Garde, Victor

From: Baldonado, Delilah
Sent: Wednesday, February 25, 2015 10:10 AM
To: Garde, Victor
Subject: WCSF Signature Form SIMR-2

Environmental Programs (EP)
Document Signature Form

Catalog Number: EP2015-0038
Document Title/Subject: WCSF:SIMR-2 Well Drilling
Project Manager: Stephani Swickley
Author: Victor Garde
Editor:
Compositor:
LA-UR-#(s): Approval Signatures on Final WCSF
Date Due:

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

Doc Reviewers Name (Print reviewer's name under title)	Signature	Date
Author/Reviewer		
Technical Reviewer		
Project Manager		
Program Director		

Waste Characterization Strategy Form

Project Title:	**SIMR-2 Well Drilling**
Area of Impact:	**SIMR-2 Well**
Activity Type:	**Installation of Regional Well**
Project Manager/Waste Generator:	**Stephani Swickley/Bennie Martinez**
LANL Waste Management Coordinator:	**Victor Garde**
Completed by:	**Victor Garde**
Date:	**February 3, 2015**

Description of Activity:

The waste-generating activities addressed in this Waste Characterization Strategy Form (WCSF) consist of the installation (i.e., drilling, collecting samples, development, groundwater sampling, and aquifer testing) of groundwater monitoring well SIMR-2. The following waste streams are expected to be generated during the drilling and installation of this well:

- 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)

Note: Waste streams generated from this project will be stored separately either at the well site or at a different location on LANL property.

All wastes will be managed in accordance with P-409, *Waste Management*; EP-DIR-SOP-10021, *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-DIR-SOP-10021.

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." Waste streams will be recycled/reused, as appropriate.

Relevant Site History and Description:

Los Alamos National Laboratory (LANL or the Laboratory) is installing regional aquifer groundwater monitoring well SIMR-2, "a single-screen regional aquifer well south of R-50," as required by the New Mexico Environment Department's (NMED's) approval with modifications of the Phase II Investigation Report for Sandia Canyon dated February 19, 2014 (NMED 2014, 524467). A location was selected collaboratively with NMED, Pueblo de San Ildefonso, and the Laboratory; and is shown in Figure 1. The approval with modifications states the objectives of the well are "1) delineate the offsite nature and extent of the plume; 2) potentially be used for long-term contaminant detection and monitoring, and monitoring of any future remediation efforts; and 3) provide data and information as to whether production well Pajarito Mesa #4 (PM-4) is susceptible to contamination from the chromium plume."

The target monitoring zone for the well is generally planned to be located near the water table. An initial design for the well is provided in Figure 2. Design of the well, including screen length and screen position, will be based on data obtained during drilling, including information from lithologic logs of cuttings, water-level measurements, video logs, geophysical logs, and field-team observations. Well-design recommendations will be submitted to NMED for approval before construction.

CHARACTERIZATION STRATEGY

The characterization strategy for investigation derived waste (IDW) generated during sampling of drilling waste 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 45 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 45 day deadline.

Based upon analytical data of groundwater from nearby wells and due diligence, there are no F-, U-, P-, or K-listed waste codes applicable to waste streams from SIMR-2 (See attachment #1: AK Review-SIMR-2).

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 25yd^3 of contact waste may be generated.

Anticipated Regulatory Status: Municipal Solid Waste (MSW) or Industrial Solid Waste

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 initially be stored as non-hazardous/non-radiological waste. Contact waste 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 a total of 90yd^3 of drill cuttings will be generated for this well.

Anticipated Regulatory Status: Reusable (land applied) or Industrial Solid Waste

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 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 required for analysis. Samples will be collected in the following way:

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 EP-SOP-06.10. This method is not applicable for VOC analysis (read note, below, for VOC sampling). 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.

VOC samples 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.

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; volatile organic compounds (VOCs); semi-volatile organic compounds (SVOCs); PCB; cyanide; nitrates/nitrites; perchlorates; explosive compounds; 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 any spills of petroleum based products occurred during the project. 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-SOP-12.01, *Field Logging, Handling, and Documentation of Borehole Materials*, EP-SOP-12.02, *Transportation and Admittance of Borehole Materials to the Field Support Facility*, and EP-SOP-5181, *Notebook and Logbook Documentation for Environmental Directorate Technical and 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, 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 or in lined roll-off containers (which may be moved off of San Ildefonso property), pending review of analytical results to determine final waste characterization. Specifications for the cuttings pit (if used) 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 WM-PROG-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 WM-PROG-QP-011.

