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Environment, Safety, Health Directorate

ENV-ES: Environmental Stewardship Services

Technical Procedure

SAMPLING SOIL AND VEGETATION AT FACILITY SITES

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REVISION HISTORY

Document Number and Revision *[Include revision number, beginning with Revision 0]*	**Effective Date** *[Document Control Coordinator inserts effective date]*	**Description of Changes** *[List specific changes made since the previous revision]*
0	10/4/96	New Document
1	3/99	Reformatted in accordance with LIR300-00-01, Safe Work Practices.
2	4/01	Added new Section 9.0, Training.
3	4/02	Change in directorate.
4	4/03	Team name change to Environmental Surveillance.
5	5/12/04	Updated and reformatted document to conform with MAQ procedures.
6	4/11/05	Quick-change revision to convert HCP attachment to HR.
7	04/12/06	Quick-change revision to revise safety equipment requirements in HR.
SOP-5139, R0	1/30/08	Renumbered and reformatted to WES Division
SOP-5139, R1	6/24/11	Added HE soil sampling requirements at DARHT
ENV-ES-TP-006	9/30/2015	Renumbered and reformatted to ENV Division, Supersedes SOP-5139

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1.0 PURPOSE AND SCOPE

The purpose of this procedure is to describe the process for collecting soil, sediment, and vegetation samples around the perimeter of facilities such as the Material Disposal Area G (Area G) at Technical Area 54 (TA-54), the Dual-Axis Radiographic Hydrodynamic Test (DARHT) facility at TA-15, and the Plutonium Facility (PF) at TA-55 per U.S. Department of Energy (DOE) Orders 458.1, "Radiation Protection of the Public and the Environment"; DOE Order 435.1, "Radioactive Waste Management, " and Mitigation Action Plans (MAPs). This procedure applies to the individual(s) assigned to collect samples from the facilities as part of the Los Alamos National Laboratory (LANL) Facility Monitoring Program.

2.0 BACKGROUND AND PRECUATIONS

2.1 Background

This document establishes the basic requirements for collecting soil, sediment; and vegetation samples around the perimeter of certain facilities. Work performed under this procedure by LANL personnel will occur only after required training to applicable documents has been completed and documented.

2.2 Precautions

General Precautions:

Sample personnel must be on the Plan of the Day for each facility before working at the site and collecting samples. See Attachment 1 for general instructions to obtain permission to enter facilities.

Individuals are required to be trained in the following prior to performing this procedure:

- First aid
- Cardiopulmonary resuscitation (CPR)
- General Field Safety for All Employees
- Site-specific training for Area G and DARHT (including the basic recognition of explosives). A minimum of two (2) people are required to go out in the field.

Precautions related to sampling in high explosives (HE) areas (DARHT):

Exposure to explosives remains a remote possibility in some locations within the HE corridor at LANL (including the DARHT area). For this reason, we will follow the protocol entitled, "Guidance for sample collection within the DX and ESA explosive use areas, Los Alamos National Laboratory memo DX-16, December 7, 1993," (Attachment 2) for the collection of soil and sediment samples at the DARHT facility. These documents state that because of the concern for beryllium and HE by the DARHT health and safety personnel, they may require that soil sampling be conducted with a full face respirator or face shield if the ground is not moist. A spot test for HE will be conducted before sampling begins.

3.0 EQUIPMENT AND TOOLS

- Tape measure
- Tape

- Ice chest with blue ice
- Ziplock™ sample bags (1-gal. size)
- Permanent marker for labeling bags
- Chain-of-custody forms
- Personal protective equipment (e.g., safety glasses, safety/field shoes, rubber gloves, and hat)
- Stainless steel soil ring (10-cm diameter), top, and ring-spatula (for soil sampling)
- 3-lb hammer (for soil sampling)
- Soap/water solution (for washing ring), water (rinsing), paper towels (for soil sampling)
- 500-mL polyethylene bottles (for soil and/or sediment sampling)
- 500-mL amber glass bottles (for soil and/or sediment sampling)
- Disposable polyethylene scoops (for grab sampling)
- Gardening shears (for vegetation sampling)
- Face shield

