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John Kieling, Bureau Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6303

Subject: Solid Waste Management Unit Assessment Report for Los Alamos Canyon Borrow Pit

Dear Mr. Kieling:

Enclosed please find two hard copies with electronic files of the Solid Waste Management Unit Assessment Report (SAR) for Los Alamos Canyon Borrow Pit.

The purpose of this SAR is to comply with Section X.C of the 2016 Compliance Order on Consent that states "DOE shall develop and implement a preliminary screening plan (including sampling and investigation activities and schedule for those activities) for such newly discovered potential SWMU or AOC, and provide NMED with the results of the preliminary screening." This SAR presents the results of the preliminary screening performed at the former borrow pit.

If you have any questions, please contact Steve Veenis at (505) 667-0013 (veenis@lanl.gov) or Cheryl Rodriguez at (505) 665-5330 (cheryl.rodriguez@em.doe.gov).

Sincerely,

Bruce Robinson, Program Director
Environmental Remediation Program
Los Alamos National Laboratory

Sincerely,

David S. Rhodes, Director
Office of Quality and Regulatory Compliance
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BR/DR/SV:sm

Enclosures: Two hard copies with electronic files – Solid Waste Management Unit Assessment Report for Los Alamos Canyon Borrow Pit (EP2017-0046)

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LA-UR-17-22475
April 2017
EP2017-0046

Solid Waste Management Unit Assessment Report for Los Alamos Canyon Borrow Pit

Prepared by the Associate Directorate for Environmental Management

EP2017-0046

Solid Waste Management Unit Assessment Report for Los Alamos Canyon Borrow Pit

April 2017

Responsible project manager:

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EXECUTIVE SUMMARY

A former borrow pit in Los Alamos Canyon has been used for the final disposition of sediment removed from the Los Alamos Canyon low-head weir basins, which captured sediment during ephemeral storm water flow events and required excavation to maintain sediment-capture capacity. Sediment was emplaced in the borrow pit in 2011, 2012, 2013, and 2014. The New Mexico Environment Department Hazardous Waste Bureau has directed Los Alamos National Laboratory (LANL or the Laboratory) to prepare a solid waste management unit assessment report (SAR) to determine whether the site should be designated a solid waste management unit or an area of concern. A SAR work plan was prepared by the Laboratory to identify the characterization activities required to collect the data needed to investigate the area and to prepare a SAR. This SAR describes the activities implemented in accordance with the SAR work plan and presents the results of those activities. Based on the investigation results, the sediments in the borrow pit do not pose an unacceptable risk under the residential scenario and no further actions under the 2016 Compliance Order on Consent (Consent Order) are needed. The site does not need to be added to Appendix A of the Consent Order as a new solid waste management unit or area of concern.

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1.0 INTRODUCTION

Los Alamos National Laboratory (LANL or the Laboratory) is a multidisciplinary research facility owned by the U.S. Department of Energy (DOE) and managed by Los Alamos National Security, LLC (LANS). The Laboratory is located in north-central New Mexico approximately 60 mi northeast of Albuquerque and 20 mi northwest of Santa Fe. The Laboratory site covers approximately 39 mi^2 of the Pajarito Plateau, which consists of a series of fingerlike mesas separated by deep canyons containing perennial and intermittent streams running from west to east. Mesa tops range in elevation from approximately 6200 to 7800 ft above mean sea level.

The Laboratory is participating in a national effort by DOE to reduce risk to human health and the environment at its facilities. The goal of the Laboratory's effort is to ensure that past operations do not threaten human or environmental health and safety in and around Los Alamos County, New Mexico. To achieve this goal, the Laboratory is currently investigating sites potentially contaminated by past Laboratory operations. The sites under investigation are designated as solid waste management units (SWMUs) and areas of concern (AOCs).

The New Mexico Environment Department (NMED), pursuant to the New Mexico Hazardous Waste Act, regulates cleanup of hazardous wastes and hazardous constituents. DOE regulates cleanup of radioactive contamination, pursuant to DOE Order 458.1, Administrative Change 3, "Radiation Protection of the Public and the Environment," and DOE Order 435.1, "Radioactive Waste Management." Information on radioactive materials and radionuclides, including the results of sampling and analysis of radioactive constituents, is voluntarily provided to NMED in accordance with DOE policy.

This SWMU assessment report (SAR) provides site characterization activities and results conducted at a former borrow pit located within Los Alamos Canyon at the Laboratory (Figure 1.0-1). This borrow pit was used to permanently emplace sediments removed from sediment basins located immediately upgradient of the Los Alamos Canyon low-head weir, which was constructed to reduce downstream flood potential beyond the Laboratory boundary post–Cerro Grande fire. The sediments emplaced within the borrow pit potentially contain contaminants from upgradient SWMUs and AOCs. These potential contaminants may have washed down the Los Alamos Canyon and deposited in the low-head weir basins during ephemeral storm events. For this reason, the sediments placed in the borrow pit are being evaluated as a potential SWMU or AOC pursuant to the screening process in Section X.C of the 2016 Compliance Order on Consent (Consent Order).

The purpose of this SAR is to comply with Section X.C of the Consent Order, which states that "DOE shall develop and implement a preliminary screening plan (including sampling and investigation activities and schedule for those activities) for such newly discovered potential SMWU or AOC, and provide NMED with the results of the preliminary screening." This SAR presents the results of the preliminary screening performed at the former borrow pit.

1.1 SAR Overview

Excavation of sediments from behind the Los Alamos Canyon low-head weir and placement of the sediments in the former borrow pit was last performed in 2013. The sediments were sampled prior to excavation and a report of the 2013 sampling and excavation activities was submitted to NMED (LANL 2013, 251741). A notice of disapproval (NOD) for the 2013 excavation report was issued by NMED (NMED 2015, 600271), requesting additional information related to the borrow pit and the sediments. A response to the NOD and a revised excavation report were submitted to NMED in 2015 (LANL 2015, 600513). An NOD for the revised report was issued by NMED on December 1, 2015 (NMED 2015,

601032), directing the Laboratory to submit Revision 2 of the 2013 excavation report and to prepare a SAR for the sediments placed in the borrow pit.

The requirements for Revision 2 of the excavation report and the SAR were discussed during a June 21, 2016, meeting among representatives of the NMED Hazardous Waste Bureau (NMED-HWB), NMED Surface Water Quality Bureau, DOE, and LANS. NMED-HWB requested that the response to the NOD be addressed in a SAR work plan. Using this approach, NMED indicated that Revision 2 would not be required, and once investigation activities proposed in the SAR work plan were complete, the results should be submitted in a SAR. A SAR work plan and revised SAR work plan were submitted to NMED in August 2016 and November 2016, respectively (LANL 2016, 601680; LANL 2016, 602010), and the revised SAR work plan was approved by NMED on December 22, 2016 (NMED 20176, 602080).

Section 2 of this SAR provides background information, including the history of sediment disposal activities at the site. Section 3 describes the scope of site characterization activities conducted at the Los Alamos Canyon borrow pit in accordance with the approved SAR work plan. Section 4 presents the results of the characterization activities, including identification of chemicals of potential concern (COPCs) and the results of the human health risk-screening evaluation. Conclusions and recommendations are presented in Section 5. Section 6 presents references. Appendix A contains acronyms and abbreviations, a metric conversion table, and data qualifier definitions. Appendix B provides a summary report of field activities. Appendix C presents the analytical data (on CD included with this document). Appendix D presents the results of statistical analysis of data and Appendix E describes management of investigation-derived waste. Appendix F presents ProUCL input and output files and dioxin/furan toxicity equivalency calculation results.

1.2 SAR Objectives

The objectives of the investigation described in this report are to characterize hazardous and radionuclide constituents present in the borrow pit sediments and to evaluate whether these sediments potentially pose an unacceptable risk to human health. This information then forms the basis for determining whether the former borrow pit should be identified as a new SWMU or AOC.

2.0 BACKGROUND

2.1 General Site Information

The Los Alamos Canyon borrow pit is located in Los Alamos Canyon approximately one-half mile west of the Laboratory boundary at NM 4 (Figure 1.0-1). In late spring/early summer of 2011, 2012, 2013, and 2014, sediments were removed from basins located behind the Los Alamos Canyon low-head weir and placed in the borrow pit. Sediments were removed annually to maintain the storm water detention capacity of the Los Alamos low-head weir and associated sediment basins before each corresponding year’s monsoon season. The borrow pit is located outside the 100-yr flood plain.

Following placement in the borrow pit, sediments have been stabilized by revegetation to prevent erosion. A runoff control berm below the sediments provides further protection against off-site transport of surface eroded sediments. The surface dimensions of the sediments placed in the borrow pit are approximately 230 ft in the downslope orientation (generally east-west direction) and 170 ft in the cross-slope direction (generally north-south direction).

The borrow pit has been used only to manage sediments removed from behind the Los Alamos Canyon low-head weir. No other materials have been managed or emplaced at the site. These sediments consist of soils and canyon sediments originating in the watershed upstream of the weir. These materials were

eroded and transported downstream during precipitation events and deposited in the basins behind the weir. The upstream watershed includes portions of the Laboratory including several SWMUs and AOCs, portions of the Los Alamos townsite, and U.S. Forest Service land.

Visual inspection of the borrow pit occurs twice a year and after every flow event greater than 50 cubic feet per second at gage station E042.1. If erosion or any other issues are noted that require follow-up maintenance, maintenance is scheduled and conducted.

2.2 History of Placement of Sediments in the Borrow Pit

The borrow pit has been used four times for disposition of sediments removed from the Los Alamos Canyon low-head weir sediment basins. An estimated 16,400 yd^3 of Los Alamos weir sediments were placed in the borrow pit between 2011 and 2014. Each of these events is described in the approved SAR work plan (LANL 2016, 602010; NMED 2016, 602080).

3.0 SCOPE OF ACTIVITIES

This section presents an overview of activities performed during the implementation of the approved SAR work plan (LANL 2016, 602010; NMED 2016, 602080).

3.1 Field Activities

The following sections describe the field activities conducted during the 2016 characterization.

3.1.1 Sampling Locations and Depth Intervals

In accordance with the NMED-approved SAR work plan (LANL 2016, 602010; NMED 2016, 602080), samples were collected at three depth intervals at each of eight locations. At each location a sample was collected from the top, mid-point, and bottom of the sediment profile. The sampling locations are shown in Figure 3.1-1, and the samples collected, including depth intervals and descriptions, are presented in Table 3.1-1.

3.1.2 Sample Analyses

In accordance with the NMED-approved SAR work plan (LANL 2016, 602010; NMED 2016, 602080), sediment samples were analyzed for the same suite of analytes used during the 2013 and 2014 sampling of the Los Alamos low-head weir sediments. Inorganic analyses included target analyte list (TAL) metals and total cyanide. Organic analyses included dioxins/furans, herbicides, polychlorinated biphenyls (PCBs), and pesticides. Radionuclide analyses included americium-241, gamma-emitting radionuclides, isotopic plutonium, strontium-90, and tritium. Table 3.1-2 summarizes the samples collected and the analyses performed.

3.1.3 Investigation Methods

Field methods used during the site characterization are described in Appendix B. These methods include performing geodetic surveys, collecting surface and subsurface samples, collecting quality assurance/quality control samples, decontaminating equipment, and managing investigation-derived waste. Appendix B also includes copies of sample chain-of-custody (COC) records and field screening results.

3.2 Data Evaluation

The analytical data were evaluated to identify COPCs and to identify potential unacceptable human-health risks associated with COPCs.

3.2.1 Identification of COPCs

COPCs are chemicals and radionuclides that may be present as a result of releases from SWMUs or AOCs. Inorganic chemicals and some radionuclides occur naturally, and inorganic chemicals and radionuclides detected because of natural background are not considered COPCs. Similarly, some radionuclides may be present as a result of fallout from historical nuclear weapons testing, and these radionuclides are also not considered COPCs. The Laboratory has collected data on background concentrations of many inorganic chemicals, naturally occurring radionuclides, and fallout radionuclides. These data have been used to develop media-specific background values (BVs) and fallout values (FVs) (LANL 1998, 059730). For inorganic chemicals and radionuclides for which BVs or FVs exist, identification of COPCs includes background comparisons, which are described below. If no BVs or FVs are available, COPCs are identified based on detection status (i.e., if the inorganic chemical or radionuclide is detected, it is identified as a COPC unless available information indicates it is not present as a result of a release from the SWMU or AOC).

Organic chemicals may be present as a result of anthropogenic activities unrelated to the SWMU or AOC or, to a lesser extent, from natural sources. Because no background data are available for organic chemicals, background comparisons cannot be performed in the same manner as for inorganic chemicals or radionuclides. Therefore, organic COPCs are identified on the basis of detection status (i.e., the organic chemical is detected). Organic chemicals that are clearly present from sources other than releases from a SWMU or AOC, and for which there are no known releases from a SWMU or AOC, may be eliminated as COPCs and not evaluated further.

3.2.1.1 Inorganic Chemical and Radionuclide Background Comparisons

COPCs are identified for inorganic chemicals and radionuclides according to Laboratory procedures EP-SOP-10071, Background Comparisons for Inorganic Chemicals, and EP-SOP-10073, Background Comparisons for Radionuclides (available at http://www.lanl.gov/environment/plans-procedures.php). Inorganic COPCs are identified by comparing site data with BVs and using statistical comparisons, as applicable (LANL 1998, 059730). Radionuclides are identified as COPCs based on background comparisons and statistical methods if BVs or FVs are available (LANL 1998, 059730) or on detection status if BVs or FVs have not been established.

Background data are generally available for inorganic chemicals in soil, sediment, and tuff (LANL 1998, 059730). A BV may be either a calculated value from the background data set (upper tolerance limit or the 95% upper confidence bound on the 95th quantile) or a detection limit (DL). When a BV is based on a DL, there is no corresponding background data set for that analyte/media combination.

For inorganic chemicals detected in borrow pit sediments, the first step was to compare the sampling result with BVs. If all results for an inorganic constituent were below BV, the inorganic chemical is not a COPC. If sampling results are above the BV and sufficient data are available (eight or more sampling results and five or more detections), statistical tests were used to compare the site sample data with the background data set for the appropriate media. If statistical tests could not be performed because of a high percentage of nondetections, the inorganic chemical was identified as a COPC unless lines of evidence could be presented to establish the inorganic chemical is not a COPC.

Radionuclides were identified as COPCs based on comparisons with BVs for naturally occurring radionuclides or with FVs for fallout radionuclides. Thorium-228, thorium-230, thorium-232, uranium-234, uranium-235/236, and uranium-238 are naturally occurring radionuclides. Americium-241, cesium-137, plutonium-238, plutonium-239/240, strontium-90, and tritium are fallout radionuclides having FVs.

Naturally occurring radionuclides detected at activities above their respective BVs are identified as COPCs in the same manner as inorganic chemicals. If there is no associated BV or FV and the radionuclide is detected, it is retained as a COPC.

3.2.1.2 Statistical Methods

If inorganic chemicals or radionuclides were detected above BVs or FVs, statistical methods were used to determine whether the constituents are COPCs. The statistical tests used evaluate potential differences between the distributions in the site data and the background data. These tests are used for testing hypotheses about data from two potentially different distributions (e.g., a test of the hypothesis that site concentrations are elevated above background levels). Three statistical tests were used: the Gehan test, the quantile test, and the slippage test.

The Gehan test is recommended when between 10% and 50% of the data sets are nondetections. It handles data sets with nondetections reported at multiple DLs in a statistically robust manner (Gehan 1965, 055611; Millard and Deverel 1988, 054953). The Gehan test is not recommended if either of the two data sets has more than 50% nondetections. If there are no nondetected concentrations in the data, the Gehan test is equivalent to the Wilcoxon Rank Sum test. The Gehan test is the preferred test because of its applicability to a majority of environmental data sets and its recognition and recommendation in U.S. Environmental Protection Agency– (EPA-) sponsored workshops and publications.

The quantile test is better suited to assessing shifts in a subset of the data. The quantile test determines whether more of the observations in the top chosen quantile of the combined data set come from the site data set than would be expected by chance, given the relative sizes of the site and background data sets. If the relative proportion of the two populations being tested is different in the top chosen quantile of the data from that of the remainder of the data, the distributions may be partially shifted because of a subset of site data. This test is capable of detecting a statistical difference when only a small number of concentrations are elevated (Gilbert and Simpson 1992, 054952). The quantile test is the most useful distribution shift test where samples from a release represent a small fraction of the overall data collected. The quantile test is applied at a prespecified quantile or threshold, usually the 80th percentile. The test cannot be performed if more than 80% (or, in general, more than the chosen percentile) of the combined data are nondetected values. It can be used when the frequency of nondetections is approximately the same as the quantile being tested. For example, in a case with 75% nondetections in the combined background and site data set, application of a quantile test comparing 80th percentiles is appropriate. However, the test cannot be performed if nondetections occur in the top chosen quantile. The threshold percentage can be adjusted to accommodate the detection rate of an analyte or to look for differences further into the distribution tails. The quantile test is more powerful than the Gehan test for detecting differences when only a small percentage of the site concentrations is elevated.

If the differences between two distributions appear to occur far into the tails, the slippage test may be performed. This test evaluates the potential for some of the site data to be greater than the maximum concentration in the background data set if, in fact, the site data and background data came from the same distribution. This test is based on the maximum concentration in the background data set and the number ("n") of site concentrations that exceed the maximum concentration in the background set (Gilbert and Simpson 1990, 055612, pp. 5–8). The result (p-value) of the slippage test is the probability that "n" site samples (or more) exceed the maximum background concentration by chance alone. The test accounts for the number of samples in each data set (number of samples from the site and number of samples from background) and determines the probability of "n" (or more) exceedances if the two data sets came from identical distributions. This test is similar to the BV comparison in that it evaluates the largest site measurements but is more useful than the BV comparison because it is based on a statistical hypothesis test, not simply on a statistic calculated from the background distribution.

For all statistical tests, a p-value less than 0.05 will be the criterion for accepting the null hypothesis that site sampling results are different from background. If the results of two statistical tests indicate site sampling results are not different from background, the constituent is not a COPC.

3.2.2 Human-Health Risk Screening Evaluation

After COPCs were identified, a human-health risk screening evaluation was performed to assess whether the sediments in the borrow pit pose a potential unacceptable human health risk. For each COPC, an exposure point concentration (EPC) was calculated. For evaluation of the borrow pit, the entire data set (i.e., all locations and depths) was used to determine EPCs. If there are sufficient data (i.e., eight samples and five detections) to calculate an upper confidence limit (UCL), the UCL was used as the EPC. UCLs were calculated using the EPA ProUCL 5.1.002 software (EPA 2015, 601725). If there were not sufficient data to calculate a UCL, the maximum detected concentration was used as the EPC. As described below, the incremental risk for each COPC was evaluated using NMED's SSLs for the residential scenario (NMED 2015, 600915). If there are no NMED SSLs for a COPC, the EPA residential screening levels (https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-may-2016) were used, adjusted to 10^{-5} risk for carcinogens.

The EPCs for the dioxin and furan congeners are the sums of the detected congeners weighted by the toxicity equivalency factors (TEFs) (NMED 2015, 600575); the sum is expressed as the 2,3,7,8-tetrachlorodibenzodioxin– (TCDD-) equivalent concentration or toxic equivalency (TEQ). The TEFs used are presented in Table 3.2-1. The results of the TEF calculations are presented in Appendix F.

Carcinogenic risk was evaluated for all inorganic and organic COPCs having a carcinogenic endpoint for the residential scenario. The carcinogenic risk associated with each COPC was calculated by dividing the EPC by the residential soil screening level (SSL) and multiplying by 10^{-5}. The carcinogenic risks for each COPC were then summed to determine the cumulative risk, which was compared to NMED's target of 1×10^{-5}.

Noncarcinogenic risk was evaluated for all inorganic and organic COPCs having a noncarcinogenic endpoint for the residential scenario. The noncarcinogenic hazard quotient (HQ) for each COPC was calculated by dividing the EPC by the residential SSL. The HQs for each COPC were then summed to determine the hazard index (HI), which was compared to NMED's target of 1.

In addition to carcinogenic and noncarcinogenic risk, the potential radiological dose for the residential scenario will also be evaluated for all radionuclide COPCs. Dose was evaluated using the Laboratory's screening action levels (SALs) for the residential scenario (LANL 2015, 600929). The dose for each radionuclide COPC was evaluated by dividing the EPC by the residential SAL and multiplying by

25 mrem/yr. The doses for each COPC were then summed to determine the total dose, which was compared with the target dose of 25 mrem/yr as authorized by DOE Order 458.1.

4.0 RESULTS

4.1 Results of Sample Analysis

Table 4.1-1 presents the inorganic chemicals detected above BV, detected with no BV, or not detected with detection limits above BV. Table 4.1-2 presents the detected organic chemicals. Table 4.1-3 presents radionuclides detected above BV/FV or detected with no BV/FV.

4.2 COPC Identification

Decision-level data at the Los Alamos Canyon borrow pit consist of the 2016 results from 24 sediment samples collected from 8 locations.

4.2.1 Inorganic Chemicals

Twenty-four sediment samples were analyzed for TAL metals and cyanide. Table 4.1-1 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs.

Antimony was not detected above the sediment BV (0.83 mg/kg) but had DLs (0.973 mg/kg to 6.72 mg/kg) above BV in 24 samples. Antimony is retained as a COPC.

Barium was detected above the sediment BV (127 mg/kg) in six samples with a maximum concentration of 247 mg/kg. The box plot and Gehan and quantile tests indicate site concentrations of barium in sediment are statistically different from background (Figure D-1 and Table D-1). Barium is retained as a COPC.

Beryllium was detected above the sediment BV (1.31 mg/kg) in five samples with a maximum concentration of 1.97 mg/kg. The box plot and Gehan and quantile tests indicate site concentrations of beryllium in sediment are statistically different from background (Figure D-2 and Table D-1). Beryllium is retained as a COPC.

Cadmium was detected above the sediment BV (0.4 mg/kg) in two samples with a maximum concentration of 0.41 mg/kg and was not detected above BV but had DLs (0.497 mg/kg to 0.532 mg/kg) above BV in four samples. The box plot and quantile and slippage tests indicate site concentrations of cadmium in sediment are statistically different from background (Figure D-3 and Table D-1). Cadmium is retained as a COPC.

Calcium was detected above the sediment BV (4420 mg/kg) in six samples with a maximum concentration of 8770 mg/kg. The box plot and Gehan and quantile tests indicate site concentrations of calcium in sediment are statistically different from background (Figure D-4 and Table D-1). Calcium is retained as a COPC.

Chromium was detected above the sediment BV (10.5 mg/kg) in five samples with a maximum concentration of 19.1 mg/kg. The box plot and Gehan and quantile tests indicate site concentrations of chromium in sediment are statistically different from background (Figure D-5 and Table D-1). Chromium is retained as a COPC.

Cobalt was detected above the sediment BV (4.73 mg/kg) in six samples with a maximum concentration of 6.07 mg/kg. The box plot and Gehan and quantile tests indicate site concentrations of cobalt in sediment are statistically different from background (Figure D-6 and Table D-1). Cobalt is retained as a COPC.

