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Management of Soil and Debris

1.0 Introduction

Lawrence Livermore National Laboratory (LLNL) policy and federal and state regulations mandate that the Laboratory and its employees comply with environmental requirements governing the handling, transportation, and disposal of potentially contaminated soil and debris. LLNL policy dictates that soil and debris shall be characterized and evaluated for potential hazardous and/or radioactive contamination prior to reuse onsite or disposal offsite. Characterization is required for every new project by using existing soil analytical data from previous projects or by collecting and analyzing new, representative soil and/or debris samples. The Environmental Operations Group (EOG) environmental analyst provides most of the oversight for the management of soil and debris.

The Operations and Regulatory Affairs Division (ORAD) of the Environmental Protection Department (EPD) provides guidelines to assist LLNL employees in understanding the requirements, procedures, and responsible organizations and individuals that are involved in the characterization and management of soil and debris at the Livermore main site and Site 300. ORAD's goal is to provide a tailored, cost-effective, efficient, and responsive soil and debris management process that assists LLNL employees in meeting applicable regulatory requirements. Many organizations and employees at LLNL are involved in the evaluation and management of soil and debris. The organizations and individuals are identified, and their roles and responsibilities are summarized, in Appendix A.

1.1 LLNL Policies for Soil and Debris Management

LLNL is under direction by the University of California pursuant to EO 12856, Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirement (August 3, 1993), to reduce the volume of waste generated each year. In keeping with this effort, LLNL intends to reuse soil and debris (i.e., asphalt and concrete) whenever possible when such reuse does not adversely affect human health or the environment. The disposition of soil and debris is determined through a process that characterizes the material for potential hazardous, radioactive, and designated constituents and its suitability for reuse onsite. LLNL policy for soil and debris management includes the following guidelines:

- Soil that meets the criteria for onsite reuse, as a function of soil analytical data, should be reused whenever possible at projects identified by Plant Engineering that require fill.

- All nonhazardous, nonradioactive, and nondesignated soil that is not suitable for reuse onsite will be removed from LLNL and disposed of at an approved Class II or Class III landfill.
- Nonhazardous, nonradioactive asphalt and/or concrete will be recycled, either onsite or at an approved landfill.
- Nonhazardous, nonradioactive soil and debris that contain constituents in excess of state water quality objectives are called designated wastes. Designated wastes exceed Class III landfill acceptance criteria and shall be disposed at a Class II landfill.
- Soil and debris determined to be hazardous shall be disposed at a permitted Class I hazardous waste landfill approved for use by LLNL.
- Soil and debris determined to be radioactive shall be disposed at a U.S. Department of Energy (DOE)-approved facility.
- Generally, soil and debris determined to be hazardous and radioactive (i.e., mixed) shall be stored at LLNL until it is properly characterized and disposed of at an approved offsite disposal facility.
- Excess soil and debris can be temporarily stored onsite pending receipt of soil analytical data and the disposition determination.
- Excess soil from sites that are not determined to be potentially contaminated, based on evaluation by the EOG environmental analyst, may be reused as backfill in the same excavation site without sampling.
- National Environmental Policy Act (NEPA) documentation is required for most excavation, resurfacing, or other ground-disturbing activities. NEPA documentation shall be completed prior to the start of work and should be started well in advance of the beginning of excavation to avoid project delays.
- Projects in or adjacent to arroyos, or in any unlandscaped open field, or in a known sensitive species habitat or exclusion zone, shall have a wildlife survey performed by EPD prior to ground disturbance.
- Evidence of cultural and/or paleontological resources shall be reported immediately to the Environment, Safety, and Health (ES&H) Team environmental analyst.

2.0 Evaluation of Soil and Debris To Be Managed

As soon as it is determined that soil and debris are to be disturbed at a project site, the Responsible Individual/project manager or authorizing organization representative is

required to notify the EOG environmental analyst to initiate a preconstruction site evaluation. A Site Evaluation Request Form (see Appendix B) shall be filled out and given to the EOG environmental analyst to document the request.

Information to be provided on, or attached to, the form includes:

- Project name.
- Plant Engineering (PE) permit number specified in the Soil Excavation Permit Procedure, MOP-02003, or Concrete Penetrations Permit Procedure, MOP-03001.
- Valid project account number and name of a signatory for the account to cover analytical costs.
- Maximum cost allowed for analyses based on estimates from the EOG environmental analyst.
- Determination of whether soil and debris can be reused onsite based on the anticipated engineering quality of the soil.
- Description of the project.
- Drawing detailing the exact location of soil and debris to be excavated.
- Depth of grading, trenches, foundation excavation, etc.
- Where the soil will be staged, if staging is necessary.

The EOG environmental analyst is a member of the ES&H Team. If you are not certain about which analyst to notify or have a related question, call your ES&H Team environmental analyst who will put you in contact with the correct EOG environmental analyst.

An Integrated Work Sheet (IWS) may be required for a project involving soil excavation or concrete penetration. The IWS is the document on which the initial ES&H review and authorization are recorded. This document is intended to ensure front-end identification of hazards associated with a work activity and to facilitate the application of appropriate controls. The Responsible Individual/project manager or authorizing organization representative initiates the IWS. Most minor excavations are already covered by generic IWSs.