If the drilling cuttings are characterized as Hazardous they will be containerized (if stored in pit) and managed in a less than 90-Day Storage Area until they can be shipped for disposal.

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 a total of 5000 gallons of drilling fluids will be generated for this well.

Anticipated Regulatory Status: Reusable (land applied) and Industrial Solid Waste

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 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 required for analysis. Samples will be collected in the following way:

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 EP-DIV-SOP-20014 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.

VOC and SVOC samples will be taken at three stages: 1) A sample must be collected upon initial placement of the fluids 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 fluids in the sample collection container.

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; volatile organic compounds (VOCs); semi-volatile organic compounds (SVOCs); oil/grease; Total Suspended Solids (TSS); pH; explosive compounds; PCB; cyanide; nitrates/nitrites; perchlorates; 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 any spills of petroleum based products occurred during the project. 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-SOP-12.01, *Field Logging, Handling, and Documentation of Borehole Materials*, EP-SOP-12.02, *Transportation and Admittance of Borehole Materials to the Field Support Facility*, and EP-SOP-5181, *Notebook and Logbook Documentation for Environmental Directorate Technical and 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, 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 or in containers (which may be moved off of San Ildefonso property), pending review of analytical results to determine final waste characterization. Based upon validated analytical data, the drilling fluids will be evaluated, using the AWD system, for land application in accordance with ENV-QP-010, *Land Application of Groundwater*. If the drilling fluids meet the criteria for land application, the drilling fluids will be land applied in accordance with ENV-QP-010. If the analytical data and due diligence documentation show that the drilling fluids do not meet land application criteria, which is not anticipated, they will be disposed of at a LANL approved disposal facility or evaporated.

If the drilling fluids are characterized as Hazardous they will be containerized (with a start date equal to the date the fluids were containerized) and managed in a less than 90-Day Storage Area until they can be shipped for disposal.

Waste # 4 – Development/Purge 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 80,000 gallons for this well.

Anticipated Regulatory Status: Reusable (land applied) or Industrial Solid Waste

Characterization Approach: Development water will be characterized based upon the analytical results obtained from direct sampling. A representative sample of the water will be taken within 10 days of well completion. A waste determination will be made within 45 days of waste generation. A 21-day turnaround time will be required for analysis. Samples will be collected in the following way:

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 EP-DIV-SOP-20014 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; volatile organic compounds (VOCs); semi-volatile organic compounds (SVOCs); oil/grease; Total Suspended Solids (TSS); pH; explosive compounds; PCB; cyanide; nitrates/nitrites; perchlorates; 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. 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-SOP-12.01, *Field Logging, Handling, and Documentation of Borehole Materials*, EP-SOP-12.02, *Transportation and Admittance of Borehole Materials to the Field Support Facility*, and EP-SOP-5181, *Notebook and Logbook Documentation for Environmental Directorate Technical and 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, waste generated, and field observations.

***Storage and Disposal Method*:** Development water will be moved off site and containerized on LANL property and stored as non-hazardous waste, pending analysis. Based upon validated analytical data, the development water will be evaluated, using the AWD system, for land application in accordance with ENV-QP-010. If the development water meets the criteria for land application it will be land applied in accordance with ENV -QP-010. If the analytical data and due diligence documentation show that the development water is hazardous wastes (i.e., contain constituents from a listed source), which is not anticipated, but meet all of the other land application criteria, they will be managed as non-hazardous/non-radioactive pending approval of a "contained in" from the NMED for the potentially listed constituents. WM-PROG must be notified on or before day 70 of the need for a "contained in" request so that approval may be obtained from NMED.

If the development water is characterized as Hazardous (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 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.

Waste # 5 – Decontamination Fluids: This waste stream 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 13, 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).
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> **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 Total Suspended Solids (TSSs) do not exceed the RLWTF WAC of 10,000 mg/L (*P930-1, Attachment 13;* 1.5).

Anticipated Regulatory Status: Hazardous, Industrial, or SWWS

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 EP-DIV-SOP-20014, *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 45 days of generation and wastes disposed within 90 days, if necessary. All samples will be submitted with a 21-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; volatile organic compounds (VOCs); semi-volatile organic compounds (SVOCs); oil/grease; Total Suspended Solids (TSS); pH; explosive compounds; PCB; cyanide; nitrates/nitrites; perchlorates; 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-SOP-12.01, *Field Logging, Handling, and Documentation of Borehole Materials*, EP-SOP-12.02, *Transportation and Admittance of Borehole Materials to the Field Support Facility*, and EP-SOP-5181, *Notebook and Logbook Documentation for Environmental Directorate Technical and 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, waste generated, and field observations.

