The Regents of the University of California

RECONNAISSANCE-LEVEL CHARACTERIZATION REPORT

for

BUILDINGS
5, 14, 25A, 40, 41, 44, 44A, 44B, 52, AND 52A

at the

LAWRENCE BERKELEY NATIONAL LABORATORY
BERKELEY, CALIFORNIA

Prepared for:

The Regents of the University of California
Lawrence Berkeley National Laboratory
One Cyclotron Road
Berkeley, California 94720

Prepared by:

Weiss Associates
5801 Christie Avenue, Suite 600
Emeryville, California 94608

December 2010
Rev. 0

Subcontract Number 6919096

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Weiss Associates
30 YEARS OF SERVICE
1980 — 2010

Approvals Page

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1. INTRODUCTION

Weiss Associates (Weiss) conducted a pre-demolition reconnaissance-level characterization of selected buildings within the "Old Town" area of the Lawrence Berkeley National Laboratory (LBNL) (Figure 1-1). The characterization was designed to assess radiological and hazardous contamination, including asbestos-containing materials and lead-based paint, to support pre-demolition planning activities.

This report presents the results of this reconnaissance-level characterization. The report also includes preliminary recommendations for waste-handling options based on information gathered during the characterization, including any recycling restrictions that might be associated with building materials and/or components.

1.1 Scope

The Regents of the University of California issued Subcontract No. 6919096 to Weiss for characterization of 11 buildings. Ten of the eleven buildings within the Old Town area are addressed in this report: Buildings 25A, 44, 44A, 44B, 52, and 52A, to which the subcontract refers as Base Bid, and Buildings 5, 14, 40, and 41 (Figure 1-1), termed the Alternate 1 Buildings. One other building in the Alternate 1 authorization, Building 4, was not characterized because of budgetary constraints and is not included in this report. An outbuilding called the Gardener Shed was characterized for the presence of lead-based paint and asbestos-containing materials. The 10 buildings and the Gardener Shed were characterized between July 7 and August 23, 2010. The characterization involved an investigation of potentially impacted facility areas and features that were indentified on the basis of process knowledge, information contained in hazards maps developed by LBNL, and physical inspections of the buildings. Specific areas investigated included:

- Floors;
- Walls (interior and exterior);
- Ceilings and roofs;
- Doors and door and window frames;
- Molding, stairs, and railings;
- Piping, including sewer lines;
- Sumps, pits, and trenches; and
- Fixed building equipment.

The characterization was conducted in accordance with the *Final Workplan for Reconnaissance Level Characterization of Buildings 25A, 44, 44A, 44B, 52, and 52* (Weiss, 2010c) (*Workplan for Base Bid Buildings*) and the *Final Workplan for Reconnaissance Level Characterization of Buildings 4, 5, 14, 40, 41* (Weiss, 2010d) (*Workplan for Alternate 1 Buildings*).

The work plans were based on industry standards for characterization practices and methods. They addressed LBNL's characterization needs through implementation of the U.S. Environmental Protection Agency (EPA) data quality objective (DQO) process (EPA, 2006).

1.2 Report Organization

This report contains the following sections and information:

- Section 2 – Site Description and History;
- Section 3 – Sampling Methodology;
- Section 4 – Sample Analysis and Data Assessment;
- Section 5 – Comparison of Analytical Data to Applicable Thresholds; and
- Sections 6 through 16 – Characterization results presented by individual building or groups of buildings.

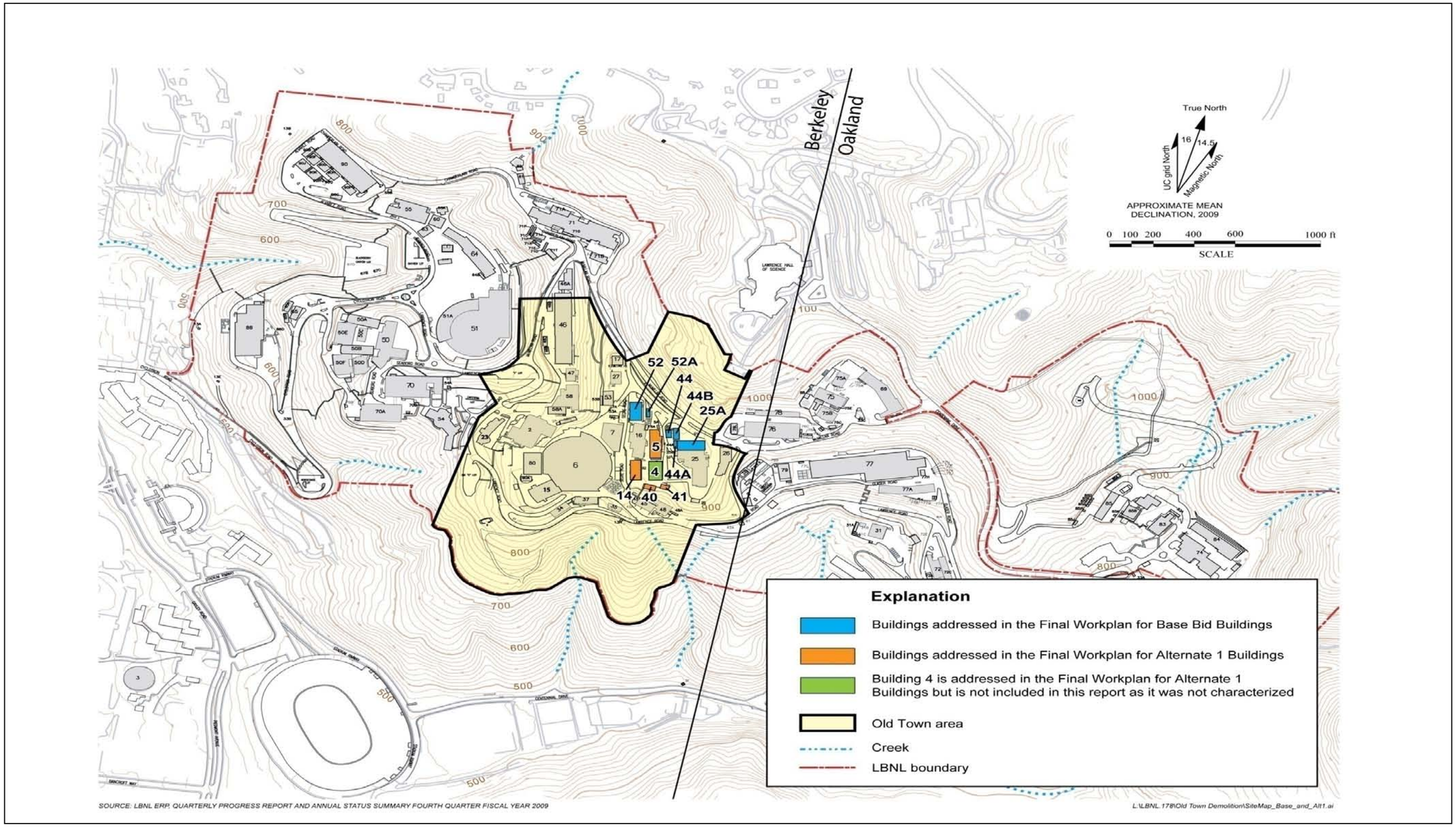


Figure 1-1. Location of Buildings Investigated as part of the Reconnaissance-level Characterization, Lawrence Berkeley National Laboratory

2. SITE DESCRIPTION AND HISTORY

LBNL is a multi-program scientific research campus operated by the University of California (UC) for the United States Department of Energy (DOE). LBNL's initial focus, in the 1940s, was nuclear physics research, but that focus has widened over time to include a vast array of scientific research, including energy, life, and environmental sciences; high-performance computing; and physical sciences.

The Old Town area of LBNL – in which all of the buildings investigated as part of the reconnaissance-level characterization are located – is approximately 15 acres in size. Several of the buildings investigated were among the first to be constructed at LBNL in the 1940s. They are part of a cluster of one- to two-story low-rise buildings located at the center of LBNL and are constructed of wood or steel frames, with concrete block, corrugated metal, or transite siding.

2.1 Old Town Buildings

The Old Town buildings were used primarily as research laboratories or secondary support facilities related to the 184-inch cyclotron, including craft and maintenance shops, storage facilities, and offices. More recently, a number of the buildings were used to support the Advanced Light Source operations and include an electron accelerator and storage ring generating beams of ultraviolet and soft X-rays (Harvey, 2003).

A description of each building to be characterized, including their current condition, is included in *Identification and Evaluation of Old Town Buildings* (Harvey, 2003). Included in this characterization report are building-specific summaries of historic uses gleaned from the Harvey report and maps that illustrate historic or current sources of potential contamination. The maps, referred to as hazard maps, were compiled by LBNL from lab records, logs, reports, and interviews with current and former employees. These maps, in conjunction with building inspections conducted by Weiss between May 3 and May 5, 2010 and supplemental documentation provided by LBNL, were the primary basis for the sampling approach described in the characterization work plans (Weiss, 2010c and 2010d).

2.2 Contaminant Sources

Contaminant sources were presumed to relate to the reported operations within the buildings, which included experimental use of radioactive and hazardous materials, neutron generation, and metal plating and cleaning.

3. SAMPLING METHODOLOGY

EPA's *Guidance on Systematic Planning Using the Data Quality Objectives Process* (EPA, 2006) was followed in the characterization work. The guidance was used to develop performance and acceptance criteria (or data quality objectives) that clarify study objectives, define the appropriate type of data, and specify tolerable levels of possible decision errors. The data quality objectives were used as the basis for establishing the quality and quantity of data needed to support decisions. Additionally, the *Multi-Agency Radiation Survey and Site Investigation Manual* (MARSSIM) (EPA, 1997) and DOE Order 5400.5, Radiation Protection of the Public and the Environment (DOE, 1992), were used as guidelines in developing the radiological sampling and survey requirements.

The following sections discuss the sample collection and survey methodology used in characterizing potential radiological and chemical contamination in building materials, dust, sediments, sludge, and liquids. Table 3-1 presents the methodologies used for collecting samples from each matrix, such as wood, concrete, and floor tile. Except where otherwise noted below, sample collection activities were conducted in conformance with the *Final Reconnaissance Level Characterization Workplans and Quality Assurance Project Plan.*

3.1 Sample Collection Procedures

Samples were collected and radiological surveys conducted from July 7 to August 23, 2010. Because of an error made by the analytical laboratory in performing the requested analysis, wipe samples collected in Buildings 14, 40, and 41, were recollected on August 20, 2010.

Sample types are summarized in Table 3-1. The locations of all samples were recorded at the time of collection. The location measurement was taken with a tape and recorded in feet and inches for all samples, except samples collected from fixtures represented on site drawings (sinks, drains) and those collected for asbestos and lead-based paint analyses, for which locations were marked on a building map. For all samples, the sample numbers were recorded using a permanent marker in or near the location in which the samples were collected. All samples shipped for analyses were accompanied by a chain-of-custody (COC) form.

All radiological characterization measurement results were identified by actual result, date, instrument, location, type of measurement, and surveyor.

3.1.1 Quality-Control Procedures

The following quality control procedures were followed in the radiological characterization:

- Use of National Institute of Standards and Technology (NIST) traceable sources to evaluate instrument performance.

- Daily instrument operation checks before and after use.
- Duplicate measurements taken at a minimum frequency of 10%.
- Compliance with LBLN's procedures for data collection activities, where applicable.

Quality-control samples for non-radiological characterization were collected and analyzed as follows:

- Field duplicates were collected at a frequency of 10% of the field samples collected per matrix.
- Matrix spike/matrix spike duplicate samples were analyzed by the laboratory at a minimum frequency of 5%.
- One equipment blank sample was collected per building.
- One trip blank, consisting of two sample vials filled with organic-free water, was included in each cooler containing volatile organic compound (VOC) samples, except as noted in deviations from work plan discussed in Section 4.4.2.1 and Section 4.4.2.2.

The laboratories analyzed 258 data points from seven trip blanks (for VOCs) and three equipment blanks (for metals). Analytical results in trip blanks indicated the presence of chloroform in one sample and methylene chloride in three samples; however, the detected substances were below the reporting limits in all samples collected during the characterization.

3.2 Radiological Sample Collection and Radiation Surveys

All buildings were evaluated for the presence of radiological contamination following the MARSSIM guidance for characterization surveys. Characterization of radiological contamination involved radiological scanning, collection of direct radiological measurements of removable surface contamination and total surface contamination, sample collection and analysis for tritium and limited volumetric sampling. The characterization plans were developed with the view that the data may potentially be used to develop final status surveys if desired.

Using the data collected during the reconnaissance level characterization, employing a computer code COMPASS and following the methods described in MARSSIM, a survey plan was developed for each building or survey unit within a building to evaluate if adequate data had been collected (see Appendix A). The survey plans specify the number of gross alpha and beta measurements and tritium samples needed to evaluate the final status of the buildings and/or survey units within the buildings. Appendix A contains the survey plans and summaries of assumptions used in developing these plans. For all buildings evaluated, the number of samples collected in each building exceeded the number of samples needed to access the final status of that building.

3.3 Non-Radiological Sample Collection and Surveys

Chemical sampling is discussed in detail in the building-specific sections that follow. Generally, samples were collected, as described in the characterization work plans, from the following matrices:

- **Flooring materials.** Samples of concrete or wood floor materials were collected in locations where stains were visible; hazardous materials were handled, processed, or stored; historical hazard maps indicate that spills or fires occurred; and/or potential contamination was noted on historical hazard maps. Vinyl tile and mastic were evaluated for asbestos-containing material.
- **Wall and window materials** (including insulation, joint compounds, caulk, and paint). Walls were suspected to contain asbestos and lead-based and/or PCB-containing paint. PCBs were suspected to have been released to building surfaces from capacitors, older machine shop oils, vacuum pump oils, and electrical/electronic equipment. Samples of wall materials, insulation, paint, and associated bonding and caulking materials were collected and analyzed for asbestos and lead-based paint as discussed in Sections 3.3.2 and 3.3.3. Samples of paint and caulking materials were collected and analyzed for PCBs.
- **Sediment or dust.** Beryllium, lead, and mercury that became airborne during machining operations were suspected to be present in sediment or dust deposited on horizontal surfaces. Mercury from diffusion pumps was also suspected to be present in the sediment accumulated at low points in the floor, including trenches and pits. Wipe samples were collected from areas with visible residue on floors, ledges, sills, curbs, or baseboard surfaces. Wipe samples also were collected from accessible air-handling vents and from tops of hanging light fixtures. Bulk samples were collected when there was a sufficient volume of dust or sediment accumulated on floors, trenches, or pits.
- **Aqueous media** (including water from heating or cooling systems, water in traps, and sludge). Aqueous samples from sink and floor traps were collected. These features were sampled because they often received waste fluids as part of their regular operations. Water from heating or cooling systems pipes were sampled to investigate whether the use of corrosion inhibitors may have resulted in residual contamination. Samples were collected at low points available at these features (such as a trap) since this is where settlement occurs and contamination is most likely to be found. The material collected consisted of fluids, or a mixture of sludge and fluid.

3.3.1 Chemical Contaminants

Table 3-1 lists the methodologies used for sample collection. Samples of concrete, wood, paint, and caulking were collected by coring, chipping, cutting, and chiseling. Sludge and liquid samples were collected from drains and traps using scoops and a peristaltic pump, and dust and other sediment samples were collected by sweeping of the surfaces on which the dust and sediment collected.

Wipe samples were collected from surface materials, including walls, floors, ledges, at vents connected to air circulation ducts, and from tops of hanging light fixtures. The wipe samples were collected using a National Institute of Occupational Safety and Health (NIOSH) method for wipe sample collection (NIOSH 9100). Appendix B provides photographs of these sample locations.

Samples of materials collected to determine the presence of asbestos are discussed in Section 3.3.2 and collection of lead-based paint samples is discussed in Section 3.3.3; lead and asbestos results are presented in Appendix C.

3.3.2 Asbestos-Containing Materials

A pre-demolition survey that meets the EPA's requirements under the National Emissions Standards for Hazardous Air Pollutants (NESHAP) for Asbestos was conducted in each building to comply with EPA's and the Bay Area Air Quality Management District's (BAAQMD) requirements under the Clean Air Act. Each building was surveyed in general conformance with the Asbestos Hazard Emergency Response Act (AHERA) requirements. Prior to sample collection, each homogenous material was classified as surfacing material, thermal system insulation (TSI), or miscellaneous material. A homogeneous material is one that is uniform in color, texture, appearance, and vintage of application and is unlikely to consist of a formulation with more constituents than those identified in the sample comprising the material. A Certified Asbestos Consultant[1] collecting the samples made a determination of homogeneity and identified appropriate sample locations in the field. Materials hidden within walls, behind structures, in vertical shafts or in areas that made them not readily available to the inspector were not sampled. If future work uncovers any such materials, these should be analyzed for asbestos.

The AHERA "3, 5, 7" rule was applied to the evaluation of each homogeneous surfacing material. Under this rule, three samples were collected from an area of less than 1,000 square feet; five samples were collected from an area ranging from 1,000 to 5,000 square feet; and seven samples were collected from an area greater than 5,000 square feet. For thermal system materials, with some exceptions, three samples were taken for each homogeneous material identified by the Certified Asbestos Consultant.

Under AHERA guidelines, sampling of miscellaneous material is not recommended. Instead, these materials should be identified as suspect and documented as such. The guideline notwithstanding, for the proper identification and management of asbestos-containing miscellaneous material in each building, at least one sample was taken from each homogeneous material. To this end, three types of roofing materials were evaluated for asbestos-containing materials: 1) center field (center of roof); 2) flashing (within 18 inches of the edge of the roof or around penetrations); and 3) patching (found where roof leaks have occurred).

3.3.3 Lead-Based Paint

The buildings covered in this report were built before 1980 and were anticipated to contain lead-based paint. Federal and state regulations (including Title 17 of the California Code of Regulations, Section 35033) define "lead-based paint" as paint or other surface coatings that contain an amount of lead equal to or in excess of: (a) one milligram per square centimeter (1.0 mg/cm^2); or (b) half of one percent (0.5%) by weight.

Composite paint samples were collected from various surfaces on the interior and exterior of each building to determine and document the amount of lead present in the paint. A small amount of paint was collected from various interior and exterior surfaces and colors and analyzed for heavy metals including lead. Paint chips and surface coating samples were collected utilizing procedures

[1] Certified by the California Division of Occupational Safety and Health. Certification is required by Title 8, California Code of Regulations, Article 2.6, Section 341.15 for individuals who contract to provide health and safety services for asbestos-related work.

based upon American Society for Testing and Materials (ASTM) Method E1729-95, *Standard Practice for Field Collection of Dry Paint Samples for Lead Determination by Atomic Spectrometry*. Observed deteriorated (loose and/or peeling) lead-based paints and/or surface coatings that should be removed or stabilized prior to demolition were noted and are included in this report.

The results of the paint sample analysis are provided in Appendix C.

3.4 Health and Safety

Characterization activities were conducted in accordance with the *Project Health and Safety Plan* (Weiss, 2010b) and Activity Hazard Analyses and a radiological work permit. Penetrations into concrete were conducted under LBNL's penetration permits and lock-out and tag-out procedures.

Air monitoring of the breathing zone was conducted during concrete sample collection in Building 52 on July 19, 20, and 21. The concrete samples were collected by drilling of 2-inch-diameter cores in the floor using a stationary coring machine with a manual hydraulic press. The depths of the cores were 1 inch for cores collected for chemical analysis and 3 or 6 inches for deep cores collected for radiological analysis. Personal protective equipment (PPE) worn during the activity comprised lab coat, gloves, safety shoes, and hearing protection. Dust was suppressed with a water mist during drilling. To represent the worst-case exposure, breathing zone samples were collected during drilling in Building 52, because the most concrete samples collected in any one day were collected in this building.

Each air sample was collected over a period ranging from 430 to 492 minutes and was analyzed for silica by Bureau Veritas North America Laboratory, located in Novi, Michigan, using NIOSH method 7500. In the three samples collected, no constituent concentrations exceeded the permissible exposure limits (PEL) or threshold limit values (TLV) presented in Table 3-2. TLV and PEL for silica dust provided in the table are based on a mathematical calculation related to the percentage of silica in the respiratory dust sample. The relationship is the inverse: the higher the percentage of silica in the dust, the lower the calculated TLV or PEL. The same formula is used for both the TLV and PEL. For a more conservative estimate, the calculated TLV/TWA is further modified by 50% by the American Conference of Governmental Industrial Hygienist. The analytical results are presented in Appendix D.

No personal air monitoring for lead or beryllium exposure was conducted during sample collection activities. Sample collection that could have created exposure to dust that may have contained lead or beryllium was limited to approximately 10 minutes per any day on which it may occurred. The samples were generally collected with moistened wipes that limited any airborne contamination.

3.5 Investigation-derived Waste

Investigation-derived waste generated during sample collection consisted of used tubing, sharps, and spent PPE (gloves and Tyvek suits). The PPE and tubing were disposed of as municipal waste because of observations of no significant contact with potential contamination. The PPE used in the attics in Buildings 5 and 14 was scanned for radiological contamination and deemed to be non-radiological waste, and thus was disposed of as municipal waste.

HEPA filters from a vacuum used during asbestos tile removal, most of the concrete coring, and destructive samples were not disposed, as they were deemed to be usable. The filters were determined to be free of radiological contamination, as they were used during collection of samples that were scanned for radiological contamination and were found to contain no detectable levels of radioactivity. Analytical results for all of the samples with the potential for radiological contamination show no such contamination. No other contaminants were detected at hazardous waste concentrations in samples collected in locations where the HEPA vacuums were used.

No liquid wastes were generated. No radiological wastes were generated. Samples sent to analytical laboratories were disposed of by the laboratories.

Asbestos-containing floor tiles removed during the sample collection, PPE, and disposable equipment associated with the floor tile removal were the only non-municipal waste generated. All of the floor tiles were scanned for radiological contamination, of which none was detected. These wastes were double-bagged, labeled as asbestos-containing waste, and placed in a Satellite Accumulation Area in Building 52. The analytical data confirm that the waste should be managed as asbestos-containing waste by LBNL. Used knife blades were placed in sharps containers, which were stored in the Satellite Accumulation Area in Building 52 for LBNL to manage.

3.6 Documentation of Field Activities

Field activities were recorded on field forms, including daily logs documenting site conditions and detailed sample logs. The field documentation includes pertinent observations, time logs, field measurements, sketches of sample and radiological survey locations, sample and survey heights, locations of potential mercury switches, and any deviations from the work plan. Digital photos documenting sample locations are provided in Appendix B.

Table 3-1. Sampling Methods by Matrix

Matrix	Sample Methodology	Equipment	Sampling Method[1]	Procedure Used to Return Sample Location to Safe Condition
Destructive Sampling Activities				
Exposed concrete slab	Chipping/coring	Electric powered diamond-core drill with optional stand, HEPA vacuum, bristle brush, hand chisel, hand scraper, hammer	Core drilled 2-inch-diameter hole to 1- or 6-inch depth. Chiseled core to remove.	HEPA-vacuumed up dust, covered sections removed with fast-drying cement to restore level of original surface.
Exposed wood flooring	Chipping	Electric roto-hammer, bristle brush, hand chisel, hammer, utility knife	Used electric roto-hammer to remove top 1/8 inch of wood surface in a 1-foot by 1-foot area.	Applied wood filler to restore level of original surface where required.
Removal Activities				
Floor tile	Tile removed by certified asbestos consultant.	Hand chisel, hand scraper, utility knife, hammer, dry ice, negative pressure enclosure	NA	Certified asbestos contractor HEPA-vacuumed up dust and particles
Carpet over concrete slab or wood floor	Removed carpet, padding, and anchorage or glue where present.	HEPA vacuum, carpet knife, industrial scissors, hand chisel, hammer, utility knife, hand scraper	NA	HEPA-vacuumed up dust, covered sections removed with fast-drying cement to restore level of original surface; LBNL reinstalled carpet/padding.
Grab/Other Sampling Activities				
Sludge - drain trap	Collected sludge sample from sink traps and floor drain traps.	Accessed using hand wrench or pliers, lifting hook, pry bar, screwdriver, or socket wrench; collected sample using hooked scoop clamped to drain rooter (snake) extension. Contained sample collection area with polyethylene plastic sheeting to prevent mercury bead release.	Drove hook scoop down drain to grab any solid trap contents; when insufficient sludge volume was present, collected only aqueous trap sample.	Restored drain pipes to pre-sampling conditions. Performed decontamination of hook and scoop.

Table 3-1. Sampling Methods by Matrix

Matrix	Sample Methodology	Equipment	Sampling Method[1]	Procedure Used to Return Sample Location to Safe Condition
Sediment - floor	Collected sample at locations that had accumulated sediment/dust on floors.	Scraper, disposable paper funnel or scoop	Used scraper to push sediment into paper funnel or scoop.	None
Sediment - trench/pit /sump	Collected loose material accumulated along bottom of trench/pit/sump floors. Accessed by removing heavy steel plates.	Accessed using vault lifting hook, crow bar, wrecking bar, socket wrenches, hand combination wrenches, lifting chain, and lifting eyes; collected sample using shovel or scoop with extension.	Scooped sediment, when present.	Restored covers to pre-sampling positions.
Aqueous - drain trap	Collected sample from sink traps and floor drain traps.	Accessed drain traps using hand wrench or pliers, lifting hook, pry bar, screwdriver, socket wrench; collected sample using peristaltic pump with dedicated tubing. Contained sample collection area with polyethylene sheeting to prevent mercury bead release.	Transferred aqueous sample via peristaltic pump with dedicated tubing to sample container. Disposed of tubing as municipal waste.	Restored drain pipes to pre-sampling conditions.
Aqueous - boiler pipe	Collected sample from pot feeder system.	Used existing boiler valves, pot feeder valves, and pot feeder spigot.	Circulated boiler pipe water through pot feeder system. Opened pot feeder spigot to collect sample.	Restored boiler valves and pot feeder valves to pre-sampling conditions.
Sewer line	Collected wipe sample from sewer pipe wall via sewer cleanout access point.	Metal drain rooter, wire clamp, wipe. Contained sample collection area with polyethylene sheeting to prevent mercury bead release.	Drove wipe down sewer cleanout portal using metal rooter; advanced into main line; Turned rooter to collect main line wall sample on wipe; retracted.	Restored covers to pre-sampling positions. Performed decontamination of rooter.

Table 3-1. Sampling Methods by Matrix

Matrix	Sample Methodology	Equipment	Sampling Method[1]	Procedure Used to Return Sample Location to Safe Condition
Dust (floors, walls, ledges, equipment, fixtures)	Collected wipe sample from floors, walls, ledges, equipment, fixtures.	Wipe and applicable solvent for analyte	Performed wipe procedure specific to each analyte.	None
Caulking	Collected sample by removing caulk from window pane/frame joint.	Caulking chisel, utility knife	Chiseled caulk and transferred to sample container.	None (re-caulking was specified in work plan but samples collected were small and did not require re-caulking).
Paint	Collected paint scraping sample.	Hand scraper, utility knife	Removed paint from approximately 3-square-foot area.	None

Note:
[1] Sample volume requirements were analyte-specific.

Abbreviations:
HEPA high-efficiency particulate air
IDW investigation-derived waste
NA not applicable

Table 3-2. Results of Breathing Zone Air Monitoring

Sample ID	Sample Date	Constituent	Reported Result		Calculated TLV	Calculated PEL	Activity
			mg/m^3	% SiO^2	mg/m^3		
49748	7/19/10	Particulate respirable	0.17			< PEL	Collection of six 1-inch-deep cores and one 3- to 6-inch-deep core from concrete floor in Building 52. All cores are 2 inches in diameter.
		Cristobalite	<0.012	<6.7	0.57	< TLV	
		Quartz	0.013	7.3	0.53	< TLV	
		Tridymite	<0.012	<6.7	0.57	< TLV	
50015	7/20/10	Particulate respirable	0.089			< PEL	Collection of one 1-inch-deep core and six 3- to 6-inch deep cores from concrete floor in Building 52. All cores are 2 inches in diameter.
		Cristobalite	<0.013	<14	0.31	< TLV	
		Quartz	<0.013	<14	0.31	< TLV	
		Tridymite	<0.013	<14	0.31	< TLV	
49979[1]	7/21/10	Particulate respirable	0.135			<PEL	Collection of six 1-inch-deep cores and five 3- to 6-inch-deep cores from concrete floor in Building 52 All cores are 2 inches in diameter.
		Cristobalite	<0.011	<8.3	0.49	< TLV	
		Quartz	0.0247	18	0.25	< TLV	
		Tridymite	<0.011	<8.3	0.49	< TLV	
50054	BLANK	Particulate respirable	ND				NA
		Cristobalite	ND	-	-		
		Quartz	ND	-	-		
		Tridymite	ND	-	-		

Note:
TLV set by the ACGIH. TLVs and PELs for silica dust are based on a mathematical calculation related to the percent of silica in the respiratory dust sample. The same formula is used for either the TLV or PEL; however, the calculated TLV/TWA is further modified by 50% by the ACGIH for a more conservative estimate.

1. Values in the lab report provided in Appendix D are based on a sample volume of 836.4 liters (1.7 lpm for 492 minutes). The values have been corrected in this table to reflect the volume of air collected as 522 liters. See handwritten Chain of Custody completed for the sample showing the collection times. The error was in the sample time reported on the consolidated COC send to the laboartory

Abbreviations:

ACGIH	American Conference of Government Industrial Hygienists	PEL	permissible exposure limit
mg/m^3	milligrams per cubic meter	TLV	threshold limit value

4. SAMPLE ANALYSIS AND DATA ASSESSMENT

4.1 Radiological Analysis

Radiological data were obtained from field surveys, samples collected and analyzed in the field using a liquid scintillation counter, and samples collected and analyzed by Eberline Services laboratory.

4.2 Radiological Data Quality Assessment

The first step of a data quality assessment is a review of the data quality objectives (DQOs) and the sampling design to verify they are still appropriate. In this step, the survey unit designations were evaluated to determine if correct classifications were applied to the buildings and/or areas investigated. It was determined that all buildings and/or building areas were correctly classified with the exception of surfaces in Building 5 and the Class 1 survey units in Buildings 44 and 52. The reconnaissance-level characterization data supported re-classification of the Class 1 area in Building 5 (floors and lower walls) to a Class 2 area for lower walls and Class 3 for floors, upper walls, and the ceiling. The Class 1 survey unit in Building 44 was incorrectly classified; it should be a Class 3 unit along with the remaining Building 44 surfaces. These revised classifications were used during development of the survey plan discussed in Section 3.2.

4.2.1 Data Verification

After review of the DQOs and the sampling design, a preliminary data review was performed for each building. Per Section 8.2.2.1 of MARSSIM, if an adequate number of measurements are collected in a survey unit and every measurement is below the applicable derived concentration guideline level (DCGL), then the survey unit clearly meets the release criteria and a statistical test need not be performed to demonstrate compliance. As discussed in Section 3.2, conclusions may be drawn from the data collected for the purpose of radiological characterization, because an adequate number of samples were collected and all measurements were below the DCGLs; hence, reliance on statistical tests was not required to determine whether the buildings met the established release criteria.

4.2.2 Radiological Data Validation Results

All radiological data were reviewed and approved by a Certified Health Physicist. Laboratory data were also reviewed by the Project Chemist, as described in Section 4.4.

Thirty-three data points were generated from eleven volumetric samples analyzed by an offsite laboratory. No samples were rejected or estimated (that is, qualified as either “R” or “J”). No

samples had detectable concentrations of radiological constituents. No blank or field duplicate samples were collected. The data set is considered to be 100 % complete.

4.3 Non-Radiological Analysis

All chemical analyses were performed by TestAmerica-St. Louis, an offsite laboratory located in Earth City, Missouri and accredited in California, Nevada, and Utah under the National Environmental Laboratory Accreditation Program (NELAP).

4.4 Non-Radiological Data Quality Assessment

Data collected during the reconnaissance-level characterization were assessed to help assure that the data satisfy the objectives of the work plans (Weiss, 2010c; Weiss, 2010d). Data assessment followed the procedures established in the *Quality Assurance Project Plan* (Weiss, 2010a). The assessment involved three elements, all of which were performed in combination: verification, validation, and data quality analysis.

4.4.1 Data Verification

Data were verified to confirm that the requirements stated in the planning documents (e.g., work plans, standard operating procedures, etc.) were implemented as prescribed. This means that deficiencies or problems that occurred during implementation were documented and reported. Analytical and radiochemical samples were subject to the following reviews:

- Chain-of-custody implemented in the field and documented through receipt by the laboratory;
- Correct login of sample information and analysis requests by the laboratory receiving the samples and chain-of-custody;
- Correct preservation of samples verified by the laboratory at the time of sample receipt; and
- Verification of electronic data received from the laboratory to confirm that electronic deliverables are in agreement with hard copy reports.

4.4.2 Data Validation

Validation activities were performed on all data generated during the reconnaissance-level characterization to confirm that the data collected support the objectives of the characterization. Laboratory data were reviewed internally by the laboratory and externally by the Project Chemist as specified in the *Quality Assurance Project Plan* (Weiss, 2010a).

The Project Chemist reviewed all data generated by the accredited offsite laboratory for the following quality parameters:

- Organic data were reviewed for holding times, blank analysis results, calibrations, laboratory control sample recovery, matrix spike/matrix spike duplicate recovery and precision, and surrogate recovery.
- Inorganic data (including radiological results generated by the accredited offsite laboratory) were reviewed for holding times, blank analysis results, matrix spike/matrix spike duplicate recovery and precision, sample duplicate precision, laboratory control sample recovery, and calibration.