Copper was detected above the sediment BV (11.2 mg/kg) in six samples with a maximum concentration of 15 mg/kg. The box plot and Gehan and quantile tests indicate site concentrations of copper in sediment are statistically different from background (Figure D-7 and Table D-1). Copper is retained as a COPC.

Cyanide was detected above the sediment BV (0.82 mg/kg) in five samples with a maximum concentration of 1.24 mg/kg. The box plot and Gehan and quantile tests indicate site concentrations of cyanide in sediment are not statistically different from background (Figure D-8 and Table D-1). Cyanide is not a COPC.

Lead was detected above the sediment BV (19.7 mg/kg) in nine samples with a maximum concentration of 40 mg/kg. The box plot and Gehan and quantile tests indicate site concentrations of lead in sediment are statistically different from background (Figure D-9 and Table D-1). Lead is retained as a COPC.

Manganese was detected above the sediment BV (543 mg/kg) in nine samples with a maximum concentration of 1130 mg/kg. The box plot and Gehan and quantile tests indicate site concentrations of manganese in sediment are statistically different from background (Figure D-10 and Table D-1). Manganese is retained as a COPC.

Nickel was detected above the sediment BV (9.38 mg/kg) in five samples with a maximum concentration of 13.4 mg/kg. The box plot and quantile and slippage tests indicate site concentrations of nickel in sediment are statistically different from background (Figure D-11 and Table D-1). Nickel is retained as a COPC.

Selenium was detected above the sediment BV (0.3 mg/kg) in 24 samples with a maximum concentration of 2.16 mg/kg. There are not sufficient detections of selenium in the sediment background data set to perform statistical tests. Selenium is retained as a COPC.

Silver was not detected above the sediment BV (1 mg/kg) but had DLs (3.07 mg/kg to 3.3 mg/kg) above BV in two samples. Detections of silver in the sediment background data set were not sufficient to perform statistical tests. Silver is retained as a COPC.

Zinc was detected above the sediment BV (60.2 mg/kg) in seven samples with a maximum concentration of 80.7 mg/kg). The box plot and Gehan and quantile tests indicate site concentrations of zinc in sediment are statistically different from background (Figure D-12 and Table D-1). Zinc is retained as a COPC.

4.2.2 Organic Chemicals

A total of 24 sediment samples were analyzed for pesticides, PCBs, herbicides, and dioxins/furans. Table 4.1-2 presents the detected organic chemicals.

Organic chemicals detected at the Los Alamos Canyon borrow pit include Aroclor-1260; alpha-chlordane; gamma-chlordane; 4-(2,4-dichlorophenoxy)butyric acid (2,4-DB); 4,4'-dichlorodiphenyldichloroethane (DDD); 4,4'-dichlorodiphenyldichloroethylene (DDE); 2,4-dichlorophenoxyacetic acid (2,4-D); dichloroprop; dieldrin; endosulfan I, endrin; heptachlor; 1,2,3,4,6,7,8-heptachlorodibenzodioxin; 1,2,3,4,6,7,8-heptachlorodibenzofuran; 1,2,3,4,7,8,9-heptachlorodibenzofuran; 1,2,3,4,7,8-hexachlorodibenzodioxin; 1,2,3,6,7,8-hexachlorodibenzodioxin;

1,2,3,7,8,9-hexachlorodibenzodioxin; 1,2,3,4,7,8-hexachlorodibenzofuran; 1,2,3,6,7,8-hexachlorodibenzofuran; 2,3,4,6,7,8-hexachlorodibenzofuran; methylchlorophenoxypropionic acid (MCPP); 1,2,3,4,6,7,8,9-octachlorodibenzodioxin; 1,2,3,4,6,7,8,9-octachlorodibenzofuran; 1,2,3,7,8-pentachlorodibenzodioxin; 1,2,3,7,8-pentachlorodibenzofuran; 2,3,4,7,8-pentachlorodibenzofuran; and 2,3,7,8-tetrachlorodibenzofuran. Because there are numerous SWMUs and AOCs in the watershed above the Los Alamos Canyon low-head weir, some of which could potentially be sources of the detected organic chemicals, the detected organic chemicals are retained as COPCs.

4.2.3 Radionuclides

Twenty-four sediment samples were analyzed for gamma-emitting radionuclides, strontium-90, americium-241, and tritium. Table 4.1-3 presents the radionuclides detected or detected above BVs/FVs.

Americium-241 was detected above the sediment FV (0.04 pCi/g) in 24 samples with a maximum activity of 0.385 pCi/g). The box plot and Gehan and quantile tests indicate site activities of americium-241 in sediment are statistically different from background (Figure D-13 and Table D-1). Americium-241 is retained as a COPC.

Cesium-137 was detected above the sediment FV (0.9 pCi/g) in 15 samples with a maximum activity of 1.31 pCi/g). The box plot and Gehan and quantile tests indicate site activities of cesium-137 in sediment are statistically different from background (Figure D-14 and Table D-1). Cesium-137 is retained as a COPC.

Plutonium-238 was detected above the sediment FV (0.006 pCi/g) in 13 samples with a maximum activity of 0.0472 pCi/g). Detections of plutonium-238 in the sediment background data set are not sufficient to perform statistical tests. Plutonium-238 is retained as a COPC.

Plutonium-239/240 was detected above the sediment FV (0.068 pCi/g) in 24 samples with a maximum activity of 0.755 pCi/g). The box plot and Gehan and quantile tests indicate site activities of plutonium-239/240 in sediment are statistically different from background (Figure D-15 and Table D-1). Plutonium-239/240 is retained as a COPC.

4.3 Human-Health Risk Screening Results

EPCs and summary statistics for inorganic, organic, and radionuclide COPCs are presented in Table 4.3-1. ProUCL input and output files are included in Appendix F.

The results of the carcinogenic human-health risk screening for the residential scenario are presented in Table 4.3-2. These results indicate a risk of 2×10^{-6}, which is below the NMED target of 1×10^{-5}. The results of the noncarcinogenic human-health risk screening for the residential scenario are presented in Table 4.3-3. These results indicate a HI of 0.6, which is below the NMED target of 1. The results of the radionuclide dose assessment for the residential scenario are presented in Table 4.3-4. These results indicate a dose of 0.3 mrem/yr, which is less than the target dose of 25 mrem/yr as authorized by DOE Order 458.1.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The results of the human-health risk screening for the Los Alamos Canyon borrow pit sediments indicate the sediments do not pose an unacceptable risk or dose under the residential scenario. Therefore, in accordance with Section X.C of the Consent Order, no further action under the Consent Order is required

for the sediments placed in the Los Alamos Canyon borrow pit and this site should not be added to Appendix A of the Consent Order as a new SWMU or AOC.

6.0 REFERENCES

The following list includes all documents cited in this report. Parenthetical information following each reference provides the author(s), publication date, and ER ID or ESH ID. This information is also included in text citations. ER IDs were assigned by the Environmental Programs Directorate's Records Processing Facility (IDs through 599999), and ESH IDs are assigned by the Environment, Safety, and Health (ESH) Directorate (IDs 600000 and above). IDs are used to locate documents in the Laboratory's Electronic Document Management System and, where applicable, in the master reference set.

Copies of the master reference set are maintained at the NMED-HWB and the ESH Directorate. The set was developed to ensure that the administrative authority has all material needed to review this document, and it is updated with every document submitted to the administrative authority. Documents previously submitted to the administrative authority are not included.

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Figure 1.0-1 2015 orthophoto showing locations of the Los Alamos weir and borrow pit near the intersection of NM 502 and NM 4

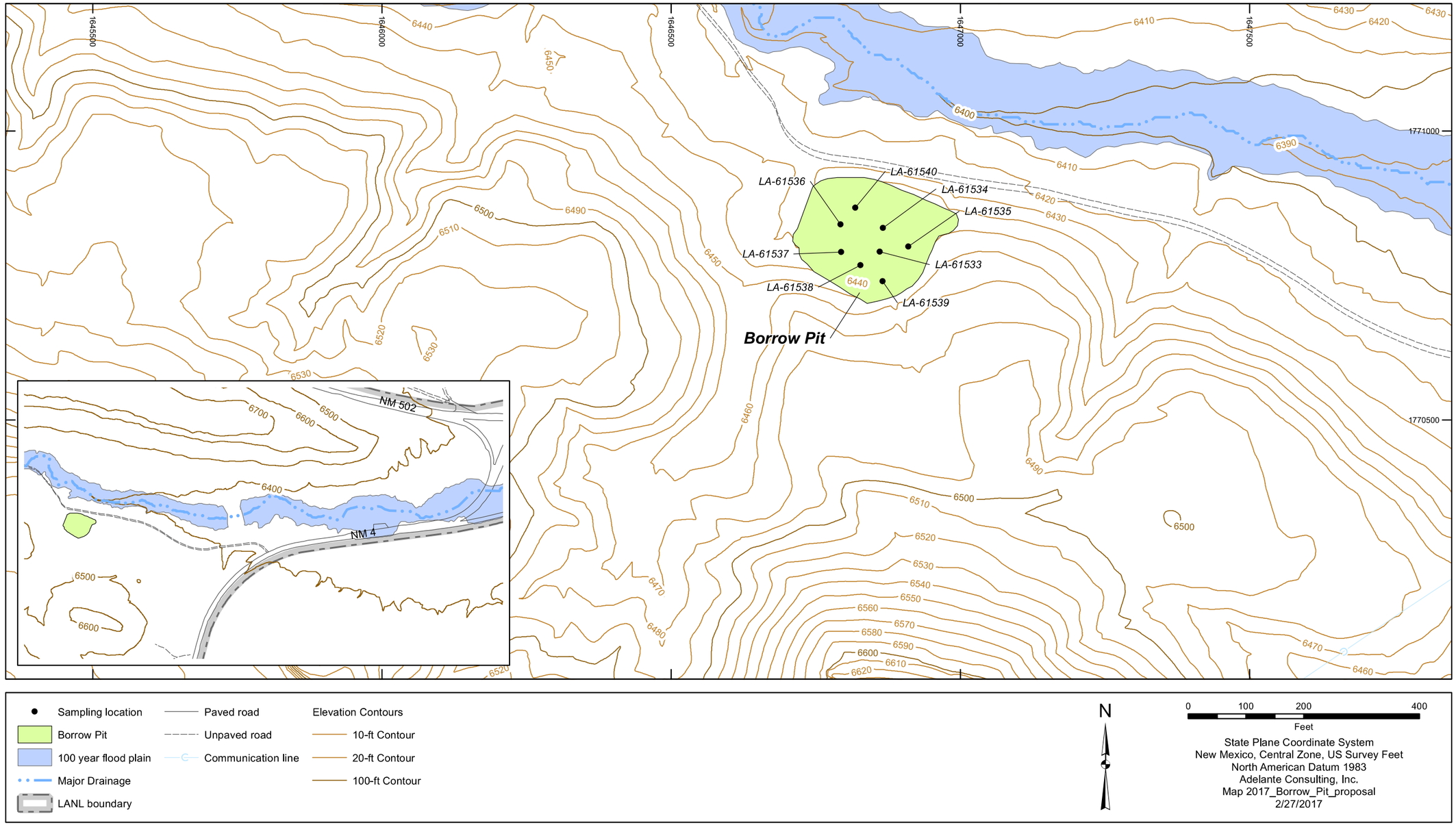

Figure 3.1-1 Sediment sampling locations for SAR investigation at Los Alamos Canyon borrow pit

Table 3.1-1
Summary of Samples Collected and Sample Descriptions

Sample ID	Location ID	Depth (ft)	Gross Alpha (dpm*)	Gross Beta/Gamma (dpm)	Description
CALA-17-127742	LA-61533	0-1 ft	21	1533	Sediment: brown to tan; silt to silty sand; some coarse sand; minor pebbles and organics; dry to damp
CALA-17-127743	LA-61533	5.5-6.5 ft	31	1630	100% muck: dark gray to black; major silty sand; minor pebbles to cobbles; minor organics; moist
CALA-17-127758	LA-61533	10-12.75 ft	21	1562	100% muck: dark gray to black; major silty sand; minor pebbles to cobbles; minor organics; moist
CALA-17-127750	LA-61534	0-1 ft	53	1861	Sediment: brown; silt to silty sand; some coarse sand; minor pebbles; some organics; damp
CALA-17-127751	LA-61534	6-7 ft	42	1890	100% muck: dark gray to black; some silty sand; minor organics and pebbles; moist
CALA-17-127759	LA-61534	11-13 ft	15	1450	100% muck: dark gray to black; some silty sand; minor pebbles and organics; moist
CALA-17-127744	LA-61535	0-1 ft	37	1437	Sediment: brown to light brown; silt to fine sand; minor silty sand; some organics; dry to damp
CALA-17-127752	LA-61535	2-3 ft	59	2310	Sediment: silt to coarse sand; some pebbles and cobbles; minor organics
CALA-17-127760	LA-61535	4.5-5.5 ft	21	2290	Sediment: silt to coarse sand; significant pebbles and cobbles (base of borrow pit/top of bedrock)
CALA-17-127745	LA-61536	0-1 ft	28	2400	Sediment: brown; silt to silty sand; minor pebbles and organics; damp and slightly frozen
CALA-17-127753	LA-61536	3-4 ft	40	2170	100% muck: dark gray to black; silt to fine sand; some coarse sand; minor tuff, pebbles, and organics; damp
CALA-17-127761	LA-61536	5-6 ft	68	2360	100% muck: dark gray to black; silt to fine sand; minor coarse sand, pebbles, and organics; some tuff (sand-sized fragments); damp
CALA-17-127746	LA-61537	0-1 ft	45	2270	Sediment: brown; silt to fine sand; minor coarse sand, pebbles, and organics; dry but probably some frozen moisture
CALA-17-127754	LA-61537	3-5.0 ft	34	2510	50% muck: same as other muck. 50% sediment: fine sand to coarse sand; minor cobbles and organics; damp

Table 3.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Gross Alpha (dpm)	Gross Beta/Gamma (dpm)	Description
CALA-17-127762	LA-61537	5.5-6.5 ft	45	2240	100% muck: dark gray to black; silt to fine sand; minor organics and coarse sand; damp
CALA-17-127747	LA-61538	0-1 ft	28	2310	Sediment: brown to tan; fine sand to coarse sand; major pebbles; minor organics; damp to dry
CALA-17-127755	LA-61538	1.5-2.5 ft	80	2370	Sediment: silt to fine sand; some coarse sand; minor pebbles, cobbles, and organics
CALA-17-127763	LA-61538	3-4 ft	26	2290	Sediment: silt to coarse sand; significant cobbles of dacite and large tuff fragments
CALA-17-127748	LA-61539	0-1 ft	28	2480	Sediment: silt to very fine sand; minor organics and pebbles; frozen damp
CALA-17-127764	LA-61539	2.5-3.5 ft	53	2250	Sediment: silt to coarse sand; some organics; minor pebbles and cobbles
CALA-17-127756	LA-61539	4-5.5 ft	69	2330	Sediment: silt to fine sand; minor coarse sand, pebbles, and organics; damp
CALA-17-127749	LA-61540	0-1 ft	51	2440	Sediment: brown; silt to fine sand; minor coarse sand, pebbles, and organics; minor tuff fragments; damp but frozen
CALA-17-127757	LA-61540	4.5-5.5 ft	64	2470	Sediment: brown to gray; fine sand to gravel; cobbles 2–5 cm diameter; minor organics; damp
CALA-17-127765	LA-61540	9.0-9.7 ft	69	2460	Sediment: silt/fine sand to coarse sand; minor pebbles, cobbles and organics

*dpm = Disintegrations per minute.

Table 3.1-2
Samples Collected and Analyses Requested at Los Alamos Canyon Borrow Pit

Sample ID	Location ID	Depth (ft)	Media	Gamma Spectroscopy	Strontium-90	Tritium	Americium-241	Isotopic Plutonium	Target Analyte List Metals	Pesticides	PCBs	Herbicides	Dioxin-Furans	Total Cyanide
CALA-17-127742	LA-61533	0–1 ft	Sed	2017-592*	2017-592	2017-592	2017-592	2017-592	2017-592	2017-592	2017-592	2017-592	2017-593	2017-592
CALA-17-127743	LA-61533	5.–6.5 ft	Sed	2017-592	2017-592	2017-592	2017-592	2017-592	2017-592	2017-592	2017-592	2017-592	2017-593	2017-592
CALA-17-127758	LA-61533	10–12.75 ft	Sed	2017-592	2017-592	2017-592	2017-592	2017-592	2017-592	2017-592	2017-592	2017-592	2017-593	2017-592
CALA-17-127750	LA-61534	0–1 ft	Sed	2017-606	2017-606	2017-606	2017-606	2017-606	2017-606	2017-606	2017-606	2017-606	2017-622	2017-606
CALA-17-127751	LA-61534	6–7 ft	Sed	2017-606	2017-606	2017-606	2017-606	2017-606	2017-606	2017-606	2017-606	2017-606	2017-622	2017-606
CALA-17-127759	LA-61534	11–13 ft	Sed	2017-606	2017-606	2017-606	2017-606	2017-606	2017-606	2017-606	2017-606	2017-606	2017-622	2017-606
CALA-17-127744	LA-61535	0–1 ft	Sed	2017-672	2017-672	2017-672	2017-672	2017-672	2017-672	2017-672	2017-672	2017-672	2017-675	2017-672
CALA-17-127752	LA-61535	2–3 ft	Sed	2017-672	2017-672	2017-672	2017-672	2017-672	2017-672	2017-672	2017-672	2017-672	2017-675	2017-672
CALA-17-127760	LA-61535	4.5–5.5 ft	Sed	2017-672	2017-672	2017-672	2017-672	2017-672	2017-672	2017-672	2017-672	2017-672	2017-675	2017-672
CALA-17-127745	LA-61536	0–1 ft	Sed	2017-641	2017-641	2017-641	2017-641	2017-641	2017-641	2017-641	2017-641	2017-641	2017-642	2017-641
CALA-17-127753	LA-61536	3–4 ft	Sed	2017-641	2017-641	2017-641	2017-641	2017-641	2017-641	2017-641	2017-641	2017-641	2017-642	2017-641
CALA-17-127761	LA-61536	5–6 ft	Sed	2017-641	2017-641	2017-641	2017-641	2017-641	2017-641	2017-641	2017-641	2017-641	2017-642	2017-641
CALA-17-127746	LA-61537	0–1 ft	Sed	2017-641	2017-641	2017-641	2017-641	2017-641	2017-641	2017-641	2017-641	2017-641	2017-642	2017-641
CALA-17-127754	LA-61537	3–5.0 ft	Sed	2017-641	2017-641	2017-641	2017-641	2017-641	2017-641	2017-641	2017-641	2017-641	2017-642	2017-641
CALA-17-127762	LA-61537	5.5–6.5 ft	Sed	2017-641	2017-641	2017-641	2017-641	2017-641	2017-641	2017-641	2017-641	2017-641	2017-642	2017-641
CALA-17-127747	LA-61538	0–1 ft	Sed	2017-641	2017-641	2017-641	2017-641	2017-641	2017-641	2017-641	2017-641	2017-641	2017-642	2017-641
CALA-17-127755	LA-61538	1.52.5 ft	Sed	2017-672	2017-672	2017-672	2017-672	2017-672	2017-672	2017-672	2017-672	2017-672	2017-675	2017-672
CALA-17-127763	LA-61538	3–4 ft	Sed	2017-672	2017-672	2017-672	2017-672	2017-672	2017-672	2017-672	2017-672	2017-672	2017-675	2017-672
CALA-17-127748	LA-61539	0–1 ft	Sed	2017-641	2017-641	2017-641	2017-641	2017-641	2017-641	2017-641	2017-641	2017-641	2017-642	2017-641
CALA-17-127764	LA-61539	2.5–3.5 ft	Sed	2017-672	2017-672	2017-672	2017-672	2017-672	2017-672	2017-672	2017-672	2017-672	2017-675	2017-672
CALA-17-127756	LA-61539	4–5.5 ft	Sed	2017-672	2017-672	2017-672	2017-672	2017-672	2017-672	2017-672	2017-672	2017-672	2017-675	2017-672
CALA-17-127749	LA-61540	0–1 ft	Sed	2017-641	2017-641	2017-641	2017-641	2017-641	2017-641	2017-641	2017-641	2017-641	2017-642	2017-641
CALA-17-127757	LA-61540	4.5–5.5 ft	Sed	2017-672	2017-672	2017-672	2017-672	2017-672	2017-672	2017-672	2017-672	2017-672	2017-675	2017-672
CALA-17-127765	LA-61540	9.0–9.7 ft	Sed	2017-672	2017-672	2017-672	2017-672	2017-672	2017-672	2017-672	2017-672	2017-672	2017-675	2017-672

*Analytical request number.

Table 3.2-1
TEFs Used for Calculating TCDD-Equivalent Concentrations

Dioxin and Furan Congeners	TEFs*
Tetrachlorodibenzodioxin[2,3,7,8-]	1
Pentachlorodibenzodioxin[1,2,3,7,8-]	1
Hexachlorodibenzodioxin[1,2,3,4,7,8-]	0.1
Hexachlorodibenzodioxin[1,2,3,6,7,8-]	0.1
Hexachlorodibenzodioxin[1,2,3,7,8,9-]	0.1
Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]	0.01
Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]	0.0003
Tetrachlorodibenzofuran[2,3,7,8-]	0.1
Pentachlorodibenzofuran[1,2,3,7,8-]	0.03
Pentachlorodibenzofuran[2,3,4,7,8-]	0.3
Hexachlorodibenzofuran[1,2,3,4,7,8-]	0.1
Hexachlorodibenzofuran[1,2,3,6,7,8-]	0.1
Hexachlorodibenzofuran[1,2,3,7,8,9-]	0.1
Hexachlorodibenzofuran[2,3,4,6,7,8-]	0.1
Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	0.01
Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	0.01
Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	0.0003

*TEFs from NMED (2015, 600915).