After the EOG environmental analyst receives the Site Evaluation Request Form, the proposed project location is evaluated to determine whether sampling of that project location is required. Evaluation includes review of the Environmental Restoration Division (ERD) historical source investigation and ORAD site evaluation documents, review of current and past operations, pre-existing soil analytical data, and a visual inspection to evaluate the project site for possible contamination.

To ensure that a project stays on schedule, a minimum 120-day lead time is requested, especially for larger projects, to allow time for the preparation of a sampling plan, sample collection, sample analyses, and the determination of disposal options. Sufficient lead time is necessary to avoid delays in soil disposal, should additional sampling and analyses be required beyond the scope of the original sampling plan. Delays in reuse or disposal can lead to double handling of soil and debris, resulting in increased project costs.

In certain cases, soil excavated from sites might not have to be sampled and analyzed. The EOG environmental analyst makes such a determination on a case-by-case basis. For example, if the EOG environmental analyst determines that there is no known or suspected designated, hazardous, or radioactive contamination; and if the soil is to be reused in the immediate excavation site; and if the excavated area is small, then sampling and analysis may not be needed. Prior analyses of soil and debris in the area may also preclude the need to collect additional samples, or may limit the number of supplemental samples that need to be collected.

At Site 300, additional care shall be exercised when grading soil in undisturbed areas because of the potential to disturb endangered species' habitats and cultural resource areas. Grading and excavation shall not be performed in undisturbed areas without the approval of the Site 300 EOG environmental analyst.

3.0 Sampling of Project Soil and Debris

3.1 Sampling Plan and Documentation

A sampling plan shall be prepared to identify and document the scope of sampling and sampling procedures. The sampling plan is usually prepared by the EOG environmental analyst with input from the ES&H Team when appropriate after the analyst has evaluated the project and determined that sampling is required. The EOG environmental analyst may have the EOG technologist prepare the plan, which the analyst then reviews and approves.

The sampling plan generally includes:

- A map of the project area.
- Site Evaluation Request Form (Appendix B), including an approved account number for soil sampling.
- Sampling/Rad Surveying Request Form (Appendix C), typically filled out by the EOG environmental analyst and submitted to the EOG technologist. The Responsible Individual/project manager completes only the upper portion of this form, including special instructions.

- Radioactivity Review Checklist for Soil (Appendix D) and/or Review Checklist for Asphalt and/or Concrete (Appendix E).

When completed, the soil analytical data, chain-of-custody, and disposition memos are added to the EOG project file and copies are sent to the Responsible Individual/project manager. The file containing the sampling plan and associated documentation is maintained by the EOG technologist at a controlled, central storage location.

3.2 Soil Excavation and Concrete Penetration

The Responsible Individual/project manager obtains a Soil Excavation and Concrete Penetration Permit from the PE Technical Administration Group. The Responsible Individual/project manager is required to prepare all data to apply for the permit. A permit is required prior to extracting a soil or debris sample, excluding staged soil piles or displaced concrete pads. In obtaining the sample, the EOG technologist is required to follow the sampling plan and to use proper collection, preservation, storage, packaging, and shipping procedures to protect samples from contamination or degradation. Guidance on sample collection is provided by the EOG environmental analyst. Level "D" personal protective equipment (PPE) is typically worn. However, when contamination is suspected, guidance on PPE is provided by the ES&H Team industrial hygienist and/or health physicist and is included in the sampling plan.

3.3 Constituents of Concern

Selecting the appropriate constituents and detection limits for analyses is vital to ensure proper evaluation. The EOG environmental analyst provides guidance in selecting the proper constituents and detection limits based on potential contamination, if any, and in selecting the kinds of analyses and detection limits that are required for proper disposition of soil and/or debris. When radiation contamination is suspected, the ES&H Team health physicist will be contacted.

3.4 Sample Collection

Samples are usually collected by the EOG technologist. Other ORAD technologists and qualified contractors can collect samples provided they follow the appropriate sampling procedures and methodology and are approved by the EOG environmental analyst.

Quality Assurance/Quality Control (QA/QC) samples are collected to assure and control quality in sampling techniques and analyses. At least one QA/QC sample shall be collected for every ten (or fewer) samples.

3.5 Sampling or Surveying of Asphalt and Concrete

All asphalt and concrete identified for demolition from LLNL construction projects shall be evaluated for the presence of hazardous and radioactive waste to determine appropriate disposal options. The EOG environmental analyst evaluates the asphalt and/or concrete in question by filling out the Review Checklist for Asphalt and/or Concrete (Appendix E). The checklist is used to determine if a construction project is located in a known or suspected area of hazardous and/or radioactive contamination and whether any asphalt and/or concrete removed from the project area needs to be sampled or surveyed prior to offsite disposal. In very rare cases, asphalt and/or concrete is allowed offsite without surveying or sampling. However, in most cases, surveying is required at a minimum.

4.0 Analysis of Samples and Recordkeeping

4.1 Chain-of-Custody Record

The EOG technologist completes and maintains a chain-of-custody record for all samples. Each time custody of the sample(s) is transferred, the chain-of-custody record shall be updated and signed by the person relinquishing control and by the person taking control of the sample(s).

4.2 Choice of Analytical Laboratory

The choice of analytical laboratory depends on many factors, including turn-around time, cost, ability of the laboratory to run a particular method, and whether the laboratory has appropriate certifications. The EOG environmental analyst and EOG technologist review all such factors with the Responsible Individual/project manager or authorizing organization representative when appropriate.