Data were reviewed by the Project Chemist in accordance with EPA's guidance contained in *Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review* (EPA, 2008) and *Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review* (EPA, 2010). The Project Chemist assembled a data validation report for each sample delivery group. The validation reports consisted of a summary report, data validation checklists, and the laboratory report hard copy. The summary reports identified the samples and analyses reviewed and any data qualifications resulting from validation. The validation results were evaluated against the project DQOs to determine whether the data are usable for their intended purpose and whether additional data collection is needed.

The results of data validation activities for each batch are discussed below. Data were received and validated in batches corresponding to the Base Bid and Alternate 1 designations for building groupings.

4.4.2.1 Chemical Data Validation Results – Buildings 25A, 44, 44A, 44B, 52, and 52A

A total of 3,490 data points were generated from 165 samples analyzed for chemical constituents, excluding samples analyzed for radiological, asbestos, and lead-based paint. Thirty-two of these data points, which is equivalent to less than 1%, were rejected (designated as "R") during the data validation process, as follows:

- Twenty-eight VOC results were reported by the laboratory as not detected but were rejected because of deficiencies associated with the laboratory's internal standard procedures.
- Three metals results were rejected.
- One semi-volatile organic compound (SVOC) result was rejected.

No detected results were rejected. The data set is considered to be 99% complete.

A total of 313 of the 3,490 data points, or 9%, were estimated values because of laboratory QC deficiencies (designated as "J") as follows:

- A total of 242 qualifications were due to trace quantities detected (below reporting limits) and
- 71 were due to laboratory deficiencies.

Overall, the laboratory data for chemical constituents are of good quality. The results of this validation indicate that the data are valid for their intended purpose.

The following deviations from quality procedures were noted during the validation process:

- No trip blanks were included with the shipment of VOC samples collected at Building 52 on July 15, 16, and 19, 2010.
- Trip blanks associated with one shipment of VOC samples collected on July 22, 23 and 26, 2010 at Buildings 25A and 52 were sent to the laboratory in a separate cooler.

Any possible VOC contamination that may have occurred during shipping would not have been substantial enough to have affected the usefulness of the data, because VOC concentrations reported by the laboratory were orders of magnitude below hazardous waste limits in all of the samples.

No asbestos analyses were rejected because of data quality deficiencies; 100% of the asbestos data are usable for the purpose of this characterization.

4.4.2.2 Chemical Data Validation Results – Buildings 5, 14, 40, and 41

A total of 2,437 data points were generated from 124 samples analyzed for chemical constituents, excluding samples analyzed for radiological, asbestos, and lead-based paint. Twenty-five of these data points, which is approximately 1%, were rejected (designated as "R") during the data validation process, as follows:

- Eleven VOC results were reported by the laboratory as not detected but were rejected because of low surrogate spike recoveries.
- Fourteen SVOC results were reported by the laboratory as not detected but were rejected because of low surrogate spike recoveries.

No detected results were rejected. The data set is considered to be 99% complete.

A total of 273 of the 2,437 data points, or 11%, were qualified as estimated values (designated as "J") as follows:

- A total of 180 qualifications were due to trace quantities detected (below reporting limits) and
- 93 were due to laboratory deficiencies.

Overall, the laboratory data for chemical constituents are of good quality. The results of this validation indicate that the data are valid for their intended purpose.

The following deviation from quality procedures was noted during the validation process:

- A trip blank was not included with one sediment sample (B5SE04) collected in Building 5. Any possible VOC contamination that may have occurred during shipping would not have been substantial enough to have affected the usefulness of the data, because VOC concentrations reported by the laboratory were orders of magnitude below hazardous waste limits in the sediment sample.

No asbestos analyses were rejected because of data quality deficiencies; 100% of the asbestos data are usable for the purpose of this characterization.

No asbestos analyses were rejected because of data quality deficiencies; 100% of the asbestos data are usable for the purpose of this characterization.

5. COMPARISON OF ANALYTICAL DATA TO APPLICABLE THRESHOLDS

Analytical data collected during the reconnaissance-level characterization were compared with a variety of screening criteria, or thresholds, as discussed in this section. Sections 6 through 15 present the results for each building, or group of buildings, in the context of these thresholds, where applicable. In each of these building-specific sections, the results of the radiological and non-radiological investigations are discussed separately; the latter discussion covers lead-based paint and asbestos-containing materials.

5.1 Radiological Data

Characterization data were evaluated per the MARSSIM guidance for final status surveys to determine if the buildings surveyed (or survey units within buildings) met predetermined criteria for release for unrestricted use or, where appropriate, for use with designated limitations. The criteria for release, specified in the work plans, consist of DCGLs and volumetric contamination limits.

Surface contamination data presented in this report were evaluated against the DCGLs in Table 5-1., which are based on the requirements in DOE Order 5400.5, *Radiation Protection of the Public and the Environment* (DOE, 1992), including surface contamination limits in Figure IV-1 Surface Contamination Guidelines, from DOE Order 5400.5, as amended by the DOE Memorandum entitled *Application of DOE 5400.5, Requirements for Release and Control of Property Containing Residual Radioactive Material*, dated November 17, 1995.

Volumetric contamination limits, from DOE Order 5400.5 Chapter II, Section 5, have not yet been defined by the DOE. Pending these, LBNL has negotiated with DOE site-specific criteria to verify that no radiological contamination has been added. These criteria were used to assess volumetric contamination data presented in this report. The criteria are documented in LBNL's procedure EHS708; they are summarized in Table 5-2.

5.2 Non-Radiological Data

Non-radiological data include chemical constituents such as metals, organics (including PCBs), lead-based paint, and asbestos.

5.2.1 Chemical Constituents

All chemical data collected and reported in the following sections, with the exception of data obtained from wipe samples, were compared to three hazardous waste thresholds used to determine whether a waste exhibits the characteristic of toxicity: toxicity characteristic leaching procedure (TCLP), total threshold limit concentration (TTLC), and soluble threshold limit concentration

(STLC). Table 5-3 provides the values for each threshold. The thresholds and their use in the characterization are described below:

TCLP is an analytical procedure performed by a laboratory to assess toxicity of wastes (U.S. EPA Test Method 1311). A waste is considered hazardous due to toxicity if it contains chemical concentrations in excess of the TCLP limits outlined in 40 CFR §261.24. A waste that is identified as hazardous by TCLP may leach hazardous concentrations of toxic substances into the environment and is defined as toxic under RCRA. If TCLP analysis is not conducted, a TCLP value may be derived from total constituent analysis. A ratio of 20:1 liquid-to-solid is employed to convert the results of total constituent analysis into a maximum leachable concentration, and thus, the concentration may be compared to the TCLP limits to determine whether the matrix analyzed is potentially hazardous waste. [2]

Total constituent analysis was performed during the characterization. The results were compared to 20 times the TCLP concentrations to determine if the matrix analyzed can exceed the hazardous waste limits (i.e., the TCLP concentration reported in mg/L was multiplied by 20 to obtain a concentration in milligrams per kilogram (mg/kg) for comparison to the hazardous waste thresholds).

TTLCs and STLCs: While California enforces the federal regulations concerning toxicity (TCLP), it regulates the disposal of inorganic and organic persistent bio-accumulative toxic substances (PBTSs) in accordance with Titles 22 and 26 of the California Code of Regulations (CCR). Concentration limits for PBTSs are established in Title 22. The TTLC analysis determines the total concentration of each PBTS in a sample; it is generally performed first. When any target analyte exceeds the TTLC, the waste is classified as hazardous, and further testing is not required. If the TTLC is not exceeded, the results of the TTLC analysis can be used to determine if analysis for STLC is necessary by comparing 10 times the STLC to the TTLC results. A factor of ten is necessary to compensate for a 1:10 dilution factor that is present in one analysis (STLC)[3] but not the other (TTLC). If the TTLC results do not exceed 10 times the STLC, it may be presumed that the STLC is not exceeded. If concentrations of PBTSs are detected in a sample at equal to or greater than 10 times the STLC but below the TTLC, the sample may or may not be classified as hazardous waste, depending on the leachability of the matrix from which the PBTSs are extracted, and the sample must be further analyzed (by the Waste Extraction Test).

It is not appropriate to directly compare wipe sample results to the hazardous waste thresholds described above, since the concentrations detected in wipe samples represent surface concentrations that may not be evenly distributed throughout the matrix from which the sample was collected. As such, wipe sample results provide quantitative information about removable

[2] If the matrix analyzed is multi-phasic, then the concentration of the analyte in each phase (liquid and solid) must be determined by additional calculations. None of the solid samples collected during the characterization activities had a filterable liquid.

[3] Toxicity under the California Code of Regulations is defined through application of laboratory test procedures called the "total digestion" and the "Waste Extraction Test" (commonly called the WET). The results of each of these laboratory tests are compared to their respective regulatory limits, the TTLCs and the STLCs, which appear in Title 22 California Code of Regulations Section 66261.24(a)(2).

contamination, but in most cases they do not provide conclusive data about the waste characteristic of a solid matrix.

Where wipe sample thresholds have been established, such as in the case of PCBs or beryllium, those thresholds are used for comparative purposes. A threshold of 0.2 micrograms (µg)/100 cm^2 is used in this report to classify removable contamination on equipment or on item surfaces in conformance with the Chronic Beryllium Disease Prevention Program (10 CFR 850). Beryllium concentrations on wipe samples below this threshold generally can be used to release equipment or surfaces to the general public or a DOE facility for non-beryllium use. A threshold of 10 µg/100 cm^2 for PCBs on wipe samples is used in this report. This threshold concentration applies to non-porous surfaces contaminated with PCBs (40 CFR 761), and surfaces containing concentrations above this limit are considered to be contaminated.

The tabulated chemical data reported in the following sections are highlighted as described below to indicate which results exceed various thresholds:

Yellow — Yellow highlighting indicates that the constituent reported was detected at a concentration equal to or greater than 10 times STLC or 20 times TCLP concentrations, for solid matrices (does not apply to wipe samples).

Red — Red highlighting indicates that the constituent reported was detected at a concentration above:

- The TTLC (for solid samples; reported in mg/kg units); or
- The STLC or TCLP (for aqueous samples; reported in mg/L units); or
- The wipe concentration limit for PCBs or beryllium (discussed above).

5.2.2 Lead-based Paint

Lead-based paint is paint that contains lead in concentrations of 5,000 parts per million (ppm), greater than 1 mg/cm^2, or 5% by weight. Lead-based paint can create a lead hazard. Deteriorating lead-based paint also may be considered a lead hazard (Title 17, California Code of Regulations, Section 35037). Abatement of lead hazards in public buildings is subject to the requirements contained in Title 17 of the California Code of Regulations. Public buildings are defined as structures generally accessible to the public (Title 17 California Code of Regulations, Section 35045). Soil containing 1,000 ppm of lead also is considered a lead hazard.

Demolition of structures containing lead-based paint is regulated as lead-related construction by the California Division of Occupational Safety and Health (CalOSHA) in Title 8 of the California Code of Regulations, §1532.1. CalOSHA regulates construction work practices involving any detectable concentrations of lead; requires the employer to ensure that no employee is exposed to lead at concentrations greater than 50 micrograms per cubic meter of air (50 micrograms/m^3) averaged over an 8-hour period; and sets an action level of 30 microgram/m3 calculated as an 8-hour time-weighted average.

Demolition debris containing lead-based paint also is regulated as hazardous waste if it exceeds the concentrations presented in Table 5-3.

5.2.3 Asbestos-containing Materials

Federal and California regulations define asbestos-containing material as material that contains more than 1% asbestos. Materials containing less than 1% asbestos are not regulated as asbestos-containing material. The U.S. EPA's National Emission Standard for Hazardous Air Pollutants for asbestos (40 CFR §61.140 – Subpart M, et. seq.) specifies that if the asbestos content of a sampled material is reported by the laboratory to be less than 10%, the asbestos content of the sample must either be verified by point counting analysis or assumed to contain more than 1% asbestos and managed as an asbestos-containing material.

Friable asbestos-containing material is regulated as a hazardous waste in California. It must be packaged, labeled, and transported to a landfill authorized to accept such waste in accordance with the requirements applicable to hazardous waste management. Materials that contain less than 1% asbestos can be disposed of as non-hazardous asbestos containing construction waste. Such materials must be manifested in accordance with 40 CFR §61.141 and must meet the labeling and packaging requirements of CalOSHA.

If more than 100 linear or 100 square feet of regulated asbestos-containing material as defined by the BAAQMD in Regulation 11 Rule 2 will be disturbed, the BAAQMD must be notified 10 days prior to start of the activity.

Table 5-1. Surface Contamination Guidelines

Radionuclides [1]	Total Average [2, 3] (dpm/100 cm^2) [4] ($DCGL_w$)	Total Maximum [4, 5] (dpm/100 cm^2) ($DCGL_{EMC}$)	Removable [4, 6] (dpm/100 cm^2) ($DCGL_w$)
Transuranics, I-125, I-129, Ra-226, Ac-227, Ra-228, Th-228, Th-230, Pa-231	100	300	20
Th-Natural, Sr-90, I-126, I-131, Ra-223, Ra-224, U-232, Th-232	1,000	3,000	200
U-Natural, U-235, U-238 and associated decay products, α-emitters	5,000	15,000	1,000
β/γ emitters (radionuclides with decay modes other than α emission or spontaneous fission) except Sr-90 and others noted above. [7]	5,000	15,000	1,000
Tritium [8](applicable to surface and subsurface.)	Not Applicable	Not Applicable	10,000

Notes:

1 Where surface contamination by both α- and β/γ-emitting radionuclides exists, the limits established for α- and β/γ-emitting radionuclides should apply independently. In addition, the limits for radionuclides specifically identified in the table (e.g. Ra-226) shall take precedent over generic categories (e.g. α-emitters).

2 Measurements of average contamination should not be averaged over an area of more than one m^2. For objects of less surface area, the average should be derived for each such object.

3 The average and maximum dose rates associated with surface contamination resulting from β/γ emitters should not exceed 0.2 mrad/h and 1.0 mrad/h, respectively, at one cm.

4 As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute measured by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

5 The maximum contamination level applies to an area of not more than 100 cm^2. DOE 5400.5 Chg 2 IV-7

6 The amount of removable material per 100 cm^2 of surface area should be determined by wiping an area of that size with dry filter or soft absorbent paper, applying moderate pressure, and measuring the amount of radioactive material on the wiping with an appropriate instrument of known efficiency. When removable contamination on objects of surface area less than 100 cm^2 is determined, the activity per unit area should be based on the actual area and the entire surface should be wiped. It is not necessary to use wiping techniques to measure removable contamination levels if direct scan surveys indicate that the total residual surface contamination levels are within the limits for removable contamination.

7 This category of radionuclides includes mixed fission products, including theSr-90 which is present in them. It does not apply to Sr-90 which has been separated from the other fission products or mixtures where the Sr-90 has been enriched.

8 Property recently exposed or decontaminated should have measurements (smears) at regular time intervals to ensure that there is not a build-up of contamination over time. Because tritium typically penetrates material it contacts, the surface guidelines for β/γ emitters are not applicable to tritium. The DOE has reviewed the analysis conducted by the DOE Tritium Surface Contamination Limits Committee ("Recommended Tritium Surface Contamination Release Guides," February 1991), and has assessed potential doses associated with the release of property containing residual tritium. The DOE recommends the use of the stated guideline as an interim value for removable tritium. Measurements demonstrating compliance of the removable fraction of tritium on surfaces with this guideline are acceptable to ensure that non-removable fractions and residual tritium in mass will not cause exposures that exceed DOE dose limits and constraints.

Abbreviations:

dpm/100 cm^2	decays per minute per 100 square centimeters
$DCGL_W$	Derived Concentration Guideline Limit (Wilcoxon)
$DCGL_{EMC}$	Derived Concentration Guideline Limit (Elevated Measurement Comparison)

Table 5-2. LBNL Institutional Volumetric Release Limits

Sample Matrix	Analysis sensitivity[1]			Unit
	Gross α	Gross β	Tritium (H-3)	
Aqueous	0.02	0.06	1	pCi/mL
Acid/Base	0.02	0.06	1	pCi/mL
Organic Solvent	0.1	0.3	20	pCi/mL
Oil and viscous organic	0.5	1.5	20	pCi/mL
Other misc. liquids	0.5	1.5	20	pCi/mL
Organic Solids	0.5	1.5	20	pCi/g
Inorganic solids	5	15	2	pCi/g
Sludge and soil	1	3	5	pCi/g
Rocky Debris (including concrete)	0.5	1.5	2	pCi/g
Concrete (neutron generators, Bevatron working model)	Cobalt-60	2		pCi/g

Note:
[1] Reference EHS 708 and 708.2
Abbreviations:
pCi/g picocuries per gram
pCi/mL picocuries per milliliter

Table 5-3. Thresholds Used in Determining the Characteristics of Toxicity in Solid Waste

Constituent	STLC mg/L	TTLC mg/kg	TCLP mg/L
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.001	0.01	--
Asbestos	--	1%	--
Fluoride Salts	180	18,000	--
Organic Lead	--	13	--
(2,4-Dichlorophenoxy) Acetic Acid	10	100	10
2,4,5-TP (Silvex)	1	10	1
Kepone	2.1	21	--
Mirex	2.1	21	--
Antimony	15	500	--
Arsenic	5	500	5
Barium	100	10,000	100
Beryllium	0.75	75	--
Cadmium	1	100	1
Chromium, Hexavalent	5	500	5
Chromium, Total[1]	5	2,500	5
Cobalt	80	8,000	--
Copper	25	2,500	--
Lead	5	1,000	5
Mercury	0.2	20	0.2
Molybdenum	350	3,500	--
Nickel	20	2,000	--
Selenium	1	100	1
Silver	5	500	5
Thallium	7	700	--
Vanadium	24	2,400	--
Zinc	250	5,000	--
PCBs (Total)[2]	5	50	--
Aldrin	0.14	1.4	--
Alpha-Chlordane	0.25	2.5	0.03
Chlordane	0.25	2.5	0.03
Dieldrin	0.8	8	--
Endrin	0.02	0.2	0.02
Gamma Bhc (Lindane)	0.4	4	0.4
Gamma-Chlordane	0.25	2.5	0.03
Heptachlor	0.47	4.7	0.008
Heptachlor Epoxide			0.008
Methoxychlor	10	100	10
p,p'-DDD	0.1	1	--
p,p'-DDE	0.1	1	--
p,p'-DDT	0.1	1	--
Toxaphene	0.5	5	0.5
2,4,5-Trichlorophenol	--	--	400

Table 5–3. Thresholds Used in Determining the Characteristics of Toxicity in Solid Waste

Constituent	STLC mg/L	TTLC mg/kg	TCLP mg/L
2,4,6-Trichlorophenol	--	--	2
2,4-Dinitrotoluene	--	--	0.13
Cresol	--	--	200
Hexachlorobenzene	--	--	0.13
Hexachlorobutadiene	--	--	0.5
Hexachloroethane	--	--	3
m-Cresol	--	--	200
Nitrobenzene	--	--	2
o-Cresol	--	--	200
p-Cresol	--	--	200
Pentachlorophenol	1.7	17	100
Pyridine	--	--	5
1,1-Dichloroethene	--	--	0.7
1,2-Dichloroethane	--	--	0.5
1,4-Dichlorobenzene	--	--	7.5
Benzene	--	--	0.5
Carbon Tetrachloride	--	--	0.5
Chlorobenzene	--	--	100
Chloroform	--	--	6
Methyl Ethyl Ketone (2-Butanone)	--	--	200
Tetrachloroethylene (PCE)	--	--	0.7
Trichloroethylene (TCE)	204	2,040	0.5
Vinyl Chloride	--	--	0.2

Notes:
-- Data do not exist
[1] The regulations provide that if soluble chromium as determined by the TCLP is less than 5 mg/L, and soluble chromium as determined by the Waste Extraction Test (WET) equals or exceeds 560 mg/L, and the waste is not otherwise identified as a RCRA hazardous waste, then the waste is a non-RCRA hazardous waste (Title 22 CCR, Section 66261.24). This exception is not applied in the evaluation criteria for this characterization, since WET was not performed and comparison to STLC values is based on a calculated value taking into account the dilution ratio.
[2] Samples were analyzed for individual PCBs, including Aroclor 1016, 1221, 1232, 1242, 1248, 1254, and 1260; however, the regulatory thresholds listed in this table apply to total PCBs.
TTLC and STLC values are from CCR, Title 22, Chapter 11, Article 3, Section 66261.24.
TCLP values are from RCRA (40 CFR Part 261).

Abbreviations:
mg/kg milligrams per kilogram
mg/L milligrams per liter
RCRA Resource Conservation and Recovery Act
STLC soluble threshold limit concentration
TTLC total threshold limit concentration
TCLP toxicity characteristic leaching procedure

6. CHARACTERIZATION OF BUILDING 5

Building 5 is a 7,176-square-foot wood-frame and concrete-block building constructed in 1948. The building is mostly one-story, with two stories at the north end. It was referred to as the "chemistry annex" and was specifically designed for high-level radioactive chemistry work. The building housed radioactive substances with high-activity levels, hot labs, counting rooms, and a two-story process laboratory. The building also contained a one-story decontamination unit at its northern end for materials and equipment cleaning. The offices and laboratories in Building 5 were later used for magnetic fusion energy research. Figure 6-1 and Figure 6-2 provide the locations of historical hazards associated with the building obtained by LBNL from historical records, interviews, and site inspections.

Building 5 was characterized in accordance with to the *Final Work Plan for Alternate 1 Buildings* (Weiss, 2010d).

6.1 Deviations from the Work Plan

No deviations occurred during the radiological characterization of Building 5. The following deviations from the work plan occurred during non-radiological characterization:

- No chemical samples were collected from two sumps at the west side of the building, because plates covering these sumps could not be removed.
- To minimize chemical sample collection in the attic, samples of the air-handling system in Building 5 were collected from a vent above the entrance door to Room 122 instead of from the duct in the attic. An additional sample was collected from the exit duct located in the ceiling of Room 112. It was determined in the field that exit points represented the locations of greatest potential for contamination from constituents entrained in the building air.
- Gravel samples were not collected from a subsurface pit in Room 102. The pit was found to be empty. Sediment at the bottom of the pit was collected in lieu of the gravel.
- A chemical wipe sample was not collected from a pipe stub shown on the hazard maps to be located at the northeast corner of Room 102. The location of the pipe stub was obscured by cabinets, and when cabinets were moved, no pipe stub was found.
- Additional chemical wipe samples were collected from drains uncovered during tile removal and equipment relocation in Rooms 100 and 112.
- No chemical sludge sample was collected from the sink trap in Room 112, because the trap could not be opened.

- Chemical sludge samples were not collected from sink traps in Rooms 118, 120, 126, and 105, toilet traps in Rooms 118 and 126, and floor drains in Rooms 122A and 126, because of the absence of sludge.
- Water samples were not collected from floor drains in Rooms 122A, 126, and 125, because of the absence of water in the drains.
- Additional wipe samples were collected from floor drains in Rooms 122A and 105 to compensate for the lack of water and/or sludge samples, which could not be collected because of the absence of these matrices.
- An additional concrete core was collected in Room 105 and analyzed for radiological constituents.

6.2 Radiological Characterization Summary

The *Final Workplan for the Reconnaissance-Level Characterization of Buildings 4, 5, 14, 40, and 41* describes Building 5 as potentially contaminated by radioactive materials. The presence of contamination was confirmed in a preliminary contamination survey conducted in May 2010. Consequently, the first and second floor, lower walls, and heating, venting, air conditioning (HVAC) system were classified as Class 1 areas; the first- and second-floor upper walls and ceilings were classified as Class 2 areas; and the walls in the two attics in Building 5 were classified as Class 3 areas. The focus of the survey was the existing floors and walls in the vicinity of the historic contamination areas and the air ductwork.

6.2.1 Radiological Scanning

Radiological scanning was performed to determine if there were any areas of elevated radioactivity that would require biased static radiological measurements. Consistent with the workplan, the following areas were scanned as described using a gas-flow proportional floor monitor (Ludlum Model 239-1F) or a hand-held dual phosphor detector (Ludlum Model 43-89):

- 100 percent alpha/beta radiation scans of Class 1 floor surfaces;
- ≥ 50 percent alpha/beta scans of Class 1 wall surfaces;
- ≥ 50 percent alpha/beta scans of Class 1 accessible internal HVAC surfaces (areas accessible from the HVAC registers around Rooms 112 and 122 and outside);
- ≥ 25 percent alpha/beta scans of all Class 2 surfaces;
- ≥ 25 percent alpha/beta scans of all Class 3 floor surfaces; and
- ≥ 10 percent alpha/beta scans of all Class 3 wall surfaces.

Scanning speeds using the gas-proportional floor monitor were approximately 10 centimeters per second (cm/s). Scanning speeds for the dual phosphor detector were approximately 5 cm/s.

No radioactivity above background levels was detected during radiological scanning of floors, walls, and the interior surfaces of the HVAC system. Consequently, no biased radiological measurements were collected from these locations.

6.2.2 Systematic Radiological Measurements

Thirty floor locations were identified in the workplan for systematic direct measurements. The locations were based on a triangular grid system with a random starting point. Sixty-nine direct radiological measurements of the first-level flooring, including duplicate measurements, were taken. Seventeen direct radiological measurements of second-level flooring, including duplicates, were taken. Removable radioactivity measurements were collected via surface smear sampling at each of the systematic sampling locations. The floor sample locations are shown in Figure 6-3 for the first floor and Figure 6-5 for the second floor. Table 6-1 indicates the types of floor materials surveyed.

Fifty wall locations were identified in the field for systematic direct radiation measurements. The locations were equally spaced, alternating between 1 and 5 feet high along the unobstructed sections of the walls on the first and second floors. If these locations were obstructed by equipment, another location with an accessible surface for measurement was identified. Removable radioactivity measurements were collected by surface smear sampling at each of these locations. Wall sample locations on the first floor are shown in Figure 6-4 and on Figure 6-5 for the second floor.

All direct radiological measurements were collected for a period of 1 minute using a hand-held gas proportional detector (Ludlum Model 43-68). Removable radioactivity measurements were also collected for 1 minute, using a channel alpha/beta sample counter (Ludlum Model 3030 or a Ludlum Model 2929).

The highest measurement of total alpha was 65 dpm/100 cm^2, and the highest measurement of total beta was 3,390 dpm/100 cm^2. Two additional measurement were collected near the location where the 3,390 dpm/100 cm^2 total beta measurement was observed. These two measurements showed total beta surface activities of 446 and 294 dpm/100 cm^2. The coordinates of these measurements listed in Table 6-1 indicate that the three measurements were taken at same location but because the grid location is measured to the nearest square foot, the measurements were actually taken in slightly different locations within an estimated one-square-foot area. The results suggest that the highest observed total beta surface activity occurs in a small area.

The DCGLs for total alpha and total beta surface radioactivity are 100 and 5,000 dpm/100 cm^2, respectively. The highest measurement of removable alpha was 12 dpm/100 cm^2 and the highest removable beta measurement was 54 dpm/100 cm^2. The DCGLs for removable alpha and total beta surface radioactivity are 20 and 1,000 dpm/100 cm^2, respectively.

The results of the systematic measurements of direct and removable radiological contamination are provided in Table 6-1 and summarized in Table 6-3.

6.2.3 Tritium Sampling

Thirty-four tritium samples were collected. Ten of these were co-located with systematic floor sample locations and five were co-located with wall sample locations. Nineteen were collected from biased samples of floors (eleven), walls (three), and the HVAC system (five). All tritium samples were analyzed by an off-site laboratory (Eberline Analytical).

The highest detected surface activity of tritium was 419 dpm/100 cm^2. The DCGL for tritium is 10,000 dpm/100 cm^2. The results of tritium sampling are provided in Table 6-1 and summarized in Table 6-4.

6.2.4 Volumetric Sampling

Three concrete core samples were collected in the Class 1 areas down to 3 inches below the surface. The locations of these samples are shown in Figure 6-6. All samples were analyzed for Cobalt-60, Europium-152, and Europium-154 via gamma spectroscopy at the off-site analytical laboratory, Test America.

The results of volumetric sampling of concrete are presented in Table 6-2. No samples were above their respective Minimal Detectable Concentrations (MDC) and all were assigned data qualifier of non-detects (U).

6.3 Non-radiological Characterization Summary

6.3.1 Chemical Constituents

As shown in Table 6-5, samples of various matrices, including concrete floor, wall paint, water in sink traps, and others, were collected from Building 5. The locations of these samples are shown in Figure 6-7. This figure also shows the locations of equipment that may contain mercury (such as thermostats) that were observed in the building. Analytical data are summarized in Table 6-6 through Table 6-9. The complete analytical results are provided on a CD-ROM in Appendix E.

Of the 32 solid, sediment, or sludge samples collected from Building 5 and analyzed for metals, two samples contained concentrations above the TTLC. Concentrations of copper and zinc were above the TTLC in the sludge sample collected from a floor drain in Room 105. The TTLC for copper was exceeded in the sediment sample collected from the floor of a pit in Room 102. The pit was accessed through small gratings in the platform. Only very limited observations of the pit floor and sidewalls were possible, because the pit was covered with a wood platform that could not be removed during sample collection.

Barium, cadmium, chromium, lead, and silver were reported at concentrations greater than 10 times the STLC in the sample of the pit sediment (Room 102). Copper was reported at concentrations greater than the STLC in water samples collected from sink traps in Rooms 120 and 126. Mercury concentrations exceeded the STLC and TCLP thresholds in a water sample collected from the sink trap in Room 120. Lead and zinc concentrations exceeded the STLC in the water sample collected from the sink trap in Room 126. Lead concentrations in this sample also exceeded the TCLP. Metals

concentrations were near or below detection limits in water samples collected from toilet traps in Rooms 118 and 126. Metals concentrations were below the STLC and TCLP thresholds in sink trap water samples in Rooms 112, 118, and 105, but lead approached the STLC and TCLP in duplicate sink trap water samples collected in Room 105. Lead concentrations were greater than 10 times the STLC in all three samples of sediment collected from the floor in the attic.

Lead and mercury were detected in all wipe samples collected from pipe stubs, sewer cleanouts, and floor drains, with the highest concentrations reported at 829 μg/100 cm^2 for lead and 329 μg/100 cm^2 for mercury. Lead was detected in all wipe samples collected from the building surfaces (floors, ledges, and sills). Mercury was detected in 14 of 18 surface wipe samples. The greatest concentrations of lead reported were found in wipe samples of the floor in Room 116A (74.2 μg/100 cm^2 and 106 μg/100 cm^2 in samples B5SW09 and B5SW10, respectively).

Lead, mercury, and, beryllium were detected in two wipe samples collected from air handling system vents. The concentration of lead in the wipe sample collected from the vent located above the entrance to Room 122 was 457 μg/100 cm^2. Beryllium concentrations were below the chronic disease prevention program limit (10 CFR 850) in both samples.

Beryllium concentrations were below the chronic disease prevention program limit (10 CFR 850) in all of the 18 wipe samples collected from exposed surfaces in Building 5 (floor, ledges, and sills). The concentration of beryllium exceeded the chronic disease prevention program limit (10 CFR 850) in a wipe sample collected from the floor drain in Room 100.

Fluoride residue was suspected to be present in ducting from a toxic gas fume hood in Room 100 because of the use of fluorinated gases at this hood. Fluoride was not detected in either of two wipe samples collected from inside the fume hood ducting. Lead and mercury were detected in both of these wipe samples. Beryllium was not detected.

Metal concentrations were below the TTLC in all of the 26 concrete core samples collected in Building 5. Mercury concentrations were greater than 10 times the STLC in two concrete samples collected at the base of the east wall in Room 112. Chromium concentrations were near or slightly greater than 10 times the STLC in all of the concrete samples.

Of the 23 samples collected in Building 5 and analyzed for PCBs, none contained concentrations above the TTLC. The greatest concentrations of PCBs were 15 mg/kg of aroclor-1260 and 4.9 mg/kg of aroclor-1254 in a paint sample collected from the east wall of Room 150.

Concentrations of VOCs were more than an order of magnitude below the TTLC, the 10-times STLC, and the 20-times TCLP in all of the 18 concrete samples and one sediment sample collected. Similarly, SVOC concentrations were reported at well below the TTLC, the 10-times STLC, and the 20-times TCLP in the five concrete cores collected. Benzyl alcohol was detected in a concrete core collected in Room 150 (1.4 mg/kg in Sample B5SC05). Low concentrations of certain VOCs and SVOCs for which numeric hazardous waste thresholds have not been established were reported.

Five concrete core samples were analyzed for TPH-diesel and TPH-motor oil. Diesel range petroleum hydrocarbons were detected in three of the five samples. The greatest concentration of

TPH diesel was 990 mg/kg in sample B5SC02, collected at the east end of Room 150. Motor oil range hydrocarbons were detected in four of the concrete core samples (42 mg/kg to 200 mg/kg).

The laboratory measured pH in five concrete core samples. The pH values ranged from 11.2 to 11.9.

6.3.2 Lead-based Paint

Seven paint samples were collected and submitted for metals analysis to Macs Lab, Inc. performed according to EPA Method 6010B/3050. The paint samples were collected from the following locations:

- Paint in Room 100 (composite);
- Paint on concrete in Room 101;
- Paint in Room 102;
- Yellow and white paint in Room 102 (composite);
- Off-white paint in Room 105 (composite);
- Paint on wood in Room 150; and
- Paint on chip exterior door frame (composite).