Table 4.1-1
Inorganic Chemicals above BVs at Los Alamos Canyon Borrow Pit

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Lead	Manganese	Nickel	Selenium	Silver	Zinc
Sediment BV[a]				**0.83**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**	**11.2**	**0.82**	**19.7**	**543**	**9.38**	**0.3**	**1**	**60.2**
Construction Worker SSL[b]				**142**	**4390**	**148**	**72.1**	**8,850,000**	**134[c]**	**36.6[d]**	**14,200**	**12.1**	**800**	**464**	**753**	**1750**	**1770**	**106000**
Industrial SSL[b]				**519**	**255,000**	**2580**	**1110**	**32,400,000**	**505[c]**	**350[e]**	**51,900**	**63.3**	**800**	**160,000**	**25,700**	**6490**	**6490**	**389000**
Recreational SSL[f]				**248**	**124,000**	**1240**	**465**	**na[g]**	**281[c]**	**186**	**24,800**	**372**	**1110**	**14,800**	**12,400**	**3100**	**3100**	**186000**
Residential SSL[b]				**31.3**	**15,600**	**156**	**70.5**	**13,000,000**	**96.6[c]**	**23[e]**	**3130**	**11.2**	**400**	**10,500**	**1560**	**391**	**391**	**23500**
CALA-17-127742	LA-61533	0–1	SED	1.09 (U)	—[h]	—	—	—	—	—	—	—	—	—	—	0.836 (J)	—	—
CALA-17-127743	LA-61533	5.5–6.5	SED	6.4 (U)	190	1.38	—	6280	—	5.31	12.7	0.968	25.2	848	9.61	1.61	—	68.8
CALA-17-127758	LA-61533	10–12.75	SED	6.72 (U)	167	1.97	—	5680	—	4.77	11.6	1.13	21.9	908	13.4	2.04	—	61.9
CALA-17-127750	LA-61534	0–1	SED	1.05 (U)	—	—	0.524 (U)	—	—	—	—	—	—	—	—	0.627 (J)	—	—
CALA-17-127751	LA-61534	6–7	SED	1.23 (U)	247	1.85	0.41 (J)	8770	—	5.79	15	0.972	28.7	1130	12.1	1.52	3.07 (U)	78.8
CALA-17-127759	LA-61534	11–13	SED	6.59 (U)	222	1.61	—	7090	—	5.74	14.5	1.24	27.7	934	11.2	1.31 (J)	3.3 (U)	76.2
CALA-17-127744	LA-61535	0–1	SED	1.13 (UJ)	—	—	—	—	—	—	—	—	23	580 (J+)	—	2.16	—	63
CALA-17-127752	LA-61535	2–3	SED	1.04 (U)	—	—	—	—	—	—	—	—	—	—	—	0.979 (J)	—	—
CALA-17-127760	LA-61535	4.5–5.5	SED	1.04 (U)	—	—	—	—	—	—	—	—	—	—	—	1.04	—	—
CALA-17-127745	LA-61536	0–1	SED	1.08 (U)	—	—	—	—	—	—	—	—	—	—	—	0.748 (J)	—	—
CALA-17-127753	LA-61536	3–4	SED	1.21 (U)	213	—	0.405 (J)	6860	—	6.07	14.8	—	29.9	881	—	1.04 (J)	—	80.7
CALA-17-127761	LA-61536	5–6	SED	1.11 (U)	—	—	—	—	—	—	—	—	—	—	—	0.754 (J)	—	—
CALA-17-127746	LA-61537	0–1	SED	1.03 (U)	—	—	—	—	—	—	—	—	—	—	—	0.736 (J)	—	—
CALA-17-127754	LA-61537	3–5.0	SED	1.12 (U)	—	—	—	—	11	—	—	—	—	565	—	1.03 (J)	—	—
CALA-17-127762	LA-61537	5.5–6.5	SED	1.21 (U)	203	1.56	—	6880	—	5.36	12.7	0.949	24	940	11.5	1.14 (J)	—	66.9
CALA-17-127747	LA-61538	0–1	SED	0.973 (U)	—	—	—	—	—	—	—	—	—	—	—	0.47 (J)	—	—
CALA-17-127755	LA-61538	1.5–2.5	SED	1.04 (U)	—	—	—	—	13.9	—	—	—	—	—	—	1.23	—	—
CALA-17-127763	LA-61538	3–4	SED	1.01 (U)	—	—	0.503 (U)	—	11.6	—	—	—	—	—	—	0.675 (J)	—	—
CALA-17-127748	LA-61539	0–1	SED	1.1 (U)	—	—	—	—	—	—	—	—	26.9	584	—	1.06 (J)	—	—
CALA-17-127764	LA-61539	2.5–3.5	SED	0.995 (U)	—	—	0.497 (U)	—	—	—	—	—	—	—	—	0.994 (J)	—	—
CALA-17-127756	LA-61539	4–5.5	SED	1.06 (U)	—	—	0.532 (U)	—	—	—	—	—	—	—	—	0.994 (J)	—	—
CALA-17-127749	LA-61540	0–1	SED	1.03 (U)	—	—	—	—	14.2	—	—	—	40	—	—	0.694 (J)	—	—

Table 4.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Lead	Manganese	Nickel	Selenium	Silver	Zinc
Sediment BV[a]				**0.83**	**0.83**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**	**11.2**	**0.82**	**19.7**	**543**	**9.38**	**0.3**	**1**
Construction Worker SSL[b]				**142**	**142**	**4390**	**148**	**72.1**	**8,850,000**	**134[c]**	**36.6[d]**	**14200**	**12.1**	**800**	**464**	**753**	**1750**	**1770**
Industrial SSL[b]				**519**	**519**	**255,000**	**2580**	**1110**	**32,400,000**	**505[c]**	**350[e]**	**51900**	**63.3**	**800**	**160,000**	**25,700**	**6490**	**6490**
Recreational SSL[f]				**248**	**248**	**124,000**	**1240**	**465**	**na[g]**	**281[c]**	**186**	**24,800**	**372**	**1110**	**14,800**	**12,400**	**3100**	**3100**
Residential SSL[b]				**31.3**	**31.3**	**15,600**	**156**	**70.5**	**13,000,000**	**96.6[c]**	**23[e]**	**3130**	**11.2**	**400**	**10,500**	**1560**	**391**	**391**
CALA-17-127757	LA-61540	4.5–5.5	SED	1.11 (U)	—	—	—	—	—	—	—	—	—	—	—	1.22	—	—
CALA-17-127765	LA-61540	9.0–9.7	SED	1.07 (U)	—	—	—	—	19.1	—	—	—	—	—	—	1.31	—	—

Notes: Results are in mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL (1998, 059730).

[b] SSLs from NMED (2015, 600915), unless otherwise noted.

[c] SSL for total chromium.

[d] SSL calculated using toxicity value from EPA regional screening tables (https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-may-2016) and equation and parameters from NMED (2015, 600915).

[e] SSL from EPA regional screening tables (https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-may-2016).

[f] SSLs from LANL (2015, 600336).

[g] na = Not available.

[h] — = Not detected or not detected above BV.

Table 4.1-2
Organic Chemicals Detected at Los Alamos Canyon Borrow Pit

Sample ID	Location ID	Depth (ft)	Media	Aroclor-1260	Chlordane[alpha-]	Chlordane[gamma-]	DB[2,4-]	DDD[4,4'-]	DDE[4,4'-]	D[2,4-]	Dichlorprop	Dieldrin	Endosulfan I	Endrin	Heptachlor	Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]	Heptachlorodibenzodioxins (Total)
Construction Worker SSL[a]				**85.3**	**153[b]**	**153[b]**	**na[c]**	**778**	**549**	**na**	**na**	**11.7**	**1610**	**80.7**	**41.5**	**na**	**na**
Industrial SSL[a]				**11.5**	**89[b]**	**89[b]**	**na**	**107**	**75.5**	**9600[d]**	**na**	**1.6**	**5500**	**275**	**5.7**	**na**	**na**
Recreational SSL[e]				**9.52**	**100[b]**	**100[b]**	**na**	**104**	**73.1**	**na**	**na**	**1.55**	**1970**	**98.5**	**5.52**	**na**	**na**
Residential SSL[a]				**2.43**	**17.7[b]**	**17.7[b]**	**na**	**22.2**	**15.7**	**700[d]**	**na**	**0.333**	**370**	**18.5**	**1.18**	**na**	**na**
CALA-17-127742	LA-61533	0–1	Sed	0.0161	—[f]	0.000534 (J)	0.0386	—	0.00108 (J)	—	—	0.00167	—	—	—	0.0000468	0.000099
CALA-17-127743	LA-61533	5.5–6.5	Sed	0.00622	—	—	—	0.00147 (J)	0.00431	—	—	0.00122 (J)	—	0.000535 (J)	—	0.0000219	0.0000467
CALA-17-127758	LA-61533	10–12.75	Sed	0.00333 (J)	—	—	—	0.0015 (J)	0.00455	—	—	0.00116 (J)	0.00132	—	—	0.0000185	0.0000405
CALA-17-127750	LA-61534	0–1	Sed	0.0171	—	0.000571 (J)	—	—	0.00101 (J)	—	—	0.00163	—	—	—	0.0000537	0.000116
CALA-17-127751	LA-61534	6–7	Sed	0.00368 (J)	—	—	—	0.00118 (J)	0.00339	—	—	—	0.000934	—	—	0.0000229	0.0000517
CALA-17-127759	LA-61534	11–13	Sed	0.0031 (J)	—	—	—	0.00078 (J)	0.0021	—	—	—	—	—	—	0.0000256	0.0000549
CALA-17-127744	LA-61535	0–1	Sed	0.0248	0.00071 (J)	0.000714 (J)	—	—	0.00218	—	—	—	—	—	—	0.0000831	0.000179
CALA-17-127752	LA-61535	2–3	Sed	0.0104	0.000365 (J)	0.000527 (J)	—	0.000784 (J)	0.000993 (J)	—	—	—	—	—	—	0.0000429	0.0000915
CALA-17-127760	LA-61535	4.5–5.5	Sed	0.00837	0.000249 (J)	0.000247 (J)	—	—	0.000522 (J)	—	—	—	—	—	—	0.0000273	0.0000579
CALA-17-127745	LA-61536	0–1	Sed	0.0195	—	0.000795	—	—	—	—	—	—	—	—	—	0.0000860	0.000202
CALA-17-127753	LA-61536	3–4	Sed	0.00761	0.000466 (J)	—	—	—	0.00434	—	—	0.00108 (J)	—	0.000552 (J)	—	0.0000249	0.0000539
CALA-17-127761	LA-61536	5–6	Sed	0.00907	—	—	—	—	0.00136 (J)	—	—	0.00108 (J)	—	—	—	0.0000548	0.000116
CALA-17-127746	LA-61537	0–1	Sed	0.017	0.000909	0.00126	—	—	0.00109 (J)	—	—	0.00182	—	—	—	0.0000563	0.000137
CALA-17-127754	LA-61537	3–5.0	Sed	0.00946	—	—	—	—	0.00103 (J)	—	—	0.000871 (J)	—	—	—	0.0000439	0.0000976
CALA-17-127762	LA-61537	5.5–6.5	Sed	0.00484	—	—	—	0.00161 (J)	0.00416	—	—	—	0.00103	—	—	0.0000271	0.0000586
CALA-17-127747	LA-61538	0–1	Sed	0.014	—	0.000447 (J)	—	—	0.000609 (J)	—	—	0.00118 (J)	—	—	—	0.0000292	0.0000617
CALA-17-127755	LA-61538	1.5–2.5	Sed	0.00859	0.000279 (J)	0.000194 (J)	—	—	0.00053 (J)	0.00571	—	—	—	—	—	0.0000627	0.000135
CALA-17-127763	LA-61538	3–4	Sed	0.00641	—	—	—	—	—	—	0.0239	—	—	—	—	0.0000162	0.000034
CALA-17-127748	LA-61539	0–1	Sed	0.0298	—	0.000897	—	—	0.00129 (J)	—	—	0.00189	—	—	—	0.0000819	0.000169
CALA-17-127764	LA-61539	2.5–3.5	Sed	0.0144	0.000361 (J)	0.000252 (J)	—	—	0.000588 (J)	—	—	—	—	—	—	0.0000897	0.000188
CALA-17-127756	LA-61539	4–5.5	Sed	0.105	0.000316 (J)	0.000248 (J)	0.0301	—	0.000708 (J)	—	—	—	—	—	—	0.0000907	0.000213
CALA-17-127749	LA-61540	0–1	Sed	0.0264	—	—	—	—	0.00233	—	—	0.00275	—	—	0.000506 (J)	0.000103	0.000213
CALA-17-127757	LA-61540	4.5–5.5	Sed	0.00809	0.000469 (J)	0.000566 (J)	—	—	0.00139 (J)	—	—	—	—	—	—	0.0000686	0.000144
CALA-17-127765	LA-61540	9.0–9.7	Sed	0.0189	0.000796	0.000942	—	—	0.00129 (J)	—	—	—	—	—	—	0.00016	0.000346

Table 4.1-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	Heptachlorodibenzofurans (Total)	Hexachlorodibenzodioxin[1,2,3,4,7,8-]	Hexachlorodibenzodioxin[1,2,3,6,7,8-]	Hexachlorodibenzodioxin[1,2,3,7,8,9-]	Hexachlorodibenzodioxins (Total)	Hexachlorodibenzofuran[1,2,3,4,7,8-]	Hexachlorodibenzofuran[1,2,3,6,7,8-]	Hexachlorodibenzofuran[2,3,4,6,7,8-]	Hexachlorodibenzofurans (Total)
Construction Worker SSL[a]				**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**
Industrial SSL[a]				**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**
Recreational SSL[e]				**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**
Residential SSL[a]				**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**
CALA-17-127742	LA-61533	0–1	Sed	0.00000855	0.00000054 (J)	0.0000287	0.000000528 (J)	0.00000166 (J)	0.000001 (J)	0.0000109	0.00000109 (J)	0.000000488 (J)	0.000000746 (J)	0.000013
CALA-17-127743	LA-61533	5.5–6.5	Sed	0.00000465 (J)	—	0.0000143	—	0.000000925 (J)	0.000000563 (J)	0.00000424 (J)	0.000000473 (J)	—	—	0.00000629
CALA-17-127758	LA-61533	10–12.75	Sed	0.00000391 (J)	—	0.0000119	—	0.000000714 (J)	—	0.00000298 (J)	—	—	—	0.00000384 (J)
CALA-17-127750	LA-61534	0–1	Sed	0.00000992	0.000000785 (J)	0.0000343	0.000000549 (J)	0.00000187 (J)	0.00000101 (J)	0.0000138	0.000000634 (J)	0.000000397 (J)	0.0000007 (J)	0.0000128
CALA-17-127751	LA-61534	6–7	Sed	0.00000455 (J)	0.000000367 (J)	0.0000151	—	0.000000964 (J)	0.000000472 (J)	0.00000658	0.000000567 (J)	0.000000286 (J)	0.000000386 (J)	0.0000064
CALA-17-127759	LA-61534	11–13	Sed	0.00000562	0.000000395 (J)	0.0000164	—	0.000000979 (J)	0.000000717 (J)	0.00000692	0.000000662 (J)	0.000000377 (J)	0.000000519 (J)	0.00000713
CALA-17-127744	LA-61535	0–1	Sed	0.00001540	0.00000121 (J)	0.0000521	0.0000008 (J)	0.00000274 (J)	0.00000184 (J)	0.0000209	0.00000107 (J)	0.000000703 (J)	0.000000944 (J)	0.0000199
CALA-17-127752	LA-61535	2–3	Sed	0.00000758	0.000000549 (J)	0.0000262	—	0.00000156 (J)	0.000000742 (J)	0.0000101	0.000000517 (J)	—	0.000000472 (J)	0.00000977
CALA-17-127760	LA-61535	4.5–5.5	Sed	0.00000456	—	0.0000154	—	0.000000909 (J)	0.000000552 (J)	0.00000611	—	—	—	0.00000537
CALA-17-127745	LA-61536	0–1	Sed	0.00001160	0.000000954 (J)	0.0000412	0.000000595 (J)	0.00000212 (J)	0.00000116 (J)	0.0000158	0.000000817 (J)	0.000000587 (J)	0.000000739 (J)	0.000015
CALA-17-127753	LA-61536	3–4	Sed	0.00000561	—	0.0000171	—	0.000000835 (J)	—	0.00000589	0.00000071 (J)	—	—	0.00000591
CALA-17-127761	LA-61536	5–6	Sed	0.00000918	0.000000868 (J)	0.0000333	—	0.00000188 (J)	—	0.0000122	0.000000649 (J)	—	0.000000685 (J)	0.0000121
CALA-17-127746	LA-61537	0–1	Sed	0.00000915	0.000000931 (J)	0.0000343	0.00000048 (J)	0.0000018 (J)	0.000000896 (J)	0.0000133	0.000000563 (J)	0.000000541 (J)	0.000000585 (J)	0.0000124
CALA-17-127754	LA-61537	3–5.0	Sed	0.00000747	0.000000532 (J)	0.0000255	0.000000534 (J)	0.00000134 (J)	0.00000053 (J)	0.00000655	0.000000708 (J)	0.000000505 (J)	0.000000543 (J)	0.0000101
CALA-17-127762	LA-61537	5.5–6.5	Sed	0.00000503	—	0.0000156	—	0.00000106 (J)	0.000000476 (J)	0.00000664	0.000000697 (J)	—	—	0.00000578
CALA-17-127747	LA-61538	0–1	Sed	0.00000541	—	0.0000179	—	0.000000864 (J)	0.00000053 (J)	0.00000672	—	—	—	0.00000631
CALA-17-127755	LA-61538	1.5–2.5	Sed	0.00000786	0.000000829 (J)	0.0000271	—	0.00000148 (J)	0.000000952 (J)	0.0000108	0.000000598 (J)	—	0.00000055 (J)	0.00000986
CALA-17-127763	LA-61538	3–4	Sed	0.00000307 (J)	—	0.0000099	—	0.000000608 (J)	—	0.00000349 (J)	—	—	—	0.00000385 (J)
CALA-17-127748	LA-61539	0–1	Sed	0.0000145	0.00000126 (J)	0.0000482	0.000000761 (J)	0.00000278 (J)	0.0000015 (J)	0.0000190	0.000000947 (J)	0.00000087 (J)	0.00000105 (J)	0.0000194
CALA-17-127764	LA-61539	2.5–3.5	Sed	0.0000166	0.00000137 (J)	0.0000635	0.000000768 (J)	0.00000307 (J)	0.0000019 (J)	0.0000231	0.00000113 (J)	0.000000856 (J)	0.00000107 (J)	0.0000238
CALA-17-127756	LA-61539	4–5.5	Sed	0.0000139	0.000000979 (J)	0.0000687	0.000000489 (J)	0.00000215 (J)	0.00000122 (J)	0.0000156	0.0000007 (J)	0.000000464 (J)	0.000000673 (J)	0.0000141
CALA-17-127749	LA-61540	0–1	Sed	0.0000153	0.00000129 (J)	0.0000586	0.000000749 (J)	0.00000321 (J)	0.00000133 (J)	0.0000219	0.000000905 (J)	0.000000771 (J)	0.000000929 (J)	0.0000199
CALA-17-127757	LA-61540	4.5–5.5	Sed	0.0000117	0.000000921 (J)	0.0000401	0.000000594 (J)	0.00000237 (J)	0.00000174 (J)	0.0000176	0.000000857 (J)	0.000000584 (J)	0.00000084 (J)	0.0000158
CALA-17-127765	LA-61540	9.0–9.7	Sed	0.0000253	0.00000217 (J)	0.0000943	0.00000123 (J)	0.00000512	0.00000284 (J)	0.0000396	0.00000156 (J)	0.00000108 (J)	0.00000175 (J)	0.0000348

Table 4.1-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	MCPP	Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]	Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	Pentachlorodibenzodioxin[1,2,3,7,8-]	Pentachlorodibenzodioxins (Total)	Pentachlorodibenzofuran[1,2,3,7,8-]	Pentachlorodibenzofuran[2,3,4,7,8-]	Pentachlorodibenzofurans (Totals)	Tetrachlorodibenzodioxins (Total)	Tetrachlorodibenzofuran[2,3,7,8-]	Tetrachlorodibenzofurans (Totals)
Construction Worker SSL[a]				**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**0.0172**	**na**
Industrial SSL[a]				**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**0.00248**	**na**
Recreational SSL[e]				**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**0.00297**	**na**
Residential SSL[a]				**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**0.00049**	**na**
CALA-17-127742	LA-61533	0–1	Sed	—	0.00049	0.0000269 (J+)	—	—	0.000000874 (J)	—	0.0000079	—	0.000000569 (J)	0.00000218
CALA-17-127743	LA-61533	5.5–6.5	Sed	—	0.000233	0.0000131 (J+)	—	—	—	—	0.00000243 (J)	0.00000158	0.000000379 (J)	0.000000379 (J)
CALA-17-127758	LA-61533	10–12.75	Sed	—	0.000214	0.0000107 (J+)	—	—	—	—	0.00000171 (J)	0.000000851 (J)	0.000000321 (J)	0.000000754 (J)
CALA-17-127750	LA-61534	0–1	Sed	—	0.000585	0.0000261	0.000000281 (J)	0.000000852 (J)	0.000000165 (J)	0.00000037 (J)	0.00000648	0.000000408 (J)	0.000000444 (J)	0.00000252
CALA-17-127751	LA-61534	6–7	Sed	—	0.000263	0.0000118	—	—	0.000000183 (J)	0.000000273 (J)	0.00000291 (J)	0.00000117	0.000000296 (J)	0.000000814 (J)
CALA-17-127759	LA-61534	11–13	Sed	—	0.000266	0.0000125	—	0.000000422 (J)	0.000000218 (J)	0.000000273 (J)	0.00000343 (J)	0.00000251	—	0.00000141
CALA-17-127744	LA-61535	0–1	Sed	—	0.000868	0.000042	0.000000589 (J)	0.000000784 (J)	—	0.000000659 (J)	0.0000094	0.000000777 (J)	0.000000714 (J)	0.00000514
CALA-17-127752	LA-61535	2–3	Sed	—	0.000449	0.00002	—	—	—	—	0.00000329 (J)	0.000000352 (J)	0.000000282 (J)	0.00000217
CALA-17-127760	LA-61535	4.5–5.5	Sed	—	0.000318	0.0000121	—	—	—	—	0.00000226 (J)	0.000000119 (J)	0.000000191 (J)	0.000000918
CALA-17-127745	LA-61536	0–1	Sed	—	0.00106	0.0000297	—	0.000000582 (J)	—	—	0.00000622	—	0.000000495 (J)	0.00000127
CALA-17-127753	LA-61536	3–4	Sed	—	0.000284	0.0000147	—	—	—	—	0.00000296 (J)	0.00000217	0.000000295 (J)	0.00000181
CALA-17-127761	LA-61536	5–6	Sed	—	0.000642	0.0000213	—	—	—	—	0.0000039 (J)	0.000000642 (J)	—	0.000000929 (J)
CALA-17-127746	LA-61537	0–1	Sed	—	0.000909	0.0000256	—	0.000000475 (J)	—	—	0.00000414 (J)	0.000000319 (J)	0.000000471 (J)	0.00000142
CALA-17-127754	LA-61537	3–5.0	Sed	—	0.000516	0.0000182	—	—	—	—	0.00000131 (J)	0.000000507 (J)	0.000000394 (J)	0.00000121
CALA-17-127762	LA-61537	5.5–6.5	Sed	—	0.0003	0.0000126	—	—	—	—	0.00000227 (J)	0.00000209	—	0.00000106
CALA-17-127747	LA-61538	0–1	Sed	—	0.00034	0.0000133	—	—	—	—	0.00000278 (J)	—	—	0.000000434 (J)
CALA-17-127755	LA-61538	1.5–2.5	Sed	—	0.000684 (J)	0.0000177	—	—	—	—	0.00000384 (J)	0.000000268 (J)	0.000000288 (J)	0.000000717 (J)
CALA-17-127763	LA-61538	3–4	Sed	—	0.00017	0.00000667 (J+)	—	—	—	—	0.00000168 (J)	—	—	0.000000334 (J)
CALA-17-127748	LA-61539	0–1	Sed	—	0.000892	0.0000376	0.00000056 (J)	—	—	0.000000545 (J)	0.00000889	0.000000306 (J)	0.000000775 (J)	0.00000345
CALA-17-127764	LA-61539	2.5–3.5	Sed	—	0.00101	0.0000398	0.000000583 (J)	0.000000744 (J)	—	0.000000632 (J)	0.00000672	—	0.000000372 (J)	0.00000159
CALA-17-127756	LA-61539	4–5.5	Sed	2.25	0.00124	0.0000702	—	0.000000605 (J)	—	—	0.0000045 (J)	—	0.000000321 (J)	0.00000178
CALA-17-127749	LA-61540	0–1	Sed	—	0.00115	0.0000415	0.000000512 (J)	0.00000109 (J)	—	—	0.00000678	—	—	0.00000171

Table 4.1-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	MCPP	Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]	Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	Pentachlorodibenzodioxin[1,2,3,7,8-]	Pentachlorodibenzodioxins (Total)	Pentachlorodibenzofuran[1,2,3,7,8-]	Pentachlorodibenzofuran[2,3,4,7,8-]	Pentachlorodibenzofurans (Totals)	Tetrachlorodibenzodioxins (Total)	Tetrachlorodibenzofuran[2,3,7,8-]	Tetrachlorodibenzofurans (Totals)
Construction Worker SSL[a]				**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**0.0172**	**na**
Industrial SSL[a]				**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**0.00248**	**na**
Recreational SSL[e]				**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**0.00297**	**na**
Residential SSL[a]				**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**0.00049**	**na**
CALA-17-127757	LA-61540	4.5–5.5	Sed	—	0.000712	0.0000256	0.000000518 (J)	0.000000598 (J)	—	—	0.00000605	—	0.000000393 (J)	0.00000244
CALA-17-127765	LA-61540	9.0–9.7	Sed	—	0.002	0.0000612	0.00000081 (J)	0.00000185 (J)	—	0.000000832 (J)	0.0000131	0.000000518 (J)	0.000000635 (J)	0.00000447

Notes: Results are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2015, 600915), unless otherwise noted.