4.0 STEP-BY-STEP PROCESS DESCRIPTION

4.1 Preparatory Activities

Sampler or Field Team Leader (FTL):

1. Submit sampling information (location IDs, number of samples, type of samples) to the Sample Management Office (SMO) and obtain chain-of-custody forms and labels from the SMO.
2. Make arrangements with the particular facility to get on the plan of the day for sampling. At DARHT, in particular, follow entry protocols (Attachment 1) and SOP-5060 section 4.1 Pre-Operational Activities (ensure and obtain the proper authorization from the host-group and HE representative to collect soil samples that may be potentially contaminated with HE.)
3. Conduct a hazard review in accordance with Attachment 3, Hazard Review for Facility Soil and Vegetation Sampling.
4. Check the condition of the vehicle and the fuel level.
5. Identify a point-of-contact to provide pertinent information of destination, expected time-in, and methods of notifying the field team.
6. Notify the group office to place you on travel status when leaving Los Alamos County.
7. Ensure you have a working cell phone and a pager.

4.2 DARHT and PF Soil Composite Sampling Steps

Sampler or FTL:

1. Soil composite (surface) sampling for radionuclides and target analyte list (TAL) elements is conducted at DARHT and the Plutonium Facility (PF) and the sampling locations are usually collected on the north, south, east, and west sides of the facility outside the perimeter fence line. In addition, one soil sample is collected at the firing point at DARHT. Refer to the latest Environmental Report to learn of the specific sampling site locations.

   (Note:. All soil and sediment sample locations are required to be tested for HE using an approved field analytical method (e.g., HE spot test kit, D-TECH, EnSys, Baytos, or Spontarelli tests). For samples that spot test positive for HE, arrange packaging, labeling and transportation of the sample to DX-2 for HE analysis. If samples contain HE greater than 5%, do not ship.)

2. Locate the center of the sampling area for composite soil samples, and place a clean 10-cm-(4-in.) diameter stainless-steel ring on the surface. Cover the ring with the stainless-steel top.
3. Drive the stainless steel ring 5 cm (2.0 in.) deep into the ground at the center and corners of a square area, 10 m (33 ft) per side using a 3-lb hammer. After driving the ring-sampler at each point, remove soil next to the soil ring-sampler, slip the spatula beneath the ring, and lift the sample. Place each of the five subsamples into a 1-gal. Ziplock bag.
4. Thoroughly mix the subsamples in the Ziplock bag to form a composite sample. Pour the composite into a 500-mL poly bottle.
5. Seal each bottle with chain-of-custody tape. Label the bottle with the sampling location, date, time, and your initials. Place each bottle in a 1-gal. Ziplock bag and then into an ice chest.
6. Complete a chain-of-custody form with the appropriate sampling information. Maintain proper chain-of-custody on the samples. See Maintaining Custody of Samples.
7. Wash the ring, spatula, and top with the soap/water solution, rinse with water, and then dry with paper towels.
8. Once at LANL, store the samples on ice or in a freezer until samples are shipped to the analytical laboratory.

4.3 Area G Soil and DARHT soil and sediment grab sampling steps

Sampler or FTL:

1. Soil and/or sediment grab sampling is conducted at Area G (soil) and DARHT (sediment) and the sampling locations are usually collected around the facility along and outside of the perimeter fence line. Refer to the latest Environmental Report to learn of the specific sampling site locations. (Note: Sample numbers and locations at Area G are routinely changed from year to year and are based on funding and past sampling results.)
2. Locate the sampling areas. Using a disposable polyethylene scoop, collect soil or sediment from the 0- to 6-in. depth. Place sample into a 500-mL polyethylene bottle for radionuclide and TAL analysis or into a 500-mL glass bottle for organic analysis.
   - perennial streams: sample sediment in dune buildup behind boulders in the main channel
   - ephemeral streams: sample sediment in the center of the main channel

(Note: At DARHT, follow SOP-5060, section 4.3. All soil and sediment sample locations are required to be tested for HE using an approved field analytical method [HE spot test kit, D-TECH, EnSys, Baytos, or Spontarelli tests]. For samples that spot test positive for HE, arrange packaging, labeling, and transporting of the sample to DX-2 for HE analysis. If samples contain HE greater than 5%, do not ship.)

