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Waste Characterization Strategy Form

Project Title	**Regional Wells R-56 and R-57 at TA-54**
Regional Aquifer Monitoring Wells	**R-56 (Area L) and R-57 (Area G)**
Activity Type	**Regional Well Installation and Corehole Drilling**
Drilling Project Technical Lead	**Theodore T. Ball**
Waste Management Coordinator	**David E. Mikkelson**
Completed by	**Jocelyn Buckley**
Date	**February 24, 2010**

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 monitoring wells, R-56 and R-57. Both regional monitoring wells are located on Mesita del Buey and are being installed to enhance the regional aquifer monitoring for MDA L and MDA G. See Figure 1 for the map of well locations.

The following waste streams are anticipated for all wells:

- Waste Stream #1-Contact Waste
- Waste Stream #2-Drill Cuttings
- Waste Stream #3-Drilling Fluids
- Waste Stream #4-Development Water
- Waste Stream #5-Decontamination Fluids
- Waste Stream #6-Municipal Solid Waste (MSW)
- Waste Stream #7-Petroleum Contaminated Soils (PCS)
- Waste Stream #8-Drilled out Concrete Chips or Concrete Slurry
- Waste Stream #9-Contaminated Storm-water

Every effort will be made to recycle or reuse contact waste, if determined to be non-hazardous, non-radioactive.

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

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

This WCSF will be implemented before any waste generating activity is undertaken. An amendment to this strategy form 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 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:

R-56 (MDA L): Regional well R-56 is being installed to satisfy a requirement by the New Mexico Environment Department (NMED) to install a regional aquifer monitoring well located between MDA L and MDA G, 400 ft east of MDA L. The primary objective of well R-56 is to monitor water quality in the regional aquifer down gradient of potential hazardous- or radioactive-chemical releases from MDA L and to provide baseline data from groundwater flowing toward MDA G. Early disposal practices at MDA L resulted in a subsurface volatile organic vapor plume that extends beneath the facility and beyond its boundary. The known sources of environmental contamination at MDA L are vapor-phase tritium and VOC releases from the subsurface units. The principle vapor phase organic compounds, listed in descending order of concentration, were 1,1,1-trichloroethane (TCA), trichloroethylene (TCE), carbon tetrachloride, chloroform, tetrachloroethylene (PCE), toluene, and benzene. Other contaminants detected, but at much lower concentrations, include chlorobenzene, xylenes, and 1, 2, 4-trimethylbenzene. TCA is the primary constituent in the VOC plume and exhibits the greatest lateral and vertical extent in the organic vapor plume. The following additional VOCs were detected in the air at MDA L for background comparison purposes: toluene, chloromethane, chlorodifluoromethane, trichlorodifluoromethane, and n-hexane. Metals dissolved in liquid solvents were released into the tuff below subsurface units at MDA L. [TA-54 RFI Report, March 2000, ER 19990003]

R-57 (MDA G): Regional aquifer R-57 is being installed to monitor regional aquifer groundwater southeast of MDA G. Evaluation of site characterization data has determined that the known sources of environmental contamination at MDA G are tritium and VOC releases from the subsurface units. Pore-gas data have determined the presence of two VOC plumes at MDA G. The largest plume is concentrated around the oldest subsurface SWMUs at the eastern end of MDA G. The second, smaller plume, is located toward the center of MDA G near the southern fence line. As reported in the September 2005, *Investigation Report for Material Disposal Area G Consolidated Unit 54-013(b)-99 at Technical Area 54*, the VOCs detected in pore-gas samples at MDA G are as follows:

VOCs Detected in Porge-Gas Samples at MDA G (Source: MDA-G Investigation Report, 9/2005, ER2005-0626)

Acetone	Dichloroethane [1,1-]	Methyl-2-pentanone[4-]	Trichloroethane[1,1,1-]
Bromodichloromethane	Dichloroethene[1,1-] Dichloroethene[cis-1,2-]	Methylene Chloride	Trichloroethene
Butanone[2-]	Dichloropropane[1,2-]	Propanol[2-]	Trichlorofluoromethane
Carbon disulfide	Ethanol	Styrene	Trimethylbenzene [1,2,4-]
Carbon Tetrachloride	Hexane	Tetrachloroethene	Trimethylbenzene[1,3,5-]
Chloroform	n-Heptane	Toluene	Vinyl Chloride
Dichlorodifluorormethane	Methanol	Trichloro-1,2,2-trifluoroethane [1,1,2-]	Xylenes

Note: Acetone, butanone [2-], and toluene were between 485ft - 700ft bgs [the greatest depth] at borehole location 54-24258.

Past analytical data associated with nearby wells installed to monitor regional aquifer groundwater from MDA L and MDA G were evaluated. Trace amounts of acetone, toluene, isopropylbenzene, carbon disulfide and chloromethane were detected in groundwater samples from wells R-32 and/or R-38 at MDA-L, and trace amounts of chloromethane and toluene were detected in wells R-39 and/or R-41 at MDA-G. The detections were very sporadic and not indicative of a contaminant "plume" from a listed source [Reference: Water Quality Database]. The organic detections at the wells were also detected in the pore gas or in the air, with the exception of isopropylbenzene. Also, past due diligence efforts in the vicinity of wells R-38, R-39, and R-41, concluded that specific contaminant detections in the IDW generated from these wells were not from a listed source.

Several inorganic chemicals were detected above background levels and did not show any discernable patterns or trends that would be indicative of a release from any of the historical waste units at MDA L and MDA G. The radionuclides detected above background at MDA-L Cesium-137, Polnium-210, Tritium, Uranium-234, Uranium-235, and Uranium-238. Anthropogenic radionuclides detected in soil and rock samples from beneath MDA G were Americium-241, Plutonium-238, Plutonium-239, Tritium, and Strontium-90. The naturally occurring radionuclides detected above background values included thorium isotopes, Uranium-234, Uranium-235, and Uranium-238 [PRS Database].