[b] Chlordane used a surrogate based on structural similarity.

[c] na = Not available.

[d] SSL from EPA regional screening tables (https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-may-2016).

[e] SSLs from LANL (2015, 600336).

[f] — = Not detected.

Table 4.1-3
Radionuclides Detected or Detected above BVs/FVs at Los Alamos Canyon Borrow Pit

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Cesium-137	Plutonium-238	Plutonium-239/240
Sediment BV/FV[a]				**0.04**	**0.9**	**0.006**	**0.068**
Construction Worker SAL[b]				**230**	**37**	**230**	**200**
Industrial SAL[b]				**1000**	**41**	**1300**	**1200**
Recreational SAL[b]				**1500**	**370**	**1400**	**1300**
Residential SAL[b]				**83**	**12**	**84**	**79**
CALA-17-127742	LA-61533	0–1	Sed	0.199	—[c]	—	0.401
CALA-17-127743	LA-61533	5.5–6.5	Sed	0.108	1.21	—	0.287
CALA-17-127758	LA-61533	10–12.75	Sed	0.0886	1.15	—	0.207
CALA-17-127750	LA-61534	0–1	Sed	0.186	—	—	0.376
CALA-17-127751	LA-61534	6–7	Sed	0.119	1.31	—	0.199
CALA-17-127759	LA-61534	11–13	Sed	0.0982	1.15	—	0.149
CALA-17-127744	LA-61535	0–1	Sed	0.231	0.999	0.0244	0.514
CALA-17-127752	LA-61535	2–3	Sed	0.173	—	0.0319	0.389
CALA-17-127760	LA-61535	4.5–5.5	Sed	0.23	—	—	0.378
CALA-17-127745	LA-61536	0–1	Sed	0.234 (J)	—	0.0337	0.442
CALA-17-127753	LA-61536	3–4	Sed	0.0867	1.16	—	0.165
CALA-17-127761	LA-61536	5–6	Sed	0.186	1.03	0.0304	0.332
CALA-17-127746	LA-61537	0–1	Sed	0.209	—	—	0.378
CALA-17-127754	LA-61537	3–5.0	Sed	0.208	0.942	0.0301	0.28
CALA-17-127762	LA-61537	5.5–6.5	Sed	0.0782	1.08	—	0.161
CALA-17-127747	LA-61538	0–1	Sed	0.178	—	—	0.35
CALA-17-127755	LA-61538	1.5–2.5	Sed	0.183	—	0.0251	0.303
CALA-17-127763	LA-61538	3–4	Sed	0.134	—	0.0265	0.213
CALA-17-127748	LA-61539	0–1	Sed	0.294	0.93	0.0418	0.687
CALA-17-127764	LA-61539	2.5–3.5	Sed	0.252	1.07	0.0472	0.515
CALA-17-127756	LA-61539	4–5.5	Sed	0.234	1.13	0.0234	0.38
CALA-17-127749	LA-61540	0–1	Sed	0.301	1.08	0.0372	0.595
CALA-17-127757	LA-61540	4.5–5.5	Sed	0.239	1.01	0.0271	0.308
CALA-17-127765	LA-61540	9.0–9.7	Sed	0.385	1.21	0.0632	0.755

[a] BVs and FVs from LANL (1998, 059730).

[b] SALs from LANL (2015, 600929).

[c] — = Not detected or not detected above BV/FV.

Table 4.3-1
EPCs and Summary Statistics for Los Alamos Canyon Borrow Pit COPCs

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Inorganic Chemicals (mg/kg)							
Antimony	24	0	0.973 (U)	6.72 (U)	n/a	6.72	Maximum detection limit
Barium	24	24	28.4	247	Gamma	133	95% Adjusted Gamma
Beryllium	24	24	0.262	1.97	Gamma	1.08	95% Adjusted Gamma
Cadmium	24	20	0.114	0.532 (U)	Normal	0.264	95% KM (t)
Calcium	24	24	874	8770	Gamma	4459	95% Adjusted Gamma
Chromium	24	24	5.02	19.1	Gamma	10.4	95% Adjusted Gamma
Cobalt	24	24	1.79	6.07	Normal	4.08	95% Student's-t
Copper	24	24	2.7	15	Normal	9.38	95% Student's-t
Lead	24	24	7.22	40	Normal	21.4	95% Student's-t
Manganese	24	24	188	1130	Normal	610	95% Student's-t
Nickel	24	24	2.7	13.4	Gamma	7.69	95% Adjusted Gamma
Selenium	24	24	0.47	2.16	Normal	1.24	95% Student's-t
Silver	24	21	0.149	3.3 (U)	Normal	0.239	95% KM (t)
Zinc	24	24	30.9	80.7	Normal	56.4	95% KM (t)
Organic Chemicals (mg/kg)							
Aroclor-1260	24	24	0.0031	0.105	Gamma	0.0229	95% Adjusted Gamma
Chlordane[alpha-]	24	10	0.000249	0.000948 (U)	Normal	0.000527	95% KM (t)
Chlordane[gamma-]	24	14	0.000194	0.00126	Normal	0.00064	95% KM (t)
2,4-D	24	1	0.00523 (U)	0.0583 (U)	n/a*	0.00571	Maximum detected value
2,4-DB	24	2	0.00523 (U)	0.0583 (U)	n/a	0.0386	Maximum detected value
4,4'-DDD	24	6	0.00078	0.00169 (U)	Normal	0.00121	95% KM (t)
4,4'-DDE	24	22	0.000522	0.00455	Lognormal	0.00241	95% KM-Log (t)
Dichlorprop	24	1	0.00523 (U)	0.0583 (U)	n/a	0.0239	Maximum detected value

Table 4.3-1 (continued)

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Dieldrin	24	11	0.000871	0.00275	Normal	0.00145	95% KM (t)
Endosulfan I	24	3	0.000696 (U)	0.00132	n/a	0.00132	Maximum detected value
Endrin	24	2	0.000535	0.0019 (U)	n/a	0.000552	Maximum detected value
Heptachlor	24	1	0.000506	0.000948 (U)	n/a	0.000506	Maximum detected value
MCPP	24	1	1.05 (U)	11.7 (U)	n/a	2.25	Maximum detected value
TCDD-TEQ	24	24	0.000000306	0.00000497	Normal	0.00000205	95% Student's-t
Radionuclides (pCi/g)							
Americium-241	24	24	0.0782	0.385	Normal	0.22	95% Student's-t
Cesium-137	24	24	0.641	1.31	Normal	1.04	95% Student's-t
Plutonium-238	24	13	0.00178 (U)	0.0632	Normal	0.0264	95% KM (t)
Plutonium-239/240	24	24	0.149	0.755	Normal	0.421	95% Student's-t

Note: Data qualifiers are defined in Appendix A.
* n/a = Not applicable.

Table 4.3-2
Residential Carcinogenic Screening Evaluation for Los Alamos Canyon Borrow Pit

COPC	EPC (mg/kg)	Residential SSL[a] (mg/kg)	Cancer Risk
Chromium	10.4	96.6	1.08E-06
Aroclor-1260	0.0229	2.43	9.42E-08
Chlordane[alpha-]	0.000527	17.7[b]	2.97E-10
Chlordane[gamma-]	0.00064	17.7[b]	3.62E-10
4,4'-DDD	0.00121	22.2	5.45E-10
4,4'-DDE	0.00241	15.7	1.54E-09
Dieldrin	0.00145	0.333	4.35E-08
Heptaclor	0.000506	1.18	4.29E-09
TCDD-TEQ	0.00000205	0.000049	4.18E-07
Total Excess Cancer Risk			**2E-06**

[a] SSLs from NMED (2015, 600915).

[b] Chlordane used as surrogate based on structural similarity.

Table-4.3-3
Residential Noncarcinogenic Screening Evaluation for Los Alamos Canyon Borrow Pit

COPC	EPC (mg/kg)	Residential SSL[a] (mg/kg)	HQ
Antimony	6.72	31.3	0.21
Barium	133	15,600	0.0085
Beryllium	1.08	156	0.0069
Cadmium	0.264	70.5	0.0037
Cobalt	4.08	23[b]	0.18
Copper	9.38	3130	0.003
Lead	21.4	400	0.054
Manganese	610	10500	0.058
Nickel	7.69	1560	0.0049
Selenium	1.24	391	0.0032
Silver	0.239	391	0.00061
Zinc	56.4	23,500	0.0024
Dichloroprop	0.0239	n/a[c]	—[d]
2,4-D	0.00571	700[b]	0.0000082
2,4-DB	0.0386	510[b]	0.000076
Endosulfan I	0.00132	370	0.0000036
Endrin	0.000552	18.5	0.00003
MCPP	2.25	63[b]	0.036
HI			**0.6**

[a] SSLs from NMED (2015, 600915) unless otherwise noted.

[b] EPA regional screening level (https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-may-2016)

[c] n/a = Not available.

[d] — = SSL not available and HQ not calculated.

Table 4.3-4
Residential Radionuclide Screening Evaluation for Los Alamos Canyon Borrow Pit

COPC	EPC (pCi/g)	Residential SAL* (pCi/g)	Dose (mrem/yr)
Americium-241	0.22	83	0.066
Cesium-137	1.04	370	0.07
Plutonium-238	0.0264	84	0.0079
Plutonium-239/240	0.421	79	0.13
Total Dose			**0.3**

* SALs from LANL (2015, 600929).

Appendix A

Acronyms and Abbreviations,
Metric Conversion Table, and Data Qualifier Definitions

A-1.0 ACRONYMS AND ABBREVIATIONS

AK	acceptable knowledge
AOC	area of concern
BV	background value
COC	chain of custody
Consent Order	Compliance Order on Consent
COPC	chemical of potential concern
D[2,4-]	2,4-dichlorophenoxyacetic acid
DB[2,4-]	4-(2,4-dichlorophenoxy)butyric acid
DDD	4,4'-dichlorodiphenyldichloroethane
DDE	4,4'-dichlorodiphenyldichloroethylene
DL	detection limit
DOE	Department of Energy (U.S.)
dpm	disintegrations per minute
EPA	Environmental Protection Agency (U.S.)
EPC	exposure point concentration
FV	fallout value
GPS	global positioning system
HI	hazard index
HQ	hazard quotient
IDW	investigation-derived waste
LANL	Los Alamos National Laboratory
LANS	Los Alamos National Security, LLC
MCPP	methylchlorophenoxypropionic acid
NMED	New Mexico Environment Department
NMED-HWB	NMED Hazardous Waste Bureau
NOD	notice of disapproval
PCB	polychlorinated biphenyl
SAL	screening action level
SAR	solid waste management unit assessment report
SMO	sample management office
SOP	standard operating procedure
SSL	soil screening level

SWMU	solid waste management unit
TAL	target analyte list
TCDD	tetrachlorodibenzodioxin
TEF	toxicity equivalency factor
TEQ	toxic equivalency
UCL	upper confidence limit
WCSF	waste characterization strategy form

A-2.0 METRIC CONVERSION TABLE

Multiply SI (Metric) Unit	by	To Obtain U.S. Customary Unit
kilometers (km)	0.622	miles (mi)
kilometers (km)	3281	feet (ft)
meters (m)	3.281	feet (ft)
meters (m)	39.37	inches (in.)
centimeters (cm)	0.03281	feet (ft)
centimeters (cm)	0.394	inches (in.)
millimeters (mm)	0.0394	inches (in.)
micrometers or microns (µm)	0.0000394	inches (in.)
square kilometers (km2)	0.3861	square miles (mi2)
hectares (ha)	2.5	acres
square meters (m2)	10.764	square feet (ft2)
cubic meters (m3)	35.31	cubic feet (ft3)
kilograms (kg)	2.2046	pounds (lb)
grams (g)	0.0353	ounces (oz)
grams per cubic centimeter (g/cm3)	62.422	pounds per cubic foot (lb/ft3)
milligrams per kilogram (mg/kg)	1	parts per million (ppm)
micrograms per gram (µg/g)	1	parts per million (ppm)
liters (L)	0.26	gallons (gal.)
milligrams per liter (mg/L)	1	parts per million (ppm)
degrees Celsius (°C)	9/5 + 32	degrees Fahrenheit (°F)

A-3.0 DATA QUALIFIER DEFINITIONS

Data Qualifier	Definition
U	The analyte was analyzed for but not detected.
J	The analyte was positively identified, and the associated numerical value is estimated to be more uncertain than would normally be expected for that analysis.
J+	The analyte was positively identified, and the result is likely to be biased high.
J-	The analyte was positively identified, and the result is likely to be biased low.
UJ	The analyte was not positively identified in the sample, and the associated value is an estimate of the sample-specific detection or quantitation limit.
R	The data are rejected as a result of major problems with quality assurance/quality control parameters.

Appendix B

Field Summary Report

FIELD SUMMARY REPORT
LA Weir Borrow Pit SAR, Revision 1 Characterization Sediment Sampling

Prepared for ADEM-ER SWP, January 2017

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1.0 INTRODUCTION

This report summarizes the field activities performed at the LA Weir Borrow Pit from November 29, 2016 to December 7, 2016. These activities fulfill the requirement to collect samples from within the borrow pit under the New Mexico Environment Department Hazardous Waste Bureau's direction to Los Alamos National Laboratory to prepare a solid waste management unit assessment report (SAR). This work was conducted in accordance with the SOW-DI-10001 for LA Weir Borrow Pit Characterization Sediment Sampling and included geodetic surveys, surface and subsurface sediment sampling, equipment decontamination, and investigation-derived waste management.

1.1 Site History

Sediment removed from the Los Alamos Canyon low-head weir basins was emplaced in the borrow pit in 2011, 2012, 2013, and 2014. Analyses were performed on weir basin sediments prior to excavation in 2013 and 2014, but not in 2011 or 2012 because of post-Las Conchas Fire Emergency actions. Results of the 2013 and 2014 sediment analyses indicate the sediments are not likely to pose an unacceptable risk to human health (per SAR Work Plan for Los Alamos Canyon Borrow Pit; LA-UR-16-25645).

2.0 FIELD METHODS

2.1 Geodetic Surveys

Staking of sample locations was conducted in accordance with TPMC-SOP-5028 Coordinating and Evaluating Geodetic Surveys (equivalent to EP-ERSS-SOP-5028) using a Topcon GRS-1 GPS Receiver with Topcon PG-A5 external antenna mounted on a survey rod.

2.2 Surface and Subsurface Samples

Sample collection was conducted in accordance with SOW-DI-10001 and TPMC-SOP-20069 (equivalent to ER-SOP-20069 Soil, Tuff, and Sediment Sampling and SOP-06.09 Spade and Scoop Method for the Collection of Soil Samples). Because the total depth of each borehole was only approximated in the SOW-DI-10001, 0.5 ft samples were collected and set aside in stainless steel bowls beginning 1 ft above the approximated middle foot of the borehole and continuing until total depth was achieved. After determining total depth, the middle two 0.5 ft samples were mixed in a stainless steel bowl with stainless steel scoop, and transferred to their labeled sterile sample bottles. All sediment not used for samples was returned to its borehole of origin, and remaining backfill was completed to grade using dirt from within two feet of the borehole.

2.3 Quality Assurance/Quality Control Samples

Quality control samples were collected in accordance with TPMC-SOP-20235 (equivalent to SOP-5059 Field Quality Control Samples): at least one field duplicate per 10 regular samples, and one field rinsate on each day samples were collected.

2.4 Equipment Decontamination

Equipment for sampling was decontaminated using dry decontamination methods in accordance with TPMC-SOP-7007 (equivalent to SOP-5061 Field Decontamination of Equipment) before and after each sample.

2.5 Investigation-Derived Waste

Investigation-derived waste (IDW) was handled in accordance with the Waste Characterization Strategy Form for Storm Water Monitoring and Storm Water Control Measures at LANL Solid Waste Management Units and Areas of Concern in Support of Federal Permits.

3.0 FIELD ACTIVITIES AND OBSERVATIONS

Field activities at the LA Weir Borrow Pit occurred between November 29, 2016 and December 7, 2016. On November 29, 2016 the eight proposed borehole locations presented in Figure 3.1-1 of SOW-DI-10001 were staked. From November 30, 2016 to December 7, 2016 24 characterization samples, 3 field duplicate samples, and 4 field rinsates were collected. All samples were collected within 1 ft of the original field location coordinates and at the depths described in SOW-DI-10001. These samples were submitted to the Sample Management Office to be analyzed in accordance with Table 3.1-1 in SOW-DI-10001. The samples taken table (Table 3.0-1) includes original proposed field location names that can be used to cross-reference the permanent, assigned location IDs. Cross-reference is also documented on the Sample Collection Log/Chain of Custody Forms (Appendix A).

The 80 ft x 100 ft 12-mil polyethylene nylon reinforced plastic sheet underlying LA Weir sediments emplaced in 2011 was encountered only in field locations B1, B2, A2, and C2 (Figure 3.1-1 in SOW-DI-10001). At these locations, the liner was directly overlying in-place bedrock of Quaternary Bandelier Tuff cooling unit 1 (Qbt1). A small scrap of the plastic sheet was encountered at field location A1 at 5.5 ft depth, but there was no change observed in the sediments above and below that scrap; the bottom of the Borrow Pit at field location A1 was not determined by contact with tuff, but by hand auger refusal at the contact with local bedrock of the Quaternary Cerro Toledo interval (Qct; a fanglomerate underlying Qbt1) at approximately 10 ft depth. The scrap of plastic sheet is thought to be a part of the extension of plastic sheeting installed prior to emplacement of LA Weir sediments in 2012. Similar to field location A1, the bottom of the Pit at field locations A3, C1, and C3 was determined by hand auger refusal at the Qct contact. No plastic sheeting was encountered at field location A3, C1, or C3.

4.0 WASTE MANAGEMENT

Ten gallons of contact IDW (nitrile gloves and paper towels) were produced during LA Weir Borrow Pit sampling activities. This contact waste was containerized at the waste storage area in the Storm Water Processing Facility, Pueblo Complex, pending characterization.

5.0 DEVIATIONS

None

Table 3.0-1
Samples Taken Table

Field Location	Location ID	Sample ID	Date Collected	Sample Usage	Depth (ft bgs)	Media	Easting	Northing	XY Uploaded?	Gross Alpha (dpm)	Gross Beta/Gamma (dpm)	Sample Comments
A1	LA-61540	CALA-17-127749	12/5/2016	INV	0 – 1	SED	1646821.735	1770870.919	Yes	51	2440	sediment: brown; silt to fs; minor cs, pebbles, and organics; minor tuff fragments; damp but frozen
A1	LA-61540	CALA-17-127757	12/7/2016	INV	4.5 – 5.5	SED	1646821.735	1770870.919	Yes	64	2470	sediment: brown to gray; fs to gravel; cobbles 2 - 5 cm diam; minor organics; damp
A1	LA-61540	CALA-17-127765	12/7/2016	INV	9 – 9.7	SED	1646821.735	1770870.919	Yes	69	2460	sediment: silt/fs to cs; minor pebbles, cobbles and organics
A2	LA-61534	CALA-17-127750	12/1/2016	INV	0 – 1	SED	1646869.583	1770836.096	Yes	53	1861	sediment: brown; silt to ms; some cs; minor pebbles; some organics; damp
A2	LA-61534	CALA-17-127751	12/1/2016	INV	6 – 7	SED	1646869.583	1770836.096	Yes	42	1890	100% muck: dk gray to black; some ms; minor organics and pebbles; moist
A2	LA-61534	CALA-17-127759	12/1/2016	INV	11 – 13	SED	1646869.583	1770836.096	Yes	15	1450	100% muck: dk gray to black; some ms; minor pebbles and organics; moist
A3	LA-61535	CALA-17-127744	12/1/2016	INV	0 –1	SED	1646913.552	1770803.914	Yes	37	1437	sediment: brown to light brown; silt to fs; minor ms; some organics; dry to damp
A3	LA-61535	CALA-17-127752	12/7/2016	INV	2 – 3	SED	1646913.552	1770803.914	Yes	59	2310	sediment: silt to cs; some pebbles and cobbles; minor organics
A3	LA-61535	CALA-17-127760	12/7/2016	INV	4.5 – 5.5	SED	1646913.552	1770803.914	Yes	21	2290	sediment: silt to cs; significant pebbles and cobbles (base of Borrow Pit/top of bedrock)
B1	LA-61536	CALA-17-127745	12/5/2016	INV	0 – 1	SED	1646796.355	1770841.942	Yes	28	2400	sediment: brown; silt to ms; minor pebbles and organics; damp and slightly frozen
B1	LA-61536	CALA-17-127753	12/5/2016	INV	3 – 4	SED	1646796.355	1770841.942	Yes	40	2170	100% muck: dk gray to blk; silt to fs; some cs; minor tuff, pebbles, and organics; damp
B1	LA-61536	CALA-17-127761	12/5/2016	INV	5 – 6	SED	1646796.355	1770841.942	Yes	68	2360	100% muck: dk gray to blk; silt to fs; minor cs, pebbles, and organics; some tuff (sand-sized fragments); damp
B2	LA-61533	CALA-17-127742	11/30/2016	INV	0 – 1	SED	1646863.901	1770794.663	Yes	21	1533	sediment: brown to tan; silt to ms; some coarse sand; minor pebbles and organics; dry to damp
B2	LA-61533	CALA-17-127743	11/30/2016	INV	5.5 – 6.5	SED	1646863.901	1770794.663	Yes	31	1630	100% muck: dk gray to black; major ms; minor pebbles to cobbles; minor organics; moist
B2	LA-61533	CALA-17-127758	11/30/2016	INV	10 – 12.75	SED	1646863.901	1770794.663	Yes	21	1562	100% muck: dk gray to black; major ms; minor pebbles to cobbles; minor organics; moist
C1	LA-61537	CALA-17-127746	12/5/2016	INV	0 – 1	SED	1646797.235	1770794.465	Yes	45	2270	sediment: brown; silt to fs; minor cs, pebbles, and organics; dry but probably some frozen moisture
C1	LA-61537	CALA-17-127754	12/5/2016	INV	3 – 5	SED	1646797.235	1770794.465	Yes	34	2510	50% muck: same as other muck | 50% sediment: fs to cs; minor cobbles and organics; damp
C1	LA-61537	CALA-17-127762	12/5/2016	INV	5.5 – 6.5	SED	1646797.235	1770794.465	Yes	45	2240	100% muck: dk gray to black; silt to fs; minor organics and cs; damp
C2	LA-61538	CALA-17-127747	12/5/2016	INV	0 – 1	SED	1646830.483	1770771.351	Yes	28	2310	sediment: brown to tan; fs to cs; major pebbles; minor organics; damp to dry
C2	LA-61538	CALA-17-127755	12/7/2016	INV	1.5 – 2.5	SED	1646830.483	1770771.351	Yes	80	2370	sediment: silt to fs; some cs; minor pebbles, cobbles, and organics
C2	LA-61538	CALA-17-127763	12/7/2016	INV	3 – 4	SED	1646830.483	1770771.351	Yes	26	2290	sediment: silt to cs; significant cobbles of dacite and large tuff fragments
C3	LA-61539	CALA-17-127748	12/5/2016	INV	0 – 1	SED	1646868.842	1770743.724	Yes	28	2480	sediment: silt to vfs; minor organics and pebbles; frozen damp