Four of the seven samples – the sample from Room 100, both samples from Room 102, and the exterior door-frame sample – contained more than 5,000 ppm of lead. Paint in Rooms 101, 105, and 150 was reported at concentrations of less than 5,000 ppm.

Lab results reporting the detectable presence of lead in these sampled paints and/or surface coatings should be assumed to be representative of all similar paints and/or surface coatings encountered in the building. The results are presented in Appendix C.

6.3.3 Asbestos-containing Materials

Asbestos was found in the following materials and approximate quantities:

- All floor tile, baseboard mastic, and floor paper felt (5,600 square feet);
- Wall texture, drywall, and joint compound (25,000 square feet);
- Transite panels (600 square feet);
- Thermal system insulation and mudded pipe elbow (400 linear feet);
- Two transite flue pipes (35 square feet);
- Exterior wall elastomeric coating (4,000 square feet);
- Pressure-valve black mastic patch (5 square feet);
- Roof penetration mastic (60 square feet); and

- Miscellaneous asbestos-containing debris in attic (4,300 square feet).

The pre-demolition survey report assessing asbestos-containing materials in Building 5 is provided in Appendix C. That report is intended for submittal in its entirety to the BAAQMD to support demolition notification documentation.

6.4 Conclusions and Recommendations

6.4.1 Radiological Constituents

No radioactivity above background levels was detected during radiological scanning of floors and interior surfaces of The HVAC system; consequently, no biased direct radiation measurements were collected from these locations. No radioactivity above background was detected by scanning of the walls in Room 112. Systematic direct measurements ranged from 661 to 725 dpm/100 cm^2, indicating no residual radioactivity above the DCGLs listed in Table 5-1.

Total alpha and total beta surface radioactivity measurements were also below the DCGLs listed in Table 5-1. The results of tritium sampling show no measurements above the DCGLs listed in Table 5-1. All volumetric samples were below the LBNL Institutional Volumetric Release Limits contained in Table 5-2.

6.4.1.1 Final Status Survey Evaluation

The data collected in Building 5 suggest that surfaces evaluated meet the release criteria established in Table 5-1 and the volumetric materials evaluated meet the limits in Table 5-2. Building 5 can be considered for unconditional release.

6.4.2 Chemical Constituents

Table 6-5 lists constituents reported in samples collected in Building 5 at concentrations potentially exceeding hazardous waste thresholds.

Available data suggest that the sewer system is contaminated with metals. Concentrations of copper and zinc in samples of sludge collected from a floor drain in Room 105 exceed hazardous waste concentrations. Lead concentrations are significantly greater than 10 times the STLC in the same sludge sample. Copper, zinc, lead, and mercury were reported at concentrations greater than the STLC in water samples collected from the sink traps. Significant concentrations of lead and mercury were also found in wipe samples collected from various points in the sewer system, with a mercury concentration as high as 329 $\mu g/100\ cm^2$ in one sample. Because of the detections of elevated metal concentrations in the sewer components and the general inaccessibility of the system during the characterization, it should be assumed that the sewer system is contaminated. Additional characterization during demolition could be considered to potentially minimize hazardous waste.

Sediment on the floor of the pit in Room 102 is considered hazardous waste because of the concentration of copper, which exceeds the TTLC. Lead, barium, chromium, cadmium, and silver also exceed 10 times the STLC in this sediment, with lead significantly exceeding this value. No

concrete sample was collected from the pit floor. It is unknown whether cracks or other penetrations exist in the pit to allow contaminant migration from the surface to deeper concrete and underlying soil. Concrete in the pit should be considered contaminated unless additional samples indicate otherwise. If cracks or penetrations are observed, soils beneath the pit should be inspected for evidence of contamination, such as staining, odors, or vapors, and soil samples should be collected and analyzed for metals and organic compounds.

Fluoride was not detected in the toxic gas fume hood in Room 100. Fluoride gas residues are not a concern in the fume hood ducting.

Elevated mercury concentrations were detected on the east wall of the former Hot Cell in Room 112 approximately 6 inches above the floor. Collection of additional samples from the wall and the floor around this location is recommended. TLCP, STLC, and TTLC analysis for mercury should be performed. The floor near the east wall should be thoroughly inspected for cracks and penetrations, and if cracks are observed, samples of soil beneath the floor should be collected and analyzed for mercury.

Metals concentrations in the remaining 24 concrete samples do not indicate contamination. Chromium was detected in concrete samples at slightly elevated concentrations; however, the elevated chromium concentrations are consistently distributed throughout the building, which is not indicative of a release, suggesting that the chromium is a component of the original concrete mixture. In addition, given that the total concentration is only slightly greater than 10 times the STLC, it is likely that the extractable concentration of chromium is below the STLC. It is reasonable to assume that the concrete in the building was not impacted by a release of chromium. If additional certainty about the characterization of the concrete is desired, one or more of the previously collected concrete samples could be analyzed in advance of the six-month holding time limit.

Lead was found in all wipe samples collected from building floors, ledges, and sills. The greatest lead concentration was reported on the floor of a lead-lined room (Room 116A). Elevated concentrations of lead were detected in two air-handling vents in rooms adjacent to Room 116 (457 $\mu g/100\ cm^2$ and 134 $\mu g/100\ cm^2$). Mercury concentrations in air handling vents also were slightly elevated. Components of the building air-handling units should be segregated and evaluated for disposal. Demolition work in the building should be conducted in a manner that protects the workers from exposure to lead.

Lead concentrations also significantly exceeded 10 times the STLC in samples of sediment collected from the attic floors in Building 5. Lead is expected to leach out of the fine sediment matrix and exceed the STCL hazardous waste threshold. Mercury concentrations in attic sediment were slightly below 10 times the STLC. The concentration of mercury in a wood sample collected under the joints of a mercury vacuum line in the south attic was low (0.32 mg/kg) and does not suggest significant mercury contamination. It is possible that mercury could exceed hazardous waste thresholds at isolated locations in this attic. The structural components of both attics, such as the wood floors, should be considered to be contaminated with lead unless additional samples indicate otherwise. Additional samples should be collected in the south attic to confirm the lack of mercury contamination.

Reported concentrations of PCBs in all concrete, sediment, caulk, and wall paint samples collected were below comparison thresholds. These results suggest that PCBs are not a concern at Building 5. Sample results for VOCs, SVOCs, and TPH indicate that these compounds are not a concern at Building 5. All reported pH values were consistent with typical pH levels of the building materials (concrete) from which they were collected.

Several thermostats that potentially contain mercury switches were identified in Building 5 (Figure 6-4). Care should be taken when removing equipment that may contain mercury switches to prevent breakage and release of liquid mercury. Additional thermostats and other mercury-containing equipment could be present.

No samples were collected under fixtures, such as the laboratory sink and bench in Room 112 where chemical handling had occurred; under experiment equipment, sink, cabinets, and shelving in Room 105; inside the cages in Room 150A; nor under the cabinets or sheet metal lining in Room 116A. If staining or other evidence of contamination is observed upon removal of these fixtures and equipment, additional samples should be collected. The outside sumps at west side of Room 150A should be characterized when they become accessible.

6.4.3 Lead-based Paint

The interior building paint in Rooms 100 and 102 and on the exterior door frame contained more than 5,000 ppm of lead. The presence of lead and/or lead-containing paint requires the use of specialized work practices during demolition work to help ensure that individuals involved in the work are adequately protected against elevated exposure to lead. Contractors or employees involved in lead-related demolition activities must comply with the Construction Safety Orders for Lead (8 CCR §1532.1 et. Seq.) and training requirements for those involved in lead-related demolition activities. The Construction Safety Orders for Lead also require that a “Lead-Work Pre-Job Notification” be filed with CalOSHA whenever a construction project involves work that includes “trigger tasks,” as defined by the standard, which will involve greater than 100 square feet of “lead-based paint.” Notification must be made 24 hours prior to the commencement of work.

Loose paint chips or other debris containing 0.5% lead by weight are likely to be characterized as hazardous waste; therefore, damaged paint containing lead at 0.5% or greater should be stabilized or removed prior to demolition. Disturbance of lead-containing paints and/or surface coatings should be conducted by a licensed contractor utilizing workers with CDPH training in lead-related construction. Lead-related construction waste should be segregated into discrete waste streams and characterized for proper disposal.

6.4.4 Asbestos-containing Materials

Asbestos was found in all floor tiles, in wall texture and drywall, and in miscellaneous patch, insulation, and coating materials. Designation of a material as asbestos-containing should be applied to all homogenous material of the type reported to contain asbestos. Since more than 100 linear or 100 square feet of regulated asbestos-containing material will be disturbed in the demolition of Building 5, the BAAQMD must be notified at least 10 days prior to demolition activities.

Table 6-1. Systematic Radiological Measurement Results – Building 5

Sample ID	X	Y	Z	Surface Type	Material Type	Total Alpha (dpm/100cm^2)	Total Beta (dpm/100cm^2)	Removable Alpha (dpm/100cm^2)	Removable Beta (dpm/100cm^2)	Tritium (dpm/100cm^2)	Comments
B5-2F-76-04-00-B1-01	76	4	0	Floor (2nd Floor)	Concrete	0	0	0	4		
B5-2F-43-41-01-B3-01	43	41	1	Floor (2nd Floor)	Tile					0.53724	
B5-2F-43-40-00-B4-01	43	40	0	Floor (2nd Floor)	Drywall	6	41	0	0		
B5-2F-59-10-00-B4-01	59	10	0	Floor (2nd Floor)	Drywall	65	0	0	0		
B5-2F-59-34-00-B4-01	59	34	0	Floor (2nd Floor)	Drywall	24	4	7	0		
B5-2F-59-40-00-B4-01	59	40	0	Floor (2nd Floor)	Drywall	65	211	0	13		
B5-2F-60-05-00-B4-01	60	5	0	Floor (2nd Floor)	Drywall	6	103	3	21		
B5-2F-66-20-00-B4-01	66	20	0	Floor (2nd Floor)	Drywall	6	0	3	0		
B5-2F-70-16-00-B4-01	70	16	0	Floor (2nd Floor)	Drywall	18	0	3	0		
B5-2F-75-34-00-B4-01	75	34	0	Floor (2nd Floor)	Drywall	0	105	0	22		
B5-2F-75-34-00-B4-01	75	34	0	Floor (2nd Floor)	Drywall	6	57	0	36		
B5-2F-79-16-00-B4-01	79	16	0	Floor (2nd Floor)	Drywall	6	0	0	0		
B5-2F-81-30-00-B4-01	81	30	0	Floor (2nd Floor)	Drywall	12	0	0	0		
B5-2F-82-24-00-B4-01	82	24	0	Floor (2nd Floor)	Drywall	0	79	0	0		
B5-2F-89-34-00-B4-01	89	34	0	Floor (2nd Floor)	Drywall	0	0	0	13		
B5-2F-95-28-00-B4-01	95	28	0	Floor (2nd Floor)	Drywall	0	65	0	0		
B5-2F-104-30-00-B4-01	104	30	0	Floor (2nd Floor)	Drywall	24	29	12	0		
B5-2F-57-02-00-B5-01	57	2	0	Floor (2nd Floor)	Painted Steel	0	0	0	8		
B5-2F-82-24-00-B4-01	82	24	0	Floor (2nd Floor)	Drywall					63.048	
B5-2W-48-39-00-B1-01	48	39	0	Wall (2nd Floor)	Concrete	6	0	0	0		
B5-2W-54-05-01-B1-01	54	5	1	Wall (2nd Floor)	Concrete	0	116	0	29		
B5-2W-54-34-05-B1-01	54	34	5	Wall (2nd Floor)	Concrete	6	0	3	0		
B5-2W-54-42-01-B1-01	54	42	1	Wall (2nd Floor)	Concrete	0	79	0	0		
B5-2W-62-04-03-B1-01	62	4	3	Wall (2nd Floor)	Concrete	0	0	3	8		
B5-1F-03-29-00-B1-01	3	29	0	Floor	Concrete	0	132	0	33		
B5-1F-11-25-00-B1-01	11	25	0	Floor	Concrete	0	175	0	33	5.106	
B5-1F-11-39-00-B1-01	11	39	0	Floor	Concrete	0	50	0	38		
B5-1F-16-40-00-B1-01	16	40	0	Floor	Concrete	0	638	0	21	7.77	
B5-1F-19-25-00-B1-01	19	25	0	Floor	Concrete	9.3	325	0	4	9.3906	
B5-1F-19-29-00-B1-01	19	29	0	Floor	Concrete	0	164	0	21		
B5-1F-23-40-00-B1-01	23	40	0	Floor	Concrete	0	475	0	0	2.6862	
B5-1F-25-28-00-B1-01	25	28	0	Floor	Concrete	0	725	0	17	86.358	
B5-1F-25-41-00-B1-01	25	41	0	Floor	Concrete	0	177	0	0		
B5-1F-35-23-00-B1-01	35	23	0	Floor	Concrete	0	92	0	33	0	
B5-1F-35-29-00-B1-01	35	29	0	Floor	Concrete	0	0	0	0		
B5-1F-42-36-00-B1-01	42	36	0	Floor	Concrete	0	240	0	0	0.26862	
B5-1F-43-11-00-B1-01	43	11	0	Floor	Concrete	0	41	0	0		
B5-1F-43-30-00-B1-01	43	30	0	Floor	Concrete	0	0	0	54	1.6095	
B5-1F-43-39-00-B1-01	43	39	0	Floor	Concrete	4.7	196	0	13	10.1898	
B5-1F-43-41-00-B1-01	43	41	0	Floor	Concrete	0	78	0	0		
B5-1F-44-26-00-B1-01	44	26	0	Floor	Concrete	0	79	0	17	8.0586	
B5-1F-44-26-00-B1-02	44	26	0	Floor	Concrete	0	54	0	13	10.4562	

Table 6-1. Systematic Radiological Measurement Results – Building 5

Sample ID	X	Y	Z	Surface Type	Material Type	Total Alpha (dpm/100cm^2)	Total Beta (dpm/100cm^2)	Removable Alpha (dpm/100cm^2)	Removable Beta (dpm/100cm^2)	Tritium (dpm/100cm^2)	Comments
B5-1F-50-09-00-B1-01	50	9	0	Floor	Concrete	0	467	0	25	3.219	
B5-1F-50-29-00-B1-01	50	29	0	Floor	Concrete	0	313	0	13	11.0112	
B5-1F-51-02-00-B1-01	51	2	0	Floor	Concrete	12	439	0	21	2.9526	
B5-1F-51-05-00-B1-01	51	5	0	Floor	Concrete	0	498	0	21	2.4198	
B5-1F-51-32-00-B1-01	51	32	0	Floor	Concrete	0	0	0	0		
B5-1F-51-32-00-B1-01	51	32	0	Floor	Concrete	0	0	0	0		
B5-1F-58-32-00-B1-01	58	32	0	Floor	Concrete	6	439	0	33	0.80586	
B5-1F-59-15-00-B1-01	59	15	0	Floor	Concrete	0	95	0	0		
B5-1F-59-41-00-B1-01	59	41	0	Floor	Concrete	0	0	0	0	2.9526	
B5-1F-65-10-00-B1-01	65	10	0	Floor	Concrete	29	317	0	45	7.2372	
B5-1F-66-42-00-B1-01	66	42	0	Floor	Concrete	6	346	0	37	1.6095	
B5-1F-67-01-00-B1-01	67	1	0	Floor	Concrete	0	91	0	0	28.638	
B5-1F-67-05-00-B1-01	67	5	0	Floor	Concrete	0	511	0	29	20.6682	
B5-1F-67-29-00-B1-01	67	29	0	Floor	Concrete	0	108	0	0		
B5-1F-67-29-00-B1-02	67	29	0	Floor	Concrete	0	78	0	17	4.551	
B5-1F-67-36-00-B1-01	67	36	0	Floor	Concrete	12	662	3	0	6.9708	
B5-1F-68-26-00-B1-01	68	26	0	Floor	Concrete	18	680	0	33	9.9234	
B5-1F-71-42-00-B1-01	71	42	0	Floor	Concrete	0	542	0	0	2.9526	
B5-1F-73-10-00-B1-01	73	10	0	Floor	Concrete	0	416	0	33	-0.53724	
B5-1F-75-15-00-B1-01	75	15	0	Floor	Concrete	0	165	0	8		
B5-1F-75-15-00-B1-02	75	15	0	Floor	Concrete	0	216	0	8		Not labeled as duplicate to sample B5-1F-75-15-00-B1-01 in datasheet.
B5-1F-75-41-00-B1-01	75	41	0	Floor	Concrete	0	61	3	4		
B5-1F-77-03-00-B1-01	77	3	0	Floor	Concrete	0	95	0	37		
B5-1F-78-42-00-B1-01	78	42	0	Floor	Concrete	36	518	0	17	5.3724	
B5-1F-80-33-00-B1-01	80	33	0	Floor	Concrete	0	405	0	37	7.5036	
B5-1F-81-42-00-B1-01	81	42	0	Floor	Concrete	0	388	0	21	1.07448	
B5-1F-83-29-00-B1-01	83	29	0	Floor	Concrete	0	104	3	0	3.7518	
B5-1F-89-05-00-B1-01	89	5	0	Floor	Concrete	0	348	0	17	-2.14674	
B5-1F-89-05-00-B1-02	89	5	0	Floor	Concrete	0	353	3	0	6.438	
B5-1F-91-15-00-B1-01	91	15	0	Floor	Concrete	11	264	0	0	5.3724	
B5-1F-91-40-00-B1-01	91	40	0	Floor	Concrete	11	69	0	17		
B5-1F-95-39-00-B1-01	95	39	0	Floor	Concrete	24	289	0	54	34.854	
B5-1F-99-06-00-B1-01	99	6	0	Floor	Concrete	0	173	0	0		
B5-1F-99-29-00-B1-01	99	29	0	Floor	Concrete	0	117	0	0		
B5-1F-107-15-00-B1-01	107	15	0	Floor	Concrete	0	277	0	21	5.6388	
B5-1F-107-41-00-B1-01	107	41	0	Floor	Concrete	0	74	3	29		
B5-1F-115-01-00-B1-01	115	1	0	Floor	Concrete	0	316	0	50		
B5-1F-115-29-00-B1-01	115	29	0	Floor	Concrete	0	104	0	0	50.172	
B5-1F-123-15-00-B1-01	123	15	0	Floor	Concrete	0	160	0	4	4.8396	
B5-1F-123-41-00-B1-01	123	41	0	Floor	Concrete	0	420	0	0		
B5-1F-131-01-00-B1-01	131	1	0	Floor	Concrete	11	199	3	8		
B5-1F-131-01-00-B1-02	131	1	0	Floor	Concrete	0	156	0	0		

Table 6-1. Systematic Radiological Measurement Results – Building 5

Sample ID	X	Y	Z	Surface Type	Material Type	Total Alpha (dpm/100cm^2)	Total Beta (dpm/100cm^2)	Removable Alpha (dpm/100cm^2)	Removable Beta (dpm/100cm^2)	Tritium (dpm/100cm^2)	Comments
B5-1F-131-29-00-B1-01	131	29	0	Floor	Concrete	0	78	0	12	-1.6095	
B5-1F-136-41-00-B1-01	136	41	0	Floor	Concrete	0	22	0	25	7.2372	
B5-1F-140-15-00-B1-01	140	15	0	Floor	Concrete	0	260	0	4		
B5-1F-147-29-00-B1-01	147	29	0	Floor	Concrete	0	33	0	0		
B5-1F-148-03-00-B1-01	148	3	0	Floor	Concrete	0	260	0	0		
B5-1F-150-15-00-B1-01	150	15	0	Floor	Concrete	5	221	0	0		
B5-1F-155-41-00-B1-01	155	41	0	Floor	Concrete	16	160	0	0		
B5-1F-35-29-00-B10-01	35	29	0	Floor	Copper	0	0	0	0		
B5-1F-35-29-00-B10-02	35	29	0	Floor	Copper	5	35	0	4		
B5-1F-83-29-00-B3-02	83	29		Floor	Tile					10.989	
B5-W-29-29-03-B1-01	29	29	3	Wall	Concrete	6	370	0	0		
B5-W-30-21-01-B1-01	30	21	1	Wall	Concrete	0	236	0	0		
B5-W-52-33-02-B1-01	52	33	2	Wall	Concrete	6	264	0	0		
B5-W-52-29-05-B1-01	52	29	5	Wall	Concrete	12	310	0	0		
B5-W-53-01-05-B1-01	53	1	5	Wall	Concrete	11	108	0	0	-1.6095	
B5-W-56-49-05-B1-01	56	49	5	Wall	Concrete	12	198	0	0		
B5-W-75-48-05-B1-01	75	48	5	Wall	Concrete	11	446	0	0	24.42	Directly above 20B on ledge
B5-W-75-48-05-B1-02	75	48	5	Wall	Concrete	0	294	0	0	-2.4198	
B5-W-75-48-05-B1-02	75	48	5	Wall	Concrete	17	3390	0	0		Second duplicate reading at this location.
B5-W-119-49-05-B1-01	119	49	5	Wall	Concrete	17	242	0	0		
B5-W-155-05-01-B1-01	155	5	1	Wall	Concrete	0	325	0	0		
B5-W-156-21-01-B1-01	156	21	1	Wall	Concrete	11	113	0	9		
B5-W-01-21-05-B11-01	1	21	5	Wall	Fiberglass	0	0	0	0	-2.14452	
B5-W-07-43-05-B11-01	7	43	5	Wall	Fiberglass	0	0	0	0		
B5-W-52-33-02-B1-02	52	33	2	Wall	Concrete	6	317	0	0		
B5-W-20-21-05-B4-01	20	21	5	Wall	Drywall	0	0	0	0		
B5-W-20-30-01-B4-01	20	30	1	Wall	Drywall	6	0	0	0		
B5-W-21-37-01-B4-01	21	37	1	Wall	Drywall	6	0	0	17		
B5-W-28-32-05-B4-01	28	32	5	Wall	Drywall	0	0	0	0		
B5-W-28-32-05-B4-02	28	32	5	Wall	Drywall	0	0	0	0		
B5-W-29-43-01-B4-01	29	43	1	Wall	Drywall	6	8	0	0	3.4854	
B5-W-52-46-05-B4-01	52	46	5	Wall	Drywall	24	99	3	0	-3.4854	
B5-W-58-12-03-B4-01	58	12	3	Wall	Drywall	17	0	0	9	-4.2846	
B5-W-69-01-01-B4-01	69	1	1	Wall	Drywall	0	117	0	9	3.4854	
B5-W-70-11-05-B4-01	70	11	5	Wall	Drywall	6	48	0	13		
B5-W-75-15-03-B4-01	75	15	3	Wall	Drywall	6	113	3	0	2.14452	
B5-W-86-28-05-B4-01	86	28	5	Wall	Drywall	11	0	3	0		
B5-W-87-21-01-B4-01	87	21	1	Wall	Drywall	0	0	0	0		
B5-W-94-21-05-B4-01	94	21	5	Wall	Drywall	0	74	0	0		
B5-W-100-28-01-B4-01	100	28	1	Wall	Drywall	6	0	0	0		
B5-W-106-17-05-B4-01	106	17	5	Wall	Drywall	11	0	0	0		
B5-W-106-17-05-B4-02	106	17	5	Wall	Drywall	0	0	0	0		

Table 6-1. Systematic Radiological Measurement Results – Building 5

Sample ID	X	Y	Z	Surface Type	Material Type	Total Alpha (dpm/100cm^2)	Total Beta (dpm/100cm^2)	Removable Alpha (dpm/100cm^2)	Removable Beta (dpm/100cm^2)	Tritium (dpm/100cm^2)	Comments
B5-W-106-29-01-B4-01	106	29	1	Wall	Drywall	6	0	0	13	-3.7518	
B5-W-107-12-01-B4-01	107	12	1	Wall	Drywall	0	61	0	0		
B5-W-108-22-01-B4-01	108	22	1	Wall	Drywall	6	0	0	0	-3.7518	
B5-W-108-28-05-B4-01	108	28	5	Wall	Drywall	6	147	0	13		
B5-W-109-46-01-B4-01	109	46	1	Wall	Drywall	11	13	0	0	0.26862	
B5-W-115-36-01-B4-01	115	36	1	Wall	Drywall	6	0	0	0		
B5-W-130-20-02-B4-01	130	20	2	Wall	Drywall	23	43	0	4	-4.551	
B5-W-133-49-03-B4-01	133	49	3	Wall	Drywall	11	52	0	0	-0.53724	
B5-W-140-37-01-B4-01	140	37	1	Wall	Drywall	6	0	0	0	-4.2846	
B5-W-147-23-03-B4-01	147	23	3	Wall	Drywall	6	0	0	0		
B5-W-155-49-05-B4-01	155	49	5	Wall	Drywall	6	0	0	18		
B5-W-29-43-05-B4-01	29	43	5	Wall	Drywall					-1.8759	
B5-W-64-35-03-B4-01	64	35	3	Wall	Drywall					16.8942	
B5-W-53-05-05-B4-01	53	5	5	Wall	Drywall					17.427	
B5-W-53-05-05-B4-02	53	5	5	Wall	Drywall					13.9416	
B5-W-78-48-05-B4-01	78	48	5	Wall	Drywall					126.54	
B5-W-140-39-05-B4-01	140	39	5	Wall	Drywall					1.8759	
B5-W-29-29-01-B4-01	29	29	1	Wall	Drywall					8.8356	
B5-W-29-29-01-B4-02	29	29	1	Wall	Drywall					-1.60728	
B5-W-64-30-03-B6-01	64	30	3	Wall	Plywood/Panel	11	0	0	0		
B5-W-94-39-01-B6-01	94	39	1	Wall	Plywood/Panel	11	35	0	0		
HVAC-RM112										5.106	
HVAC-RM112										9.1242	
HVAC-ABOVE RM122										13.9416	
HVAC-ABOVE RM122										27.306	
HVAC-OUTSIDE-B5										-3.219	
HVAC OUTSIDE UNIT-B5										28.86	
B5-HVAC RM122 OVER HEAD										99.456	
B5-HVAC RM122 OVER HEAD										23.088	
HVAC-RM122-B5										419.58	
HVAC-RM122-B5										211.788	
HVAC-RM122-B5										28.86	

Abbreviation:
dpm/100cm^2 decay per minute per 100 square centimeters of surface area

Table 6-2. Volumetric Sample Results – Building 5

Sample ID	Matrix	Method	Analyte	Result (pCi/g)	TPU (pCi/g)	MDA (pCi/g)	Data Qualifiers	Comments
SC25	Concrete	EPA 901.1 MOD	Cobalt-60	-0.4	0.24	0.46	U	
			Europium-152	-0.1	0.41	0.76	U	
			Europium-154	0.36	0.92	1.8	U	
SC26	Concrete	EPA 901.1 MOD	Cobalt-60	0.0	0.071	0.26	U	
			Europium-152	0.08	0.25	0.47	U	
			Europium-154	0.0	1.6	3.2	U	
SC27	Concrete	EPA 901.1 MOD	Cobalt-60	0.30	0.3	0.55	U	
			Europium-152	-0.06	0.4	0.88	U	
			Europium-154	0.0	0.87	3.2	U	

Abbreviation:
pCi/g picoCuries per gram

Table 6-3. Summary of Surface Alpha and Beta Radioactivity Measurements – Building 5

Area	Matrix	Parameter[1]	Number of Measurements	dpm/100cm^2 Median	Mean	Standard Deviation	Minimum	Maximum
1st Floor (systematic)	Concrete Copper Tile	Total Alpha	69	0	3.1	7.1	0	36
		Removable Alpha	9	0	0.3	.9	0	3
		Total Beta	69	175	231	189	0	725
		Removable Beta	69	8	14.2	15.7	0	54
2nd Floor (systematic)	Concrete Drywall Tile Wood	Total Alpha	17	6	14	21	0	65
		Removable Alpha	17	0	1.6	3.3	0	12
		Total Beta	17	4	41	58	0	211
		Removable Beta	17	0	6.9	10.7	0	36
1st Floor Walls (systematic)	Concrete Copper Carpet	Total Alpha	15	6	7.3	6.2	0	17
		Removable Alpha	15	0	0	0	0	0
		Total Beta	15	264	440	825	0	3390
		Removable Beta	15	0	0.6	2.3	0	9
1st Floor Walls (systematic)	Drywall Plywood/ Panel	Total Alpha	30	6	6.9	6.3	0	24
		Removable Alpha	30	0	0.3	0.9	0	3
		Total Beta	30	0	27	43	0	147
		Removable Beta	30	0	3.2	5.8	0	18
2nd Floor Walls (systematic)	Concrete	Total Alpha	5	0	2.4	3.3	0	6
		Removable Alpha	5	0	1.2	1.6	0	3
		Total Beta	5	0	39	55	0	116
		Removable Beta	5	0	7.4	12.6	0	29
Walls above 6 feet (biased)	Drywall	Total Alpha	3	0	0	0	0	0
		Removable Alpha	3	0	0	0	0	0
		Total Beta	3	0	33.4	46.9	0	123
		Removable Beta	3	0	14.3	20.6	0	55.1

Notes:
[1] Low energy beta emitters such as tritium are not included

Abbreviation:
dpm/100 cm^2 decay per minute per 100 square centimeters of surface area

Table 6-4. Measurements of Tritium Surface Radioactivity – Building 5

Area	Number of Measurements	dpm/100 cm^2 Median	Mean	Standard Deviation	Minimum	Maximum
1st Floor (Systematic and biased)	40	5.3	9.7	16	-2.1	86.4
2nd Floor (Systematic and biased)	2	31.7	31.7	44	0.5	63
1st floor Walls (concrete) (systematic and biased)	4	-1.9	4.56	13.2	-2.4	24.4
1st Floor Walls (drywall) (systematic and biased)	19	0.26	8.8	29.4	-4.6	126.5
HVAC (biased)	11	27	78.6	129	-3.2	419

Abbreviation:
dpm/100 cm^2 decay per minute per 100 square centimeters of surface area

Table 6-5. Non-Radiological Sampling and Analysis Summary – Building 5

Location	Matrix/Sample Type	Assumptions/Collection Rationale	Analytes	Constituents Potentially Above Hazardous Waste Thresholds [1]
Rooms 150, 150A	Concrete slab below tile	Chemical handling, decontamination area, machine shop, experimental mercury diffusion pumps, solvent use	TPH, PCBs, CAM 17, VOCs, SVOCs	Chromium [4] (Room 150A)
Two sumps - outside, west of Room 150A	Sump	Contaminant settling point	CAM 17, PCBs, VOCs	inaccessible [2]
Room 100	Concrete slab below tile	Decontamination area, mercury diffusion pumps, oil diffusion pumps, solvent use, molybdenum disulfide use, uraninite pitch-blend spill (metals)	CAM 17, PCBs, VOCs	Chromium [4]
Floor drain trap in Room 105, ; sink traps in Rooms 105, 112, 118, 120, 126; toilet traps in rooms 118, 126	Wastewater	Contaminant settling points	CAM 17, pH	Copper (Rooms 120 and 126), mercury (Room 120), lead and zinc (Room 126)
	Sediment and sludge	Contaminant settling points	CAM 17	Copper, lead, nickel, zinc (Room 105)
Sewer cleanouts, floor drains and pipe stubs - Rooms 150, 100, 112, 122A, 105; outside, south of Room 135, north of Room 105	Sewer pipe inner surface[3]	Contamination conduit	CAM 17	Beryllium (Room 100)
Room 102 Pit	Sediment	Contaminant settling point	CAM 17, PCBs, VOCs	Barium, cadmium, chromium, copper, lead, silver
Room 102	Concrete slab below tile	Contaminated material pit, diffusion pumps in adjacent rooms	Mercury	None
Room 112	Concrete slab below tile	Toxics substance storage, solvent handling area, lead shielding	CAM 17, VOCs	Chromium [4]
East wall of Room 112	Concrete	Wall labeled "Under Paint Contamination," toxics substance storage in room, solvent handling, lead shielding	CAM 17, PCBs, VOCs	Chromium [4], mercury

Table 6-5. Non-Radiological Sampling and Analysis Summary – Building 5

Location	Matrix/Sample Type	Assumptions/Collection Rationale	Analytes	Constituents Potentially Above Hazardous Waste Thresholds [1]
Room 116A	Concrete floor	Lead shielding on north wall	Lead	None
Rooms 122, 122A	Concrete floor	Refrigeration unit and associated piping, stain on Room 122 floor adjacent to refrigerant compressor	CAM 17, VOCs	Chromium [4]
Rooms 105, 117	Concrete slab below tile	Mercury diffusion pumps in radiological work area/hot cell and neutron generator	Mercury, lead, PCBs	None
Toxic gas vacuum ducting in Rooms 100, 201	Ducting inner surface[3]	Fume hood system used for fluorinated toxic gases	Fluoride	None
Floors 1 and 2 (see map)	Dust on horizontal surfaces such as floors, HVAC vents, ledge[3]	Potential releases of beryllium, lead, and mercury and dispersion in dust	Beryllium, lead, mercury	None [5]
Rooms 150, 112, 136	Interior paint	PCBs commonly used in paint, pre-1979	PCBs	None
Room 150	Window sill caulking	PCBs commonly used in paint, pre-1979	PCBs	None
Attic areas	Bulk dust and sediment	Potential releases of beryllium, lead, and mercury and dispersion in dust	Beryllium, lead, mercury	Lead
South attic at abandoned mercury vacuum lines [3]	Attic floor material	Abandoned mercury vacuum lines	Mercury	None

Notes:
Asbestos and lead-based paint are not included in this table. See Appendix C for asbestos and lead-based paint results.
1 Constituents above thresholds listed in Table 5-3 and described in 5.2.1. To determine if a constituent is considered a hazardous waste or is potentially a hazardous waste (based on leachability), consult analytical results tables.
2 Both sumps inaccessible because of heavy steel cover plates. A cargo container anchored to a concrete slab overlies the south sump. No samples collected.
3 Wipe sample.
4 Total chromium concentration only slightly greater than 10 times the STLC and not likely hazardous waste.
5 Lead concentrations were detected in all building surface wipe samples, and were especially high in air handling vents. Demolition work in the building should be conducted in a manner that protects the workers from exposure to lead.