Based on an EPA decision, documented in 54 FR 50973 and 56 FR 7200, vapor is an "uncontained gas" and is, therefore, not a solid (or hazardous) waste. Because the vapor is not a solid or hazardous waste, the mixture rule, derived-from rule, and contained-in policy do not apply to wastes contaminated by the vapor. Therefore, IDW wastes (e.g., drill cuttings, drilling fluids, and development water) coming into contact with the pore gas, or vapor plume, are not hazardous wastes unless they exhibit a characteristic.

CHARACTERIZATION STRATEGY

The characterization strategy for investigation derived waste (IDW) generated during well installation is based upon direct sampling of the containerized waste and acceptable knowledge (AK) data/documentation associated with well location (i.e., within or near an Area or Concern [AOC] or Solid Waste Management Unit [SWMU]). AK includes review of existing analytical (i.e., soil, sediment, cuttings, groundwater, etc.) data in the vicinity of the wells, historical documentation associated with nearby AOCs or SWMUs, and may also include source term/process identification performed to identify whether listed hazardous waste may be present (i.e., due diligence reviews).

The initial management of each waste stream will be based upon existing acceptable knowledge (AK) data/documentation or by direct sampling of the IDW. Based upon previous AK data/ documentation [See Relevant Site History and Description], the waste streams generated from R-56 and R-57 will initially be managed as non-hazardous, pending analytical results. Although listed constituents have been detected in the vapor plumes underlying Area L and Area G, ENV-RCRA maintains the position that the VOC vapor plume from the underlying SWMUs (MDA-L or Area L) is an "uncontained gas" and is therefore not a solid (or hazardous) waste. For the initial management of the IDW, the non-hazardous waste label, date of generation (i.e., initial placement in the container), as well as the generator's name and container contents will be placed on the non-hazardous waste containers as a best management practice. A final waste determination will be made within 45 days from the date of generation so that if the waste is determined to be hazardous, it can be managed expeditiously. Returned samples and associated PPE may be included with a waste stream at the time of disposal, if appropriate.

Based upon historical data/documentation, the IDW from this well may be designated as radioactive [See Relevant Site History and Description]. Once waste has been determined to be radioactive and does not meet land application standards, waste must be managed in a registered radioactive waste staging or storage area. Waste determinations will be made in a timely manner so that if the waste is determined to be hazardous, radioactive, or mixed low-level, it can be managed expeditiously. A Waste Acceptance Criteria (WAC) exception form (WEF) can be used if the generator does not make a waste determination within 45 days of the generation date of the waste.

If analytical data or AK documentation indicate the presence of listed constituents that are not documented as being part of the underlying VOC plumes, or if drilling penetrates the VOC liquid plume that is known to be underneath a portion of Area-L, a due diligence review of available documentation may be performed to support the position that the constituents are not from a listed source (i.e., a listed process or spill or disposal of an unused/unspent chemical). If the due diligence does not identify a listed source, the waste will not carry the listed waste number. If a listed constituent is identified and is from a listed source, but the levels are below groundwater standards or soil screening levels and land disposal restrictions (LDRs), a "contained-in" request may be made to New Mexico Environment Department (NMED) in order to remove the listed waste number from the waste stream. A copy of either the ENV-RCRA approved due diligence or the NMED "contained-in" approval must accompany all waste profiles prepared for the subject waste(s).

Sampling Waters in Pits and Tanks:

Groundwater produced during well drilling, development, and rehabilitation must be containerized on-site in a lined pit or tank(s). A representative sample(s) will be collected from each pit or tank in order to accurately characterize the water quality to determine compliance with the NOI Decision Tree, Representative samples shall be collected in accordance with the following requirements (Reference: ENV-RCRA-SOP-10.1, *Land Application of Groundwater*, May 2008)

- A composite sample shall be collected from each pit and 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 pit or 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 pit or 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

- Alternately, an aliquot may be collected during water production and diversted to a smaller container (e.g., clean 55-gallon drum) that can then be sampled. For example, while filling a 21,000 gallon frac tank, a one-gallon sample is collected every 500 gallons and placed in a clean, 55-gallon drum.

Note: Select the appropriate sampling method, and operate the device in accordance with Appendix E of the RCRA Waste Sampling Draft Technical Guidance (EPA 530-D-02-002, August 2002).

Sampling personnel must record IDW 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 field conditions, problems encountered, local sources of contamination (e.g., operating generators or vehicles), the personnel involved, equipment and supplies used, wastes generated, and field observations.

Discharging Containerized Secondary Containment Storm water:

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 CFR §112, Oil Pollution Prevention Regulations (Spill Prevention, Control, and Countermeasure [SPCC] Plan); 40 CFR §122, Construction General Permit Regulations, and applicable Storm Water Pollution Prevention (SWPP) Plan requirements. Department of Energy (DOE), LANL Engineering Standards, and state and federal policies/regulations may also apply.

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 exist, contact Mark Haagenstad 665-2014 or Jake Meadows 606-0185 for handling requirements.

2) Check for pH. The pH must be between 6 and 9.

3) Notify ENV-RCRA (Mark Haagenstad 665-2014 or Jake Meadows 606-0185) prior to proposed discharge.

4) If discharge is not granted by ENV-RCRA, the contaminated storm water must be managed in accordance with this WCSF (See Waste Stream #9).

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

5) Document the volume of waste released; time, date, and location of discharge; and other conditions (Complete Form in Attachment 1).