Storage and Disposal Method: Decontamination water will be containerized and initially managed as nonhazardous waste. 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 analytical data and due diligence documentation show that the decontamination water is a hazardous waste (i.e., contain constituents from a listed source), which is not anticipated, they will continue to be managed as non-hazardous/non-radioactive pending approval of a "contained in" from the NMED for the potentially listed constituents. WM-PROG must be notified on or before day 70 of the need for a "contained in" request so that approval may be obtained from NMED. If the decontamination water was derived from the decontamination of drilling equipment/materials prior to use at LANL and it is found to contain chemicals that are potentially K-listed only, a due diligence does not have to be prepared. In lieu of addressing the K-listed chemicals, the following statement must be included on the Waste Profile Form (WPF):

> "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 documents amounts of K-listed wastes generated are not sufficient to have impacted well drilling and sampling operations. Therefore, the IDW is not K-listed."

If the decontamination water is characterized as Hazardous (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 facility if WAC requirements are met. If the waste cannot be disposed of at the SWWS facility, due to operational limitations or inability to meet the WAC, it will be sent to an authorized off-site facility for treatment and/or 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 Total Suspended Solids (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-CP policy), Used Oil for Recycle (Oily Water), Hazardous, Industrial, or SWWS

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 45 days of generation and wastes dispositioned within 90 days, if necessary. All samples will be submitted with a 30-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 field 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, used 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-CP (Jake Meadows 606-0185) prior to proposed discharge.
4. If discharge is not granted by ENV-CP, 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 (contact ENV-CP for 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 is estimated that approximately 1 yd^3 of residual solids may 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: Hazardous, 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; volatile organic compounds (VOCs); semi-volatile organic compounds (SVOCs); PCB; cyanide; nitrates/nitrites; perchlorates; HE; 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 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 field 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 analytical data and due diligence documentation show that the residual solids are a hazardous waste (i.e., contain constituents from a listed source), they will continue to be managed as non-hazardous/non-radioactive pending approval of a "contained in" from the NMED for the potentially listed constituents. WM-PROG must be notified on or before day 70 of the need for a "contained in" request so that approval may be obtained from NMED.

If the residual solids are characterized as Hazardous (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 at an authorized off-site facility.

Waste # 8 – Drilled Out Concrete, Chips, Concrete Slurry: This waste stream consists of concrete chips from drilling out a plug used to seal off perched groundwater or stabilized the borehole to facilitate drilling. It is estimated that 80 yd^3 of drilled out concrete chips or concrete slurry may be generated.

Anticipated Regulatory Status: Reusable (released under ENV-CP 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: 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-CP 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 4 yd^3 of residual concrete may be generated.

Anticipated Regulatory Status: Reusable (released under ENV-CP 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-CP 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 4 yd^3 of this waste stream will be generated.

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

Characterization Approach: If the material spilled is known and the spill occurs on clean base course (Non-Hazardous and Non-Radioactive), AK along with direct sampling for TPH-DRO, TPH-GRO, and BTEX 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 sampled 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.*

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. 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. 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 45 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 field 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 NMSW 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 8 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. If this waste is stored in roll-off bins, these bins will be covered with a tarp and inspected to make sure no rain water enters the bin.

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	25-yd^3 (Includes liner)	90-yd^3	5,000-gallons	80,000-gallons
Packaging	Drums/Roll Offs	Lined Pit/Drums/Roll Offs	Lined Pit/Drums/Tanks	Frac Tanks/Drums
Regulatory classification:				
Radioactive Waste				
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]				
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	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)	X (As needed)	
TCLP Organics (EPA 1311/8260-B & 1311/8270-C)		X (As needed)	X (As needed)	
TCLP Pest. & Herb. (EPA 1311/8081-A/1311/8151-A)		X (As needed)	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
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	80-yd^3
Packaging	Drums/Tanks	Drums/Tanks	Drums	Drums/Roll Offs
Regulatory classification:				
Radioactive Waste				
Reusable Material		X (Released; Used Oil for Recycle)		X (with ENV-CP Approval)
Municipal Solid Waste (MSW)				
Waste destined for LANL's SWWS or RLWTF [1]	X	X		
Hazardous Waste	X	X	X	
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	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)	X			
Perchlorates (EPA 6850)	X	X	X	
High Explosives Constituents (EPA 8330/8321-A)	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	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	
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	4-yd^3	4-yd^3	8-yd^3
Packaging	Drums	Drums	Plastic Trash Bags/Trash Cans/Dumpsters
Regulatory classification:			
Radioactive Waste			
Reusable Material	X (with ENV-CP 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	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)			
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) [2]			
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)[3]			
Perchlorates (EPA 6850)			
High Explosives Constituents (EPA 8330/8321-A)			
Asbestos			
BTEX (EPA-8021b)		X	
Total petroleum hydrocarbon (TPH)-GRO (EPA 8015-M) TPH-DRO (EPA 8015-M)		X	
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)	
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). Filtered metals and filtered Cyanide are required for land application, with the exception of mercury (hg).