3. Seal each bottle with chain-of-custody tape. Label the bottle with the sample location, date, time, and your initials. Place each bottle into a 1-gal. Ziplock bag.
4. Place the bags in the cooler with ice for transport back to the SFB laboratory (presently, at TA-35). Complete a chain- of-custody form with the appropriate sampling information. Maintain proper chain-of-custody on the samples. See Maintaining Custody of Samples.
5. Once at the laboratory, store the samples on ice or in a freezer until samples are shipped to the analytical laboratory.

4.4 Vegetation Sampling Steps

Sampler or FTL:

1. Vegetation samples at Area G, DARHT and the PF are usually collocated with the soil sampling sites. Refer to the latest Environmental Report to learn of the specific sampling site locations for Area G, DARHT, and PF and the type of sampling required (overstory and understory). (Note: Sample locations are sometimes changed based on funding and past sampling results.)
2. Understory (grasses and forbs) are collected by cutting the vegetation near the ground level with stainless-steel sheers. Overstory (trees) are collected by cutting the end of tree branch tips (0- to 6-in. long) at chest level. Collect approximately 3 lb. of vegetation and place into a Ziplock bag. Label the bag with the sampling location, date, time, and your initials.
3. Place the bags in the cooler with ice for transport back to LANL. Complete a chain-of-custody form with the appropriate sampling information. Maintain proper chain-of-custody procedures for samples until they are shipped to the analytical laboratory. See *Maintaining Custody of Samples*.
4. Once at the SFB laboratory, store the samples on ice or in a freezer until samples are submitted to an analytical laboratory.

4.5 Maintaining Custody of Samples

Sampler or FTL:

1. Document chain of custody for all samples used to demonstrate compliance.
2. Verify the possession and handling of samples is traceable at all times.

   Note: A sample is considered in custody if it is one of the following:

   - In one's physical possession
   - In one's view after being in one's physical possession
   - In one's physical possession and then locked up so that no one can tamper with it or
   - In a secure area where access is restricted to authorized and accountable personnel only

A secured area is defined as an area that is locked (e.g., a room, cooler, vehicle, or refrigerator).

4.6 Transferring Custody of Samples

Sampler or FTL:

1. Whenever samples are transferred into the custody of another person or organization, complete the "relinquished by/received by" and "date" sections of the form.

   NOTE: These sections of the form must provide a complete history of custody of the samples from collection to transfer to the analytical laboratory.

4.7 Broken Chain of Custody

Sampler or FTL:

1. Document the failure by initiating a deficiency report in accordance with P322-4, Laboratory Performance Feedback and Improvement Process whenever there is a break in the chain of custody of a sample.
2. Document the occurrence, evaluate the potential impact (if any) on the samples, and propose a fix to prevent recurrence.

4.8 Emergency Actions to Take in the Event of Control Failure

FTL:

1. Perform first aid for cuts, as appropriate.
2. Provide first aid for all injuries, and see that the injured person is taken to Occupational Medicine (only if immediate medical attention is not required) or to the nearest hospital if immediate attention is required.

4.9 Records

FTL:

1. Submit the following records generated by this procedure to the Principal Investigator (PI).
   - Completed chain-of-custody form and radiological control technician and HE documentation.

5.0 PROCESS FLOW CHART

Flow chart is to be included at a later date.

6.0 ATTACHMENTS

Attachment 1: *Protocols for Access to Facility Sites*
Attachment 2: *Guidance for Sample Collection within the DX and ESA Explosive use Areas*
Attachment 3: *Hazard Review for Soil and Vegetation Sampling*

ATTACHMENT 1 – PROTOCOLS FOR ACCESS TO FACILITY SITES

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Protocols for Access to Facility Sites	Records Use only Los Alamos NATIONAL LABORATORY EST. 1943

A. The general access control procedure applicable for access to Area G at TA-54:

1. Attend meeting for the plan of the day.
2. All personnel will badge in at Access Control.
3. Sampling crew will inform Access Control, where we will be sampling in case of an emergency. Personnel will keep in contact with Access Control by cell phone.
4. If we need a key to enter gates off Pajarito Road, Sampling crew will pick up and sign for keys at Access Control. Keys will be returned to Access Control before the end of work day.
5. Sampling crew will badge out at Access Control at the end of the day shift or whenever work is completed.