Table 3.0-1 (continued)

Field Location	Location ID	Sample ID	Date Collected	Sample Usage	Depth (ft bgs)	Media	Easting	Northing	XY Uploaded?	Gross Alpha (dpm)	Gross Beta/Gamma (dpm)	Sample Comments
C3	LA-61539	CALA-17-127764	12/7/2016	INV	2.5 – 3.5	SED	1646868.842	1770743.724	Yes	53	2250	sediment: silt to cs; some organics; minor pebbles and cobbles
C3	LA-61539	CALA-17-127756	12/7/2016	INV	4 – 5.5	SED	1646868.842	1770743.724	Yes	69	2330	sediment: silt to fs; minor cs, pebbles, and organics; damp
B2	LA-61533	CALA-17-127766	11/30/2016	FD	0 – 1	SED	1646863.901	1770794.663	Yes	21	1511	Field duplicate of CALA-17-127742
A2	LA-61534	CALA-17-127767	12/1/2016	FD	11 – 13	SED	1646869.583	1770836.096	Yes	15	1450	Field duplicate of CALA-17-127759
C1	LA-61537	CALA-17-127768	12/5/2016	FD	3 – 5	SED	1646797.235	1770794.465	Yes	34	2510	Field duplicate of CALA-17-127754
B2	LA-61533	CALA-17-127769	11/30/2016	FR	NA	W	1646863.901	1770794.663	NA	NA	NA	Field rinsate for 11/30/2016; field location B2 (Loc ID: LA-61533); pH < 2
A2	LA-61534	CALA-17-127770	12/1/2016	FR	NA	W	1646869.583	1770836.096	NA	NA	NA	Field rinsate for 12/1/2016; field locations A2 and A3; pH < 2
C3	LA-61539	CALA-17-127771	12/5/2016	FR	NA	W	1646868.842	1770743.724	NA	NA	NA	Field rinsate for 12/5/2016; field locations B1, C1, C2, C3, and A1; pH < 2
C2	LA-61538	CALA-17-127772	12/7/2016	FR	NA	W	1646830.483	1770771.351	NA	NA	NA	Field rinsate for 12/7/2016; field locations A1, A3, C2, and C3; pH < 2

Appendix A

Sample Collection Log/Chain of Custody Forms

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127749

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):		12/05/2016	FIELD MATRIX:	SED	ok
TIME COLLECTED (HH:MM):		13:15	MEDIA:	SED	
PRS ID:	C-00-006	ok	SAMPLE TECH CODE:	HA	
LOCATION ID:	LA-61540	ok	FIELD PREP:	NA	ok
LOCATION TYPE:	BH	ok	FIELD QC TYPE:	REG	
TOP DEPTH:		0 ft	SAMPLE USAGE:	INV	ok
BOTTOM DEPTH:		1 ft	EXCAVATED:		YES / (NO) / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	8081A+8151A	500 ML GLASS	1	ICE	Y	NA
	8082	250 ML GLASS	1	ICE	Y	
	8290	125 ML GLASS	2	ICE	Y	
NA	Am241+GS+PU +SR90	1 LITER POLY	1	NONE	Y	NA
	H3	500 ML POLY	1	ICE	Y	
	Tal Metals	125 ML POLY	1	ICE	Y	
NA	TCN	125 ML POLY	1	ICE	Y	NA

SAMPLE COMMENTS: Sediment (fill): silt to fs; minor cs, pebbles, and organics; minor tuff fragments; damp but frozen

LOCATION COMMENTS: field loc. A1

FIELD PARAMETERS:

FIELD SCREENING/MEASUREMENT RESULTS:

Bkd = 11.03

Alpha 51 **dpm**

Beta/Gamma 2440 **dpm**

PID Ambient Reading = NA **ppm**

COLLECTED BY (PRINT): SW Pryce

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127749

WORK ORDER:

RELINQUISHED BY Tessa S Hermes **(Printed Name)** **(Signature)** Tessa S Hermes	**Date/Time** 12/5/2016 1615	**RECEIVED BY** S. Sherwood **(Printed Name)** **(Signature)** S. Sherwood	**Date/Time** 12/5/16 1615
RELINQUISHED BY **(Printed Name)** **(Signature)**	**Date/Time**	**RECEIVED BY** **(Printed Name)** **(Signature)**	**Date/Time**

Report Date: 11/16/2016

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127757

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):		12/7/2016 ~~1050~~ SU 12/9/16	FIELD MATRIX:	SED	ok
TIME COLLECTED (HH:MM):		1050	MEDIA:	SED	
PRS ID:	C-00-006	ok	SAMPLE TECH CODE:	HA	
LOCATION ID:	LA-61540		FIELD PREP:	NA	
LOCATION TYPE:	BH		FIELD QC TYPE:	REG	
TOP DEPTH:		4.5 ft bgs	SAMPLE USAGE:	INV	
BOTTOM DEPTH:		5.5 ft bgs	EXCAVATED:		YES / (NO) / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	8081A+8151A	500 ML GLASS	1	ICE	Y	NA
	8082	250 ML GLASS	1	ICE		
	8290	125 ML GLASS	2	ICE		
	Am241+GS+PU +SR90	1 LITER POLY	1	NONE		
	H3	500 ML POLY	1	ICE		
	Tal Metals	125 ML POLY	1	ICE		
	TCN	125 ML POLY	1	ICE		

SAMPLE COMMENTS: Fine sand to gravel and cobbles approx 2-5 cm big. Pieces of wood and minor organ. Brown to grey color, sample is damp

LOCATION COMMENTS: Hole A-1 middle Sample.

FIELD PARAMETERS:

FIELD SCREENING/MEASUREMENT RESULTS:

BAG: Alpha 64 dpm

20,8 P. 1820 Beta/Gamma 2470 dpm

PID Ambient Reading = NA ppm

COLLECTED BY (PRINT): T. Walker

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127757

WORK ORDER:

RELINQUISHED BY (Printed Name) Tom Walker (Signature) T. J. Walker	**Date/Time** 12/7/2016 1610	**RECEIVED BY** (Printed Name) S. Sherwood (Signature) S. Sherwood	**Date/Time** 12/7/16 1610
RELINQUISHED BY (Printed Name) (Signature)	**Date/Time**	**RECEIVED BY** (Printed Name) (Signature)	**Date/Time**

Report Date: 11/16/2016

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127765

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):		12/7/2016	FIELD MATRIX:	SED	OK
TIME COLLECTED (HH:MM):		1125	MEDIA:	SED	
PRS ID:	C-00-006	OK	SAMPLE TECH CODE:	HA	
LOCATION ID:	LA-61540		FIELD PREP:	NA	
LOCATION TYPE:	BH		FIELD QC TYPE:	REG	
TOP DEPTH:		9.0 ft bgs	SAMPLE USAGE:	INV	
BOTTOM DEPTH:		9.7 ft bgs	EXCAVATED:		YES / (NO) / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	8081A+8151A	500 ML GLASS	1	ICE	Y	NA
	8082	250 ML GLASS	1	ICE		
	8290	125 ML GLASS	2	ICE		
	Am241+GS+PU +SR90	1 LITER POLY	1	NONE		
	H3	500 ML POLY	1	ICE		
	Tal Metals	125 ML POLY	1	ICE		
	TCN	125 ML POLY	1	ICE		

SAMPLE COMMENTS: Silt and Fine Sand to coarse sand, minor Pebbles and Cobbles + organics

LOCATION COMMENTS: Hole A-1 bottom Sample

FIELD PARAMETERS:

FIELD SCREENING/MEASUREMENT RESULTS:

Bkg: 20.8 pm 1820

Alpha 69 dpm

Beta/Gamma 2460 dpm

PID Ambient Reading = NA ppm

COLLECTED BY (PRINT): Lt. Pryce

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127765

WORK ORDER:

RELINQUISHED BY (Printed Name) Tom Walker (Signature) T. A. Walker	**Date/Time** 12/7/2016 1610	**RECEIVED BY** (Printed Name) S. Isenwood (Signature) S. Isenwood	**Date/Time** 12/7/16 1610
RELINQUISHED BY (Printed Name) (Signature)	**Date/Time**	**RECEIVED BY** (Printed Name) (Signature)	**Date/Time**

Report Date: 11/16/2016

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127750

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):		12/01/2016	**FIELD MATRIX:**	SED	ok
TIME COLLECTED (HH:MM):		10:50	**MEDIA:**	SED	
PRS ID:	C-00-006	ok	**SAMPLE TECH CODE:**	HA	ok
LOCATION ID:	LA-61533	LA-61534	**FIELD PREP:**	NA	
LOCATION TYPE:	BH	ok	**FIELD QC TYPE:**	REG	
TOP DEPTH:		0 ft	**SAMPLE USAGE:**	INV	ok
BOTTOM DEPTH:		1 ft	**EXCAVATED:**		YES / (NO) / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	8081A+8151A	500 ML GLASS	1	ICE	Y	NA
	8082	250 ML GLASS	1	ICE	Y	
	8290	125 ML GLASS	2	ICE	Y	
NA	Am241+GS+PU +SR90	1 LITER POLY	1	NONE	Y	NA
	H3	500 ML POLY	1	ICE	Y	
	Tal Metals	125 ML POLY	1	ICE	Y	
NA	TCN	125 ML POLY	1	ICE	Y	NA

SAMPLE COMMENTS: sediment: brown, some organics, minor pebbles; silt to ms; some cs.; damp

LOCATION COMMENTS: field loc. A2

FIELD PARAMETERS:

FIELD SCREENING/MEASUREMENT RESULTS:

Alpha 53 dpm

Beta/Gamma 1861 dpm

PID Ambient Reading = NA ppm

COLLECTED BY (PRINT): SW Pryce

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127750

WORK ORDER:

RELINQUISHED BY Tessa S. Hermes **(Printed Name)** **(Signature)** Tessa S Hermes	**Date/Time** 12/1/2016 1645	**RECEIVED BY** S. Sherwood **(Printed Name)** **(Signature)** S Sherwood	**Date/Time** 12/1/16 1645
RELINQUISHED BY **(Printed Name)** **(Signature)**	**Date/Time**	**RECEIVED BY** **(Printed Name)** **(Signature)**	**Date/Time**

Report Date: 11/30/2016

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127751

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):		12/01/2016	**FIELD MATRIX:**	SED	ok
TIME COLLECTED (HH:MM):		11:00	**MEDIA:**	SED	
PRS ID:	C-00-006	ok	**SAMPLE TECH CODE:**	HA	
LOCATION ID:	LA-61534	ok	**FIELD PREP:**	NA	ok
LOCATION TYPE:	BH	ok	**FIELD QC TYPE:**	REG	
TOP DEPTH:		6 ft	**SAMPLE USAGE:**	INV	ok
BOTTOM DEPTH:		7 ft	**EXCAVATED:**		YES / (NO) / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	8081A+8151A	500 ML GLASS	1	ICE	Y	NA
	8082	250 ML GLASS	1	ICE	Y	
	8290	125 ML GLASS	2	ICE	Y	
NA	Am241+GS+PU +SR90	1 LITER POLY	1	NONE	Y	NA
	H3	500 ML POLY	1	ICE	Y	
	Tal Metals	125 ML POLY	1	ICE	Y	
NA	TCN	125 ML POLY	1	ICE	Y	NA

SAMPLE COMMENTS: Sediment ("muck" assoc w/ ash from forest fire); dk gray to black; minor organics; minor pebbles, (100% muck) some ms; moist

LOCATION COMMENTS: field loc. A2

FIELD PARAMETERS:

FIELD SCREENING/MEASUREMENT RESULTS:

Alpha 42 dpm

Beta/Gamma 1890 dpm

PID Ambient Reading = NA ppm

Background x = 9.8

COLLECTED BY (PRINT): SW Pryce

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127751

WORK ORDER:

RELINQUISHED BY Tessa S. Hermes **(Printed Name)** **(Signature)** Tessa S Hermes	**Date/Time** 12/1/2016 1645	**RECEIVED BY** S. Sherwood **(Printed Name)** **(Signature)** S Sherwood	**Date/Time** 12/1/16 1645
RELINQUISHED BY **(Printed Name)** **(Signature)**	**Date/Time**	**RECEIVED BY** **(Printed Name)** **(Signature)**	**Date/Time**

Report Date: 11/16/2016

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127759

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):		12/01/2016	**FIELD MATRIX:**	SED	ok
TIME COLLECTED (HH:MM):		12:20	**MEDIA:**	SED	
PRS ID:	C-00-006	ok	**SAMPLE TECH CODE:**	HA	
LOCATION ID:	LA-61534	ok	**FIELD PREP:**	NA	ok
LOCATION TYPE:	BH	ok	**FIELD QC TYPE:**	REG	
TOP DEPTH:		11 ft	**SAMPLE USAGE:**	INV	ok
BOTTOM DEPTH:		13 ft	**EXCAVATED:**		YES / (NO) / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	8081A+8151A	500 ML GLASS	1	ICE	Y	NA
	8082	250 ML GLASS	1	ICE	Y	
	8290	125 ML GLASS	2	ICE	Y	
NA	Am241+GS+PU +SR90	1 LITER POLY	1	NONE	Y	NA
	H3	500 ML POLY	1	ICE	Y	
	Tal Metals	125 ML POLY	1	ICE	Y	
NA	TCN	125 ML POLY	1	ICE	Y	NA

SAMPLE COMMENTS: Sediment: 100% muck; dk gray to blk; minor organics; minor pebbles; some ms; moist

LOCATION COMMENTS: field loc. A2

FIELD PARAMETERS:

FIELD SCREENING/MEASUREMENT RESULTS:

Bkgd $\alpha = 9.8$ β/γ 51

Alpha 15 **dpm**

Beta/Gamma 1450 **dpm**

PID Ambient Reading = NA **ppm**

COLLECTED BY (PRINT): SW Pryce

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127759

WORK ORDER:

RELINQUISHED BY Tessa S. Hermes **(Printed Name)** **(Signature)** Tessa S Hermes	**Date/Time** 12/1/2016 1645	**RECEIVED BY** S. Sherwood **(Printed Name)** **(Signature)** S Sherwood	**Date/Time** 12/1/16 1645
RELINQUISHED BY **(Printed Name)** **(Signature)**	**Date/Time**	**RECEIVED BY** **(Printed Name)** **(Signature)**	**Date/Time**

Report Date: 11/16/2016

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127744

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):		12/01/2016	**FIELD MATRIX:**	SED	ok
TIME COLLECTED (HH:MM):		13:00	**MEDIA:**	SED	
PRS ID:	C-00-006	ok	**SAMPLE TECH CODE:**	HA	
LOCATION ID:	LA-61535	ok	**FIELD PREP:**	NA	ok
LOCATION TYPE:	BH	ok	**FIELD QC TYPE:**	REG	
TOP DEPTH:		0ft	**SAMPLE USAGE:**	INV	ok
BOTTOM DEPTH:		1 ft	**EXCAVATED:**		YES / NO / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	8081A+8151A	500 ML GLASS	1	ICE	Y	NA
	8082	250 ML GLASS	1	ICE	Y	
	8290	125 ML GLASS	2	ICE	Y	
NA	Am241+GS+PU +SR90	1 LITER POLY	1	NONE	Y	NA
	H3	500 ML POLY	1	ICE	Y	
	Tal Metals	125 ML POLY	1	ICE	Y	
NA	TCN	125 ML POLY	1	ICE	Y	NA

SAMPLE COMMENTS: brown to light brown sediment; silt to fs; minor mis; dry to damp; some organics

LOCATION COMMENTS: field loc. A3

FIELD PARAMETERS:

FIELD SCREENING/MEASUREMENT RESULTS:

Blogl α = 9.8 β/γ = 1351

Alpha 37 **dpm**

Beta/Gamma 1437 **dpm**

PID Ambient Reading = NA **ppm**

COLLECTED BY (PRINT): T. Hermes

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127744

WORK ORDER:

RELINQUISHED BY (Printed Name) Tom Walker (Signature) T. A Walker	**Date/Time** 12/7/2016 1610	**RECEIVED BY** (Printed Name) S Sherwood (Signature) S Sherwood	**Date/Time** 12/7/16 1610
RELINQUISHED BY **(Printed Name)** **(Signature)**	**Date/Time**	**RECEIVED BY** **(Printed Name)** **(Signature)**	**Date/Time**

Report Date: 11/16/2016

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127752

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):		12/7/2016	**FIELD MATRIX:**	SED	OK
TIME COLLECTED (HH:MM):		1330	**MEDIA:**	SED	
PRS ID:	C-00-006	OK	**SAMPLE TECH CODE:**	HA	
LOCATION ID:	LA-61535		**FIELD PREP:**	NA	
LOCATION TYPE:	BH		**FIELD QC TYPE:**	REG	
TOP DEPTH:		2 ft bgs	**SAMPLE USAGE:**	INV	
BOTTOM DEPTH:		3 ft bgs	**EXCAVATED:**		YES / NO / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	8081A+8151A	500 ML GLASS	1	ICE	Y	NA
	8082	250 ML GLASS	1	ICE		
	8290	125 ML GLASS	2	ICE		
	Am241+GS+PU +SR90	1 LITER POLY	1	NONE		
	H3	500 ML POLY	1	ICE		
	Tal Metals	125 ML POLY	1	ICE		
	TCN	125 ML POLY	1	ICE		

SAMPLE COMMENTS: Silt to course Sand, some pebbles + cobbles, minor organics

LOCATION COMMENTS: Hole A-3, middle.

FIELD PARAMETERS:

FIELD SCREENING/MEASUREMENT RESULTS:

BKG: 20.8 B: 1820 **Alpha** 59 **dpm**

Beta/Gamma 2310 **dpm**

PID Ambient Reading = NA **ppm**

COLLECTED BY (PRINT): W. Pryce

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127752

WORK ORDER:

RELINQUISHED BY (Printed Name) (Signature)	Tom Walker T. Walker	**Date/Time**	12/7/2016 1610	**RECEIVED BY** (Printed Name) (Signature)	S. Sherwood S. Sherwood	**Date/Time**	12/7/16 1610
RELINQUISHED BY (Printed Name) (Signature)		**Date/Time**		**RECEIVED BY** (Printed Name) (Signature)		**Date/Time**	

Report Date: 11/16/2016

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127760

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):		12/7/2016	FIELD MATRIX:	SED	OK
TIME COLLECTED (HH:MM):		1345	MEDIA:	SED	
PRS ID:	C-00-006	OK	SAMPLE TECH CODE:	HA	
LOCATION ID:	LA-61535		FIELD PREP:	NA	
LOCATION TYPE:	BH		FIELD QC TYPE:	REG	
TOP DEPTH:		4.5ft bgs	SAMPLE USAGE:	INV	
BOTTOM DEPTH:		5.5ft bgs	EXCAVATED:		YES / (NO) / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	8081A+8151A	500 ML GLASS	1	ICE	Y	NA
	8082	250 ML GLASS	1	ICE		
	8290	125 ML GLASS	2	ICE		
	Am241+GS+PU +SR90	1 LITER POLY	1	NONE		
	H3	500 ML POLY	1	ICE		
	Tal Metals	125 ML POLY	1	ICE		
	TCN	125 ML POLY	1	ICE		

SAMPLE COMMENTS: Silt to coarse sand w/ significant pebbles and cobbles (base of pit)

LOCATION COMMENTS: Hole A-3 bottom

FIELD PARAMETERS:

FIELD SCREENING/MEASUREMENT RESULTS:

BKgs: A: 20.8 B: 1820

Alpha 21 **dpm**

Beta/Gamma 2290 **dpm**

PID Ambient Reading = NA **ppm**

COLLECTED BY (PRINT): V. Pryce

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127760

WORK ORDER:

RELINQUISHED BY (Printed Name) Tom Walker (Signature) T. B. Walker	**Date/Time** 12/7/2016 1610	**RECEIVED BY** (Printed Name) S Sherwood (Signature) S Sherwood	**Date/Time** 12/7/16 1610
RELINQUISHED BY (Printed Name) (Signature)	**Date/Time**	**RECEIVED BY** (Printed Name) (Signature)	**Date/Time**

Report Date: 11/16/2016

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127745

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):		12/05/2016	**FIELD MATRIX:**	SED	o/c
TIME COLLECTED (HH:MM):		09:45	**MEDIA:**	SED	
PRS ID:	C-00-006	ok	**SAMPLE TECH CODE:**	HA	
LOCATION ID:	LA-61536	ok	**FIELD PREP:**	NA	ok
LOCATION TYPE:	BH	ok	**FIELD QC TYPE:**	REG	
TOP DEPTH:		0 ft	**SAMPLE USAGE:**	INV	ok
BOTTOM DEPTH:		1 ft	**EXCAVATED:**		YES (NO) / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	8081A+8151A	500 ML GLASS	1	ICE	Y	NA
	8082	250 ML GLASS	1	ICE	Y	
	8290	125 ML GLASS	2	ICE	Y	
NA	Am241+GS+PU +SR90	1 LITER POLY	1	NONE	Y	NA
	H3	500 ML POLY	1	ICE	Y	
	Tal Metals	125 ML POLY	1	ICE	Y	
NA	TCN	125 ML POLY	1	ICE	Y	NA

SAMPLE COMMENTS: sediment (fill); brown; silt to ms; minor organics; minor pebbles, slightly frozen damp

LOCATION COMMENTS: field loc. B1

FIELD PARAMETERS:

FIELD SCREENING/MEASUREMENT RESULTS:

Bkgd x = 11.03 pfy 643

Alpha 28 **dpm**

Beta/Gamma 2400 **dpm**

PID Ambient Reading = NA **ppm**

COLLECTED BY (PRINT): SW Pryce

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127745

WORK ORDER:

RELINQUISHED BY (Printed Name) Tessa S. Hermes **(Signature)** Tessa S. Hermes	**Date/Time** 12/5/2016 1615	**RECEIVED BY** (Printed Name) S Sherwood **(Signature)** S Sherwood	**Date/Time** 12/5/16 1615
RELINQUISHED BY **(Printed Name)** **(Signature)**	**Date/Time**	**RECEIVED BY** **(Printed Name)** **(Signature)**	**Date/Time**

Report Date: 11/16/2016

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127753

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):		12/05/2016	**FIELD MATRIX:**	SED	ok
TIME COLLECTED (HH:MM):		10:10	**MEDIA:**	SED	
PRS ID:	C-00-006	ok	**SAMPLE TECH CODE:**	HA	
LOCATION ID:	LA-61536	ok	**FIELD PREP:**	NA	ok
LOCATION TYPE:	BH	ok	**FIELD QC TYPE:**	REG	
TOP DEPTH:		3 ft	**SAMPLE USAGE:**	INV	ok
BOTTOM DEPTH:		4 ft	**EXCAVATED:**		YES / (NO) / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	8081A+8151A	500 ML GLASS	1	ICE	Y	NA
	8082	250 ML GLASS	1	ICE	Y	
	8290	125 ML GLASS	2	ICE	Y	
NA	Am241+GS+PU +SR90	1 LITER POLY	1	NONE	Y	NA
	H3	500 ML POLY	1	ICE	Y	
	Tal Metals	125 ML POLY	1	ICE	Y	
NA	TCN	125 ML POLY	1	ICE	Y	NA

SAMPLE COMMENTS: sediment (100% "muck"); dk gray to blk; minor organics & pebbles; silt to fs w/ some coarse sand and minor tuff. damp

LOCATION COMMENTS: field loc B1

FIELD PARAMETERS:

FIELD SCREENING/MEASUREMENT RESULTS:

bkgd x = 11.03 / 18 43

Alpha 40 **dpm**

Beta/Gamma 2170 **dpm**

PID Ambient ---------- Reading = NA **ppm**

COLLECTED BY (PRINT): SW Pryce

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127753

WORK ORDER:

RELINQUISHED BY Tessa S Hermes **(Printed Name)** **(Signature)** Tessa S Hermes	**Date/Time** 12/5/2016 1615	**RECEIVED BY** S. Sherwood **(Printed Name)** **(Signature)** S. Sherwood	**Date/Time** 12/5/16 16:15
RELINQUISHED BY **(Printed Name)** **(Signature)**	**Date/Time**	**RECEIVED BY** **(Printed Name)** **(Signature)**	**Date/Time**

Report Date: 11/16/2016

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127761

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):		12/05/2016	**FIELD MATRIX:**	SED	ok
TIME COLLECTED (HH:MM):		10:30	**MEDIA:**	SED	
PRS ID:	C-00-006	ok	**SAMPLE TECH CODE:**	HA	
LOCATION ID:	LA-61536	ok	**FIELD PREP:**	NA	ok
LOCATION TYPE:	BH	ok	**FIELD QC TYPE:**	REG	
TOP DEPTH:		5 ft	**SAMPLE USAGE:**	INV	ok
BOTTOM DEPTH:		6 ft	**EXCAVATED:**		YES / (NO) / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	8081A+8151A	500 ML GLASS	1	ICE	Y	NA
	8082	250 ML GLASS	1	ICE	Y	
	8290	125 ML GLASS	2	ICE	Y	
NA	Am241+GS+PU +SR90	1 LITER POLY	1	NONE	Y	NA
	H3	500 ML POLY	1	ICE	Y	
	Tal Metals	125 ML POLY	1	ICE	Y	
NA	TCN	125 ML POLY	1	ICE	Y	NA

SAMPLE COMMENTS: sediment (100% "muck"); dk gray to blk; silt to fs; minor organics, cs, & pebbles; some tuff (sand-sized fragments); damp

LOCATION COMMENTS: field loc. B1

FIELD PARAMETERS:

FIELD SCREENING/MEASUREMENT RESULTS:

Bkgd α = 11.03 β/γ 643

Alpha 68 **dpm**

Beta/Gamma 2360 **dpm**

PID Ambient Reading = NA **ppm**

COLLECTED BY (PRINT): SW Pryce

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127761

WORK ORDER:

RELINQUISHED BY Tessa S Hermes **(Printed Name)** **(Signature)** Tessa S Hermes	**Date/Time** 12/5/2016 1615	**RECEIVED BY** S. Sherwood **(Printed Name)** **(Signature)** S. Sherwood	**Date/Time** 12/5/16 1615
RELINQUISHED BY **(Printed Name)** **(Signature)**	**Date/Time**	**RECEIVED BY** **(Printed Name)** **(Signature)**	**Date/Time**

Report Date: 11/16/2016

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127742

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):		11/30/2016	**FIELD MATRIX:**	SED	ok
TIME COLLECTED (HH:MM):		11:35	**MEDIA:**	SED	ok
PRS ID:	C-00-006	ok	**SAMPLE TECH CODE:**	HA	
LOCATION ID:	LA-61533	ok	**FIELD PREP:**	NA	ok
LOCATION TYPE:	BH	ok	**FIELD QC TYPE:**	REG	
TOP DEPTH:		0 ft	**SAMPLE USAGE:**	INV	ok
BOTTOM DEPTH:		1 ft	**EXCAVATED:**		YES / (NO) / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	8081A+8151A	500 ML GLASS	1	ICE	Y	NA
	8082	250 ML GLASS	1	ICE	Y	
	8290	125 ML GLASS	2	ICE	Y	
NA	Am241+GS+PU +SR90	1 LITER POLY	1	NONE	Y	NA
	H3	500 ML POLY	1	ICE	Y	
	Tal Metals	125 ML POLY	1	ICE	Y	
NA	TCN	125 ML POLY	1	ICE	Y	NA

SAMPLE COMMENTS: silt to ms, some coarse sand, minor organics & pebbles, dry to damp; color: brown to tan

LOCATION COMMENTS: field loc. B2

FIELD PARAMETERS:

FIELD SCREENING/MEASUREMENT RESULTS:

3 yrs
x 3.8
12/7/2016

Alpha 21 **dpm**

Beta/Gamma 1533 **dpm**

PID Ambient / Reading = NA **ppm**

COLLECTED BY (PRINT): SW Pryce

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127742

WORK ORDER:

RELINQUISHED BY Tessa S. Hermes **(Printed Name)** **(Signature)** Tessa S. Hermes	**Date/Time** 11/30/2016 1600	**RECEIVED BY** K. Green **(Printed Name)** **(Signature)**	**Date/Time** 11/30/16 4:00
RELINQUISHED BY **(Printed Name)** **(Signature)**	**Date/Time**	**RECEIVED BY** **(Printed Name)** **(Signature)**	**Date/Time**

Report Date: 11/16/2016

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127743

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):		11/30/2016 ~~11/30/2016~~ TSH 11/30/16	**FIELD MATRIX:**	SED	TSH 11/30/2016 ~~SOIL~~ SED
TIME COLLECTED (HH:MM):		~~1230~~ TSH 11/30/16 1230	**MEDIA:**	SED	SED
PRS ID:	C-00-006	ok	**SAMPLE TECH CODE:**	HA	ok
LOCATION ID:	LA-61534	TSH 11/30/16 ~~ok~~ LA-61537	**FIELD PREP:**	NA	ok
LOCATION TYPE:	BH	ok	**FIELD QC TYPE:**	REG	
TOP DEPTH:		5.5 ft	**SAMPLE USAGE:**	INV	ok
BOTTOM DEPTH:		6.5 ft	**EXCAVATED:**		YES / (NO) / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	8081A+8151A	500 ML GLASS	1	ICE	Y	NA
	8082	250 ML GLASS	1	ICE	Y	
	8290	125 ML GLASS	2	ICE	Y.	
NA	Am241+GS+PU +SR90	1 LITER POLY	1	NONE	Y	NA
	H3	500 ML POLY	1	ICE	Y	
	Tal Metals	125 ML POLY	1	ICE	Y	
NA	TCN	125 ML POLY	1	ICE	Y	NA

SAMPLE COMMENTS: dk gray to black; moist; minor organics; minor pebbles to cobbles; major med. sand (100% "muck" from ash assoc. w/ forest fire)

LOCATION COMMENTS: field location B2

FIELD PARAMETERS:

FIELD SCREENING/MEASUREMENT RESULTS:

Bkgd α = 22.8
B/γ = 16

Alpha 31 **dpm**

Beta/Gamma 1630 **dpm**

PID Ambient ---------- Reading = NA **ppm**

COLLECTED BY (PRINT): SW Pryce

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127743

WORK ORDER:

RELINQUISHED BY (Printed Name) Tessa S. Hermes **(Signature)** Tessa S. Hermes	**Date/Time** 11/30/2016 1600	**RECEIVED BY** (Printed Name) S. Sherwood **(Signature)** S. Sherwood	**Date/Time** 11/30/16 1600
RELINQUISHED BY (Printed Name) (Signature)	**Date/Time**	**RECEIVED BY** (Printed Name) (Signature)	**Date/Time**

Report Date: 11/16/2016

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127758

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):		11/30/2016	**FIELD MATRIX:**	SED	ok
TIME COLLECTED (HH:MM):		1330	**MEDIA:**	SED	
PRS ID:	C-00-006	ok	**SAMPLE TECH CODE:**	HA	
LOCATION ID:	LA-61533	ok	**FIELD PREP:**	NA	ok
LOCATION TYPE:	BH	ok	**FIELD QC TYPE:**	REG	
TOP DEPTH:		10 ft	**SAMPLE USAGE:**	INV	ok
BOTTOM DEPTH:		12.75 ft	**EXCAVATED:**		YES / (NO) / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	8081A+8151A	500 ML GLASS	1	ICE	Y	NA
	8082	250 ML GLASS	1	ICE	Y	
	8290	125 ML GLASS	2	ICE	Y	
NA	Am241+GS+PU +SR90	1 LITER POLY	1	NONE	Y	NA
	H3	500 ML POLY	1	ICE	Y	
	Tal Metals	125 ML POLY	1	ICE	Y	
NA	TCN	125 ML POLY	1	ICE	Y	NA

SAMPLE COMMENTS: dk gray to black; moist; minor organics, minor pebbles to cobbles, major med. sand (100% "muck" - ash rich)

LOCATION COMMENTS: field loc. B2

FIELD PARAMETERS:

FIELD SCREENING/MEASUREMENT RESULTS:

Bkgd C = 23.8

Alpha 21 **dpm**

B/G = 1216 **Beta/Gamma** 1562 **dpm**

PID Ambient Reading = NA **ppm**

COLLECTED BY (PRINT): SW Pryce

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127758

WORK ORDER:

RELINQUISHED BY (Printed Name) Tessa S. Hermes **(Signature)** Tessa S. Hermes	**Date/Time** 11/30/2016 1600	**RECEIVED BY** (Printed Name) S. Sherwood **(Signature)** S. Sherwood	**Date/Time** 11/30/16 16:00
RELINQUISHED BY (Printed Name) (Signature)	**Date/Time**	**RECEIVED BY** (Printed Name) (Signature)	**Date/Time**

Report Date: 11/16/2016

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127746

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):		12/05/2016	**FIELD MATRIX:**	SED	ok
TIME COLLECTED (HH:MM):		10:45	**MEDIA:**	SED	
PRS ID:	C-00-006	ok	**SAMPLE TECH CODE:**	HA	
LOCATION ID:	LA-61537	ok	**FIELD PREP:**	NA	ok
LOCATION TYPE:	BH	ok	**FIELD QC TYPE:**	REG	
TOP DEPTH:		0 ft	**SAMPLE USAGE:**	INV	ok
BOTTOM DEPTH:		1 ft	**EXCAVATED:**		YES / NO / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	8081A+8151A	500 ML GLASS	1	ICE	Y	NA
	8082	250 ML GLASS	1	ICE	Y	
	8290	125 ML GLASS	2	ICE	Y	
NA	Am241+GS+PU +SR90	1 LITER POLY	1	NONE	Y	NA
	H3	500 ML POLY	1	ICE	Y	
	Tal Metals	125 ML POLY	1	ICE	Y	
NA	TCN	125 ML POLY	1	ICE	Y	NA

SAMPLE COMMENTS: Sediment (fill); brown; silt to fs; minor cs, pebbles, & organics; dry but probably some frozen moisture

LOCATION COMMENTS: field loc. C1

FIELD PARAMETERS:

FIELD SCREENING/MEASUREMENT RESULTS:

Alpha 45 dpm

Beta/Gamma 2270 dpm

PID Ambient Reading = NA ppm

3kSd
(= 11.03
:17 43

COLLECTED BY (PRINT): SW Pryce

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127746

WORK ORDER:

RELINQUISHED BY (Printed Name) Tessa S. Hermes **(Signature)** Tessa S Hermes	**Date/Time** 12/5/2016 1615	**RECEIVED BY** (Printed Name) S Sherwood **(Signature)** S Sherwood	**Date/Time** 12/5/16 1615
RELINQUISHED BY (Printed Name) (Signature)	**Date/Time**	**RECEIVED BY** (Printed Name) (Signature)	**Date/Time**

Report Date: 11/16/2016

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127754

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):		12/05/2016	**FIELD MATRIX:**	SED	ok
TIME COLLECTED (HH:MM):		12:20	**MEDIA:**	SED	
PRS ID:	C-00-006	ok	**SAMPLE TECH CODE:**	HA	
LOCATION ID:	LA-61537	ok	**FIELD PREP:**	NA	ok
LOCATION TYPE:	BH	ok	**FIELD QC TYPE:**	REG	
TOP DEPTH:		3.0 ft	**SAMPLE USAGE:**	INV	ok
BOTTOM DEPTH:		TSH 12/5/16 5.0 ~~4.5~~ ft	**EXCAVATED:**		YES / NO / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	8081A+8151A	500 ML GLASS	1	ICE	Y	NA
	8082	250 ML GLASS	1	ICE	Y	
	8290	125 ML GLASS	2	ICE	Y	
NA	Am241+GS+PU +SR90	1 LITER POLY	1	NONE	Y	NA
	H3	500 ML POLY	1	ICE	Y	
	Tal Metals	125 ML POLY	1	ICE	Y	
NA	TCN	125 ML POLY	1	ICE	Y	NA

SAMPLE COMMENTS: sediment (~~50%~~ "muck") (~~50%~~ sed -- not fill); muck description same as others (i.e. CALA-17 - 127761) TSH 12/6/16
sed not fill description: fine to cs; minor cobbles; minor organics; damp.

LOCATION COMMENTS: field. loc. C1

FIELD PARAMETERS:

FIELD SCREENING/MEASUREMENT RESULTS:

'kgd
x = 11.03
'17 p43

Alpha 34 **dpm**

Beta/Gamma 2510 **dpm**

PID Ambient Reading = NA **ppm**

COLLECTED BY (PRINT): T. Hermes

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127754

WORK ORDER:

RELINQUISHED BY Tessa S. Hermes **(Printed Name)** **(Signature)** Tessa S Hermes	**Date/Time** 12/5/2016 1615	**RECEIVED BY** Sherri Sherwood **(Printed Name)** **(Signature)** Sherri Sherwood	**Date/Time** 12/5/16 1615
RELINQUISHED BY **(Printed Name)** **(Signature)**	**Date/Time**	**RECEIVED BY** **(Printed Name)** **(Signature)**	**Date/Time**

Report Date: 11/16/2016

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127762

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):		12/05/2016	**FIELD MATRIX:**	SED	ok
TIME COLLECTED (HH:MM):		12:45	**MEDIA:**	SED	
PRS ID:	C-00-006	ok	**SAMPLE TECH CODE:**	HA	
LOCATION ID:	LA-61537	ok	**FIELD PREP:**	NA	ok
LOCATION TYPE:	BH	ok	**FIELD QC TYPE:**	REG	
TOP DEPTH:		5.5 ft	**SAMPLE USAGE:**	INV	ok
BOTTOM DEPTH:		6.5 ft	**EXCAVATED:**		YES (NO) NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	8081A+8151A	500 ML GLASS	1	ICE	Y	NA
	8082	250 ML GLASS	1	ICE	Y	
	8290	125 ML GLASS	2	ICE	Y	
NA	Am241+GS+PU +SR90	1 LITER POLY	1	NONE	Y	NA
	H3	500 ML POLY	1	ICE	Y	
	Tal Metals	125 ML POLY	1	ICE	Y	
NA	TCN	125 ML POLY	1	ICE	Y	NA

SAMPLE COMMENTS: Sediment (100% muck, trace tuff) dk gray to blk; silt to fs; minor organics, cs; damp

LOCATION COMMENTS: field loc. C1

FIELD PARAMETERS:

FIELD SCREENING/MEASUREMENT RESULTS:

Bkgd x = 11.03 2σ 6.43

Alpha 45 **dpm**

Beta/Gamma 2240 **dpm**

PID Ambient Reading = NA **ppm**

COLLECTED BY (PRINT): T. Hermes

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127762

WORK ORDER:

RELINQUISHED BY Tessa S Hermes **(Printed Name)** **(Signature)** Tessa S. Hermes	**Date/Time** 12/5/2016 1615	**RECEIVED BY** D. Sherwood **(Printed Name)** **(Signature)** D. Sherwood	**Date/Time** 12/5/16 1618
RELINQUISHED BY **(Printed Name)** **(Signature)**	**Date/Time**	**RECEIVED BY** **(Printed Name)** **(Signature)**	**Date/Time**

Report Date: 11/16/2016

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127747

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):		12/05/2016	**FIELD MATRIX:**	SED	ok
TIME COLLECTED (HH:MM):		13:25	**MEDIA:**	SED	
PRS ID:	C-00-006	ok	**SAMPLE TECH CODE:**	HA	
LOCATION ID:	LA-61538	ok	**FIELD PREP:**	NA	ok
LOCATION TYPE:	BH	ok	**FIELD QC TYPE:**	REG	
TOP DEPTH:		0 ft	**SAMPLE USAGE:**	INV	ok
BOTTOM DEPTH:		1 ft	**EXCAVATED:**		YES / (NO) / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	8081A+8151A	500 ML GLASS	1	ICE	Y	NA
	8082	250 ML GLASS	1	ICE	Y	
	8290	125 ML GLASS	2	ICE	Y	
NA	Am241+GS+PU +SR90	1 LITER POLY	1	NONE	Y	NA
	H3	500 ML POLY	1	ICE	Y	
	Tal Metals	125 ML POLY	1	ICE	Y	
NA	TCN	125 ML POLY	1	ICE	Y	NA

SAMPLE COMMENTS: sediment (fill): brown to tan; fs to cs; major pebbles; minor organics; damp to dry

LOCATION COMMENTS: field loc. C2

FIELD PARAMETERS:

FIELD SCREENING/MEASUREMENT RESULTS:

BKA 2' B3 BH=1643

Alpha 28 **dpm**

Beta/Gamma 2310 **dpm**

PID **Ambient** ---------- **Reading** = NA **ppm**

COLLECTED BY (PRINT): T. Hermes

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127747

WORK ORDER:

RELINQUISHED BY Tessa S. Hermes **(Printed Name)** **(Signature)** Tessa S. Hermes	**Date/Time** 12/5/2016 1615	**RECEIVED BY** S. Sherwood **(Printed Name)** **(Signature)** S. Sherwood	**Date/Time** 12/5/16 1615
RELINQUISHED BY **(Printed Name)** **(Signature)**	**Date/Time**	**RECEIVED BY** **(Printed Name)** **(Signature)**	**Date/Time**

Report Date: 11/16/2016

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127755

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):		12/7/2016	FIELD MATRIX:	SED	OK
TIME COLLECTED (HH:MM):		1410	MEDIA:	SED	
PRS ID:	C-00-006	OK	SAMPLE TECH CODE:	HA	
LOCATION ID:	LA-61538		FIELD PREP:	NA	
LOCATION TYPE:	BH		FIELD QC TYPE:	REG	
TOP DEPTH:		1.5ft bgs	SAMPLE USAGE:	INV	
BOTTOM DEPTH:		2.5ft bgs	EXCAVATED:		YES / NO / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	8081A+8151A	500 ML GLASS	1	ICE	Y	NA
	8082	250 ML GLASS	1	ICE		
	8290	125 ML GLASS	2	ICE		
	Am241+GS+PU +SR90	1 LITER POLY	1	NONE		
	H3	500 ML POLY	1	ICE		
	Tal Metals	125 ML POLY	1	ICE		
	TCN	125 ML POLY	1	ICE		

SAMPLE COMMENTS: Silt to fine Sand, some coarse Sand, minor Pebbles/cobbles/organics

LOCATION COMMENTS: Hole C-2, middle

FIELD PARAMETERS:

FIELD SCREENING/MEASUREMENT RESULTS:

Bkg: 20.8 1820

Alpha 80 dpm

Beta/Gamma 2370 dpm

PID Ambient Reading = NA ppm

COLLECTED BY (PRINT): W. Pryce

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127755

WORK ORDER:

RELINQUISHED BY Tom Walker **(Printed Name)** **(Signature)** T. G. Walker	**Date/Time** 12/7/2016 1610	**RECEIVED BY** S. Sherwood **(Printed Name)** **(Signature)** Sue Sherwood	**Date/Time** 12/7/16 1610
RELINQUISHED BY **(Printed Name)** **(Signature)**	**Date/Time**	**RECEIVED BY** **(Printed Name)** **(Signature)**	**Date/Time**

Report Date: 11/16/2016

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127763

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):		12/7/2016	FIELD MATRIX:	SED	OK
TIME COLLECTED (HH:MM):		1435	MEDIA:	SED	
PRS ID:	C-00-006	OK	SAMPLE TECH CODE:	HA	
LOCATION ID:	LA-61538		FIELD PREP:	NA	
LOCATION TYPE:	BH		FIELD QC TYPE:	REG	
TOP DEPTH:		3 ft bgs	SAMPLE USAGE:	INV	
BOTTOM DEPTH:		4 ft bgs	EXCAVATED:		YES / NO / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	8081A+8151A	500 ML GLASS	1	ICE	Y	NA
	8082	250 ML GLASS	1	ICE		
	8290	125 ML GLASS	2	ICE		
	Am241+GS+PU +SR90	1 LITER POLY	1	NONE		
	H3	500 ML POLY	1	ICE		
	Tal Metals	125 ML POLY	1	ICE		
	TCN	125 ML POLY	1	ICE		

SAMPLE COMMENTS:

Silt - Fine Sand - Coarse Sand, Significant cobbles of dacite and large fragments of Tuff

LOCATION COMMENTS:

Hole C-2 bottom

FIELD PARAMETERS:

FIELD SCREENING/MEASUREMENT RESULTS:

BKG: α: 20.8 1820

Alpha 26 dpm

Beta/Gamma 2290 dpm

PID Ambient ---------- Reading = NA ppm

COLLECTED BY (PRINT): N. Pryce

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127763

WORK ORDER:

RELINQUISHED BY (Printed Name) Tom Walker (Signature) T. J. Walker	**Date/Time** 12/7/2016 1610	**RECEIVED BY** (Printed Name) S Sherwood (Signature) S Sherwood	**Date/Time** 12/7/16 1610
RELINQUISHED BY (Printed Name) (Signature)	**Date/Time**	**RECEIVED BY** (Printed Name) (Signature)	**Date/Time**