The soil and debris sampling procedures typically employed by LLNL do not comply with the DOE Nevada Operations Office (DOE-NV) procedure NVO 325 Rev. 1 standards for storage of radioactive waste at the Nevada Test Site (NTS). The increased cost and management required to implement NVO 325 Rev. 1 standards for all samples are not warranted because of the low probability that LLNL samples will be radioactive. If soil and debris are suspected or found to be radioactive by standard LLNL sampling procedures, the Waste Generator Services Group in Radioactive and Hazardous Waste Management (RHWM) is contacted to assist in developing sampling plans and procedures in compliance with NVO 325, Rev. 1.

4.3 Transport of Samples to Offsite Analytical Laboratories

Samples that are to be transported offsite to a non-LLNL laboratory are directed through the EOG technologist. The EOG technologist ensures that samples are properly packaged and transported to the designated analytical laboratory and that proper chain-of-custody is maintained.

The Chemistry and Materials Science, Environmental Services (CES) laboratory performs radioactivity prescreening services for soil and debris samples potentially contaminated with radioactivity prior to sending samples offsite. The EOG environmental analyst determines whether prescreening is or is not required.

4.4 Soil Analytical Data

All soil analytical data are evaluated through a quality assurance process. Data are then forwarded to the EOG technologist who retains the original data package and provides a copy to the EOG environmental analyst for evaluation.

The EOG environmental analyst evaluates the soil analytical data to determine if the soil can be reused onsite, or if soil and debris shall be managed as nonhazardous, nonradioactive, nondesignated, designated, hazardous, radioactive, or mixed waste, or if supplemental analyses are required. The EOG environmental analyst uses established environmental regulatory limits, DOE and LLNL policies, and best management practices in making the determination. The EOG environmental analyst consults with the Water Guidance and Monitoring Group (WGMG) before determining if contaminated soil that is to be reused in the same project or elsewhere onsite meets the LLNL reuse criteria, or if special approval is required from the San Francisco Bay or Central Valley Regional Water Quality Control Board for reuse.

4.5 VOC Evaluation

When volatile organic compounds (VOCs) are detected in soil samples, the EOG environmental analyst evaluates Environmental Restoration Division (ERD)/EOG working documents, ERD published documents, and current and past operations at the site, and performs a visual inspection to evaluate the site for potential VOC contaminant sources. The EOG environmental analyst pays particular attention to processes or events that may have caused the contamination. In the case of VOC contamination, the EOG environmental analyst determines if there is any documented evidence that the VOCs are from F-listed sources as referenced in 22 CCR §§ 66261.1–66261.126 and appendices, Identification and Listing of Hazardous Waste, and 40 CFR 261, Identification and Listing of Hazardous Waste. Soil containing F-listed constituents at any concentration is considered hazardous under state and federal environmental regulations. This evaluation process is referred to as a due-diligence search. Results of

the due-diligence search are summarized in a memo by the EOG environmental analyst and submitted to ERD for concurrence.

4.6 Supplemental Analyses

If the soil analytical data are inconclusive, or if the scope of the project changes, the EOG environmental analyst, Responsible Individual/project manager, or authorizing organization representative may request additional sampling. The cost for additional sampling is paid from the project account.

Additional sampling can lead to delays in determining disposal options, pending receipt of soil analytical data. If the project needs to proceed, the soil and debris can be temporarily stockpiled, as described next.

5.0 Disposition of Soil and Debris

5.1 Staging of Soil and Debris

Because of tight construction schedules, soil and debris are sometimes excavated and removed prior to sampling. In such cases, material not suspected to be contaminated can be excavated and staged in a location approved by PE Space and Site Planning, Civil Planning. The material shall be appropriately labeled (see Appendix F) and managed in a way that will not cause sediment in storm water runoff. The label lists the name of the project; the PE contact, client contact, and the EOG environmental analyst; the date sampled; and associated telephone numbers. The label is generally photo-reduced, laminated, and attached to a wooden stake driven into the pile. If the soil is suspected to be contaminated, the ES&H Team responsible for the project shall be consulted to determine whether excavation is possible.

If soil and/or debris are suspected to be contaminated, the material shall be stockpiled on and covered with plastic (polyethylene) sheets. The plastic covering shall be held in place by some means to prevent soil or debris from becoming uncovered. The covered pile(s) shall be checked at least weekly by the Responsible Individual/project manager, a designee, or the authorizing organization representative to ensure proper management of the soil.

5.2 Nonhazardous, Nondesignated, and Nonradioactive Soil

Excavated soil that has been determined to be nonhazardous, nondesignated, and nonradioactive by the EOG environmental analyst is either disposed in an approved Class II or Class III landfill, or it may be reused onsite if reuse criteria are met. The PE

Labor Shop, or the designated contractor, normally removes the soil and debris for disposal at a local landfill or for reuse onsite.

Below LLNL Reuse Criteria. Soil that meets PE engineering requirements and contains constituents at concentrations below LLNL environmental reuse criteria may be reused onsite, provided that PE Space and Site Planning, Civil Planning has identified a project requiring excess soil. LLNL's environmental reuse criteria are based on statistically derived background levels and on approved application of the Designated Level Methodology for Waste Classification and Clean-Up Level Determination (Marshack, 1991); implementing procedure in support of 23 CCR §§ 2200–2236, Waste Discharge Reports and Requirements. The Designated Level Methodology is a procedure that was developed and used by the Central Valley Regional Water Quality Control Board (CVRWQCB) and has been adopted for use by the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB). The methodology is used to determine if soils containing trace levels of contaminants can remain in place and still be protective of applicable water quality goals. The determination is done by considering several factors, such as contaminant concentration level, depth to groundwater, fracturing in rocks, soil types, beneficial uses, and water quality goals. LLNL's reuse criteria are consistent with the state of California Antidegradation Policy and the two regional boards' water quality control plans.