2 TTO is the total of volatile organic and semi-volatile organic compound contaminants. Request methods EPA 8260-B (VOCs) and EPA 8270-C (SVOCs).
3 If Microtox analysis is not available, request BOD.

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-10021, *Characterization and Management of Environmental Program Waste*
- P-409, *Waste Management*
- P930-1, LANL Waste Acceptance Criteria
- P930-2, LANL Radioactive Waste Certification Program
- LA-UR-12-26098, *Drilling Work Plan for Regional Aquifer Well R-47 (EP2012-0254)*
- LA-UR-12-26784, *Drilling Work Plan for Regional Aquifer Well R-58 (EP2012-0271)*
- LA-UR-13-20150, *Drilling Work Plan for Regional Aquifer Well R-63i (EP2013-0015)*
- LA-UR-13-20779, *Drilling Work Plan for Well CdV-9-1(i) (EP2013-0007)*

Waste Characterization Strategy Form

Signatures	Date
Project Manager: Stephani Swickley	3/4/15
Waste Generator: Bennie Martinez FOR BENNIE MARTINEZ RON VESCOVI	3.4.15
Waste Management Coordinator: Victor Garde	3-4-15
ENV-CP Representative: John Valdez	3/4/15
Waste Acceptance Representative: Andy Elicio	03/04/2015
	Los Alamos National Laboratory EP

Attachment #1: AK-Review: SIMR-2

AK REVIEW **FORM**

Groundwater Well, Spring, and Baseflow Monitoring, Drilling, Installation, Maintenance, and Abandonment

Well/Spring/Baseflow ID No.: SIMR-2	Type:
Location:	SIMR-2 is located in Mortandad Canyon in the vicinity of R-50 and CrEX-1, in the far west portion of Pueblo of San Ildefonso Land (Figure 1).
Watershed and Associated TAs	Mortandad Canyon -TA-03, Former TA-04, TA-05, TA-35, Former TA-42, TA-48,
Description/ Scope of Work:	Installation of SIMR-2 a regional aquifer groundwater monitoring well: a single-screen regional aquifer well south of R-50 and CrEX-1.

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 SIMR-2.

Waste Management Instructions

1. Manage wastes generated due to activities at SIMR-2 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 Review Summary

This well is located in Mortandad Canyon,in the far west portion of Pueblo of San Ildefonso Land . The objectives of the well are "1) delineate the offsite nature and extent of the chromium plume (upstream from Pueblo Land); 2) potentially be used for long-term contaminant detection and monitoring, and monitoring of any future remediation efforts; and 3) provide data and information as to whether production well Pajarito Mesa #4 (PM-4) is susceptible to contamination from the chromium plume."
Potential contamination sources for canyon systems include SWMUs/AOCs associated with TAs in or adjacent to the canyons.

- TA-03, which is located on the mesa at the head of Mortandad Canyon, contains numerous potential contaminant sources. SWMUs/AOCs at TA-03 include outfalls discharging into Mortandad Canyon, material and equipment storage areas, electrical equipment containing PCBs, and releases to the ground surface from spills and stacks. These SWMUs/AOCs may have released contaminants to Mortandad Canyon either by direct discharge or by contaminating surface runoff entering the canyon.

- Former TA-04 is located on a mesa within current TA-52 south of Ten Site Canyon and was used in the 1940s as a firing site. SWMUs/AOCs at TA-04 include the former firing site, which used HE and radioactive materials, and associated facilities, including a photo processing facility, surface disposal area, and outfalls.