6) Submit the Liquid Discharge Form (Attachment 1) to Mark Haagenstad or Jacob Meadows via FAX to 505-665-9344. .

7) Document the discharge in the SPCC Plan or SWPP Plan, when applicable.

For questions, please contact Mark Haagenstad 665-2014, Jake Meadows 606-0185 or the ENV-RCRA Group Office, 667-0666.

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 (primarily gloves); plastic sheeting (e.g., tarps and 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 30 cubic yards of contact waste may be generated per well.

Anticipated Regulatory Status: Green is Clean, LLW, Hazardous, MLLW, Industrial, and Solid (Municipal)

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

Storage and Disposal Method: Contact waste will initially be stored as nonhazardous waste. The waste will ultimately be managed based upon the final regulatory classification of the waste. If the contact waste is determined to be nonhazardous/nonradioactive and approval is granted by ENV-RCRA, it may be recycled or reused via the Material Recycling Facility (MRF).

Waste # 2: Drill Cuttings – This waste stream is comprised of borehole cuttings and core, soil, and rock sediments produced from drilling. The cuttings may or may not contain residue of drilling additives. It is estimated that 80 cubic yards of drill cuttings may be generated per well.

Anticipated Regulatory Status: LLW, Hazardous, MLLW, Solid (Nonhazardous), and Industrial

Characterization Approach: Waste characterization will be based upon the analytical results obtained from the direct sampling (See Sampling Approach) of the cuttings. A representative sample of the cuttings will be taken within 10 days of well completion. A waste determination will be made within 45 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 21-day turnaround time will be requested for analysis.

Sampling Approach: After fluids have been removed from the pit, samples of the drill cuttings will be collected in accordance with LANL SOP-06.10, *Hand Auger and Thin-Wall Tube Sampler,* using 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). Collect an incremental sample from each grid, 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 an 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.

Sampling personnel must record IDW 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 field conditions, problems encountered, local sources of contamination (e.g., operating generators or vehicles), the personnel involved, equipment and supplies used, wastes generated, and field observations.

Storage and Disposal Method: Drill cuttings will initially be stored in lined pits within the project controlled area at each 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, drill cuttings will be evaluated using the Automated Waste Determination (AWD) Program, for land application in accordance with ENV-RCRA-SOP-011.1, *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 the procedure. If analytical data and documentation show the cuttings are hazardous wastes (i.e., contain constituents from a listed source) that meet all of the land application criteria, they will be left in the pit pending a "contained-in" approval from the New Mexico Environment Department. Any wastes that cannot be land applied will be excavated, containerized, and placed in an accumulation area appropriate for the regulatory classification of the waste. Wastes with a 90-day accumulation limit (NMSW or hazardous waste) will be sent to an authorized facility for treatment, storage, or disposal within 90-days of containerization.

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 may be generated from each well.

Anticipated Regulatory Status: LLW, Hazardous, MLLW, Solid (Nonhazardous), and Industrial

Characterization Approach: Waste characterization will be based upon the analytical results obtained from the direct sampling of the drilling fluids. Representative samples of the fluids will be taken within 10 days of well completion. If for any reason drilling fluids cannot be placed in pits, they will be containerized and sampled within 10 days of containerization. A waste determination will be made within 45 days of waste generation (i.e., the date the fluids were removed from the pit and first placed into a container, or the date of initial placement into an approved container). A 21-day turnaround time will be requested for analysis.

Sampling Approach: See Sampling Waters from Pits and Tanks section of this WCSF

Storage and Disposal Method: Drilling fluids will initially be stored in lined pits pending review of analytical results to determine final waste characterization. If, for any reason, the fluids cannot be placed in pits, they will be containerized and stored as nonhazardous waste. The non-hazardous waste label, date of generation (i.e., initial placement in the container), as well as the generator's name and container contents will be placed on the non-hazardous waste containers as a best management practice. Based on validated analytical data, drilling fluids will be evaluated, using the Automated Waste Determination (AWD) Program, for land application in accordance with ENV-RCRA-SOP-10.1, *Land Application of Groundwater*. If the drilling fluids meet the criteria for land application, they will be land applied in accordance with the procedure. If analytical data and documentation show the fluids are hazardous wastes (i.e., contain constituents from a listed source) that meet all of the land application criteria, they will be left in pit or container, pending a "contained-in" approval from the New Mexico Environment Department. If the hazardous waste fluids are containerized, they are subject to the 90-day accumulation limit and the "contained-in" approval must be obtained before the accumulation period is exceeded. Any wastes that cannot be land applied will be managed and disposed of based upon the regulatory classification of the waste. Wastes with a 90-day accumulation limit (NMSW or hazardous waste) will be sent to an authorized facility for treatment, storage, or disposal within 90 days of containerization.

Waste #4: Development Water- This waste stream consists of groundwater generated during development of the well and aquifer testing. The anticipated volume of development water that will be generated is approximately 50,000 gallons per well.

***Anticipated Regulatory Status*:** LLW, Hazardous, MLLW, Solid (Nonhazardous), and Industrial

Characterization Approach: Waste characterization will be based upon the analytical results obtained from the direct sampling of containerized waste. A representative sample will be taken within 10 days of generation (i.e., date of initial placement into the container) so that a waste determination can be made within 45 days of generation and the waste dispositioned within 90 days, if necessary. Samples will be submitted with a 21-day turnaround time for analyses.

Sampling Approach: See Sampling Waters from Pits and Tanks section of this WCSF. **Note:** To collect representative waste samples, either a composite sample will be collected after well development or sample aliquots will be collected periodically during development and stored in a clean 55-gallon drum.

