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Waste Characterization Strategy Form

Project Title:	**R-62**
Area of Impact:	**TA-05, East End of Sigma Mesa**
Activity Type:	**Installation of Regional Aquifer Well**
Project Manager:	**Theodore T. Ball**
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Completed by:	**Jennifer Griffin**
Date:	**May 6, 2011**

Description of Activity:

The waste-generating activities addressed in this Waste Characterization Strategy Form (WCSF) consist of the installation (i.e., drilling, collecting chip and core samples, development, groundwater sampling, and aquifer testing) of regional aquifer well R-62. Regional aquifer well R-62 is being installed to monitor water quality in the regional aquifer and to help define the vertical and lateral extent of chromium contamination known to exist in the vicinity of wells R-28, R-42, and R-50, as required by the New Mexico Environment Department's *Approval with Modification, Investigation Report for Sandia Canyon,* Los Alamos National Laboratory, dated February 9, 2010 (NMED 2010, 108683). The following waste streams are expected to be generated during the drilling and installation of these wells:

- Contact Waste
- Drill Cuttings
- Drilling Fluids
- Development Water
- Decontamination Fluids
- Storm water
- Residual Solids from Secondary Containments
- Drilled Out Concrete, Chips, Concrete Slurry
- Residual Concrete Washout
- Petroleum Contaminated Soils (PCS)
- Municipal Solid Waste (MSW)

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 (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 change 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 minimizes the generation of waste. Waste minimization will be accomplished by implementing the most recent version of the "Los Alamos National Laboratory Hazardous Waste Minimization Report" (LANL 2008, 104174). Waste streams will be recycled/reused, as appropriate.

Relevant Site History and Description:
Regional aquifer well R-62 will be located on a narrow ridge that separates Sandia and Mortandad Canyons at the east end of Sigma Mesa. The well is being installed to reduce uncertainty about the upgradient extent of chromium contamination in the area west-northwest of wells R-42 and R-28. Elevated chromium concentrations detected in the regional aquifer at Wells R-28, R-42, and R-50 are attributed to releases that occurred in the headwaters of Sandia Canyon. The likely source of chromium was cooling tower blow down from TA-03 power plant. From 1956 to 1972, potassium dichromate was used as a corrosion inhibiter, and approximately 31,000 – 72,000 kg of hexavalent chromium was released into the upper Sandia Canyon. Surface water flow carried dissolved chromium down canyon to the vicinity of SCI-1 and R-43 before infiltrating canyon-floor sediments and recharging perched alluvial groundwater. Percolation of the contaminated alluvial groundwater into bedrock units of the vadose zone recharged perched-intermediate groundwater at wells SCI-1 and SCI-2 and eventually entered the regional aquifer. Tables 1 and 2 provide analytical data from the wells adjacent to the proposed location for R-62.

Table 1
Analytical Data for Chromium Detections for Well Locations Adjacent to Proposed R-62

Analyte	Well ID.	Range of Detections (ug/L)	No. Detections	RCRA Regulated Level (ug/L)	Max Background Regional Groundwater (ug/L)	3103 Standards (ug/L)	SDW MCLs (ug/L)
Chromium	R-15	7.1 -18.2	24	5000	7.2	50	100
	R-28	310 - 472	24				
	R-42	758 - 1240	17				
	R-43	1.8 - 16	20				
	R-50	3.83 - 78.8	10				
	SCI-1	11 - 22.1	21				
	SCI-2	502 - 658	15				
Chromium VI	R-15	7	1				
	R-28	376 - 417	4				

Table 2
Radiological Analytical Data for Well Locations Adjacent to Proposed R-62

Analyte	Location	Range of Detections (pCi/L)	No. Detections	Background (pCi/L)
Gross alpha	R-15	5.36	1	2.54
	R-28	1.75 - 3.18	2	
	R-42	1.62	1	
	R-43	6.9	1	
	R-50	5.3 - 5.78	2	
	SCI-1	2.68 - 5.58	5	
Gross beta	R-15	1.98 - 4.38	4	14.1
	R-28	2.27 - 12.4	7	
	R-42	2.91 - 22.2	4	
	R-43	1.07 - 2.48	3	
	R-50	2.68 - 4.47	3	
	SCI-1	2.81 - 4.5	6	
	SCI-2	3.36 - 4.69	7	
Gross gamma	R-15	137 - 240	4	123
	R-28	97.3	1	
	R-43	67 - 94.4	5	
	R-50	85.3 - 107	2	
	SCI-2	89.9 - 246	4	
Plutonium-238	R-28	0.0324	1	0
Radium-226	R-15	0.527 - 0.926	3	5
	R-28	14.1	1	
	R-43	0.73 - 0.883	2	
	SCI-1	0.348	1	

Table 2 (continued)
Radiological Analytical Data for Well Locations Adjacent to Proposed R-62

Analyte	Location	Range of Detections (pCi/L)	No. Detections	Background (pCi/L)
Radium-228	R-42	0.872	1	5
	R-43	0.521 - 1.45	3	
	SCI-1	2.3	1	
	SCI-2	0.673 - 0.854	2	
Strontium-90	R-15	1.51	1	0.06
Tritium	R-15	0.606 - 37.83	29	57.28
	R-28	151.98 - 233.59	25	
	R-42	181.36 - 329.75	7	
	R-43	1.40 - 26.72	4	
	R-50	3.54 - 26.34	5	
	SCI-1	68.64 - 298.64	15	
	SCI-2	374.75 - 510.88	9	
Uranium-234	R-15	0.2 - 0.341	21	0.16
	R-28	0.731 - 0.954	13	
	R-42	0.454 - 0.717	13	
	R-43	0.0578 - 1.17	15	
	R-50	0.403 - 1.28	10	
	SCI-1	0.143 - 2.29	19	
	SCI-2	0.577 - 0.797	13	
Uranium-235/236	R-15	0.0281 - 0.0403	3	0.04
	R-28	0.0522 - 0.0844	5	
	R-42	0.038	1	
	R-43	0.0756	1	
	R-50	0.0556 - 0.0716	2	
	SCI-1	0.0717 - 0.153	10	
	SCI-2	0.0287 - 0.0622	4	
Uranium-238	R-15	0.103 - 0.186	19	0.12
	R-28	0.205 - 0.407	13	
	R-42	0.175 - 0.255	13	
	R-43	0.0398 - 0.446	12	
	R-50	0.177 - 0.76	10	
	SCI-1	0.0675 - 1.09	19	
	SCI-2	0.312 - 0.474	13	

The AK review (see Attachment A) for R-62 and the data in Table 1 do not indicate the presence of listed sources or contaminate levels that would require the waste to be managed for a characteristic, therefore, the wastes generated during the drilling and installation of regional aquifer well R-62 can be managed as non-hazardous until analytical data are available to make a final waste determination. The data in Table 2 indicate that the wastes from drilling R-62 may exceed background levels for radiological constituents. Manage the waste as "non-radiological pending characterization" until analytical data are available to make a final waste determination.

> **NOTE:** The chromium levels may cause the drilling fluids and development water from this well to fail the land application requirements specified in ENV-RCRA-QP-010.2, *Land Application of Groundwater.*

CHARACTERIZATION STRATEGY

The characterization strategy for investigation derived waste (IDW) generated during drilling 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 groundwater data) in the vicinity of the sampling locations, historical documentation associated with nearby AOCs or SWMUs (i.e., RFI Work Plans, Investigation Reports, Sediment Canyon Investigation Report, etc.), and may also include source term/process identification performed to identify whether listed hazardous waste may be present (i.e., due diligence review).

The selection of waste containers will be based on U.S. Department of Transportation requirements, waste types, and estimated volumes of waste to be generated. Immediately following containerization, each waste container will be individually labeled with a unique container identification number and with information regarding waste classification, contents, and date generated. A waste determination must be made within 30 days of the generation of the waste. A Waste Acceptance Criteria (WAC) waste exception form (WEF) can be used if the generator does not meet the 30 day deadline.

