Due to the continued occupation of Building 5, the interior of the air handling units could not be safely accessed at the time of the RLC and therefore were not further characterized.

5.2.2.5 Attic Samples for Lead and Mercury

According to the 2010 Weiss RLCR, total lead concentrations significantly exceeded 10 times the STLC in samples of sediment collected from the attic floors in Building 5. Total mercury concentrations in attic sediment were slightly below 10 times the STLC. As stated in the 2010 Weiss RLCR, a mercury vacuum line, considered to be contaminated and included in the hazardous materials estimate for demolition purposes, is located on the west side within the south attic of Building 5 (Figure 6-2 in the 2010 Weiss RLCR). The concentration of mercury in a wood sample collected under the joints of a mercury vacuum line in the south attic was relatively low (0.32 mg/kg) and did not suggest significant mercury contamination.

Two wood samples from the Building 5 attics, one of which was collected near the mercury vacuum line, were evaluated for CAM 17 metals to confirm the lack of mercury contamination. Neither sample exceeded regulatory thresholds for mercury or other metals for hazardous waste classification (one sample contained 0.2 mg/kg of mercury and the other did not contain mercury above the detection limit of 0.05 mg/kg) with the exception of total lead exceeding 10 times the STLC. A WET was not performed on the sample due to insufficient volume.

5.2.2.6 Supplemental Characterization, Rooms 112, 105, 105A, 116A, & Sumps near 150A

As noted above, ~~T~~the previous 2010 RLC detected elevated concentrations of lead in wipe samples in two air-handling vents in rooms adjacent to Room 116A ~~(457 µg/100 cm^2 and 134 µg/100 cm^2)~~. Additionally, concentrations of mercury in wipe samples collected on the shelving of equipment number 30 in Room 105 ranged from non-detectable to 0.65 µg/100 cm^2.

During this RLC, wipe samples were collected per recommendations reported in the 2010 Weiss RLCR from beneath the laboratory sink and bench in Room 112, the shelving in Rooms 105, on the footprint of the cages in Room 150A, on the sheet metal lining in Room 116A, and at the air vent intake in Rooms 100 and 102 (on equipment E17). Wipe samples were analyzed for lead and mercury. Lead was found in all wipe samples collected from building floors, vents, and ledges ranging from 2.35 to 18 µg/100 cm^2 with the exception of the sample collected beneath the sink in Room 112 which had a concentration of 420 µg/100 cm^2.

Additionally, the two circular steel-lined secondary-containment pits located outside of Room 150 and the associate rectangular vault were visually inspected based on photographs taken of

8.0 SUMMARY AND RECOMMENDATIONS

The data collected and analyzed for this RLC met the requirements of the project RLC Work Plan, QAPP, and SAP. A summary and recommendations regarding materials handling and disposal during future demolition are presented below.

Materials hidden within walls, behind structures, in vertical shafts or in areas that made them not readily available for inspection or sampling were not characterized as part of this RLC. If future work uncovers any such materials, the materials should be characterized.

8.1 Chemical Constituents

Recommendations for additional characterization of materials in Building 5 for chemical constituents, per the 2010 RLCR, were completed as part of this RLC. The additional characterization indicated the following:

- The concrete floor slab contains total chromium at concentrations ranging from 67 to 77 mg/kg. These concentrations are likely indicative of the concrete content rather than a contaminant source derived from historic building activity. Though the measured levels are slightly above 10 times the STLC threshold (5 mg/L), it is unlikely that the concrete would fail the WET for total chromium. The result of a WET for hexavalent chromium was well below the hazardous waste threshold~~. Therefore, the concrete from Building 5 may be recycled~~;
- Sediment from the two circular steel-lined secondary containment pits located outside of Room 150A showed chromium and lead concentrations slightly above the 10 times STLC thresholds, but well below TTLC thresholds. The soluble chromium and lead content, as measured using the WET, were below their respective STLCs. If disposed of as an independent waste stream, it can be classified as a non-hazardous waste. Only a small quantity of the material is present in the secondary containment pits;
- Beryllium was not detected in wipe samples collected at Building 5. Based on the results and the previous beryllium characterizations reported in the 2010 RLCR and the March 2013 LBNL survey, beryllium is not a significant concern for the future demolition of the Building;
- At two air handling vents adjacent to Room 116A, the 2010 Weiss RLCR reported lead concentrations on wipe samples above the comparative threshold. The 2010 Weiss RLCR recommended that the components of the building air-handling units be segregated and evaluated for disposal. During this RLC, further testing of the interiors of the air vents at Building 5 was not possible due to continued occupancy of the building. Therefore, the 2010 RLCR recommendation continues to be valid and supplemental characterization of

the air vent units should be completed before or during the demolition work to inform disposal options for the units;

- Other than the Weiss 2010 lead results for the air handling vents noted above, only one other lead concentration on a wipe sample exceeded the comparative threshold (wipe sample beneath the sink in Room 112). With the exception of this one lead concentration, ~~above the comparative threshold,~~ the lead and mercury in wipe samples were either not detected or were detected at low concentrations. It should be noted that there is no published threshold that is applicable for mercury in wipe samples. With the exception of the air handling vents noted above, t~~T~~he detected concentrations of lead and mercury in dust would not affect the waste stream for equipment recycling or disposal, and decontaminating equipment prior to its removal would not be necessary; and,

- Based on the one wipe sample that contained lead at an elevated concentration, Cal-OSHA regulations would require a contractor whose work involves disturbing the material to take health and safety precautions when handling the materials.

Characterization for chemical constituents in Building 16/16A indicated the following:

- Most of the sediment that has accumulated at various locations classifies as a California hazardous waste or RCRA hazardous waste according to total metals, WET and TCLP results.
    - The material within equipment no. 100 exceeded the federal TC thresholds for lead and chromium and therefore would classify as RCRA-hazardous waste for disposal purposes. The material within equipment no. 100 is of a small quantity.
    - The sediment accumulated in the plumbing-trap (p-trap) of the sinks in Rooms 138 and 124, and the floor drains of Room 124 and hallway exceeded the federal TC threshold for lead and therefore would classify as RCRA-hazardous waste for disposal purposes. The samples likely are representative of materials accumulated in the drainage and sewer system throughout Building 16/16A.
    - Material from the dungeon and the trenches in Rooms 109 and 125 exceeded the TTLC for chromium, lead, mercury and/or silver, but passed the TC for those metals. Therefore, the material would classify as California-hazardous waste for disposal purposes. Based on observations made during sampling activities, the dungeon consists of an approximately few-inch thick layer of accumulated sediment spread over the footprint. The materials in the trenches of Rooms 109 and 125 are small quantities.
    - Material from (and on) equipment no. 9 contained lead above the TTLC and therefore would classify as a California hazardous waste for disposal purposes. There was an insufficient amount of material to perform further testing using the

TCLP to evaluate if the materials could be classified as a RCRA hazardous waste. The material within equipment no. 100 is of a small quantity.

  - Test results of the other materials tested, including the liquid from the Room 125 sump, the concrete cores, and materials within equipment no. 18 (the sandblaster) indicate that these materials would classify as non-hazardous waste for disposal purposes;

- Light ballasts in Building 16/16A were deemed non-PCB containing ballasts. The lights contain fluorescent tubes that may contain mercury and the tubes should be recycled. Some oils within Building 16/16A contain PCBs but not above hazardous waste thresholds;
- Out of 100 wipe samples analyzed for beryllium, there was only one detection reported above the laboratory detection limit (a sample from Room 125). The results were consistent with the previous characterization completed by LBNL in March 2013 where only one out of 68 samples collected in Building 16 contained a concentration above the comparative threshold;
- Detections of lead and mercury in wipe samples were generally relatively low with the exception of several lead detections above the CFR threshold. The detected concentrations of lead and mercury in dust would not affect the waste stream for equipment recycling or disposal, and decontaminating equipment prior to its removal would not be necessary;
- Based on the wipe samples that contained lead at elevated concentrations, Cal-OSHA regulations would require a contractor whose work involves disturbing the settled dust to take health and safety precautions when handling the materials; and
- Lead washers/caps located on the transite siding of the perkins pad and around the building had a high lead content. The lead in the washer/caps may be recovered and recycled or segregated and disposed of as hazardous waste.

It is recommended that a contractor who is licensed in the handling of hazardous materials conduct the demolition work involving the removal of materials in Building 5 and 16/16A that contain hazardous chemical constituents such as, removing settled dust through decontamination or removing accumulated sediment considered to be hazardous. As part of that work, the contractor would be required to develop and implement a site specific health and safety plan (SSHSP), provide hazard communication training, conduct employee exposure monitoring and implement a personal decontamination program. The SSHSP would describe procedures to minimize exposures and present objective data or exposure modeling to determine if airborne exposures would be over the permissible levels.