Storage and Disposal Method: Development water will be containerized at the point of generation and initially managed as nonhazardous waste. The non-hazardous waste label, date of generation (i.e., initial placement in the container), as well as the generator's name and container contents will be placed on the non-hazardous waste containers as a best management practice. If appropriate, and based on the validated , using the Automated Waste Determination (AWD) Program, for land application in accordance with ENV-RCRA-SOP-10.1, *Land Application of Groundwater.* If the development water meets the criteria for land application, it will be land applied in accordance with the procedure. If analytical data and documentation show the development waters are hazardous wastes (i.e., contain constituents from a listed source) that meet all of the land application criteria, they will be placed in an accumulation area appropriate for the regulatory classification of the waste, pending a "contained-in" approval from the New Mexico Environment Department. Any wastes that cannot be land applied will be managed and disposed of based upon the regulatory classification of the waste. Wastes with a 90-day accumulation limit (NMSW or hazardous waste) will be sent to an authorized facility for treatment, storage, or disposal within 90 days of generation (i.e., initial placement in the container).

Waste #5: Decontamination Water - Consistent with waste minimization practices, the Laboratory employs dry decontamination methods to the extent possible. However, if dry decontamination cannot be performed, liquid decontamination is used. Decontamination water consists of liquid wastes generated from the decontamination of excavation, sampling, and drilling equipment. It is estimated that approximately 500 gallons of decontamination water will be generated from each well.

Anticipated Regulatory Status: LLW, Hazardous, MLLW, and Sanitary Wastewater

Characterization Approach: Decontamination water used on down hole equipment and materials will be characterized using acceptable knowledge (AK) of the media with which it came into contact. All other decontamination water generated from this project (i.e., decontamination water from rinsing a frac tank or drilling equipment prior to use) must be segregated from the decontamination water used on down-hole equipment and analyzed separately. The characterization approach for decontamination water used on down hole equipment and materials may be augmented, as needed, by direct sampling of containerized waste to fulfill a treatment, storage, or disposal facility's waste acceptance criteria (WAC). A representative sample will be taken within 10 days of generation (i.e., date of initial placement into the container) so that a waste determination can be made within 45 days of generation and wastes dispositioned within 90 days, if necessary. Samples will be submitted with a 21-day turnaround time for analyses. Multiple sampling may be required to ensure WAC requirements are met.

Sampling Approach: Samples will be collected from the storage container in accordance with LANL SOP-06.15, *COLIWASA Sampler for Liquids and Slurries.* If the container does not permit COLIWASA or bailer sampling, the type of sampling equipment used will be appropriate for the waste container and based on Chapter 7 and operated in accordance with Appendix E of the RCRA Waste Sampling Draft Technical Guidance (EPA 530-D-02-002, August 2002).

Sampling personnel must record IDW 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 field conditions, problems encountered, local sources of contamination (e.g., operating generators or vehicles), the personnel involved, equipment and supplies used, wastes generated, and field observations.

Note: Decontamination fluids destined for the Sanitary Wastewater Plant must be sampled by Dustie Rich (ENV-RCRA), or an alternate sampler that is approved by the SWWS WAC Committee, for Microtox Analysis, TSS, TDS, and pH. Submit a request for analysis by going to https://esp-esh-as01-f5.lanl.gov/~esh19/databases/rfa_form.shtml. If LANL does not have an available Microtox Analysis facility to handle the Microtox analysis, this analysis may not be required and may be accepted by the SWWS sanitary wastewater plant on a case-by-case basis.

Storage and Disposal Method: Decontamination water will be containerized at the point of generation and managed as nonhazardous waste. The non-hazardous waste label, date of generation (i.e., initial placement in the container), as well as the generator's name and container contents will be placed on the non-hazardous waste containers as a best management practice. Nonhazardous/nonradioactive decontamination water may be disposed of on-site at the Sanitary Wastewater Treatment Facility if WAC requirements are met. If the waste is hazardous, LLW, or MLLW, it will be managed as such and treated and/or disposed of at an authorized facility.

Waste #6: Municipal Solid Waste (MSW) – This waste stream primarily consists of non-contact trash, including, but not limited to paper, cardboard, wood, plastic, food and beverage containers. It is estimated that 2 cubic yards of MSW will be generated for each well.

Anticipated Regulatory Status: MSW

Characterization Approach: MSW will be characterized based on acceptable knowledge.

Storage and Disposal Method: MSW will be segregated from all other waste streams. It is anticipated that the waste will be stored in plastic trash bags or other appropriate containers and transferred/disposed of at an authorized facility.

Waste #7: Petroleum Contaminated Soils (PCS) – PCS may be generated from 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.). Absorbent padding, paper towels, spill pillows or other absorbent material used to contain the released material may be added to the PCS waste for storage and disposal. It is estimated that <1 cubic yards of this waste stream will be produced per well.

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

Characterization and Sampling Approach: The contaminated soil may either be sampled in-place or after containerization in accordance with SOP-06.10, Hand Auger and Thin-Wall Tube Sampler. If the spill is shallow (in-place sampling) or containers are small, Spade and Scoop Method for Collection of Soil Samples (SOP-06.11) may also be appropriate. The analysis of the samples will be dependent on where the spill occurred:

- If the spill occurred on clean soil, samples will be analyzed for VOCs, total petroleum hydrocarbons (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 must be analyzed as needed to meet the receiving disposal facility's WAC.
- If the spill occurs on soils with known hazardous contaminants or soils with no available information, samples will be analyzed, at a minimum, for VOCs, SVOCs, total metals, and TCLP metals, if necessary, as well as analytes needed to meet the WAC of the anticipated receiving treatment or disposal facility. If radioactive or explosives operations occurred in the vicinity,

samples may also need to be analyzed for explosives, gross alpha, gross beta, and isotopic radionuclides, as appropriate.