Waste # 1 - Contact Waste: This waste stream is comprised of solid waste generated during well installation activities that has come into contact with contaminated environmental media and equipment. This includes, but is not limited to: PPE (e.g., gloves); plastic sheeting (e.g., tarps, liners); plastic and glass sample bottles; disposable sampling supplies (e.g., filters, tubing, plastic bags); and dry decontamination wastes, such as paper items. It is estimated that less than 20 yd^3 of contact waste may be generated.

Anticipated Regulatory Status: Green is Clean (GIC), Municipal Solid Waste (MSW) (non-hazardous/non-radiological), or LLW

Characterization Approach: Contact Waste will be characterized using the AK of the environmental media (i.e., drill cuttings and drilling fluids) with which it came into contact.

Storage and Disposal Method: Contact waste will be containerized at the point of generation and managed as nonhazardous/non-radiological pending review of AK to determine final waste characterization. If the contact waste is determined to be non-hazardous/nonradioactive and approval is granted by ENV-RCRA, it may be recycled and reused via the Material Recycling Facility (MRF). Otherwise, the contact will be disposed of at an appropriate waste disposal facility.

Waste # 2 – Drill Cuttings: This waste stream is comprised of borehole cuttings and core, soil, and rock sediments produced during drilling. The cuttings may or may not contain residue of drilling additives. It is estimated that 150 yd^3 of drill cuttings will be generated at R-62.

Anticipated Regulatory Status: Reusable (land applied), LLW, Industrial

Characterization Approach: Drill cuttings will be characterized based upon the analytical results obtained from direct sampling. A representative sample of the cuttings will be taken within 10 days of well completion. A waste determination will be made within 30 days of waste generation (i.e., the date the cuttings were removed from the pit and first placed into a container, or the date of initial placement into an approved container). A 30-day turnaround time will be required for analysis. Samples can be collected one of the following ways:

1. Collect an aliquot of drill cuttings during the drilling operations (incremental sampling) by diverting the material to a smaller container (i.e., clean 55-gallon drum) that can then be sampled for analysis in accordance with LANL SOP-06-10. This method is not applicable for volatile organic compounds (VOC) analysis. After the samples are collected from the smaller container, the residual cuttings may be placed into the pit with the rest of the cuttings produced during drilling.

   NOTE: Due to safety concerns (toxic fumes, slips/trips/falls, and excavation slippage) associated with grid sampling in a pit, the above option (#1) is preferred.

   NOTE: If incremental sampling is used for drill cuttings sampling, a VOC sample will be taken at three stages: 1) A sample must be collected upon initial placement of the cuttings in the sample collection container, 2) A second sample should be collected during the middle of the incremental sampling process, and 3) A third sample must be collected after the final placement of the cuttings in the sample collection container.

2. After the fluids have been either evaporated or removed from the pit, collect the sample in accordance with LANL SOP-06-10, *Hand Auger and Thin-Wall Tube Sampler,* using a systematic grid sampling (minimum of 20 grids) as described in Section 5.2 of the RCRA Waste Sampling Draft Technical Guidance (EPA 530-D-02-

002, August 2002, http://www.epa.gove/osw/hazard/testmethods/sw846/pdfs/rwsdtf.pdf). Collect an incremental sample from each grid by boring through the entire depth of the cuttings. Combine the increments into a single sample for the pit. If a hand auger or thin-wall tube sampler is not a appropriate sampling device, select the appropriate tools described in Table 8 of Section 7.1.3 of the EPA guidance, and operate the sampling device in accordance with Appendix E of the guidance.

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; semi-volatile organic compounds (SVOCs); PCB; cyanide; nitrates/nitrites; perchlorates; general inorganics; and pesticides/herbicides. Toxicity characteristic leaching procedure (TCLP) analysis may also be performed for TAL metals if the analytical results for the total metals divided by 20 indicate contaminants that exceed regulatory thresholds. Total petroleum hydrocarbons (TPH) will be analyzed if staining is observed. Other constituents may be analyzed as necessary to meet the WAC of the disposal facility.

Sampling personnel must record 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 or sample collection sheet must be used to document sample collection activities (e.g., equipment and sampling methods used, number and location of samples, etc.). Sampling personnel must also record filed conditions, problems encountered, local sources of contamination (e.g., operating generators or vehicles), the personnel involved, equipment and supplies used, waste generated, and field observations.

Storage and Disposal Method: Drill cuttings will initially be stored in lined pits within the project controlled area at the well, pending review of analytical results to determine final waste characterization. Specifications for the cuttings pit will be in accordance with the approved Storm Water Pollution Prevention Plan. Based upon validated analytical data, the drill cuttings will be evaluated, using the Automated Waste Determination (AWD) system, for land application in accordance with ENV-RCRA-QP-011, *Land Application of Drill Cuttings*. If the cuttings meet the criteria for land application, the pit liner will be removed and managed as contact waste and the drill cuttings will be land applied in accordance with ENV-RCRA-QP-011.

If the cuttings are characterized as LLW (exceeding the land application criteria) they will be removed from the pit, containerized, and managed in a radioactive waste staging or storage area until they can be shipped for disposal. 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. Any drill cuttings that cannot be land applied will be managed and disposed of based upon the regulatory classification of the waste at a LANL approved disposal facility.

Waste # 3 – Drilling Fluids: This waste stream is comprised of potable water, from a municipal water well, that is introduced into and retrieved from the borehole during drilling; mixing with groundwater may occur if water bearing formations are encountered. Drilling fluids may or may not contain drilling additives. It is estimated that 50,000 gallons of drilling fluids will be generated at R-62.

Anticipated Regulatory Status: Reusable (land applied), LLW, and Industrial

Characterization Approach: Drilling fluids will be characterized based upon the analytical results obtained from direct sampling. A representative sample of the fluids will be taken within 10 days of well completion. A waste determination will be made within 30 days of waste generation (i.e., the date the fluidswere removed from the pit and first placed into a container, or the date of initial placement into an approved container). A 30-day turnaround time will be required for analysis. Samples can be collected one of the following ways:

1. Collect a composite sample from the pit at intervals across the entire water column (surface, middle, and bottom). Stratified, vertical sampling is necessary to address NMED's concerns about stratification of contaminants in the pit. NOTE: If the water freezes, leaving a thin film of ice at the top, a composite sample may still be taken by breaking through the thin film, as long as the stratified vertical composite sampling is maintained. The methods available to sample a pit at varying depths include the following:
    - Geotech pump with tubing attached to a weight or pole

- Bomb sampler
- COLIWASA liquid waste sampler
- Thief sampler
- Bailer depending upon depth of container

Samples will be collected in accordance with LANL SOP-06.15, *COLIWASA Sampler for Liquids and Slurries* or subcontractor equivalent procedure. If the SOP is not used, the type of sampling equipment and methods used will be consistent with EPA 530-D-02-002.

2. Collect an aliquot of drilling fluids during the drilling operations (incremental sampling) by diverting the material to a smaller container (i.e., clean 55-gallon drum) that can then be sampled for analysis in accordance with LANL SOP-06.15 or subcontractor equivalent procedure. If the SOP is not used, the type of sampling equipment and methods used will be consistent with the EPA 530-D-02-002. If incremental sampling is used for drilling fluids sampling, a VOC and SVOC sample will be taken each time the material is diverted into the smaller container (i.e., 55-gallon drum) and analyzed immediately, instead of waiting until all the aliquots have been collected.

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; Total Suspended Solids (TSS); pH; explosive compounds; PCB; cyanide; nitrates/nitrites; perchlorates; general inorganics; and pesticides/herbicides. Other constituents may be analyzed as necessary to meet the WAC of the disposal facility.

Sampling personnel must record sampling information in accordance with EP-ERSS-SOP-5058 and EP-ERSS-SOP-5181. The Field notebook or sample collection sheet must be used to document sample collection activities (e.g., equipment and sampling methods used, number and location of samples, etc.). Sampling personnel must also record filed conditions, problems encountered, local sources of contamination (e.g., operating generators or vehicles), the personnel involved, equipment and supplies used, waste generated, and field observations.