Abbreviations:
CAM 17 California Administrative Code, Title 22 Priority Pollutant Metals
PCBs polychlorinated biphenyl compounds
TPH total petroleum hydrocarbons, diesel and motor oil range organics
VOCs volatile organic compounds

Table 6-6. Analytical Results for Metals – Building 5

Sample Type	Sample Description	Sample Name	Units	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Hg	Mo	Ni	Se	Ag	Tl	V	Zn
Exposed Wood	Wood below mercury vacuum line joints in attic, east	B5EW01	mg/kg	---	---	---	---	---	---	---	---	---	0.32	---	---	---	---	---	---	---
Concrete	Concrete core, Room 150A southeast	B5SC01	mg/kg	<0.52	3.6	104	0.27	0.15	35.3	22.4	49.7	5.3	0.16 U, 2	0.49 J, T	41.0	0.77	0.043 J, T	0.14 U, 2	25.0	150 J, 4L
Concrete	Concrete core, Room 150 east	B5SC02	mg/kg	<0.52	3.3	83.5	0.24	0.24	20.9	8.9	25.3	3.3	0.16 U, 2	0.58	16.3	0.70	0.036 J, T	0.32 U, 2	15.2	34.1 J, 4L
Concrete	Concrete core, Room 150A west	B5SC03	mg/kg	<0.53	4.8	136	0.29	0.19	52.3	13.2	36.0	5.4	0.25 U, 2	0.58	64.8	0.78	0.061 J, T	0.099 U, 2	29.8	63.1 J, 4L
Concrete	Concrete core, Room 150A southwest	B5SC04	mg/kg	<0.52	4.9	117	0.26	0.10	51.2	15.0	35.8	5.4	0.18 U, 2	0.54	58.4	0.91	0.058 J, T	0.064 U, 2	32.7	52.9 J, 4L
Concrete	Concrete core, Room 150	B5SC05	mg/kg	<0.51	2.5	67.8	0.19	0.16	22.5	8.6	25.9	2.3	0.11 U, 2	0.54	9.7	0.61	0.042 J, T	0.091 U, 2	13.2	33.3 J, 4L
Concrete	Concrete core, Room 100 east	B5SC06	mg/kg	<0.52	3.5	110	0.21	0.043 J, T	51.3	13.5	31.1	3.8	0.081 U, 2	0.71	70.4	0.58	0.035 J, T	<0.21	35.7	38.9 J, 4L
Concrete	Concrete core, Room 100 northwest	B5SC07	mg/kg	<0.57	3.7	112	0.25	0.046 J, T	39.3	13.7	30.2	4.6	0.025 U, 2	0.91	49.7	0.69	0.032 J, T	<0.23	28.4	39.2 J, 4L
Concrete	Concrete core, Room 100 center	B5SC08	mg/kg	<0.53	3.3	81.8	0.22	0.12	53.9	8.2	16.5	15.1	0.030 U, 2	0.57	72.2	0.69	0.053 J, T	<0.21	29.3	37.5 J, 4L
Concrete	Concrete core, Room 100 south	B5SC09	mg/kg	<0.54	3.9	135	0.28	0.047 J, T	46.1	14.3	28.6	4.9	0.036 U, 2	0.55	89.2	0.94	0.039 J, T	<0.22	38.4	43.4 J, 4L
Concrete	Concrete core, Room 102 west	B5SC10	mg/kg	---	---	---	---	---	---	---	---	---	0.022 U, 2	---	---	---	---	---	---	---
Concrete	Concrete core, Room 112 north	B5SC11	mg/kg	<0.56	3.2	110	0.24	0.052 J, T	64.6	13.5	29.4	3.6	0.029 U, 2	0.60	55.6	0.77	0.033 J, T	<0.22	40.7	38.7 J, 4L
Concrete	Concrete core, Room 112 north	B5SC12 DUP	mg/kg	<0.56	3.8	286	0.25	0.11	44.9	11.9	81.8	4.5	0.025 U, 2	0.57	53.7	0.79	0.056 J, T	<0.22	47.9	45.3 J, 4L
Concrete	Concrete core, Room 112 central	B5SC13	mg/kg	<0.52	3.2	135	0.21	0.32	42.6	20.7	38.4	7.6	0.034 U, 2	0.49 J, T	45.2	0.55	0.050 J, T	<0.21	42.2	54.0 J, 4L
Concrete	Concrete core, Room 112 northwest	B5SC14	mg/kg	<0.52	3.5	109	0.27	0.068	40.8	8.6	25.3	6.1	0.032 U, 2	0.61	45.7	0.66	0.055 J, T	<0.21	44.7	53.8 J, 4L
Concrete	Concrete wall chips, Room 112 east	B5SC15	mg/kg	<0.51	3.5	106	0.26	0.26	45.3	5.9	19.0	38.8	7.0 J, 4L	0.72	44.8	0.55	0.064 J, T	0.12 U, 2	26.5	62.7
Concrete	Concrete wall chips, Room 112 southeast	B5SC16	mg/kg	<0.52	3.3	108	0.21	0.54	60.4	5.2	23.3	7.5	4.4 J, 4L	1.2	39.2	0.53	0.064 J, T	0.079 U, 2	40.0	53.2
Concrete	Concrete core, Room 116A central	B5SC17	mg/kg	<0.52	3.1	131	0.21	0.14	38.8	11.8	27.0	5.6	0.032 U, 2	0.58	42.4	0.85	0.086 J, T	<0.21	56.5	89.1 J, 4L
Concrete	Concrete core, Room 122 northeast	B5SC18	mg/kg	<0.51	4.4	168	0.24	0.22	70.1	19.2	80.2	6.4	0.058	0.68	53.9	0.86	0.072 J, T	<0.2	62.1	75.3 J, 4L
Concrete	Concrete core, Room 122A northeast	B5SC19	mg/kg	<0.51	3.1	223	0.22	0.40	54.2	28.7	58.1	8.8	0.043 U, 2	0.69	47.7	0.63	0.058 J, T	<0.2	70.2	110 J, 4L
Concrete	Concrete, Room 117	B5SC20	mg/kg	---	---	---	---	---	---	---	---	2.2	0.057 U, 2	---	---	---	---	---	---	---
Concrete	Concrete core, Room 105 east	B5SC21	mg/kg	---	---	---	---	---	---	---	---	4.1	0.025 U, 2	---	---	---	---	---	---	---
Concrete	Concrete core, Room 105 east	B5SC22 DUP	mg/kg	---	---	---	---	---	---	---	---	3.5	0.028 U, 2	---	---	---	---	---	---	---
Concrete	Concrete core, Room 105 southeast	B5SC23	mg/kg	---	---	---	---	---	---	---	---	3.6	0.067 U, 2	---	---	---	---	---	---	---
Concrete	Concrete core, Room 105	B5SC24	mg/kg	---	---	---	---	---	---	---	---	6.2	0.024 U, 2	---	---	---	---	---	---	---
Concrete	Concrete core, Room 105 northeast	B5SC25	mg/kg	---	---	---	---	---	---	---	---	7.9	0.021 U, 2	---	---	---	---	---	---	---
Concrete	Concrete core, Room 105 northwest	B5SC26	mg/kg	---	---	---	---	---	---	---	---	5.7	0.033 U, 2	---	---	---	---	---	---	---
Sediment	Attic sediment, Room 150/150A attic southwest	B5SE01	mg/kg	---	---	---	0.072 J, T	---	---	---	---	155	0.80	---	---	---	---	---	---	---
Sediment	Attic sediment, Main attic east	B5SE02	mg/kg	---	---	---	0.15	---	---	---	---	735	1.3	---	---	---	---	---	---	---
Sediment	Attic sediment, Main attic west	B5SE03	mg/kg	---	---	---	0.12 J, T	---	---	---	---	998	1.2	---	---	---	---	---	---	---
Sediment	Pit sediment, Room 102 central	B5SE04	mg/kg	1.8	4.9	2,160	0.25	16.0	190	20.7	4,090	397	0.77	12.5	98.8	0.55	65.1	<0.2	29.5	2,240
Sludge	Floor drain sludge, Room 105 south	B5SL09	mg/kg	1.2	2.1	2.4	0.020 J, T	9.2	42.0	7.8	4,710	961	1.2	6.5	232	0.21 J, T	6.5	<0.2	2.1	43,900
Wipe	Floor wipe, Room 150A northeast	B5SW01	µg/100 cm²	---	---	---	<0.1	---	---	---	---	1.3	0.0093 J, T	---	---	---	---	---	---	---
Wipe	Window sill wipe, Room 150 east	B5SW02	µg/100 cm²	---	---	---	<0.1	---	---	---	---	27.6	<0.02	---	---	---	---	---	---	---
Wipe	Floor wipe, Room 100 north	B5SW03	µg/100 cm²	---	---	---	<0.1	---	---	---	---	4.4	0.041	---	---	---	---	---	---	---
Wipe	Fume hood ducting wipe, Room 100 northeast	B5SW04	µg/100 cm²	---	---	---	<0.1	---	---	---	---	5.5 J, 2	0.17	---	---	---	---	---	---	---
Wipe	Floor wipe, Room 102 northeast	B5SW06	µg/100 cm²	---	---	---	<0.1	---	---	---	---	3.9	0.059	---	---	---	---	---	---	---
Wipe	Pipe stub wipe, Room 112 northwest	B5SW07	µg/100 cm²	0.33	1.4	28.2	0.062 J, T	6.4	9.1	0.70	79.4	829	0.32	0.36	5.9	0.062 J, T	0.51	<0.1	1.9	23,600
Wipe	Floor wipe, Room 112 southwest	B5SW08	µg/100 cm²	---	---	---	<0.1	---	---	---	---	2.7	0.014 J, T	---	---	---	---	---	---	---
Wipe	Floor wipe, Room 116A north	B5SW09	µg/100 cm²	---	---	---	<0.1	---	---	---	---	74.2	0.064	---	---	---	---	---	---	---
Wipe	Floor wipe, Room 116A south	B5SW10	µg/100 cm²	---	---	---	<0.1	---	---	---	---	106	0.022	---	---	---	---	---	---	---
Wipe	Floor wipe, Room 132	B5SW11	µg/100 cm²	---	---	---	<0.1	---	---	---	---	6.9	0.024 J, 8	---	---	---	---	---	---	---
Wipe	Floor wipe, Room 132	B5SW12 DUP	µg/100 cm²	---	---	---	<0.1	---	---	---	---	0.88	0.011 J, T, 8	---	---	---	---	---	---	---
Wipe	Floor wipe, Room 136 southeast	B5SW13	µg/100 cm²	---	---	---	<0.1	---	---	---	---	0.78	0.026	---	---	---	---	---	---	---
Wipe	Sewer cleanout wipe, outside, south of B5	B5SW14	µg/100 cm²	0.13 J, T	0.15 J, T	6.1	<0.1	0.10	9.2	0.44	18.4	15.2	0.061	0.13 J, T	2.0	0.025 J, T	0.16	<0.1	1.1	41.1
Wipe	Floor wipe, Room 121	B5SW15	µg/100 cm²	---	---	---	<0.1	---	---	---	---	0.80	0.022	---	---	---	---	---	---	---
Wipe	Floor wipe, Room 119	B5SW16	µg/100 cm²	---	---	---	<0.1	---	---	---	---	0.80	0.020 J, T	---	---	---	---	---	---	---
Wipe	Floor wipe, Room 109	B5SW17	µg/100 cm²	---	---	---	<0.1	---	---	---	---	0.48	0.010 J, T	---	---	---	---	---	---	---
Wipe	Floor wipe, Room 101	B5SW18	µg/100 cm²	---	---	---	<0.1	---	---	---	---	1.9	<0.02	---	---	---	---	---	---	---

Table 6-6. Analytical Results for Metals – Building 5

Sample Type	Sample Description	Sample Name	Units	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Hg	Mo	Ni	Se	Ag	Tl	V	Zn
Wipe	Floor wipe, Room 105 near cage	B5SW19	µg/100 cm²	---	---	---	<0.1	---	---	---	---	1.4	0.012 J, T	---	---	---	---	---	---	---
Wipe	Sewer cleanout wipe, outside, north of Room 105	B5SW20	µg/100 cm²	0.43	0.93	4.1	<0.1	0.57	9.8	1.1	251	53.0	18.2	0.66	7.8	<0.25	1.3	<0.1	1.7	78.4
Wipe	Sewer cleanout wipe, Room 150 southwest	B5SW21	µg/100 cm²	1.3	1.0	25.8	0.030 J, T	2.0	13.1	1.5	314	246	0.80	0.76	9.7	0.19 J, T	0.70	<0.1	4.0	299
Wipe	Sewer cleanout wipe, Room 150 southwest	B5SW22 DUP	µg/100 cm²	1.1	0.97 J, T	19.0	0.041 J, T	1.3	8.3	1.2	264	511	0.58	0.75	7.7	0.19 J, T	0.62	0.36 UJ, Y	2.6	219
Wipe	Ledge wipe, Room 200 north	B5SW23	µg/100 cm²	---	---	---	<0.25	---	---	---	---	68.0	0.10	---	---	---	---	---	---	---
Wipe	Floor wipe, Room 201	B5SW24	µg/100 cm²	---	---	---	<0.25	---	---	---	---	0.72	<0.02	---	---	---	---	---	---	---
Wipe	Floor wipe, walkway north of Room 203	B5SW25	µg/100 cm²	---	---	---	<0.25	---	---	---	---	0.70	<0.02	---	---	---	---	---	---	---
Wipe	Fume hood ducting wipe, Room 201 southeast	B5SW26	µg/100 cm²	---	---	---	<0.25	---	---	---	---	22.5	0.13	---	---	---	---	---	---	---
Wipe	HVAC vent above door, Room 122 west	B5SW27	µg/100 cm²	---	---	---	0.084 J, T	---	---	---	---	457	1.8	---	---	---	---	---	---	---
Wipe	HVAC ceiling vent, Room 112 east	B5SW28	µg/100 cm²	---	---	---	0.077 J, T	---	---	---	---	134	0.82	---	---	---	---	---	---	---
Wipe	Floor drain wipe, Room 112 east	B5SW29	µg/100 cm²	0.60	0.63	7.0	<0.25	5.0	3.8	1.3	151	53.7	2.7	2.2	49.1	<0.25	0.92	<0.1	1.6	225
Wipe	Floor drain wipe, Room 105 south	B5SW30	µg/100 cm²	0.081 J, T	<0.5	2.2	<0.25	0.43	1.1	0.24	24.8	7.7	0.19	0.24 J, T	2.5	<0.25	0.081 J, T	<0.1	<0.5	62.8
Wipe	Floor drain wipe, Room 122A west	B5SW31	µg/100 cm²	2.4	2.2	67.2	<0.25	6.2	211	2.6	500	566	0.78	1.3	126	<0.62	0.64	<0.25	4.9	2,270
Wipe	Floor drain wipe, Room 100 west	B5SW32	µg/100 cm²	---	---	---	0.26	---	---	---	---	275	329	---	---	---	---	---	---	---
Wastewater	Sink trap water, Room 112 west	B5WW01	mg/L	0.0012 J, T	<0.01	0.0266	<0.0005	0.0037	<0.01	0.0024	0.31	0.0698	<0.0002	0.0035 J, T	0.432	<0.005	0.0012 J, T	0.086 UJ, Y	<0.01	6.11
Wastewater	Sink trap water, Room 118 north	B5WW02	mg/L	<0.005	0.0022 J, T	0.0228	<0.0005	0.0026	0.0043 J, T	0.002 J, T	13	0.0714	<0.0002	0.0013 J, T	0.027	<0.005	0.0021	<0.1	<0.01	7.47
Wastewater	Sink trap water, Room 120 south	B5WW03	mg/L	0.397	0.0324	1.1	0.00072 J, T	0.246	0.141	0.0839	35.8	3.43	0.368	0.0309	0.345	0.0038 J, T	0.199	<0.1	0.0551	31.3
Wastewater	Toilet trap water, Room 118 southeast	B5WW04	mg/L	<0.005	<0.01	0.0121	<0.0005	<0.0005	<0.01	<0.002	0.0388	0.0017 J, T	<0.0002	0.00031 J, T	0.0012 J, T	<0.005	<0.002	<0.1	<0.01	0.0216
Wastewater	Toilet trap water, Room 126 northeast	B5WW06	mg/L	<0.005	<0.01	0.0112	<0.0005	<0.0005	<0.01	<0.002	0.0381	0.0035	<0.0002	0.00028 J, T	0.0015 J, T	<0.005	<0.002	<0.1	<0.01	0.0451
Wastewater	Sink trap water, Room 126 south	B5WW08	mg/L	0.0086 J, T	0.0133 J, T	0.92	<0.001	0.0961	0.0943	0.128	85.9	13.2	0.006	0.0469	5.29	<0.01	0.312	<0.1	0.0263	344
Wastewater	Sink trap water, Room 105 south	B5WW10	mg/L	0.0045 J, T	0.0021 J, T	0.0271	<0.0005	0.0203	0.0177	0.0169	7	2.03	0.0023	0.0154	0.504	<0.005	0.015	<0.1	0.004 J, T	33.7
Wastewater	Sink trap water, Room 105 south	B5WW11 DUP	mg/L	0.0046 J, T	0.0018 J, T	0.0267	<0.0005	0.0188	0.0253	0.0199	7.83	2.55	0.0036	0.0189	0.399	<0.005	0.0335	<0.1	0.0049 J, T	25

Abbreviations:

mg/L = milligrams per liter
µg/100 cm² = micrograms per 100 square centimeters
DUP = field duplicate
mg/kg = milligrams per kilogram
Sb = antimony, As = arsenic, Ba = barium, Be = beryllium, Cd = cadmium, Cr = total chromium, Cr6 = hexavalent chromium, Co = cobalt, Cu = copper, Pb = lead, Hg = mercury, Mo = molybdenum, Ni = nickel, Se = selenium, Ag = silver, Tl = thallium, V = vanadium, Zn = zinc
STLC = Soluble Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24
TCLP = Toxicity Characteristic Leaching Procedure, Title 22 California Code of Regulations, Section 66261.24
TTLC = Total Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24

Notes:

<n = analyte not detected above reporting limit of 'n'
J = estimated result
T = trace level compound, poor quantitation
UJ = result is not detected at an estimated detection limit
2 = method blank contamination
8 = field duplicate precision outside limits
Y = initial and continuing calibration blank problem
4L = matrix spike recovery below normal limits
--- = not analyzed
Italics = no published bulk sample concentration (TTLC, STLC, TCLP) at which the constituent is deemed a hazardous waste
red = detected above: 1) the TTLC for solid samples; 2) or the STLC or TCLP for aqueous samples; 3) or the wipe concentration limit
yellow = detected above 10 x STLC or 20 x TCLP concentrations, for solid matrices (does not apply to wipe samples)

Analysis for Metals by USEPA Methods 6020, 7470A and 7471A. All samples analyzed by Test America, Earth City, Missouri.

The comparison threshold for beryllium of 0.2 µg/100 cm2 (collected on wipes) applies to removable contamination on equipment or surfaces. Equipment or surfaces with beryllium concentrations below this threshold may be released to the general public or to a DOE facility for use in a manner not requiring controls for beryllium exposure per the Chronic Beryllium Disease Prevention Program (10 CFR 850).

Table 6-7. Analytical Results for PCBs – Building 5

Sample Type	Sample Description	Sample Name	Units	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260
Caulk	Window sill caulking, Room 150 northeast	B5CK01	mg/kg	<0.33	<0.33	<0.33	<0.33	<0.33	0.17 J, T	0.25 J, T
Paint	Wall paint, Room 150 northeast	B5PC01	mg/kg	<0.34	<0.34	<0.34	<0.34	<0.34	4.9	15
Paint	Wall paint, Room 112 east	B5PC02	mg/kg	<3.9	<3.9	<3.9	<3.9	<3.9	3.1 J, T	2.1 J, T
Paint	Wall paint, Room 136 southeast	B5PC03	mg/kg	<0.33	<0.33	<0.33	<0.33	<0.33	1.4	0.94
Concrete	Concrete core, Room 150A southeast	B5SC01	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033
Concrete	Concrete core, Room 150 east	B5SC02	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033
Concrete	Concrete core, Room 150A west	B5SC03	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	0.0068 J, T	<0.033
Concrete	Concrete core, Room 150A southwest	B5SC04	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033
Concrete	Concrete core, Room 150	B5SC05	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033
Concrete	Concrete core, Room 100 east	B5SC06	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033
Concrete	Concrete core, Room 100 northwest	B5SC07	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033
Concrete	Concrete core, Room 100 center	B5SC08	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033
Concrete	Concrete core, Room 100 south	B5SC09	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033
Concrete	Concrete wall chips, Room 112 east	B5SC15	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	0.071	0.033
Concrete	Concrete wall chips, Room 112 southeast	B5SC16	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	0.07	0.032 J, T
Concrete	Concrete, Room 117	B5SC20	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033
Concrete	Concrete core, Room 105 east	B5SC21	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033
Concrete	Concrete core, Room 105 east	B5SC22 DUP	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033
Concrete	Concrete core, Room 105 southeast	B5SC23	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033
Concrete	Concrete core, Room 105	B5SC24	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033
Concrete	Concrete core, Room 105 northeast	B5SC25	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033
Concrete	Concrete core, Room 105 northwest	B5SC26	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033
Sediment	Pit sediment, Room 102 central	B5SE04	mg/kg	<0.33	<0.33	<0.33	<0.33	<0.33	0.33	0.19 J, T

Abbreviations:

DUP = field duplicate
mg/kg = milligrams per kilogram
PCBs = polychlorinated biphenyls
STLC = Soluble Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24
TCLP = Toxicity Characteristic Leaching Procedure, Title 22 California Code of Regulations, Section 66261.24
TTLC = Total Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24

Notes:

<n = analyte not detected above reporting limit of 'n'
J = estimated result
T = trace level compound, poor quantitation
Italics = no published bulk sample concentration (TTLC, STLC, TCLP) at which the constituent is deemed a hazardous waste
red = detected above: 1) the TTLC for solid samples; 2) or the STLC or TCLP for aqueous samples; 3) or the wipe concentration limit
yellow = detected above 10 x STLC or 20 x TCLP concentrations, for solid matrices (does not apply to wipe samples)

Analysis for PCBs by USEPA Method 8082. All samples analyzed by Test America St. Louis, Earth City, Missouri.

The comparison threshold for PCBs of 10 µg/100 cm2 (collected on wipes) applies to non-porous surfaces contaminated with PCBs. Surfaces containing PCB concentrations above this limit are considered to be contaminated (40 CFR 761).

The value used as the threshold for determining if PCBs exceed hazardous waste limits is applicable to the sum of the Aroclor mixtures reported.

Table 6-8. Analytical Results for TPH and pH – Building 5

Sample Type	Sample Description	Sample Name	Units	TPH Diesel	TPH Motor Oil	pH	Fluoride
Concrete	Concrete core, Room 150A southeast	B5SC01	mg/kg	*<25*	*<25*	---	---
Concrete	Concrete core, Room 150A southeast	B5SC01	pH Units	---	---	*11.6*	---
Concrete	Concrete core, Room 150 east	B5SC02	mg/kg	*990*	*170*	---	---
Concrete	Concrete core, Room 150 east	B5SC02	pH Units	---	---	*11.8*	---
Concrete	Concrete core, Room 150A west	B5SC03	mg/kg	*<25*	*42*	---	---
Concrete	Concrete core, Room 150A west	B5SC03	pH Units	---	---	*11.2*	---
Concrete	Concrete core, Room 150A southwest	B5SC04	mg/kg	*450*	*71*	---	---
Concrete	Concrete core, Room 150A southwest	B5SC04	pH Units	---	---	*11.7*	---
Concrete	Concrete core, Room 150	B5SC05	mg/kg	*800*	*200*	---	---
Concrete	Concrete core, Room 150	B5SC05	pH Units	---	---	*11.9*	---
Wipe	Fume hood ducting wipe, Room 100 northeast	B5SW04	mg/100 cm²	---	---	---	*<0.0020*
Wipe	Fume hood ducting wipe, Room 201 southeast	B5SW26	mg/100 cm²	---	---	---	*<0.0020*

Abbreviations:

mg/kg = milligrams per kilogram
STLC = Soluble Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24
TCLP = Toxicity Characteristic Leaching Procedure, Title 22 California Code of Regulations, Section 66261.24
TPH = total petroleum hydrocarbons
TTLC = Total Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24

Notes:

<n = analyte not detected above reporting limit of 'n'
--- = not analyzed
Italics = no published bulk sample concentration (TTLC, STLC, TCLP) at which the constituent is deemed a hazardous waste
red = detected above: 1) the TTLC for solid samples; 2) or the STLC or TCLP for aqueous samples; 3) or the wipe concentration limit
yellow = detected above 10 x STLC or 20 x TCLP concentrations, for solid matices (does not apply to wipe samples)

Analysis for TPH by USEPA Method 8015 MOD, pH by USEPA Method 9045. All samples analyzed by Test America St. Louis, Earth City, Missouri

Table 6-9. Analytical Results for VOCs – Building 5

Sample Type	Sample Description	Sample Name	Units	1,1,1-Trichloro-ethane	1,3-Dichloro-benzene	1,4-Dichloro-benzene	2-Buta-none	2-Hexa-none	4-Methyl-2-penta-none	Acetone	Benzene	Bromo-methane	Carbon disulfide	Chloro-benzene	Chloro-ethane	Chloro-form	Chloro-methane	Ethyl-benzene	Methylene chloride	Tetrachloro-ethene	Toluene	Vinyl chloride	Xylenes (total)
Concrete	Concrete core, Room 150A southeast	B5SC01	mg/kg	*<0.005*	*<0.005*	<0.005	0.0024 U, 2	*<0.02*	*<0.02*	*0.045 UJ, 2*	<0.005	*<0.01 UJ, 3L*	*<0.005 UJ, 3L*	<0.005	*<0.01 UJ, 3L*	<0.005 UJ, 3L	*<0.01 UJ, 3L*	*<0.005*	*<0.005 UJ, 3L*	*<0.005*	*<0.005*	<0.005 UJ, 3L	*<0.01*
Concrete	Concrete core, Room 150 east	B5SC02	mg/kg	*<0.005*	*<0.005*	<0.005	0.0052 U, 2	*<0.02*	*<0.02*	*0.1 UJ, 2*	<0.005	*<0.01*	*<0.005*	<0.005	*<0.01*	<0.005	*<0.01*	*0.00032 J, T*	*0.0015 U, 2*	*<0.005*	*0.0021 J, T*	<0.005	*0.0013 J, T*
Concrete	Concrete core, Room 150A west	B5SC03	mg/kg	*<0.005*	*<0.005*	<0.005	<0.02	*<0.02*	*<0.02*	*0.084 U, 2*	<0.005	*<0.01*	*<0.005*	<0.005	*<0.01*	<0.005	*<0.01*	*0.00058 J, T*	*0.0023 U, 2*	*0.00074 J, T*	*0.0067*	<0.005	*0.0034 J, T*
Concrete	Concrete core, Room 150A southwest	B5SC04	mg/kg	*<0.005*	*<0.005*	<0.005	0.0057 U, 2	*<0.02*	*<0.02*	*0.16 U, 2*	<0.005	*<0.01*	*<0.005*	<0.005	*<0.01*	<0.005	*<0.01*	*<0.005*	*0.0018 U, 2*	*<0.005*	*0.00058 J, T*	<0.005	*<0.01*
Concrete	Concrete core, Room 150	B5SC05	mg/kg	*<0.005*	*<0.005*	<0.005	0.005 U, 2	*<0.02*	*<0.02*	*0.18 U, 2*	<0.005	*<0.01*	*<0.005*	<0.005	*<0.01*	<0.005	*<0.01*	*0.00093 J, T*	*0.0017 U, 2*	*<0.005*	*0.0033 J, T*	<0.005	*0.0054 J, T*
Concrete	Concrete core, Room 100 east	B5SC06	mg/kg	*<0.005*	*<0.005*	<0.005	0.0073 U, 2	*<0.02*	*<0.02*	*0.16 J, T*	0.00034 J, T	*<0.01*	*<0.005*	<0.005	*<0.01*	<0.005	*<0.01*	*0.0003 J, T*	*0.0023 U, 2*	*<0.005*	*0.0013 J, T*	<0.005	*0.0019 J, T*
Concrete	Concrete core, Room 100 northwest	B5SC07	mg/kg	*<0.005*	*<0.005*	<0.005	<0.02	*<0.02*	*<0.02*	*0.61 J, T*	<0.005	*<0.01*	*<0.005*	<0.005	*<0.01*	<0.005	*<0.01*	*<0.005*	*0.0015 U, 2*	*<0.005*	*<0.005*	<0.005	*<0.01*
Concrete	Concrete core, Room 100 center	B5SC08	mg/kg	*<0.005*	*<0.005*	<0.005	0.0078 U, 2	*<0.02*	*<0.02*	*0.089 J, T*	0.0005 J, T	*<0.01*	*<0.005*	<0.005	*<0.01*	<0.005	*<0.01*	*<0.005*	*0.003 U, 2*	*<0.005*	*0.0015 J, T*	<0.005	*0.001 J, T*
Concrete	Concrete core, Room 100 south	B5SC09	mg/kg	*<0.005*	*<0.005 UJ, X*	<0.005 UJ, X	0.0048 U, 2	*<0.02*	*<0.02*	*0.37 J, T*	<0.005	*<0.01*	*<0.005*	<0.005	*<0.01*	<0.005	*<0.01*	*<0.005*	*0.0023 U, 2*	*<0.005*	*0.00085 J, T*	<0.005	*<0.01*
Concrete	Concrete core, Room 112 north	B5SC11	mg/kg	*<0.005*	*<0.005*	<0.005	<0.02	*<0.02*	*<0.02*	*0.17 U, 2*	0.00038 J, T	*0.00066 J, T*	*<0.005*	<0.005	*<0.01*	<0.005	*0.00068 J, T*	*<0.005*	*0.0022 U, 2*	*<0.005*	*0.0025 J, T*	<0.005	*0.0012 J, T*
Concrete	Concrete core, Room 112 north	B5SC12 DUP	mg/kg	*<0.005*	*<0.005*	<0.005	<0.02	*<0.02*	*<0.02*	*0.13 J, T*	<0.005	*<0.01*	*<0.005*	<0.005	*<0.01*	<0.005	*<0.01*	*0.00036 J, T*	*0.0034 J, T*	*<0.005*	*0.0014 J, T*	<0.005	*<0.01*
Concrete	Concrete core, Room 112 central	B5SC13	mg/kg	*<0.005*	*<0.005 UJ, X*	<0.005 UJ, X	0.012 U, 2	*<0.02 UJ, X*	*<0.02*	*<1*	<0.005	*<0.01*	*<0.005*	<0.005	*<0.01*	<0.005	*<0.01*	*0.00054 UJ, X*	*0.0038 U, 2*	*<0.005 UJ, X*	*0.004 UJ, X*	<0.005	*0.004 J, T*
Concrete	Concrete core, Room 112 northwest	B5SC14	mg/kg	*<0.005*	*<0.005 UJ, X*	<0.005 UJ, X	0.0031 U, 2	*<0.02*	*<0.02*	*0.045 U, 2*	0.00046 J, T	*<0.01*	*<0.005*	<0.005	*<0.01*	<0.005	*<0.01*	*<0.005*	*0.0025 U, 2*	*<0.005*	*0.0022 J, T*	<0.005	*<0.01*
Concrete	Concrete wall chips, Room 112 east	B5SC15	mg/kg	*<0.005*	*<0.005 UJ, X*	<0.005 UJ, X	0.085	*0.059*	*<0.02*	*<1*	0.12	*<0.01*	*<0.005*	<0.005	*<0.01*	<0.005	*<0.01*	*<0.005*	*0.00087 U, 2*	*<0.005*	*0.0011 J, T*	<0.005	*<0.01*
Concrete	Concrete wall chips, Room 112 southeast	B5SC16	mg/kg	*<0.005*	*<0.005 UJ, X*	<0.005 UJ, X	0.0076 U, 2	*<0.02 UJ, X*	*<0.02*	*0.12 U, 2*	0.0053	*<0.01*	*<0.005*	<0.005	*<0.01*	<0.005	*<0.01*	*<0.005 UJ, X*	*<0.005*	*<0.005 UJ, X*	*<0.005 UJ, X*	<0.005	*<0.01 UJ, X*
Concrete	Concrete core, Room 116A central	B5SC17	mg/kg	*<0.005*	*<0.005*	<0.005	<0.02 R, 3L	*<0.02*	*<0.02*	*0.035 U, 2*	<0.005	*<0.01 R, 3L*	*<0.005 R, 3L*	<0.005	*<0.01 R, 3L*	<0.005 R, 3L	*<0.01 R, 3L*	*<0.005*	*<0.005 R, 3L*	*<0.005*	*<0.005*	<0.005 R, 3L	*<0.01*
Concrete	Concrete core, Room 122 northeast	B5SC18	mg/kg	*<0.005*	*<0.005*	<0.005	0.022	*<0.02*	*<0.02*	*0.14*	<0.005	*<0.01*	*<0.005*	<0.005	*<0.01*	<0.005	*0.0006 J, T*	*<0.005*	*0.0042 J, T*	*<0.005*	*<0.005*	<0.005	*<0.01*
Concrete	Concrete core, Room 122A northeast	B5SC19	mg/kg	*<0.005*	*<0.005 UJ, X*	<0.005 UJ, X	0.016 U, 2	*0.063*	*<0.02*	*0.1 U, 2*	<0.005	*<0.01*	*<0.005*	<0.005	*<0.01*	<0.005	*<0.01*	*<0.005*	*0.0018 U, 2*	*<0.005*	*<0.005*	<0.005	*<0.01*
Sediment	Pit sediment, Room 102 central	B5SE04	mg/kg	*<0.005*	*0.00094 J, T, X*	0.00089 J, T, X	<0.02	*<0.02 UJ, X*	*<0.02*	*0.025*	<0.005	*<0.01*	*<0.005*	<0.005	*<0.01*	<0.005	*<0.01*	*<0.005 UJ, X*	*0.014*	*<0.005 UJ, X*	*<0.005 UJ, X*	<0.005	*<0.01 UJ, X*