B. The general access control procedure applicable for access to DARHT at TA-15:

1. Check with Access Control on firing schedule at 667-6742.
2. Attend plan-of-the-day meeting at Dual-Axis Radiographic Hydrodynamic Test (DARHT) facility site.
3. Check in with Access Control for access into DARHT.
4. Sign visitor log book and exchange badge.
5. Meet with the radiological control technician and high explosives (HE) representative and make arrangements for spot testing of radioactivity swipes and HE at proposed sampling sites and/or soil samples collected. Health Hazards precautions information will be make clear to all personnel on the sampling team.
6. Open perimeter gate make sure the gate is closed before continuing to DARHT.
7. At DARHT, sign in and inform the Duty Officer that sampling will be conducted outside the controlled area.
8. Sign out at DARHT and exit to Access Control.
9. Open perimeter gate and make sure gate is closed before proceeding.
10. Personnel and equipment that have been off the paved road must be monitored by trained personnel prior to leaving the area.
11. Return exchange badge, sign out, and exist access control.
12. Return to work station.

ATTACHMENT 2 – GUIDANCE FOR SAMPLE COLLECTION WITHIN THE DX AND ESA EXPLOSIVE USE AREAS

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Guidance to DX and ESA Sites	Records Use only

LOS ALAMOS
NATIONAL LABORATORY
memorandum
EXPLOSIVES TECHNOLOGY
EXPLOSIVES REVIEW COMMITTEE

To/MS: Distribution
From/MS: Roy Lucht/C920 Roy Lucht
John Ramsay/C920 John B Ramsay
Phone/FAX: 5-0111/7-0500
Symbol: DX-16
Date: December 7, 1993

SUBJECT: GUIDANCE FOR SAMPLE COLLECTION WITHIN THE DX AND ESA EXPLOSIVE USE AREAS

Various groups from within the Laboratory are collecting or intend to collect soil samples from within explosives exclusion areas. These include processing areas, such as TA-16 (S-Site) and TA-9(DX-16), and firing areas such as TA-14, 36, and 39. The samples are intended for various types of chemical and physical analyses, both locally and at outside contracting laboratories. It is essential to the research ethic of Los Alamos that these projects continue and be encouraged. However, we, the explosives handling groups, must be confident that a sample containing significant and potentially explosively hazardous quantities of explosives does not leave the DX and ESA Division areas without proper controls. The purpose of this memorandum is to provide guidance to DX and ESA Groups for permitting sampling within the explosive use areas. Questions of toxicity and allergenic character of explosives, and radiological or metal contamination are specifically not addressed. The guidance applies to all samples, such as archaeological, water runoff, etc. For each program that will involve sampling material from within the generally accepted explosive handling areas, a brief summary should be submitted to the responsible explosive operating group of the type, location, and size of samples to be taken from within the area. This plan should be reviewed and approved by the appropriate group and division before samples are removed from the area in question. If there are any questions concerning the level of contamination, DX-16 should perform a suitable suite of analyses to obtain sufficient data for the evaluation.

Soil, water, and archaeological specimens each appear to present different questions before the material should be released outside of the explosive controlled areas. Pottery shards, projectile points, and materials excavated from below the soil surface and found in areas of low exposure to explosive contamination can be released based on a visual inspection of the site or artifacts by a responsible DX or ESA Division employee. If in the future, excavations take place in the vicinity of high probability areas for explosive contamination then a more detailed procedure will need to be instituted. The source of a water sample must be considered in the release of a sample. Clear water samples collected from stream beds outside the fragment range of firing sites again can probably be released without further analysis. Nitroguanidine is soluble in water and might be present in outflow from processing facilities. Until we have more data, such samples should be analyzed before release.

