see note)	X (see note)		X (see note)	X (see note)
Solid	X	X	X	X	X	X
Hazardous	X (see note)	X (see note)	X (see note)	X	X (see note)	X (see note)
Mixed (hazardous and radioactive)	X (see note)	X (see note)	X (see note)		X (see note)	X (see note)
Toxic Substances Control Act (TSCA)						
New Mexico Special Waste						
Industrial	X (see note)	X (see note)	X (see note)		X (see note)	X (see note)
Characterization Method						
Acceptable knowledge (AK): Existing Data/Documentation	X	X	X		X	X
AK: Site Characterization	X	X	X		X	X
Direct Sampling of Containerized Waste						
Analytical Testing						
Volatile Organic Compounds (EPA 8260-B)						
Semivolatile Organic Compounds (EPA 8270-C)						
Organic Pesticides (EPA 8081-A)						
Organic Herbicides (EPA 8151-A)						
PCBs (EPA 8082)						
Total Metals (EPA 6010-B/7471-A)						

Waste Description	Waste #5 Septic tank liquids	Waste #6 Plastics, PPE, and sampling wastes	Waste #7 Soil, rock, gravel, sand	Waste #8 Lead collars	Waste #9 Misc. C&D	Waste #10 Mixed veg. debris
Total Cyanide (EPA 9012-A)						
High Explosives Constituents (EPA 8330/8321-A)						
Asbestos						
Total petroleum hydrocarbon (TPH)-GRO (EPA 8015-M)						
TPH-DRO (EPA 8015-M)						
Toxicity characteristic leaching procedure (TCLP) Metals (EPA 1311/6010-B)						
TCLP Organics (EPA 1311/8260-B & 1311/8270-C)						
TCLP Pest. & Herb. (EPA 1311/8081-A/1311/8151-A)						
Gross Alpha (alpha counting) (EPA 900)						
Gross Beta (beta counting) (EPA 900)						
Tritium (liquid scintillation) (EPA 906.0)						
Gamma spectroscopy (EPA 901.1)						
Isotopic plutonium (chem. separation/alpha spec.) (HASL-300)						
Isotopic uranium (chem. separation/alpha spec.) (HASL-300)						
Total uranium (6020 inductively coupled plasma mass spectroscopy [ICPMS])						
Strontium-90 (EPA 905)						
Americium-241 (chem. separation/alpha spec.) (HASL-300)						
Waste Profile Form #						
NOTE: Waste classification will be based on site-characterization data. Waste streams may have potential to fall under any of these regulatory classifications.						

Waste Characterization Strategy Form (continued)

SIGNATURES	DATE
Project Leader (Print name and then sign below.) or designe Roy Bohn Roy Bohn (designe)	6/22/06
ENV-ERSS Waste Management Coordinator (Print name and then sign below.) Leonard Trujillo Leonard	6/22/06
SWRC Representative (Print name and then sign below.) John Tymkowych John M. Tymkowych	6/22/06
NWIS-SWO Representative (Print name and then sign below.) Andy Elicio	6/22/06

SOP-01.10, R2	**Los Alamos National Laboratory** **ENV-ECR**

Amendment 1 to the Waste Characterization Strategy Form (WCSF) for DP Site Aggregate Area Investigation/Corrective Actions

Date: 1/17/07

INTRODUCTION

This is Amendment #1 to the original waste characterization strategy form (WCSF) for DP Site Aggregate Area Investigation/Corrective Actions dated 6/21/06 (ER2006-0476). This amendment includes a direct waste sampling strategy for waste containers (roll-off bins, 55 gallon drums, wrangler bags) or directly from in situ waste material itself (i.e. septic tank contents, drain lines, etc) just prior to removal and containerization. Wastes will be generated at all the solid waste management units (SWMUs) and areas of concern (AOCs) specified in the original WCSF. The original WCSF did not include a sampling strategy for direct waste sampling from waste storage containers and/or from the waste material itself. Direct sampling from the waste containers and/or waste in place will provide better waste characterization and will provide data in a more timely manner in order to meet the <90 day storage requirements. This is more preferable than using site characterization data as described in the original WCSF. Modifications also need to be made to 3 waste streams due to the discovery of a steel septic tank that was found at SWMU 21-024 (c). See changes in the Waste Description box below.