Abbreviations:

DUP = field duplicate
mg/kg = milligrams per kilogram
STLC = Soluble Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24
TCLP = Toxicity Characteristic Leaching Procedure, Title 22 California Code of Regulations, Section 66261.24
TTLC = Total Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24
VOCs = volatile organic compounds

Notes:

<n = analyte not detected above reporting limit of 'n'
J = estimated result
R = result rejected
T = trace level compound, poor quantitation
UJ = result is not detected at an estimated detection limit
X = internal standard recovery problem
2 = method blank contamination
3L = surrogate recovery below normal limits
--- = not analyzed
Italics = no published bulk sample concentration (TTLC, STLC, TCLP) at which the constituent is deemed a hazardous waste
red = detected above: 1) the TTLC for solid samples; 2) or the STLC or TCLP for aqueous samples; 3) or the wipe concentration limit
yellow = detected above 10 x STLC or 20 x TCLP concentrations, for solid matices (does not apply to wipe samples)

Analysis for VOCs by USEPA Method 8260B. All samples analyzed by Test America St. Louis, Earth City, Missouri

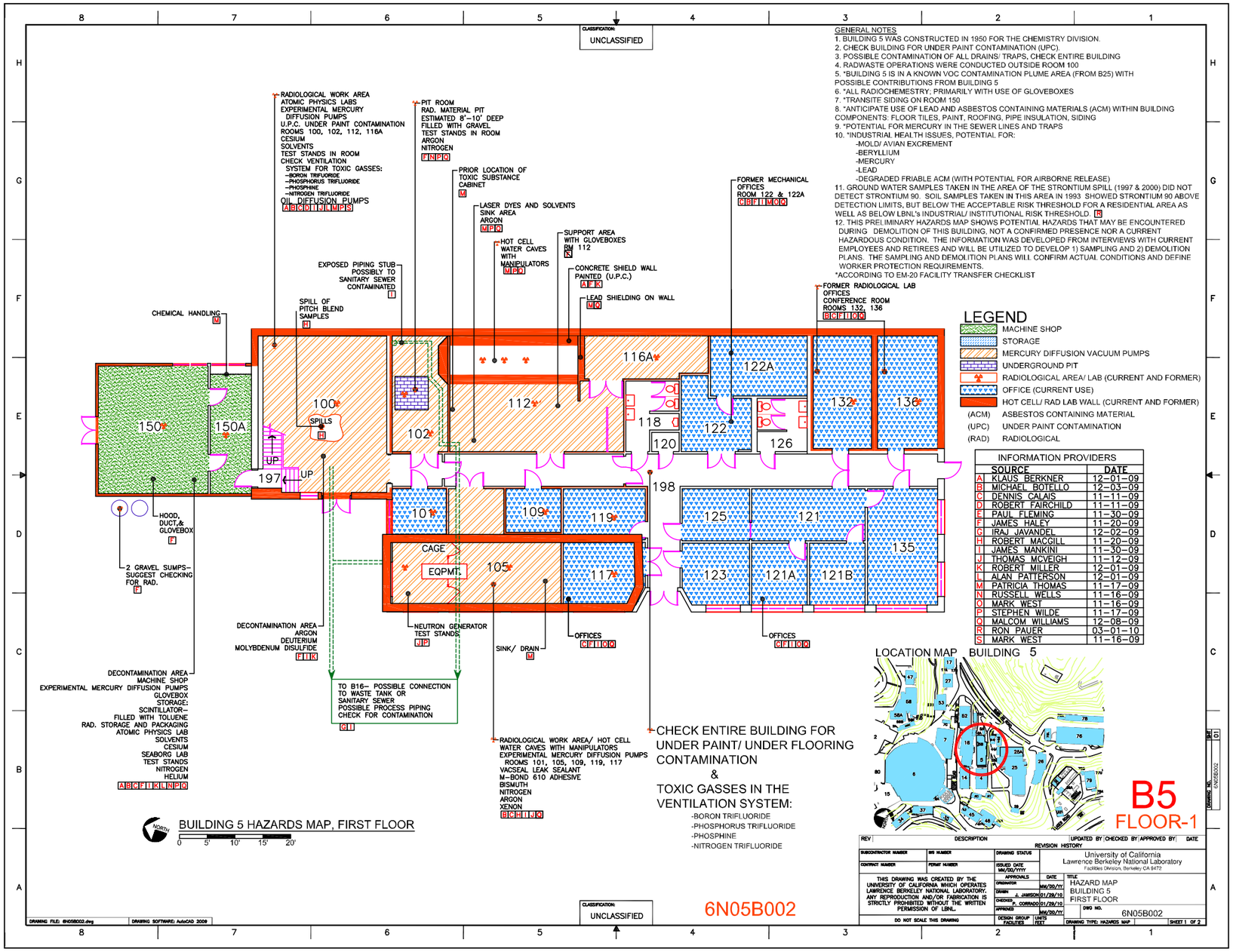


Figure 6-1. Hazard Map – Building 5, First Floor

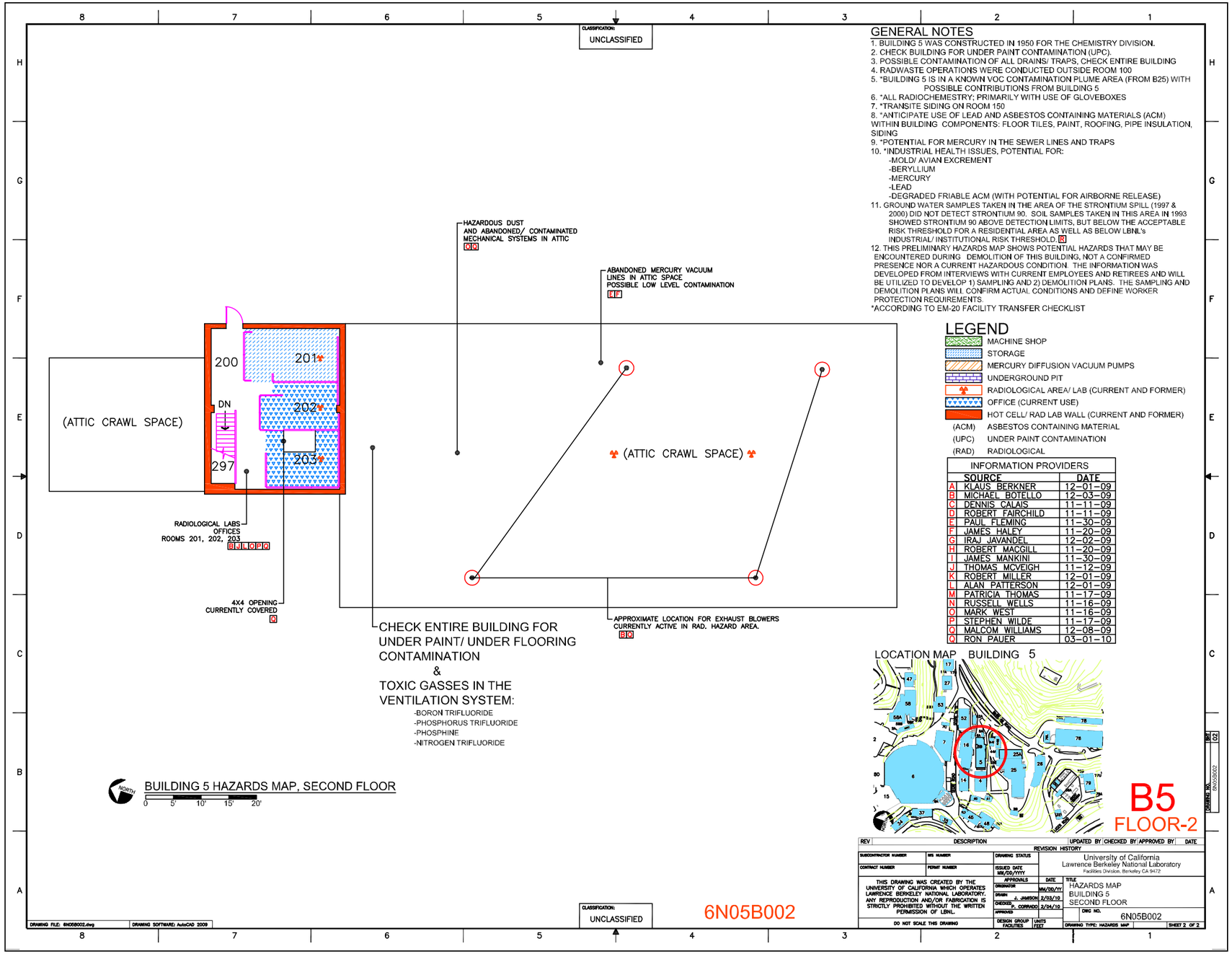
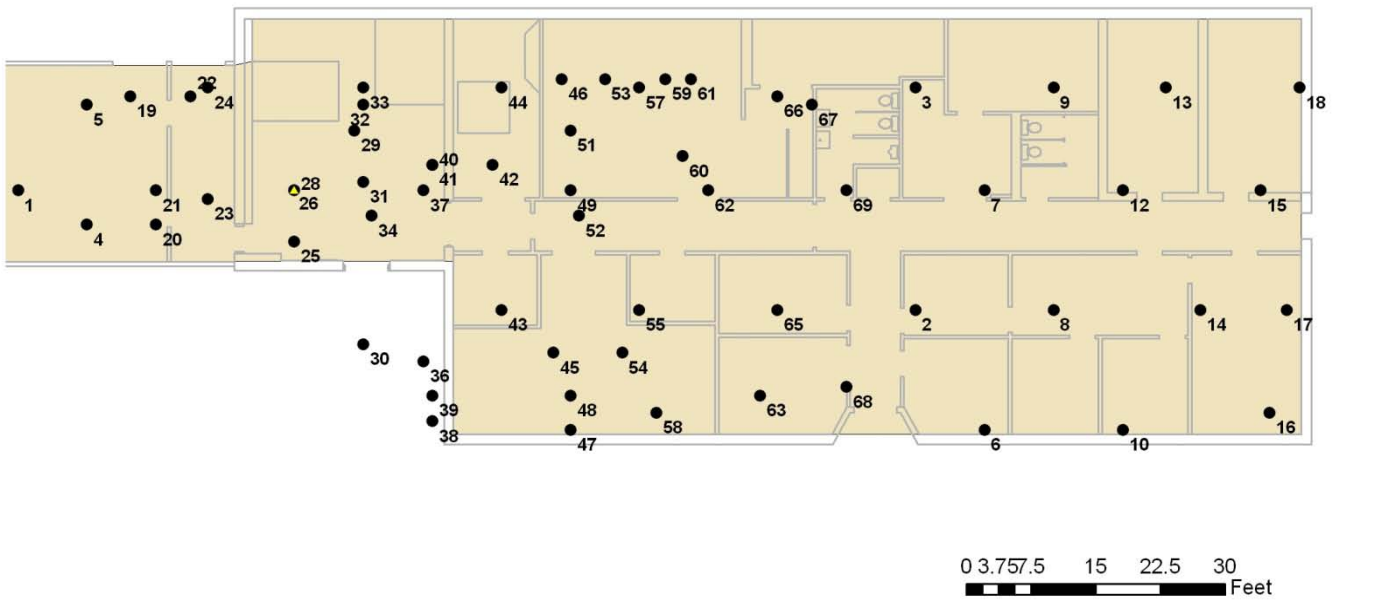


Figure 6-2. Hazard Map – Building 5, Second Floor

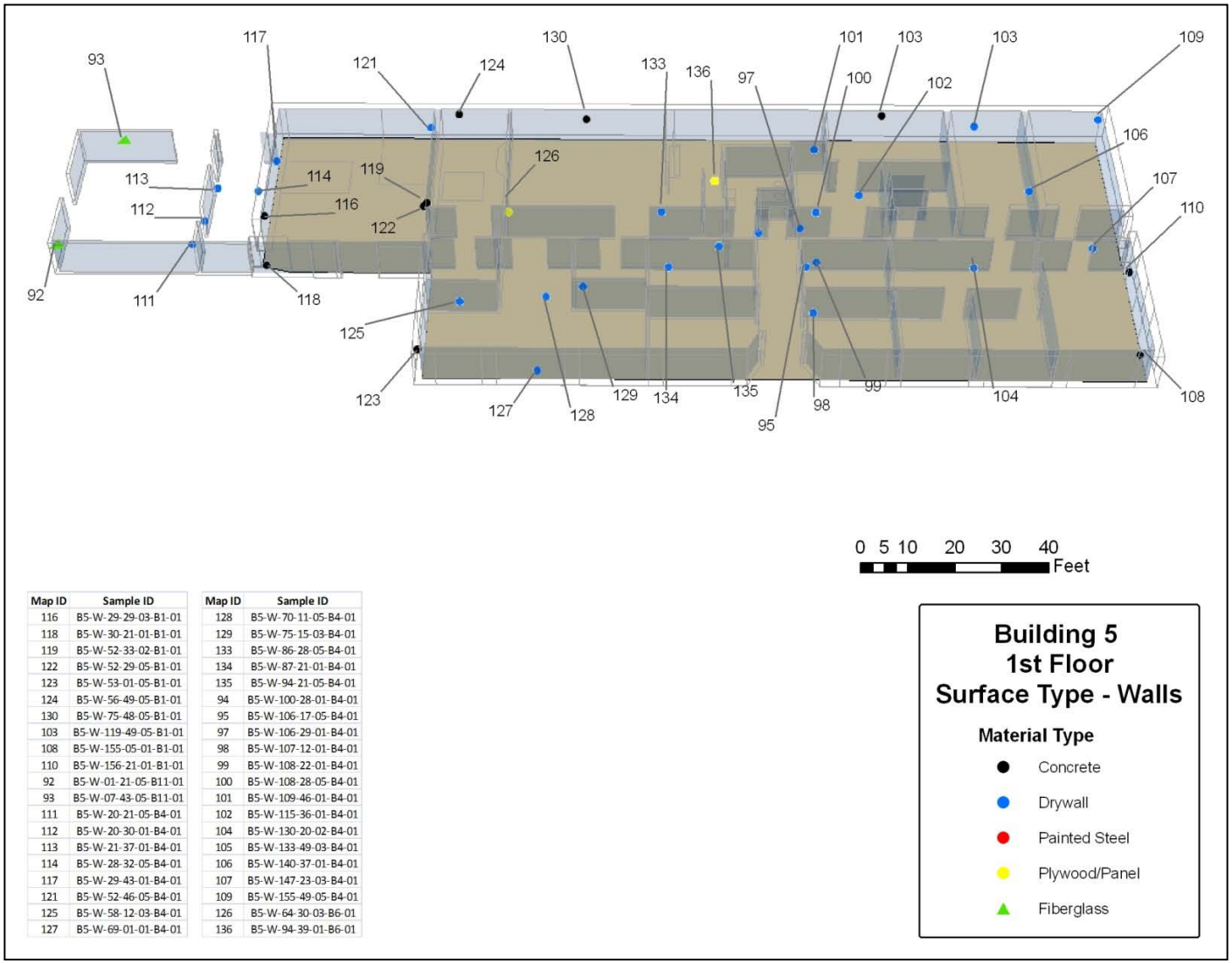


Map ID	Sample ID
1	B5-1F-03-29-00-B1-01
2	B5-1F-107-15-00-B1-01
3	B5-1F-107-41-00-B1-01
4	B5-1F-11-25-00-B1-01
5	B5-1F-11-39-00-B1-01
6	B5-1F-115-01-00-B1-01
7	B5-1F-115-29-00-B1-01
8	B5-1F-123-15-00-B1-01
9	B5-1F-123-41-00-B1-01
10	B5-1F-131-01-00-B1-01
12	B5-1F-131-29-00-B1-01
13	B5-1F-136-41-00-B1-01
14	B5-1F-140-15-00-B1-01
15	B5-1F-147-29-00-B1-01
16	B5-1F-148-03-00-B1-01
17	B5-1F-150-15-00-B1-01
18	B5-1F-155-41-00-B1-01
19	B5-1F-16-40-00-B1-01
20	B5-1F-19-25-00-B1-01
21	B5-1F-19-29-00-B1-01
22	B5-1F-23-40-00-B1-01

Map ID	Sample ID
23	B5-1F-25-28-00-B1-01
24	B5-1F-25-41-00-B1-01
25	B5-1F-35-23-00-B1-01
26	B5-1F-35-29-00-B10-01
28	B5-1F-35-29-00-B1-01
29	B5-1F-42-36-00-B1-01
30	B5-1F-43-11-00-B1-01
31	B5-1F-43-30-00-B1-01
32	B5-1F-43-39-00-B1-01
33	B5-1F-43-41-00-B1-01
34	B5-1F-44-26-00-B1-01
36	B5-1F-50-09-00-B1-01
37	B5-1F-50-29-00-B1-01
38	B5-1F-51-02-00-B1-01
39	B5-1F-51-05-00-B1-01
40	B5-1F-51-32-00-B1-01
41	B5-1F-51-32-00-B1-01
42	B5-1F-58-32-00-B1-01
43	B5-1F-59-15-00-B1-01
44	B5-1F-59-41-00-B1-01
45	B5-1F-65-10-00-B1-01

Map ID	Sample ID
46	B5-1F-66-42-00-B1-01
47	B5-1F-67-01-00-B1-01
48	B5-1F-67-05-00-B1-01
49	B5-1F-67-29-00-B1-01
51	B5-1F-67-36-00-B1-01
52	B5-1F-68-26-00-B1-01
53	B5-1F-71-42-00-B1-01
54	B5-1F-73-10-00-B1-01
55	B5-1F-75-15-00-B1-01
57	B5-1F-75-41-00-B1-01
58	B5-1F-77-03-00-B1-01
59	B5-1F-78-42-00-B1-01
60	B5-1F-80-33-00-B1-01
61	B5-1F-81-42-00-B1-01
62	B5-1F-83-29-00-B1-01
63	B5-1F-89-05-00-B1-01
65	B5-1F-91-15-00-B1-01
66	B5-1F-91-40-00-B1-01
67	B5-1F-95-39-00-B1-01
68	B5-1F-99-06-00-B1-01
69	B5-1F-99-29-00-B1-01

Figure 6-3. Systematic Radiological Sampling Locations – Building 5, First Floor, Floors



Map ID	Sample ID
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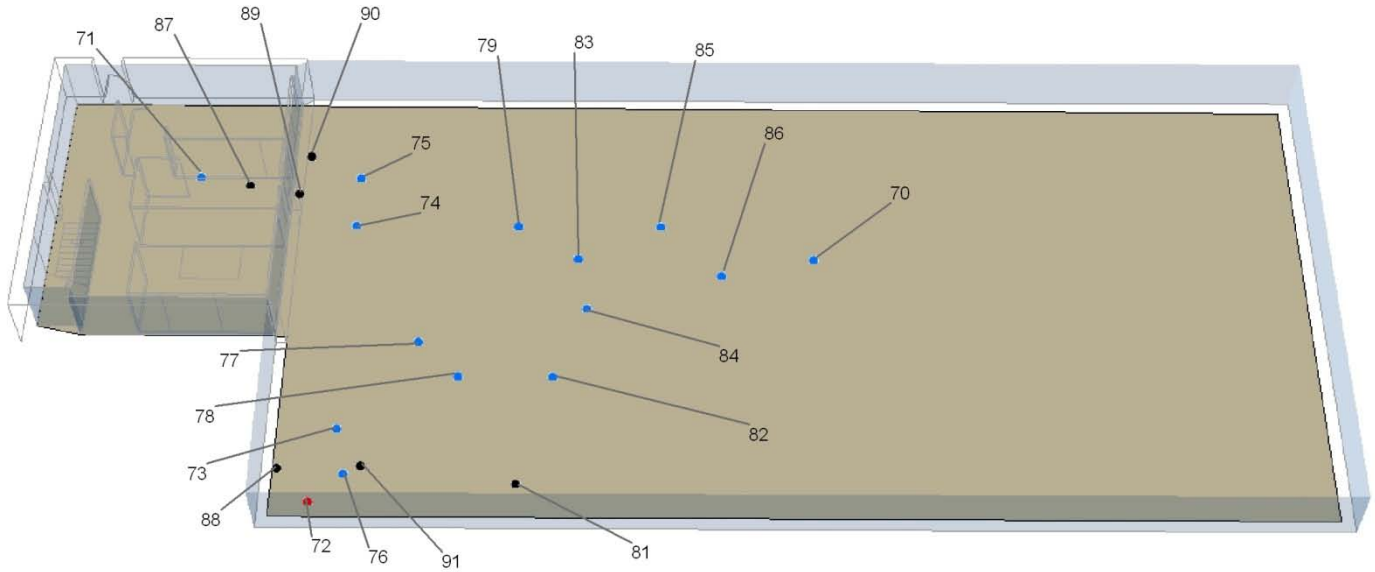
118	B5-W-30-21-01-B1-01
119	B5-W-52-33-02-B1-01
122	B5-W-52-29-05-B1-01
123	B5-W-53-01-05-B1-01
124	B5-W-56-49-05-B1-01
130	B5-W-75-48-05-B1-01
103	B5-W-119-49-05-B1-01
108	B5-W-155-05-01-B1-01
110	B5-W-156-21-01-B1-01
92	B5-W-01-21-05-B11-01
93	B5-W-07-43-05-B11-01
111	B5-W-20-21-05-B4-01
112	B5-W-20-30-01-B4-01
113	B5-W-21-37-01-B4-01
114	B5-W-28-32-05-B4-01
117	B5-W-29-43-01-B4-01
121	B5-W-52-46-05-B4-01
125	B5-W-58-12-03-B4-01
127	B5-W-69-01-01-B4-01

Map ID	Sample ID
128	B5-W-70-11-05-B4-01
129	B5-W-75-15-03-B4-01
133	B5-W-86-28-05-B4-01
134	B5-W-87-21-01-B4-01
135	B5-W-94-21-05-B4-01
94	B5-W-100-28-01-B4-01
95	B5-W-106-17-05-B4-01
97	B5-W-106-29-01-B4-01
98	B5-W-107-12-01-B4-01
99	B5-W-108-22-01-B4-01
100	B5-W-108-28-05-B4-01
101	B5-W-109-46-01-B4-01
102	B5-W-115-36-01-B4-01
104	B5-W-130-20-02-B4-01
105	B5-W-133-49-03-B4-01
106	B5-W-140-37-01-B4-01
107	B5-W-147-23-03-B4-01
109	B5-W-155-49-05-B4-01
126	B5-W-64-30-03-B6-01
136	B5-W-94-39-01-B6-01

Figure 6-4. Systematic Radiological Sampling Locations – Building 5, First Floor, Walls



MapID	SampleID
70	B5-2F-104-30-00-B4-01
71	B5-2F-43-40-00-B4-01
72	B5-2F-57-02-00-B5-01
73	B5-2F-59-10-00-B4-01
74	B5-2F-59-34-00-B4-01
75	B5-2F-59-40-00-B4-01
76	B5-2F-60-05-00-B4-01
77	B5-2F-66-20-00-B4-01
78	B5-2F-70-16-00-B4-01
79	B5-2F-75-34-00-B4-01
81	B5-2F-76-04-00-B1-01
82	B5-2F-79-16-00-B4-01
83	B5-2F-81-30-00-B4-01
84	B5-2F-82-24-00-B4-01
85	B5-2F-89-34-00-B4-01
86	B5-2F-95-28-00-B4-01
87	B5-2W-48-39-00-B1-01
88	B5-2W-54-05-01-B1-01
89	B5-2W-54-34-05-B1-01
90	B5-2W-54-42-01-B1-01
91	B5-2W-62-04-03-B1-01

Building 5
2nd Floor
Surface Type - Floors and Walls

Material Type

- Concrete
- Drywall
- Painted Steel

Figure 6-5. Systematic Radiological Sampling Locations – Building 5, Second Floor and Attic, Floors and Walls

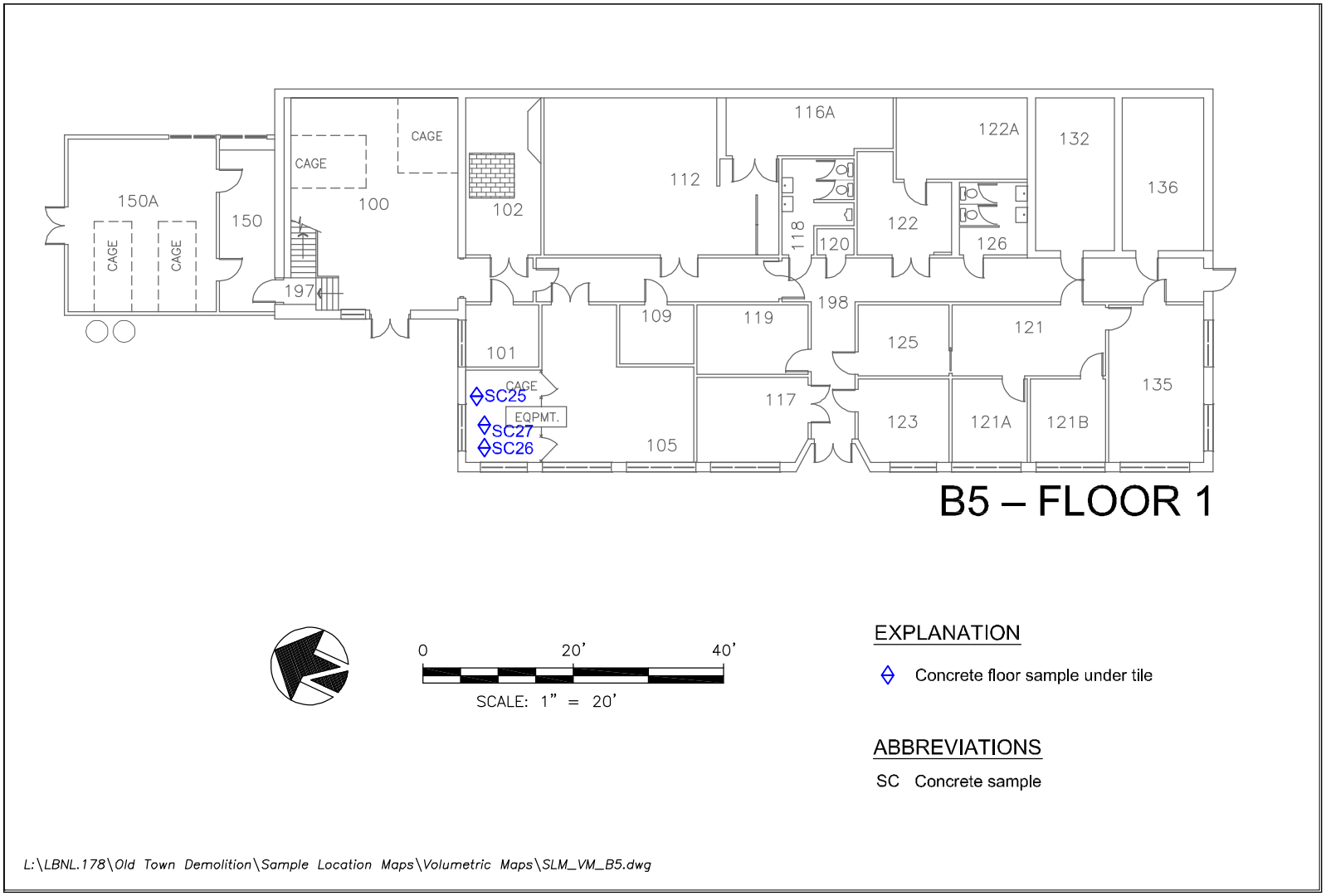


Figure 6-6. Volumetric Radiological Sampling Locations – Building 5

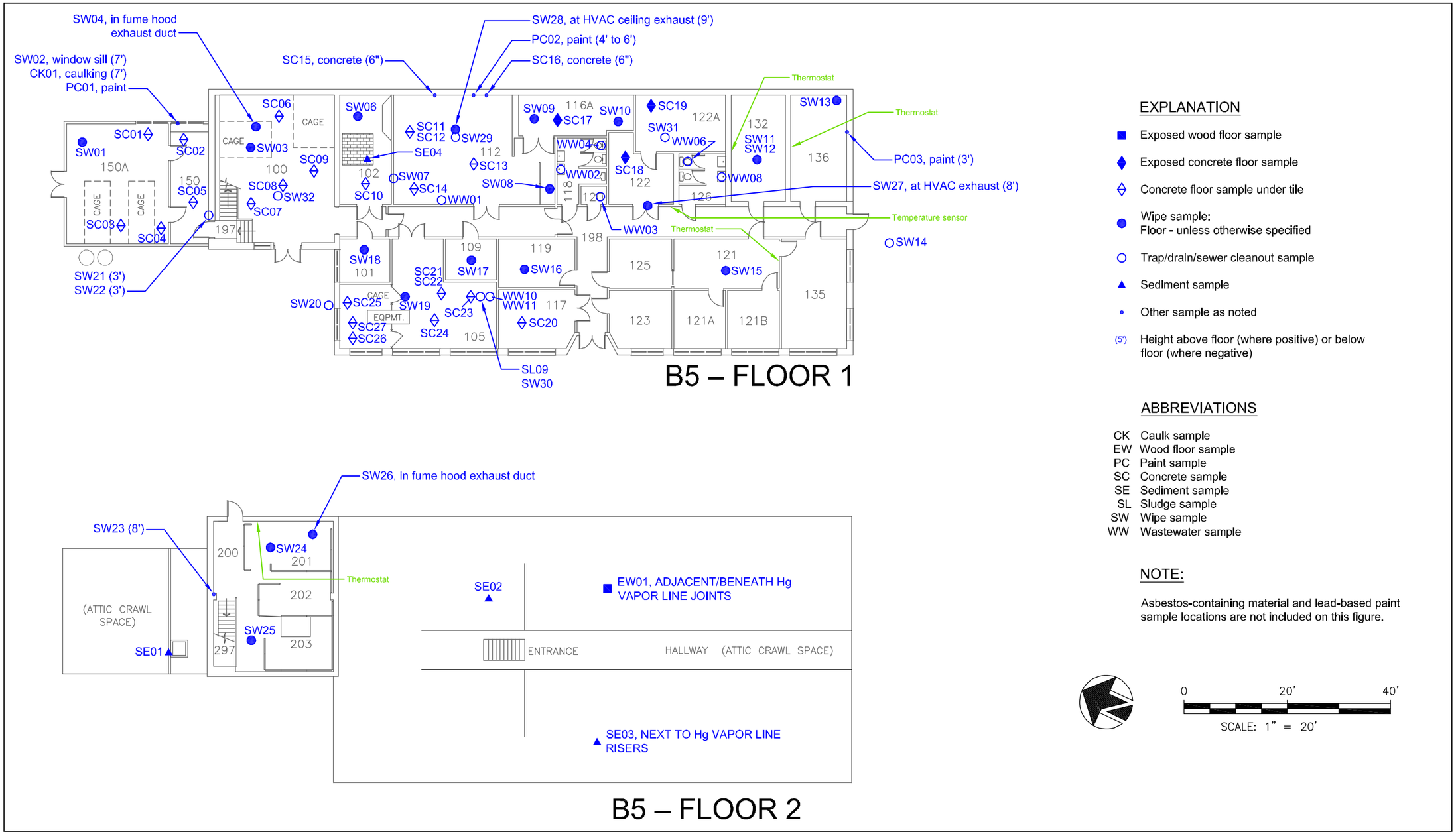


Figure 6-7. Non-Radiological Sampling Locations – Building 5

7. CHARACTERIZATION OF BUILDING 14

Building 14 is a 4,201-square-foot one-story building constructed of poured concrete with stucco siding. The building was constructed in 1944 as the "general stores warehouse," but it was converted in 1950 into an electrical shop with offices, a drafting room, and an electronics shop. The building was primarily used for repair and maintenance of electronics instruments and later was used for offices and laboratories. Figure 7-1 provides the locations of historical hazards associated with the building obtained by LBNL from historical records, interviews, and site inspections.

Building 14 was characterized per the *Final Work Plan for Alternate 1 Buildings* (Weiss, 2010d).

7.1 Deviations from Work Plan

No deviations occurred during the radiological characterization of Building 14.

The area under a mezzanine in Room 114 in Building 14 was inspected during the characterization activities. There was no indication of potential contamination; therefore, no additional samples were collected under the mezzanine.