Different reuse criteria for soils have been developed for LLNL's main site and Site 300. Reuse of soils at the Livermore site is evaluated against the site background values for metals and an approved list of organic compounds and corresponding *de minimus* values that were developed using the Designated Level Methodology. If contaminant levels in representative soil-characterization samples are below these values, and the soil is not generated from a known area of contamination, the soil may be reused onsite. However, there is one exception. If the soil is generated from a known area of contamination, further negotiations with the SFBRWQCB are necessary.

Soil that meets PE project requirements and contains constituents at concentrations below LLNL environmental reuse criteria may be reused onsite provided that there is a project identified by PE Space and Site Planning, Civil Planning that requires excess soil, or if the soil is qualified for reuse in the southwest buffer zone. When an onsite use has been identified, that use shall be evaluated and approved by the Soil Management Committee, the EOG environmental analyst, and both the generating and receiving Responsible Individuals/project managers.

Above LLNL Reuse Criteria. Soil that exceeds LLNL environmental reuse criteria and/or fails PE project requirements shall be disposed offsite in an approved Class I, Class II, or Class III landfill.

5.3 Designated Soil and Debris

Soil and debris are considered to be "designated waste" if they are nonhazardous and nonradioactive but consist of or contain pollutants that, under ambient environmental conditions at the waste management unit, could be released in concentrations exceeding applicable water quality objectives or could cause degradation of waters of the state (CA Water Code § 13000 et seq., Porter Cologne Water Quality Control Act).

Designated wastes shall be discharged at Class I Hazardous Waste landfills or at Class II landfills that have been approved for containment of the specific waste to be discharged by the Regional Water Quality Control Board (23 CCR §§ 2510–2601 and appendices, Discharges of Hazardous Waste to Land).

5.4 Hazardous or Radioactive Soil and Debris

Soil and debris that have been determined by the EOG environmental analyst to be hazardous or radioactive shall be managed according to applicable federal, state, regional, and local regulations and DOE orders. When soil and debris are determined to be hazardous or radioactive, the EOG environmental analyst notifies the Responsible Individual, ES&H Team leader, environmental duty officer (24-hour on-call EPD representative for environmental incidents), and either the PE project manager or the authorizing organization representative. The PE project manager or authorizing organization representative coordinates removal of the contaminated material. Before the material is removed, the EOG environmental analyst also notifies ERD of the findings and planned actions. The ES&H Team, including the EOG environmental analyst, representatives from health and safety disciplines, and the RHWM Division, advise and assist the PE project manager or authorizing organization representative in this effort.

When the amount of contaminated soil and debris to be removed is small, and the hazards are minimal, the PE Labor Shop will be contacted to load the contaminated soil and debris into appropriate containers for disposal through the RHWM Division. The PE Labor Shop uses personnel trained in the proper procedures for handling hazardous and radioactive soil and debris. The ES&H Team industrial hygienist and/or health physicist will be contacted prior to handling the material to ensure that the proper personal protective equipment is used.

For larger contaminated areas, or when the PE Labor Shop is unable to provide support to remove soil and debris, the Responsible Individual/project manager or authorizing organization representative shall contact RHWM to provide personnel to remove the contaminated soil and debris. If RHWM personnel cannot accommodate the request, RHWM shall secure an approved contractor to conduct the removal. The manifest and other documentation that always accompany each load of hazardous waste offsite are prepared and signed by RHWM.

5.5 Mixed (Hazardous and Radioactive)

Soil and debris that have been excavated and determined by the EOG environmental analyst to be mixed (i.e., contaminated with a combination of hazardous and radioactive constituents) shall be stored onsite at the RHWM facility until they can be characterized for offsite disposal. With the exception of disposal options, mixed waste should be managed as described in the "Hazardous or Radioactive Soil or Debris" section above. Contact the EOG environmental analyst to coordinate containerization and storage with RHWM.

6.0 Discovery of Contaminated Soil and Debris During Demolition or Construction

Although project sites should be adequately characterized prior to construction, contaminated soil and debris can be encountered unexpectedly during excavation. The PE project manager, construction manager, construction inspector, Labor Shop supervisor, or authorizing organization representative are required to notify the ES&H Team leader immediately when suspect items (e.g., drums, boxes, cans, bottles, or discolored, malodorous, or otherwise suspected contaminated soil and debris) are discovered during excavation. Construction or other work in the affected area shall be stopped, and the area shall be cordoned off until an evaluation can be made by the appropriate ES&H Team disciplines, including the EOG environmental analyst and ERD.

If there is a perception of imminent threat to health, safety, or the environment, call the LLNL Fire Department (ext. 911) immediately.

When an evaluation of potentially contaminated soil and debris by the ES&H Team and ERD indicates that the soil and debris are nondesignated, nonhazardous, and nonradioactive, the soil can be disposed of or used according to the guidelines set forth in this document, unless the EOG environmental analyst specifies disposal or use limitations.