BACKGROUND

DP Site Aggregate Area investigation and corrective action activities will consist of soil/tuff sampling and/or removal of drain lines, septic tanks, sumps, outfalls, and soil at approximately 28 SWMUs/AOCs across the TA-21 mesa top. Based on past Laboratory activities, the SWMUs/AOCs may have the potential to contain hazardous and/or radioactive constituents. In depth descriptions of the units, previous sampling and remediation activities, and expected waste streams can be found in the Investigation Work Plan for Delta Prime Site Aggregate Area at TA-21 (ER2004-0409) and Revision 1 (ER2005-0192). Additional information can be found in the original WCSF for DP Site Aggregate Area Investigation/Corrective Actions dated 6/21/06 (ER2006-0476).

WASTE DESCRIPTION

Waste # 3 – Due to the discovery of a steel tank at 21-024(c), the following modification to this waste description is made.

This waste may also consist of large pieces of rusty metal that are remnants of old metal septic tanks that are removed. These metal pieces may also contain trace amounts of the septic tank contents (i.e. sludge) and soil. This waste will be characterized based on the characterization of tank contents or associate contaminated material. Waste will be managed in a hazardous waste storage area (<90 day or Satellite area) at a designated location pending analytical results. If characterized as hazardous, the waste will be disposed of at an authorized hazardous wasted disposal facility. If characterized as low-level radioactive, the waste will be disposed of on-site at TA-54, or other authorized low level disposal facility. If characterized as mixed low-level waste, the waste will be disposed of at an authorized mixed low level disposal facility. If characterized as TSCA waste, the waste will be disposed of at an authorized TSCA disposal facility. If characterized as non-hazardous, the waste will be disposed of at an authorized industrial disposal facility.

Waste #4 – Due to the corroding metal tanks that could be destroyed during excavation, this waste stream could also contain small pieces of rusty metal tanks, as well as portions of Waste # 7 (Excavated soil, rock, gravel, and sand). Care will be taken to not commingle the waste streams, however this may not be

possible. This waste will be characterized based on the characterization of tank contents or associate contaminated material. Waste will be managed in a hazardous waste storage area (<90 day or Satellite area) at a designated location pending analytical results. If characterized as hazardous, the waste will be disposed of at an authorized hazardous wasted disposal facility. If characterized as low-level radioactive, the waste will be disposed of on-site at TA-54, or other authorized low level disposal facility. If characterized as mixed low-level waste, the waste will be disposed of at an authorized mixed low level disposal facility. If characterized as TSCA waste, the waste will be disposed of at an authorized TSCA disposal facility. If characterized as non-hazardous, the waste will be disposed of at an authorized industrial disposal facility.

Waste # 7 may also contain small pieces of the rusty tanks, as well as small amounts of the tank contents. In these instanced samples of this waste stream will include a composite of all the different matrix in the excavated waste stream.

This waste will be characterized based on the characterization of tank contents or associate contaminated material. Waste will be managed in a hazardous waste storage area (<90 day or Satellite area) at a designated location pending analytical results. If characterized as hazardous, the waste will be disposed of at an authorized hazardous wasted disposal facility. If characterized as low-level radioactive, the waste will be disposed of on-site at TA-54, or other authorized low level disposal facility. If characterized as mixed low-level waste, the waste will be disposed of at an authorized mixed low level disposal facility. If characterized as TSCA waste, the waste will be disposed of at an authorized TSCA disposal facility. If characterized as non-hazardous, the waste will be disposed of at an authorized industrial disposal facility.

CHARACTERIZATION, MANAGEMENT, AND DISPOSAL

Direct sampling of waste containers for characterization will be implemented in the following manner;

- Sample will be a composite of two bins each (if more than 1 bin of a waste stream is generated)
- In each bin, a hand auger or spade/scoop will be used to collect a grab from the top of container to bottom (or refusal), from each quadrant and the center area (for a total of five grabs) and consolidated in a sample bowl
- This first consolidated bowl will be mixed with a consolidated bowl from the second bin of the two bin set to provide the sample media for one sample ID/analyte suite

Direct sampling of waste material itself (i.e. septic tank contents, drainlines, etc) will be implemented to characterize waste streams prior to excavation in cases where contents may be unknown and/or there are concerns about a path forward for the waste. In this case, one or more grab samples will be collected from the waste material.