Non-radiological samples from the air-handling system were collected at the exit of the system as opposed to the intake registers as planned in the work plan. It was determined that the exit points represent the locations in the air-handling system with the greatest potential for contamination from constituents entrained in the building air.

A sample (B14SL03) was not collected from the sink trap in the northeast side of Room 137 because of the absence of sludge in the trap.

7.2 Radiological Characterization Summary

The information provided on the hazard map developed by LBNL (Figure 7-1) and the historic information obtained by LBNL and summarized in the *Final Workplan for the Reconnaissance-Level Characterization of Buildings 4, 5, 14, 40, and 41* indicate that no radiological contamination should be present in Building 14. Consequently, the floor and wall areas of Building 14 were classified as a Class 3 area. The entire building was treated as one survey unit under the assumption that all gross measurement values would be less than the DCGLs in Table 5-1. The focus of the radiological characterization was the floors and lower walls, around sinks and drains, and storage cabinets where present. Radiological survey locations were selected by biased and systematic methods.

7.2.1 Radiological Scanning

Radiological scanning was performed to determine if there were any areas of elevated radioactivity that would require biased static radiological measurements. Consistent with the workplan, the following areas were scanned using a gas-flow proportional floor monitor (Ludlum Model 239-1F) or a hand-held dual phosphor detector (Ludlum Model 43-89):

- ≥ 25 percent alpha/beta scans of Class 3 floor surfaces;
- ≥ 10 percent alpha/beta scans of Class 3 wall surfaces; and
- ≥ 25 percent alpha/beta scans of Class 3 accessible internal HVAC surfaces.

Scanning speeds using the gas proportional floor monitor were approximately 10 cm/s. Scanning speeds for the dual phosphor detectors were approximately 5 cm/s. No radioactivity above background levels was detected during radiological scanning of floors, walls, and the interior surfaces of The HVAC system. Consequently, no biased radiological measurements were collected from these locations.

7.2.2 Systematic Radiological Measurements

Thirty floor locations were identified in the workplan for systematic direct measurements. The locations were based on a triangular grid system with a random starting point. Direct radiological measurements of the floors were collected at 44 locations including duplicate and subfloor material measurements. Removable radioactivity measurements were collected by surface smear sampling at each of the systematic sampling locations. The floor sample locations are shown in Figure 7-2. Table 7-1 indicates the types of floor materials surveyed.

Thirty wall locations were identified in the field for systematic direct measurements. The locations were equally spaced, alternating between 1 and 5 feet high along the wall unless obstructed by equipment. Removable radioactivity was measured using surface smear sampling at each of these locations. Wall sample locations are shown in Figure 7-3.

All direct radiological measurements were collected for a period of 1 minute using a hand-held gas proportional detector (Ludlum Model 43-68). Removable radioactivity measurements also were also collected for 1 minute using a channel alpha/beta sample counter (Ludlum Model 3030).

The highest total alpha measurement was 38.5 dpm/100 cm^2, while the highest total beta measurement was 901 dpm/100 cm^2. The DCGLs for total alpha and total beta surface radioactivity are 100 and 5,000 dpm/100 cm^2, respectively.

The highest removable alpha measurement was 3.2 dpm/100 cm^2, while the highest removable beta measurement was 63 dpm/100 cm^2. The DCGLs for removable alpha and total beta surface radioactivity are 20 and 1000 dpm/100 cm^2, respectively. The results of the direct and removable radiological measurements are provided in Table 7-1 and summarized in Table 7-2.

7.2.3 Tritium Sampling

Forty-five tritium samples were collected from the floors and walls at locations chosen systematically or with a biased approach. All tritium samples were counted for 2 minutes using an automated liquid scintillation counter (Beckman Model TR2550).

The results of tritium sampling are presented in Table 7-1 and summarized in Table 7-3. The highest tritium surface activity was 45 dpm/100 cm^2.

7.2.4 Volumetric Sampling

No volumetric samples were collected in Building 14.

7.3 Non-radiological Characterization Summary

7.3.1 Chemical Constituents

As shown in Table 7-4, samples were collected in Building 14 of wall paint; concrete slab; water; sediment and sludge in sink traps; and dust on horizontal building surfaces, on light fixtures, and in air ducts. The locations of these samples are shown in Figure 7-4. Analytical data are summarized in Table 7-5 (metals) and Table 7-6 (PCBs). The complete analytical results are provided on a CD-ROM included in Appendix E.

Of the seven concrete core samples collected at Building 14 and analyzed for metals, four contained chromium concentrations slightly greater than 10 times the STLC. None of the concrete samples contained concentrations above the TTLC.

One sludge sample of three collected in Building 14 and analyzed for metals contained concentrations above the TTLC and all three contained concentrations greater than 10 times the STLC. A sludge sample collected from a sink trap in Room 118 (B14SL04) had concentrations of chromium, lead, nickel, and zinc above the TTLC and of copper and silver at concentrations greater than 10 times the STLC. The concentration of lead in a wastewater sample collected from the same trap as B14SL04 (B14WW04) was slightly above the STLC. Metals concentrations in wastewater samples from sewer traps in Room 137 (B14WW01 and B14WW02) were below the STLC, but sludge in samples from these sink traps (B14SL01 and B14SL02) were greater than 10 times the STLC.

A wipe sample collected at the sewer cleanout near the northwest corner of Building 14 (B14SW01) contained low concentrations of chromium, lead, nickel, and zinc, at 0.28, 2.1, 0.30, and 11.1 μg/100 cm^2, respectively.

Of the 11 wipe samples collected from building surfaces and analyzed for beryllium, none was reported to have exceeded the wipe concentration limits for beryllium. The greatest concentration of lead in wipe samples was 96 μg/100 cm^2, in a sample collected from former fume hood ducting in Room 137 (B14SW03). A concentration of lead at 20.3 μg/100 cm^2 was detected in the wipe collected from an air-handling unit vent in Room 114. Mercury concentrations were smaller

than 1 μg/100 cm^2 in all wipe samples collected. Selenium was analyzed in wipe samples because of its historical use in the building, but the greatest selenium concentration was only 1.3 μg/100 cm^2 in a wipe sample collected from the air-handling unit vent in Room 114 (B14SW05).

Concentrations of PCBs reported were below comparison thresholds in all of the five samples collected at Building 14. PCBs were detected in two wall paint samples collected in Rooms 104 and 137, but they were not detected in any concrete core samples collected in the building. The highest concentration of PCBs, at 6.6 mg/kg of Aroclor 1254, was reported in one of the two samples of wall paint (B14PC02).

Four concrete core samples were analyzed for pH by the laboratory and were reported as showing slightly alkaline pH. pH was measured in the field in four water samples from sink traps and was found to be neutral.

7.3.2 Lead-based Paint

Four paint samples were collected and submitted for metals analysis to Macs Lab, Inc. using EPA Method 6010B/3050. All of the four samples contained more than 5,000 ppm of lead. The paint samples were collected from the following locations:

- Exterior windows and doors, paint on wood (composite);
- Exterior walls, paint on concrete (composite); and
- Interior building paint (composite).

Lab results reporting the detectable presence of lead in these sampled paints and/or surface coatings should be assumed to be representative of all similar paints and/or surface coatings encountered in the building. The results are presented in Appendix C.

7.3.3 Asbestos-containing Materials

Asbestos was found in the following materials at these approximate quantities:

- All 9-inch-by-9-inch and 12-inch-by-12-inch floor tile and mastic (4,730 square feet);
- Wall texture, drywall, and joint compound (25,000 square feet);
- Transite panel (10 square feet);
- Transite flue pipes (20 square feet);
- Roof patch/penetration mastic (30 square feet); and
- Door frame sealant (20 square feet).

The floor of the mezzanine in Room 114 was noted to contain the same 9-inch-by-9-inch asbestos-containing green floor tile that is found throughout the building.

The pre-demolition survey report assessing asbestos-containing materials in Building 14 is provided in Appendix C. That report is intended for submittal in its entirety to the BAAQMD to support demolition notification documentation.

7.4 Conclusions and Recommendations

7.4.1 Radiological Constituents

No radioactivity above background levels was detected by scanning of the walls, floors, and interior surfaces of the HVAC system; consequently, biased direct radiation measurements were not taken. The results of direct radiological measurements and measurements of removable radiological contamination were below the DCGLs listed in Table 5-1.

No measurements for tritium were above the DCGLs of 10,000 dpm/100 cm^2.

7.4.1.1 Final Status Survey Evaluation

The data collected in Building 14 indicate that the surfaces in the building meet the release criteria in Table 5-1 and can be considered for unconditional release.

7.4.2 Chemical Constituents

Table 7-4 lists constituents reported in samples collected in Building 14 at concentrations potentially exceeding hazardous waste thresholds.

Sludge in a sink trap in Room 118, formerly an electronics laboratory, exceeded hazardous waste threshold concentrations for chromium, lead, nickel, and zinc. Lead concentrations exceeded the STLC in wastewater from the same trap. Sludge samples collected from two sink traps in Room 137 were reported at concentrations greater than 10 times the STLC, but concentrations of metals in wastewater samples from these drains were below the STLC. A wipe sample collected from a sewer cleanout near the northwest corner of Building 14 and downstream of these traps (B14SW01) did not suggest elevated metals concentrations.

Because of the detections of elevated metal concentrations in sewer traps in the two labs evaluated (in Rooms 118 and 137) and the general inaccessibility of large segments of the system during this characterization, it should be assumed that the sewer system is contaminated. Additional characterization during demolition could be considered to potentially minimize hazardous waste.

Chromium was detected in concrete samples at slightly elevated concentrations; however, the elevated chromium concentrations are consistently distributed throughout the building, which is not indicative of a release, suggesting that the chromium is a component of the original concrete mixture. In addition, given that the total concentration is only slightly greater than 10 times the STLC, it is likely that the extractable concentration of chromium will be below the STLC. It is reasonable to assume that the concrete in the building was not impacted by a release of chromium. If additional certainty about the characterization of the concrete is desired, one or more of the previously collected concrete samples can be analyzed in advance of the six-month holding time limit.

Reported concentrations of PCBs in all concrete and wall paint samples collected were below comparison thresholds. These results suggest that PCBs are not a concern at Building 14.

Lead was found in all wipe samples collected in the building, in both labs and office areas. The greatest lead concentrations were reported in ducting from the fume hood in Room 137 and the exit vent of the air-handling unit in Room 114. Components of the building air-handling units should be segregated and evaluated for disposal. Demolition work in the building should be conducted in a manner that protects the workers from exposure to lead.

Selenium was noted on the hazard map as a potential contaminant in Rooms 118 and 137. Reported selenium concentrations in samples from sink traps and wipe samples from air-handling units in these rooms, and wipe samples from other building areas, do not suggest selenium contamination.

Concentrations of beryllium in wipe samples collected throughout the building did not exceed published criteria for beryllium.

All reported pH values were neutral or consistent with expected pH levels of the building materials (concrete) from which they were collected.

Thermostats that potentially contain mercury switches or other mercury-containing equipment were not identified in Building 14, but they may be present. Care should be taken when removing equipment that may contain mercury switches to prevent breakage and release of liquid mercury.

Rooms 118 and 137 contain laboratory fixtures (cabinets, sinks, benches, etc.) under which there may be potential contamination. No samples were collected under these fixtures. If staining, corrosion, or other signs of contamination are observed upon removal of these fixtures, additional samples should be collected.

7.4.3 Lead-based Paint

The interior building paint and exterior paint on concrete surfaces appear to be lead-based, as does the paint on the exterior wood of windows and doors. The presence of lead and/or lead-containing paint requires that specialized work practices be used during demolition work to help ensure that individuals involved in the work are adequately protected against elevated exposure to lead. Contractors or employees involved in lead-related demolition activities must comply with the Construction Safety Orders for Lead (8 CCR §1532.1 et. seq.) and training requirements for those involved in lead-related demolition activities. The Construction Safety Orders for Lead [8 CCR 1532.1 (p)] also require that a “Lead-Work Pre-Job Notification” be filed with CalOSHA whenever a construction project involves work that includes “trigger tasks,” as defined by the standard, which will involve greater than 100 square feet of “lead-based paint.” Notification must be made 24 hours prior to the commencement of work.

The paint on the exterior of the building was observed to be in poor condition, with peeling and chipping evident in various locations (see Appendix C for photographs of samples 14B-PC1 and 14B-PC2). Loose paint chips or other debris containing 0.5% lead by weight are likely to be characterized as hazardous waste; therefore, damaged paint containing lead at 0.5% or greater should

be stabilized or removed prior to demolition. Disturbance of lead-containing paints and/or surface coatings should be conducted by a licensed contractor utilizing workers with CDPH training in lead-related construction. Lead-related construction waste should be segregated into discrete waste streams and characterized for proper disposal.

7.4.4 Asbestos-containing Material

The 9-inch-square and 12-inch-square floor tiles and mastic were found to contain asbestos. Asbestos is also present in the wall texture and drywall, roof patch penetration mastic, door-frame sealant, and transite planes and flue pipes. Designation of a material as asbestos-containing should be applied to all homogenous material of the type reported to contain asbestos.

Since more than 100 linear or 100 square feet of regulated asbestos-containing material will be disturbed in demolition of Building 5, the BAAQMD must be notified 10 days prior to demolition activities.

Table 7-1. Systematic Radiological Measurement Results – Building 14

SampleID	X	Y	Z	Surface Type	Material Type	Total Alpha (dpm/100cm^2)	Total Beta (dpm/100cm^2)	Removable Alpha (dpm/100cm^2)	Removable Beta (dpm/100cm^2)	Tritium (dpm/100cm^2)	Comments
B14-1F-04-06-00-B3-01	4	6	0	Floor	Tile	5.9	265.2	0	0	0	
B14-1F-04-28-00-B3-01	4	28	0	Floor	Tile	0	173.9	0	0	26.37	
B14-1F-101-17-00-B3-01	101	17	0	Floor	Tile	21.9	34.3	0	0	1.21	
B14-1F-10-17-00-B3-01	10	17	0	Floor	Tile	5.6	182.6	0	0	4.04	
B14-1F-102-38-00-B3-01	102	38	0	Floor	Tile	5.5	279	0	8.4	4.27	
B14-1F-10-36-00-B3-01	10	36	0	Floor	Tile	0	78.3	0	3.1		
B14-1F-16-17-00-B3-01	16	17	0	Floor	Tile					0	
B14-1F-16-28-00-B3-01	16	28	0	Floor	Tile	0	200	0	0		
B14-1F-16-28-00-B3-02	16	28	0	Floor	Tile	5.5	223.2	0	33.5		
B14-1F-17-06-00-B2-B3-01	17	6	0	Floor	Carpet/Tile					0	
B14-1F-17-06-00-B3-01	17	6	0	Floor	Tile	5.9	178.3	0	63		
B14-1F-17-06-00-B3-02	17	6	0	Floor	Tile	0	321.9	0	25.1		
B14-1F-23-16-00-B2-B3-01	23	16	0	Floor	Carpet/Tile					0	
B14-1F-23-16-00-B3-01	23	16	0	Floor	Tile	5.9	208.9	0	0		
B14-1F-23-16-00-B3-01	23	16	0	Floor	Tile	5.5	266.1	0	0		
B14-1F-23-36-00-B3-01	23	36	0	Floor	Tile	5.9	143.5	0	0		
B14-1F-25-39-00-B2-01	25	39	0	Floor	Carpet	11	78.7	0	37.7		
B14-1F-25-39-00-B7-01	25	39	0	Floor	Wood	5.5	300.4	0	12.6		
B14-1F-30-05-00-B3-01	30	5	0	Floor	Tile	0	165.2	0	0		
B14-1F-30-05-00-B3-01	30	5	0	Floor	Tile	11	264.8	0	12.6		
B14-1F-30-28-00-B3-01	30	28	0	Floor	Tile	0	247.8	0	0		
B14-1F-30-34-00-B3-01	30	34	0	Floor	Tile					0	
B14-1F-31-17-00-B2-B3-01	31	17	0	Floor	Carpet/Tile					8.27	
B14-1F-31-17-00-B3-01	31	17	0	Floor	Tile	0	334.8	0	25.1		
B14-1F-31-17-00-B3-01	31	17	0	Floor	Tile	0	0	0	0		
B14-1F-36-37-00-B3-01	36	37	0	Floor	Tile	11.8	91.3	0	0	44.99	
B14-1F-45-17-00-B2-01	45	17	0	Floor	Carpet	0	279	0	29.3		
B14-1F-45-17-00-B2-B3-01	45	17	0	Floor	Carpet/Tile					0	
B14-1F-45-17-00-B3-01	45	17	0	Floor	Tile	0	227.5	0	0		
B14-1F-45-17-00-B3-02	45	17	0	Floor	Tile	5.5	304.7	0	18.5		
B14-1F-49-37-00-B3-01	49	37	0	Floor	Tile	11.8	252.2	0	0		
B14-1F-56-06-00-B3-01	56	6	0	Floor	Tile	11	167.4	0	8.4		
B14-1F-56-28-00-B3-01	56	28	0	Floor	Tile	0	234.8	0	0		
B14-1F-60-28-00-B3-01	60	28	0	Floor	Tile	11	343.3	0	0		
B14-1F-61-17-00-B3-01	61	17	0	Floor	Tile	0	334.8	0	25.1		
B14-1F-62-17-00-B3-01	62	17	0	Floor	Tile	5.5	176	0	0		
B14-1F-62-38-00-B3-01	62	38	0	Floor	Tile	5.9	191.3	0	0	0	
B14-1F-62-38-00-B3-02	62	38	0	Floor	Tile					0	
B14-1F-69-06-00-B3-01	69	6	0	Floor	Tile	22	206	0	0	0	
B14-1F-69-28-00-B2-01	69	28	0	Floor	Carpet	11	98.7	0	12.5		
B14-1F-69-28-00-B2-B7-01	69	28	0	Floor	Carpet/Wood					0	
B14-1F-69-28-00-B7-01	69	28	0	Floor	Wood	5.5	283.3	0	0		
B14-1F-75-17-00-B3-01	75	17	0	Floor	Tile	16.5	236.1	0	29.3		
B14-1F-78-10-00-B3-01	78	10	0	Floor	Tile					0	

Table 7-1. Systematic Radiological Measurement Results – Building 14

SampleID	X	Y	Z	Surface Type	Material Type	Total Alpha (dpm/100cm^2)	Total Beta (dpm/100cm^2)	Removable Alpha (dpm/100cm^2)	Removable Beta (dpm/100cm^2)	Tritium (dpm/100cm^2)	Comments
B14-1F-82-06-00-B3-01	82	6	0	Floor	Tile	22	296.1	3.2	16.7	4.5	
B14-1F-82-06-00-B3-02	82	6	0	Floor	Tile	11	270.4	0	16.7		
B14-1F-82-15-00-B3-01	82	15	0	Floor	Tile					3.01	
B14-1F-82-28-00-B3-01	82	28	0	Floor	Tile	11	77.3	0	8.4	0	
B14-1F-88-17-00-B2-01	88	17	0	Floor	Carpet	22	201.7	0	20.9		
B14-1F-88-17-00-B3-01	88	17	0	Floor	Tile	5.5	321.8	0	20.9		
B14-1F-88-36-00-B2-01	88	36	0	Floor	Carpet	38.5	193.1	0	0		
B14-1F-88-36-00-B3-01	88	36	0	Floor	Tile	0	137.3	0	12.5		
B14-1F-91-28-00-B3-01	91	28	0	Floor	Tile	22	188.8	0	0		
B14-1F-95-06-00-B3-01	95	6	0	Floor	Tile	27.5	214.6	0	0		
B14-1F-96-18-00-B3-01	96	18	0	Floor	Tile					0	
B14-W-01-06-01-B4-01	1	6	1	Wall	Drywall	0	785	0	0	1.69	
B14-W-01-06-01-B4-02	1	6	1	Wall	Drywall					0	
B14-W-01-13-05-B5-01	1	13	5	Wall	Painted Steel	0	0	0	0	0	
B14-W-01-33-05-B4-01	1	33	5	Wall	Drywall	0	0	0	0		
B14-W-06-12-05-B4-01	6	12	5	Wall	Drywall	0	0	0	0		
B14-W-06-12-05-B4-02	6	12	5	Wall	Drywall	0	0	0	0		
B14-W-101-10-01-B4-01	101	10	1	Wall	Drywall	11	0	0	4.2	0	
B14-W-101-10-01-B4-02	101	10	1	Wall	Drywall					0.42	
B14-W-105-14-01-B4-01	105	14	1	Wall	Drywall	0	51.5	0	16.7	0	
B14-W-14-40-05-B4-01	14	40	5	Wall	Drywall	0	901	0	0	0	
B14-W-16-20-01-B4-01	16	20	1	Wall	Drywall	0	0	0	0		
B14-W-17-05-05-B4-01	17	5	5	Wall	Drywall					0	
B14-W-20-01-01-B7-01	20	1	1	Wall	Wood					0	
B14-W-20-01-01-B7-02	20	1	1	Wall	Wood					6.55	
B14-W-20-16-02-B3-01	20	16	2	Wall	Tile					8.89	
B14-W-20-40-05-B4-01	20	40	5	Wall	Drywall	0	18.7	0	0		
B14-W-21-01-05-B7-01	21	1	5	Wall	Wood	0	0	0	0	5.31	
B14-W-37-32-01-B4-01	27	32	1	Wall	Drywall	0	0	0	0		
B14-W-39-32-05-B4-01	39	32	5	Wall	Drywall					0	
B14-W-39-40-05-B4-01	39	40	5	Wall	Drywall	0	32.7	0	0	5.45	
B14-W-40-01-01-B4-01	40	1	1	Wall	Drywall	0	0	0	0	1.07	
B14-W-40-01-01-B4-01	40	1	1	Wall	Drywall	-	98.7	0	8		NO TOTAL ALPHA
B14-W-45-23-01-B4-01	45	23	1	Wall	Drywall	0	0	0	58.6		
B14-W-45-40-05-B4-01	45	40	5	Wall	Drywall	11	0	0	12.6		
B14-W-47-40-05-B4-01	47	40	5	Wall	Drywall	0	0	0	0	0	
B14-W-60-01-05-B4-01	60	1	5	Wall	Drywall	0	0	0	0		
B14-W-60-20-05-B4-01	60	20	5	Wall	Drywall	0	0	0	0	3.39	
B14-W-68-40-02-B4-01	68	40	2	Wall	Drywall	0	0	0	12.57		
B14-W-68-40-02-B4-02	68	40	2	Wall	Drywall	0	-	0	0		REM BETA ILLEGIBLE
B14-W-68-40-05-B4-01	68	40	5	Wall	Drywall					2.57	
B14-W-69-20-05-B4-01	69	20	5	Wall	Drywall	0	107.5	0	0	4.09	
B14-W-70-18-05-B4-01	70	18	5	Wall	Drywall	0	0	0	1	0.55	
B14-W-74-21-05-B4-01	74	21	5	Wall	Drywall	11	42.9	0	20.9		

Table 7-1. Systematic Radiological Measurement Results – Building 14

SampleID	X	Y	Z	Surface Type	Material Type	Total Alpha (dpm/100cm^2)	Total Beta (dpm/100cm^2)	Removable Alpha (dpm/100cm^2)	Removable Beta (dpm/100cm^2)	Tritium (dpm/100cm^2)	Comments
B14-W-77-21-01-B4-01	77	21	1	Wall	Drywall	22	0	0	20.9	0	
B14-W-77-21-01-B4-02	77	21	1	Wall	Drywall	-	0	0	6		NO TOTAL ALPHA
B14-W-80-01-01-B4-01	80	1	1	Wall	Drywall	0	0	3.2	11		
B14-W-82-21-05-B4-01	82	21	5	Wall	Drywall	16.5	0	0	33.5		
B14-W-87-21-05-B4-01	87	21	5	Wall	Drywall					0	
B14-W-88-10-02-B4-01	88	10	2	Wall	Drywall					0	
B14-W-88-10-05-B4-01	88	10	5	Wall	Drywall	-	0	0	3		NO TOTAL ALPHA
B14-W-88-29-01-B4-01	88	29	1	Wall	Drywall	16.5	0	0	0		
B14-W-94-01-05-B4-01	94	1	5	Wall	Drywall	16.5	30	0	0		
B14-W-96-33-05-B4-01	96	33	5	Wall	Drywall	5.5	64.4	0	29.3		
SC0-7						33.3	291.5	7.1	76.9		
SCO 5 / SCO 6						22.2	222.7	0	36.4		
SCO-1						5.5	117.4	0	243		
SCO-2						0	174.1	0	60.7		
SCO-3						27.7	161.9	7.1	60.7		
SCO-4						5.5	142.8	0	32.4		

Table 7-2. Summary of Surface Alpha and Beta Radioactivity Measurements – Building 14

				dpm/100 cm^2				
Area	Matrix	Parameter	Number of Measurements	Median	Mean	Standard Deviation	Minimum	Maximum
Floor	Carpet Tile Wood	Total Alpha	41	5.75	8.5	8.8	0	38.5
		Removable Alpha	44	0	0.1	0.5	0	3.2
		Total Beta	43	211	211	84	0	343.3
		Removable Beta	44	0	10	13.9	0	63
Walls	Dry Wall Wood	Total Alpha	33	0	3.3	6.4	0	22
		Removable Alpha	33	0	0.1	0.6	0	3.2
		Total Beta	33	0	64.6	203	0	901
		Removable Beta	33	0	7.2	13	0	58.6

Notes:
* Low energy beta emitters such as tritium are not included
dpm/100 cm^2 = decay per minute per 100 square centimeters of surface area

Table 7-3. Measurements of Tritium Surface Radioactivity – Building 14

		dpm/100 cm^2				
Area	Number of Measurements	Median	Mean	Standard Deviation	Minimum	Maximum
Floors (Systematic and biased)	21	0	4.6	11	0	45
Walls (Systematic and biased)	23	0	1.7	2.6	0	8.9
HVAC	1	3	NA	NA	NA	NA

Note:
dpm/100 cm^2 = decay per minute per 100 square centimeters of surface area

Table 7-4. Non-Radiological Sampling and Analysis Summary – Building 14

Location	Matrix/Sample Type	Assumptions/Collection Rationale	Analytes	Constituents Potentially Above Hazardous Waste Thresholds[1]
Room 137	Concrete slab below tile	Selenium, mercury, and concentrated acid use; metals analysis laboratory	CAM 17, pH	Chromium
Room 118	Concrete slab below tile	Electronics parts repair, fabrication, storage; selenium use, laboratory sink	CAM 17, PCBs	Chromium
Room 104	Concrete slab below tile	Tech area, meters, equipment storage, sample storage, small quantities of mild acids	CAM 17, pH	Chromium
Sink traps in Rooms 137, 118	Wastewater	Contaminant settling points	CAM 17, pH	Lead (Room 118)
	Sediment and sludge	Contaminant settling points	CAM 17	Room 137: copper, mercury, lead, silver
				Room 118: chromium, copper, lead, nickel, silver, zinc
Sewer cleanout - outside, northwest corner of Building 14	Wipe of sewer pipe inner surface	Contamination conduit	CAM 17	None
Entire building (see map)	Dust on horizontal surfaces such as floors, HVAC ducting, light fixtures[2]	Potential release(s) of beryllium, lead, mercury, and selenium and dispersion in dust	Beryllium, lead, mercury, selenium	None
Rooms 104, 137	Interior wall paint	PCBs commonly used in paint, pre-1979	PCBs	None

Notes:
Asbestos and lead-based paint are not included in this table. See Appendix C for asbestos and lead-based paint results.
[1] Constituents above thresholds listed in Table 5-3 and described in Section 5.2.1. To determine if a constituent is considered a hazardous waste or is potentially a hazardous waste (based on leachability), consult analytical results tables.
[2] Wipe sample

Abbreviations:
CAM 17 California Administrative Code, Title 22 Priority Pollutant Metals
PCBs polychlorinated biphenyl compounds

Table 7-5. Analytical Results for Metals – Building 14

Sample Type	Sample Description	Sample Name	Units	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Hg	Mo	Ni	Se	Ag	Tl	V	Zn
Concrete	Concrete core, room 137 north	B14SC01	mg/kg	0.21 J, T	2.6	80.2 J, 4H	0.18 J, SL	0.053	26.8 J, 4H	34.9	47.1	3.8	0.21 J, D, 4H	1.4 J, 4H	28.4 J, 4H	0.32 J, T	0.034 J, T	<0.2	26.6	31.1
Concrete	Concrete core, room 137 center	B14SC02	mg/kg	<0.5	3.9	70.5 J, 4H	0.17 J, SL	0.054	59.9 J, 4H	11.6	21.5	6.1	0.064 J, D, 4H	1.2 J, 4H	40.6 J, 4H	0.54	0.038 J, T	<0.2	59.4	60.1
Concrete	Concrete core, room 137 east	B14SC03	mg/kg	<0.5	3.9	238 J, 4H	0.30 J, SL	0.074	54.0 J, 4H	64.2	97.6	4.5	0.29 J, D, 4H	1.0 J, 4H	77.3 J, 4H	1.2	0.060 J, T	0.30 J, 4H	44.9	37.4
Concrete	Concrete core, room 118 west	B14SC04	mg/kg	<0.5	4.7	185 J, 4H	0.34 J, SL	0.058	76.8 J, 4H	77.6	127	4.7	0.031 J, 2, D, 4H	1.0 J, 4H	57.3 J, 4H	0.87	0.053 J, T	0.17 J, 4H, T	56.5	46.1
Concrete	Concrete core, room 118 east	B14SC05	mg/kg	<0.5	6.1	162 J, 4H	0.34 J, SL	0.053	47.4 J, 4H	41.3	82.8	6.5	0.022 J, 2, D, 4H	0.86 J, 4H	51.9 J, 4H	0.74	0.050 J, T	0.11 J, T, 4H	38.5	40.4
Concrete	Concrete core, room 118 east	B14SC06 DUP	mg/kg	<0.5	4.6	163 J, 4H	0.39 J, SL	0.054	45.3 J, 4H	24.0	70.0	6.1	0.026 J, 2, D, 4H	0.82 J, 4H	44.5 J, 4H	0.64	0.13 J, T	0.082 J, T, 4H	38.3	37.5
Concrete	Concrete core, room 104 south	B14SC07	mg/kg	0.20 J, T	3.4	114 J, 4H	0.24 J, SL	0.033 J, T	66.0 J, 4H	11.9	31.0	3.6	0.020 J, T, 2, D, 4H	3.0 J, 4H	48.1 J, 4H	0.37 J, T	0.048 J, T	<0.2	31.2	30.9
Sludge	Sink trap sludge, room 137 north	B14SL01	mg/kg	<2.5	4.0 J, T	54.7 J, 4H	<0.5 UJ, SL	4.0	21.4 J, 4H	32.0	347	26.0	2.5 J, D, 4H	37.9 J, 4H	29.4 J, 4H	3.6	19.1	0.32 J, 4H, T	<5	1,410
Sludge	Sink trap sludge, room 137 north	B14SL02	mg/kg	0.36 J, T	1.5	21.7 J, 4H	0.021 J, SL, T	0.68	23.1 J, 4H	8.3	241	53.0	0.26 J, D, 4H	1.8 J, 4H	19.0 J, 4H	<0.5	303	<0.2	6.6	162
Sludge	Sink trap sludge, room 118 northeast	B14SL04	mg/kg	35.5	11.9	9.3 J, 4H, T	<0.5 UJ, SL	2.4	44,700 J, 4H	463	1,800	24,800	0.28 J, D, 4H	857 J, 4H	19,800 J, 4H	<2.5	187	<1	203	11,400
Wipe	Sewer wipe at cleanout, outside, northwest corner of Building 14	B14SW01	µg/100 cm²	<0.5	<1	0.67 J, T	<0.1	0.0098 J, T	0.28 J, T	0.078 J, T	11.8	2.1	---	<0.5	0.30 J, T	<0.5	0.056 J, T	<0.2	<1	11.1
Wipe	Sewer wipe at cleanout, outside, northwest corner of Building 14	B14SW01 RS	µg/100 cm²	---	---	---	---	---	---	---	---	---	0.034	---	---	---	---	---	---	---
Wipe	Floor wipe, room 137 west	B14SW02	µg/100 cm²	---	---	---	<0.1	---	---	---	---	2.5	---	---	---	<0.5	---	---	---	---
Wipe	Floor wipe, room 137 west	B14SW02 RS	µg/100 cm²	---	---	---	---	---	---	---	---	---	0.21	---	---	---	---	---	---	---
Wipe	Former vacuum hood ducting, room 137 east	B14SW03	µg/100 cm²	---	---	---	<0.25	---	---	---	---	96.0	---	---	---	0.24 J, T	---	---	---	---
Wipe	Former vacuum hood ducting, room 137 east	B14SW03 RS	µg/100 cm²	---	---	---	---	---	---	---	---	---	0.24	---	---	---	---	---	---	---
Wipe	HVAC vent wipe, room 114	B14SW04	µg/100 cm²	---	---	---	0.025 J, T	---	---	---	---	19.0	0.26	---	---	1.1	---	---	---	---
Wipe	HVAC vent wipe, room 114	B14SW05	µg/100 cm²	---	---	---	0.026 J, T	---	---	---	---	20.3	0.31	---	---	1.3	---	---	---	---
Wipe	Floor wipe, room 134 east	B14SW06	µg/100 cm²	---	---	---	<0.1	---	---	---	---	3.7	---	---	---	<0.5	---	---	---	---
Wipe	Floor wipe, room 134 east	B14SW06 RS	µg/100 cm²	---	---	---	---	---	---	---	---	---	0.049	---	---	---	---	---	---	---
Wipe	Floor wipe, room 118 north	B14SW07	µg/100 cm²	---	---	---	<0.1	---	---	---	---	15.5	---	---	---	<0.5	---	---	---	---
Wipe	Floor wipe, room 118 north	B14SW07 RS	µg/100 cm²	---	---	---	---	---	---	---	---	---	0.13	---	---	---	---	---	---	---
Wipe	Floor wipe, room 120C north	B14SW08	µg/100 cm²	---	---	---	<0.1	---	---	---	---	0.15 J, T	---	---	---	<0.5	---	---	---	---
Wipe	Floor wipe, room 120C north	B14SW08 RS	µg/100 cm²	---	---	---	---	---	---	---	---	---	0.030	---	---	---	---	---	---	---
Wipe	Floor wipe, room 120C south	B14SW09	µg/100 cm²	---	---	---	<0.1	---	---	---	---	0.54	---	---	---	<0.5	---	---	---	---
Wipe	Floor wipe, room 120C south	B14SW09 RS	µg/100 cm²	---	---	---	---	---	---	---	---	---	0.014 J, T	---	---	---	---	---	---	---
Wipe	Floor wipe, room 104 north	B14SW10	µg/100 cm²	---	---	---	<0.1	---	---	---	---	0.93	---	---	---	0.25 J, T	---	---	---	---
Wipe	Floor wipe, room 104 north	B14SW10 RS	µg/100 cm²	---	---	---	---	---	---	---	---	---	0.022	---	---	---	---	---	---	---
Wipe	Floor wipe, room 104 north	B14SW11 DUP	µg/100 cm²	---	---	---	<0.1	---	---	---	---	0.44	---	---	---	<0.5	---	---	---	---
Wipe	Floor wipe, room 104 north	B14SW11 DUP RS	µg/100 cm²	---	---	---	---	---	---	---	---	---	0.018 J, T	---	---	---	---	---	---	---
Wipe	Light fixture top wipe, room 104 east	B14SW12	µg/100 cm²	---	---	---	0.0074 J, T	---	---	---	---	14.8	---	---	---	0.23 J, T	---	---	---	---
Wipe	Light fixture top wipe, room 104 east	B14SW12 RS	µg/100 cm²	---	---	---	---	---	---	---	---	---	0.98	---	---	---	---	---	---	---
Wastewater	Sink trap water, room 137 north	B14WW01	mg/L	<0.005	<0.01	0.0168	<0.0005	0.0003 J, T	<0.01	0.0049	0.166 J, D	0.0995	0.00028	0.0088	0.0206	<0.005	0.0033	<0.002	<0.01	0.508
Wastewater	Sink trap water, room 137 north	B14WW02	mg/L	<0.005	0.0013 J, T	0.0134	<0.0005	0.0004 J, T	<0.01	0.00087 J, T	0.572 J, D	0.0787	<0.0002	<0.005	0.0822	<0.005	0.002	<0.002	<0.01	0.233
Wastewater	Sink trap water, room 137 northeast	B14WW03	mg/L	0.0012 J, T	0.0041 J, T	0.0774	<0.0005	0.0014	<0.01	0.0057	3.12 J, D	0.109	<0.0002	0.0273	0.0631	<0.005	0.00037 J, T	<0.002	<0.01	0.239
Wastewater	Sink trap water, room 118 northeast	B14WW04	mg/L	0.0015 J, T	0.0015 J, T	0.0292	<0.0005	0.0077	0.0066 J, T	0.001 J, T	3.78 J, D	5.64	0.002	0.00037 J, T	0.56	<0.005	0.0149	<0.002	<0.01	35.1

Table 7-5. Analytical Results for Metals – Building 14

Abbreviations:

mg/L =	milligrams per liter
µg/100 cm² =	micrograms per 100 square centimeters
DUP =	field duplicate
mg/kg =	milligrams per kilogram
RS =	sample location resampled
Sb =	antimony, As = arsenic, Ba = barium, Be = beryllium, Cd = cadmium, Cr = total chromium, Co = cobalt, Cu = copper, Pb = lead, Hg = mercury, Mo = molybdenum, Ni = nickel, Se = selenium, Ag = silver, Tl = thallium, V = vanadium, Zn = zinc
STLC =	Soluble Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24
TCLP =	Toxicity Characteristic Leaching Procedure, Title 22 California Code of Regulations, Section 66261.24
TTLC =	Total Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24

Notes:

<n =	analyte not detected above reporting limit of 'n'
D =	lab duplicate/replicate precision outside limits
J =	estimated result
SL =	initial or continuing calibration check problem - low bias
T =	trace level compound, poor quantitation
UJ =	result is not detected at an estimated detection limit
4H =	matrix spike recovery above normal limits
--- =	not analyzed
Italics =	no published bulk sample concentration (TTLC, STLC, TCLP) at which the constituent is deemed a hazardous waste
red =	detected above: 1) the TTLC for solid samples; 2) or the STLC or TCLP for aqueous samples; 3) or the wipe concentration limit
yellow =	detected above 10 x STLC or 20 x TCLP concentrations, for solid matrices (does not apply to wipe samples)

Analysis for Metals by USEPA Methods 6020, 7470A and 7471A. All samples analyzed by Test America, Earth City, Missouri.

The comparison threshold for beryllium of 0.2 µg/100 cm2 (collected on wipes) applies to removable contamination on equipment or surfaces. Equipment or surfaces with beryllium concentrations below this threshold may be released to the general public or to a DOE facility for use in a manner not requiring controls for beryllium exposure per the Chronic Beryllium Disease Prevention Program (10 CFR 850).

If chromium STLC and TCLP analyses are performed on future waste characterization samples, the optional 560 mg/L STLC limit can be applied if the TCLP concentration is below 5 mg/L per California Code of Regulations, Title 22, Section 66261.24.

Table 7-6. Analytical Results for PCBs – Building 14

Sample Type	Sample Description	Sample Name	Units	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260
Paint	Wall paint sample, room 137 northwest	B14PC01	mg/kg	<0.099 UJ, 1, 3L	<0.099 UJ, 1, 3L	<0.099 UJ, 1, 3L	<0.099 UJ, 1, 3L	<0.099 UJ, 1, 3L	5.6 J, 1	<0.099 UJ, 1, 3L
Paint	Wall paint sample, room 104 south	B14PC02	mg/kg	<0.099	<0.099	<0.099	<0.099	<0.099	6.6	<0.099 UJ, S
Concrete	Concrete core, room 118 west	B14SC04	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033 UJ, S
Concrete	Concrete core, room 118 east	B14SC05	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033 UJ, S
Concrete	Concrete core, room 118 east	B14SC06 DUP	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033 UJ, S

Abbreviations:

DUP = field duplicate
mg/kg = milligrams per kilogram
PCBs = polychlorinated biphenyls
STLC = Soluble Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24
TCLP = Toxicity Characteristic Leaching Procedure, Title 22 California Code of Regulations, Section 66261.24
TTLC = Total Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24

Notes:

<n = analyte not detected above reporting limit of 'n'
J = the result is not detected at the reported detection limit
S = initial or continuing calibration check problem
UJ = the result is not detected at an estimated detection limit
1 = holding time violation
3L = surrogate recovery below normal limits
Italics = no published bulk sample concentration (TTLC, STLC, TCLP) at which the constituent is deemed a hazardous waste
red = detected above: 1) the TTLC for solid samples; 2) or the STLC or TCLP for aqueous samples; 3) or the wipe concentration limit.
yellow = detected above 10 x STLC or 20 x TCLP concentrations, for solid matrices (does not apply to wipe samples)

Analysis for PCBs by USEPA Method 8082. All samples analyzed by Test America St. Louis, Earth City, Missouri.

The comparison threshold for PCBs of 10 µg/100 cm2 (collected on wipes) applies to non-porous surfaces contaminated with PCBs. Surfaces containing PCB concentrations above this limit are considered to be contaminated (40 CFR 761).

The value used as the threshold for determining if PCBs exceed hazardous waste limits is applicable to the sum of the Aroclor mixtures reported.

Table 7-7. Analytical Results for pH – Building 14

Sample Type	Sample Description	Sample Name	Units	pH
Concrete	Concrete core, room 137 north	B14SC01	pH Units	*11.0*
Concrete	Concrete core, room 137 center	B14SC02	pH Units	*11.0*
Concrete	Concrete core, room 137 east	B14SC03	pH Units	*11.7*
Concrete	Concrete core, room 104 south	B14SC07	pH Units	*11.4*
Wastewater	Sink trap water, room 137 north	B14WW01 FM	pH Units	*7.26*
Wastewater	Sink trap water, room 137 north	B14WW02 FM	pH Units	*7.31*
Wastewater	Sink trap water, room 137 northeast	B14WW03 FM	pH Units	*7.90*
Wastewater	Sink trap water, room 118 northeast	B14WW04 FM	pH Units	*7.56*

Abbreviations:

FM = field measurement
STLC = Soluble Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24
TCLP = Toxicity Characteristic Leaching Procedure, Title 22 California Code of Regulations, Section 66261.24
TPH = total petroleum hydrocarbons
TTLC = Total Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24

Notes:

Italics = no published bulk sample concentration (TTLC, STLC, TCLP) at which the constituent is deemed a hazardous waste
red = detected above: 1) the TTLC for solid samples; 2) or the STLC or TCLP for aqueous samples; 3) or the wipe concentration limit
yellow = detected above 10 x STLC or 20 x TCLP concentrations, for solid matices (does not apply to wipe samples)

Analysis for pH by USEPA Method 9045. Samples analyzed by Test America St. Louis, Earth City, Missouri unless noted as a field measurement

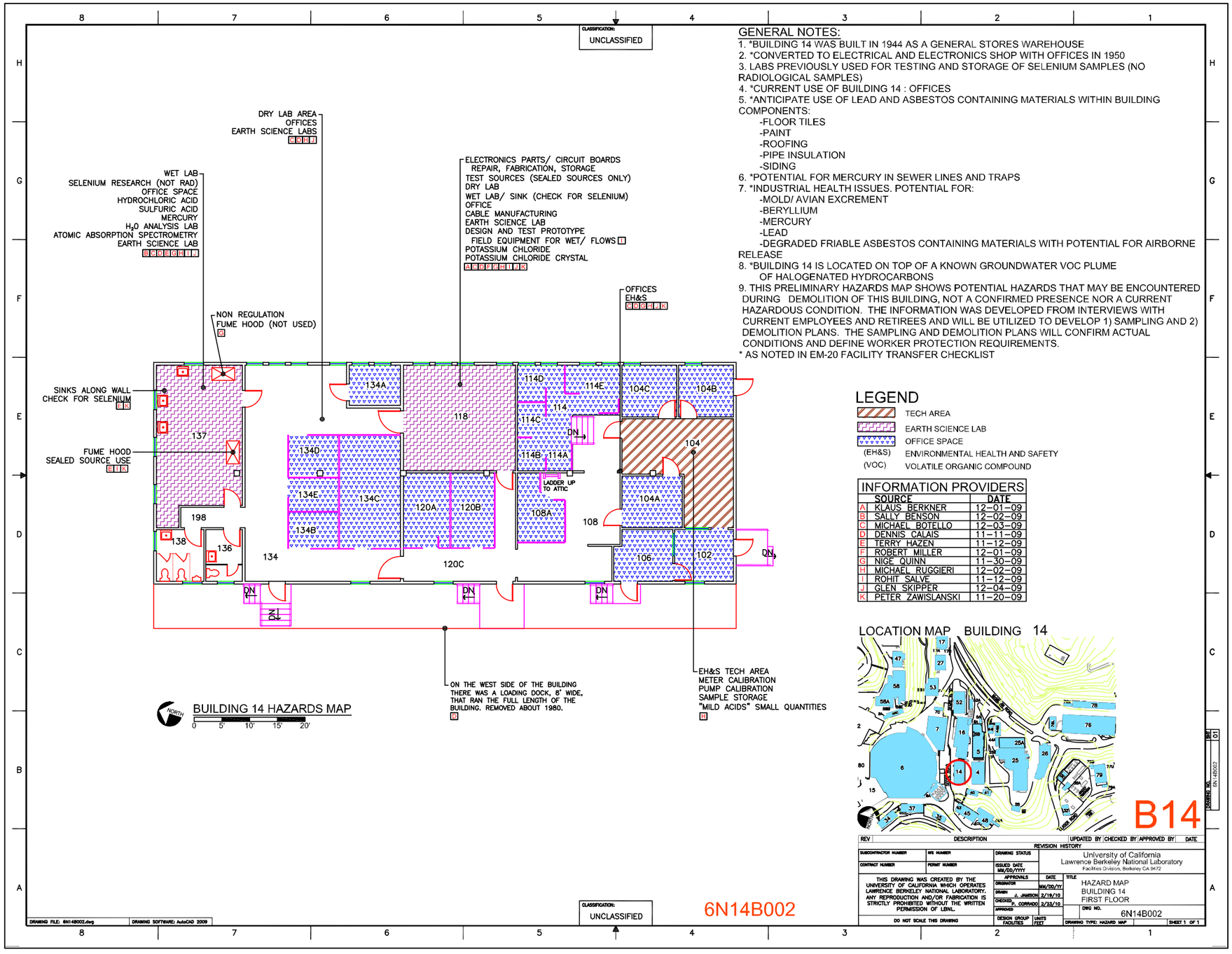
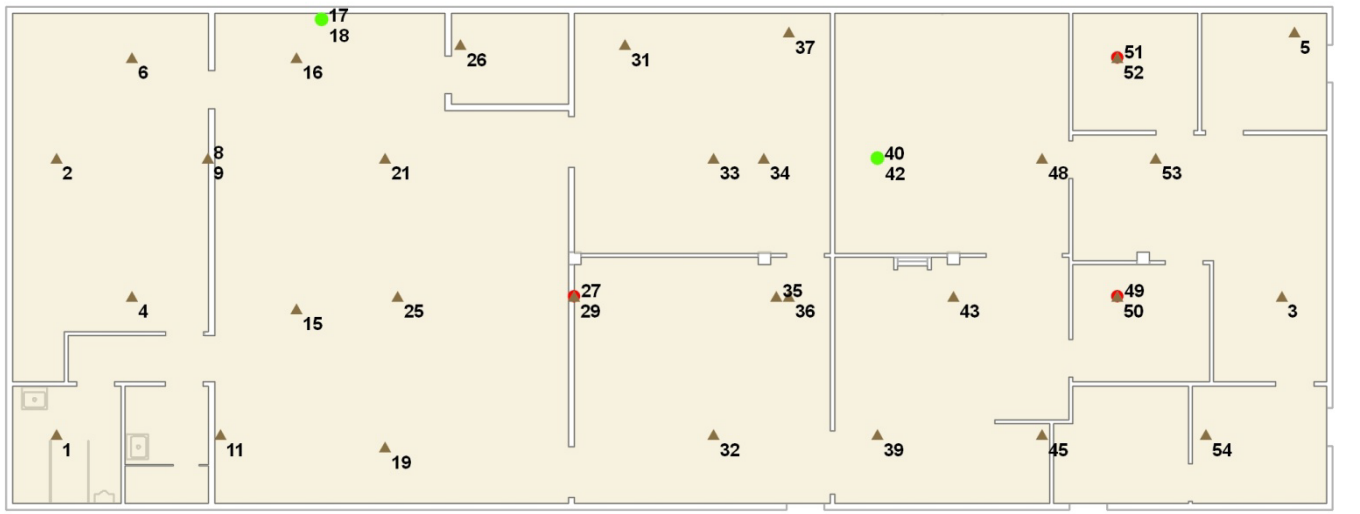


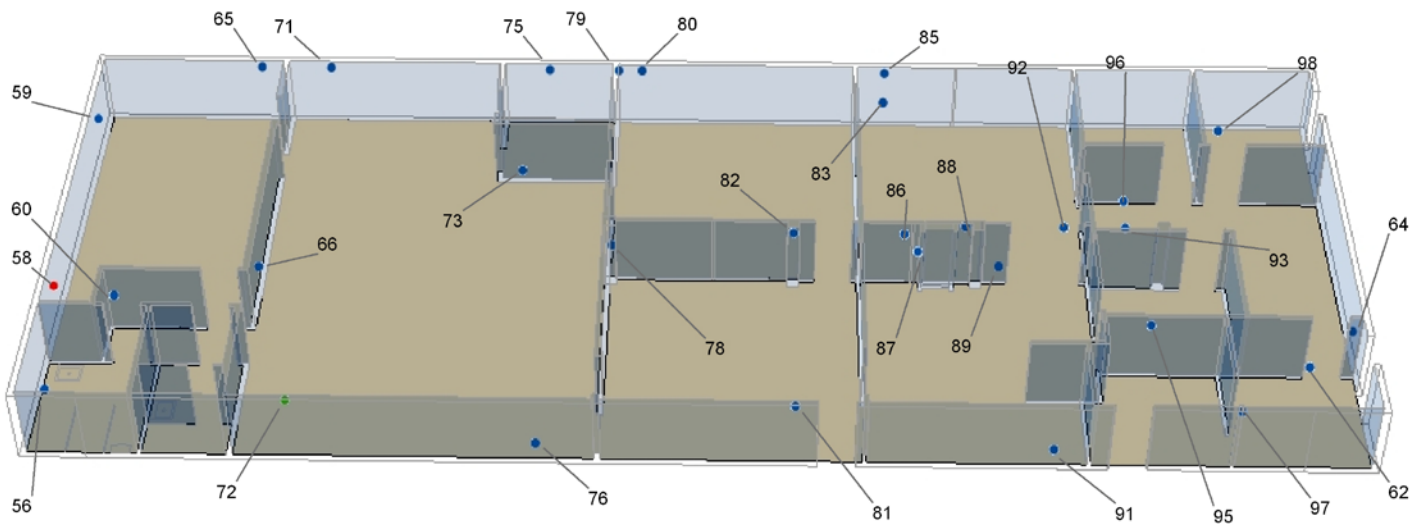
Figure 7-1. Hazard Map – Building 14



MapID	SampleID
1	B14-1F-04-06-00-B3-01
2	B14-1F-04-28-00-B3-01
3	B14-1F-101-17-00-B3-01
4	B14-1F-10-17-00-B3-01
5	B14-1F-102-38-00-B3-01
6	B14-1F-10-36-00-B3-01
8	B14-1F-16-28-00-B3-01
9	B14-1F-16-28-00-B3-01
11	B14-1F-17-06-00-B3-01
15	B14-1F-23-16-00-B3-01
16	B14-1F-23-36-00-B3-01
17	B14-1F-25-39-00-B2-01
18	B14-1F-25-39-00-B7-01
19	B14-1F-30-05-00-B3-01
21	B14-1F-30-28-00-B3-01
25	B14-1F-31-17-00-B3-01
26	B14-1F-36-37-00-B3-01
27	B14-1F-45-17-00-B2-01
29	B14-1F-45-17-00-B3-01

MapID	SampleID
31	B14-1F-49-37-00-B3-01
32	B14-1F-56-06-00-B3-01
33	B14-1F-56-28-00-B3-01
34	B14-1F-60-28-00-B3-01
35	B14-1F-61-17-00-B3-01
36	B14-1F-62-17-00-B3-01
37	B14-1F-62-38-00-B3-01
39	B14-1F-69-06-00-B3-01
40	B14-1F-69-28-00-B2-01
42	B14-1F-69-28-00-B7-01
43	B14-1F-75-17-00-B3-01
45	B14-1F-82-06-00-B3-01
48	B14-1F-82-28-00-B3-01
49	B14-1F-88-17-00-B2-01
50	B14-1F-88-17-00-B3-01
51	B14-1F-88-36-00-B2-01
52	B14-1F-88-36-00-B3-01
53	B14-1F-91-28-00-B3-01
54	B14-1F-95-06-00-B3-01

Figure 7-2. Radiological Sampling Locations – Building 14, Floor



Map ID	Sample ID
56	B14-W-01-06-01-B4-01
58	B14-W-01-13-05-B5-01
59	B14-W-01-33-05-B4-01
60	B14-W-06-12-05-B4-01
62	B14-W-101-10-01-B4-01
64	B14-W-105-14-01-B4-01
65	B14-W-14-40-05-B4-01
66	B14-W-16-20-01-B4-01
71	B14-W-20-40-05-B4-01
72	B14-W-21-01-05-B7-01
73	B14-W-37-32-01-B4-01
75	B14-W-39-40-05-B4-01
76	B14-W-40-01-01-B4-01
77	B14-W-40-01-01-B4-01
78	B14-W-45-23-01-B4-01
79	B14-W-45-40-05-B4-01

MapID	SampleID
80	B14-W-47-40-05-B4-01
81	B14-W-60-01-05-B4-01
82	B14-W-60-20-05-B4-01
83	B14-W-68-40-02-B4-01
85	B14-W-68-40-05-B4-01
86	B14-W-69-20-05-B4-01
87	B14-W-70-18-05-B4-01
88	B14-W-74-21-05-B4-01
89	B14-W-77-21-01-B4-01
91	B14-W-80-01-01-B4-01
92	B14-W-82-21-05-B4-01
93	B14-W-87-21-05-B4-01
95	B14-W-88-10-05-B4-01
96	B14-W-88-29-01-B4-01
97	B14-W-94-01-05-B4-01
98	B14-W-96-33-05-B4-01

Building 14
1st Floor
Surface Type - Walls

Material Type

- Drywall
- Painted Steel
- Wood

Figure 7-3. Radiological Sampling Locations – Building 14, Walls

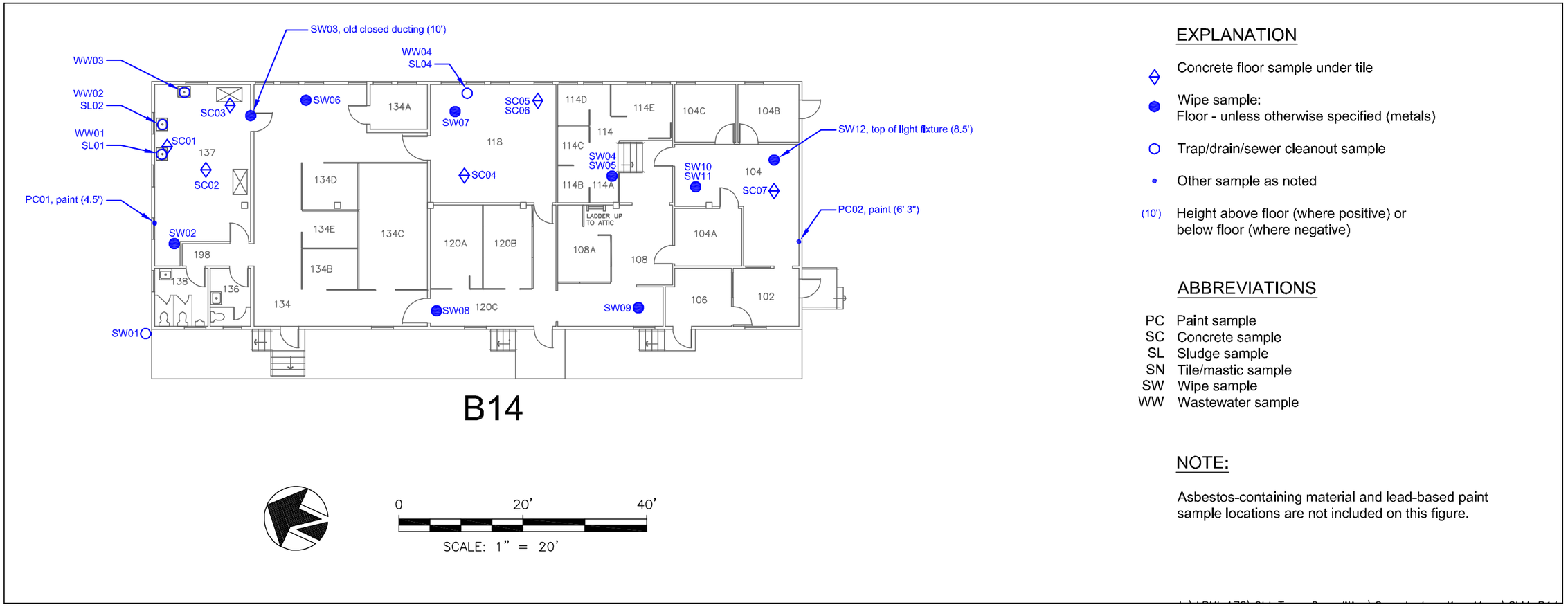


Figure 7-4. Non-Radiological Sampling Locations – Building 14

8. CHARACTERIZATION OF BUILDING 25A

Building 25A is a 7,514-square-foot building constructed in 1963 for use as an engineering shop. It has housed chemical storage, an electronics shop, a machine shop, a plastics shop, and an infrared lab, many of which are still operating presently. Figure 8-1 provides the locations of historical hazards associated with the building obtained by LBNL from historical records, interviews, and site inspections.

Building 25A was characterized per the *Final Work Plan for Base Bid Buildings* (Weiss, 2010c).

8.1 Deviations from Work Plan

No deviations occurred during the radiological characterization of Building 25A.The following non-radiological samples were not collected in Building 25A:

- A sludge sample (B25ASL01) from the sink trap in the only sink in Room 131 was not collected because of the lack of sludge in the trap.
- A sludge sample (B25ASL03) from the floor trap in the eastern portion of Room 101 was not collected because of the lack of sludge in the trap.
- A water sample (B25AWW04) from the floor trap in the southwest portion of Room 119 was not collected. The floor trap did not contain water.
- In addition to the metals analyses called out in the work plan, PCBs were analyzed for in the sewer wipe samples (B25ASW18 and 19) collected outside and east of Building 25A.
- Samples of window caulking were collected in Room 124 instead of Room 120.

Non-radiological samples from the air-handling system were collected at the exit of the system as opposed to the intake registers as planned in the work plan. It was determined that the exit points represent the locations in the air-handling system with the greatest potential for contamination from constituents entrained in the building air.

Additional tile samples were collected in Room 119 and analyzed for asbestos. Additional tiles discovered beneath the carpet in Rooms 104 and 112 were removed to allow collection of concrete samples.

8.2 Radiological Characterization Summary

The information provided on the hazard map developed by LBNL (Figure 8-1) and the historic information obtained by LBNL and summarized in the *Final Workplan for the*

Reconnaissance-Level Characterization of Buildings 4, 5, 14, 40, and 41 indicate that no radiological contamination should be present in Building 25A. The floors and lower walls were classified as Class 3 areas and considered one survey unit. The focus of the radiological characterization was the existing floors and lower walls, around sinks and drains, and machinery footprints if evident. Radiological survey locations were based on biased and systematic methods. Building 25A was also identified as a candidate for a background reference area.

8.2.1 Radiological Scanning

Radiological scanning was performed to determine if there were any areas of elevated radioactivity that would require biased static radiological measurements. Consistent with the workplan, the following areas were scanned using a gas-flow proportional floor monitor (Ludlum Model 239-1F) or a hand-held duel phosphor detector (Ludlum Model 43-89):

- ≥ 25 percent alpha/beta scans of Class 3 floor surfaces;
- ≥ 10 percent alpha/beta scans of Class 3 wall surfaces; and
- ≥ 25 percent alpha/beta scans of Class 3 accessible internal HVAC surfaces.

Scanning speeds using the gas proportional floor monitor were approximately 10 cm/s. Scanning speeds for the duel phosphor detectors were approximately 5 cm/s.

No radioactivity above background levels was detected during radiological scanning of floors, walls, and the interior surfaces of HVAC systems; consequently, no biased radiological measurements were collected from these locations.

8.2.2 Systematic Radiological Measurements

Thirty floor locations were identified in the workplan for systematic direct measurements. The locations were based on a triangular grid system with a random starting point. Direct radiological measurements of the floors were collected at 37 locations. Floor material consisted of exposed concrete and tile. Tiles were not removed to collect radiological measurements of the underlying concrete. Removable radioactivity measurements were collected using surface smears at each of the systematically-identified sampling locations. The floor sample locations are shown in Figure 8-2 for the first floor and Figure 8-4 for the second floor. Table 8-1 indicates the types of floor materials surveyed.

Thirty-five wall locations were systematically identified in the field for direct measurements. The locations were equally spaced, alternating between 1 and 5 feet high along the wall unless obstructed by equipment. In cases where the sampling location was obstructed, the location was offset to allow access to the nearest wall surface. Direct radiological measurements of various wall surface materials were collected at 35 locations. Removable radioactivity was measured using surface smears at each of the systematic sampling locations. Wall sample locations are shown in Figure 8-3 for the first floor and Figure 8-4 for the second floor.

All direct radiological measurements were collected for a period of 1 minute using a hand-held gas proportional detector (Ludlum Model 43-68). Removable radioactivity measurements also were collected for 1 minute, using a duel phosphor sample counter (Ludlum Model 3030).

The results of the systematic direct and removable radiological measurement are presented in Table 8-1 and summarized in Table 8-2. The highest total alpha measurement was 33 dpm/100 cm^2, while the highest total beta measurement was 461 dpm/100 cm^2. The DCGLs for total alpha and total beta surface radioactivity are 100 and 5,000 dpm/100 cm^2, respectively. The highest removable alpha measurement was 0 dpm/100 cm^2, while the highest removable beta measurement was 88 dpm/100 cm^2. The DCGLs for removable alpha and total beta surface radioactivity are 20 and 1,000 dpm/100 cm^2, respectively.

8.2.3 Tritium Sampling

Consistent with the workplan, 30 systematic tritium samples were collected on the floor and wall surfaces using methods described in the workplan. Twelve biased samples were also collected on the floors and lower walls. One sample was also collected from the HVAC system. All tritium samples were counted for 2 minutes using an automated liquid scintillation counter (Beckman Model TR2550).

The results of tritium sampling are presented in Table 8-1 and summarized in Table 8-3. The highest tritium surface activity was 39.4 dpm/100 cm^2.

8.2.4 Volumetric Sampling

No volumetric samples were collected in Building 25A.

8.3 Non-radiological Characterization Summary

8.3.1 Chemical Constituents

As shown in Table 8-4, samples were collected at Building 25A to characterize wastewater, sink, and sewer/floor trap water/sludge; concrete cores; re-circulating pipe water; a sewer cleanout; residual dust on window sills, walls, ledges, and light fixtures; wall paint; and window caulk. The locations of these samples are shown in Figure 8-5. This figure also shows the locations of equipment that may contain mercury switches (such as thermostats) that were observed in the building. Analytical data are summarized in Table 8-5 through Table 8-8. Samples were analyzed for metals by EPA Methods 6020A, and 7470A or 7471A, PCBs by EPA Method 8082, pH by EPA Method 9045, TPH by EPA Method 8015MOD, and VOCs by EPA Method 8260B. The complete analytical results are provided on a CD-ROM included in Appendix E.

Of the 18 solid or sludge samples collected at Building 25A and analyzed for metals, only one sludge sample, collected from a sewer trap in Room 119 (sample B25ASL04), contained lead at a concentration above the TTLC and cadmium and copper greater than 10 times the STLC. Mercury was reported at a concentration greater than 10 times the STLC in a sludge sample from a sink trap in Room 101C (B25ASL02). One sample of water collected from a floor trap in Room 101 (sample

B25AWW03) contained lead in a concentration above the STLC. Water samples collected from sink traps in Rooms 101C and 131 showed no metals above hazardous waste thresholds.

One of the wipe samples collected from a sewer cleanout outside of the building (sample B25ASW18) contained 52 μg/100 cm^2 of lead. A sample from the adjacent sewer cleanout showed a concentration of only 1.752 μg/100 cm^2 of lead.

A water sample collected from the recirculation pipe in the boiler room adjacent to Building 25A did not contain significant metal or hexavalent chromium concentrations according to the analyses.

A wood floor sample from Room 218 (B25AEW01) was reported to contain lead at a concentration in excess of 10 times the STLC and pH at 4.5. pH ranged from 11.5 to 12 in three concrete core samples collected in Room 131.

Of the 25 samples collected at Building 25A and analyzed for PCBs, all concentrations were more than an order of magnitude below comparison thresholds. TPH was not present at concentrations above the reporting limit in any of the three concrete core samples collected in Room 131. There are no thresholds for comparison for TPH. VOCs were not present at concentrations above comparison thresholds (where any exist) in any of the 13 concrete core samples collected throughout the building or the one sample of the wood flooring collected from the second floor. Chloroform was detected in two trip blank samples (B25ABT02, B52BT03); however, chloroform was not present at concentrations above detection limits in any of the 14 samples analyzed for VOCs.

8.3.2 Lead-based Paint

Eleven paint samples were collected and submitted for metals analysis to Macs Lab, Inc. using EPA Method 6010B/3050. All but two of the samples contained over 5,000 ppm of lead. The paint samples that exceeded the 5,000-ppm threshold were collected from the following locations:

- Area 119A, metal roll-up door;
- Room 124 window (wood);
- Wood stairway (composite);
- Metal surface in Area 218;
- Red and yellow wood floor paint in Area 218;
- North wall between Rooms 1010 and 101C paint on metal;
- Boiler room paint on concrete;
- Exterior west wall of building paint on metal; and
- Light fixture at east exit in Room 131.

The two locations with lead concentrations below the 5,000-ppm threshold were:

- Light fixtures above the northwest entrance and

- Light fixture between Rooms 119 and 218.

Lab results reporting the detectable presence of lead in these sampled paints and/or surface coatings should be assumed to be representative of all similar paints and/or surface coatings encountered in the building. The results are presented in Appendix C.