- TA-05 primarily serves as a LANL reserve area. The TA includes an inactive firing site located on the south rim of Mortandad Canyon that was used from 1944 to 1959. Potential contaminant sources include former firing sites, a septic tank, and a drain. The former operations and the SWMUs/AOCs at TA-05 are not a potential source for listed contaminants in drilling wastes associated with SIMR-2.

- TA-35 is located on a mesa between Mortandad and Ten Site Canyons and was constructed in 1951 to house experimental reactor and hot-cell facilities. The TA-35 WWTP [consolidated unit 35-003(a)-99] was used until 1963 to treat wastewater from radiochemistry laboratories in TA-35. Plant effluent

discharged to Pratt Canyon is the most significant TA-35 contaminant source in the Mortandad Canyon system. Over 2,700,000 gallons of wastewater, which contained 20.7 Ci of gross beta activity, were discharged into Pratt Canyon. In addition to consolidated unit 35-003(a)-99, SWMUs/AOCs in TA-35 include surface impoundments, oil storage and treatment facilities, transformers, septic systems, and disposal areas. These SWMUs/AOCs may have released contaminants to Mortandad Canyon either by direct discharge or by contaminating surface runoff entering the canyon.

- Former TA-42 is located within current TA-55 and was used from 1951 to 1952 to incinerate radioactive wastes and from 1957 to 1969 to decontaminate radioactive equipment. These facilities underwent D&D in 1977 and 1978. SWMUs/AOCs include the former incinerator and decontamination facility and associated equipment.

- TA-48 is located on the south rim of Mortandad Canyon and houses radiochemistry laboratories. Potential contaminant sources include outfalls that discharge to Mortandad and Effluent Canyons, a septic system, container storage areas, and stack releases.

The analytical data from the groundwater generated during the drilling and installation of R-28 and the surrounding wells were reviewed as acceptable knowledge (AK) for the groundwater extraction well SIMR-2. This data indicated detections of potentially F-listed solvents (Table 1) and low levels of U-234 above background but below 4% of the DOE's Derived Concentration Standards (DCSs) for land application (Table 2). Table 3 shows Chromium concentrations below RCRA limits.

Table 1 – Groundwater Data for Solvent Detections at or in the Vicinity of R-28

Location	Analyte Name	Result (ug/L)	Qualifier	Begin Collection Date	Port Depth (ft)
R-42	Toluene	12.2	NQ	11/20/2008	952.9
R-28	Toluene	29.1		5/20/2005	958.1
R-13	Toluene	2.8		7/3/2002	1018.72
R-44	Toluene	0.261	J	2/17/2009	905
R-13	Carbon Disulfide	2.15		2/2/2006	1018.72
R-44	Trichloroethylene (TCE)	0.36	J	11/13/2009	995.2

Table 2 - Radiological Concentrations in Groundwater at R-28 Above Background

Contaminant	Location	Media	Date	Maximum Concentration (pCi/L) [a,b]	Background (pCi/L)	4% of DCS (pCi/L)
Uranium-234	R-28	GW	8/17/07	**0.912 (Filtered)**	0.26	26.4

a. All other radioisotopes were either below background or undetected.

b. Regional groundwater at R-28 may be above background for Uranium-234, but it is below 4% of the DCS. Therefore, it is not LLW, and it meets the criteria for land application in accordance with the ENV-RCRA-QP-010, *Land Application of Groundwater* radiological decision tree.

Table 3 - Analytical Data for Chromium Detections at R-28

Analyte	Well ID.	Range of Detections (ug/L)	No. Detections	RCRA Regulated Level (ug/L)	Max Background Regional Groundwater (ug/L)[a]	3103 Standards (ug/L)	SDW MCLs (ug/L)

Chromium	R-28	310 - 472	24	5000	7.2	50	100
Chromium VI	R-28	376 - 417	4				

The detections of solvents in the vicinity (i.e., downstream and upstream) of the location of R-28 are infrequent and do not indicate the existence of a plume in the area. The toluene, carbon disulfide, and trichloroethylene (TCE) detections are more consistent with contamination due to surface water runoff from asphalt parking lots and/or storage pads located along the Canyons that could potentially contaminate the area of the Well. There is no other documented evidence of F-, K-, U-, or P-listed constituents that may have contaminated the area. 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 SIMR-2.

In conclusion, the wastes generated from the pump test SIMR-2 can be initially managed as non-hazardous and "non-radiological pending characterization" until analytical data is available to make a final waste determination and to determine if the cuttings, development water, and drilling fluid meet land application criteria.