When an evaluation of the potentially contaminated soil and debris by the EOG environmental analyst indicates that the soil and debris are designated, hazardous, and/or radioactive, the contaminated soil and debris shall be managed as designated, hazardous, radioactive, or mixed waste. The ES&H Team, including the EOG environmental analyst and RHWM, will assist in managing contaminated soil and debris as described in the section above, entitled "Disposition of Soil and Debris."

If analytical results indicate that the soil or debris are hazardous, radioactive, or mixed waste, regulatory agencies and the DOE may need to be notified. The conditions under which such notification to the DOE is required are specified in DOE Order 232.1A

(8/1/97), Occurrence Reporting and Processing of Operations Information, Attachment 1 Contractor Requirements Document, and in DOE Order 231.1 Chg 2, ES&H Reporting Contractor Requirements Document. The EOG environmental analyst and the environmental duty officer assist the responsible authorizing organization in making all necessary notifications.

7.0 Hazardous Materials Spills during Demolition or Construction

Spills of hazardous material that could constitute a threat to human health or the environment can become environmental incidents. Common hazardous materials used during demolition or construction include petroleum fuels, hydraulic fluids, paints, oils, and solvents. The PE construction manager or the construction inspector shall notify the ES&H Team leader immediately if a spill occurs.

Each spill of hazardous material is classified as a small incident or a large incident (see Document 22.2, "Environmental Emergency Response," in the *ES&H Manual* for more information on spills and their classification). In a large incident, call the LLNL Fire Department immediately.

8.0 Work Standards

8.1 Work Smart Standards

CA Health and Safety Code §§ 25100 et seq., Hazardous Waste Control

CA Water Code § 13000 et seq., Porter Cologne Water Quality Control Act

14 CCR §§17301–17345, Solid Waste Storage & Removal Standards

22 CCR §§ 66261.1–66261.126 and appendices, Identification & Listing of Hazardous Waste

22 CCR §§ 66262.10–66262.89, Standards Applicable to Generators of Hazardous Waste

22 CCR §§ 66263.10–66263.50, Standards Applicable to Transporters of Hazardous Waste

23 CCR §§ 2200–2236, Waste Discharge Reports and Requirements

23 CCR §§ 2510–2601 and appendices, Discharges of Hazardous Waste to Land

10 CFR 71, Packaging & Transportation of Radioactive Material (offsite)

40 CFR 243, Guidelines for the Storage and Collection of Residential, Commercial, and Institutional Solid Waste

40 CFR 260, Hazardous Waste Management System: General

40 CFR 261, Identification and Listing of Hazardous Waste

40 CFR 262, Standards Applicable to Generators of Hazardous Waste

40 CFR 263, Standards Applicable to Transporters of Hazardous Waste

42 USC § 6901 et seq., Solid Waste Disposal Act

42 USC §§ 13101–13109, Pollution Prevention Act of 1990

49 CFR 100–199, Research and Special Programs Administration, DOT (Off-site)

DOE M 435.1-1, Chapter I General Requirements and Responsibilities.

DOE O 231.1 Chg 2, ES&H Reporting Contractor Requirements Document

DOE O 232.1A (8/1/97), Occurrence Reporting and Processing of Operations Information, Attachment 1 Contractor Requirements Document

DOE O 435.1, Radioactive Waste Management, Attachment 1 Contractor Requirements Document.

DOE O 451.1B Chg 1, National Environmental Policy Act Compliance Program

EO 12856, Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirement (August 3, 1993)

Public Law 94–580, Resource Conservation and Recovery Act of 1976

UCRL-AR-130204, LLNL Onsite Packaging and Transportation Safety Standard

8.2 Other References

22 CCR §§ 67100.1–67100.14, Waste Minimization

LLNL, Plant Engineering Maintenance Operations Procedure (MOP-02003), Soil Excavation Permit Procedure (Digging, Grading, Tunneling, Trenching, and/or Drilling)

http://www-r.llnl.gov/plant_eng/safety/ism/pdfs/Mop02003.pdf

LLNL, Plant Engineering Maintenance Operations Procedure (MOP-03001), Concrete Structure Penetrations Permit Procedure (Floor, Wall, and Ceiling)

http://www-r.llnl.gov/plant_eng/safety/ism/pdfs/Mop03001.pdf

Marshack, J. B., Designated Level Methodology for Waste Classification and Clean-Up Level Determination, A Summary of the Staff Report of the California Regional Water Quality Control Board, Central Valley Region (1991)

Public Law 120-386, Federal Facilities Compliance Act of 1992

Appendix A

Organizations and Employees Responsible for Soil and Debris Management

All workers and organizations responsible for soil and debris management shall refer to Document 2.1, "Laboratory and ES&H Policies, General Worker Responsibilities, and Integrated Safety Management," in the *ES&H Manual* for a list of general responsibilities. Specific responsibilities are listed below each title.

I. Environmental Protection Department

A. Operations and Regulatory Affairs Division (ORAD)

ORAD includes EOG environmental analysts and technologists and WGMG analysts who assist LLNL organizations in complying with environmental protection.