Samples will be submitted with 21-day turnaround time for analysis so that a waste determination can be made within 45 days of generation.

Storage and Disposal Method: PCS will be stored in clearly marked and appropriately constructed waste accumulation areas. Waste accumulation area postings, regulated storage duration, and inspection requirements will be based on the waste classification.

If the PCS is not contaminated with radioactive or hazardous materials, it will be classified as:

- NMSW PCS 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/liter, based upon TCLP, it is a hazardous waste, not a NMSW), or if TPH (DRO+GRO) concentration is greater than 100 mg/kg. NMSW will be managed in a registered NMSW area.
- Industrial waste if the contaminant levels are less than the NMSW and/or PCB regulatory levels.

If the PCS is suspect or known hazardous or mixed waste, it will initially be managed in a registered hazardous waste accumulation area until analytical data are available to make a waste determination. If the analytical data show that the waste is radioactive-only, the waste will be managed in a registered, posted radioactive waste staging or storage area. If the analytical data show that the soil is regulated PCB waste, it will be managed in a registered PCB area, hazardous waste accumulation area, or radioactive waste staging or storage area, as appropriate to the final waste classification. The 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. Do not sample NMSW if additional waste will be added to the container.

All PCS will be treated/disposed at an authorized off-site treatment or disposal facility appropriate to the waste classification.

Waste #8: Drilled-out Concrete Chips and Concrete Slurry- This waste stream consists of concrete chips from drilling out plug used to seal off perched groundwater or stabilize the borehole to facilitate drilling. It is estimated that 60 cubic yards of drilled out concrete chips or concrete slurry may be generated per well.

Anticipated Regulatory Status: Hazardous, LLW, Solid (Municipal), and Industrial

Characterization Approach: The concrete waste will be characterized based on AK from the MSDS for the cement and/or the surrounding soil. If concrete is generated from within a potential release site (PRS), and AK data/documentation is not available, a total metal analysis will be used to determine if the material can be recycled or reused. Additional sampling may be required depending on contaminants of concern in a PRS or the presence of radionuclides. A representative sample will be taken within 10 days of generation (i.e., date of initial placement into the container) so that a waste determination can be made within 45 days of generation and wastes dispositioned within 90 days, if necessary. Samples will be submitted with a 21-day turnaround time for analyses.

Storage and Disposal Method: Concrete waste will be managed in a roll-off container or other suitable container as nonhazardous, initially. If concrete is not contaminated, it may be sent to the county landfill for reuse but the waste must have ENV-RCRA approval for release. If it is contaminated, it must be managed as waste and managed appropriately. For concrete generated from within a PRS, analyses for total metal and contaminants associated with the PRS will be conducted to determine if the material can be recycled or reused if AK documentation is not available. Every effort will be made to recycle or reuse these materials, if possible.

Waste #9: Contaminated Stormwater - This waste stream consists of contaminated storm water precipitation collected within a secondary containment unit. If the storm water cannot be released

under the current ENV-RCRA discharge policy (See Characterization Strategy, Discharging Containerized Secondary Containment Storm Water), there are two potential waste management disposition options for which this waste shall be managed.

Waste 9a: Containerize storm water tainted with petroleum or non-hazardous glycol-based coolants (antifreeze) products in DOT approved containers and disposing of drummed liquid as used oil providing it meets the following:

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

- Acceptable Oil, Used Oil and Coolant
  - Used and unused petroleum oils
  - Oil filters for Oil filters for non-prohibited oils
  - Non-hazardous glycol-based coolants (antifreeze)
  - Oily water
  - Used and unused synthetic oils
  - Non-hazardous used oil absorbents
  - 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-contaminated oils
  - Any oils containing >2ppm PCB
  - Hazardous glycol-based coolants (i.e.. those failing TCLP like selenium or other metals)
  - Vegetable and other food oils

Anticipated Regulatory Status: Used Oil for Recycle

Characterization Approach: This waste will be characterized based on AK from the MSDS or direct sampling. A representative sample will be taken within 10 days of generation (i.e., date of initial placement into the container) so that a waste determination can be made within 45 days of generation and wastes dispositioned within 90 days, if necessary. Samples will be submitted with a 21-day turnaround time for analyses.

Storage and Disposal Method: This waste stream will be stored in accordance with the regulatory classification of the waste and disposed of at an authorized treatment, storage, and disposal facility.

Waste 9b: Any containerization of secondary storm waters not otherwise dispositioned in 9a above.

Anticipated Regulatory Status: Hazardous and Industrial

Characterization Approach: This waste will be characterized based on AK from the MSDS or direct sampling. A representative sample will be taken within 10 days of generation (i.e., date of initial placement into the container) so that a waste determination can be made within 45 days of generation and wastes dispositioned within 90 days, if necessary. Samples will be submitted with a 21-day turnaround time for analyses.

Storage and Disposal Method: This waste stream will be stored in accordance with the regulatory classification of the waste and disposed of at an authorized treatment, storage, and disposal facility.