Potential Contaminant Sources	Listed
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 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

- Sandia Canyon Watershed Wide Due Diligence, R.0, February 2011
- Mortandad Canyon Watershed Wide Due Diligence, R.0, April 2011
- ER2006-0144, SWMU/AOC Report, January 2007
- AK Review Form: Groundwater Well, Spring, and Baseflow Monitoring, Drilling, Installation, Maintenance, and Abandonment, May, 2011
- PRS Database
- Spill Report, May 1990 – December 2010

ADEP Representative:	**Date:** 2/26/2015
ENV-CP Environmental Professional: John M Valdez	**Date:** 2/25/2015

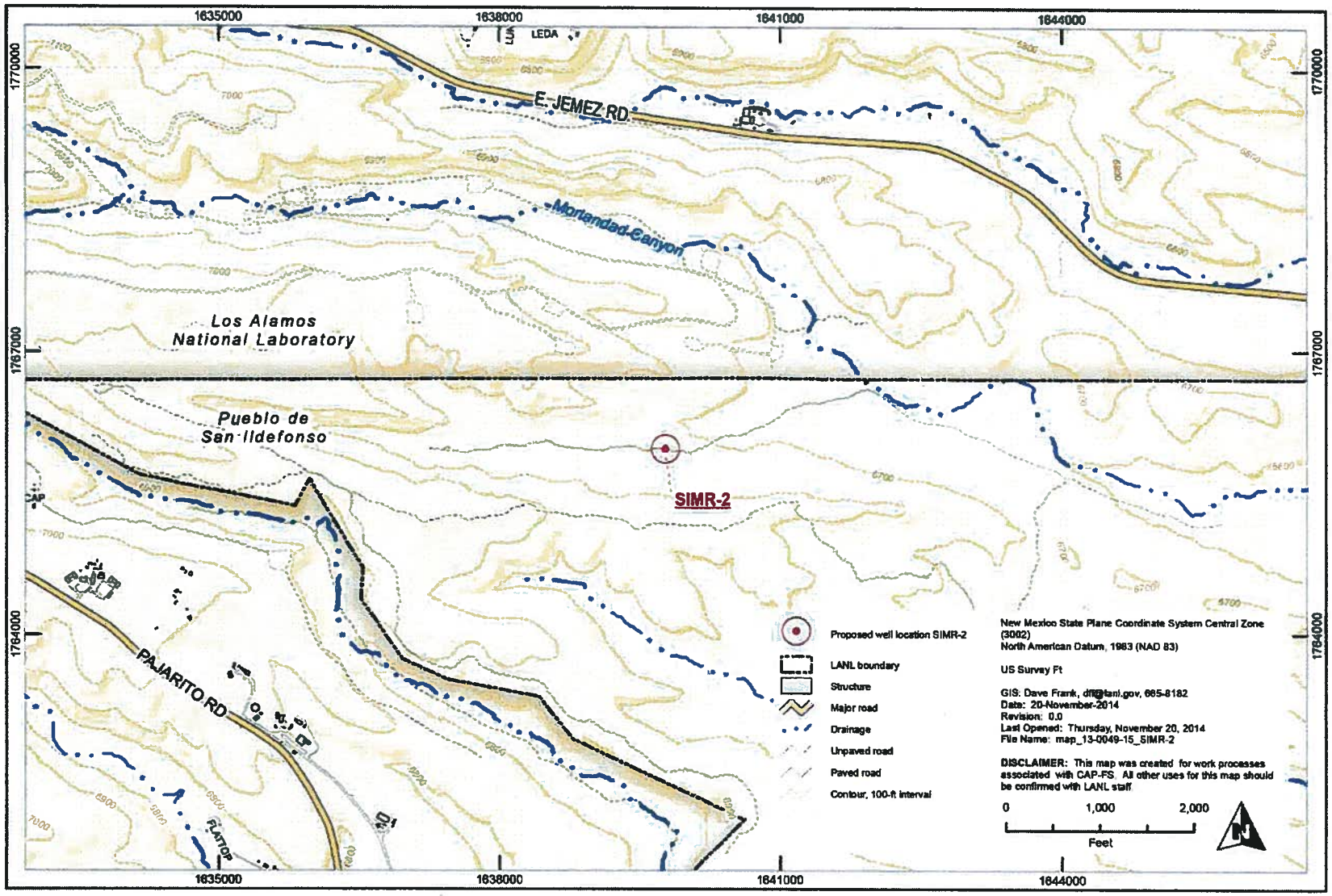

Figure 1 – Location Map for SIMR-2