



Lawrence Berkeley National Laboratory
Environment, Waste & Radiation Protection Department

Waste Management Plan for Phase One of Old Town
Demolition

Revision: 01
Effective Date: July 25, 2014

Prepared By: A. Desrosiers Date: 25 JUL 14
Arthur Desrosiers CHP
Affiliate, Radiation Protection Group

Reviewed By: CS Blackmore Date: 7-25-2014
Carolyn Blackmore
Affiliate, Waste Management Group

Reviewed By: Ron Power Date: 7/25/14
David Baskin
ESG Environmental Restoration Program Manager

Reviewed By: Maram Kassis Date: 7-25-14
Maram Kassis
Waste Services Team Lead, Waste Management Group

Approved By: Joe Gantos Date: 7/25/2014
Joe Gantos,
EHS Old Town Assurance Manager
Environment Health and Safety Division

Approved By: Robert Cronin Date: 7/28/14
Robert Cronin
Project Manager, Facilities Division

Approved By: D. J. Kestell Date: 07/28/14
David Kestell
Department Head
Environment, Waste & Radiation Protection Department

Waste Management Plan for Phase One of Old Town Demolition

Table of Contents

1	INTRODUCTION	3
2	WASTE MANAGEMENT PROGRAM.....	5
3	WASTE CATEGORIES	12
4	WASTE MANAGEMENT PROGRAM ELEMENTS AND ACTIVITIES	17
5	REFERENCES.....	26
6	REVISION LOG.....	28
7	APPENDICIES	30

Waste Management Plan for Phase One of Old Town Demolition

1 INTRODUCTION

1.1 Purpose

The primary purpose of this document is to define the required waste management program and program elements for the Old Town Project (project) at the Department of Energy (DOE) Lawrence Berkeley National Laboratory (LBNL). To that end, the plan also identifies potential wastes, anticipated characteristics of the potential wastes, and expected regulatory drivers applicable to the potential wastes. Waste processing, packaging, sampling and analysis and shipping requirements are discussed.

1.2 Overview

Phase One of the Old Town Project will demolish building 16, building 16A, building 5, (including the removal of the floor slabs and utilities), and the electrical substation and pad north of building 16A. The project will also remove the floor slabs for buildings 52 and 52A. The floor slabs of buildings 40 and 41 may also be removed. As required, the project will remove contaminated soil that may be encountered under the floor slabs. Unless building 16A is specifically described as the location of radiological or hazardous waste or contamination, all references to building 16 do not include building 16A.

The project will generate various types of hazardous wastes, universal wastes, non-hazardous construction debris or solid waste, and recycle or salvage material. The removal of the floor slabs of building 52 and 52A and excavation of associated soil may generate polychlorinated biphenyl (PCB) containing waste that is regulated by the Toxic Substances Control Act (TSCA) and the State of California. The demolition of building 5 will generate radiological wastes, including low level waste (LLW) and hazardous LLW. No radiological waste is anticipated to be generated as a result of the removal of building 16, building 16A, or the slabs of buildings 40, 41, 52 and 52A.

The Environment/Health/Safety Division (EHS) at LBNL has primary responsibility for developing compliance strategies and programs for meeting the requirements of federal, state, and local environmental laws and regulations, and for developing internal LBNL policies and procedures. In conformance with applicable laws and regulations, EHS establishes procedures for storage, handling, use, and disposal of hazardous and radioactive wastes. These are described in the *ES&H Manual* (Formerly PUB-3000. See Chapter 20, *Waste Management*); PUB-3140, the *Integrated Environment, Safety and Health Management Plan*; and in other supporting EH&S documents (these references are available to the public through the website of the Environment/Health/Safety Division at <http://www.lbl.gov/ehs/>). The Waste Management Group (WMG) of the Environment, Waste & Radiation Protection (EWRP) Department within EHS, is responsible for management of radioactive and hazardous wastes at LBNL.

The debris wastes will include the structures, installed equipment, floor slabs, pedestals, piping and utilities below the floor slabs, the subsurface vessels and valve pit of building 5, the nitrogen tank on the east side of building 16, the loading dock of building 5, foundations

Waste Management Plan for Phase One of Old Town Demolition

and retaining walls, except structures that are determined to be uncontaminated and appropriate to remain in place to stabilize the site. The electrical substation and pad that is adjacent to building 16A will also be removed. Portions of the roadway between building 16 and building 5 areas of pavement that were previously used for waste processing will be removed, if necessary to remove contaminated soil or to provide set back slopes for excavations.

Disposal of waste soil associated with the removal of the buildings and slabs is included in the scope of this effort. This plan also includes disposal of waste soil that is excavated from below building grade or between the buildings.

A description of each Old Town building is included in an evaluation by Harvey in 2003. Hazard maps, were compiled by LBNL from lab records, logs, reports, and interviews with current and former employees. These maps, in conjunction with Reconnaissance-Level Characterization (RLC) conducted by Weiss Associates in 2010, were the primary basis for the sampling approach of the RLC conducted by B&B Environmental Safety, Inc. (BBES) in 2013-2014.

1.2.1 Buildings 16 and 16A

Building 16 contains controlled and potentially hazardous wastes in the form of sediments, lead, asbestos containing materials (ACM), PCB containing materials, electronic equipment and universal wastes.

Sediments found in building 16 and building 16A were classified as California hazardous wastes in the RLC report of BBES. Additional testing would be needed to determine if the wastes are classified as Resource Conservation and Recovery Act (RCRA) hazardous wastes. Low levels of lead and mercury were reported by BBES in wipe samples of various interior surfaces. ACM was found in many of the building materials in buildings 16 and 16A by Weiss and BBES.

Many samples of deteriorated paint that were analyzed by BBES during the RLC exceeded California criteria for hazardous waste classification. Appropriate controls must be implemented for hot cutting and management of deteriorated loose or flaking lead paint.

Concrete floor slabs in building 16 were tested for hexavalent chromium during the 2013 BBES RLC. Total hexavalent chromium concentrations detected in the samples were below the California criteria for hazardous waste classification.

1.2.2 Building 5

Building 5 was partially surveyed by Weiss Associates (Weiss) in 2010 in an RLC. Weiss identified minor levels of radioactive contamination on building surfaces, including floors and ceilings. A follow-up RLC by BBES in 2013 and 2014 verified that radiological (rad) contamination is present at low levels. The remnant hot cell wall, loading dock structures, ramp, legacy exhaust stacks, process piping, the floor slab, the pavement in the yard north of the building, a portion of the roadway west of the building, the drain pipes above and below the floor slab and the roof over the 1949 building additions are (or are assumed to be)

Waste Management Plan for Phase One of Old Town Demolition

radioactively contaminated. Subsurface soil surveys by LBNL are in progress and the presence of radiologically contaminated soil in the yard and under the roadway is expected.

Weiss reported the presence of ACM, universal waste (e.g. electronic equipment), and metals in sediments that may exceed hazardous waste thresholds in building 5. No PCBs or fluoride were reported to be potentially above the hazardous waste thresholds. However, PCBs have been detected in concrete, drain system components and soil at or near building 52 and cannot be eliminated as a potential contaminant of concern for any of the old town building components when characterizing demolition wastes for off-site shipment, treatment and/or disposal.

According to the 2010 Weiss RLC chromium was detected in concrete samples in building 5 at slightly elevated. In 2013 under the Northgate RLC a concrete core sample designed to be representative of the building material (rather than of potential contamination) was collected and analyzed for soluble hexavalent chromium; the detected value, 0.065 mg/L was well below California hazardous waste criteria.

The sediments and drain pipes were reported to be contaminated with hazardous metals by Weiss.

BBES found lower levels of lead contamination in dust, compared to the Weiss report. However, the project assumes that the dust in building 5 must be treated as a lead hazard. Many of the deteriorated paint samples that were analyzed by BBES during the RLC exceeded California criteria for hazardous waste. Asbestos was found in many of the building materials in building 5 by BBES and Weiss.

1.2.3 Buildings 40, 41, 52, and 52A

The sub slab utility drains of building 41 may be contaminated with lead and other metals. The sub slab utility drains of building 52 may be contaminated with lead, other metals and other contaminants, including PCBs that were found in building 52. A concrete sump still exists in the foundation slab of building 52 on the west side. PCBs above 500 mg/kg have been found in recent sampling and analysis of sediment/water in that sump and adjacent soils. The sump sediment and water have been removed as has some of the contaminated soil. Additional subsurface soil characterization is in progress.