Based on previous site investigations, LANL expects the waste streams to be non-hazardous, but will be managed in a conservative manner, in containers, in a hazardous waste storage area at a designated location, pending analytical results.

If characterized as hazardous, the waste will be disposed of at an authorized hazardous waste disposal facility. If characterized as low-level radioactive, the waste will be disposed of on-site at TA-54, or other authorized low level disposal facility. If characterized as mixed low-level waste, the waste will be disposed of at an authorized mixed low level disposal facility. If characterized as TSCA waste, the waste will be disposed of at an authorized TSCA disposal facility. If characterized as non-hazardous, the waste will be disposed of at an authorized industrial disposal facility.

See attachment for updated Characterization Table:

SIGNATURES (Print name and then sign.)	**DATE**
Project Leader: Mark Thacker/Roy Bohn	1/17/07
Waste Management Coordinator: Michael Le Scouarnec	1.17.07
SWRC Representative: Kelly VanDerpoel/John Tymkowych	1-18-07
NWIS-SWO Representative: Andy Elicio	1/18/07

Waste Characterization Strategy Form
CHARACTERIZATION TABLE 1- 4

Waste Description	Waste # _1_ Decontamination Water	Waste # _2_ Drill Cuttings	Waste # _3_ Tank structures, inlet/outlet pipes, and culverts	Waste # _4_ Tank content soils
Approximate Volume	**<6 gallons per day**	**10 yd³**	**1026 yd³**	**20 yd³**
Packaging	**Metal drum(s)**	**Metal drum(s)**	**Roll-offs**	**Metal drum(s)**
Regulatory classification:				
Radioactive	**X (see note)**	**X (see note)**	**X (see note)**	**X (see note)**
Solid		X	X	X
Hazardous	**X (see note)**	**X (see note)**	**X (see note)**	**X (see note)**
Mixed (hazardous and radioactive)	**X (see note)**	**X (see note)**	**X (see note)**	**X (see note)**
Toxic Substances Control Act (TSCA)	**X (see note)**	**X (see note)**	**X (see note)**	**X (see note)**
New Mexico Special Waste				
Industrial	**X (see note)**	**X (see note)**	**X (see note)**	**X (see note)**
Characterization Method				
Acceptable knowledge (AK): Existing Data/Documentation	X	X	X	X
AK: Site Characterization	X	X	X	X
Direct Sampling of Containerized Waste	X	X	X	X
Analytical Testing				
Volatile Organic Compounds (EPA 8260-B)	X	X	X	X
Semivolatile Organic Compounds (EPA 8270-C)	X	X	X	X
Organic Pesticides (EPA 8081-A)	X	X	X	X
Organic Herbicides (EPA 8151-A)	X	X	X	X
PCBs (EPA 8082)	X	X	X	X
Total Metals (EPA 6010-B/7471-A)	X	X	X	X
Total Cyanide (EPA 9012-A)	X	X	X	X
High Explosives Constituents (EPA 8330/8321-A)				
Asbestos				
Total petroleum hydrocarbon (TPH)-GRO (EPA 8015-M)		X*	X*	X*
TPH-DRO (EPA 8015-M)		X*	X*	X*
Toxicity characteristic leaching procedure (TCLP) Metals (EPA 1311/6010-B)	X	X	X	X
TCLP Organics (EPA 1311/8260-B & 1311/8270-C)				
TCLP Pest. & Herb. (EPA 1311/8081-A/1311/8151-A)				
Gross Alpha (alpha counting) (EPA 900)	X	X	X	X
Gross Beta (beta counting) (EPA 900)	X	X	X	X
Tritium (liquid scintillation) (EPA 906.0)	X	X	X	X
Gamma spectroscopy (EPA 901.1)	X	X	X	X