TABLE 1- CHARACTERIZATION TABLE

Waste Description	Waste # 1 Contact Waste	Waste #2 Drill cuttings	Waste #3 Drilling Fluids	Waste #4 Development Water	Waste #5 Decontamination Fluids
Volume	30 cy	80 cy/well	50,000 gal/well	50,000 gal/well	500 gal/well
Packaging	Drums or roll-off bins	Lined pit or approved containers	Lined pit or approved containers	Approved Containers	Approved Containers
Regulatory Classification					
Radioactive (rad)	X	X	X	X	X
Solid	X	X	X	X	—
Hazardous	X	X	X	X	X
Mixed (hazardous and rad)	X	X	X	X	X
Toxic Substances Control Act	—	—	—	—	—
New Mexico Special Waste	—	—	—	—	—
Industrial	X	X	X	X	—
Sanitary Wastewater	—	—	—	—	X
Characterization Method					
Acceptable knowledge (AK): Existing Data/Documentation	X	—	—	—	X
AK: Site Characterization	—	—	—	—	—
Direct Sampling of Containerized Waste	—	X	X	X	X
Analytical Testing					
Volatile Organic Compounds (EPA 8260-B)	—	X	X	X	X
Semi volatile 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	—
Total Metals (EPA 6010-B/7471-A)	—	X	X1	X1	X
Total Cyanide (EPA 9012-A)	—	X	X2	X2	X
General (NO3+NO2, F, Cl, SO4, TDS, pH, microtox/COD/TSS)	—	X (nitrates if land applied)	X	X	X3
Perchlorates	—	—	X	X	X
High Explosives Constituents (EPA 8330/8321-A)	—	—	X	X	—
Asbestos	—	—	—	—	—
BTEX (EPA-8021b)	—	—	—	—	
Tot. pet. hydrocarbon (TPH)-GRO (EPA 8015-M) TPH-DRO (EPA-8015-M)	—	X (if visible stain)	—	—	—
Toxicity characteristic leaching procedure (TCLP) Metals (EPA 1311/6010-B)	—	X	—	—	—
TCLP Organics (EPA 1311/8260-B & 1311/8270-C)	—	—	—	—	—
TCLP Pest. & Herb. (EPA 1311/8081-A/1311/8151-A)	—	—	—	—	—
Radium 226 & 228 (EPA 9320)	—	X	X	X	—
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)	—	X4	X4	X4	X4
Gamma spectroscopy (EPA 901.1)	—	—	X	X	X
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	—
Americium-241 (Separation/alpha spec.) (HASL-300)	—	X	X	X	—

TABLE 1- CHARACTERIZATION TABLE --CONTINUED

Waste Description	Waste #6 Municipal Solid Waste	Waste #7 PCS	Waste #8 Concrete Chips and Concrete Slurry	Waste #9 Potentially Contaminated Storm water	
				Waste 9a Secondary Containment Storm water, managed as Used Oil (recycled)	Waste #9b Secondary Containment Storm water, managed as Other
Volume	2 cy/well	<1 cy/well	60 cy/well	variable	variable
Packaging	Approved Containers	Approved Containers	Approved Containers	Approved Containers	Approved Containers
Probable or potential Regulatory classifications					
Radioactive	—	X	X	—	—
Solid	X	—	X	X (for recycle)	—
Hazardous	—	—	X	—	X
Mixed (hazardous and radioactive)	—	—	—	—	—
Toxic Substances Control Act (TSCA)	—	—	—	—	—
New Mexico Special Waste	—	X	—	—	—
Industrial	—	X	X	—	X
Sanitary Wastewater	—	—	—	—	—
Characterization Method	—				
Acceptable knowledge (AK): Existing Data/Documentation	—	X	X	—	X
AK: Site Characterization	X	X (rad only)	X	—	—
Direct Sampling of Containerized Waste	—	X	X (as needed)	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
Organic Herbicides (EPA 8151-A)	—	—	—	—	X
PCBs (EPA 8082)	—	X	—	X	—
Total Metals (EPA 6010-B/7471-A)	—	—	X (if required by ENV-RCRA)	X	X
Total Cyanide (EPA 9012-A)	—	X	—	—	X
General (NO3+NO2, F, Cl, SO4, TDS, pH, microtox/COD/TSS)	—	—	—	—	X3
Perchlorates	—	—	—	—	X
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	—	X	—
TCLP Metals (EPA 1311/6010-B)	—	X	—	—	—
TCLP Organics (EPA 1311/8260-B & 1311/8270-C)	—	X	—	—	—
TCLP Pest. & Herb. (EPA 1311/8081-A/1311/8151-A)	—	X	—	—	—
Radium 226 & 228 (EPA 9320)	—	—	—	—	—
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 (ihem.. Separation/alpha spec.) (HASL-300)	—	X	—	—	—
Isotopic uranium (ihem.. Separation/alpha spec.) (HASL-300)	—	X	—	—	—
Total uranium (6020 inductively coupled plasma mass spectroscopy [ICPMS])	—	—	—	—	—
Strontium-90 (EPA 905)	—	X	—	—	—
Americium-241 (ihem. Separation/alpha spec.) (HASL-300)	—	X	—	—	—

1-FILTERED METALS REQUIRED FOR LAND APPLICATION (EXCEPT HG)
2-FILTERED CYANIDE FOR LAND APPLICATION
3-ANALYZE FOR MICROTOX//COD/TSS/TDS/Oil and Grease and pH for SWWS Plant; include TOC, Total Nitrogen, and Total Nitrates for RLWTF. Note: If LANL does not have an available Microtox Analysis facility to handle the Microtox analysis, this analysis may not be required and may be accepted by the SWWS sanitary wastewater plant on a case-by-case basis.
4- TRITIUM ANALYSIS: Request TRITIUM ANALYSIS, H3 not LLH3, with a 30 DAY TURNAROUND.
NOTE: Multiple sampling may be required to ensure WAC requirements are met.