2 WASTE MANAGEMENT PROGRAM

Prior to mobilization, the demolition contractor will establish a Radioactive Waste Certification Organization (RWCO) and a Hazardous Waste and Debris Organization (HW&DO) for the project. The RWCO and HW&DO may be constituted from the demolition contractor in-house staff and/or subcontracted organizations. The demolition contractor will manage the activities of the RWCO and HW&DO. This plan does not prevent the merger or integration of the RWCO and the HW&DO by the demolition contractor.

The RWCO and HW&DO will be responsible for developing waste management/waste management quality assurance programs and plans, completing required additional waste characterization, selecting processing and disposal sites, obtaining acceptance of waste

Waste Management Plan for Phase One of Old Town Demolition

profiles by the processing and disposal sites, transportation of wastes to processing and disposal sites, and mobilizing and managing all qualified personnel and resources required on-site to administer the waste programs. See section 4 of this plan for more information on necessary waste management program elements.

The scope of this plan excludes detailed compliance procedures, which must be provided by the RWCO or HW&DO and approved by WMG. Prior to preparation of the detailed program procedures, the RWCO and HW&DO shall evaluate previously prepared documents and conduct physical inspections to identify potential wastes and hazards.

Further sampling and characterization of radioactive, hazardous or toxic constituents of the waste is not specified in this plan. The RWCO or the HW&DO are responsible for any further required characterization and must determine if additional sampling and characterization of hazardous or toxic constituents of the waste is necessary and propose the methods and procedures for implementation.

The RWCO and the HW&DO must characterize and manage secondary wastes that are created by the demolition and waste processing activities, using methods that comply with their waste management programs and procedures.

Due to restrictions on total heavy truck traffic through the City of Berkeley, the RWCO and HW&DO must adhere to LBNL's coordinated shipping schedules. Based on prior experience with the Bevatron Project, LBNL expects that the schedule will not exceed six truckloads per day or 24 truckloads per week for the duration of the demolition activity. The number of packages per truckload may vary. The density of demolition debris may be estimated to be 1 to 4 cubic yard/ton, according to the material. The RWCO and HW&DO must provide sufficient resources to meet the maximum shipping schedule.

2.1 RWCO

LBNL does not operate a program for certifying radioactive waste for disposal at the Nevada National Security Site (NNSS). The demolition contractor will obtain the services of a RWCO that currently provides packaging, certification, manifesting and transportation services for disposal of radioactive waste at NNSS or an alternative commercial site. Approval for use of a non-DOE waste disposal site requires that the RWCO obtain an exemption according to DOE M 435.1 Radioactive Waste Manual, Chapter I, Section (2)(F)(4). Exemptions for the use of non-DOE facilities require DOE approval and must be documented to be "cost effective and in the best interest of DOE, including consideration of alternatives for on-site disposal, an alternative DOE site, and available non-DOE facilities; consideration of life-cycle cost and potential liability; and protection of public health and the environment."

The RWCO must have similar and recent experience in certifying LLW for processing and disposal at commercial facilities and NNSS, while operating their program on a DOE site. The RWCO must use existing characterization information in the Weiss and BBES RLC reports and obtain any additional information required to satisfy the waste acceptance criteria (WAC) of all chosen receiving facilities.

Waste Management Plan for Phase One of Old Town Demolition

The RWCO will be responsible for all aspects of the radioactive waste management program for the project that LBNL does not perform, including those for hazardous LLW. LBNL's radioactive waste management role for the project will be to maintain an oversight and concurrence review of the RWCO's program. This oversight and concurrence review includes all plans, procedures, waste profiles, characterization information, and on-site management and shipping documentation, etc..

The RWCO's plans will identify known and potential sources of LLW and hazardous LLW and incorporate suitable waste management requirements into procedures. As required, all hazardous LLW must be properly stored within satellite accumulation areas or 90-day storage areas, which will be identified, established and managed by the RWCO. WMG will approve the accumulation areas prior to establishment and provide oversight during the operations. The RWCO is responsible for proper waste characterization, packaging, and transfer to these accumulation areas.

After the waste is compliantly packaged and stored, the appropriate certification documentation must be submitted to WMG for concurrence with the characterization and proposed disposition. All radioactive and hazardous waste and hazardous material transporters and receiving facilities must be approved by WMG. Generally, the RWCO will ship LLW and hazardous LLW directly from the demolition site or the accumulation or storage areas to the appropriate receiving facility without passing through LBNL's Hazardous Waste Holding Facility (HWHF).

2.2 HW&DO

The demolition contractor will also establish and manage a hazardous waste and debris organization (HW&DO) for characterizing, quantifying, packaging, certification and transportation of hazardous wastes, universal wastes, non-hazardous demolition debris or solid waste, and recycle or salvage material to appropriate receiving facilities.

The HW&DO must have current programs for disposal of hazardous and demolition wastes at convenient or appropriate receiving facilities. The HW&DO must have similar and recent experience in waste management while operating their program on a DOE site. Prior to preparation of the detailed program plans, the HW&DO shall evaluate previously prepared documents and conduct physical inspections to identify potential wastes and hazards. The HW&DO must use existing characterization information in the Weiss and BBES RLC reports and obtain any additional information required to satisfy the WACs of the receiving facilities.

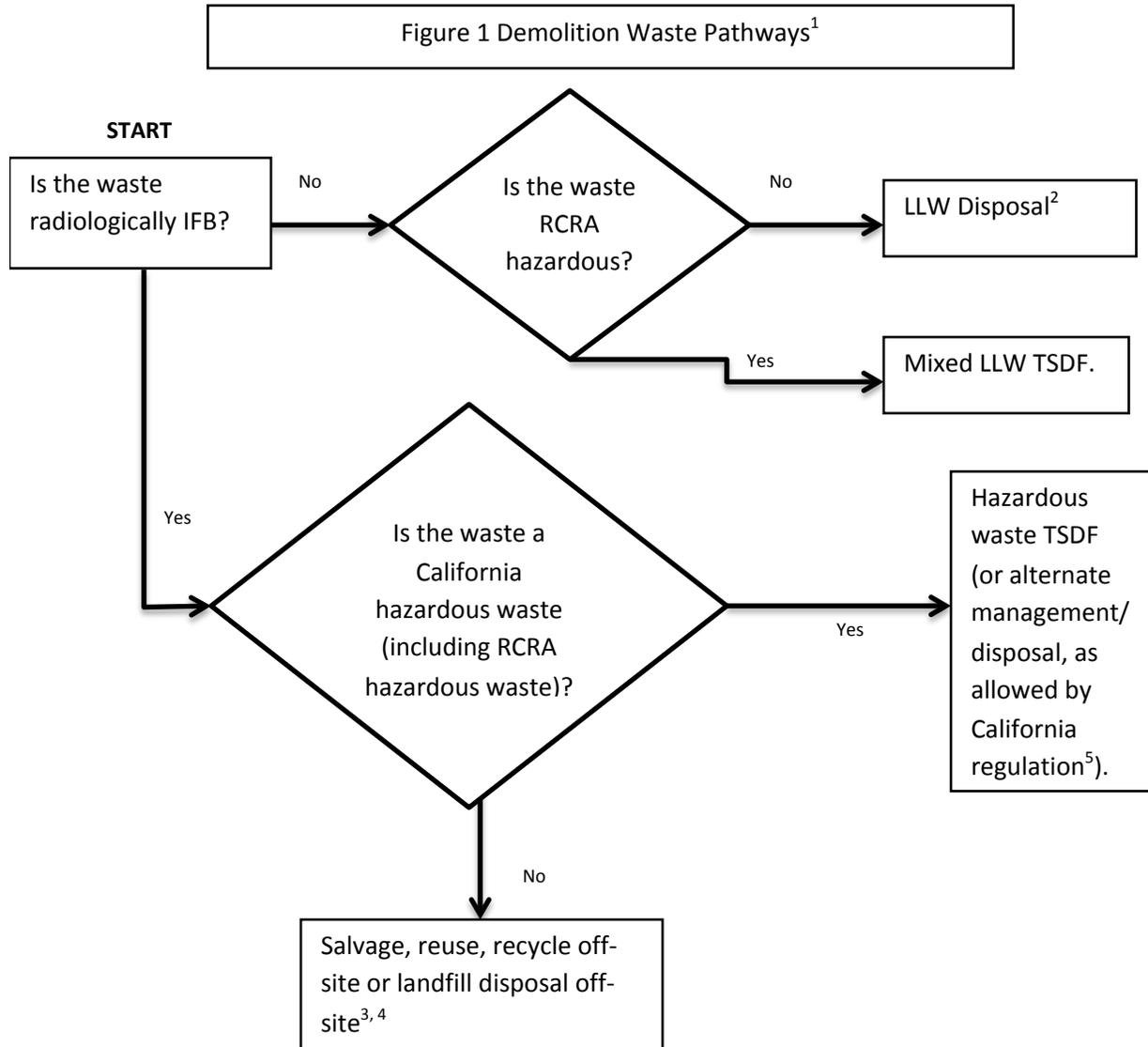
Wastes that are subject to RCRA/State of California regulations must be shipped under LBNL's Environmental Protection Agency identification number. The HW&DO will be responsible for all aspects of the non-radioactive waste management program that LBNL does not perform. LBNL's role in non-radioactive waste management for the project will be to provide oversight and concurrence with the HW&DO's activities, including review of shipping documents, waste profiles and the HW&DO plans and procedures.

Waste Management Plan for Phase One of Old Town Demolition

2.3 Waste Management Pathways

The major waste streams are anticipated to be non-radioactive and radioactive demolition rubble. Potential management pathways for the demolition rubble and other wastes (excluding soil) are shown in Figure 1.

Waste Management Plan for Phase One of Old Town Demolition



1. This flow diagram for demolition waste excludes soil that is not waste to be disposed off-site. The criteria for defining soil as waste soil are provided in the Old Town Project Soil Management Plan.
2. LLW that is California hazardous waste but not RCRA hazardous (i.e. combined waste) can be transported as LLW and disposed of outside of California as LLW. The requirements for on-site management of combined waste are addressed in a memorandum of agreement between California Department of Toxic Substances Control and DOE.
3. Waste soils must be landfilled; no off-site reuse will be allowed.
4. Any salvage, reuse, recycling must be in accordance with applicable regulations, best management practices and facility acceptance criteria. ESH concurrence is required.
5. Examples of alternate management are those utilized for universal waste and treated wood waste.

Note: The official version of this document is on the Waste Management Group web page. Printed copies are not official versions of the document. Before using the printed copy, verify that it is the most current version.

Waste Management Plan for Phase One of Old Town Demolition

2.4 Recycling and Reuse

The project has established a landfill diversion goal. LBNL Project Manual Specification Section 017419, *Construction Waste Management*, requires a minimum diversion of 75% of the total project non-radiological/non-hazardous waste. In order to achieve this goal, all non-radioactive, non-hazardous material must be recycled or diverted for reuse to the extent practicable. This goal applies to buildings 16/16A but not to building 5, which is classified as radioactive. The goal applies to buildings 40 and building 41 if they are demolished. The goal does not apply to either building 52 or 52A. This category includes electronic waste.

The demolition subcontractor is responsible for estimating the types and quantities of waste materials as well as the amounts to be reused (preferable), recycled or landfilled. Section 017419 defines documentation and reporting requirements for landfilled and diverted wastes, information on waste reuse and recycling services in the area and categories of waste materials that are candidates for landfill diversion.

If a material that is proposed for recycle or reuse could potentially be a regulated material, the following information must be submitted for review and approval at least two weeks prior to planned removal from the site: (1) Full description of the material (2) Description of how the material will be recycled or reused (3) Name, address, phone number of the company providing the recycling service (4) Method of transport, including name, address, phone number of company transporting the material. The proposed recycle or reuse must be approved by WMG prior to removal of the material from the site.

2.5 Regulation of Hazardous Waste

The California Environmental Protection Agency implemented a *Uniform Hazardous Waste and Hazardous Materials Regulatory Program* (Unified Program) in 1996. The Unified Program operates through a local Certified Uniform Program Agency (CUPA). The City of Berkeley is the lead agency for all CUPA activities other than emergency notifications. These are performed under the authority of the Department of Energy, Office of Science, Berkeley Site Office (BSO).

In California, the Department of Toxic Substances Control (DTSC) regulates the generation, transportation, treatment, storage and disposal of hazardous waste. Table 1 identifies relevant regulations and laws governing the project's waste disposal.

The RWCO and HW&DO is responsible for ensuring that management of hazardous and toxic substances is performed in accordance with LBNL programs, applicable federal, state and local (e.g. CUPA) regulations.

Utilities, systems and equipment with refrigerants, oils or hydraulic fluids shall be drained by a licensed contractor, if necessary, until no other additional material can be removed. Tanks that have held hazardous materials or wastes, and which are designated for disposal or recycling as scrap metal, shall only be rinsed or otherwise cleaned in compliance with Section 67383.3 of Title 22 of the California Code of Regulations.

All hazardous wastes must be properly stored within satellite accumulation areas or 90-day storage areas, which are identified, established and managed by the HW&DO and RWCO.

Waste Management Plan for Phase One of Old Town Demolition

WMG will approve the accumulation areas prior to establishment and provide oversight during the operations. The HW&DO and RWCO are responsible for proper waste characterization, packaging, and transfer to these accumulation areas. After the waste is compliantly packaged and stored, the appropriate documentation must be submitted to WMG for approval with the characterization and proposed disposition.

Table 1: Laws and Regulations Relevant to Project Waste Disposal

Classification	Law/Agency	Description
Hazardous and Contaminated Waste	Resource Conservation and Recovery Act (RCRA), 40 CFR 260 - 280	EPA regulates the entire life cycle of hazardous wastes, including disposal
	Hazardous and Solid Waste Amendments Act (HSWA)	The amendments prohibit certain techniques for disposal of specific hazardous wastes
	Toxic Substances Control Act (TSCA); 40 CFR Part 761, 40 CFR 61	EPA requirements for PCBs and asbestos ¹
	DOE Order 435.1, Chg 1.	DOE radioactive wasterequirements
	Title 22, Division 4.5 of the California Code of Regulation; Chapter 6.5, Division 20, California Health and Safety Code	California requirements on management and disposal of hazardous wastes
Hazardous Materials Transportation	US Department of Transportation (DOT)	DOT regulations govern all means of transportation except US mail.
Building Materials, Equipment and Soil	Toxic Substances Control Act (TSCA); 40 CFR Part 761, 40 CFR 61	EPA requirements for PCBs and asbestos ¹
	DOE Order 435.1, Chg 1.	DOE radioactive waste requirements
Demolition and Recycling	DOE Order 435.1, Chg 1, DOE Order 458.1, Chg 2	DOE radiation protection and radioactive waste requirements
	Chapter 6.5 of Division 20 of the California Health and Safety Code and Chapters 11 and 16 of Division 4.5 of Title 22 of the California Code of Regulations	Packaging, storage and recycling of demolition waste
1. PCBs and friable asbestos are also regulated as a hazardous waste in California.		

All hazardous waste transporters and treatment, storage and disposal facilities (TSDF) must be approved by WMG. Generally, the RWCO and HW&DO will ship hazardous or toxic waste directly from the demolition site or the accumulation or storage areas to the appropriate receiving facility without passing through the HWHF.

LBNL may agree to accept incidental quantities (less than one 55-gallon drum) via transfer to building 85, the HWHF. This determination will be made by WMG based on the overall cost and efficiency of management alternatives.

2.6 Regulation of LLW and Hazardous LLW

The disposal of LLW is subject to the Atomic Energy Act, which is administered at LBNL by DOE's Office of Science in accordance with DOE Order 435.1. The RWCO must have a current certification program that allows for, as required: processing, treatment and disposal

Note: The official version of this document is on the Waste Management Group web page. Printed copies are not official versions of the document. Before using the printed copy, verify that it is the most current version.

Waste Management Plan for Phase One of Old Town Demolition

of the project's LLW and hazardous LLW. Radioactive waste management activities must comply with applicable DOE Orders.

LLW for the project is defined as any demolition material or waste that contains radioactive residues or contamination that are reliably distinguishable from natural background or any demolition material from building 5 that cannot be determined to be free of radioactive residues according to LBNL procedures (see section 4.2).

The RWCO's plans will identify known and potential sources of LLW and hazardous LLW and incorporate suitable radioactive waste management requirements in work procedures. As necessary, the procedures must conform to the WAC of the potential or designated receiving facilities. The RWCO must account for hard-to-detect radionuclides in the waste profile(s) as applicable by applying methods for analyzing and assaying packages of LLW that comply with DOE Order 435.1.

MLLW will be managed in compliance with State of California Health and Safety Code, Division 20, Chapter 6.5 *Hazardous Waste Control* and Title 22 of California Code of Regulation, Division 4.5 *Environmental Health Standards for the Management of Hazardous Waste*. Hazardous LLW that is only regulated as hazardous wastes in the State of California (i.e., combined waste) will be managed in accordance with the DTSC/DOE Combined Waste Memorandum.

2.7 Regulation of Waste Transportation

The Department of Transportation (DOT) regulates the transportation of hazardous materials including hazardous and radioactive wastes between states. The shipper must meet the DOT's hazardous materials regulations in 49 CFR Parts 171 - 180. The State of California regulates the transportation of waste that originates in California or passes through California. California regulations are contained in Title 26 of the California Code of Regulation. The regulations and procedures for shipping hazardous materials govern all activities associated with the transportation or shipping of hazardous materials. This includes arranging for transport, filling packages, marking and labeling packages, and preparing shipping papers. The regulations also control the handling, loading, securing and segregating of packages within a transport vehicle or freight container, and transporting the hazardous materials.

Much of the Old Town demolition waste will not be LLW and most of the LLW will not be Department of Transportation (DOT) Class 7 material. Much of the waste will not require manifesting and can be shipped on a Straight Bills of Lading (BOL). The RWCO must demonstrate that each package complies with all requirements. Procedures for waste transportation and associated quality assurance must be included with the waste management procedures provided by the RWCO and HW&DO, and approved by WMG.

3 WASTE CATEGORIES

The potential sources of hazardous materials/waste in Old Town include processes related to the science programs, the materials of building construction, and the constituents of the building's systems. The potential sources of radioactive material in building 5 include induced activity related to operation of the neutron generators and residual contamination

Waste Management Plan for Phase One of Old Town Demolition

from former radiochemistry operations. In any project of this type, there is always a possibility that additional sources of radioactive material may be discovered.

The hazard maps, which are included in the RLC reports, summarize the historical knowledge of potential residues. The results of radiological, chemical and toxic materials tests are documented in the reports that were issued by Weiss and BBES. The RWCO and HW&DO are responsible for performing any additional analyses that may be required in order to comply with the LBNL programs and regulatory requirements associated with the disposition of demolition wastes.

3.1 LLW

It is assumed that building 5 will be disposed of as radioactive waste (LLW or MLLW) in its entirety¹. Subsurface soil surveys by LBNL are in progress and the presence of radiologically contaminated soil in the yard, under the building and under the roadway is expected.

3.2 Hazardous and PCB Waste (including those that are potentially LLW)

For building 5, building 16, and building 16A, hazardous wastes may include materials that are contaminated with lead, mercury, beryllium, chromium or other metals. The available characterization data were provided by Weiss Associates and BBES. The Weiss Associates RLC provides characterization data for the slabs of buildings 40, 41, 52 and 52A.

Lead and other hazardous metals, PCBs, diesel and motor oil contamination were reported in the trenches and concrete slab of building 52. The sub slab utility drains of building 41 may be contaminated with lead and other metals. The sub slab utility drains of building 52 may be contaminated with lead, other metals and other contaminants (e.g. PCBs) that were found in building 52. Soil adjacent to buildings 16 and 52 is contaminated with PCBs.

The data collected by Weiss indicates that the drain system(s) in building 5 are contaminated with metals, including beryllium, copper, nickel, zinc, lead and mercury and that the pit in room 102 is contaminated with barium, chromium, copper, cadmium, silver, lead and mercury. Additional mercury sampling of the remnant hot cell wall in room 112 resulted in no indication that mercury is present at levels that would trigger hazardous waste classification.

PCBs, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs) and total petroleum hydrocarbon (TPH) were not detected in building 5. However, PCBs have been detected in concrete, drain system components and soil at or near building 52 and cannot be eliminated as a potential contaminant of concern for any of the old town building components when characterizing demolition wastes for off-site shipment, treatment and/or disposal.

¹ July 22, 2014 Memorandum from David Kestell, Department Head – EHS Division Environment, Waste and Radiation Protection Department to Robert Cronin, Facilities Division Project Manager, Old Town Project, “Reconnaissance Level Characterization (RLC) Report,” RPG-14-013.

Waste Management Plan for Phase One of Old Town Demolition

3.2.1 Lead

Some lead shielding material may be present in room 101 of building 16, as well as in room 116A of building 5. The shield door of the former hot cell may contain lead shielding. The asbestos cement exterior siding panels are attached to the building with fasteners that contain lead. Most painted surfaces contain lead-based paint, some in a deteriorated and flaky condition. LBNL has a lead compliance program that covers all facets of lead handling including disposal of lead-containing materials. Lead hazards and controls are addressed in Chapter 37 of the LBNL ES&H Manual (PUB-3000).

The RWCO and HW&DO must evaluate the levels of lead dust on equipment and building surfaces to determine if lead hazard controls are required (e.g. vacuuming using High Efficiency Particulate Air (HEPA) filter-equipped vacuums to remove surface deposits). Captured wastes generated during control activities such as HEPA vacuuming must be characterized, packaged and managed as hazardous waste if appropriate.

The RWCO and HW&DO must also determine if areas of peeling or flaking paint are large enough to impact demolition waste characterization and if such areas should undergo lead paint abatement in order to avoid the creation of hazardous demolition waste. If lead paint abatement is performed, the removed material shall be collected, packaged and managed as hazardous waste, as appropriate.

California regulates lead under criteria for total and extractable lead. The total lead content or Total Threshold Limit Concentration (TTLC) regulatory limit is 1000 mg/kg. The extractable lead content limit or Soluble Threshold Limit Concentration (STLC) is 5 mg/L using the Waste Extraction Test (WET) method. If one were to assume all lead in lead based paint were extractable in a WET evaluation, then there would need to be at least 50 mg/kg total lead content in the waste item for the item to exceed 5 mg/L in the test. This is due to the 1:10 waste to extract dilution inherent in the method. The HW&DO and RWCO should use conservative assumptions when using screening calculations in order to determine thresholds that would trigger regulation of these items as lead containing hazardous waste.

3.2.2 Mercury

Mercury was found in plumbing drains in building 5 and in a remnant hot cell wall. It is possible that additional mercury contamination may be discovered during the demolition. Additional characterization may be needed to confirm the regulatory status of mercury-contaminated materials and that any mercury contamination has been appropriately remediated prior to demolition of the structure. Most intact mercury containing items are managed as universal waste; see section 3.2.7 regarding these wastes in the Old Town buildings.

3.2.3 Chromium

The BBES survey showed that sediments in building 16 are contaminated with chromium.

Concrete floor slabs in building 16/16A were tested for hexavalent chromium during the 2013 Northgate RLC. Two core samples, one from room 101 and one from room 130 were

Waste Management Plan for Phase One of Old Town Demolition

analyzed and showed 7.2 mg/kg and 5.6 mg/kg total hexavalent chromium. These results are below the TTLC of 500 mg/kg.

According to the 2010 Weiss RLC chromium was detected in concrete samples in building 5 at slightly elevated concentrations (slightly greater than 10 times the STLC of 5 mg/L for chromium). In 2013 under the Northgate RLC a concrete core sample designed to be representative of the building material (rather than of potential contamination) was collected and analyzed for hexavalent chromium using the WET. The detected value, 0.065 mg/L was below the waste toxicity STLC.

3.2.4 Beryllium

The Weiss survey found beryllium at one location, a floor drain in room 100 (0.26 ug/100 cm²) in building 5. The BBES survey did not find beryllium contamination in the facility structures or on the external surfaces of equipment above regulatory limits in building 5, building 16 or building 16A. LBNL surveyed buildings 5, 16, and 16A for beryllium and removed localized contamination that approached or exceeded 0.20 ug/100 cm².

The LBNL Industrial Hygiene organization has also done extensive beryllium surveying in buildings 5 and 16. All areas that with initial beryllium detections above 0.20 ug/100 cm² have been decontaminated. At present, the demolition effort is not considered to be beryllium work by LBNL. However, at present the buildings cannot be certified as free of beryllium and continued beryllium monitoring is recommended.

If additional beryllium, above regulatory levels, is found the demolition contractor must meet DOE requirements (10 CFR 850) for beryllium cleanup operations. All work would also be performed in accordance with the LBNL ES&H Manual Chapter 38 *Beryllium Hazards and Controls*.

3.2.5 PCB Wastes

PCBs were found in the concrete of the building 52 and 52A foundations, and in the soil in the Old Town area. TSCA regulations must be followed when these materials (and any other PCB contaminated materials found) are generated, stored and disposed. Additionally PCB wastes are regulated as a hazardous waste in California.

3.2.6 Asbestos Wastes

The exterior siding of building 16 and building 16A is composed of transite, a material typically containing non-friable chrysotile asbestos fibers. Weiss reported that building 5 contains non-friable ACM in vinyl asbestos floor tiles, roofing felt, walls, coatings, miscellaneous patch and insulation. In addition, due to the age of the buildings and equipment within the buildings, friable asbestos might be encountered during demolition or disposal activities.

Regulated asbestos-containing materials (RACM) are defined as friable asbestos material; Category I non-friable ACM that has become friable; Category I non-friable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading; or Category II non-friable ACM that has a high probability of becoming or has become crumbled, pulverized, or

Waste Management Plan for Phase One of Old Town Demolition

reduced to powder during demolition operations. RACM are regulated as a hazardous waste in the State of California.

LBNL has a comprehensive asbestos management program to manage asbestos materials at the Laboratory. The HW&DO and RWCO's waste management plans must meet all requirements for asbestos controls in the LBNL ES&H Manual, Chapter 36. Prior to undertaking demolition activities, the HW&DO and RWCO shall review the existing characterization data and shall identify ACM in the buildings, along with any additional sampling required to assess and quantify ACM for removal.

Removal of ACM must be conducted by a licensed and certified asbestos abatement firm using an asbestos abatement permit, issued by the Bay Area Air Quality Management District (BAAQMD). The ACM abatement would be conducted under the oversight of LBNL personnel and subject to inspection by the BAAQMD. The available characterization data were provided by Weiss and BBES. The HW&DO and RWCO are responsible for disposal of the waste to approved TSDFs. In building 5, building 16, and building 16A, the current information indicates ACM throughout the buildings as detailed in the reports.

3.2.7 Universal Waste

Minor amounts of universal waste are present in building 5, building 16 and building 16A, generally in the form of mercury control switches and electronic devices.

3.2.8 California Executive Order D-62-02

In September 2002, California Executive Order D-62-02 imposed a moratorium on the disposal of all demolition materials from licensed facilities having low residual levels of radioactivity - even when the materials meet applied federal and state cleanup standards - into Class III or unclassified waste management units. Wastes that are determined to be IFB have no measureable residual contamination. Because Executive Order D-62-02 is applicable to disposal of residual radioactive material, it does not apply to IFB wastes.

3.2.9 Metal Waste Affected by the DOE Moratorium

The 2000 DOE suspension on the release for recycling of surplus and scrap metals from radiation areas is not applicable to the management of wastes from building 5 because no radiological zones have been established since the suspension was implemented. Conceivably, reinforcing iron such as rebar or rewire may be released for recycle from the remnant hot cell wall, the floor slab, or any concrete matrix that is categorized as radioactive waste, *if* surveys are performed that satisfy LBNL's programs for compliance with DOE Order 458.1 and MARSAME requirements. LBNL must approve MARSAME survey plans. The 2000 DOE moratorium on the release of activated and volumetrically contaminated metal is still in effect. For more information see *Agreement between LBNL and DOE Berkeley Site Office, LBNL Implementation of DOE Metal Release Suspension*(EHS Procedure IP02),

Waste Management Plan for Phase One of Old Town Demolition

3.2.10 Soil Waste

Soil that is excavated and moved from the work area for disposal will be considered to be “excavated soil waste” (waste soil) and will be disposed off-site. Soil that is handled within the work area is not considered to be waste until declared waste by the RWCO or HW&DO. See the Old Town Soil Management Plan for more information on management of soils in the work area and determination of when excavated soil becomes a waste soil subject to this plan.

Waste soils that are not classified as hazardous waste and which are radiologically IFB must be disposed of at a solid waste facility (landfill) that is permitted by the California Integrated Waste Management Board (CIWMB). Permitted landfills are listed on the state of California’s Solid Waste Information System (SWIS) database at the following URL: www.calrecycle.ca.gov/SWFacilities/Directory. Soils meeting the critical level shown in Table 2 are deemed non-radioactive for the purposes of off-site landfill disposal.

Table 2: Critical Levels for Gross Alpha and Gross Beta Radioactivity in Soil (pCi/g)

Radionuclide	L _c ¹ (pCi/g)	Analytical Method	RL ² (pCi/g)
Gross Alpha	12	E900-4925	2
Gross Beta	28	E900-4927	2
1) L _c – critical level; 2) RL – reporting level Source: EWRP 05, <i>Release Limits for Gross Alpha and Gross Beta Radioactivity in Soil for the Old Town Project</i> , Revision 0.			

4 WASTE MANAGEMENT PROGRAM ELEMENTS AND ACTIVITIES

4.1 Waste Management Compliance Matrix

The RWCO and the HW&DO will prepare and implement a Waste Management Compliance Matrix (matrix). This matrix must, at a minimum, identify each waste stream anticipated to be generated during the project, identify applicable regulatory and oversight requirements with respect to the handling, temporary staging/storage, packaging, transportation and receipt at the chosen disposal site; state how each of these requirements will be implemented in the waste handling processes; and identify key individuals, including their specific roles and responsibilities.

In the event that a new waste is identified during the performance of the demolition work activities, the matrix will be updated as required prior to the generation of the waste.

Note: The official version of this document is on the Waste Management Group web page. Printed copies are not official versions of the document. Before using the printed copy, verify that it is the most current version.

Waste Management Plan for Phase One of Old Town Demolition

Additionally, this matrix will be maintained up-to-date by the RWCO and the HW&DO during the duration of the demolition project. LBNL Quality Assurance and WMG staff will approve the matrix prior to mobilization and provide oversight during implementation.

4.2 Waste Characterization

All waste from the project must be characterized by the RWCO and HW&DO to ensure that requirements of LBNL's waste management program and procedures, as well as the requirements of the receiving facilities' WACs, are met before the wastes are shipped. To the extent possible, wastes will be characterized using process knowledge and existing sampling and analysis results. LBNL requirements on generator characterization and management of wastes are given in Chapter 20 of the ESH Manual. The RWCO and the HW&DO must provide a program with procedures that describe the waste characterization and radiological survey processes; define waste characterization requirements to support profile development; delineate responsibility for characterization, characterization quality assurance and regulatory compliance; identify the interactions with LBNL (e.g. with WMG and other EHS groups); and establish data flow protocols. EHS will approve program documents and procedures.

The information in the Weiss Associates and BBES RLC reports shall be reviewed and additional sampling and analysis that is necessary to complete waste characterization for receiving facility acceptance and shipment will be identified by the RWCO and HW&DO. The RWCO and HW&DO must ensure that all facility-specific analytical requirements are satisfied, as well.

Additional characterization must conform to the methods applied in the Weiss and BBES characterization surveys, including the use of independent third-party laboratories with Department of Energy Consolidated Audit Program (DOECAP), National Voluntary Laboratory Accreditation Program (NVLAP) or National Environmental Laboratory Accreditation Program (NELAP) qualifications, and conform to LBNL's programs and procedures. Analytical laboratories with other accreditations required by receiving facilities' waste acceptance criteria will be utilized as needed to profile the waste. WMG or EHS will approve the methods and procedures prior to implementation and provide oversight during the activities.

The RWCO and HW&DO will develop plans and procedures to complete characterization that addresses (but is not limited to):

- sample collection methods;
- analytical tests;
- data quality objectives and quality assurance
- validation of sampling and analytical data
- evaluation of results against disposal/reuse options;
- coordination with the WMP; and
- preparing and submitting characterization records.