Storage and Disposal Method: Drilling fluids will initially be stored in lined pits within the project controlled area at the well, pending review of analytical results to determine final waste characterization. Specifications for the pit will be in accordance with the approved Storm Water Pollution Prevention Plan. Based upon validated analytical data, the drilling fluids will be evaluated, using the AWD system, for land application in accordance with ENV-RCRA-QP-010, *Land Application of Groundwater*. If the drilling fluids meet the criteria for land application, they will be pumped out of the pit and land applied in accordance with ENV-RCRA-QP-010. If the drilling fluids are characterized as non-hazardous, but cannot be land applied, the fluids may be evaporated using pit sprinklers.

If the drilling fluids are characterized as LLW (exceeding the land application criteria) they will be removed from the pit, containerized, and managed in a radioactive waste staging or storage area until they 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.

Waste # 4 – Development Water: This waste stream is comprised of groundwater generated during development of the well and aquifer testing. The anticipated volume of development water that will be generated is approximately 60,000 gallons.

Anticipated Regulatory Status: Reusable (land applied), LLW, Industrial, SWWS, or RLWTF

Characterization Approach: Development water will be characterized based upon the analytical results obtained from direct sampling. A representative sample of the development water will be taken within 10 days of well completion. A waste determination will be made within 30 days of waste generation. A 30-day turnaround time will be required for analysis. Samples can be collected one of the following ways:

1. Collect a composite sample from the container/tank at intervals across the entire water column (surface, middle, and bottom). Stratified, vertical sampling is necessary to address NMED's concerns about

stratification of contaminants in the tank. NOTE: If the water freezes, leaving a thin film of ice at the top, a composite sample may still be taken by breaking through the thin film, as long as the stratified vertical composite sampling is maintained. The methods available to sample a tank at varying depths include the following:

- Geotech pump with tubing attached to a weight or pole
- Bomb sampler
- COLIWASA liquid waste sampler
- Thief sampler
- Bailer depending upon depth of container

Samples will be collected in accordance with LANL SOP-06.15 or subcontractor equivalent procedure. If the SOP is not used, the type of sampling equipment and methods used will be consistent with EPA 530-D-02-002.

2. Collect an aliquot of development water as it is generated (incremental sampling) by diverting the material to a smaller container (i.e., clean 55-gallon drum) that can then be sampled for analysis in accordance with LANL SOP-06.15 or subcontractor equivalent procedure. If the SOP is not used, the type of sampling equipment and methods used will be consistent with the EPA 530-D-02-002.

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; perchlorates; general inorganics; and pesticides/herbicides. Other constituents may be analyzed as necessary to meet the WAC of the disposal facility.

Sampling personnel must record sampling information in accordance with EP-ERSS-SOP-5058 and EP-ERSS-SOP-5181. The Field notebook or sample collection sheet must be used to document sample collection activities (e.g., equipment and sampling methods used, number and location of samples, etc.). Sampling personnel must also record filed conditions, problems encountered, local sources of contamination (e.g., operating generators or vehicles), the personnel involved, equipment and supplies used, waste generated, and field observations.

Storage and Disposal Method: Development water will be containerized at the point of generation and initially managed as non-hazardous/non-radiological pending review of analytical results to determine final waste characterization. Based upon validated analytical data, the development water will be evaluated, using the AWD system, for land application in accordance with ENV-RCRA-QP-010. If the development water meets the criteria for land application it will be land applied in accordance with ENV-RCRA-QP-010. Any development water that cannot be land applied will be managed and disposed of based upon the regulatory classification of the waste at a LANL approved disposal facility.

If the development water is characterized as LLW (exceeding the land application criteria) 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 development 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.

Waste # 5 – Decontamination Fluids: This waste streams consists of liquid wastes (e.g., water, water & Alconox) generated from the decontamination of excavation, sampling, and drilling equipment. Every attempt will be made to limit the volume of this waste stream by using dry decontamination methods, where applicable. It is estimated that approximately 500 gallons of decontamination water will be generated.

NOTE #1: Decontamination fluids that include surfactants (e.g., Alconox) can be difficult to dispose of if the analytical results indicate a Chemical Oxygen Demand (COD) that exceeds the RLWTF WAC of 250 mg/L (P930-1, Attachment 1, 1.4.4). Surfactants are acceptable to use in decontamination solutions but in limited quantities (not in excess of manufacturer recommendations or less than 0.2% by weight).

NOTE #2: Decontamination of drill rigs, augers, and other equipment using water/steam typically results in a waste stream that is comprised of both solids and liquids. The solids are addressed as Waste #7 and must be segregated (within reason) from the bulk decontamination water so that the TSSs do not exceed the RLWTF WAC of 10,000 mg/L (P930-1, Attachment 1; 1.5).

Anticipated Regulatory Status: LLW, Industrial, SWWS, or RLWTF

Characterization Approach: Decontamination fluids will be characterized based upon the AK of the media with which it came into contact and/or using the analytical results obtained from direct sampling. Samples, if needed to meet a disposal facility WAC or due to poor AK, will be collected in accordance with LANL SOP-06.15, *COLIWASA Sampler for Liquids and Slurries* or subcontractor equivalent procedure. If the SOP is not used, the type of sampling equipment and methods used will be consistent with EPA 530-D-02-002. A representative sample will be taken within 10 days of generation (i.e., date of initial placement into container) so that a waste determination can be made within 30 days of generation and wastes disposed within 90 days, if necessary. All samples will be submitted with a 30-day turnaround time for analyses. Multiple sampling events may be required to ensure WAC requirements are met.

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; perchlorates; and pesticides/herbicides. Other constituents may be analyzed as necessary to meet the WAC of the disposal facility.

Sampling personnel must record sampling information in accordance with EP-ERSS-SOP-5058 and EP-ERSS-SOP-5181. The Field notebook or sample collection sheet must be used to document sample collection activities (e.g., equipment and sampling methods used, number and location of samples, etc.). Sampling personnel must also record filed conditions, problems encountered, local sources of contamination (e.g., operating generators or vehicles), the personnel involved, equipment and supplies used, waste generated, and field observations.

Storage and Disposal Method: Decontamination water will be containerized at the point of generation and managed as non-hazardous/non-radiological pending review of analytical results to determine final waste characterization. Decontamination water from different sources (i.e., down hole equipment, rinsing a frac tank, drilling equipment/materials prior to use) must be segregated into different containers and analyzed separately.

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, 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 sent to an authorized off-site facility for treatment, storage, and disposal.

Waste # 6 – Storm water: This waste stream is comprised of storm water for discharge and/or potentially contaminated storm water (i.e., tainted with petroleum or non-hazardous glycol based lubricants) collected within a secondary containment unit. It is estimated that approximately 500 gallons of storm water will be generated.

NOTE #1: Storm water collected in a secondary containment typically results in a waste stream that is comprised of both solids and liquids. The solids are addressed as Waste #7 and must be segregated (within reason) from storm water that cannot be discharged (is a waste) before it is containerized so that the TSSs do not exceed the RLWTF WAC of 10,000 mg/L (P930-1, Attachment 1; 1.5).

Anticipated Regulatory Status: Reusable (released under ENV-RCRA policy), Used Oil for Recycle (Oily Water), LLW, Industrial, SWWS, RLWTF

Characterization Approach: Storm water will be characterized based on the AK from the MSDS of the contaminant (e.g., hydraulic fluid) or by direct sampling. Samples, if needed, will be collected in accordance with LANL SOP-06.15, *COLIWASA Sampler for Liquids and Slurries* or subcontractor equivalent procedure. If the SOP is not used, the type of sampling equipment and methods used will be consistent with EPA 530-D-02-002. A representative sample will be taken within 10 days of generation (i.e., date of initial placement into container) so that a waste determination can be made within 30 days of generation and wastes dispositioned within 90 days, if necessary. All samples will be submitted with a 21-day turnaround time for analyses. Samples will be analyzed for TAL metals; VOCs; SVOCs; oil/grease; TSS; pH; PCB; cyanide; nitrates/nitrites; perchlorates; fluorine, chlorine, sulfate, COD, biological oxygen demand (BOD), TPH, and pesticides/herbicides.

Sampling personnel must record sampling information in accordance with EP-ERSS-SOP-5058 and EP-ERSS-SOP-5181. The Field notebook or sample collection sheet must be used to document sample collection activities (e.g., equipment and sampling methods used, number and location of samples, etc.). Sampling personnel must also record filed conditions, problems encountered, local sources of contamination (e.g., operating generators or vehicles), the personnel involved, equipment and supplies used, waste generated, and field observations.

NOTE #2: The criteria for recycling oil, used oil, and coolant is as follows:

- Acceptable Oil, use Oil, and Coolant
  - Used and unused petroleum oils
  - Oil filters for non-prohibited oils
  - Non-hazardous glycol-based coolants (antifreeze)
  - Oily water
  - Used and unused synthetic oils
  - Non-hazardous used oil adsorbents
  - Mineral oil
- Unacceptable Oil, Used Oil, and Coolant
  - Oil with >1000 ppm halogens (oils mixed with solvents)
  - Freon-contaminated oil
  - Oils containing chlorinated compounds
  - Degreasers containing chlorinated compounds
  - Radiation-contamination oils
  - Any oil containing>2ppm PCB
  - Hazardous glycol-based coolants (fails TCLP for Se or Pb)
  - Vegetable and other food oils

Storage and Disposal Method: Potentially contaminated storm water will be managed in accordance with the requirements in 20-6-2-1201, NMAC of the New Mexico Water Quality control Commission (NMWQCC) Regulations; 40 CF 112, Oil Pollution Prevention Regulations (SPPC Plan): 40 CFR122, Construction General Permit Regulations, and applicable SWPPP requirements. To determine if storm water discharges from secondary containment systems are permitted on LANL property under LANL's discharge policy, the following steps are mandatory:

1. Check for oil sheen. If oil sheen exists, contact Jake Meadows, at 606-0185, for handling requirements.
2. Check pH. The pH must be between 6 and 9.
3. Notify ENV-RCRA (Jake Meadows 606-1085) prior to proposed discharge.
4. If discharge is not granted by ENV-RCRA, the contaminated storm water must be containerized and managed as waste.

Contaminated storm water that cannot be discharged will be containerized at the point of generation and managed in accordance with the regulatory classification of the waste and disposed of at an authorized treatment, storage, disposal facility.

For unintentional release or discharges of potentially contaminated storm water to the environment, the following actions must be taken:

1. Document the volume of waste released; time, date, and location of the discharge; and other conditions on the Liquid Discharge Form.
2. Submit the Liquid Discharge Form to Jacob Meadow via FAX to 505-665-9344.
3. Document the discharge in the SPCC Plan or SWPP, when applicable.

Waste # 7 – Residual Solids from Secondary Containments: This waste stream is comprised of residual solids segregated during the containerization of storm water and decontamination fluids that have been removed from secondary containments. It may consist of residues, pebbles, soil, cuttings, and/or rocks that cannot be disposed of with the liquid waste stream (i.e., storm water, decontamination fluids). It is estimated that approximately 1 yd^3 of residual solids will be generated.

NOTE #4: Residual solids cannot be collected and added to the drill cuttings/fluids pit. They must be containerized, segregated, and managed as waste.

Anticipated Regulatory Status: LLW, and Industrial

Characterization Approach: Residual solids will be characterized based upon the AK of the media (i.e., cuttings, decontamination water, storm water) with which it came into contact and/or using the analytical results obtained from direct sampling. Samples, if needed, will be collected in accordance with LANL SOP-06-10, *Hand Auger and Thin-Wall Tube Sampler* and analyzed for TAL metals; radionuclides (by alpha and gamma spectroscopy); isotopic uranium, isotopic plutonium, americium-241, tritium, and strontium-90; VOCs; SVOCs; PCB; cyanide; nitrates/nitrites; perchlorates; and pesticides/herbicides. TCLP analysis may also be performed for TAL metals if the analytical results for the total metals divided by 20 indicate contaminants that exceed regulatory thresholds. TPH will be analyzed if staining is observed. Other constituents may be analyzed as necessary to meet the WAC of the disposal facility.

Sampling personnel must record sampling information in accordance with EP-ERSS-SOP-5058 and EP-ERSS-SOP-5181. The Field notebook or sample collection sheet must be used to document sample collection activities (e.g., equipment and sampling methods used, number and location of samples, etc.). Sampling personnel must also record filed conditions, problems encountered, local sources of contamination (e.g., operating generators or vehicles), the personnel involved, equipment and supplies used, waste generated, and field observations.

Storage and Disposal Method: Residual solids will be containerized at the point of generation and managed as non-hazardous/non-radiological pending review of AK and/or analytical results to determine final waste characterization. Residual solids from different sources (i.e., decontamination, storm water) must be segregated into different containers and analyzed separately.

If the residual solids are characterized as LLW they 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 residual solids are characterized as Hazardous or MLLW (with D-codes for characteristic waste) they 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 they can be shipped for disposal. Residual solids will be shipped and disposed of to an authorized off-site facility.

Waste # 8 – Drilled Out Concrete, Chips, Concrete Slurry: This waste stream consists of concrete chips from drilling out plug used to seal off perched groundwater or stabilized the borehole to facilitate drilling. It is estimated that 60 yd^3 of drilled out concrete chips or concrete slurry may be generated.

Anticipated Regulatory Status: Reusable (released under ENV-RCRA policy), LLW, Industrial

Characterization Approach: This waste stream will be characterized based upon the AK from the MSDS for the cement and/or the media (i.e., cuttings) with which it came into contact.

Storage and Disposal Method: Concrete waste will be containerized at the point of generation and managed as non-hazardous/non-radiological pending review of AK and/or analytical results (of associated media) to determine final waste characterization. If the concrete waste is not contaminated, it may be sent to the county landfill for reuse with an ENV-RCRA approval for release. Otherwise, the concrete must be managed in accordance with the regulatory classification of the waste. Waste concrete will be shipped and disposed of at an authorized off-site facility.

Waste # 9 – Residual Concrete Washout: This waste stream is comprised of residual cement generated from the evaporation of concrete wash out water. It is estimated that 1 yd^3 of residual concrete may be generated.

Anticipated Regulatory Status: Reusable (released under ENV-RCRA policy), Industrial

Characterization Approach: This waste stream will be characterized based upon the AK from the MSDS for the cement and/or the media (i.e., cuttings) with which it came into contact.

Storage and Disposal Method: Residual concrete washout waste will remain in an on-site containment until final waste characterization and disposition. If the residual concrete waste is not contaminated, it may be sent to the county landfill for reuse with an ENV-RCRA approval for release. Otherwise, the concrete must be containerized and managed in accordance with the regulatory classification of the waste. Waste concrete will be shipped and disposed of at an authorized off-site facility.

Waste # 10 – Petroleum Contaminated Soils (PCS): This waste stream is comprised of soils contaminated due to the accidental release of commercial 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, etc.). It may also include adsorbent padding, paper towels, spill pillows or other adsorbent material used to contain the released material and added to the containerized PCS waste for storage and disposal. It is estimated that 1 yd^3 of this waste stream will be generated.

Anticipated Regulatory Status: New Mexico Special Waste (NMSW), Hazardous, MLLW

Characterization Approach: PCS will be characterized based upon either AK or direct waste sampling. If the material spilled is known and the spill occurs on clean base course, AK can be used to characterize the waste as NMSW. If the spill is of an unknown material/origin or occurs in an AOC, PRS, or SWMU, characterization will be based upon the analytical results from direct sampling either performed in place (same day as spill/containerization) or from the containerized waste within 10 days of generation. If sampling is required, samples will be collected in one of the following two ways:

1. For spills containerized in large containers (i.e., 55-gallon drums) and/or deep spills being sampling in place the samples will be collected in accordance with LANL SOP-06-10, *Hand Auger and Thin-Wall Tube Sampler.*

2. For spills containerized in small containers and/or shallow spills being sampled in place the samples will be collected in accordance with SOP-06.11, *Spade and Scoop Method for Collection of Soil Samples.*

The analysis of the samples will be dependent on where the spill occurred as follows:

- If the spill occurred on clean soil (and samples are collected), samples will be analyzed for VOCs, TPH, gasoline-range and diesel-range (DRO/GRO), and total metals, at a minimum. These analytical

suites are required to determine whether the waste is NMSW. Other constituents may be analyzed as necessary to meet the WAC of the disposal facility.

- If the spill occurs on soils with known hazardous contaminants or soils with no available/reliable AK documentation the samples will be analyzed, at minimum, for VOCs, SVOCs, TPH, gasoline-range and diesel-range (DRO/GRO)and total metals. TCLP analysis may also be performed for TAL metals if the analytical results for the total metals divided by 20 indicate contaminants that exceed regulatory thresholds. If radiological contamination is a possibility the samples must also be analyzed for radionuclides (by alpha and gamma spectroscopy); isotopic uranium, isotopic plutonium, americium-241, tritium, and strontium-90.

All samples will be submitted with a 30-day turnaround time for analysis so that a waste determination can be made within 30 days of generation. The "initial" date or date of generation for NMSW is the date the container is completely full or the date in which no additional NMSW will be added to the container. The "final" date (or the date starting the 90 day NMSW clock) is the date that the validated analytical data is received by the WMC.

Sampling personnel must record sampling information in accordance with EP-ERSS-SOP-5058 and EP-ERSS-SOP-5181. The Field notebook or sample collection sheet must be used to document sample collection activities (e.g., equipment and sampling methods used, number and location of samples, etc.). Sampling personnel must also record filed conditions, problems encountered, local sources of contamination (e.g., operating generators or vehicles), the personnel involved, equipment and supplies used, waste generated, and field observations.

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) until it can be shipped for disposal to an authorized off-site facility.

Waste # 11 – Municipal Solid Waste (MSW): This waste stream is comprised of non-contact trash, including, but not limited to, paper, cardboard, wood, plastic, food, and beverage containers. It is estimated that 2 yd^3 of MSW will be generated.

Anticipated Regulatory Status: MSW

Characterization Approach: MSW will be characterized based on AK of the waste materials (including MSDSs) and methods of generation.

Storage and Disposal Method: MSW will be segregated from all other waste streams. It is anticipated that the wastes 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.

TABLE 1- CHARACTERIZATION TABLE

NOTE: Multiple sampling may be required to ensure WAC requirements are met.

Waste Description	Waste # 1 Contact Waste	Waste # 2 Drill Cuttings	Waste # 3 Drilling Fluids	Waste # 4 Development Water
Estimated Volume	20-yd^3 (includes liner)	150-yd^3	50,000-gallons	60,000-gallons
Packaging	Drums/Roll Offs	Lined Pit/Drums/Roll Offs	Lined Pit/Drums/Tanks	Frac Tanks/Drums
Regulatory classification:				
Radioactive Waste	X	X	X	X
Reusable Material		X (Land Applied)	X (Land Applied)	X (Land Applied)
Municipal Solid Waste (MSW)	X			
Waste destined for LANL's SWWS or RLWTF [1]				X
Hazardous Waste				
Mixed (hazardous and radioactive) Waste				
Toxic Substances Control Act (TSCA)				
New Mexico Special Waste				
Industrial Waste	X	X	X	X
Characterization Method				
Acceptable knowledge (AK): Existing Data/Documentation	X			
AK: Site Characterization				
Direct Sampling of Waste		X	X	X
Analytical Testing				
Volatile Organic Compounds (EPA 8260-B)		X	X	X
Semivolatile Organic Compounds (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	X	X
Total Metals (EPA 6010-B/7471-A)		X	X	X
Total Cyanide (EPA 9012-A) [2]		X	X	X
Nitrates/Nitrites (EPA 300.09)		X	X	X
Dioxins/Furans (EPA 1613B)				
Oil/Grease (EPA 1665)			X	X
Fluoride, Chlorine, Sulfate (EPA 300)			X	X
TTO (EPA 8260-B and EPA 8270-C) [3]				
Total Suspended & Dissolved Soilds (TSS) and Total Dissolved Soilds (TDS) (EPA 160.1 and 160.2)			X	X
Chemical Oxygen Demand (COD) (EPA 410.4)			X	X
pH (EPA 904c)			X	X
Microtox or Biological Oxygen Demand (BOD) [4]			X	X
Perchlorates (EPA 6850)		X	X	X
High Explosives Constituents (EPA 8330/8321-A)			X	X
Asbestos				
BTEX (EPA-8021b)				
Total petroleum hydrocarbon (TPH)-GRO (EPA 8015-M) TPH-DRO (EPA 8015-M)		X (As needed)		
Toxicity characteristic leaching procedure (TCLP) Metals (EPA 1311/6010-B)		X (As needed)		
TCLP Organics (EPA 1311/8260-B & 1311/8270-C)		X (As needed)		
TCLP Pest. & Herb. (EPA 1311/8081-A/1311/8151-A)		X (As needed)		
Radium 226 & 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
WSP – General Inorganics (filtered)		X	X	X
Waste Profile Form #	TBD	TBD	TBD	TBD

TABLE 1- CHARACTERIZATION TABLE (CONTINUED)

Waste Description	Waste #5 Decontamination Fluids	Waste #6 Storm Water	Waste #7 Residual Solids from Secondary Containments	Waste #8 Drilled Out Concrete, Chips, Concrete Slurry
Estimated Volume	500-gallons	500-gallons	1-yd^3	60-yd^3
Packaging	Drums/Tanks	Drums/Tanks	Drums	Drums/Roll Offs
Regulatory classification:				
Radioactive Waste	X	X		
Reusable Material		X (Released; Used Oil for Recycle)		X (with ENV-RCRA Approval)
Municipal Solid Waste (MSW)				
Waste destined for LANL's SWWS or RLWTF [1]	X	X		
Hazardous Waste				
Mixed (hazardous and radioactive) Waste				
Toxic Substances Control Act (TSCA)				
New Mexico Special Waste				
Industrial Waste	X	X		
Characterization Method				
Acceptable knowledge (AK): Existing Data/Documentation	X	X	X	X
AK: Site Characterization				
Direct Sampling of Waste	X	X	X	
Analytical Testing				
Volatile Organic Compounds (EPA 8260-B)	X	X	X	
Semivolatile Organic Compounds (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	X	X	
Total Metals (EPA 6010-B/7471-A)	X	X	X	
Total Cyanide (EPA 9012-A) [2]	X	X	X	
Nitrates/Nitrites (EPA 300.09)	X	X	X	
Dioxins/Furans (EPA 1613B)				
Oil/Grease (EPA 1665)	X	X		
Fluoride, Chlorine, Sulfate (EPA 300)		X		
TTO (EPA 8260-B and EPA 8270-C) [3]				
Total Suspended & Dissolved Soilds (TSS) and Total Dissolved Soilds (TDS) (EPA 160.1 and 160.2)	X	X		
Chemical Oxygen Demand (COD) (EPA 410.4)	X	X		
pH (EPA 904c)	X	X		
Microtox or Biological Oxygen Demand (BOD) [4]				
Perchlorates (EPA 6850)	X	X	X	
High Explosives Constituents (EPA 8330/8321-A)	X	X		
Asbestos				
BTEX (EPA-8021b)				
Total petroleum hydrocarbon (TPH)-GRO (EPA 8015-M) TPH-DRO (EPA 8015-M)		X	X (As needed)	
Toxicity characteristic leaching procedure (TCLP) Metals (EPA 1311/6010-B)			X (As needed)	
TCLP Organics (EPA 1311/8260-B & 1311/8270-C)			X (As needed)	
TCLP Pest. & Herb. (EPA 1311/8081-A/1311/8151-A)			X (As needed)	
Radium 226 & 228 (EPA 9320)	X		X	
Gross Alpha (alpha counting) (EPA 900)	X		X	
Gross Beta (beta counting) (EPA 900)	X		X	
Tritium (liquid scintillation) (EPA 906.0)	X		X	
Gamma spectroscopy (EPA 901.1)	X		X	
Isotopic plutonium (Chem. Separation/alpha spec.) (HASL-300)	X		X	
Isotopic uranium (Chem. Separation/alpha spec.) (HASL-300)	X		X	
Total uranium (EPA 6020)	X		X	
Strontium-90 (EPA 905)	X		X	
Americium-241 (Chem. Separation/alpha spec.) (HASL-300)	X		X	
Isotopic Thorium	X		X	
WSP – General Inorganics (filtered)				
Waste Profile Form #	TBD	TBD	TBD	TBD

TABLE 1- CHARACTERIZATION TABLE (CONTINUED)

Waste Description	Waste #9 Residual Concrete Washout	Waste #10 Petroleum Contaminated Soils (PCS)	Waste #11 Municipal Solid Waste (MSW)
Estimated Volume	1-yd^3	1-yd^3	2-yd^3
Packaging	Drums	Drums	Plastic Trash Bags/Trash Cans/Dumpsters
Regulatory classification:			
Radioactive Waste		X	
Reusable Material	X (with ENV-RCRA Approval)		
Municipal Solid Waste (MSW)			X
Waste destined for LANL's SWWS or RLWTF [1]			
Hazardous Waste			
Mixed (hazardous and radioactive) Waste			
Toxic Substances Control Act (TSCA)			
New Mexico Special Waste		X	
Industrial Waste		X	
Characterization Method			
Acceptable knowledge (AK): Existing Data/Documentation	X	X	X
AK: Site Characterization			
Direct Sampling of Waste		X	
Analytical Testing			
Volatile Organic Compounds (EPA 8260-B)		X (As needed)	
Semivolatile Organic Compounds (EPA 8270-C)		X (As needed)	
Organic Pesticides (EPA 8081-A)			
Organic Herbicides (EPA 8151-A)			
PCBs (EPA 8082)			
Total Metals (EPA 6010-B/7471-A)		X (As needed)	
Total Cyanide (EPA 9012-A) [2]			
Nitrates/Nitrites (EPA 300.09)			
Dioxins/Furans (EPA 1613B)			
Oil/Grease (EPA 1665)			
Fluoride, Chlorine, Sulfate (EPA 300)			
TTO (EPA 8260-B and EPA 8270-C) [3]			
Total Suspended & Dissolved Soilds (TSS) and Total Dissolved Soilds (TDS) (EPA 160.1 and 160.2)			
Chemical Oxygen Demand (COD) (EPA 410.4)			
pH (EPA 904c)			
Microtox or Biological Oxygen Demand (BOD) [4]			
Perchlorates (EPA 6850)			
High Explosives Constituents (EPA 8330/8321-A)			
Asbestos			
BTEX (EPA-8021b)			
Total petroleum hydrocarbon (TPH)-GRO (EPA 8015-M) TPH-DRO (EPA 8015-M)		X (As needed)	
Toxicity characteristic leaching procedure (TCLP) Metals (EPA 1311/6010-B)		X (As needed)	
TCLP Organics (EPA 1311/8260-B & 1311/8270-C)		X (As needed)	
TCLP Pest. & Herb. (EPA 1311/8081-A/1311/8151-A)			
Radium 226 & 228 (EPA 9320)		X (As needed)	
Gross Alpha (alpha counting) (EPA 900)		X (As needed)	
Gross Beta (beta counting) (EPA 900)		X (As needed)	
Tritium (liquid scintillation) (EPA 906.0)		X (As needed)	
Gamma spectroscopy (EPA 901.1)		X (As needed)	
Isotopic plutonium (Chem. Separation/alpha spec.) (HASL-300)		X (As needed)	
Isotopic uranium (Chem. Separation/alpha spec.) (HASL-300)		X (As needed)	
Total uranium (EPA 6020)		X (As needed)	
Strontium-90 (EPA 905)		X (As needed)	
Americium-241 (Chem. Separation/alpha spec.) (HASL-300)		X (As needed)	
Isotopic Thorium		X (As needed)	
WSP – General Inorganics (filtered)			
Waste Profile Form #	TBD	TBD	TBD

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 Filtered metals and filtered Cyanide are required for land application, with the exception of mercury (hg).
3 TTO is the total of volatile organic and semi-volatile organic compound contaminants. Request methods EPA 8260-B (VOCs) and EPA 8270-C (SVOCs).
4 If Microtox analysis is not available, request BOD.
5 Based on direct sampling of associated sediment (Waste #1).
6 Only if other analyses indicate material constitutes a mixed waste.
7 Only if total concentrations of RCRA toxicity characteristic constituents exceed 20 times their regulatory limit.

Notes:

If data are insufficient to make a definitive regulatory classification at the time of WCSF completion, more than one box on the characterization table may be checked, along with an explanation in the text section. The final regulatory classification will be reflected on the waste profile form. The table identifies the suite of analyses required based on site knowledge, information needed by the anticipated receiving facility, or for land application, if applicable.

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 in soil 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 level 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 may either declare the waste hazardous or run TCLP analyses.

Additional Analytical Information:

Standard analytical turnaround time is anticipated to be 30 calendar days. In the event a waste is suspected to be hazardous, the total waste volume exceeds 55 gallons (e.g., purge water, decontamination fluids, and contact waste), and a <90-day Accumulation Area is required, then an expedited analytical turnaround time will be needed to meet the 90-day time limit. Environmental Stewardship sample support will be notified if an expedited analysis is necessary. Utah-certified analytical laboratory data is recommended to meet the MLLW WAC for waste streams that are suspected to be hazardous and low-level radioactive.

References:

- 40 CFR 261.24, 40 *Code of Federal Regulations* Part 261, Identification and Listing of Hazardous Waste, Subpart C, Section 24, Toxicity Characteristic.
- ADEP-SOP-5238, *Characterization and Management of Environmental Program Waste*
- P-409, *Waste Management*
- P930-1, LANL Waste Acceptance Criteria
- P930-2, Radioactive Waste Certification Program
- SOP-06.09, *Spade and Scoop Method for the Collection of Soil Samples*
- LA-UR-10-3958, *Drilling Work Plan for Regional Aquifer Well R-25r (EP2010-0277)*

Signatures	Date
Project Manager: Theodore T. Ball	5/11/11
Waste Generator: Bennie Martinez	5/9/11
Preparer: Jennifer Griffin	5/6/11
Waste Management Coordinator: Victor Garde	5/9/11
ENV-RCRA Representative: Jennifer Griffin	5/6/11
Waste Acceptance Representative: Andy Elicio	05/10/2011
Waste Certification Program Representative: Michelle Coriz for Michelle Coriz	5/11/11
	Los Alamos National Laboratory EP

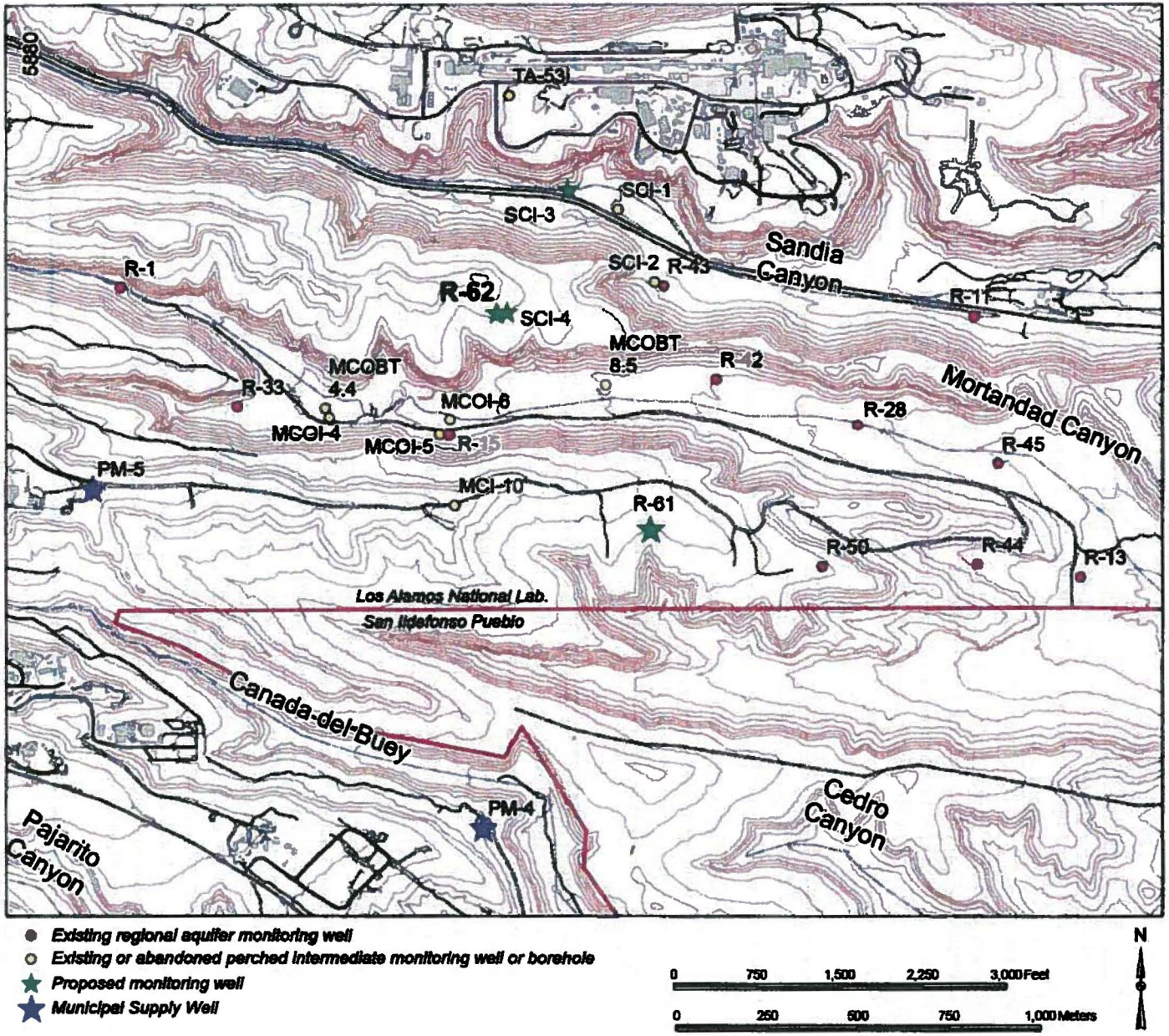

Figure 1 – Location Map for R-62

ATTACHMENT A
AK Review for Proposed Location of R-62

AK REVIEW

ALLUVIAL, INTERMEDIATE, AND REGIONAL MONITORING WELLS/BASEFLOW/SPRINGS

ID No.: R-62	Type: Regional
Location:	On a narrow ridge that separates Sandia and Mortandad Canyons at the east end of Sigma Mesa and on the same drill pad as proposed perched-intermediate well SCI-4 (Figure 1).
Watershed and Associated TAs	Sandia Canyon Watershed TA-03, TA-20, TA-53, TA-60, TA-61, and TA-72
Description/ Scope:	A two screened well installed to monitor water quality in the regional aquifer and to help define the vertical and lateral extent of chromium contamination known to exist in the vicinity of wells R-28, R-42, and R-50.
Listed Status	There are no F-, U-, P-, or K-listed waste codes applicable to waste streams (i.e., contact waste, development water, purge water, drill cuttings/fluids, decontamination water) from R-62.

Waste Management Instructions

1. Manage wastes generated due to activities at R-62 as non-hazardous.
2. Review analytical data to determine if wastes are radiological and/or hazardous for a characteristic prior to making a final waste determination for disposal.

AK/Due Diligence Summary

The location of well R-62 limits the due diligence review to TA-3, TA-53, TA-60, and TA-61.

- TA-03 houses most of the administrative and public access activities within its boundaries. The site also contains a mixture of experimental sciences, special nuclear materials, administrative, public and corporate access, theoretical/computations, and physical support operations. Many of LANL's major facilities providing physical support in the form of utilities and maintenance are located in TA-03. There are a total of 92 SWMUs/AOCs associated with operations at TA-03 that are potential sources for contaminants in the LA/Pueblo, Mortandad, Pajarito, and Sandia Canyon Watersheds. There are 45 SWMUs/AOCs that were evaluated as potential listed sources in the Sandia Canyon Watershed. Several of these SWMUs/AOCs include records that indicate the presence of operations and spills (i.e., waste solvent disposal; waste solvent storage, disposal of spent electroplating solutions/residues) that may require the application of the listed hazardous waste codes F001, F002, F005, F007, F008, and F009. However, further analysis indicates that there is currently no pathway for those contaminants to reach the Sandia Canyon Watershed. There are also several SWMUs/AOCs associated with the discharge of cooling tower blow down that is the likely source of Cr/Cr(VI) contamination in the Sandia Canyon Watershed. There are no records to support that this contamination is from a listed source or is due to the spill of a material with a P/U-listed chemical as the sole active ingredient. The conclusion of this analysis is that the SWMUs/AOCs and operations associated with TA-03 are not a potential source for F- or P/U-listed contaminants in the Sandia Canyon Watershed.

- TA-61 is a relatively small site that contains physical support and infrastructure facilities. The facilities, all previously designated non-hazardous, include the Los Alamos County landfill, sewer pump stations, a radio shop, general storage sheds, a blower house, and general warehouse storage

for maintenance activities performed throughout LANL. TA-61 is bounded on the north by Los Alamos County and on the south by Sandia Canyon and surrounds a small parcel of private property known as the Royal Crest manufactured Home Community. There are a total of 5 SWMUs/AOCs associated with operations at TA-61 that serve as potential sources for contaminants in the Los Alamos and Sandia Canyon Watersheds. There are 4 SWMUs/AOCs at that were evaluated as potential listed sources in the Sandia Canyon Watershed. The SWMUs/AOCs at TA-61 may be a source for low concentrations of organics including solvents and petroleum hydrocarbons in the groundwater due to fuel/oil spills but there are no records to indicate that this residual contamination is from a listed source. The conclusion of this analysis is that the SWMUs/AOCs and operations associated with Former TA-61 are not a potential source for F-, P-/U-listed contaminants.

- TA-60 lies southeast of TA-03 between Mortandad Canyon and Sandia Canyon. The site is primarily used for LANL physical support and infrastructure activities. Some support services and physical support areas for subcontractors are also located at TA-60. The NTS Test Fabrication Facility and a test tower (Buildings 60-0017 and -0018) are located in TA-60. Because of the moratorium on testing, these buildings are not currently in use but are being maintained for future use, should testing again become a part of LANL's mission. There are a total of 10 SWMUs/AOCs associated with operations at TA-60 that serve as potential sources for contaminants in the Mortandad and Sandia Canyon Watersheds. There are 7 SWMUs/AOCs that were evaluated as potential listed sources in the Sandia Canyon Watershed. The SWMUs/AOCs at TA-60 may be a source for low concentrations of organics including solvents and petroleum hydrocarbons in the groundwater due to fuel/oil spills but there are no records to indicate that this residual contamination is from a listed source. The conclusion of this analysis is that the SWMUs/AOCs and operations associated with Former TA-60 are not a potential source for F-, P-/U-listed contaminants.

- TA-53 is located on Mesita de Los Alamos, north of the lower portion of Sandia Canyon. TA-53 occupies 750 acres and includes approximately 400 buildings and other structures. It is the current location of one of the largest research accelerators in the world. TA-53 currently supports both basic and applied research programs. Basic research includes studies of subatomic and particle physics, atomic physics, neutrinos, and the chemistry of subatomic interactions. Applied research includes materials science studies that use neutron spallation and contributions to defense programs such as stockpile stewardship and the production of tritium. The facility also supports the production of radioisotopes for medical research and use and supports programs for accelerator-related technologies (i.e., radio-frequency power sources, high-power microwaves, and free-electron lasers). There are a total of 15 SWMUs/AOCs associated with operations at TA-53 that serve as potential sources for contaminants in the Los Alamos/Pueblo and Sandia Canyon Watersheds. There are 13 SWMUs/AOCs that were evaluated as potential listed sources in the Sandia Canyon Watershed. Several of the SWMUs/AOCs at TA-53 include records that indicate the presence of operations and/or spills (i.e., waste solvent disposal; waste solvent storage, mercury spill) that may require the application of the listed hazardous waste codes F005 and U151 to the wastes generated in the Sandia Canyon Watershed. However, further analysis indicates that there is currently no pathway for those contaminants to reach the Sandia Canyon Watershed. The conclusion of this analysis is that the SWMUs/AOCs and operations associated with TA-53 are not a potential source for F- or P/U-listed contaminants in the Sandia Canyon Watershed.

Spill records for these technical areas and the R-62 well site were also reviewed. There are no records

of F-, U-, and/or P- listed spills that would require wastes from R-62 to be listed.

Most K-listed sources are industrial in nature and not typical of Laboratory operations. The Laboratory generates only small amounts of K-listed wastes, primarily spent carbon from high explosives processing that is disposed off-site. The documented amounts of K-listed wastes generated at LANL are not sufficient to have impacted activities at R-62.

Potential Contaminant Sources	Listed
Elevated chromium concentrations detected in the regional aquifer in the wells associated with Sandia and Mortandad Canyon are attributed to releases that occurred in the headwaters of Sandia Canyon. The likely source of the chromium was cooling tower blow down from the TA-3 power plant. From 1956 to 1972, potassium dichromate was used as a corrosion inhibiter and approximately 31,000 – 72,000 kg of hexavalent chromium (Cr IV) were released into the upper Sandia Canyon Watershed. The surface water flow carried dissolved chromium down canyon to the vicinity of SCI-1 and R-43 before infiltrating canyon floor sediments and recharging perched alluvial groundwater. Percolation of the contaminated alluvial groundwater into bedrock units of the vadose zone recharged perched-intermediate groundwater at wells SCI-1 and SCI-2 and eventually entered the regional aquifer.	No
Storm water runoff from asphalt parking lots and storage pads. Asphalt can contribute low levels of residual organics (i.e., butanone[2-], acetone, toluene, benzene, carbon disulfide, trimethylbenzene[1,2,4], methylene chloride, 1,1,2-Trichloro-1,2,2,-Trifluoroethane, Hexane, 3-methylpentane, methylcyclopentane) to surface water, sediments, and soils.	No
Phthalates due to plastics used as components of shot assemblies, as bonding agents for high explosives, in waste storage equipment, and/or in sampling equipment.	No
Residual contaminants due to combustion products and/or the fire retardants used to fight the Cerro Grande Fire (i.e., Benzoic acid, Benzyl Alcohol, cyanide. 4-Methylphenol (p-cresol), Pyridine, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(g,h,I)perylene, Chrysene, Fluoranthene, Naphthalene, Phenanthrene, Pyrene, Summed 2,3,7,8-TCDD equivalent), and cyanide.	No
Residual metals (i.e., nickel, chromium, cadmium) due to the breakdown of stainless steel well components, drilling equipment, and/or cooling towers/other equipment that discharge potable water to the canyon.	No
Residual contaminants due to insecticide, herbicide, and/or fertilizer use.	No

Documents Reviewed

- EP2010-0483, Drilling Work Plan for Regional Aquifer Well R-62, October 2010.
- ER2006-0144, SWMU/AOC Report, January 2007
- PRS Database
- Spill Report May 1990 – December 2010
- RFI Work Plan for Operable Unit 1114
- RFI Work Plan for Operable Unit 1100
- RFI Report at PRSs at TA-3, 60, 61
- RFI Report at PRSs at TA-20, 53, 72
- SWMU 61-002 Remedy Completion Report, Revision 1
- 100692, Investigation Work Plan for Upper Sandia Canyon Aggregate Area, March 2008
- 100693, Historical Investigation Report for Upper Sandia Canyon Aggregate Area, March 2008
- 105078, Historical Investigation Report for Lower Sandia Canyon Aggregate Area, April 2009
- 105079, Investigation Work Plan for Lower Sandia Canyon Aggregate Area, April 2009

- PRR-WTR-0281, Investigation Report for Sandia Canyon, October 2009
- PRR-REM-0500, Investigation Report for Upper Sandia Canyon Aggregate Area, May 2010
- DRAFT, Investigation Report for Lower Sandia Canyon Aggregate Area.

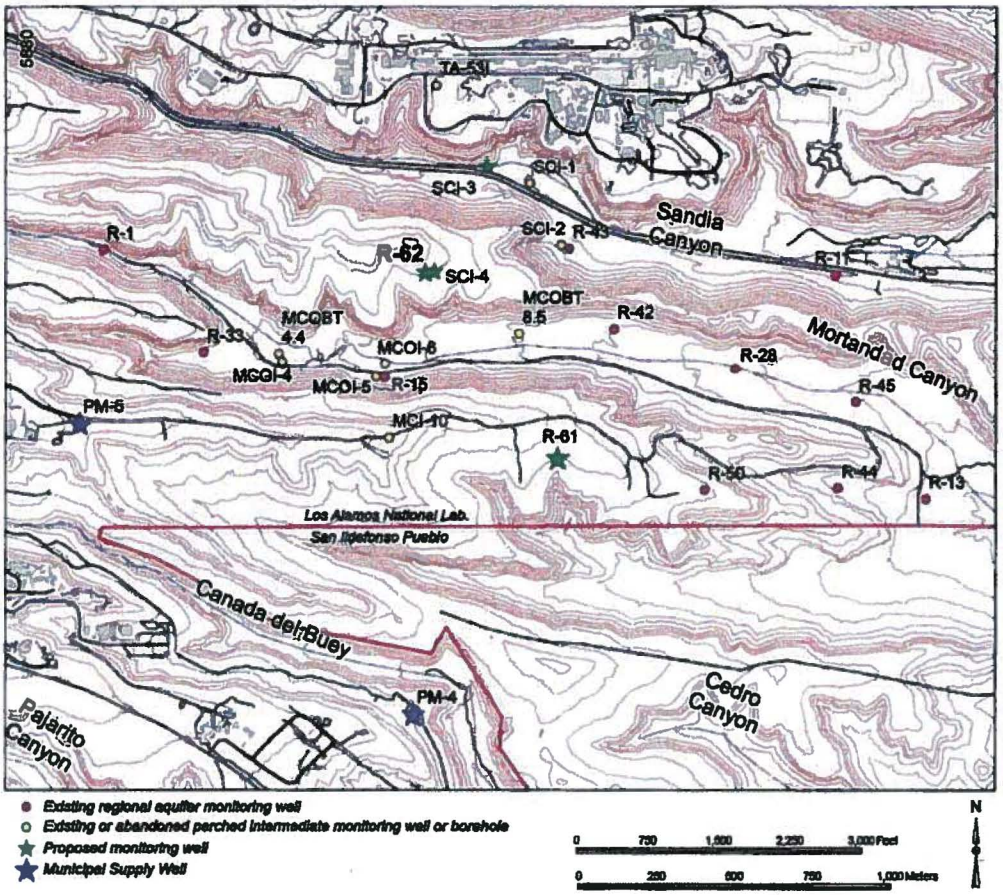

Figure 1 Proposed location for well R-62