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

> **Liquids – Wastes containing less than 0.5% filterable solids do not require extraction and therefore by filtering the waste and measuring the total constituent levels of the filtrate and comparing those levels to regulatory levels is appropriate.**
>
> **Solids – Constituent concentrations from the extraction fluid of wastes that are 100% physical solids are divided by 20 (reflecting the 20 to 1 ratio of TCLP extraction) and then compared to the regulatory levels. If the theoretical levels do not equal or exceed the regulatory levels, the TCLP need not be run. If the levels do equal or exceed the regulatory levels, the generator may either declare the waste hazardous or run TCLP analyses**

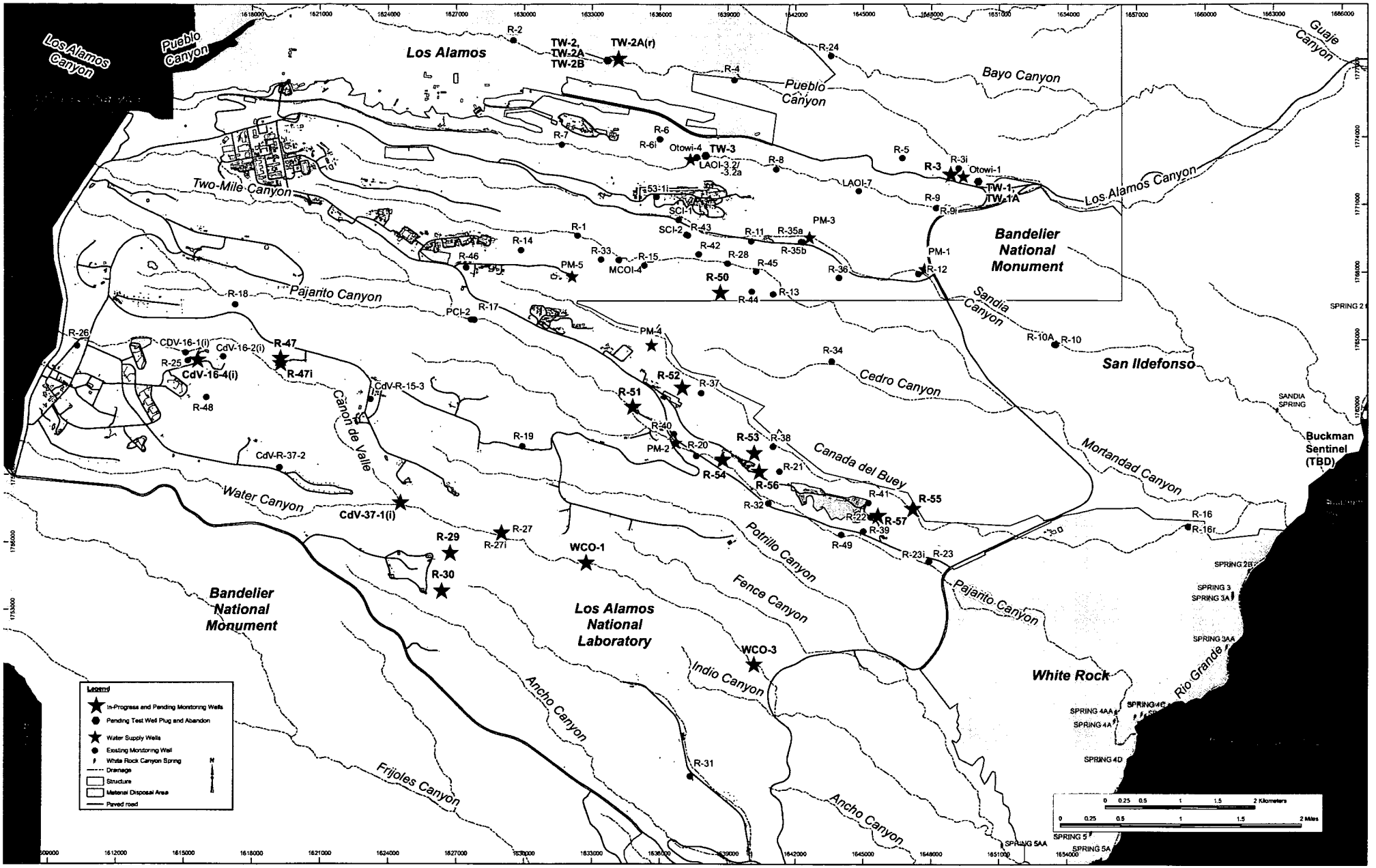
References

P-409, *Waste Management*
ADEP-SOP-5238, *Characterization and Management of Environmental Program Waste* (September 2009)
ENV-RCRA-SOP-10.1, *Land Application of Groundwater* (May 2008)
ENV-RCRA-QP-11.1, *Land Application of Drill Cuttings* (August 2008
Investigation Report for Material Disposal Area G Consolidated Unit 54-013(b)-99 at Technical Area 54 (September 2005)
TA-54 RFI Report, (March 2000, ER 19990003)
R-56 and R-57 Drilling Work Plans (DRAFT)
Water Quality and PRS Databases
Due Diligence Reports for R-38, R-39, and R-41

Waste Characterization Strategy Form

Signatures	Date
EP Project Leader (Theodore T. Ball)	2/25/10
EP Waste Management Coordinator (David E. Mikkelson)	2/25/10
ENV-RCRA Representative (Jocelyn Buckley)	2/25/10
WES-WA Representative (Jose D. Ortega)	2/25/10
Waste Certification Program Representative (Michelle Coriz)	2/25/10
	Los Alamos National Laboratory EP