Soil samples create a special problem. Two types of contamination are of concern. They are; 1) homogeneous dispersion throughout a soil volume; and 2) heterogeneous dispersions, which could include macroscopic pieces of explosive visible to the eye. The homogeneous dispersion would be exemplified by the outfalls of machining and processing operations, whereas heterogeneous dispersion would be expected around areas such as, the gap-test arena and bullet impact impact stand, at Q-Site and the drop tower. Some firing sites will not have significant quantities of unreacted explosives, while others may have visible pieces of explosives scattered over the firing pad. Sites where deliberate NO-GOs, misfires, and partial detonations have occurred would be expected to be more of the heterogeneous nature. The expected probability of

explosive contamination must also be considered. Areas within the fragment range of a firing site would be more probable; whereas, areas well outside the fragment range or drainage area of a liquid effluent would have a negligible probability. (There are data available from firing areas within LANL that support this). Because of its density, HE fragments would not be expected to fly as far as metal fragments, unless attached to metal pieces. Thus, well away from the firing pad, HE pieces are most likely to be associated with metal fragments.

Group DX-16 has two chemical spot tests for the presence of explosives. The first and older test was developed by Baytos and is sensitive to most main line explosives at the 1 to 5% level. The newer test developed by Spontarelli is sensitive to a slightly larger spectrum of explosives down to the 100 parts per million (ppm) level. The test is sensitive to 100 ppm of TNT, tetryl, HMX, RDX, nitroglycerine, and nitrocellulose, and to 500 ppm of PETN. The tests sensitivity to TATB is questionable; however, this IHE is not likely to be hazardous under these conditions. These constitute the vast majority of explosives historically used at the Lab and would generally be expected to be found in areas where the few other non detectable HEs might also remain. A negative result with the Baytos test has been accepted as sufficient to ship machining equipment for repair without further decontamination. Both tests are equally easy to use. The Spontarelli test does give false positive results. Group DX-16 is working on this, but the error is in the conservative direction. The U. S. Army is currently accepting a contamination level of <10% as non explosive. We propose using a level of ≤5% (half the Army limit) as being non explosive. If someone finds an area with samples in the 10% range in the future which they would like to send out for analysis, we could revisit this issue. We need to understand the potential reactivity hazards from low levels of explosive contamination. Until we have a more quantitative understanding of the extent of explosives contamination and its migration we would like to propose the following guidance for all DX and ESA Division groups for the release of soil samples.

Areas Generally Accepted as Free of Explosives Contamination.
There are some areas controlled by explosives handling groups and of significant interest to outside groups to sample material frequently (the wetlands for example). If there is substantial evidence, either from existing knowledge, or a sufficient sampling and analysis history that the area may be considered as free of explosive contamination, then samples may be removed without further consideration by the sampling team. They should be alert to the fact that they are in an area where explosives material might be found and report any unusual or unrecognized material for further analysis.

Low to Negligible Probability Areas.
These are areas known not to have been exposed to direct explosive contamination. These would include areas outside of the fragment range limits of current and abandoned firing sites (900 m) and above the high water mark of stream beds draining firing mounds and processing effluent. In these areas reconnaissance sampling programs should be performed using the Spontarelli test. The tests should be performed by a trained individual who may be either a member of the sampling team or a representative of DX or ESA Division. Reconnaissance samples should be obtained over the entire area and at the various depths that the final samples will be taken. Examination of these samples by an explosives expert should also be performed to confirm the absence of visible pieces of explosives. If all the samples are negative, then the sampling team may collect samples and remove them from the controlled explosive area. Should a test give a positive result for the presence of explosive the results must be reported to the appropriate Group and Division Offices. Consideration should be given to a further study of the source of the contamination.

Areas with Potential Explosives Contamination.
These are all other areas not allowed as a Low Probability Area. They include firing mounds, stream beds draining firing mounds, areas inside the fragment range limits, and drainage paths from explosives-contaminated fluid effluent and burning grounds. Within these areas the

distinction between homogeneous and heterogeneous distribution must be carefully considered in obtaining samples.