1. Environmental Operations Group (EOG)

EOG provides analysts and technologists to help authorizing organizations sample and evaluate soil and debris to ensure proper handling and disposition.

a. EOG environmental analyst

- See III.E.

b. EOG technologist

- Completes the bottom portion of the Site Evaluation Request Form and returns a copy of the form to the originator.
- Prepares the appropriate sampling and/or surveying plan with the EOG environmental analyst.
- Ensures a Soil Excavation and Concrete Penetration Permit has been obtained from the PE Technical Administration Group prior to extracting a soil or concrete sample, excluding staged soil piles or displaced concrete pads.
- Collects soil and debris samples and/or conducts rad surveys following the sampling plan approved by the EOG environmental analyst.
- Immediately notifies the EOG environmental analyst and ES&H Team of any unusual findings observed during sampling and/or surveying.

- Documents sample and survey activities in the EOG sampling field log book.
- Prepares a chain-of-custody record, and submits the samples to the appropriate analytical laboratory.
- Ensures that soil analytical data are routed through the QC data validation process.
- Forwards soil analytical data packages to the EOG environmental analyst.
- Maintains complete files and soil analytical data on each project at a central storage location.
- Enters sampling project information on the EOG sample tracking log.

2. *Water Guidance and Monitoring Group (WGMG) analyst*

- Develops and negotiates conditions for soil reuse, including obtaining permits as necessary with the San Francisco Bay and Central Valley Regional Water Quality Control Boards, and provides guidance for the development and implementation of associated Storm Water Pollution Prevention Plans (SWPPP) at LLNL.
- Obtains coverage of construction projects under the General Construction Storm Water National Pollutant Discharge Elimination System (NPDES) permit, if necessary.
- Assists PE and the authorizing organizations in complying with SWPPP requirements.
- Assists PE, authorizing organizations, and EOG environmental analysts in obtaining approval for reuse of soil that exceeds negotiated acceptance criteria or in other special cases.

B. *Environmental Restoration Division (ERD)*

- Investigates and remediates historic soil contamination (i.e., contamination that resulted from past activities as opposed to contamination from ongoing activities and operations).
- Project leaders for the Livermore Site or for Site 300, or their designee, review EOG sampling plans for projects located in areas identified for source investigation.
- Subject matter experts review and concur with the memos summarizing the due-diligence searches prepared by the EOG environmental analyst for VOCs detected in samples.

- Maintains a database of ERD soil analytical data.

C. RHWM Division Storage and Disposal Operations

- Assists in preparing a disposal cost estimate for loading, transporting, and disposing of hazardous, radioactive, and mixed waste.
- Approves and provides a list of offsite contractors qualified to handle onsite excavation of hazardous or radioactive contaminated soil and debris.
- Prepares and signs the Uniform Hazardous Waste Manifest for transport of hazardous soil and debris offsite to a permitted treatment, storage, or disposal facility.
- Prepares documentation and coordinates disposal of low-level radioactive waste at a DOE-approved disposal site.
- Stores mixed waste until it is properly characterized and disposed of at an approved offsite disposal facility.

D. RHWM Waste Generator Services

- Assists the EOG environmental analyst, as necessary, in cleanup and packaging of hazardous or radioactive soil and debris.
- Coordinates, along with other RHWM groups, the site cleanup of contaminated soil and debris in emergency situations.
- Coordinates removal of properly packaged and identified soil and/or debris contaminated with hazardous, radioactive, or mixed constituents.
- Assists the EOG environmental analyst in preparation of sampling plans for soil and debris found or believed to be radioactive, and ensures that plans comply with requirements of the intended disposal facility.

II. Chemistry and Materials Science Environmental Services (CES) Laboratory

- Accepts and processes potentially contaminated soil and debris samples for chemical analyses using standard laboratory methods. The CES Laboratory is certified by the state of California to conduct most analyses. Samples not analyzed by CES are forwarded to offsite, state-certified contract laboratories for analyses.
- Accepts and processes all soil and/or debris potentially contaminated with radioactive constituents for radiological analyses. Performs gross alpha, gross

beta, and tritium measurements. If alpha or beta is above action levels, CES performs alpha and/or gamma spectroscopic analyses.

- Notifies the EOG technologist of any concerns about a sample.
- Provides rad prescreening services for samples potentially contaminated with radioactivity prior to sending the samples to an offsite laboratory.
- Prepares a radiological declaration for samples following review of radiological data.
- Sends soil analytical data and the radiological declaration to the EOG technologist.
- Retains reserve portions of samples for a minimum of 30 days.

III. Environmental Safety and Health (ES&H) Teams

A. *ES&H Team leader*

- Identifies the appropriate ES&H disciplines for assistance with soil and debris management.
- Responds to emergencies, such as spills.

B. *ES&H health and safety technician*

- Responds to emergencies, such as spills.
- Monitors for radioactive contamination when soil and debris are suspected or known to be radioactive.

C. *ES&H health physicist*

- Provides guidance on personal protective equipment and other exposure control requirements when appropriate.

D. *ES&H industrial hygienist*

- Provides guidance on personal protective equipment and other exposure control requirements when appropriate.

E. *EOG environmental analyst*

- Provides the Plant Engineering (PE) project manager with an estimate of costs for sampling and analyses.
- Obtains authorization from PE or the authorizing organization for use of the project account number.