FIGURE 1


Los Alamos Canyon
Pueblo Canyon
Los Alamos
TW-2, TW-2A TW-2B
TW-2A(r)
R-2
R-4
Pueblo Canyon
Bayo Canyon
Guaje Canyon
R-24
R-7
R-6
R-6i
Otowi-4
TW-3
LAOI-3.2/ -3.2a
R-8
R-5
R-3
R-3i
Otowi-1
TW-1, TW-1A
Two-Mile Canyon
LAOI-7
R-9
R-9i
Los Alamos Canyon
SCI-1
SCI-2
R-43
R-11
R-35a
PM-3
R-1
R-14
R-33
R-15
R-42
R-28
R-45
R-35b
R-36
PM-1
R-12
Bandelier National Monument
PM-5
MCOI-4
R-50
R-44
R-13
R-46
R-18
Pajarito Canyon
PCI-2
R-17
Sandia Canyon
R-10A
R-10
SPRING 2
PM-4
R-34
R-26
CDV-16-1(i)
CdV-16-2(i)
R-47
R-25
CdV-16-4(i)
R-47i
R-52
R-37
San Ildefonso
Cedro Canyon
CdV-R-15-3
R-51
R-48
Canon de Valle
R-40
SANDIA SPRING
R-19
PM-2
R-20
R-53
R-38
Buckman Sentinel (TBD)
Canada del Buey
CdV-R-37-2
R-54
R-21
R-56
Mortandad Canyon
R-41
R-55
R-32
R-22
R-57
R-16
R-16r
Water Canyon
CdV-37-1(i)
R-39
R-49
R-23i
R-23
R-29
R-27
R-27i
WCO-1
Potrillo Canyon
SPRING 2B
SPRING 3
SPRING 3A
R-30
Fence Canyon
Pajarito Canyon
Bandelier National Monument
Los Alamos National Laboratory
SPRING 3AA
WCO-3
Indio Canyon
White Rock
Rio Grande
SPRING 4AA
SPRING 4C
SPRING 4A
Ancho Canyon
SPRING 4D
R-31
Frijoles Canyon
Ancho Canyon
SPRING 5AA
SPRING 5
SPRING 5A
Legend
In-Progress and Pending Monitoring Wells
Pending Test Well Plug and Abandon
Water Supply Wells
Existing Monitoring Well
White Rock Canyon Spring
Drainage
Structure
Material Disposal Area
Paved road
N
0 0.25 0.5 1 1.5 2 Kilometers
0 0.25 0.5 1 1.5 2 Miles

Attachment 1: LANL LIQUID DISCHARGE FORM

ENV-RCRA Los Alamos National Laboratory

LOCATION: TA: _____ **BLDG:** _____

FIRE HYDRANT / PIPE / MANHOLE / TRANSFORMER /OTHER #: _____

USER GROUP: _____ **CONTACT PERSON:** _____

PHONE: _____ **PAGER:** _____

PERSON CONDUCTING SECONDARY CONTAINMENT DRAINAGE ACTIVITY: _____

DATE and TIME of DISCHARGE: _____ / _____

DURATION of DISCHARGE: _____ / _____

ENV-RCRA CONTACT: **Mark Haagenstad, 665-2014** **Please FAX to 665-9344**

or Jacob Meadows, 606-0185

DESCRIPTION of DISCHARGE: _____

VOLUME of DISCHARGE: _____

CANYON AFFECTED: _____

SAMPLES TAKEN: **YES:** _____ **NO:** _____

COMMENTS: _____

REVIEWED BY: _____ **DATE:** _____

ENV-RCRA

Revised 01/28/2010

Subject: Emailing: DocEditPrint_wconcur
From: "Saundra Martinez" <saundra@lanl.gov>
Date: Thu, 11 Feb 2010 16:27:02 -0700
To: "'Jocelyn Buckley'" <jbuckley@lanl.gov>, <dav_mik@lanl.gov>

Environmental Programs (EP)
Document Signature Form

Document Catalog Number: EP2010-0085
(Please prefix the name of all electronic versions of this document with this number.)

Document Title /Subject: Regional Wells R-56 and R-57 at TA-54 R-56 (Area L) and R-57 (Area G) Regional Well Installation and Corehole Drilling

PRSs: None **OUO Information: Y / N**

Associated Document Catalog Number(s): None

Author: Ball, Ted 665-3996 tedball@lanl.gov

Organization: TA-21 – PKG #1828

Document Team: None

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Date Due: Unknown **Date Final Complete:** Unknown

Date Sent to DOE: Unknown **Date Sent to NMED:** Unknown

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LA-UR Number: **RPF ER ID Number:** **Performance Measure:** No

AA Deliverable: No **Certification Required:** No **Force Peer Review:** No

Distribution TO: NOTE: See approval signatures on final document. **Distribution FROM:**

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Status/Comments: POC: Jocelyn Buckley David Mikkelson

Reviewer Signatures: (By signing below, the reviewer indicates that he/she **reviewed** and **approves** the document. Conditional approval may be indicated by checking the COMMENTS ATTACHED box.)

Reviewer (Print reviewer's name under title)	Signature	Date	Comments Attached
- SIGNATURES ON FINAL DOCUMENT -			

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Reference Cited in NMED Deliverables? Yes ☑ No ☐ **Receipt Acknowledgement:** Do you need this form returned to you? Yes ☑ No ☐

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Z # : 236166 Name: Vanessa Troncoso E-mail: tronco@lanl.gov Transmitters Organization: WES-RS

Contamination Potential

☑ To the best of my knowledge, the record(s) has no *radioactive* contamination. Signature: V. Troncoso

Record Type: Individual Record (no package) ☐ New package ☐ E-mail ☐ Add to existing package (fill in # and title below) ☑ Resubmitted/superseded record (record #) ☐

Package(s) # : 1828 Package title(s):

Reference/Retrieval Information

Organization: TA-21- PKG # 1828

Record (Package) Contents

Record Title	Media Type	Document Date	Author/Originator	Other Doc. # (e.g. Doc. Catalog #)	Page Count	ERID (RPF only)
Regional Wells R-56 and R-57 at TA-54 R-56 (Area L) and R-57 (Area G) Regional Well Installation and Corehole Drilling	Paper (letter)	02/24/2010	Ted Ball	EP2010-0085		104753
	-					
	-					
	-					

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