Homogeneous Areas. If it recognized that the area could contain explosives material, but that it will be dispersed throughout the desired sampling volume, then a reconnaissance-type sampling program should be performed. The reconnaissance samples should be analyzed by an experienced analyst from DX or ESA-Division or individual approved by DX or ESA Division. If all the results from the reconnaissance sampling program are negative, the specific area can be declared a low-probability area. The guidance provided above should then be followed and samples may be released from the explosives control area. If positive results are obtained for any sample then all samples should be submitted to Group DX-16 for a more complete analysis of the level of explosives contamination. Samples from such positive areas can be released outside of the explosive control area only after approval of an authorized Division representative. They can be released only to outside laboratories whose analysis techniques have been approved by a knowledgeable LANL employee. This person will ensure that the analysis techniques cannot concentrate HE into hazardous quantities or that the laboratory properly handles hazardous quantities when produced.

Heterogeneous Areas. These areas constitute a potentially more hazardous situation, because visible pieces of explosives might be present and not detected by a chemical spot test. Such areas would include, but are not limited to, the firing pad at Q-Site where gap-tests and bullet impact test have been fired for many years, and the firing sites of TA-36 and TA-40 where there have been tests fired in which the entire charge did not detonate. Personnel taking samples in these areas should be accompanied by a DX or ESA Division explosives expert who can identify possible pieces of HE on the ground before the sample is taken. Not only should a spot test be performed on these samples, but the material should be visibly examined by the experienced person for the presence of pieces of explosives. If for reasons of sample control a careful visual examination of the entire sample cannot be made, then the sample should be analyzed by DX-16 until a more complete analytical assessment of the area has been completed. No samples should be released from the "Potentially-contaminated, heterogeneous areas" until a knowledgeable person from DX or ESA Division specifically authorizes such release.

Groups authorized to sample within the explosive exclusion areas are obligated to provide timely reports to the appropriate Group and Division on the status of analysis of samples taken from within their boundaries.

Because of the varied nature of the hazard and the types of samples and potential contamination, it appears that each sampling program must be evaluated and approved individually. It would be a mistake to arbitrarily ascribe a contaminated status to all areas but neither can we state that any area is uncontaminated. As data are collected and we know more about the location, concentration, and migration of explosive contamination some areas can be declared free of significant contamination and the sampling restrictions requiring can be relaxed.

The Explosives Review Committee recommends this memorandum be used as minimum guidance. Group Leaders and Division Directors responsible for potentially explosively contaminated areas may require more stringent requirements if they believe they are warranted.

ATTACHMENT 3 – HAZARD REVIEW FOR SOIL AND VEGETATION SAMPLING

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Hazard Review for Soil and Vegetation Sampling	Records Use only

Work Tasks/Steps	Hazards, Concerns, and Potential Accidents; Likelihood/Severity	Controls, Preventive Measures (e.g., safety equipment, administrative controls, etc.)	Hazard Level (from IMP 300-00-00, Hazard Grading Matrix)
Travel to sampling sites in the field.	Various field and outdoor hazards such as seasonal heat and cold extremes, wind, sun exposure, lightning, insects, reptiles, slips, falls, brush remote/moderate = Low	Train to "General Field Safety for all Employees." Wear personal protective equipment (PPE) that includes pants, long-sleeve shirt, safety glasses, steel toed safety shoes, and protective gloves.	Low
Collect samples around perimeter of TA-55.	Radionuclide contamination Occasional/moderate = Low (Note: Knowledge of process of radionuclide contaminants at Technical Area 55 (TA-55) shows that they are within screening action levels and far below regulatory levels; there are no metals above background.)	Follow all site-specific training and entry requirements.	Low

ATTACHMENT 2 – HAZARD REVIEW FOR SOIL AND VEGETATION SAMPLING (CONT.)

Work Tasks/Steps	Hazards, Concerns, and Potential Accidents; Likelihood/Severity	Controls, Preventive Measures (e.g., safety equipment, administrative controls, etc.)	Hazard Level (from IMP 300-00-00, Hazard Grading Matrix)
Enter DARHT to collect samples.	Radionuclides, beryllium, and HE contamination Remote/moderate = Low (Note: Process of knowledge of radionuclide and Be contaminants at the DARHT site shows that they are either not detected and/or within background concentrations. All HE samples have been at nondetectable levels.)	Follow all site-specific training and entry requirements. Access control check-in required for DARHT. Note: because of the concern for beryllium and HE by the DARHT health and safety personnel, they may require that soil sampling be conducted with a full face respirator or face shield if the ground is not moist. A spot test for HE will be conducted before sampling begins.	Low
Enter Area G to collect samples.	Radionuclide contamination remote/ moderate = Low (Note: Knowledge of process of radionuclide contaminants at TA-54 show that they are within screening action levels and far below regulatory levels; there are no metals above background.)	Follow all site-specific training and entry requirements. Facility-specific training is needed for Area G. Ensure you are on the area's "plan of the day."	Low
Collect soil samples according to steps for soil sample collection in the chapter "Collecting Samples."	Smashing fingers, toes, head and eyes with soil sampling tool. Occasional /moderate = Low	Review "Facility Soil and Vegetation Sampling" protocol for sampling procedures. Wear PPE.	Low

ATTACHMENT 2 – TITLE OF ATTACHMENT OR APPENDIX (CONT.)
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Work Tasks/Steps	Hazards, Concerns, and Potential Accidents; Likelihood/Severity	Controls, Preventive Measures (e.g., safety equipment, administrative controls, etc.)	Hazard Level (from IMP 300-00-00, Hazard Grading Matrix)
Collect sediment samples according to steps for sediment sample collection in the chapter "Collecting Samples."	Hammering injury (smashed fingers) and flying debris from use of ring and hammer Ergonomic injuries (repetitive motion) Occasional /moderate = Low	Wear the minimum PPE as described above. Take a short break every hour.	Low
Collect vegetation samples according to steps for vegetation sample collection in the chapter "Collecting Samples."	Cutting fingers, dropping on toes, poking eyes with vegetation cutting shears Occasional /moderate = Low	Use care when cutting with shears and clippers—wear protective (Kevlar) gloves.	Low

Wastes or Residual Materials

Sample materials will be disposed by the analytical laboratory.

Emergency Actions to Take in Event of Control Failure

For cuts, perform first aid as appropriate. Go to hospital for serious injuries. Go to Occupational Medicine for evaluation. Notify supervisor ASAP.

Los Alamos NATIONAL LABORATORY EST. 1943

Environment, Safety and Health

Electronic Public Reading Room - Posting of Controlled Procedures

Operations Integration Office Management Approval:

Print Name	Signature	Date
Ellena Martinez	Ellena Martinez	3/4/16

Derivative Classifier:

☐ OUO ☐ UCNI ☒ Unclassified ☐ Classified

Print Name	Signature	Date
Larry W. Maassen	Larry Maassen	3/4/16

List of Controlled Documents:

Procedure No.	Title/Description
Air Monitoring (ENV)	
ENV-ES-TPP-003	Technical Project Plan for the Neighborhood Environmental Watch Network (NEWNET)
ENV-ES-TPP-007	Technical Project Plan for the Direct Penetrating Radiation Monitoring Network (DPRNET)
Data Validation (ADESH)	
OIO-TP-5161	Routine Validation of Volatile Organic Compound Analytical Data
OIO-TP-5162	Routine Validation of Semivolatile Organic Compound Analytical Data
OIO-TP-5163	Routine Validation of Organochlorine Pesticide and Polychlorinated Biphenyl Analytical Data
OIO-TP-5165	Routine Validation of Metals Analytical Data
General Field Work	
OIO-TP-222	Shipping/Receiving of Environmental Samples by the Sample Management Office (SMO)
OIO-QP-219	Sample Control and Field Documentation
Soil, Foodstuffs, and Biota Sampling (ENV)	
ENV-ES-TPP-002	Technical Project Plan for Biota Dose Assessment
ENV-ES-TP-003	Collection of Soil and Vegetation Samples for the Environmental Surveillance Program
ENV-ES-TP-004	Produce Sampling
ENV-ES-TP-007	Game Animal Sampling
ENV-ES-TP-006	Sampling Soil and Vegetation at Facility Sites
SOP-5247	Collection of Benthic Macroinvertebrates in the Rio Grande
ENV-ES-TP-008	Collection of Crawfish in the Rio Grande
Well Drilling, Construction, Development, Maintenance, and Abandonment	
ENV-RCRA-QP-010	Land Application of Groundwater