- Reviews existing soil and debris analytical data for projects identified by PE or the authorizing organization to determine whether sampling of soil and debris is required.
- Evaluates project location, and reviews the ERD historical source investigation and site evaluation documents, current and past operations, and performs a visual inspection to evaluate the project site for possible contamination.
- Performs a due-diligence search when volatile organic compounds (VOCs) are detected in soil samples. The results of the due-diligence search are then summarized in a memo by the EOG environmental analyst and submitted to ERD for concurrence.
- Prepares a Radioactivity Review Checklist for Soil with appropriate ES&H subject matter expert input to identify whether soil samples shall be prescreened for radioactivity prior to being shipped to a certified offsite contract laboratory for analysis.
- Prepares a Radioactivity Review Checklist for Asphalt and/or Concrete to evaluate the need for sampling and analysis of asphalt and/or concrete identified for disposal or reuse.
- Approves the sampling/surveying plan(s) prepared by the EOG technologists.
- Provides the ERD Livermore site or Site 300 project leader, or their designee, with a copy of the sampling plan for review before samples are collected in areas identified for source investigation.
- Consults with ERD subject experts for projects located in areas identified for source investigation to determine whether environmental sampling has been done previously and, if so, what levels of contamination, if any, have been identified.
- Provides guidance on proper placement, containment, and erosion control measures for soil piles.
- Coordinates collection of samples with the EOG technologist.
- Reviews the soil analytical data, and recommends management alternatives to PE or the authorizing organization by memorandum.
- Notifies the appropriate ES&H Team leader to evaluate health and safety issues when contamination is suspected or found.

- Notifies EPD management and the PE project manager or Responsible Individual when contamination is found, and when reporting to the DOE and other regulatory agencies is required.
- Advises and assists PE and the authorizing organization in coordinating the disposal of contaminated soil and debris with the Labor Shop, RHWM, and outside contractors, as necessary.
- Assists in the preparation of Occurrence Reports.

IV. LLNL Fire Department

- Responds to emergencies, along with the ES&H Team, when unexpected or unidentified hazards are found during excavation of soil and debris.
- Stabilizes situations that pose an immediate threat to human health, environment, or property. Once the situation is stabilized, the Fire Department relinquishes control to the ES&H Team leader or the EOG environmental analyst.

V. Authorizing Organization Representative

- Notifies the EOG environmental analyst to initiate a preconstruction site evaluation.
- Initiates the Integration Work Sheet (IWS), which records the initial ES&H review and authorization, and which may be required for any project involving soil excavation or concrete penetration.
- Fills out the Site Evaluation Request Form (see Appendix B) as completely as possible and submits the form to the EOG environmental analyst.
- Obtains a Soil Excavation and Concrete Penetration Permit from the PE Technical Administration Group.
- Notifies the ES&H Team leader immediately when suspect items (e.g., drums, boxes, cans, bottles, or discolored, malodorous, or otherwise suspected contaminated soil and debris) are discovered during excavation, demolition, or construction.
- Provides authorizing organization funding, in most cases, for projects related to soil and debris management.

VI. Plant Engineering (PE)

A. PE Project Manager

- Notifies the EOG environmental analyst either directly or through the ES&H Team in the early stages (Title I) of a proposed construction project that might involve excavation of soil and debris. Notification is often accomplished through the design review process.
- Provides sufficient notice to allow adequate time for evaluation, sample collection, and analyses (at least 120-days' notice for long-term planned projects, or as soon as possible for short-term, planned projects).
- Provides information, including a scaled drawing of the proposed excavation site, approximate depths of excavation, and any personal knowledge of historic or suspected contamination in the project area.
- Authorizes (see Appendix B) the use of an account number to pay for sampling and analytical costs. A maximum dollar amount is given based on the cost estimate prepared by the EOG environmental analyst.
- Arranges for labor and equipment, if requested by the EOG environmental analyst, to assist in collecting samples (e.g., a backhoe to remove an asphalt cover). A Soil Excavation and Concrete Penetration Permit shall be obtained from PE's Technical Administration Group prior to excavating soil or penetrating concrete.
- Coordinates the disposal of contaminated soil and debris with advice and assistance of the EOG environmental analyst, RHW, and the ES&H Team.
- Coordinates the disposal of soil and debris determined by the EOG environmental analyst to be nonhazardous and nonradioactive.
- Obtains approval to store soil and debris onsite, when necessary, from PE Space and Site Planning, Civil Planning.

B. Construction manager/inspector

- Is responsible for stopping the excavation, cordoning off a potentially contaminated area, and notifying the ES&H Team or the EOG environmental analyst when potential contamination is found during excavation. Potential contamination can be foreign matter (e.g., containers, bottles or drums) or discolored or malodorous soil and debris.
- May coordinate the removal of the soil and debris for the Responsible Individual/project manager.

C. Labor Shop

- Provides personnel and equipment for removal and disposal of contaminated and uncontaminated soil and debris when an outside contractor is not involved in the project or when a project is small, limited in scope, and has minimal hazards.
- Provides personnel who are trained in the proper procedures for removal of contaminated soil and debris.

D. Space and Site Planning, Civil Planning

- Approves the temporary and long-term staging of soil and debris.
- Coordinates the reuse of soil onsite.

E. Soil Management Committee

- Composed of members of PE and EPD who meet regularly to ensure that the soil and debris management process works effectively and efficiently.

Appendix B

Site Evaluation Request Form (Soil/Asphalt/Concrete)

Date: _____

To: _____

Dig permit number: _____

From: _____ Phone: _____ L-code: _____

Project title and location: _____

PFN: _____ Disposal site: _____

Signature authority for account number: _____

Account number: _____ Employee number: _____

Please evaluate this project for (circle one or more) soil/asphalt/concrete sampling/ surveying needs. A description of the project is attached, including project location, excavation footprint, and depths of excavations. The material (circle one or both) **will/will not** be reused onsite. The planned excavation start date is _____.