Report Date: 11/16/2016

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127748

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):		12/05/2016	**FIELD MATRIX:**	SED	ok
TIME COLLECTED (HH:MM):		13:35	**MEDIA:**	SED	
PRS ID:	C-00-006	ok	**SAMPLE TECH CODE:**	HA	
LOCATION ID:	LA-61539	ok	**FIELD PREP:**	NA	ok
LOCATION TYPE:	BH	ok	**FIELD QC TYPE:**	REG	
TOP DEPTH:		0 ft	**SAMPLE USAGE:**	INV	ok
BOTTOM DEPTH:		1 ft	**EXCAVATED:**		YES / (NO) / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	8081A+8151A	500 ML GLASS	1	ICE	Y	NA
	8082	250 ML GLASS	1	ICE	Y	
	8290	125 ML GLASS	2	ICE	Y	
NA	Am241+GS+PU +SR90	1 LITER POLY	1	NONE	Y	NA
	H3	500 ML POLY	1	ICE	Y	
	Tal Metals	125 ML POLY	1	ICE	Y	
NA	TCN	125 ML POLY	1	ICE	Y	NA

SAMPLE COMMENTS: sediment(fill): silt to vfs; minor organics and pebbles; frozen moisture (estimate it would be damp & warm)

LOCATION COMMENTS: field loc. C3

FIELD PARAMETERS:

FIELD SCREENING/MEASUREMENT RESULTS:

BKG
α = 11.03
β/γ 1643

Alpha 28 **dpm**

Beta/Gamma 2480 **dpm**

PID Ambient ---------- Reading = NA **ppm**

COLLECTED BY (PRINT): SW Pryce

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127748

WORK ORDER:

RELINQUISHED BY Tessa S Hermes **(Printed Name)** **(Signature)** Tessa S Hermes	**Date/Time** 12/5/2016 1615	**RECEIVED BY** S. Shepherd **(Printed Name)** **(Signature)** S. Shepherd	**Date/Time** 12/5/16 1615
RELINQUISHED BY **(Printed Name)** **(Signature)**	**Date/Time**	**RECEIVED BY** **(Printed Name)** **(Signature)**	**Date/Time**

Report Date: 11/16/2016

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127764

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):		12/7/2016	**FIELD MATRIX:**	SED	OK
TIME COLLECTED (HH:MM):		1315	**MEDIA:**	SED	
PRS ID:	C-00-006	OK	**SAMPLE TECH CODE:**	HA	
LOCATION ID:	LA-61539		**FIELD PREP:**	NA	
LOCATION TYPE:	BH		**FIELD QC TYPE:**	REG	
TOP DEPTH:		2.5 ft bgs	**SAMPLE USAGE:**	INV	
BOTTOM DEPTH:		3.5 ft bgs	**EXCAVATED:**		YES / ~~NO~~ / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	8081A+8151A	500 ML GLASS	1	ICE	Y	NA
	8082	250 ML GLASS	1	ICE		
	8290	125 ML GLASS	2	ICE		
	Am241+GS+PU +SR90	1 LITER POLY	1	NONE		
	H3	500 ML POLY	1	ICE		
	Tal Metals	125 ML POLY	1	ICE		
	TCN	125 ML POLY	1	ICE		

SAMPLE COMMENTS: Silt to course sand, Minor Pebbles and cobbles, Some organics

LOCATION COMMENTS: Hole C-3 middle sample

FIELD PARAMETERS:

FIELD SCREENING/MEASUREMENT RESULTS:

DHG: A: 30.8 B: 1020

Alpha 53 **dpm**

Beta/Gamma 2250 **dpm**

PID Ambient Reading = NA **ppm**

COLLECTED BY (PRINT): L. Pryce

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127764

WORK ORDER:

RELINQUISHED BY Tom Walker **(Printed Name)** **(Signature)** T.D. Walker	**Date/Time** 12/7/2016 1610	**RECEIVED BY** S. Shenwood **(Printed Name)** **(Signature)** Shenwood	**Date/Time** 12/7/16 1610
RELINQUISHED BY **(Printed Name)** **(Signature)**	**Date/Time**	**RECEIVED BY** **(Printed Name)** **(Signature)**	**Date/Time**

Report Date: 11/16/2016

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127756

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):		12/7/2016	FIELD MATRIX:	SED	OK
TIME COLLECTED (HH:MM):		1250	MEDIA:	SED	
PRS ID:	C-00-006	OK	SAMPLE TECH CODE:	HA	
LOCATION ID:	LA-61539		FIELD PREP:	NA	
LOCATION TYPE:	BH		FIELD QC TYPE:	REG	
TOP DEPTH:		4 ft bgs	SAMPLE USAGE:	INV	
BOTTOM DEPTH:		5.5 ft bgs	EXCAVATED:		YES / NO / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	8081A+8151A	500 ML GLASS	1	ICE	Y	NA
	8082	250 ML GLASS	1	ICE		
	8290	125 ML GLASS	2	ICE		
	Am241+GS+PU +SR90	1 LITER POLY	1	NONE		
	H3	500 ML POLY	1	ICE		
	Tal Metals	125 ML POLY	1	ICE		
	TCN	125 ML POLY	1	ICE		

SAMPLE COMMENTS: Silt to Fine sand, Minor coarse sand and pebbles, organics, sample Damp

LOCATION COMMENTS: TW 12/7/16
Hole C-3 ~~Middle~~ Bottom sample

FIELD PARAMETERS:

FIELD SCREENING/MEASUREMENT RESULTS:

Bkg: α: 20.8 1820

Alpha 69 dpm

Beta/Gamma 2330 dpm

PID Ambient ---------- Reading = NA ppm

COLLECTED BY (PRINT): W. Pryce

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127756

WORK ORDER:

RELINQUISHED BY (Printed Name)	Tom Walker	**Date/Time**	12/7/2016 1610	**RECEIVED BY** (Printed Name)	S. Sherwood	**Date/Time**	12/7/16 1600
(Signature)	T. D. Walker			**(Signature)**	S. Sherwood		
RELINQUISHED BY (Printed Name) (Signature)		**Date/Time**		**RECEIVED BY** (Printed Name) (Signature)		**Date/Time**	

Report Date: 11/16/2016

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127767

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):		12/01/2016	FIELD MATRIX:	SED	ok
TIME COLLECTED (HH:MM):		12:20	MEDIA:	SED	
PRS ID:	C-00-006	ok	SAMPLE TECH CODE:	HA	
LOCATION ID:	UNK	LA-61534	FIELD PREP:	NA	ok
LOCATION TYPE:		BH	FIELD QC TYPE:	FD	
TOP DEPTH:		11 ft	SAMPLE USAGE:	QC	ok
BOTTOM DEPTH:		13 ft	EXCAVATED:		YES / (NO) / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	8081A+8151A	500 ML GLASS	1	ICE	Y	NA
	8082	250 ML GLASS	1	ICE	Y	
	8290	125 ML GLASS	2	ICE	Y	
NA	Am241+GS+PU +SR90	1 LITER POLY	1	NONE	Y	NA
	H3	500 ML POLY	1	ICE	Y	
	Tal Metals	125 ML POLY	1	ICE	Y	
NA	TCN	125 ML POLY	1	ICE	Y	NA

SAMPLE COMMENTS: field duplicate of CALA-17-127759

LOCATION COMMENTS: field loc. A2

FIELD PARAMETERS:

FIELD SCREENING/MEASUREMENT RESULTS:

Alpha 15 dpm

Beta/Gamma 1450 dpm

PID Ambient Reading = NA ppm

COLLECTED BY (PRINT): SW Pryce

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127767

WORK ORDER:

RELINQUISHED BY Tessa S. Hermes **(Printed Name)** **(Signature)** Tessa S Hermes	**Date/Time** 12/1/2016 1645	**RECEIVED BY** S. Sherwood **(Printed Name)** **(Signature)** S Sherwood	**Date/Time** 12/1/16 1645
RELINQUISHED BY **(Printed Name)** **(Signature)**	**Date/Time**	**RECEIVED BY** **(Printed Name)** **(Signature)**	**Date/Time**

Report Date: 11/16/2016

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127766

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):		11/30/2016	**FIELD MATRIX:**	SED	ok
TIME COLLECTED (HH:MM):		1135	**MEDIA:**	SED	ok
PRS ID:	C-00-006	ok	**SAMPLE TECH CODE:**	HA	
LOCATION ID:	UNK	LA-61533	**FIELD PREP:**	NA	ok
LOCATION TYPE:		BH	**FIELD QC TYPE:**	FD	
TOP DEPTH:		0 ft	**SAMPLE USAGE:**	QC	ok
BOTTOM DEPTH:		1 ft	**EXCAVATED:**		YES / (NO) / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	8081A+8151A	500 ML GLASS	1	ICE	Y	NA
	8082	250 ML GLASS	1	ICE	Y	
	8290	125 ML GLASS	2	ICE	Y	
NA	Am241+GS+PU +SR90	1 LITER POLY	1	NONE	Y	NA
	H3	500 ML POLY	1	ICE	Y	
	Tal Metals	125 ML POLY	1	ICE	Y	
NA	TCN	125 ML POLY	1	ICE	Y	NA

SAMPLE COMMENTS: Field duplicate of CALA-17-127742

LOCATION COMMENTS: field loc. B2

FIELD PARAMETERS:

FIELD SCREENING/MEASUREMENT RESULTS:

Blegd α - 23.8 β/γ - 1216

Alpha 21 **dpm**

Beta/Gamma 1511 **dpm**

PID Ambient Reading = NA **ppm**

COLLECTED BY (PRINT): SM Pryce

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127766

WORK ORDER:

RELINQUISHED BY Tessa S. Hermes **(Printed Name)** **(Signature)** Tessa S. Hermes	**Date/Time** 11/30/2016 1600	**RECEIVED BY** S. Thornwood **(Printed Name)** **(Signature)** S. Thornwood	**Date/Time** 11/30/16 1600
RELINQUISHED BY **(Printed Name)** **(Signature)**	**Date/Time**	**RECEIVED BY** **(Printed Name)** **(Signature)**	**Date/Time**

Report Date: 11/16/2016

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127768

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):		12/05/2016	**FIELD MATRIX:**	SED	ok
TIME COLLECTED (HH:MM):		12:20	**MEDIA:**	SED	
PRS ID:	C-00-006	ok	**SAMPLE TECH CODE:**	HA	ok
LOCATION ID:	UNK	LA-61537	**FIELD PREP:**	NA	
LOCATION TYPE:		BH	**FIELD QC TYPE:**	FD	
TOP DEPTH:	~~BH 12/5/16~~	3.0 ft	**SAMPLE USAGE:**	QC	ok
BOTTOM DEPTH:		5.0 ~~3.5~~ ft	**EXCAVATED:**		YES / (NO) / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	8081A+8151A	500 ML GLASS	1	ICE	Y	NA
	8082	250 ML GLASS	1	ICE	Y	
	8290	125 ML GLASS	2	ICE	Y	
NA	Am241+GS+PU +SR90	1 LITER POLY	1	NONE	Y	NA
	H3	500 ML POLY	1	ICE	Y	
	Tal Metals	125 ML POLY	1	ICE	Y	
NA	TCN	125 ML POLY	1	ICE	Y	NA

SAMPLE COMMENTS: field duplicate of CALA-17-127754

LOCATION COMMENTS: field loc. C1

FIELD PARAMETERS:

FIELD SCREENING/MEASUREMENT RESULTS:

Bkgd
α = 11.03
β/γ 43

Alpha 34 **dpm**

Beta/Gamma 2510 **dpm**

PID Ambient ---------- Reading = NA **ppm**

COLLECTED BY (PRINT): T. Hermes

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127768

WORK ORDER:

RELINQUISHED BY Tessa S. Hermes **(Printed Name)** **(Signature)** Tessa S Hermes	**Date/Time** 12/5/2016 1615	**RECEIVED BY** S. Sherwood **(Printed Name)** **(Signature)** S. Sherwood	**Date/Time** 12/5/16 1615
RELINQUISHED BY **(Printed Name)** **(Signature)**	**Date/Time**	**RECEIVED BY** **(Printed Name)** **(Signature)**	**Date/Time**

Report Date: 11/16/2016

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Plt Characterization

SAMPLE ID: CALA-17-127769

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):		11/30/2016	FIELD MATRIX:	W	ok
TIME COLLECTED (HH:MM):		TSH 11/30/2016 15~~13~~:00	MEDIA:		W
PRS ID:	C-00-006	ok	SAMPLE TECH CODE:	DC	ok
LOCATION ID:	UNK	LA-61533	FIELD PREP:	UF	ok
LOCATION TYPE:		NA	FIELD QC TYPE:	FR	
TOP DEPTH:		NA	SAMPLE USAGE:	QC	ok
BOTTOM DEPTH:		NA	EXCAVATED:		YES / NO (NA)

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	Metals(W)	1 LITER POLY	1	HNO3	Y	NA

SAMPLE COMMENTS: FR for 11/30/2016 ; loc. B2

LOCATION COMMENTS: pH < 2

FIELD PARAMETERS:

COLLECTED BY (PRINT): S.W. Pryce

RELINQUISHED BY (Printed Name) Tessa S. Hermes (Signature) Tessa S. Hermes	Date/Time 11/30/2016 1600	**RECEIVED BY** (Printed Name) K. Greene (Signature)	Date/Time 11/30/16 4:00
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	**RECEIVED BY** (Printed Name) (Signature)	Date/Time

Report Date: 11/16/2016

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127770

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):		12/01/2016	**FIELD MATRIX:**	W	ok
TIME COLLECTED (HH:MM):		15:45	**MEDIA:**		W
PRS ID:	C-00-006	ok	**SAMPLE TECH CODE:**	DC	ok
LOCATION ID:	UNK	LA-61534	**FIELD PREP:**	UF	ok
LOCATION TYPE:		NA	**FIELD QC TYPE:**	FR	
TOP DEPTH:		NA	**SAMPLE USAGE:**	QC	ok
BOTTOM DEPTH:		NA	**EXCAVATED:**		YES / NO / (NA)

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	Metals(W)	1 LITER POLY	1	HNO3	Y	NA

SAMPLE COMMENTS: field rinsate for 12/1/2016; locs. LA-61534 and LA-61535

Note: LA-61534 was not final location of the day, but majority of samples were taken at LA-61534.

LOCATION COMMENTS: pH < 2

FIELD PARAMETERS:

COLLECTED BY (PRINT): S W Pryce

RELINQUISHED BY (Printed Name) Tessa S. Hermes (Signature) Tessa S. Hermes	**Date/Time** 12/1/2016 1645	**RECEIVED BY** (Printed Name) S. Sherwood (Signature) S. Sherwood	**Date/Time** 12/1/16 1645
RELINQUISHED BY (Printed Name) (Signature)	**Date/Time**	**RECEIVED BY** (Printed Name) (Signature)	**Date/Time**

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127771

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):		12/05/2016	FIELD MATRIX:	W	ok
TIME COLLECTED (HH:MM):		15:00	MEDIA:		W
PRS ID:	C-00-006	ok	SAMPLE TECH CODE:	DC	ok
LOCATION ID:	UNK	LA-61539	FIELD PREP:	UF	ok
LOCATION TYPE:		NA	FIELD QC TYPE:	FR	
TOP DEPTH:		NA	SAMPLE USAGE:	QC	ok
BOTTOM DEPTH:		NA	EXCAVATED:		YES / NO / (NA)

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	Metals(W)	1 LITER POLY	1	HNO3	Y	NA

SAMPLE COMMENTS: field rinsate for 12/05/2016; field locations B1, C1, C2, C3, and A1

LOCATION COMMENTS: pH < 2

FIELD PARAMETERS:

COLLECTED BY (PRINT): W. Sanchez

RELINQUISHED BY (Printed Name) (Signature)	Tessa S. Hermes Tessa S Hermes	Date/Time 12/5/2016 1615	RECEIVED BY (Printed Name) (Signature)	S Sherwood S Sherwood	Date/Time 12/5/16 1615
RELINQUISHED BY (Printed Name) (Signature)		Date/Time	RECEIVED BY (Printed Name) (Signature)		Date/Time

Report Date: 11/16/2016

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127772

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):		12/7/2016	FIELD MATRIX:	W	OK
TIME COLLECTED (HH:MM):		1510	MEDIA:		LI
PRS ID:	C-00-006	OK	SAMPLE TECH CODE:	DC	OK
LOCATION ID:	UNK	LA-61538	FIELD PREP:	UF	
LOCATION TYPE:		NA	FIELD QC TYPE:	FR	
TOP DEPTH:			SAMPLE USAGE:	QC	
BOTTOM DEPTH:			EXCAVATED:		YES / NO / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	Metals(W)	1 LITER POLY	1	HNO3	Y	NA

SAMPLE COMMENTS: Field RINSATE for 12/7/2016 PH= 1

LOCATION COMMENTS: field locations A1, A3, C2, &C3

NONE

FIELD PARAMETERS: None!

COLLECTED BY (PRINT): L. Sanchez

RELINQUISHED BY (Printed Name) Tom Walker (Signature) T. R. Walker	Date/Time 12/7/2016 1610	RECEIVED BY (Printed Name) S Sherwood (Signature) S Sherwood	Date/Time 12/7/16 1610
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 11/16/2016

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11055

EVENT NAME: LA Weir Borrow Pit Characterization

SAMPLE ID: CALA-17-127773

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYY):			**FIELD MATRIX:**	W	
TIME COLLECTED (HH:MM):			**MEDIA:**		
PRS ID:	C-00-006		**SAMPLE TECH CODE:**	DC	
LOCATION ID:	UNK		**FIELD PREP:**	UF	
LOCATION TYPE:			**FIELD QC TYPE:**	FR	
TOP DEPTH:			**SAMPLE USAGE:**	QC	
BOTTOM DEPTH:			**EXCAVATED:**		YES / NO / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
	Metals(W)	1 LITER POLY	1	HNO3		

SAMPLE COMMENTS:

LOCATION COMMENTS:

FIELD PARAMETERS:

COLLECTED BY (PRINT):

CRL TSH 12/09/16

RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Appendix C

Analytical Data
(on CD included with this document)