Waste Description	Waste # _1_ Decontamination Water	Waste # _2_ Drill Cuttings	Waste # _3_ Tank structures, inlet/outlet pipes, and culverts	Waste # _4_ Tank content soils
Isotopic plutonium (chem. separation/alpha spec.) (HASL-300)	X	X	X	X
Isotopic uranium (chem. separation/alpha spec.) (HASL-300)	X	X	X	X
Total uranium (6020 inductively coupled plasma mass spectroscopy [ICPMS])				
Strontium-90 (EPA 905)	X	X	X	X
Americium-241 (chem.. separation/alpha spec.) (HASL-300)	X	X	X	X
Waste Profile Form #				

Waste Characterization Strategy Form (continued)

CHARACTERIZATION TABLE 5 - 10

Waste Description	Waste #5 Septic tank liquids	Waste #6 Plastics, PPE, and sampling wastes	Waste #7 Soil, rock, gravel, sand	Waste #8 Lead collars	Waste #9 Misc. C&D	Waste #10 Mixed veg. debris
Approximate Volume	300 gallons	10 yd^3	1900 yd^3	1 yd^3	50 yd^3	16 yd^3
Packaging	Metal drum(s)	Metal drum(s)	Roll-offs	Metal drum(s)	Roll-offs	Roll-offs
Regulatory classification:						
Radioactive	X (see note)	X (see note)	X (see note)		X (see note)	X (see note)
Solid	X	X	X	X	X	X
Hazardous	X (see note)	X (see note)	X (see note)	X	X (see note)	X (see note)
Mixed (hazardous and radioactive)	X (see note)	X (see note)	X (see note)	X (see note)	X (see note)	X (see note)
Toxic Substances Control Act (TSCA)	X (see note)	X (see note)	X (see note)	X (see note)	X (see note)	X (see note)
New Mexico Special Waste						
Industrial	X (see note)	X (see note)	X (see note)		X (see note)	X (see note)
Characterization Method						
Acceptable knowledge (AK): Existing Data/Documentation	X	X	X		X	X
AK: Site Characterization	X	X	X		X	X
Direct Sampling of Containerized Waste	X	X	X	X	X	X
Analytical Testing						
Volatile Organic Compounds (EPA 8260-B)	X	X	X	X	X	X
Semivolatile Organic Compounds (EPA 8270-C)	X	X	X	X	X	X
Organic Pesticides (EPA 8081-A)	X	X	X	X	X	X
Organic Herbicides (EPA 8151-A)	X	X	X	X	X	X
PCBs (EPA 8082)	X	X	X	X	X	X
Total Metals (EPA 6010-B/7471-A)	X	X	X	X	X	X
Total Cyanide (EPA 9012-A)	X	X	X	X	X	X
High Explosives Constituents (EPA 8330/8321-A)						
Asbestos						
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	X	X	X	X
TCLP Organics (EPA 1311/8260-B & 1311/8270-C)						
TCLP Pest. & Herb. (EPA 1311/8081-A/1311/8151-A)						
Gross Alpha (alpha counting) (EPA 900)	X	X	X	X	X	X
Gross Beta (beta counting) (EPA 900)	X	X	X	X	X	X
Tritium (liquid scintillation) (EPA 906.0)	X	X	X	X	X	X
Gamma spectroscopy (EPA 901.1)	X	X	X	X	X	X
Isotopic plutonium (chem. separation/alpha spec.) (HASL-300)	X	X	X	X	X	X

Waste Description	Waste #5 Septic tank liquids	Waste #6 Plastics, PPE, and sampling wastes	Waste #7 Soil, rock, gravel, sand	Waste #8 Lead collars	Waste #9 Misc. C&D	Waste #10 Mixed veg. debris
Isotopic uranium (chem. separation/alpha spec.) (HASL-300)	X	X	X	X	X	X
Total uranium (6020 inductively coupled plasma mass spectroscopy [ICPMS])						
Strontium-90 (EPA 905)	X	X	X	X	X	X
Americium-241 (chem. separation/alpha spec.) (HASL-300)	X	X	X	X	X	X
Waste Profile Form #						
NOTE: Waste classification will be based on site-characterization data. Waste streams may have potential to fall under any of these regulatory classifications.						

*Analysis will only be performed if any evidence of petroleum contamination.