The Environmental Protection Department is authorized to use the account number above to pay for the costs associated with sampling and analyzing the material to be excavated from the project area. Account charges are not to exceed \$_____ based on your cost estimate, without prior approval.

When sampling/rad surveying is complete, the EOG technician will complete the bottom portion of this form and return a copy of the entire form to the originator.

.....
Date: _____

From: _____ Phone: _____ L-code: _____

Date rad survey requested: _____ Date rad survey completed: _____

Number of samples taken: _____

Date samples submitted for analyses	Type of analyses requested	Lab performing analyses	Estimated date when analytical data due from lab

Estimated date determination memo provided to Project Manager: _____

cc: _____

Appendix C

Sampling/Rad Surveying Request Form

Type of sample: Incident Response Miscellaneous Preconstruction

Requestor/Team # _____ Sampler/ _____ Today's
 /phone # _____ phone # _____ date _____

Due date _____ Project title _____ Bldg/location _____

Authorizing organization contact _____ Account number _____ Phone/pager _____

Samples: Number of Field log book
 Number of samples _____ sample locations _____ page number _____

Survey

Soil Asphalt Concrete Other

Sample location	Depth (ft)	Analysis requested

Sample location	Depth (ft)	Analysis requested

Comments/special instructions: _____

Sample ID number	Easting (X)	Northing (Y)	Analysis requested	Date/time sampled	Onsite lab	Offsite lab

Appendix D

Radioactivity Review Checklist for Soil

Project Title _____

1. Reviewed *Radioactive Substances Map* from the set of maps entitled "Guidelines for Soil Usage at LLNL, Main Site":

Date _____ Comments _____

2. Reviewed *Remedial Investigations Report for the LLNL Livermore Site*, Figure 3.1-15, "Areas Identified for Evaluation of Potential Hazardous Materials Releases":

Date _____ Comments _____

3. Reviewed current list of Radioactive Materials Management Areas (RMMAs) at LLNL:

Date _____ Comments _____

4. Reviewed EOG Incident Log for radioactive spills in project area:

Date _____ Comments _____

5. Contacted ERD for information regarding known and suspected radioactive contamination in the project area:

Date _____ Comments _____

6. Conducted a visual site inspection of the project area for indications of radioactive contamination (e.g., operations involving radioactive materials, storage of radioactive materials, suspicious spills and stains, etc.):

Date _____ Comments _____

Findings from Items 1–6 are to be reviewed with the appropriate ES&H Team members and authorizing organization representatives.

Recommendation:

_____ The project area is not located in a known or suspected radioactive contaminated area.
Radioactivity screening is not required prior to sending samples offsite for analyses.

_____ The project area is located in a known or suspected radioactive contaminated area. Soil
samples must be screened for radioactivity prior to sending samples offsite for analyses.

EOG Analyst

Date

Appendix E

Review Checklist for Asphalt and/or Concrete

Project Title _____

1. Reviewed *Radioactive Substances Map* from the set of maps entitled "Guidelines for Soil Usage at LLNL, Main Site:"

Date _____ Comments _____

2. Reviewed *Remedial Investigations Report for the LLNL Livermore Site*, Figure 3.1-15, "Areas Identified for Evaluation of Potential Hazardous Materials Releases:"

Date _____ Comments _____

3. Reviewed current list of Radioactive Materials Management Areas (RMMAs) at LLNL:

Date _____ Comments _____

4. Reviewed EOG Incident Log for spills in project area:

Date _____ Comments _____

5. Contacted ERD for information regarding known and suspected hazardous and/or radioactive contamination in the project area:

Date _____ Contact name _____ Title _____

Comments: _____

- 6. Contacted the ES&H Team for information regarding known and suspected hazardous and/or radioactive contamination in the project area:

Date _____ Contact name _____ Title _____

Comments: _____

- 7. Contacted the Program Representative for information regarding known and suspected hazardous and/or radioactive contamination in the project area:

Date _____ Contact name _____ Title _____

Comments: _____

- 8. Conducted a visual site inspection of the project area for indications of hazardous contamination (e.g., operations involving hazardous materials, storage of radioactive or hazardous materials, suspicious spills and stains, etc.):

Date _____ Comments _____

- 9. Conducted a radiation meter survey according to training provided in the Health and Safety Course HS6622, Very Low Range Gamma Survey Instruments:

Date _____ EOG Tech/Analyst Associate Name _____

Survey instrument # _____ Date instrument last calibrated _____

Results/comments: _____

- 10. Recommendation:

_____ The project area is not located in a known or suspected hazardous and/or radioactive contaminated area. Analyses for radioactive constituents are not required prior to offsite disposal.

_____ The project area is located in a known or suspected hazardous and/or radioactive contaminated area. Asphalt/concrete must be sampled and analyzed for radioactive constituents prior to offsite disposal.

EOG Analyst/Analyst Associate

Date

EOG SOP 07/Rev. 1/bld

Appendix F

Plant Engineering Construction Project Label for Stockpiled Soil

Plant Engineering Construction Project

Project name:

Plant Engineering contact/phone number:

Client contact/phone number:

Environmental Protection Department contact/phone number:

Date samples obtained:
