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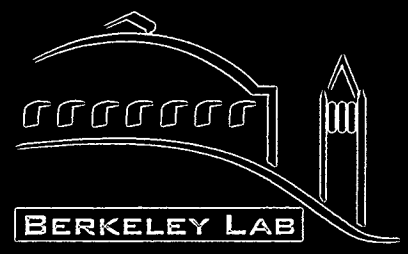

Decontamination and Decommissioning of Rooms 62-248 and 62-250 at Ernest Orlando Lawrence Berkeley National Laboratory

Prepared by Glenn Garabedian

Radiation Protection Program

Environment, Health and Safety Division

Ernest Orlando Lawrence Berkeley National Laboratory

May 1996

Prepared for the U.S. Department of Energy under Contract No. DE-AC03-76SF00098

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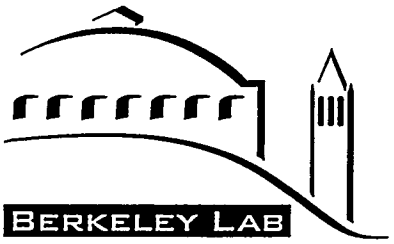

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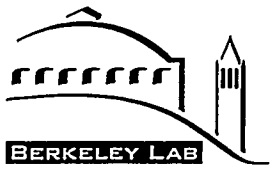


Decontamination and Decommissioning of Rooms 62-248 and 62-250 at Ernest Orlando Lawrence Berkeley National Laboratory

Environment, Health and Safety Division

May 1996

Prepared By: _____ Date: 5/10/96
Glenn Garabedian
D&D Operations Coordinator
Environment, Health and Safety Division

Reviewed By: _____ Date: 5/10/96
Jim Floyd
Radiological Control Manager
Environment, Health and Safety Division

Approved By: _____ Date: 5/10/96
Jack Bartley
Deputy Division Director
Environment, Health and Safety Division

Contents

Introduction

This document details the decontamination and decommissioning (D&D) process of Rooms 248 and 250 of Building 62 at the Ernest Orlando Lawrence Berkeley National Laboratory (LBNL). The document describes the D&D efforts for the rooms, their contents, and adjacent areas containing ancillary equipment. The rooms and equipment, before being released, were required to meet the unrestricted release criteria and requirements set forth in DOE orders 5400.5 and 5480.11, LBNL's internal release-criteria procedure (EH&S Procedure 708), and the LBNL Radiological Control Manual. The radioactive material and items not meeting the release criteria were either sent to the Hazardous Waste Handling Facility (HWHF) for disposal or transferred to other locations approved for radioactive material.

The D&D was undertaken by the Radiation Protection Group of LBNL's Environment, Health and Safety (EH&S) Division at the request of the Materials Sciences Division. Current and past use of radioactive material in both Rooms 248 and 250 necessitated the D&D in order to release both rooms for nonradioactive work.

- Room 248 was designated a "controlled area." There was contained radioactive material in some of the equipment. The previous occupants of Room 248 had worked with radioactive materials.

- Room 250 was designated a "Radioactive Materials Management Area" (RMMA) because the current occupants used potentially dispersible radioisotopes.

Both laboratories, during the occupancy of U.C. Berkeley Professor Leo Brewer and Ms. Karen Krushwitz, were kept in excellent condition. There was a detailed inventory of all radioactive materials and chemicals. All work and self surveys were documented. The labs were kept extremely orderly, clean, and in compliance. In October 1993 Ms. Krushwitz received an award in recognition of her efforts in Environmental Protection, Health, and Safety at LBNL.

History

In July 1994, meetings were held with Professor Brewer and Ms. Krushwitz to discuss the proposed D&D of Rooms 62-248 and 250. Discussions centered around the history of work performed in these rooms, potential problem areas, and the relocation of the materials and equipment.

Particular concern was expressed about the occupants of the rooms prior to Professor Brewer. Questions were raised about the quantities of dispersible radioactive material used in these laboratories. It was decided that the decommissioning plan would address the worst possible scenario.

D&D Plan Outline

A D&D plan was produced as a result of these meetings, incorporating suggested procedures submitted by Professor Brewer and all applicable DOE, LBNL, and EH&S procedures. The resulting plan was approved by EH&S, DOE, and the Material Sciences Division, of which Professor Brewer was a Principal Investigator.

The purpose of the D&D plan was to establish a protocol for the characterization, decontamination, and decommissioning of Rooms 248 and 250 in Building 62. Topics addressed in the plan were

- preliminary assessment
- contamination surveys (types and methods)
- decontamination
- transfer of nonradioactive equipment, materials, personal items, and chemicals
- safety instructions
- record requirements
- governing documents and references

The D&D Team

The principal D&D team consisted of the following:

- two retired LBNL employees, a health physicist and a radiological control technician, who were called back to work as contract personnel especially for this project
- the Radiological Control Manager
- The D&D Operations Coordinator

The four principal team members had a combined total of more than 130 years of work experience in radiation safety operations and decontamination. Additional assistance and oversight was provided by other members of LBNL's Radiation Protection Program (RPP).

D&D Process

Preliminary Work

The following preliminary operations were done before the formal D&D process began.

- The locks were changed in Rooms 248 and 250 at the request of the Materials Sciences Division to restrict access to only the Building Manager, the D&D team, and the Operations Coordinator.
- The Operations Coordinator consulted with the three radiation control technicians (RCTs) previously assigned to Rooms 248 and 250 to compile relevant background information.
- A Radiological Work Permit (RWP) #94-011 was issued and posted.
- An official logbook and document file were established to record in detail the entire D&D process.
- Team members submitted baseline bioassays, were issued dosimetry, and qualified as Radiological Worker I.
- Area dosimeters (SI 9412, SI 9413, SI 9414, and SI 9415) were strategically placed in Room 250 to record exposure. No exposures were recorded during the duration of the D&D.
- The Operations Coordinator reviewed the air-sampling data for the rooms dating back to January 1987. No indication was found of any airborne releases.
- The Operations Coordinator reviewed swipe result data dating back to January 1992. Results were negative.
- Implementation of the D&D Plan was discussed in pre-job briefings with the team members, Operations Coordinator, and Radiological Control Manager. The sequence and scope of the tasks were established.
- Workplace air sampling was started.

Continued on next page.

D&D Process (continued)

Health and Safety

The following health and safety measures were taken.

- Team members wore appropriate personal protective equipment, as specified by the RWP.
- Air samplers operated during all work activities. Final results showed nothing above background.
- Stack sampling for gross alpha/beta particulates, I-125, C-14, S-35, and tritium continued during the D&D process. Results were negative.
- Team members maintained daily contact with the Operations Coordinator.
- EH&S's Industrial Hygiene staff was consulted before handling and transporting chemicals.
- Team members submitted closeout urine samples for bioassay upon completion of the D&D Project. Results were negative.
- The team's total person/rem internal and external exposure during the D&D period was 0.021 rem. This represented the cumulative and combined total of the four team members during the three-month project. There were no nonuniform exposures.

Preparation for D&D

- The supply of Professor Brewer's radioactive thorium (approximately 5 kg) was securely packaged and transferred to the radioactive storage area in Room 70-147A (also called the pit room).
- The glove box in Room 250 was decontaminated and transferred to LBNL's Hazardous Waste Handling Facility (HWHF) for disposal.
- An initial series of direct surveys and random swipes of entrances, exposed floor areas, and work areas was taken. The initial results showed radiation levels <0.3 mr/hr @ 30 cm and no contamination detected on the areas swiped.

Continued on next page.

D&D Process (continued)

The D&D Process

A combination of extensive direct surveys and swipes was taken on the floors, walls, ceiling, above the suspended ceiling, work areas, laboratory equipment, chemicals, and the interior and exterior of all drawers, drawer cavities, and cabinets. The following text describes the D&D process. All contamination and contaminated items are listed in Attachment A.

- More than 700 swipes and 250 samples were taken in Rooms 248 and 250. All swipes and samples were analyzed by EH&S's Analytical Services Group. The Group's analytical laboratory is fully accredited by the State of California Department of Health Services, has a fully accredited quality assurance program in compliance with DOE and industry standards, and in the last year has had two audits by DOE, as well as internal management audits. (The next several bullets detail the swipes taken.)

- Thirty-six swipes were sent to FGL Laboratories, Santa Paula, CA, for quality assurance analysis. FGL is a fully accredited laboratory for regulatory tests and analyses by City, State, and Federal agencies. The findings (FGL Environmental Radiological Analysis SP501163) were consistent with those of the LBNL Analytical Services Group.

- Seventeen mechanical vacuum pumps, which included the pumps in the utility corridor, were swiped on the exterior, and the oil was agitated and then sampled. This process was repeated a second time for all pumps. Both sets of results showed no contamination.

- The sinks in Rooms 248 and 250 were swiped and surveyed. No contamination was detected.

- The sink traps in Rooms 248 and 250 were dismantled and swiped. The trap from Room 248 had no detectable radioactive contamination on the interior surface. The trap from Room 250 had radioactive contamination on the inside surface. New traps were installed in both sinks.

- The interior surfaces of the plumbing beyond the traps were also swiped. No contamination was detected.

- Sections of the vinyl base molding that come in contact with the floor were lifted and swiped. Samples of the residue under the molding were collected and analyzed. All results were negative.

- Room ventilation registers, both supply and exhaust, were swiped and surveyed. All results were negative.

Continued on next page.

D&D Process (continued)

The D&D Process (continued)

- All of the drawers were numbered and the contents surveyed and swiped. Any radioactive materials or items contaminated with radioactivity were either decontaminated, sent to the HWHF for disposal, or transferred to the pit room for interim storage. The nonradioactive contents were inventoried by drawer number and placed into a separate tote box with a copy of the inventory. The tote boxes were then wrapped with a clear plastic wrap to maintain separation, provide some degree of security, and keep the contents clean.
- All surfaces of the drawers and drawer cavities were swiped and surveyed. Radioactive contamination, approximately 200 to 300 cpm at the surface using a Ludlum Model 3 with a 44-9 detector, was found on two drawers and in one drawer cavity. The contamination was swipe free. Drawer #6 from Room 248, and drawer #8 and drawer cavity #8 from Room 250, were contaminated. All surfaces were decontaminated, except for a small section on drawer #8, which was cut out and sent to the HWHF for disposal.
- The nonradioactive contents of Rooms 248 and 250 were placed in secured storage areas for interim storage. The storage areas were surveyed and swiped prior to relocating the tote boxes from Rooms 248 and 250. No radioactive contamination was detected. The storage areas were locked.
- Care was exercised in the handling, dismantling, and packaging of all materials and equipment.
- A total of 150 chemicals were inventoried, surveyed, and swiped. The survey and swipe results were negative. The contents of one out of three chemicals were sampled and analyzed for radioactive contamination. Two chemicals showed traces of alpha contamination, and one chemical showed traces of beta contamination. They were sent to the HWHF for disposal. Since the chemicals were to be released to a nonradioactive area, it was decided to sample all of the chemicals. An additional nine chemicals were found to contain traces of radioactive contamination. These were sent to the HWHF for disposal.
- Radioactive waste was prepared for disposal and transported to the HWHF.
- In Room 250, two areas of floor tile had the markings of a chemical spill. To ensure that no radioactive contamination was present in these "spill" areas, approximately four square feet of floor tile was removed from each location. The tile and subfloor were surveyed and swiped, and no contamination was detected.

Continued on next page.

D&D Process (continued)

The D&D Process (continued)

- In Room 248, approximately 10 square feet of floor tiles was removed because of fixed low-level contamination detected by direct survey. After the tile was removed, some low-level contamination was discovered on the subfloor. The area was decontaminated. Tiles were sent to the HWHF for disposal.
- A portion of the equipment from Rooms 248 and 250 was transferred to Professor Donald Olander (a Principal Investigator in LBNL's Materials Sciences Division, or MSD) in Etcheverry Hall on the U.C. Berkeley campus. Before any material or equipment was released to Professor Olander, authorization was received from MSD and LBNL's Property Management Department. The transfer of radioactive material to campus was approved by UCB EH&S [UCB Radiological Use Authorization (RUA) #4731].
- A lead-lined safe containing the 5 kg of thorium and thoria was removed from Room 250 and stored in the pit room until the transfer process was completed. Releases were issued from MSD and Property Management. An RUA (#7271) was issued by UCB's EH&S Department authorizing the transfer of the radioactive material to Professor Brewer and Dr. Darleane Hoffman. Transportation of the safe and its contents was reviewed by LBNL's EH&S Transportation. The paperwork was generated, and the delivery was made on August 16, 1995, to 19 Lewis Hall. Upon receipt of the safe and contents, Professor Brewer, Dr. Hui-Fen Wu, and Ms. Krushwitz successfully completed the inventory (see Attachment E). Dr. Radoslav Radev (UCB Office of Radiation Safety) and Glenn Garabedian (Operations Coordinator for LBNL's Radiation Protection Program) provided oversight.
- Upon completion of the D&D, team members submitted urine samples for bioassay. Results were negative.
- Closeout swipes were taken by the Radiological Control Manager and the RCT assigned to Rooms 248 and 250. No contamination was detected.
- A second set of closeout swipes was taken in both rooms by the EH&S Operations Coordinator and Team Supervisor. No contamination was detected.
- The results and procedures of the decommissioning process were reviewed by the D&D Operations Coordinator and the Radiological Control Manager. All terms and conditions specified in the D&D Plan were met and in most cases exceeded.
- The rooms were released for unrestricted use on February 27, 1995.

Summary and Acknowledgments

Summary

The radioactive contamination found in Rooms 248 and 250, by radiation protection standards, was low-level and well-contained. The quantity of radioactivity posed no exposure hazards because of the way it was stored and contained. The well-maintained and organized conduct of operations was a tribute to Professor Brewer and his staff.

All of the data mentioned in this report were reviewed by the D&D team members, the Radiological Control Manager, and the Operations Coordinator. The equipment and materials belonging to Professor Brewer and those belonging to the Materials Sciences Division had been moved to other locations. As a result of this D&D, all contaminated material was either decontaminated, transferred to the HWHF, or formally transferred to other locations. No detectable contamination or radioactive material remained in Rooms 248 and 250 at the conclusion of this project. On February 27, 1995, Rooms 248 and 250 in Building 62 were released to the Materials Sciences Division for unrestricted use.

Acknowledgments

As with any laboratory decontamination and decommissioning, assistance from the researchers is vital to the development and implementation of a workable and proper plan. In this particular case, an extraordinary effort was required to take this project to its conclusion. I wish to express my gratitude to Professor Leo Brewer and Ms. Karen Krushwitz for their cooperation, assistance, and extraordinary effort.

The project posed challenges beyond the normal demands of a typical decommissioning. Jim Haley and Don Gregerson, the primary members of the team, were able to call upon their wealth of experience and expertise to successfully meet the challenges they encountered. Their diligence and attention to detail, both in their job performance and in the critical documentation, exceeded expectations. Greg Buck was instrumental in the early phase of putting this program together. He earned the respect and confidence of all parties involved. Roger Kloepping provided technical expertise in developing the D&D plan and valuable assistance with the decommissioning. There were many occasions when it was necessary to call on my colleagues in the Radiation Protection Program and EH&S. They were always ready to help. I wish to express my gratitude to those who participated.

Thank you all.

Glenn Garabedian

Instruments Used

The following instruments were used for the D&D effort:

- air-proportional alpha meters, numbers 1000192, 1000037, and 1000015
- Ludlum Model 3 meters, numbers 1000533 and 1000587, with a 44-9 "pancake" detector
- Ludlum Model 16 meter, number 1000513, with a 44-2 NaI detector
- Room air sampler: Radeco Model #0523-V5210 continuous air monitor (CAM) with an AVT-100 digital air-volume totalizer

All instruments were within their calibration period and were performance-checked before, during, and after use, according to approved procedures.

Records on File

- swipe reports
- assay reports
- air-sampling reports
- "Certification of Survey" release tags
- bioassay reports
- dosimetry reports
- material and equipment inventory
- chemical inventory
- radioactive material inventory
- pertinent correspondence for 1994, 1995, and 1996

Attachments

Attachment A List of contaminated items

Date contamination found	Item	cpm/type	Type of contamination
Room 248			
11/3/94	top surface of sintering furnace	100–300 α	fixed (swipe free)
11/4/94	one 4"-diameter metal disk	100–200 α	fixed
11/7/94	furnace support holder located in lab cabinet drawer #4	1000 cpm α 600 cpm βγ	swiping
11/7/94	lead sheet, lab cabinet	3000 cpm α 500 cpm βγ	swiping
11/8/94	bottom inside surface, drawer #6, lab cabinet	200 cpm α	fixed
11/8/94	differential voltmeter, drawer #6	1000 cpm α	swiping
11/8/94	micro-optical pyrometer instruction booklet, drawer #6	200 cpm α (on 2 pages)	fixed
11/8/94	drawer cavity #8	200 cpm α	fixed
12/5/94	sintering furnace—shields inside furnace	10,000 cpm α 600 cpm βγ	swiping
12/6/94	diffusion pump on sintering furnace	400 cpm α 1100 cpm βγ	swiping
12/9/94	floor under sintering furnace	100–400 cpm α	fixed
Room 250			
10/6/94	asbestos glove in Drawer #15, lab cabinet	300 cpm α	fixed (swipe-free)
10/13/94	two 4"-diameter metal disks in gray steel cabinet #21	400 cpm α	fixed
10/13/94	ceramic collar on gettering oven tray, east wall	1000 cpm βγ	fixed
11/23/94	galvanic cell on benchtop	1500 cpm α	swiping
11/23/94	condenser and ceramic funnel in cabinet #22	100 cpm α	swiping
12/2/94	sink trap	300 cpm βγ	fixed
—	12 contaminated chemicals*	trace amounts	—

*Of the 150 chemicals sampled from Rooms 248 and 250, 12 showed trace amounts of radioactivity. They were taken to the HWHF for disposal.

Continued on next page.

Attachments (continued)

Attachment B D&D Plan (on the following pages)

Continued on next page.

Lawrence Berkeley Laboratory

Environment, Health and Safety Division

Health Department

Radiation Assessment Group

Decontamination and Decommissioning Plan for Building 62, Rooms 248 and 250

Revision 0

August 5, 1994

Approved by _____ Date 8/5/94

David C. McGraw
Environment, Health and Safety Division Director

Prepared by _____ Date 8/5/94

Roger J. Kloepping
D & D Project Manager
Radiation Assessment Group Leader

Reviewed by _____ Date Aug. 5, 1994

Kensley Rivera
U.S. Department of Energy
Berkeley Site Office

Reviewed by _____ Date 8/9/94

Mark D. Alper
Materials Science Division

Decontamination and Decommissioning Plan for Building 62, Rooms 248 and 250

Effective Date: August 1, 1994

Table of Contents

1.0 PURPOSE To establish a protocol for the characterization, decontamination and decommissioning of Rooms 248 and 250 in Building 62, Lawrence Berkeley Laboratory. This plan is to define the decommissioning process to meet the unrestricted use criteria and requirements set forth in DOE Order 5400.5, 5480.11 and LBL Procedure 708.

2.0 SCOPE The provisions of this plan apply to the decontamination and decommissioning of rooms 248 and 250, located in Building 62, LBL, including all equipment and materials, and adjacent areas which may contain ancillary equipment, e.g., vacuum pumps, exhaust hose, etc.

3.0 RESPONSIBILITY

Material Science Division Project Manager is Dr. Mark Alper.

The EH&S D&D Project Manager Is Roger J. Kloepping, Radiation Assessment Group Leader.

The EH&S D&D Operations Coordinator is Glenn Garabedian.

4.0 PLAN

4.1 Preliminary Assessment

A. Initial interview of laboratory occupants for determination of radiological history in each laboratory.

B. Establish quantity and location of radioactive materials.

C. Select initial areas to begin direct and wipe surveys.

4.2 Conduct preliminary surveys to characterize the radiation environment.

4.3 Conduct contamination surveys in the room, both direct and swipe. Surveys to initially include historically identified areas, areas identified from previous survey information, and vacuum pumps.

4.4 Decontaminate any areas that are found to be contaminated in excess of DOE Order 5400.5 criteria for unrestricted use.

4.5 With the direction of Materials Science Division Staff and with Dr. Brewer's assistance, identify, characterize and assign location for transfer of all equipment, personal items, chemicals, supplies and materials.

4.6 Characterize and remove all radioactive material for disposal or storage.

4.7 Survey all items to be released from each laboratory. Tag items based on survey results.

4.8 Remove contaminated equipment for disposal, or transfer to an authorized RMMA or other licensed facility off site.

4.9 Remove and survey potentially radioactively contaminated ducting from rooms to the steel duct in the service corridor.

4.10 Conduct final radiation and contamination surveys of rooms 248 and 250.

4.11 Prepare and submit final D&D Report.

4.12 Release rooms 248 and 250 for general use.

5.0 PROPOSED SCHEDULE

5.1 Preliminary assessment: .....7/29/94 - 8/1/ 94

5.2 Visual and radiation inspection:.....8/1/94 - 8/5/94

5.3 Sample vacuum pumps.....8/5/94

5.4 Contamination/radiation surveys:.....8/5/94 -8/19/94

5.5 Process evaluation: .....8/12/94 - 8/30/94

5.6 Start survey and tag for release: 8/13/94

5.7 Characterize and transfer radioactive material:.....8/14/94 & 8/15/94

5.8 Submit status report to Material Science Division and EH&S:.....8/19/94

5.9 Prepare glove box and furnaces for shipment to HWHF:.....8/26/94 - 8/30/94

5.10 Ship glove box and any contaminated equipment for disposal:.....9/7/94

5.11 Remove and survey ducting:.....9/7/94

5.12 Decommissioning final room release surveys: 9/9/94

5.13 Final Report:.....9/15/94

6.0 SAFETY INSTRUCTIONS

6.1 All LBL and contractor staff conducting D&D work will be RW I trained or a RCT or a health physicist.

6.2 Rules for Entering Work Area

- Check hands and feet for radioactivity before entering rooms 248 and 250 during this D&D activity.
- Determine the location of the nearest safety shower and eyewash, and be familiar with its operation.
- Sign log for room entry.
- Wear dosimeter provided.

6.3 Rules for Exiting Area

- Check hands and feet for radioactivity before leaving rooms.
- Leave all tools and equipment in the rooms until they have met the release criteria in EH&S Procedure 708.

6.4 Personnel conducting surveys or decontamination must wear personal protective clothing (PPC). The type of PPC required shall be determined by the EH&S Operations Coordinator.

6.5 Primary Contractor or LBL personnel who remove ducts must wear personnel protective equipment (PPE), which may include approved respiratory protection devices.

6.6 Accidents or Spills

- Call the Fire Department at x7911. Answer their questions.
- If anyone has spilled chemicals on themselves
  - take person to nearest safety shower and eyewash.

- Continue to flush injured person until the Fire Department arrives to administer first aid.

- For radioactive spills
  - evaluate extent of contamination
  - Call the Fire Department x 7911 when there are injuries involved, personnel contamination, or the spill requires immediate additional assistance
  - Call RA x 7652 for assistance for all other small spills
  - Wear appropriate PPC and PPE for decontamination.

7.0 Process Evaluations, Visual and Radiological Inspections, Surveys, Swipes and Samples

7.1 Evaluations

- Evaluate current and past processes that may have resulted in contamination or spills involving radioactive material by talking with Dr. Brewer, his staff, and assigned EH&S staff.

- Document all germane information.

7.2 Visual Inspections

- Visually inspect the area for industrial hazards prior to work.

- Conduct visual inspection and note areas where previous spills may have occurred.

7.3 A radiological inspection will be made prior to commencement of D&D operations to ensure a safe work environment. All work areas exceeding 5 mrad/hr (50uGy/hr) will be posted in accordance with the LBL Radiation Control Manual, Table 2.4. The D&D Operations Coordinator shall be notified.

7.4 Surveys

- Direct Radiation Surveys
  - All radiation surveys will be made in accordance with appropriate sections of LBL Radiation Control Manual, Article 551 and 552.
  - All radiation surveys shall be documented in accordance with Section 9 of this Plan.
  - Final decommissioning radiation surveys will be taken on a 1 square meter grid of the accessible floor surface of each room at the surface and 1 meter off the floor. Other work areas as determined by process knowledge and good health physics practices will also be surveyed.
  - Surveys and results will be incorporated into the final report.

- Direct Contamination Surveys
  - Alpha air-proportional and thin-window beta pancake, or end-window survey instruments with current calibration will be used for contamination surveys.
  - Floors may be surveyed with alpha floor survey instrument, with current calibration.
  - Surveys will be made of areas identified in process evaluation, identified in previous survey data, and as directed by the D&D Project Manager.
  - Surveys will be conducted in accordance with appropriate sections of the LBL Radiation Control Manual, Articles 551 and 554, and EH&S Procedure 710, 1/91.
  - All contamination surveys shall be documented in accordance with Section 9 of this Plan.
  - Surveys and results will be incorporated into the final report.

- Swipe Surveys
  - Wipe surveys will be taken in accordance with established Radiation Assessment procedures including handling, chain of custody and documentation.
  - Room swipes should approximate 100 cm^2.
  - Equipment item with irregular shapes or surfaces and large area swipes shall be so identified on the swipe survey form, including an estimate of area.
  - Items that may be internally contaminated can not normally be released for unrestricted use. See sample surveys.
  - All items to be released will be swiped and tagged in accordance with EH&S Procedures 708 and 868, EH&S Procedure 710, 1/91, and meet the release criteria of DOE Order 5400.5.
  - Analysis will be in accordance with the LBL Health Department, Analytical Services Group's established methods and procedures.
  - A representative number, as recommended by the Analytical Services Group Leader of general and final survey samples shall be submitted as QA samples for third party analysis.
  - All contamination surveys and analytical results shall be documented in accordance with Section 9 of this Plan.
  - Surveys and results will be incorporated into the final report.

- Sample Surveys
  - Items which contain internally contaminated or potentially contaminated liquids, e.g., vacuum pump/oil, shall have a representative sample of the liquid taken for analysis.
  - Samples will be handled in accordance with established Radiation Assessment procedures including handling, chain of custody and documentation.

- Analysis will be in accordance with the LBL Health Department, Analytical Services Group's established methods and procedures.
- All contamination surveys and analytical results shall be documented in accordance with Section 9 of this Plan.
- Surveys and results will be incorporated into the final report.

8.0 TRANSFER OF ITEMS TO THE HWHF OR ANOTHER RMMA

8.1 Hazardous Waste Handling Facility (HWHF)

- Fill out Hazardous Waste Disposal Requisition per instructions in PUB-3092.
- Fax Hazardous Waste Disposal Requisition per instructions in PUB-3092.
- Arrange with the HWHF for pick up and transfer.

8.2 Radioactive Material Management Area (RMMA)

- All items to be transferred will be swiped and tagged in accordance with EH&S Procedures 708 and 868.
- Verify that the RMMA designated to receive radioactive material or contaminated equipment has an approved Radiation Work Authorization (RWA) for radionuclides to be transferred.
- Arrange with Radiation Assessment Field Operations for transfer.

9.0 RECORDS

9.1 Records which may be created by this Plan

- Hazardous Waste Disposal Requisition
- Smear Record Form
- EH&S Liquid/Solid Record
- Status Reports
- Injury and Illness Reports
- Release Tags
- Dosimetry Records

9.2 Records Custodian

- The Field Operations Unit Manager is the Custodian of all records created by this Plan.
- The Occupational Safety Group keeps copies of injury and illness reports.
- The Personnel Dosimetry Unit maintains all dosimetry records.

9.3 Records Care and Maintenance

- All record custodians are responsible for the care, maintenance, and disposition of these records according to LBL's records management policies and procedures, as listed in Section 1.18 of PUB-201.
- Records must be retained in an organized file system so that the records are protected and easily accessed when needed.

9.4 Records Retention

- All records created by this procedure and retained by LBL are kept in the locations above for three full years beyond the creation of the record before being transferred to the LBL Archives and Records Office.

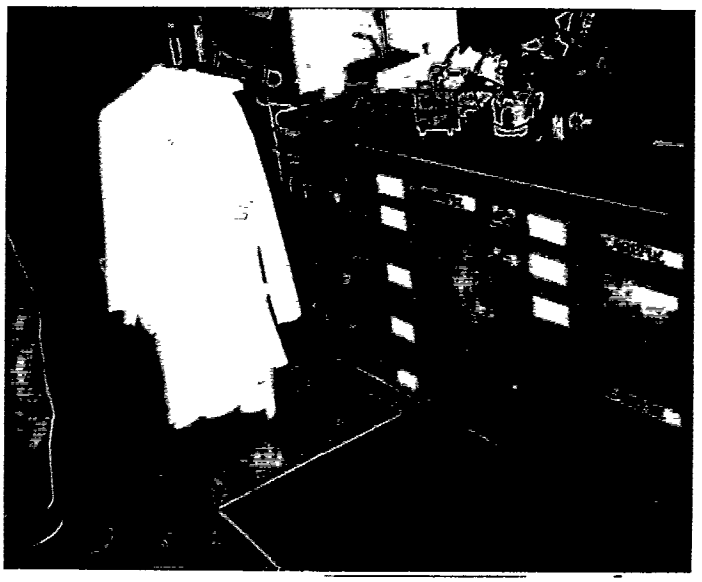
10.0 GOVERNING DOCUMENTS AND REFERENCES

10.1 Governing Documents

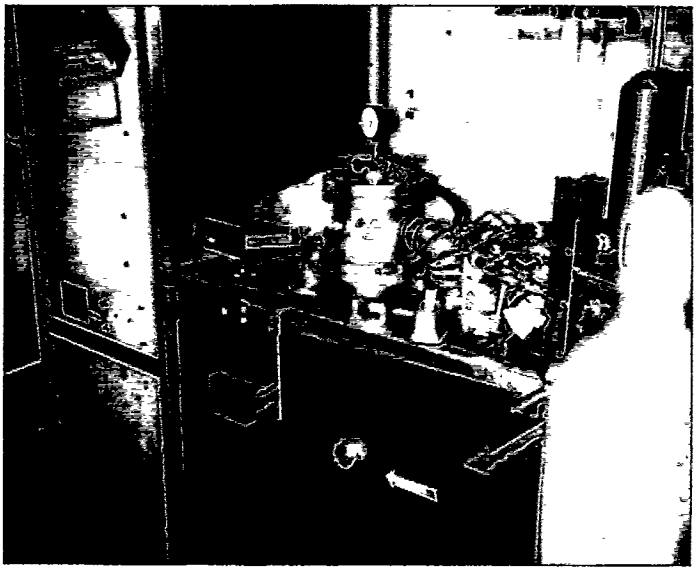
- DOE ORDER 5480.11, Radiation Protection for Occupational Workers, change 3, 12/1/92
- DOE ORDER 5400.5, Radiation Protection of the Public and the Environment, 2/8/90
- PUB-3000, the LBL Health And Safety Manual
- PUB-3113, the LBL Radiological Control Manual

10.2 References

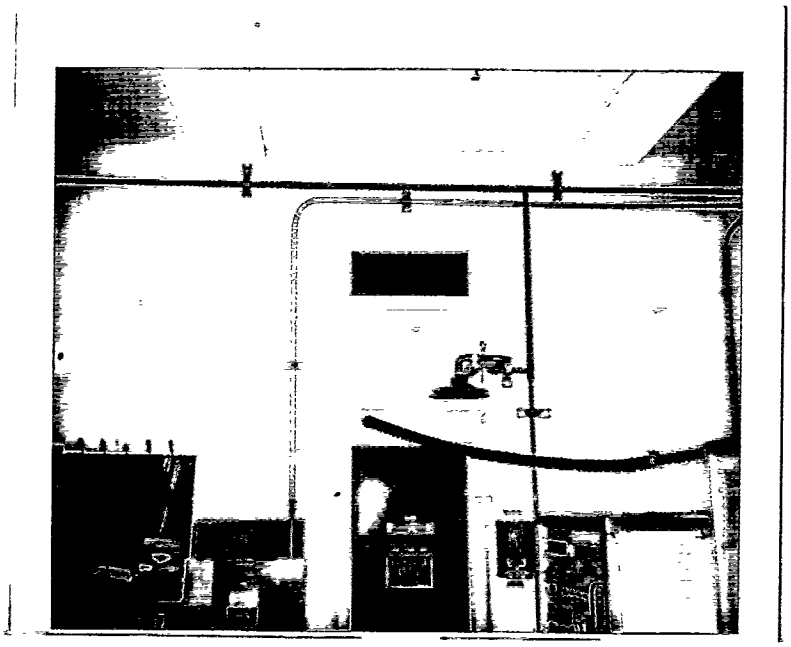
- PUB-3092
- EH&S Procedure 708
- EH&S Procedure 821
- EH&S Procedure 868



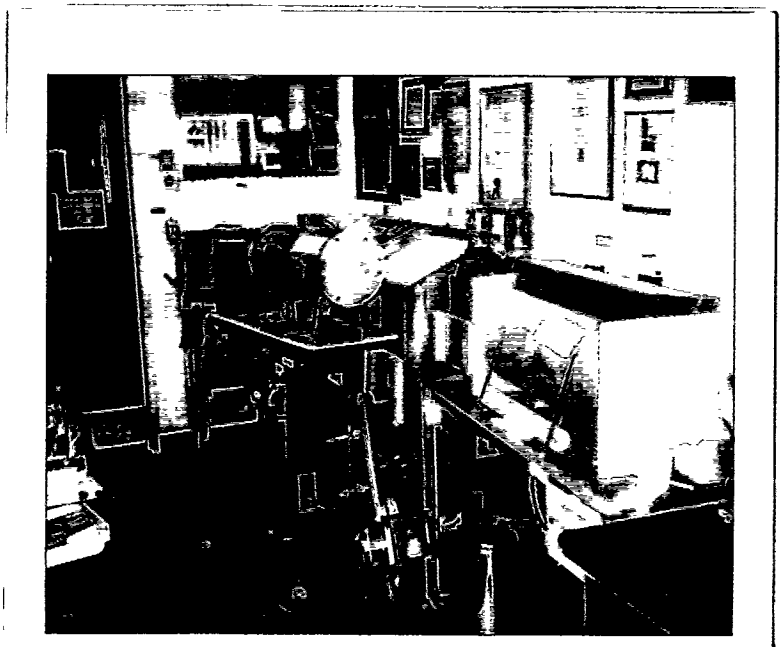
Building 62, Room 248.
Laboratory cabinet and coats.
Yellow stickers signifiy monitored areas.
East wall.



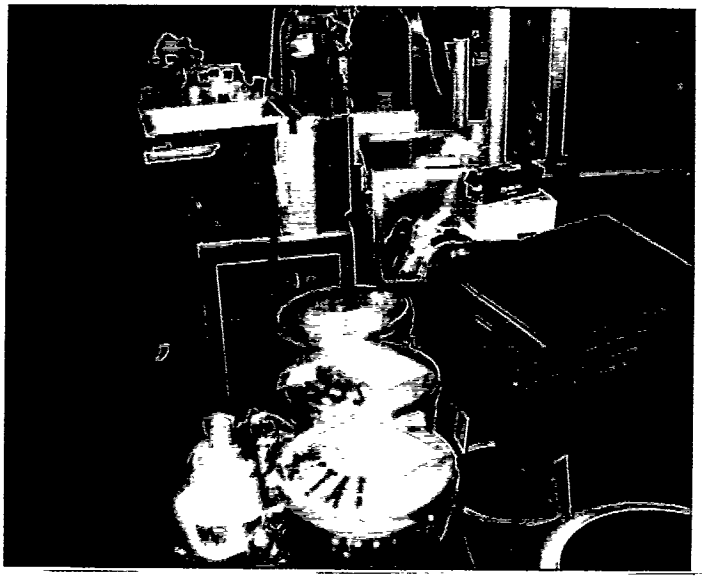
Building 62, Room 248.
Rad contaminated sintering furnace and rack.
West wall.



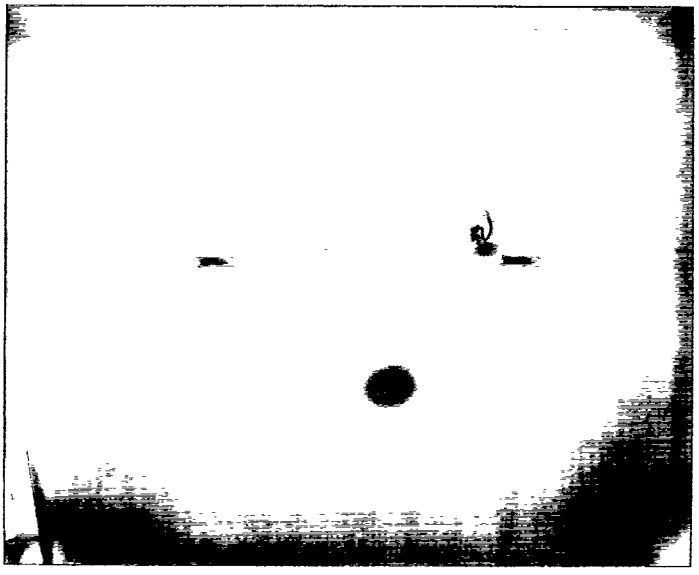
Building 62, Room 248.
Rear entrance, south wall and ceiling.
Yellow stickers signify monitored areas.



Building 62, Room 248.
Brewer High Vac and sintering furnaces. Chem cabinets at rear.
Yellow stickers signify monitored areas.
North-east corner.

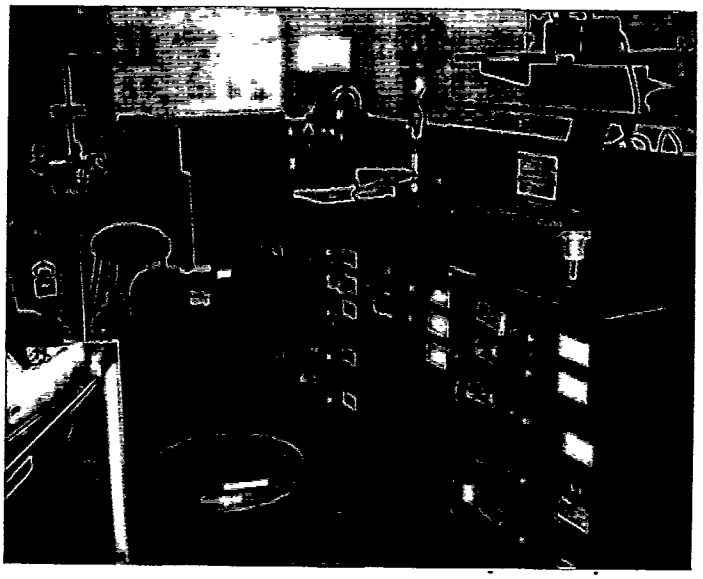


Building 62, Room 248.
Laboratory equipment, waste cans, and gas cylinders.
Yellow stickers signify monitored areas.
NOTE: Yellow stickers on floor.

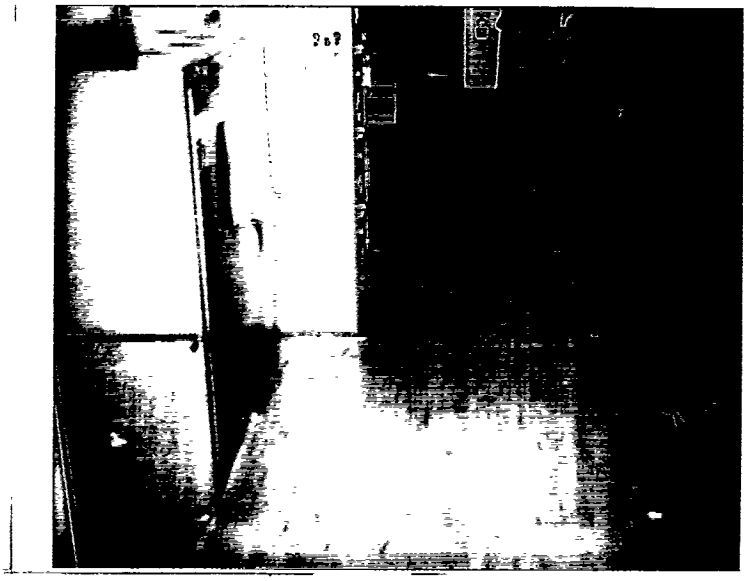


Building 62, Room 248.
Ceiling heat detector and sprinkler.
Yellow stickers signify monitored areas.

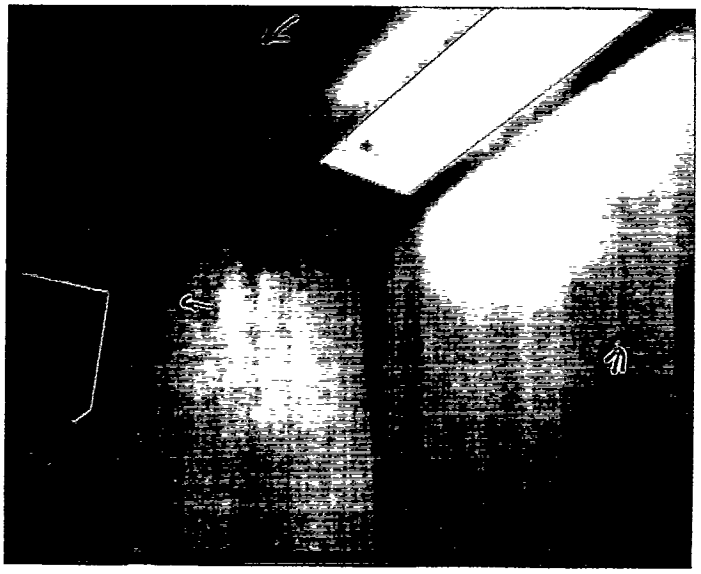
Building 62, Room 250.
Cabinets, stool, and rear door.
White stickers signify monitored areas.
South-east corner.



Building 62, Room 250.
Laboratory bench, stools, and chair.
White stickers signify monitored areas.



Building 62, Room 250.
Floor and flammable cabinet.
White stickers signify monitored areas.



Building 62, Room 250.
Ceiling and walls.
White stickers (beside arrows) signify monitored areas.

Building 62, Room 250.
Safe, flammable cabinet, and file cabinets.
White stickers signify monitored areas.
North-east corner.

Attachments (continued)

Attachment D Permits (on the following pages)

Radiological Work Permit No. 94-011 (on the following pages)
UCB Campus RUA No. 4731
UCB Campus RUA No. 7271

Continued on next page.

LBL	RADIOLOGICAL WORK PERMIT RWP# 94-011	Date: 9/23/94 Page 1 of 2

This form **must** be completed and approved prior to performing work in any area where **radiological concerns** exist. Call extension 7609 for assistance.

Locations	*62-248 & 250*	**Issued**	*9/22/94*	**Expires**	*1/2/95*

Job Description	*Decontaminate and decommission 248 and 250 to release for non-rad use.*		
Project Manager	*Roger Kloepping*	**Phone**	*7608*
Work Leader	*Jim Haley*	**Phone**	*7620*

Radiological Conditions:	*62-248 is a "Controlled Area" with a history of work with radioactive isotopes. The equipment has internal contamination with isotopes of thorium and possibly transuranics. Select pieces of equipment will be relocated to another area authorized for radioactive material. The balance will have to be decontaminated or go to HWHF for disposal.* *62-250 is a RMMA also with a history of work with radioactive isotopes. The glove box needs to be decontaminated and sent to HWHF for disposal. There is approximately 10 lbs of thorium and thoria in the safe.*
Other Conditions	*There is a substantial inventory of chemicals, some hazardous.*

PPE	*Labcoats/coveralls and gloves are required. Respiratory protection will be worn as directed by the project manager or work leader.*
EH&S coverage	*Work shall be conducted by EH&S, Rad Worker I trained personnel. Any other personnel requested to participate shall do so under the constant escort of an authorized EH&S person.*
Stay time restrictions	*None*
Surveys	*Surveys of personnel and work area shall be conducted before, during and after each work period in 248 and 250. Hand and foot surveys are required before leaving the rooms. Daily meter checks of the room air sampler are required.*
Instrumentation	• *Air proportional alpha meters* • *Ludlum Model 3 with 44-9 detector* • *Ludlum Model 16 with 44-2 NaI detector* • *Floor Monitor*
Air sampling	*Work area air sampling is required*
Equipment release	*Release of items shall be in accordance with EH&S Procedures 708 and 868.*
Pre-job briefing	*A pre-job briefing is required with the Team members and Team supervisor. Briefings shall be scheduled at the discretion of the project manager, team supervisor, or work leader.*

LBL	RADIOLOGICAL WORK PERMIT RWP# 94-011	Date: 9/23/94 Page 2 of 2

Dosimetry *Whole body TLD for beta-gamma and pocket dosimeters are required for team members.*

Bioassay *Submit urine bioassays to establish baseline and again at the completion of the project. In the event of a spill or an airborne release, additional bioassays may be required.*

Training *Rad Worker I required*

Comments:

All work performed will be in accordance with the rules and regulations of LBL, DOE, Radiation Control Manual, the Official Decontamination and Decommissioning Plan for Building 62, Rooms 248 and 250, and the terms set forth in this Radiological Work Permit.

Transportation of any hazardous material must be cleared through EH&S Transportation Group.

The LBL Industrial Hygiene Group must be contacted before handling any hazardous chemicals.

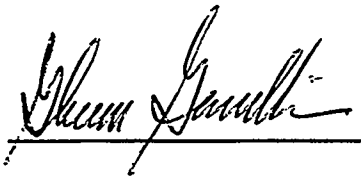
All work must be recorded in a logbook and maintained daily. All equipment and material removed from 248 and 250 must be inventoried and tracked.

If a "spill" occurs, work will stop immediately and the team supervisor and project manager must be notified. For emergencies, call 7911.

Authorized Personnel:

Only workers listed below are authorized for unescorted entry into 62-248 & 250

Name	Employee No./Affiliation		Training	Exp. Date
Greg Buck	295901	EH&S	Rad Worker I	January 1996
Jim Haley	351100	EH&S	Rad Worker I	September 1995
Don Gregerson	337100	EH&S	Rad Worker I	September 1995
Steve Sohner	739001	EH&S	Rad Worker I	May 1995
Doug Ryan	283401	EH&S	Rad Worker I	May 1995
Roger Kloepping	235401	EH&S	CHP	May 1997
Glenn Garabedian	302100	EH&S	Rad Worker I	March 1996

EH&S Project Coordinator  **Date** 9/22/94

University of California at Berkeley — **Radiation Use Authorization**

Number: 4732 HGV: 3176603 Class: III Expiration: December 31, 1995

New [ ] Renewal [X] Amendment Number [1] Revision Number [ ] Quarterly

Authorized User: **Olander, Dr. Donald R.** Department: **Nuclear Engineering**

Location: Etcheverry Hall: 1110B, 1107, 1140, 4164 ,4152

Lab Contact: Chaoyang Li Telephone: 642-7055

Personnel: Dr. D. Olander, Mehrdad Mansouri, Mehran Moalem, Wei-E Wang, Yeon Soo Kim, Chaoyang Li (2-7158),Dr. Leo Brewer, kRawmlu Bet-Yonan

* Indicates personnel who are specifically required to use dosimetry.

Radioisotope Limits

Isotope	Chemical Form(s)	Physical Form	mCi/ Expt.	mCi/ Vial	mCi/Possession	mCi/Year
U-238	uranium oxides (natural, depleted, or enriched up to 5%)	solid	0.005 (15 g)	0.005 (15 g)	1.665 (5000 g)	1.665 (5000 g)
U-238	UO-2 fuel pellets - natural or depleted (contain mixed fission prods when irradiated)	solid	0.2 (0.94gm)	0.5 (2.43gm)	2 (94.3gm)	4 (94.3gm)
Cm-244	CmO2	solid	10	10	10	10
Unat	U salts	solid	0.001	0.001	0.001	0.001
U-235	uranium oxides (enriched up to 45%)	solid	0.1	0.1	0.056	0.1
Th-232	Thoria (ThO2)	solid	0.0005	0.0003	0.006	0.006

Experiment Description

Heat uranium compounds in vacuum and gas flow systems to induce physical changes (vaporization, grain growth) and chemical reactions with water, tungsten, etc. Cut and polish samples using metallurgical equipment in room 1110B. Examine samples.
Chemical reactions of uranium compounds outside closed systems are not authorized on this RUA.
Alpha radiolysis of a steam in a closed system.
Heat thoria in vacuum or gas flow systems to investigate intermetallic oxides.

Precautions Required

The following protection items are required: Lab Coat, Disposable Gloves, Eye Protection Equipment, and if marked, the following:

TLD Ring ___ Body Badge ___ Thyroid Scan ___ Urinalysis ___ G-M Meter X Scint. Probe ___

1. Please comply with the applicable provisions of the University of California at Berkeley Radiation Safety Manual.
2. All radiation users must submit to ORS a properly completed Radiation User Information Record prior to any radiation work.
3. Mouth pipetting of radioactive solutions is specifically forbidden.
4. Eating, drinking, or smoking is forbidden in the immediate area of radioisotope work.
5. All areas and equipment used for radioactive work shall be properly labeled and shielded.
6. Radioactive work areas shall be delineated and lined with absorbent paper having an impervious backing.
7. A current, written inventory of radioactive materials shall be maintained; totals shall reflect any half-life decays.
8. Radioactive wastes shall be disposed according to Sec. 3.7 UC Radiation Safety Manual.
9. Notify ORS of changes in personnel list, work location, or transfer of radioisotope out of the authorized location.
10. Notify ORS in event of any spill or suspected area contamination. Materials for spill clean-up shall be available (decontamination solution, extra bench covers, wipes, buckets, etc.). Lab personnel shall be available for decontamination under ORS supervision.
11. Radiomaterials, with the exception of full LSC vials, transported in liquid form through hallways and other public areas shall be enclosed in leak-proof unbreakable containers.
12. Bi-monthly meter and swipe surveys, prior to the transfer of the alfa radiolysis equipment, or after a thoria heating experiment are to be conducted and documented, noting any corrective action taken.
13. All radioactive material shall be stored in a marked and locked cabinet; no RAM shall be left unattended.
14. Uranium containing mixed fission products must be vented through a charcoal trap and into a fume hood duct.
15. The Cm-244 foils are to be stored in a shielded container in a fume hood prior to mounting in the reaction chamber.
16. The alpha radiolysis shall be conducted in a closed system in a fume hood.

Certification

All work will be performed with the precautions specified.	*Radiation use is approved with the required precautions.*
Signed RUA on file at ORS	Signed RUA on file at ORS
Authorized User — Date: Signed RUA on file at ORS	Radiation Safety Officer — Date: Signed RUA on file at ORS
Department Chairperson — Date	Radiation Safety Committee — Date

Radioactive Use Authorization

Number: [redacted] HGW: 304 Class: I Expiration: April 30, 1996

New: X Renewal: Amendment Number: Revision Number: 1 Semi-Annual

Authorized User: Brewer, Dr. Leo Department: Chemistry

Location: Lewis Hall, Rm. 19

Lab Contact: Dr. Leo Brewer Telephone:643-5555

Personnel: Dr. Leo Brewer, Darleane Hoffman

* Indicates personnel who are specifically required to use dosimetry.

Radioisotope Limits

Isotope	Chemical Form(s)	Physical Form	mCi/ Expt.	mCi/Vial	mCi/Possession	mCi/Year
Th-232	ThO2 sulfides, oxides, nitrates, yttria	solid	0.3	0.3	0.3	0.3
U-238	sulfide	solid	0.004	0.004	0.004	0.004

Experimental Description

This is a storage only RUA for the radioactive materials in the RUA inventory.

Precautions Required

The following protection items are required: Lab Coat, Disposable Gloves, Eye Protection Equipment, and if marked, the following:

TLD Ring ___ Body Badge ___ Thyroid Scan ___ Urinalysis ___ G-M Meter ___ Scint. Probe ___

1. Please comply with the applicable provisions of the University of California at Berkeley Radiation Safety Manual.
2. All radiation users must submit to ORS a properly completed Radiation User Information Record prior to any radiation work.
3. All areas and equipment used for radioactive work shall be properly labeled and shielded.
4. A current, written inventory of radioactive materials shall be maintained; totals shall reflect any half-life decays.
5. Radioactive wastes shall be disposed according to Sec. 3.7 UC Radiation Safety Manual.
6. Notify ORS of changes in personnel list, work location, or transfer of radioisotopes out of the authorized location.
7. Notify ORS in event of any spill or suspected area contamination. Materials for spill clean-up shall be available (decontamination solution, extra bench covers, wipes, buckets, etc.). Lab personnel shall be available for decontamination under ORS supervision.
8. Radiomaterials, with the exception of full LSC vials, transported in liquid form through hallways and other public areas shall be enclosed in leak-proof unbreakable containers.
9. All radioactive materials shall be stored in a marked and locked cabinet, no RAM shall be left unattended.

Certification

All work will be performed with the precautions specified.
Signed RUA on file at ORS

Authorized User — Date
Signed RUA on file at ORS

Department Chairperson — Date

Radiation use is approved with the required precautions.
Signed RUA on file at ORS

Radiation Safety Officer — Date
Signed RUA on file at ORS

Radiation Safety Committee — Date

Attachments (continued)

Attachment E Memo: Storage safe for radioactive inventory (on the following pages)

Continued on next page.

University of California
Department of Chemistry
#19 Lewis Hall/MC: 1460
Telephone: 510-643-5555
Telefax: 510-642-8369
e-mail:brewer@cchem.berkeley.edu

Hand-delivered/Thursday, 17 August 1995/3:00 p.m.

17 August 1995

TO: Dr. Radoslav Radev — University of California@Berkeley
Office of Radiation Safety
University Hall/3rd Floor

FROM: Leo Brewer

SUBJECT: Radioactive Chemical Safe Inventory/Key

I have included with this memorandum the radioactive chemical inventory completed on Wednesday, 16 August 1995/noon, which is signed by the personnel involved with this inventory for UCB/RUA#7271.

I wish to thank-you for facilitating the transfer from Lawrence Berkeley Laboratory, Environmental Health & Safety Division, Radiation Assessment our radioactive safe, and for overseeing our inventory conducted on Wednesday, 16 August 1995. We greatly appreciate your generous allotment of time for this purpose, and the professional demeanor that you exhibit. We especially appreciate the fact that you expedited the swipe reports taken post-inventory. It was reassuring to know at 5:00 p.m. on Wednesday, 16 August 1995 that no contamination resulted from the transfer and/or inventory of this radioactive-related materials safe.

Please feel free to contact me if you have any questions.

LB
Enclosure
cc: (1) John C. Layton
Inspector General
Department of Energy
1000 Independence Avenue, SW
Washington, D.C. 20515

(2) Ronald V. Dellums
Congressman
2109 Rayburn Building
Washington, D.C. 20585

(3) Glenn Garabedian, Operations Head
Environmental Health & Safety Division
Radiation Assessment
Lawrence Berkeley Laboratory
#1 Cyclotron Road: MS:71-259
Berkeley CA 94720

(4) Dr. Darleane Hoffman
Lawrence Berkeley Laboratory
#1 Cyclotron Road
Nuclear Chemistry Division
Berkeley CA 94720

Radioactive Chemical Inventory
Leo Brewer Research Group/University of California@Berkeley

16 August 1995

Legend: (1) Control Identification Number is equivalent to one compound entry. I.D.#:
TO# is thorium oxide TS# is thorium sulfide T# is thorium
TNO is thorium nitrate TOX is thorium oxylate US is uranium sulfide
YT# is yttria-doped thoria LT is lantha-doped thoria
(2) October 1993 column is inventory measured in grams conducted October 1993 @ Lawrence Berkeley Laboratory/Materials Sciences Division/Building62/Laboratory 250
(3) August 1995 column is inventory measured in grams conducted 16 August 1995 @ University of California@Berkeley/College of Chemistry/#19Lewis Hall
(4) activity column is calculated from the weights and specific activity from the Health Physics Handbook (1992).

Substance (name)	October 1993 (grams)	August 1995 (grams)	Control I.D.# (see legend)	Activity (microCuries)
thoria (glovebox)	005	4.46	TO3	0.44
thorium sulfide (powder)	640	did not weigh	TS1	61.88
thorium sulfide (powder)	102	did not weigh	TS2	9.96
thorium sulfide (powder)	120	did not weigh	TS3	11.6
thorium sulfide (crucibles)	810	#1 Crucible: 53.45	TS4	5.17
		#2 Crucibles: 486.00		46.99
		#3 Crucibles: 255.77		24.73
uranium sulfide (powder)	011	did not weigh	US	2.86
thoria (crucibles,x2),each10gm)	020	#1: 12.55	TO5	1.23
		#2: 10.39		1.02
thorium (powder)	025	did not weigh	T1	2.75
thorium (wire)	005	did not weigh	T2	0.55
		(T1&T2 are both stored in lead box)		
thorium oxide (powder;134gm in glass vial)	082.9	134.5	TO7	13.18
thorium nitrate (powder)	125	did not weigh	TNO	0.003
thorium oxylate (powder)	001	did not weigh	TOX	0.1
thorium nitride (powder)	010	did not weigh	TON	9.25

Substance (name)	October 1993 (grams)	August 1995 (grams)	Control I.D.# (see legend)	Activity (microCuries)
thorium yttrium oxylate (powder;3jars)	075	Jar#1: 32.72	YTOX	1.74
		Jar#2: 16.08		0.85
		Jar#3: 5.62		0.3
thorium oxide-yttrium oxide (solid;2 tubes,each 25 gm)	050	2-1: 37.69	YT1	2.95
		2-2: 38.14		2.99
yttria-doped thoria & lanthana-doped (solid;x7,each1gm)	008	x: 3.81	YT3	0.3
		96: 2.4		0.19
		6: 1.07		0.08
		23: 1.08		0.08
		35: 4.08		0.32
		32: 1.1		0.09
		574D(Lanthana): 2.64		0.21
yttria-doped thoria/S.Leonard(11-09-88) (solid;x5,each3gm)	012	#1: 3.91	YT4	0.31
		#2: 3.15		0.25
		#3: 1.99		0.16
		#5: 4.41		0.35
		#6: 3.78		0.30
yttria-doped thoria & lanthana-doped (solid;x17,each 3gm)	051	#574F: 3.3	YT5	0.27
		#574C(Lanthana): 2.81		0.23
		#106C(x3): 9.79(total weight)		0.82
		#75: 2.42		0.2
		#286C: 3.36		0.28
		#313A: 3.58		0.30
		#286B: 3.5		0.29
		#188A: 3.24		0.27
		#528C: 3.92		0.33
		#313B(x2): 6.09(total weight)		0.51
		#313C: 3.18		0.26

cont'd.

Radioactive Chemical Inventory
Leo Brewer Research Group

16 August 1995

Substance (name)	October 1993 (grams)	August 1995 (grams)	Control I.D.# (see legend)	Activity (microCuries)
yttria-doped thoria & lanthan-doped (solid;x17,each 3gm)	051 cont'd.:			
		#286A: 2.99		0.25
		#528A: 3.98		0.33
		#528D: 3.42		0.28
		#528B: 3.49		0.29
		x1: 2.17		0.18
		x2: 3.54		0.29
yttria-doped thoria (solid; Reddy)	003	3.41	YT6	0.27
yttria-doped thoria (solid;Krushwitz,x2,each3gm)	009	#1: 4.17	YT7	0.33
		#3: 3.7		0.29
Modifications to October 1993 LBL Inventory:				
(1) thoria(ThO2)/separate box, not in safe		143.44	TO8	14.06
(2) thoria (ThO2)/three crucibles	---	#1(with lid): 48.14	TO9	4.74
		#2: 96.4		9.45
		#3: 31.58		3.09
(3) thoria (ThO2)/powder(coarse)	---	27.73	TO10	2.72

Radioactive Inventory conducted to determine total 243.52 microCuries on Wednesday, 16 August 1995/9:00 a.m. @UCB/College of Chemistry/#19 Lewis Hall by:
N.B.#1: Thorium Sulfide (Control I.D.#s TS1, TS2, & TS3) was not weighed this date.
N.B.#2: All other entries not weighed were in original, sealed containers. Seals unbroken.
N.B.#3: Denver Balance:Instrument Serial#:11727/UC85-10-00608/calibrated with 500 gm weight.

Leo Brewer
Leo BREWER
Principal Investigator
END- Aug. 17, 1995

R.R
Radoslav RADEV
UCB/Office of Radiation
present during inventory

Karen Krushwitz
Karen KRUSHWITZ
Researcher
17 Aug 95

Hui-Fen Wu 8/18/95
Hui-Fen WU
Researcher

Attachments (continued)

Attachment F Release Correspondence (on the following pages)

LAWRENCE BERKELEY LABORATORY
Bldg.: B71 Room: 229 Ext: 7608

February 27, 1995

RA-95-68

MEMORANDUM

TO: **Mark Alper**

FROM: **Roger Kloepping & Glenn Garabedian**

SUBJECT: **Release of Room's 248 and 250, Bldg. 62 For Unrestricted Use**

The decommissioning and decontamination process of rooms 248 and 250 in building 62 has been concluded. The radioactive materials and radioactive contamination have been removed. Based on our evaluation of all of the swipe results, air sampling data, and direct surveys, the rooms are no longer Controlled Areas and can be released for unrestricted use. However, Radiation Assessment must be consulted before any major remodeling or plumbing removal is conducted in either of these rooms. The final report is in preparation. It will be completed and submitted to Material Science Division by March 10, 1995.

If you have any questions concerning the radiological status of rooms 248 and 250, please contact Glenn Garabedian or Roger Kloepping at ext. 7609 or 7608.

c. J. Bartley
J Floyd
D. McGraw
R. Ellis
K. Rivera

Post-it™ brand fax transmittal memo 7671 | # of pages ▸ 1

To Gavin Labiollad	From Susan Waters
Co: Glenn Garabedian	Co.
Dept.	Phone #
Fax #	Fax #

To: Susan Waters

Materials Science Division Administrator

Lawrence Berkeley Laboratory

Dear Ms. Waters

Professor D.R. Olander is accepting all supplies and equipments from Professor Leo Brewer that is currently in building 62. The materials and equipment will be used for research for Materials Sciences Division of Lawrence Berkeley Laboratory here in building 24. If you have any questions, you may call Professor Olander at (510)642-7055 or Dr. Moalem at (510)642-7158.

Dr. M. Moalem

Melkan Moalem

4164 Etcheverry Hall-Building 24

Of D R Olander

MEMORANDUM

TO: Glenn Garabedian, LBL, EH&S

FROM: Michael Yurich, Office of Radiation Safety (ORS) my

DATE: 3/24/95

RE: Approval of Shipment of Furnaces From LBL to UCB

Today, I received a call from Karen Krushwitz, from the Dr. Leo Brewer lab, requesting that ORS give its approval for shipment of two furnaces from LBL's Material and Sciences Building #62 to Etcheverry Hall. One of the furnaces has residual Th-232 contamination reading approximately five times background. The two furnaces will be stored in a caged area in Etcheverry Hall, Rm. 1140. Karen told me that the Olander lab staff are prepared to receive the furnaces for storage under their RUA. Approval has also been given for storage of the furnaces by Dr. Ed Morse, who manages the cage area in Rm. 1140.

In light of the required approvals from Etcheverry Hall, ORS approves the shipment of the two furnaces (for storage only) from LBL to the caged area in Etcheverry Hall, Rm. 1140.

Please call me at extension 3-7970 if you require any additional information. Thank you.

cc: Paul Lavely, RSO
Dr. Leo Brewer
Karen Krushwitz
Dr. Olander RUA File # 4731
ORS Chronological File

Materials Sciences Division
Lawrence Berkeley Laboratory
Mailstop 66 Extension 4895 FAX 7768

March 29, 1995

TO: Leo Brewer
University of California@Berkeley
Department of Chemistry: MC:1460

FROM: Russ Ellis, Building Manager/building 62

SUBJECT: Laboratory Goods Removal

This acknowledges receipt of your memo dated 29 March 1995. All your laboratory goods have been removed.

cc: Glenn Garabedian, LBL/EH&S/RadAssess/Operations Director
R. Dellums
J. Layton
D. Chemla

From: robillag@ccmail2.lbl.gov (8/3/95)
To: Leo Brewer
CC: SLWaters@lbl.gov, GFGarabedian@lbl.gov
BCC:
Priority: Normal Date sent: 8/3/95 10:27 AM

Mail*Link® SMTP Safe

Received: by ehssmtp.lbl.gov with SMTP;3 Aug 1995 10:23:05 U
Received: from lbl.gov (lbl.gov [128.3.254.23]) by ehssun.lbl.gov (8.6.12/G) with SMTP id KAA24652 for <glenn_garabedian@ehssun.lbl.gov>; Thu, 3 Aug 1995 10:20:40 -0700
From: robillag@ccmail2.lbl.gov
Received: from ccmail2.lbl.gov by lbl.gov (4.1/1.39)
id AA07044; Thu, 3 Aug 95 10:21:24 PDT
Received: from ccMail by ccmail2.lbl.gov (SMTPLINK V2.10.03)
id AA807470347; Thu, 03 Aug 95 10:23:48 PST
Date: Thu, 03 Aug 95 10:23:48 PST
Message-Id: <9507038074.AA807470347@ccmail2.lbl.gov>
To: Leo Brewer <Brewer@cchem.berkeley.edu>
Cc: SLWaters@lbl.gov, GFGarabedian@lbl.gov
Subject: Safe

Dr. Brewer,
I have received authority from DOE-OAK for you to accept the safe. As you acquire it you and UCB become responsible for all liability. My understanding is that you have already processed the necessary paperwork through the University to take care of the future control and documentation of this item. If not please advise. Tks.
Gavin

Notification of Shipment

Unclassified Transmittal

Date: 8/16/95 Shipping Document No: 4080

From: Lawrence Berkeley Laboratory
Attn: EH&S Transportation
1 Cyclotron Rd. Bldg. 75, Rm 113
Berkeley, CA 94720
Phone No. 510-486-5251 FAX No. 510-486-4877

Subject: Verification of Receipt and Notification...
per U.S. Department of Energy (DOE) Order 5480.3,
Subpart G, Paragraph 4

NOTE: Upon receipt of material, please FAX notification 510-486-4877.

Receipt Date: 8/16/95

Receipt Verified By: Les Brewer

Lawrence Berkeley Laboratory
University of California Berkeley, California 94720
(510) 486-4000 • FTS

October 5, 1995
PM 96-06

University of California
Department of Chemistry
College of Chemistry
Berkeley, CA 94720
Attn.: Dr. Leo Brewer

Subject: Transfer of Property

Dr. Leo Brewer,

Please be advised that the safe and furnace have been processed under separate documentation, but per your request this memo confirms their current status. The safe, previously owned by the Department of Energy (DOE), under Lawrence Berkeley National Laboratory's (LBNL) control, has been officially transferred to the University of California, Berkeley Campus (UCB). Ms. Mary Laverty is the Equipment Manager for the campus and has agreed to this transfer. The radioactive material contained with-in the safe is your personal property and UCB has accepted responsibility for the control and monitoring of this radioactive material.

The furnace that is being donated has been approved by LBNL's Donation Coordinator, Monte Clevenger, and is waiting for shipment. The donation followed LBNL's established procedures approved by DOE-OAK for donation to an educational institution.

The Galvanic Cell you refer to is a new issue and it is not transferred at this time. A request to your Division office must be made for the transfer and documentation prepared to justify the potential donation. In order to expedite this process please advise me of the exact location of the cell and who the current user is of it, plus the DOE Property Number.

If you should have any questions or comments please call me at (510) 486-4184. Thank you.

c: M. Clevenger
G. Garabedian
IG-OAK
M. Laverty
R. Radev
S. Waters

Sincerely,

Gavin M. Robillard

University of California at Berkeley

RADIATION SAFETY ACTIVITY SURVEY REPORT

Office of Radiation Safety

DATE: **11/17/95**
RE: **Survey of Room D34 of Hildebrand Hall**

NOTE: All dose rate survey measurements made with Ludlum Model 16S survey meter (S# 40779), and a Ludlum 44-9 GM pancake probe (S# PR046803). Wipe surveys counted on a Packard 1900 CA LSC.

NOTE: All items were discussed with Prof. Leo Brewer and Karin Krushwitz.

At the request of Prof. Leo Brewer, I performed a radiation safety survey of Room D34 of Hildebrand Hall. The survey was performed on 11/17/95 after radioactive-contaminated chemicals were removed from D34 Hildebrand earlier that day. The GM meter and swipe survey revealed no fixed or removable contamination in Room D34, i.e. Room D34 is clean from radioactive contamination.

A set of approximately 150 chemicals contained in glass bottles with screw tops were stored in cardboard boxes temporarily in D34 Hildebrand. The chemicals were LBNL's property (LBNL bar coded). These chemicals were part of Prof. Leo Brewer's lab that was transferred from LBNL to UCB.

LBNL's survey of the chemicals (see attached fax of 10/19/95) indicated that some of the chemicals were contaminated (three to four times the background). James Hayes and Donald Gregorssen of LBNL's Radiation Assessment Group performed on 9/28/95 a GM meter and swipe survey of Room D34 of Hildebrand Hall. Their survey of the sink, the fume hood, the staging area, the floor, and the garbage can found no radioactive contamination.

On 11/17/95 all the radioactive-contaminated chemicals (11 out of 150) were removed and transported to LBNL by James Hayes of LBNL's Radiation Assessment Group.

Performed By: _____ 11/20/95 Reviewed By: _____ 11/20/95
Radoslav Radev Date Radiation Safety Reviewer Date
Radiation Safety (642-6167)

cc: Prof. Leo Brewer, Department of Chemistry

Lawrence Berkeley Laboratory
University of California Berkeley, California 94720

(510) 486-4000 • FTS

April 17, 1996

Dr. Leo Brewer
University of California
College of Chemistry
Berkeley, CA 94720

Re:		
	Description:	Galvanic Cell
	Model Number:	Contractor Fabricated
	Serial Number:	797179
	Manufacture Date:	December 1994
	EPRI Property Tag	25134

Dr. Brewer,
The Lawrence Berkeley Laboratory and the Department of Energy are relinquishing all title, control, and responsibility for the Galvanic Cell. The Galvanic Cell used in building 62, room 250 had the following identification numbers:

(1) Instrument Identification #02175 Lawrence Berkeley Laboratory

(2) AEC-LRL #171585

(3) Inorganic Materials Division #02475

(4) LBL-DOE US Govt. Property #6240849

(5) DOE/LBL #517101

(6) AEC-LRL #39794(5)

All of the old DOE/LBL.ID numbers have been removed as per my instructions and the LBL Property Management organization is in possession of the necessary supporting documents.

c: S Crawford UCB
G. Garbedian
K. Rivera BSO
R. Edwards
R. Haddock DOE-OAK
S. Waters
K. Woodruff

Sincerely,

Gavin M. Robillard