Waste Management Plan for Phase One of Old Town Demolition

4.2.1 Radiological Surveys and Analysis

For building 5, the demolition contractor's may provide for release of material under the guidance of DOE Order 458.1, which requires MARSAME compliant surveys. LBNL's policy for demolition is that material release surveys will be compliant with IFB methods and the following EHS procedures:

- EHS Procedure OHP 18 – *Technical Basis for Release of Old Town Buildings Using a Three-Stage Survey Method* (provides guidance for performing IFB surveys).
- EHS Procedure OHP 19 – *DCGLs for MARSSIM Release Surveys of Old Town Buildings* (provides guidance for establishing investigation levels)
- EHS Procedure OHP 20 – *Data Life Cycle for MARSSIM Release Surveys of Old Town Buildings*.
- EHS Procedure 760.1 – *Technical Basis for Radiological Clearance Surveys Using a Three-Stage Survey Method*.

The demolition contractor will perform the indicated MARSAME/IFB surveys if any materials are to be removed from building 5 for salvage, reuse, recycling or disposal as non-radioactive waste.

4.3 On-site Storage and Handling

The RWCO and the HW&DO must develop procedures to transport demolition wastes off-site as quickly as practicable, consistent with quality, safety and environmental protection. However, lay-down areas may be established for temporary on-site staging to allow proper segregation of certain materials and to accommodate transportation scheduling. All materials must be maintained within the project zone (i.e., restricted access, fenced area).

Proposed lay down areas for staging or accumulating waste and demolition debris must be identified and established by the RCWO and HW&DO. WMG will provide oversight and approval of the proposed areas. The RWCO and HW&DO must provide specific procedures for the use and control of the areas. WMG will approve these procedures prior to use.

As required, hazardous and mixed wastes must be properly stored within satellite accumulation areas or 90-day storage areas, which are identified, established and managed by the RWCO and HW&DO. WMG will approve the accumulation areas prior to establishment and provide oversight during the operations. The HW&DO and RWCO are responsible for proper waste characterization, packaging, and transfer to these accumulation areas. Generally, the RWCO and HW&DO will ship hazardous and hazardous LLW directly from the demolition site or the accumulation areas to the appropriate TSDF without passing through the on-site RCRA-permitted HWHF.

4.3.1 Soil

Soil that is excavated and moved from the work area for disposal will be considered to be "excavated soil waste" (waste soil) and will be disposed off-site. Soil that is handled within the work area is not considered to be waste until declared waste by the RWCO or HW&DO. See the Old Town Soil Management Plan for more information on management of soils in

Waste Management Plan for Phase One of Old Town Demolition

the work area and determination of when excavated soil becomes a waste soil subject to this plan.

Waste soils will be placed in shipping packages for interim storage pending laboratory analysis (if necessary) and shipment to a receiving facility. These waste soils will not be mounded or stored outside of transportation packages. Furthermore, soft packages will be protected from potential forces that might cause dispersion of the contaminants by the demolition contractor. Soil containing 50 mg/kg PCBs or more (as determined using applicable regulatory criteria) are subject to Subpart D requirements of 40 CFR 761 and California hazardous waste regulations.

4.3.2 Waste Packaging

All demolition materials must be packaged in compliance with applicable regulations and receiving facility acceptance criteria. Some large items may be shipped unpackaged. The RWCO and HW&DO must provide suitable packages, package the materials and load the packages on trucks for shipment to the appropriate facility. The WMG will provide oversight to ensure compliance with DOT and WAC requirements. Procedures must provide specific instructions for packaging of LLW to be shipped to disposal facilities, such as for

- proper package selection,
- receiving, inspecting and using DOT containers,
- packaging specific wastes to meet the WAC,
- compliance with regulations in 49 CFR 171 through 180, NUREG-1608, and RCRA and California hazardous waste regulations;
- size reduction of bulky items,
- identifying hold points for LBNL oversight, and
- identifying labeling and marking requirements for waste containers.

4.3.3 Liquid Waste Treatment

No liquid LLW is anticipated to be generated during the demolition, and will be addressed on a case-by-case basis, if generated. Expected management methods for any hazardous or non-hazardous liquid wastes anticipated will require LBNL EHS approval prior to generation. The HW&DO must describe the characteristics and quantities of liquid waste to be generated; define the intended methods to capture the liquid, and specify methods to prevent release into the environment. Options may include:

- direct disposal into the LBNL sanitary treatment system under the conditions in the East Bay Municipal Utility District permit;
- transfer of the liquid waste to a permitted pretreatment processes on site if validated characterization and volume data ensure the waste meets the applicable LBNL permit requirements;
- perform treatment that does not require a RCRA Part B Permit; or
- transfer of the waste to a TSDF.

Waste Management Plan for Phase One of Old Town Demolition

In all cases the proposed management of liquid wastes must be performed under HW&DO procedures. EHS will approve the procedures prior to implementation and provide oversight during operations.

4.4 Waste Processing

The RWCO and the HW&DO, on behalf of LBNL (the generator), are responsible to characterize, classify, schedule, manifest, package (if necessary) and transport waste shipments to the appropriate receiving facilities in accordance with the WACs, licenses, permits, and applicable state and federal regulations. LBNL will conduct all notifications to government entities. For each facility, specific requirements are provided in the applicable WAC. The following is a general overview of the steps involved in disposition waste to an off-site waste handling or disposal facility:

- Contact a client service manager.
- Complete and submit the waste profile and other applicable information.
- Finalize subcontract arrangements.
- Receive waste profile approval.
- Receive approval from the facility of shipping documents/shipment.
- Ship the waste to the facility.
- Obtain a Certificate of Disposal for permanent retention.

4.4.1 Waste Profiles

The RWCO and HW&DO must prepare suitable profiles/manifests for all project wastes. The waste profiles provide WAC required information including:

- Generator and waste stream information.
- Physical properties and packaging.
- Radiological information:
 - Maximum dose rate.
 - Contamination limits.
 - Concentration limits.
- Chemical composition and hazard evaluation.

The waste profiles must primarily be based on process knowledge augmented with radiation survey information and analytical sample results as needed.

Any project-specific WAC forms or approval to transport forms, manifests and other documents will be reviewed by WMG prior to shipment by the demolition contractor.

4.4.2 Transportation

The RWCO and HW&DO will establish and document the process for transporting wastes from the demolition work site to waste receiving facilities. The process will:

- provide the basic approaches to transportation management of each waste category/type.
- integrate the number and frequency of shipments with the overall project schedule;
- establish guidelines and delineate responsibility for shipment scheduling;

Waste Management Plan for Phase One of Old Town Demolition

- identify and describe how and where shipping records are retained and for how long; identify who is responsible for records retention.
- delineate responsibilities for required interfaces and notifications with LBNL organizations/personnel and with receiving facilities.
- provide instructions for completing shipping papers and forms for each approved receiving facility;
- address transportation security requirements.
- provide instructions for shipment preparations and loading materials/packages onto transport vehicles, that includes (but is not necessarily limited to);
 - specifying banding, palletizing, blocking and bracing methods to ensure load stability;
 - identifying LBNL staff and RWCO and HW&DO responsibilities and hold points for LBNL WMG inspection.
 - safety/security inspection checklists for trucks arriving at and departing the project;
 - verifying compliance of transporter with applicable requirements;
 - conducting inspections of transport vehicles, loads, and reusable shipping packages;
 - specifying how radiological surveys will also be performed on radioactive materials transport vehicles and packages when they arrive at or leave LBNL.²

Hazardous and mixed wastes will be manifested to TSDFs using the LBNL EPA identification number. Prepared uniform hazardous waste manifests (UHWM) will include as the Generator's Name and Mailing Address, the following;

Lawrence Berkeley National Laboratory (LBNL)
One Cyclotron Rd, MS85R0203
Berkeley, CA 94720
Attention: Maram Kassis 510-486-6823

Once a UHWM has been signed by the shipper and transporter picking up the waste at the LBNL, a copy of the manifest will be provided to the designated WMG contact.

The RWCO and HW&CO must identify forms necessary for specific types of shipments; describe the process for completing the forms; provide "Shipping Checklists" to ensure compliance with approved receiving facility's waste acceptance process; and provide instruction for submitting advance copies of required documents to the receiving facilities prior to the shipment arrival date and as specified by the receiving facilities.

The RWCO and HW&DO must provide a weekly and total project rollup of all material and container shipments from and to LBNL.

4.5 Emergency Response

LBNL's Emergency Management Program maintains an emergency-management system designed to minimize the consequences of all emergencies, protect the health and safety of

² Radiological surveys will be performed on all radioactive materials transport vehicles and packaging previously used for radioactive materials on arrival at LBNL to verify that contamination levels are within DOT regulations and to prevent the introduction of extraneous contamination to the site.

Waste Management Plan for Phase One of Old Town Demolition

all workers and the public from hazards associated with LBNL's facilities, and prevent damage to the environment in compliance with DOE Order 151.1C *Comprehensive Emergency Management System*. The implementation of the Emergency Management Program is outlined in Chapter 9 of LBNL's *Environment, Safety & Health (ES&H) Manual* (Pub 3000). LBNL has developed an Emergency Operations Plan (EOP) that defines the scope of preparedness and emergency-management activities necessary to address the hazards and threats identified in the Hazards Survey.

The EOP is further supported by Emergency Plan Implementing Procedures (EPIPs). Plans and procedures are reviewed, revised, and tested at intervals predetermined by DOE contract requirements, exercises, actual events, or on an as-needed basis. The RWCO and the HW&DO must support LBNL's EOP and EPIPs; support employee involvement in training, drills, and exercises; provide adequate Hazard Surveys and updates; and ensure that implementations meet LBNL's requirements for employee emergency preparedness.

4.6 Waste Management Quality Assurance

The LBNL WMG will approve the RWCO and HW&DO waste management quality assurance programs and implementing procedures prior to mobilization. The quality assurance programs and procedures will be consistent with the requirements in the LBNL Quality Assurance Program Description (PUB-3111).

The demolition contractors quality assurance plan will describe and define responsibilities by title for project tasks, including (but not limited to):

- preparing 435.1 exemption packages,
- performing quality control or quality assurance inspections,
- preparing hazardous waste determinations,
- storage and labeling of wastes and waste containers
- performing sampling and analysis activities,
- preparing profiles for receiving facilities,
- receiving, inspecting and using DOT containers,
- preparing uniform hazardous waste manifests,
- completing BOLs, 540/541 forms, Land Disposal Restrictions (LDR) certifications and related documentation,
- reviewing shipping documents,
- pre/post shipment notifications,
- and submittal and keeping of records

4.6.1 Reviews and Assessments

A management assessment that includes assessing results, identifying process improvements, taking effective corrective actions, and sharing lessons learned will be performed quarterly. The RWCO and HW&DO must conduct management assessments to ensure workers meet requirements specified in procedures and documents. These assessments must include line management self-assessments and functional manager assessments. To evaluate the effectiveness of the quality program, trained and technically knowledgeable personnel not

Waste Management Plan for Phase One of Old Town Demolition

having direct responsibility for the areas they are assessing, must conduct assessments in accordance with written plans or procedures. The assessment frequency may be reduced if a management assessment determines that the organizations are effective in delivering quality performance. A finding that significant improvement is needed will result in more frequent assessments.

4.6.2 Conformance/Non-Conformance and Resolution

The RWCO and HW&DO must take action when there is a failure to meet external or internal requirements, laws, regulations, or compliance documents or specifications. This action may include immediate correction of the deficiency. Deficiencies and their corrections will be documented according to established group requirements. Failures will be analyzed to identify systemic weaknesses in management. The LBNL EHS group must be notified as soon as practicable when any major waste management deficiencies are found. The RWCO and HW&DO must comply with the requirements for issues management as prescribed in LBNL/PUB 5519(4), *Lessons Learned and Best Practices Program Manual*.

4.6.3 Records/Document Control

The RWCO and HW&DO must develop a Records Management Plan that is approved by LBNL. Among other requirements, the Records Management Plan must identify the records that must be retained; describe how and where they must be retained; specify the retention period; and identify who is to be responsible for records retention. The Records Management Plan must integrate the demolition contractor's records management process into the requirements of the LBNL archives and records management process. plan.

The RWCO and HW&DO must ensure that documents (including plans, procedures, work instructions, drawings, surveys, calculations, and specifications) will be controlled to provide users with the most current version used to perform work. Work processes that ensure compliance with requirements will be documented in approved controlled electronic documents. Documents will be prepared, reviewed, issued, and revised according to established processes. The RWCO and HW&DO must provide for the processing, protection, and retrieval of records according to industry standard records management procedure. To facilitate transparency and retrieval, records must be stored in their original electronic form whenever possible. All records will identify the applicable procedures and include retention schedules, as required by [LBNL Archives and Records Management Policy](#) (found within the LBNL Requirements and Policy Manual).

4.6.4 Waste Certification Quality Assurance

A quality control program to ensure compliance with waste classification requirements is required. Characterization and survey data inputs must be specified and scheduled in a timely manner for completing certification activities on schedule. Characterizations, evaluations, observations, data and documentation must contain the level of detail required to permit the correct performance of certification activities. Formal documentation reviews, including verifications and validations, and software quality assurance checks if appropriate, must be conducted to ensure that the characterization is performed and documented correctly.

Waste Management Plan for Phase One of Old Town Demolition

Changes to characterization documents must undergo the same review as the original document.

4.6.5 Waste Operations

Work that characterizes, processes, packages, or transports waste must be planned, documented, and tracked. Work operations and activities must be consistent with the principles of the LBNL Integrated Environmental Safety & Health Management Plan (PUB-3140) and performed in accordance with established procedures. All employees must have the right and responsibility to stop work activities considered to be an imminent danger.

Managers must implement an integrated safety management process to ensure that safety-related work operations and activities are addressed comprehensively. Managers must have auditable evidence of the identification and control of hazards in their responsible workplaces by documenting potential hazards and the engineering controls needed to mitigate these hazards.

Work Plans must be prepared for operations activities not identified in procedures. These plans must identify the objective of the project, work to be done, special project provisions, safety information such as characteristics of the waste that may be unusual, subject containers, stop or hold points in the process that require requester input, expected output or data, and any other information deemed necessary for successful completion of the project.

4.6.6 Conduct of Operations

Waste certification activities must be conducted in accordance with the RWCO and HW&DO's approved procedures. Programs for the overall characterization and management of regulated wastes must be conducted in accordance with the established and approved plans and procedures, as applicable.

All procedures or instructions must be prepared at a level of detail that ensures that the activity can be performed as required by the appropriate personnel. Procedures and instructions must include or refer to appropriate quantitative or qualitative acceptance criteria for determining that prescribed activities have been completed as specified. Procedures and instructions must be uniquely identifiable, retrievable, and reproducible.

4.6.7 Qualifications and Training

Personnel must be qualified through a combination of education, experience, and training to perform their assigned tasks. Personnel who verify conformance of work activities must be qualified to perform the assigned inspection task. Personnel selected for assessments or other evaluations must collectively have training and experience commensurate with the scope and complexity of the activities to be evaluated. Individuals participating in a quality-verification activity must be independent of any direct responsibility for performance of the activities that they will evaluate.

The demolition contractor must implement a training system to ensure that employees receive, and continue to maintain, the necessary skills and knowledge requirements to fulfill their group and institutional work responsibilities. Completion of training activities must be

Waste Management Plan for Phase One of Old Town Demolition

documented. Training may be provided in the form of required reading, formal classroom sessions, or other methods. On-the-job training, where required, must be documented. Periodic observations and documented assessments must be performed to evaluate performance, safety, or changes needed in processes.

4.6.8 Quality Assurance Oversight

The demolition contractor's supervisors must perform regular oversight to verify the quality of waste management activities. Oversight observations must be documented to include work observed, noteworthy practices, observations, and deficiencies. The LBNL EHS group must be notified as soon as practicable when any major waste management deficiencies are found. Deficiencies must be documented and resolved in accordance with the approved quality management program. Periodic observation of routine activities identifies areas where procedures could be improved, and assures that employees are adhering to procedures and safety requirements. Results of these observations must be fed back to the individuals, and improvements must be made (as warranted) to operating procedures and safety programs.

Findings, concerns, and deficiencies identified in an assessment must be addressed as soon as practicable. If corrective action cannot be completed immediately, a corrective action plan must be prepared to allow for additional planning and scheduling. The tasks identified in a corrective action plan must be tracked until completion and management verification. Managers must perform root-cause analyses and develop Lessons Learned to prevent problems from recurring. These activities must be commensurate with the hazard, significance, and consequence of the problem. Managers must conduct Lessons Learned sessions as appropriate. The session(s) must include all involved parties and must identify areas of improvement, good performance and applicable future activities.

5 REFERENCES

LBNL EHS Procedure IP02, *Agreement between LBNL and DOE Berkeley Site Office, LBNL Implementation of DOE Metal Release Suspension*, Revision 3, updated June 2011

LBNL EHS Procedure OHP 18, *Technical Basis for Release of Old Town Buildings Using a Three-Stage Survey Method*

LBNL EHS Procedure OHP 19, *DCGLs for MARSSIM Release Surveys of Old Town Buildings*

LBNL EHS Procedure OHP 20, *Data Life Cycle for MARSSIM Release Surveys of Old Town Buildings*

LBNL EHS Procedure 760.1, *Technical Basis for Radiological Clearance Surveys Using a Three-Stage Survey Method*

LBNL EHS Technical Note RWRP05, *Release Limits for Gross Alpha and Gross Beta Radioactivity in Soil for the Old Town Project*

LBNL *ES&H Manual*, Chapter 9, Emergency Preparedness

LBNL *ES&H Manual*, Chapter 20, Waste Management

Waste Management Plan for Phase One of Old Town Demolition

LBNL *ES&H Manual*, Chapter 36, Asbestos Hazards and Controls
LBNL *ES&H Manual*, Chapter 37, Lead Hazards and Controls
LBNL *ES&H Manual*, Chapter 38, Beryllium Hazards and Controls
LBNL/PUB-3140, *Integrated Environment, Safety, & Health Management Plan*
LBNL/PUB-5519(4), *Lessons Learned and Best Practices Program Manual*
LBNL/PUB-3111, *Quality Assurance Program Description*
LBNL *Soil Management Plan Old Town Demolition Project, Phase One*, latest revision.
LBNL Standard Specification 017419 *Construction Waste Management Section 1.2E*
DOE Order 151.1C *Comprehensive Emergency Management System, Attachment 2, Contractors Requirement Document*
DOE Order 243.1B *Records Management Program, , Attachment 2, Contractors Requirement Document*
DOE Order 435.1 *Radioactive Waste Management , Chg 1*
DOE Order 458.1, Chg 2 *Radiation Protection of the Public and the Environment*
DOE Order 460.1C, *Packaging and Transportation Safety, Attachment 1, Contractor Requirements Document Sections: 1, 2, 3, and 6.b*
B&B Environmental Safety, Inc., *Reconnaissance Level Characterization Report*, Revision 0, June 2014
Weiss Associates, *Reconnaissance-Level Characterization Report*, 2010
PNNL-14156 *Identification and Evaluation of Old Town Buildings*, Harvey, 2003
NUREG-1608, *Categorizing and Transporting Low Specific Activity Materials and Surface Contaminated Objects*
DTSC/DOE Combined Waste MOA, *California Department of Toxic Substances Control and United States Department of Energy Governing the Regulation of Combined Waste at Department of Energy Facilities in California*, May 25, 1999
California Executive Order D-62-02
California Code of Regulations, Title 26 *Toxics*
California Code of Regulations, Division 4.5
California Health and Safety Code, Division 20, Chapter 6.5
Bay Area Air Quality Management District Regulation 11, Rule 2 – *Asbestos Demolition, Renovation and Manufacturing*
10 CFR 835 *Occupational Radiation Protection*
10 CFR 850 *Chronic Beryllium Disease Prevention Program*
10 CFR 851 *Worker Safety and Health Program*

Waste Management Plan for Phase One of Old Town Demolition

10 CFR 61 National Emission Standards for Hazardous Air Pollutants
 40 CFR Part 260 through 280 - *RCRA regulations on hazardous waste*
 40 CFR 761, Subpart D, *Polychlorinated Biphenyls*
 49 CFR 171, 172 and 173 *Hazardous Materials Transportation*

15 USC, Chapter 53, 2601-2692, *Toxic Substances Control Act*
 42 USC, Chapter 82, 6901 et seq., *Resource Conservation and Recovery Act (RCRA)*, as amended

6 REVISION LOG

Date, Revision #	Brief Description of Revision / Changes	Pg. #, Sec. #, Parag.
May 29, 2014 Revision 00	New document.	All
July 25, 2014 Revision 01	<p>Rearranged plan information, deleted some redundant information and revised section headings.</p> <p>Moved some of the detailed characterization information to a new waste categories section.</p> <p>Created new section on waste management program with subsections on RWCO and HW&DO and moved information regarding these from the overview and other places into these new sections.</p> <p>Placed overview under new introduction section and added a new purpose subsection.</p> <p>Rewrote information on PCBs in building 52 and deleted specific concentration information on wastes no longer there.</p> <p>Deleted the waste type tables that were in Appendix A and replaced with a flow diagram generally showing expected waste types and disposition pathways.</p> <p>Deleted “This goal applies to Building 16/16A and the portion of Building 5 that is not classified as hazardous or LLW.” Replaced with “This goal applies to Buildings 16/16A but not to Building 5, which is classified as radioactive.”</p>	<p>All</p> <p>All</p> <p>All</p> <p>Pg. 3, Sec. 1</p> <p>Pg 3, Sec. 1.1</p> <p>Pg. 9, Fig. 1</p> <p>Pg. 10, Sec. 2.4</p>

Note: The official version of this document is on the Waste Management Group web page. Printed copies are not official versions of the document. Before using the printed copy, verify that it is the most current version.

Waste Management Plan for Phase One of Old Town Demolition

	Clarifications and updates made to Table 1,	Pg. 11, Table 1
	Created a new waste soil subsection in the new waste categories section. Moved information regarding waste soils from other areas of document to new subsection. Added information on how soils must be disposed off-Site.	Pg. 16, Sec. 3.2.10
	In waste categories, added additional information explaining history and purpose of D-62-02 and the metals moratorium.	Pg. 16, Sec. 3.2.8 and 3.2.9
	Added table showing IFB criteria for waste soil.	Pg. 17, Table 2
	Added new waste management program elements subsection and rearranged information relevant to this topic in subsections there.	Pg. 17, Sec. 4
	Deleted information on soil sampling and analysis and soil management which is included in SMP.	Pg. 18, Sec. 4.2
	Added reference to procedure 760.1	Pg. 19, Sec. 4.2.1 and Pg. 26, Sec. 5
	Added specific information on submittal of UHWM.	Pg. 22, Sec. 4.4.2
	Updated references in section 5. Deleted referrals and references to WMP plans and procedures which may be useful to the subcontractor, but which they are not required to follow.	Pg. 26, Sec. 5
	Moved old Section 2 Definitions to Appendix A. Clarified mixed low level waste definition. Added definition for hazardous low level waste.	Pg. 31, App. A.

7 APPENDICIES

Appendix A, Definitions

Waste Management Plan for Phase One of Old Town Demolition

APPENDIX A, Definitions

Asbestos Containing Material (ACM) is any building material containing more than 1% asbestos.

Combined waste is any waste containing radioactivity that is reliably distinguishable from background levels and that is a non-RCRA hazardous waste (see definition below).

Hazardous waste is solid waste designated as hazardous by California regulations. (CCR Title 22, Section 66261.3). For the purposes of this definition, a solid can be a solid, semisolid, liquid, or contained gas. Hazardous waste includes acutely hazardous waste, extremely hazardous waste, non-RCRA hazardous waste, RCRA hazardous waste, special waste, and universal waste.

Hazardous low level waste (hazardous LLW) is any solid waste designated as hazardous by California regulations (CCR Title 22, Section 66261.3) and which are low level waste (see definition below). These include combined waste and mixed low level waste.

Low level waste (LLW) is any waste containing radioactivity that is reliably distinguishable from natural background levels and that is not classified as high-level waste, transuranic waste or spent nuclear fuel.

Mixed low level waste (MLLW) is any low level waste also identified as a RCRA hazardous waste (see definition below).

Non-RCRA hazardous waste is a waste that does not meet the federal criteria for a hazardous waste, but which meets California specific state regulatory criteria for a hazardous waste.

Recycled material is defined as material that is collected, sorted, cleaned, treated or reconstituted for a new purpose.

RCRA hazardous waste is waste that meets the federal criteria for listed wastes, ignitable wastes, corrosive wastes, reactive wastes, or toxic wastes and that has not been delisted or excluded under federal regulation. By California regulation, all hazardous wastes are presumed to be RCRA hazardous waste unless or until the generator determines that the wastes are non-RCRA hazardous waste in accordance with CCR Title 22, Section 66261.101.

Salvage material is defined as material that is reused in its original form.

Universal waste is hazardous waste that is managed under 22 California Code of Regulations Section 66273.

Waste is defined as a by-product of work, research, decommissioning that has no further use.