Appendix D

Box Plots and Statistical Results

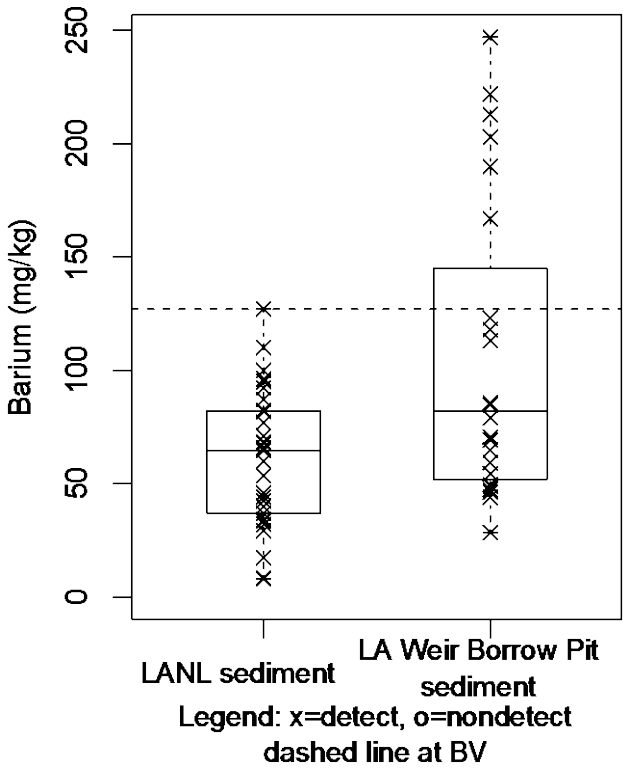

Figure D-1 Box plot for barium in sediment at Los Alamos Canyon borrow pit

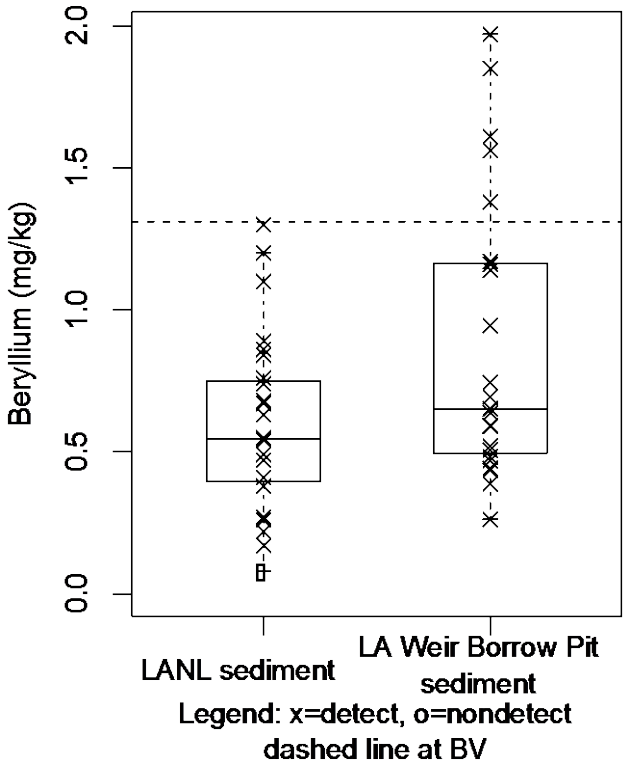

Figure D-2 Box plot for beryllium in sediment at Los Alamos Canyon borrow pit

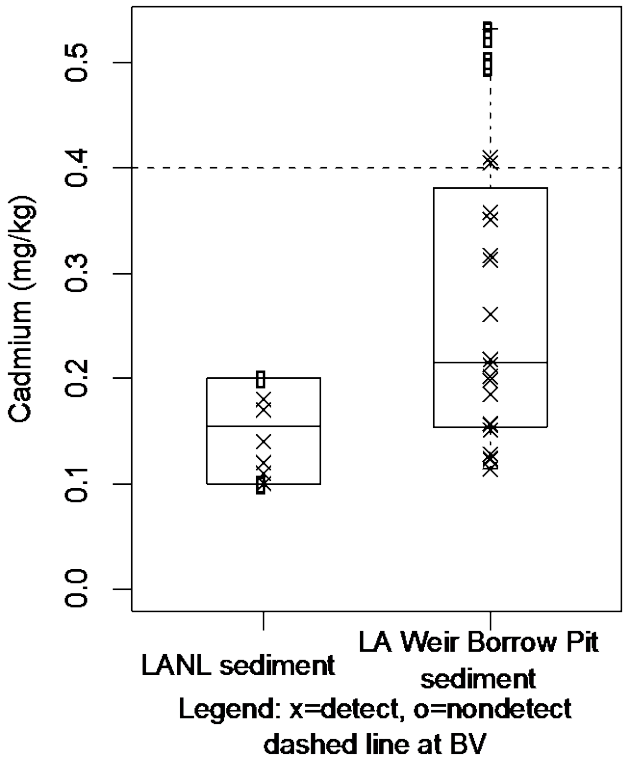

Figure D-3 Box plot for cadmium in sediment at Los Alamos Canyon borrow pit

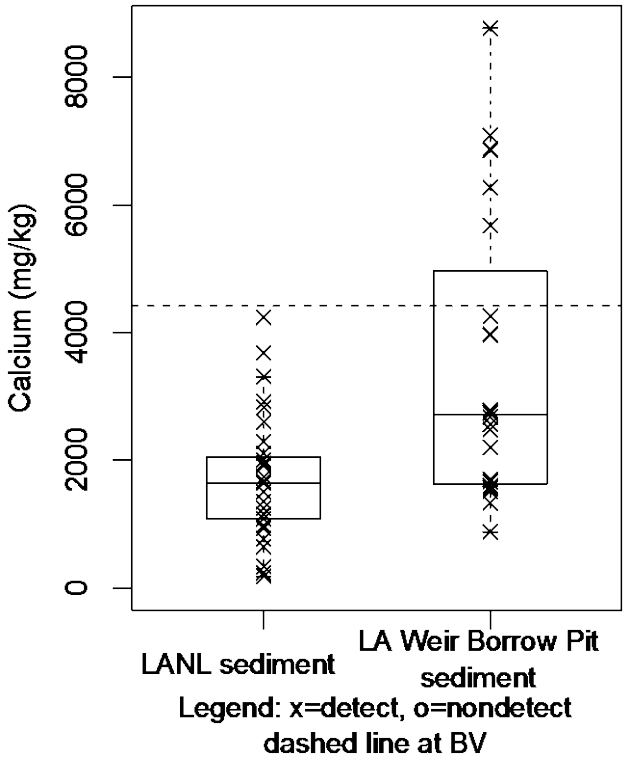

Figure D-4 Box plot for calcium in sediment at Los Alamos Canyon borrow pit

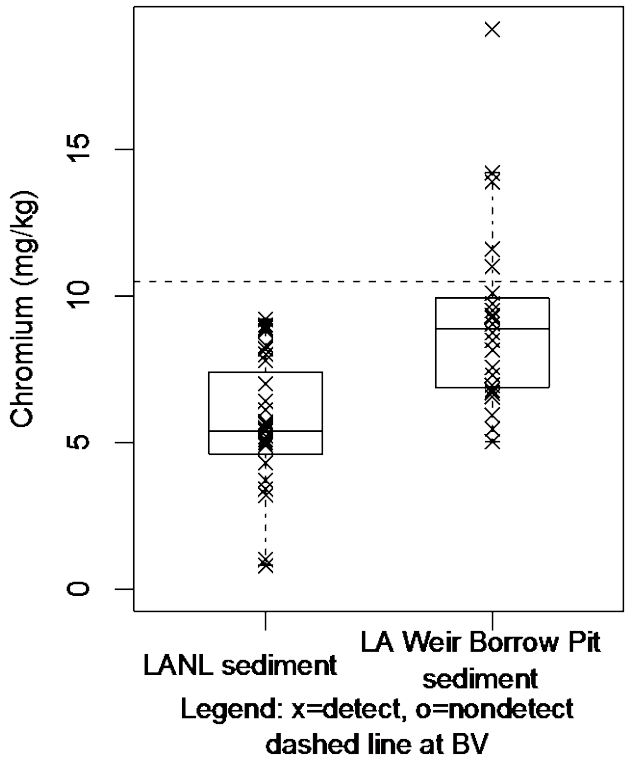

Figure D-5 Box plot for chromium in sediment at Los Alamos Canyon borrow pit

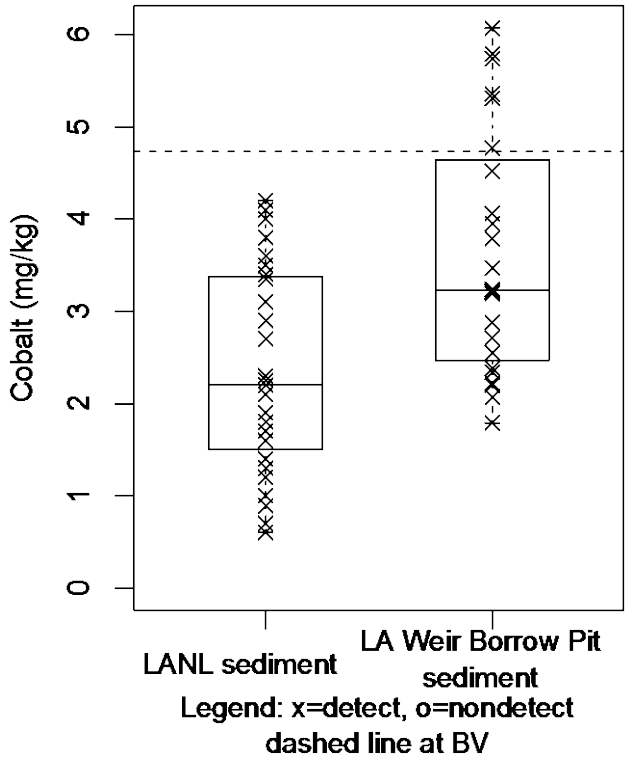

Figure D-6 Box plot for cobalt in sediment at Los Alamos Canyon borrow pit

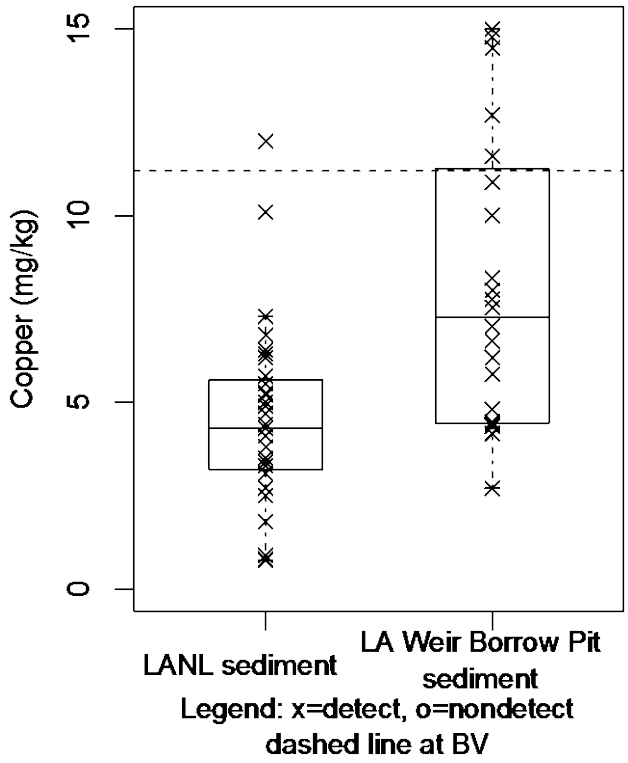

Figure D-7 Box plot for copper in sediment at Los Alamos Canyon borrow pit

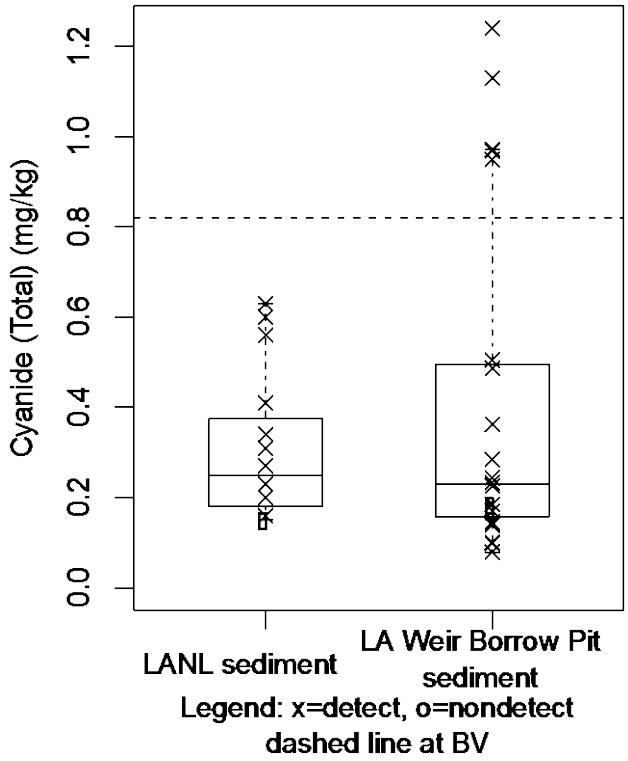

Figure D-8 Box plot for cyanide in sediment at Los Alamos Canyon borrow pit

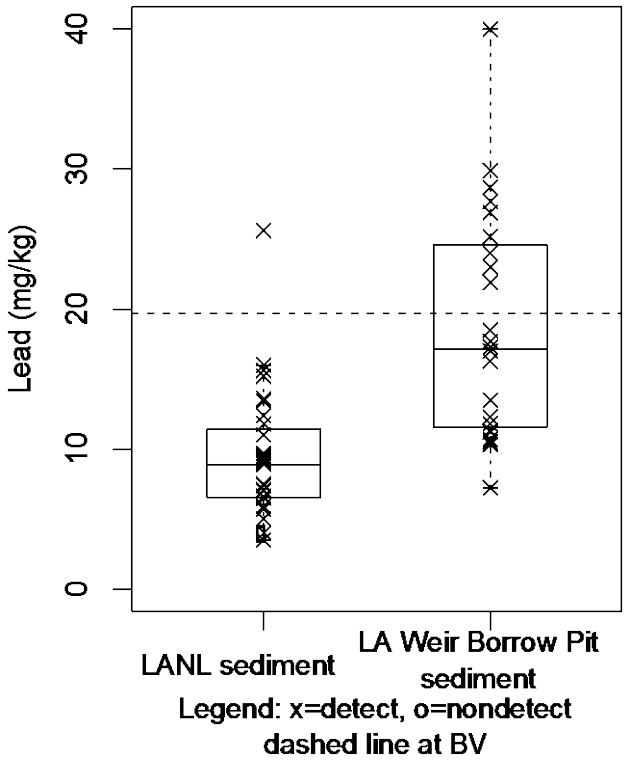

Figure D-9 Box plot for lead in sediment at Los Alamos Canyon borrow pit

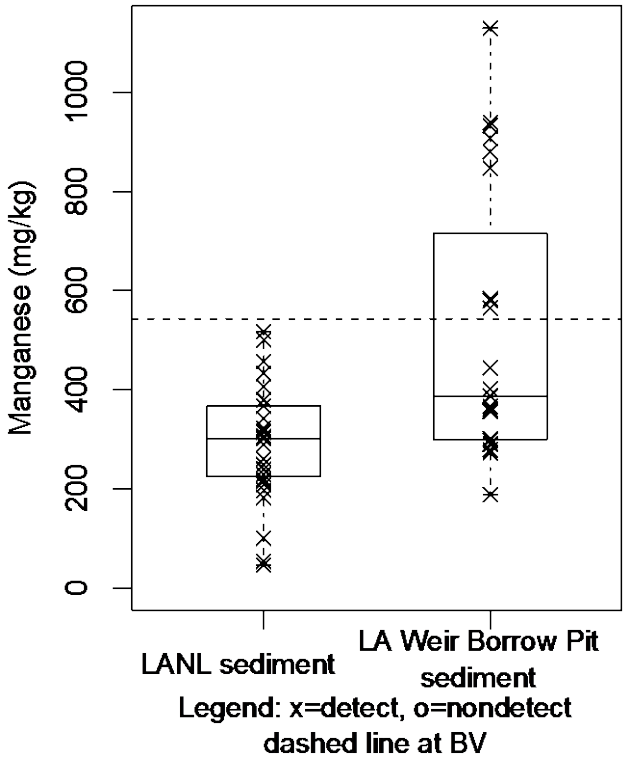

Figure D-10 Box plot for manganese in sediment at Los Alamos Canyon borrow pit

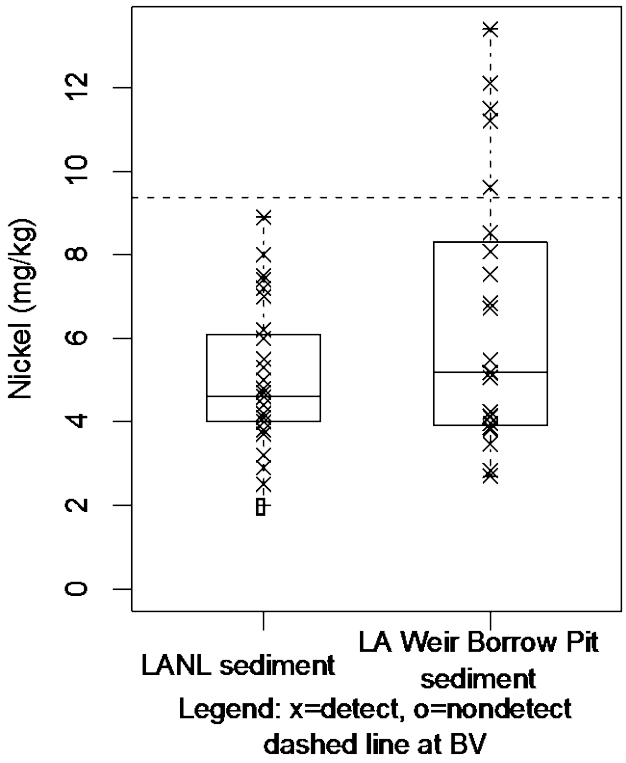

Figure D-11 Box plot for nickel in sediment at Los Alamos Canyon borrow pit

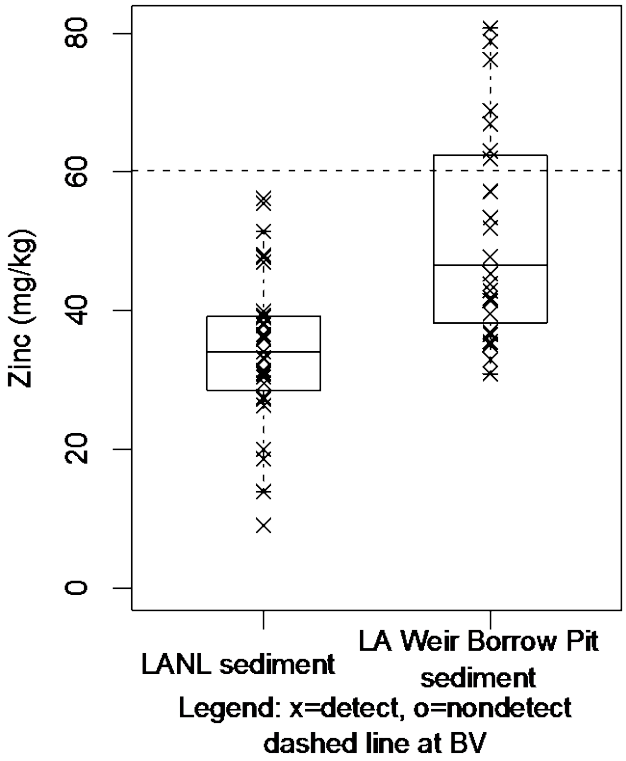

Figure D-12 Box plot for zinc in sediment at Los Alamos Canyon borrow pit

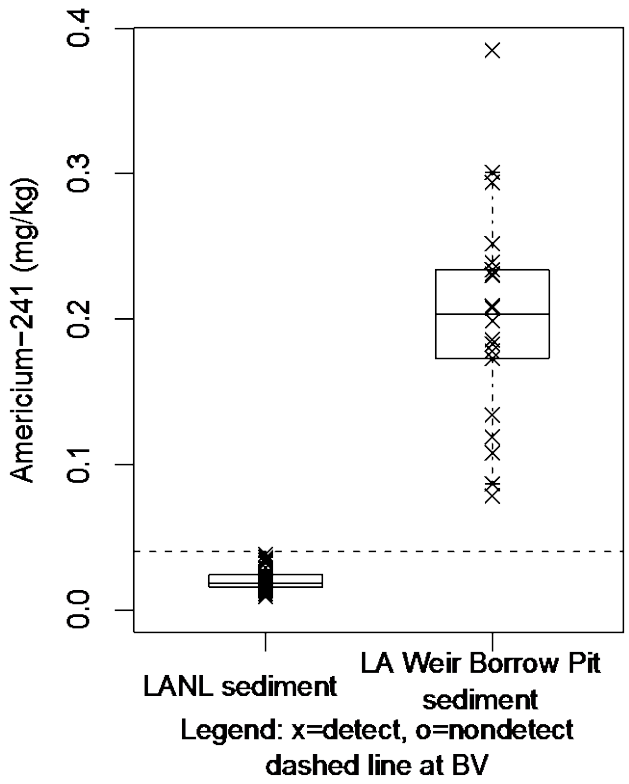

Figure D-13 Box plot for americium-241 in sediment at Los Alamos Canyon borrow pit

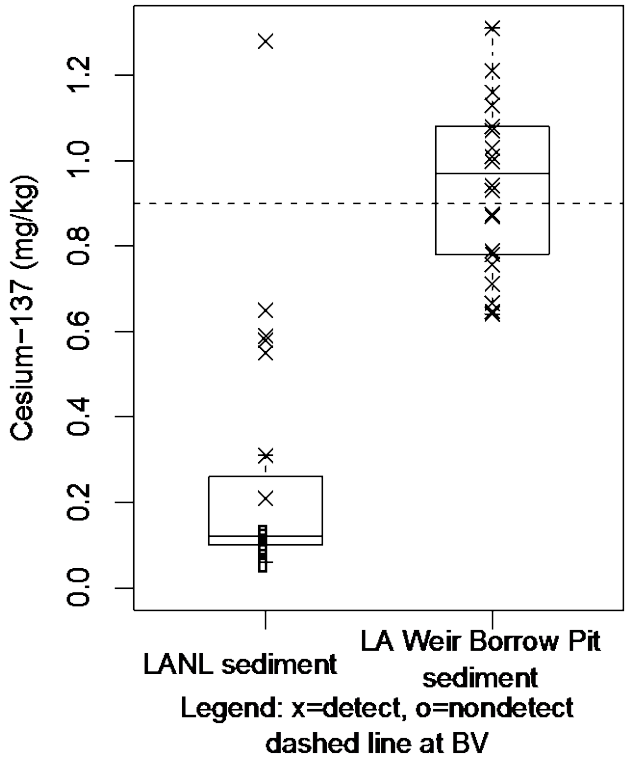

Figure D-14 Box plot for cesium-137 in sediment at Los Alamos Canyon borrow pit

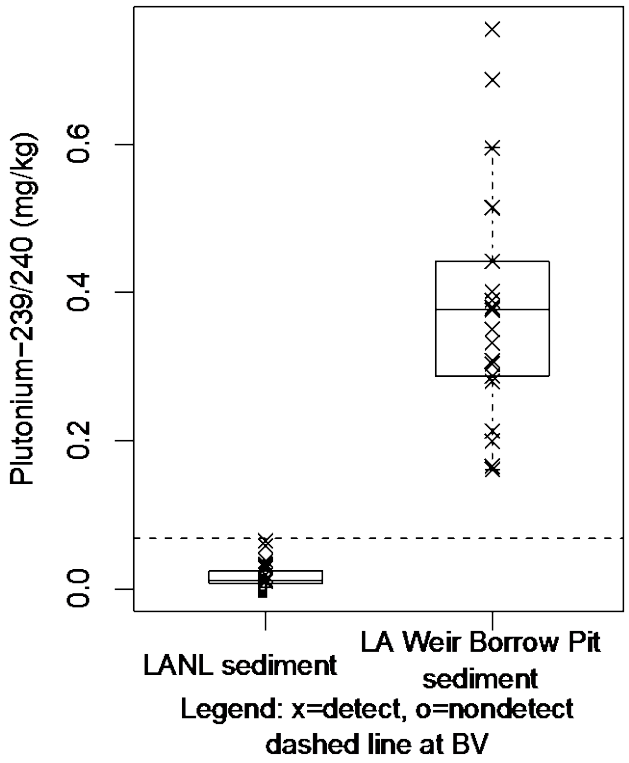

Figure D-15 Box plot for plutonium-239/240 in sediment at Los Alamos Canyon borrow pit

Table D-1
Results for Statistical Tests for Inorganic
Chemicals in Sediment at Los Alamos Canyon Borrow Pit

Analyte	Gehan Test p-Value	Quantile Test p-	Slippage p-Value	COPC?
Barium	0.00601	0.00561	n/a*	Yes
Berylium	0.0395	0.0132	n/a	Yes
Cadmium	n/a	0.0448	<0.0001	Yes
Calcium	0.000453	0.00561	n/a	Yes
Chromium	<0.0001	<0.0001	n/a	Yes
Cobalt	0.000594	0.0332	n/a	Yes
Copper	0.000195	0.00561	n/a	Yes
Cyanide	0.618	0.5	n/a	No
Lead	<0.0001	0.000529	n/a	Yes
Manganese	0.000543	0.00561	n/a	Yes
Nickel	0.133	0.0332	0.0122	Yes
Zinc	<0.0001	0.00561	n/a	Yes
Americium-241	<0.0001	0.00096	n/a	Yes
Cesium-137	n/a	0.00510	0.5	Yes
Plutonium-239/240	<0.0001	0.00096	n/a	Yes

* n/a = Not applicable.

Appendix E

Management of Investigation-Derived Waste

E-1.0 INTRODUCTION

This appendix describes management of the investigation-derived waste (IDW) generated during the field activities for characterization of the Los Alamos Canyon borrow pit. IDW generated during the field investigation was managed in accordance with Standard Operating Procedure (SOP) 5238, Characterization and Management of Environmental Program Waste. This procedure incorporates the requirements of applicable U.S. Environmental Protection Agency and New Mexico Environment Department regulations, U.S. Department of Energy orders, and Los Alamos National Laboratory (LANL or the Laboratory) policies and procedures.

Consistent with Laboratory procedures, a waste characterization strategy form (WCSF) was prepared to address characterization approaches, on-site management, and final disposition options for wastes. Analytical data and information on wastes generated during previous investigations and/or acceptable knowledge (AK) were used to complete the WCSF.

The selection of waste containers was based on U.S. Department of Transportation requirements, waste types, and estimated volumes of IDW to be generated. Immediately following containerization, each waste container was individually labeled with a unique identification number and with information regarding waste classification, contents, and radioactivity, if applicable.

Investigation activities were conducted in a manner that minimized the generation of waste. Waste minimization was accomplished by implementing the most recent version of the annual Los Alamos National Laboratory Hazardous Waste Minimization Report.

E-2.0 WASTE STREAMS

The IDW streams generated and managed during the borrow pit sediments are described below and are summarized in Table E-2.0-1.

- *Contact Waste IDW*—Contact waste consisted of spent personal protective equipment (nitrile gloves) and material used in dry decontamination of sampling equipment (paper towels) that contacted, or potentially contacted, contaminated environmental media and could not be decontaminated. These wastes were containerized at the point of generation and were initially characterized based on AK of the waste materials. Final characterization will be based on the analytical data for the media with which they came into contact. Approximately 10 gal. of contact waste was generated and stored in a waste accumulation area pending final characterization. The waste was determined to be nonhazardous and disposed of as municipal solid waste.

Table E-2.0-1
Summary of IDW Generation and Management

Waste Stream	Waste Type	Volume	Characterization Method	On-Site Management	Disposition
Contact waste	Nonhazardous	10 gal.	AK and analytical results of site characterization samples	5 gal. poly container	Disposed of off-site as municipal solid waste

Appendix F

ProUCL Input and Output Files and
Toxic Equivalency Calculations
(on CD included with this document)