8.3.3 Asbestos-containing Materials

Asbestos was found in the following materials at these approximate quantities:

- Wall texture, drywall joint compound (9,500 square feet);
- Mudded pipe elbow (20 elbows);
- Thermal system insulation (150 linear feet);
- Interior walls paint or coating (9,000 square feet);
- Room 204, black flooring material and yellow glue (300 square feet);
- Room 112, floor mastic (200 square feet);
- Exterior roof, sealant (30 square feet);
- Fire door (four doors);
- Room 104, vinyl floor sheeting and mastic (300 square feet); and
- Door-frame, sealant (five doors).

The boiler room, men's restroom, hallway between the men's restroom and boiler room, and Rooms 119 and 131 contain TSI pipe lagging and mudded elbow considered to be asbestos-containing material. The east exterior door of Aisle 194 and the south exit door of Aisle 194 to the boiler room are fire doors consisting of asbestos-containing material.

The pre-demolition survey report assessing asbestos-containing materials in Building 25A is provided in Appendix C. That report is intended for submittal in its entirety to the BAAQMD to support demolition notification documentation.

8.4 Conclusions and Recommendations

8.4.1 Radiological Constituents

The radiological scanning of floors, walls, and interior surfaces of The HVAC system showed no detectable radioactivity above background levels; consequently, no biased locations for direct radiation measurements were identified. No measurements of systematic direct and removable radiological measurement were above the DCGLs in Table 5-1.

No tritium measurements exceeded the DCGL of 10,000 dpm/100 cm^2 (see Table 5-1).

8.4.1.1 Final Status Survey Evaluation

The surfaces in Building 25A evaluated in this investigation meet the release criteria in Table 5-1. Building 25A can be considered for unconditional release.

8.4.2 Chemical Constituents

Table 8-4 lists constituents reported in samples collected in Building 25A at concentrations potentially exceeding hazardous waste thresholds.

Lead was reported at hazardous waste levels in a sample of sewer trap sludge and wastewater. Lead was also found in a wipe sample collected from a sewer cleanout, suggesting lead dispersion in the sewer pipe system. Because of the detections of lead and other metals at elevated concentrations in sewer traps and a cleanout outside the building, and the general inaccessibility of large segments of the system during this characterization, it should be assumed that the sewer system is contaminated. Additional characterization during demolition could be considered to potentially minimize hazardous waste.

No significant metal concentrations were found in a sample from the boiler pipe in the boiler room between Buildings 25 and 25A, indicating that the boiler water is not a concern.

Lead was found in all wipe samples collected in the building. The greatest lead concentrations were reported on a ledge in Room 101. Mercury was detected at relatively low concentrations ($< 1\ \mu g/100\ cm^2$) in 12 of 22 wipe samples collected in the building. Lead concentrations in air ducting were reported to be very low ($0.37\ \mu g/100\ cm^2$). The data suggest that the ducting is not likely to contain lead concentrations exceeding hazardous waste thresholds. Demolition work in the building should be conducted in a manner that protects the workers from exposure to lead.

pH was measured in a wood floor in Room 218 and in a concrete floor in Room 131 because of acid use and storage noted on the hazard map. The alkaline pH values measured in concrete core samples are typical of concrete chemistry and clearly do not reflect an acid release. The pH of 4.5 in the wood floor sample collected from the second floor is not reflective of direct contact with strong acid. Lead reported at a concentration of 115 ppm in the same wood floor may be associated with the floor paint, which was present in the sample and has been determined to be lead-based paint (with a concentration of lead greater than 5,000 ppm; see Section 8.4.3 for lead-based paint discussion). These findings suggest that the wood floor should be managed in the same manner as other building materials containing lead-based paint (see Section 8.4.3 for discussion of management requirements for lead-based paint).

No elevated PCBs, TPH, or VOC concentrations were reported in any of the samples collected. The data suggest that PCBs, TPHs, or VOCs are not a concern at Building 25A.

Several thermostats that potentially contain mercury switches were identified in Building 25A (Figure 8-5). Care should be taken when removing equipment that may contain mercury switches to prevent breakage and release of liquid mercury. Additional thermostats and other mercury-containing equipment may be present.

To prevent disturbance of the research, no samples were collected in the two-story structure in Room 119 used for research on optical properties of solar energy materials (see Figure 8-1). No samples were collected under fixtures in Room 131 or under machine equipment and storage cabinets in Room 101. If staining or other evidence of contamination is observed upon removal of these fixtures and equipment, additional samples should be collected.

8.4.3 Lead-based Paint

Lead in paint was reported at concentrations at which the paint is considered lead-based in all surfaces from which samples were collected. The presence of lead and/or lead-containing paint requires that specialized work practices be used during demolition work to adequately protect individuals involved in the work against elevated exposure to lead. Contractors or employees involved in lead-related demolition activities must comply with the Construction Safety Orders for Lead (8 CCR §1532.1 et. seq.) and training requirements for those involved in lead-related demolition activities. The Construction Safety Orders for Lead [8 CCR 1532.1 (p)] also require that a "Lead-Work Pre-Job Notification" be filed with CalOSHA whenever a construction project involves "trigger tasks," as defined by the standard, which will involve greater than 100 square feet of "lead-based paint." Notification must be made 24 hours prior to the commencement of work.

Loose paint chips or other debris containing 0.5% lead by weight are likely to be characterized as hazardous waste; therefore, damaged paint containing lead at 0.5% or greater should be stabilized or removed prior to demolition. Disturbance of lead-containing paints and/or surface coatings should be conducted by a licensed contractor utilizing workers with CDPH training in lead-related construction. Lead-related construction waste should be segregated into discrete waste streams and characterized for proper disposal.

8.4.4 Asbestos-containing Materials

Asbestos-containing material was found in wall texture and drywall; interior paint or coating; floor tiles and floor materials in Rooms 104, 112, and 204; and miscellaneous patch, insulation, and sealant materials. Since more than 100 linear or 100 square feet of regulated asbestos-containing material will be disturbed in the demolition of Building 25A, the BAAQMD must be notified 10 days prior to demolition activities.

Table 8-1. Systematic Radiological Measurement Results – Building 25A

Sample ID	X	Y	Z	Surface Type	Material Type	Total Alpha dpm/100cm^2	Total Beta dpm/100cm^2	Removable Alpha dpm/100cm^2	Removable Beta dpm/100cm^2	Tritium dpm/100cm^2	Comments
B25A-2F-122-07-00-B7-01	122	7	0	2nd Floor	Wood	17	0	0	0		
B25A-2F-27-04-00-B7-01	27	4	0	2nd Floor	Wood	0	0	0	8		
B25A-2F-45-03-00-B7-01	45	3	0	2nd Floor	Wood	22	0	0	17		
B25A-2F-64-03-00-B7-01	64	3	0	2nd Floor	Wood	6	0	0	0		
B25A-2F-78-03-00-B7-01	78	3	0	2nd Floor	Wood	6	0	0	4		
B25A-2F-78-33-00-B7-01	78	33	0	2nd Floor	Wood	11	0	0	0		
B25A-2W-122-13-05-B4-01	122	13	5	2nd Level Wall	Gypsum Board	0	0	0	0		
B25A-2W-53-01-05-B4-01	53	1	5	2nd Level Wall	Gypsum Board	0	0	0	0		
B25A-2W-83-26-01-B4-01	83	26	1	2nd Level Wall	Gypsum Board	0	0	0	17		
B25A-2W-25-01-05-B5-01	25	1	5	2nd Level Wall	Painted Steel	0	0	0	17		
B25A-2W-20-12-01-B7-01	20	12	1	2nd Level Wall	Unknown	0	0	0	25	4.3	
B25A-2W-64-01-04-B7-01	64	1	4	2nd Level Wall	Unknown	0	0	0	0		
B25A-1F-04-25-00-B1-01	4	25	0	Floor	Concrete	17	281	0	9		
B25A-1F-30-24-00-B1-01	30	24	0	Floor	Concrete	0	379	0	44		
B25A-1F-50-25-00-B1-01	50	25	0	Floor	Concrete	0	379	0	18		
B25A-1F-82-12-00-B1-01	82	12	0	Floor	Concrete	0	130	0	0		
B25A-1F-04-18-00-B3-01	4	18	0	Floor	Tile	6	213	0	0		
B25A-1F-04-47-00-B3-01	4	47	0	Floor	Tile	6	239	0	0		
B25A-1F-10-03-00-B3-01	10	3	0	Floor	Tile	0	291	0	0		
B25A-1F-103-18-00-B3-01	103	18	0	Floor	Tile	6	332	0	21		
B25A-1F-10-33-00-B3-01	10	33	0	Floor	Tile	11	261	0	0		
B25A-1F-103-48-00-B3-01	103	48	0	Floor	Tile	0	259	0	88		
B25A-1F-112-30-00-B3-01	112	30	0	Floor	Tile	6	345	0	0	0.82	
B25A-1F-120-18-00-B3-01	120	18	0	Floor	Tile	0	246	0	0		
B25A-1F-120-48-00-B3-01	120	48	0	Floor	Tile	6	125	0	8	9.36	
B25A-1F-123-04-00-B3-01	123	4	0	Floor	Tile	17	461	0	8		
B25A-1F-15-18-00-B3-01	15	18	0	Floor	Tile	17	243	0	8	0	
B25A-1F-18-47-00-B3-01	18	47	0	Floor	Tile	6	326	0	0	0	
B25A-1F-27-03-00-B3-01	27	3	0	Floor	Tile	0	209	0	0		
B25A-1F-29-33-00-B3-01	29	33	0	Floor	Tile	0	165	0	0	6.66	
B25A-1F-35-18-00-B3-01	35	18	0	Floor	Tile	6	157	0	0		
B25A-1F-35-48-00-B3-01	35	48	0	Floor	Tile	11	65	0	4	8.1	
B25A-1F-38-05-00-B3-01	38	5	0	Floor	Tile	0	70	0	0	9.6	
B25A-1F-46-33-00-B3-01	46	33	0	Floor	Tile	6	235	0	0	0	
B25A-1F-52-18-00-B3-01	52	18	0	Floor	Tile	6	261	0	0	6.27	
B25A-1F-52-48-00-B3-01	52	48	0	Floor	Tile	0	165	0	8		
B25A-1F-61-15-00-B3-01	61	15	0	Floor	Tile	0	83	0	8		
B25A-1F-62-33-00-B3-01	62	33	0	Floor	Tile	11	103	0	4		
B25A-1F-69-18-00-B3-01	69	18	0	Floor	Tile	0	374	0	0	0.83	
B25A-1F-69-48-00-B3-01	69	48	0	Floor	Tile	6	183	0	0		
B25A-1F-77-33-00-B3-01	77	33	0	Floor	Tile	6	0	0	0		
B25A-1F-86-47-00-B3-01	86	47	0	Floor	Tile	28	384	0	42		
B25A-1F-89-18-00-B3-01	89	18	0	Floor	Tile	17	341	0	0		
B25A-1F-95-03-00-B3-01	95	3	0	Floor	Tile	11	345	0	0		

Table 8-1. Systematic Radiological Measurement Results – Building 25A

Sample ID	X	Y	Z	Surface Type	Material Type	Total Alpha dpm/100cm^2	Total Beta dpm/100cm^2	Removable Alpha dpm/100cm^2	Removable Beta dpm/100cm^2	Tritium dpm/100cm^2	Comments
B25A-1F-95-33-00-B3-01	95	33	0	Floor	Tile	11	392	0	17		
B25A-1F-06-50-04-X-01	6	50	4	Floor	Unknown					0.94	Material Type was not documented
B25A-1F-10-03-00-X-01	10	3	0	Floor	Unknown					0	Material Type was not documented
B25A-1F-105-49-00-X-01	105	49	0	Floor	Unknown					2.36	Material Type was not documented
B25A-1F-112-30-00-X-01	112	30	0	Floor	Unknown					9.54	Material Type was not documented
B25A-1F-14-33-00-X-01	14	33	0	Floor	Unknown					2.15	Material Type was not documented
B25A-1F-21-38-00-X-01	21	38	0	Floor	Unknown					0.62	Material Type was not documented
B25A-1F-39-18-00-X-01	39	18	0	Floor	Unknown					9.64	Material Type was not documented
B25A-1F-45-03-00-X-01	45	3	0	Floor	Unknown					2.88	Material Type was not documented
B25A-1F-68-18-00-X-01	68	18	0	Floor	Unknown					6.07	Material Type was not documented
B25A-1F-78-03-00-X-01	78	3	0	Floor	Unknown					0	Material Type was not documented
B25A-1F-80-33-00-X-01	80	33	0	Floor	Unknown					0	Material Type was not documented
B25A-1F-89-18-00-X-01	89	18	0	Floor	Unknown					6.97	Material Type was not documented
B25A-W-02-50-04-B4-01	2	50	4	Wall	Gypsum Board	0	0	0	0		
B25A-W-106-03-05-B4-01	106	3	5	Wall	Gypsum Board	6	69	0	25		
B25A-W-123-14-05-B4-01	123	14	5	Wall	Gypsum Board	0	0	0	0		
B25A-W-126-03-01-B4-01	126	3	1	Wall	Gypsum Board	33	91	0	13		
B25A-W-20-22-05-B4-01	20	22	5	Wall	Gypsum Board	0	0	0	0	10.34	
B25A-W-20-26-01-B4-01	20	26	1	Wall	Gypsum Board	0	0	0	0		
B25A-W-21-09-05-B4-01	21	9	5	Wall	Gypsum Board	0	0	0	0		
B25A-W-25-14-01-B4-01	25	14	1	Wall	Gypsum Board	0	0	0	0	6.64	
B25A-W-26-40-01-B4-01	26	40	1	Wall	Gypsum Board	0	0	0	0	3.17	Documented location does not match wall location. Sample location was adjusted on Figure 8-3 to reflect the wall location. New coordinate is (35,40, 1).
B25A-W-28-01-01-B4-01	28	1	1	Wall	Gypsum Board	6	0	0	0	0	
B25A-W-32-13-01-B4-01	32	13	1	Wall	Gypsum Board	0	0	0	0	3.21	
B25A-W-32-14-05-B4-01	32	14	5	Wall	Gypsum Board	0	0	0	21		
B25A-W-35-50-01-B4-01	35	50	1	Wall	Gypsum Board	0	0	0	0	0	
B25A-W-51-01-04-B4-01	51	1	4	Wall	Gypsum Board	0	0	0	37		
B25A-W-53-14-01-B4-01	53	14	1	Wall	Gypsum Board	0	0	0	0		
B25A-W-61-14-05-B4-01	61	14	5	Wall	Gypsum Board	0	0	0	0	0	
B25A-W-62-23-05-B4-01	62	23	5	Wall	Gypsum Board	11	0	0	4	10.3	
B25A-W-70-13-05-B4-01	70	13	5	Wall	Gypsum Board	0	0	0	0		
B25A-W-86-01-01-B4-01	86	1	1	Wall	Gypsum Board	0	0	0	0		
B25A-W-86-26-01-B4-01	86	26	1	Wall	Gypsum Board	0	116	0	38	0	
B25A-W-01-27-04-B5-01	1	27	4	Wall	Painted Steel	0	0	0	0		
B25A-W-103-50-04-B5-01	103	50	4	Wall	Painted Steel	6	0	0	0	12.21	
B25A-W-116-50-04-B5-01	116	50	4	Wall	Painted Steel	0	0	0	0		
B25A-W-126-24-05-B5-01	126	24	5	Wall	Painted Steel	0	0	0	0		
B25A-W-20-02-05-B5-01	20	2	5	Wall	Painted Steel	0	0	0	12	5.72	
B25A-W-59-50-04-B5-01	59	50	4	Wall	Painted Steel	0	0	0	0		
B25A-W-62-46-01-B5-01	62	46	1	Wall	Painted Steel	0	0	0	0		
B25A-W-69-46-05-B5-01	69	46	5	Wall	Painted Steel	0	0	0	25	0	

Table 8-1. Systematic Radiological Measurement Results – Building 25A

Sample ID	X	Y	Z	Surface Type	Material Type	Total Alpha dpm/100cm^2	Total Beta dpm/100cm^2	Removable Alpha dpm/100cm^2	Removable Beta dpm/100cm^2	Tritium dpm/100cm^2	Comments
B25A-W-02-07-05-B7-01	2	7	5	Wall	Wood	0	0	0	0		
B25A-W-18-42-01-B7-01	18	42	1	Wall	Wood	0	0	0	0		
B25A-W-01-25-04-X-01	1	25	4	Wall	Unknown					13.42	Material Type was not documented
B25A-W-101-50-04-X-01	101	50	4	Wall	Unknown					12.78	Material Type was not documented
B25A-W-29-09-05-X-01	29	9	5	Wall	Unknown					0	Material Type was not documented
B25A-W-47-01-05-X-01	47	1	5	Wall	Unknown					10.74	Material Type was not documented
B25A-W-47-01-05-X-01	47	1	5	Wall	Unknown					3.68	Material Type was not documented
B25A-W-61-50-04-X-01	61	50	4	Wall	Unknown					6.71	Material Type was not documented
B25A-W-83-26-05-X-01	83	26	5	Wall	Unknown					0	Material Type was not documented
25A-HVAC-01										39.35	Heater Vent

Table 8-2. Summary of Surface Alpha and Beta Radioactivity Measurements – Building 25A

				dpm/100cm^2				
Area	Matrix	Parameter[1]	Number of Measurements	Median	Mean	Standard Deviation	Minimum	Maximum
Floor	Wood	Total Alpha	6	8.5	10.3	8.1	0	22
		Removable Alpha	6	0	0	0	0	0
		Total Beta	6	0	0	0	0	0
		Removable Beta	6	2	4.8	6.8	0	17
	Tile	Total Alpha	33	6	7.2	8.0	0	33
		Removable Alpha	33	0	0	0	0	0
		Total Beta	33	239	233	108	0	461
		Removable Beta	33	0	7.4	18.0	0	88
	Concrete	Total Alpha	4	0	4.3	8.5	0	17
		Removable Alpha	4	0	0.3	0.9	0	330
		Total Beta	4	330	292	117	130	379
		Removable Beta	4	13.5	17.8	18.9	0	44
Walls	Gypsum Wall Board	Total Alpha	25	0	2.4	7.2	0	33
		Removable Alpha	25	0	0	0	0	0
		Total Beta	25	0	12	32.4	0	116
		Removable Beta	25	0	6.7	12.3	0	38
	Painted Steel	Total Alpha	9	0	0.67	2	0	6
		Removable Alpha	9	0	0	0	0	0
		Total Beta	9	0	0	0	0	0
		Removable Beta	9	0	6	9.6	0	25
	Wood	Total Alpha	6	0	0	0	0	0
		Removable Alpha	6	0	0	0	0	0
		Total Beta	6	0	0	0	0	0
		Removable Beta	6	0	4.8	10.0	0	25

Notes:
[1] Low energy beta emitters such as tritium are not included
dpm/100 cm^2 = decay per minute per 100 square centimeters of surface area

Table 8-3. Measurements of Tritium Surface Radioactivity – Building 25A

Area	Number of Measurements	dpm/100cm^2 Median	Mean	Standard Deviation	Minimum	Maximum
Floors (Systematic and Biased)	24	2.3	3.9	4.0	0	11.27
Walls (Systematic and Biased)	21	4.3	5.2	4.8	0	13.4
HVAC	1	NA	NA	NA	NA	39.4

Note:
dpm/100 cm^2 = decay per minute per 100 square centimeters of surface area

Table 8-4. Non-Radiological Sampling and Analysis Summary – Building 25A

Location	Matrix	Collection Rationale	Analytes	Constituents Potentially Above Hazardous Waste Thresholds[1]
Room 131	Concrete slab below tile	Solvents, cutting oils, metals, acids used in machine shop, electronics shop, lab	CAM 17, PCBs, TPH, VOCs, pH	None
Room 101- floor drain trap; Rooms 131, 101C - sink trap	Wastewater	Contaminant settling points	CAM 17, pH	Lead (Room 101)
	Sediment and/or sludge	Contaminant settling points	CAM 17	Cadmium; copper (Room 119); mercury (Room 101C)
Outside, east of B25A - sewer cleanouts	Wipe of sewer pipe inner surface	Contamination conduit	CAM 17, PCBs	None
Room 119	Concrete slab below tile	Mechanical and electrical fabrication, capacitors, solvent use	CAM 17, PCBs, VOCs	None
Rooms 101B, 101C	Concrete floor	Large soldering equipment (lead), circuit boards, electronic parts	CAM 17, PCBs	None
Rooms 101, 101A, 104	Concrete floor	Machine shops, electronics fabrication/maintenance, cutting oil, soldering	CAM 17, PCBs, VOCs	None
Room 112	Concrete floor	Electronics fabrication, soldering (lead)	Lead, VOCs	None
Rooms 118, 120, 124	Concrete slab below tile	Electronics fabrication, soldering (lead)	Lead, VOCs	None
Room 218	Wood floor	Chemical storage, glues, paints, solvents, freon, metals	CAM 17, VOCs, pH	Lead
Floors 1 and 2 (see map)	Dust on horizontal surfaces, such as floors, ledges, sills, HVAC ducting, light fixtures[2]	Potential release(s) of beryllium, lead, and mercury and dispersion in dust	Beryllium, lead, mercury	None
Rooms 131, 119, 101, 101D	Oil on floors [2]	Areas of potential PCB release	PCBs	None
Rooms 131A, 119, 118	Interior wall paint	PCBs commonly used in paint, pre-1979	PCBs	None
Rooms 119, 120	Windowsill caulking	PCBs commonly used in caulking, pre-1979	PCBs	None

Table 8-4. Non-Radiological Sampling and Analysis Summary – Building 25A

Location	Matrix	Collection Rationale	Analytes	Constituents Potentially Above Hazardous Waste Thresholds[1]
Boiler room heat pipes (B25)	Boiler pipe water	Corrosion inhibitor use	Cr6+, CAM 17	None

Notes:
Asbestos and lead-based paint are not included in this table. See Appendix C for asbestos and lead-based paint results.
[1] Constituents above thresholds listed in Table 5-3 and described in Section 5.2.1. To determine if a constituent is considered a hazardous waste or is potentially a hazardous waste (based on leachability), consult analytical results tables.
[2] Wipe sample

Abbreviations:
CAM 17 California Administrative Code, Title 22 Priority Pollutant Metals
PCBs polychlorinated biphenyl compounds
TPH total petroleum hydrocarbons, diesel and motor oil range organics
VOCs volatile organic compounds
Cr6+ hexavalent chromium
ft feet

Table 8-5. Analytical Results for Metals – Building 25A

Sample Type	Sample Description	Sample Name	Units	Sb	As	Ba	Be	Cd	Cr	Cr6	Co	Cu	Pb	Hg	Mo	Ni	Se	Ag	Tl	V	Zn
Exposed Wood	Wood Floor, room 218 south	B25AEW01	mg/kg	0.36 J, T	<1.0	10	<0.10	2.0	21.4	---	4.7	20.9	115	0.18 J, 6L	0.44 J, T	1.6	0.33 J, T	0.49	<0.20	<1.0	165
Liquid	Recirculating pipe water, Boiler room adjacent to B25A	B25ALH01	mg/L	0.0073	0.0041 J, T	0.0039	<0.0005	0.00014 J, T	<0.01	0.0068 J, T	<0.002	0.33	0.11	<0.0002	0.0045 J, T	0.00098 J, T	<0.005	---	<0.002	<0.01	0.338
Concrete	Concrete core, room 131 west	B25ASC01	mg/kg	<0.50	2.2	61.4	0.14	0.026 J, T	18.9	---	7.7	16.6	5.8	0.037 J, 6L	0.27 J, T	22.8	0.49 J, T	0.041 J, T	<0.20	15.6	29.8
Concrete	Concrete core, room 119 southwest	B25ASC02	mg/kg	<0.50	1.0	65.4	0.062 J, T	0.028 J, T	12.1	---	6.0	12.7	1.4	0.014 J, 6L	0.28 J, T	14.8	0.27 J, T	0.019 J, T	<0.20	8.6	14.7
Concrete	Concrete core, room 119 east	B25ASC03	mg/kg	<0.50	4.4	118	0.21	0.070	26.2	---	23.8	41.3	4.2	0.028 J, 6L	0.83	33.8	0.48 J, T	0.061 J, T	<0.20	18.9	37.3
Concrete	Concrete core, room 101C northwest	B25ASC04	mg/kg	<0.5	3.7	92.3	0.22	0.043	24.5	---	25.1	50.8	3.4	0.062 J, 6L	0.36	26.5	0.45	0.055	<0.2	22.9	31.8
Concrete	Concrete core, room 101 northeast	B25ASC05	mg/kg	<2.5	3.8 J, T	93.8	0.19 J, T	<0.25	36.3	---	44.0	77.3	6.0	0.044 J, 6L	0.73 J, T	35.9	<2.5	<1	<1	30.6	41.1
Concrete	Concrete core, room 101 northeast	B25ASC06 DUP	mg/kg	<0.50	4.5	202	0.33	0.10	46.0	---	90.9	168	6.0	0.18 J, 6L	0.62	44.0	0.80	0.070 J, T	<0.076 UJ, 2	40.3	42.8
Concrete	Concrete core, room 101B east	B25ASC07	mg/kg	0.17 J, T	2.4	104	0.18	0.041 J, T	24.6	---	4.6	16.3	4.1	<0.02	0.33 J, T	52.0	<0.57 UJ, 2	0.031 J, T	<0.36 UJ, 2	20.1	57.6
Concrete	Concrete core, room 101A north	B25ASC08	mg/kg	0.30 J, T	3.9	211	0.25	0.066	37.7	---	51.1	84.3	4.3	0.026 J, 6L	0.71	39.4	0.61	0.063 J, T	<0.20 UJ, 2	33.9	39.1
Concrete	Concrete core under carpet, room 104 east	B25ASC09	mg/kg	<0.50	4.1	88.8	0.18	0.070	29.9	---	12.2	27.0	4.2	0.024 J, 6L	0.54	33.3	0.50	0.046 J, T	<0.20	24.1	33.1
Concrete	Concrete core under carpet, room 112 north	B25ASC10	mg/kg	---	---	---	---	---	---	---	---	---	4.5	---	---	---	---	---	---	---	---
Concrete	Concrete core, room 118 south	B25ASC11	mg/kg	---	---	---	---	---	---	---	---	---	3.5	---	---	---	---	---	---	---	---
Concrete	Concrete core, room 120 south	B25ASC12	mg/kg	---	---	---	---	---	---	---	---	---	4.1	---	---	---	---	---	---	---	---
Concrete	Concrete core, room 124 south	B25ASC13	mg/kg	---	---	---	---	---	---	---	---	---	5.2	---	---	---	---	---	---	---	---
Concrete	Concrete core, room 131 south	B25ASC14	mg/kg	<0.50	3.0	99.4	0.19	0.054	27.3	---	14.6 J, 8	31.0	3.6	<0.02	0.42 J, T	32.4	0.42 J, T	0.040 J, T	<0.20	19.1	33.4
Concrete	Concrete core, room 131 south	B25ASC15 DUP	mg/kg	<0.50	3.9	106	0.20	0.070	29.1	---	56.1 J, 8	51.9	4.6	0.0083 J, 6L	0.59	31.7	0.55	0.053 J, T	<0.20	22.5	34.4
Sludge	Sink trap sludge, room 101C northwest	B25ASL02	mg/kg	<0.5	2.8	69.9	0.19	0.15	32.1	---	56.1	96.4	8.0	3.1 J, 6L	0.54	37.8	0.51	0.073	<0.2	21.4	70.4
Sludge	Sewer trap sludge, room 119 southwest	B25ASL04	mg/kg	1.9 J, 6H	0.72 J, T	16.3	0.047 J, T	10.8	17.0	---	1.7	979	1,630	1.6	2.1	17.1	<0.5	7.0	<0.2	1.9	179
Wipe	Window sill wipe, room 119 north	B25ASW03	µg/100 cm²	---	---	---	<0.1	---	---	---	---	---	93.8	<0.02	---	---	---	---	---	---	---
Wipe	Window sill wipe, room 101C north	B25ASW05	µg/100 cm²	---	---	---	<0.1	---	---	---	---	---	32.1	<0.02	---	---	---	---	---	---	---
Wipe	Floor wipe, room 101C northeast	B25ASW06	µg/100 cm²	---	---	---	<0.1	---	---	---	---	---	10.0	0.0073 J, T	---	---	---	---	---	---	---
Wipe	Window sill wipe, room 101 northeast	B25ASW08	µg/100 cm²	---	---	---	0.015 J, T	---	---	---	---	---	72.5	<0.02	---	---	---	---	---	---	---
Wipe	Ledge wipe, room 101 southeast	B25ASW12	µg/100 cm²	---	---	---	0.014 J, T	---	---	---	---	---	393	0.0096 J, T	---	---	---	---	---	---	---
Wipe	Floor wipe, room 101A central	B25ASW13	µg/100 cm²	---	---	---	<0.1	---	---	---	---	---	0.94	<0.02	---	---	---	---	---	---	---
Wipe	Wall wipe, room 101A west	B25ASW14	µg/100 cm²	---	---	---	<0.1	---	---	---	---	---	8.4	0.087	---	---	---	---	---	---	---
Wipe	Ledge wipe, room 101A southwest	B25ASW15	µg/100 cm²	---	---	---	0.020 J, T	---	---	---	---	---	364	0.16	---	---	---	---	---	---	---
Wipe	Ledge wipe, room 101A southwest	B25ASW16 DUP	µg/100 cm²	---	---	---	0.023 J, T	---	---	---	---	---	356	0.12	---	---	---	---	---	---	---
Wipe	Under carpet wipe, room 104 northwest	B25ASW17	µg/100 cm²	---	---	---	<0.1	---	---	---	---	---	11.8	0.061	---	---	---	---	---	---	---
Wipe	Sewer cleanout wipe, outside, east of B25A	B25ASW18	µg/100 cm²	<0.5	<1	1.1 J, T	<0.1	0.036 J, 6L, T	0.51 J, T	---	0.076 J, 6L, T	1.7	52.0	0.046	0.10 J, T	0.28 J, 6H, T	<0.5 UJ, 6H	0.091 J, T	<0.2 UJ, 6L	<1 R, 6L	4.6 J, 6L, T
Wipe	Sewer cleanout wipe, outside, east of B25A	B25ASW19	µg/100 cm²	<0.5	<1	1.1	<0.1	0.062 J, 6L	0.86 J, T	---	0.17 J, 6L, T	6.5	1.7	<0.02	<0.5	1.2 J, 6H	<0.5 UJ, 6H	0.030 J, T	<0.2 UJ, 6L	<1 R, 6L	4.3 J, 6L, T
Wipe	Light fixture top wipe, room 114 north	B25ASW20	µg/100 cm²	---	---	---	<0.1	---	---	---	---	---	21.2	<0.02	---	---	---	---	---	---	---
Wipe	Light fixture top wipe, room 120 north	B25ASW21	µg/100 cm²	---	---	---	<0.1	---	---	---	---	---	6.0	0.043	---	---	---	---	---	---	---
Wipe	Window sill wipe, room 124 southwest	B25ASW22	µg/100 cm²	---	---	---	<0.1	---	---	---	---	---	36.4	0.012 J, T	---	---	---	---	---	---	---
Wipe	Floor wipe, room 131 southwest	B25ASW23	µg/100 cm²	---	---	---	<0.1	---	---	---	---	---	1.7	<0.02	---	---	---	---	---	---	---
Wipe	Light fixture top wipe, room 119 northwest	B25ASW24	µg/100 cm²	---	---	---	<0.1	---	---	---	---	---	42.1	0.011 J, T	---	---	---	---	---	---	---
Wipe	HVAC ducting wipe, room 101 northeast	B25ASW25	µg/100 cm²	---	---	---	<0.1	---	---	---	---	---	0.37	<0.02	---	---	---	---	---	---	---
Wipe	Fume hood ducting wipe, room 101 northeast	B25ASW26	µg/100 cm²	---	---	---	<0.1	---	---	---	---	---	3.1	<0.02	---	---	---	---	---	---	---
Wipe	Under carpet wipe, room 204 northeast	B25ASW27	µg/100 cm²	---	---	---	<1	---	---	---	---	---	0.83	<0.02	---	---	---	---	---	---	---
Wipe	Floor wipe, room 298 north	B25ASW28	µg/100 cm²	---	---	---	<0.1	---	---	---	---	---	55.5	0.20	---	---	---	---	---	---	---
Wipe	Floor wipe, room 218 west	B25ASW29	µg/100 cm²	---	---	---	<0.1	---	---	---	---	---	45.5	0.016 J, T	---	---	---	---	---	---	---
Wipe	Floor wipe, room 218 west	B25ASW30 DUP	µg/100 cm²	---	---	---	<0.1	---	---	---	---	---	39.3	<0.02	---	---	---	---	---	---	---
Wipe	Light fixture top wipe, room 119 southwest	B25ASW31	µg/100 cm²	---	---	---	<0.1	---	---	---	---	---	30.7	0.016 J, T	---	---	---	---	---	---	---
Wastewater	Sink trap water, room 131 west	B25AWW01	mg/L	<0.005	<0.01	0.0796	<0.005	0.0041	0.0043 J, T	---	0.0034	1.64	0.0362	<0.0002	0.0023 J, T	0.226	0.0015 J, T	0.00093 J, T	0.0019 J, T	<0.01	3.39
Wastewater	Sink trap water, room 101C northwest	B25AWW02	mg/L	0.0055	0.0083 J, T	0.401	0.006	0.0456	0.334	---	0.0157	6.79	0.282	0.0027	0.0211	0.423	0.0076	0.0018 J, T	<0.002	0.138	9.13
Wastewater	Floor trap water, room 101 east	B25AWW03	mg/L	0.0368	0.105	0.357	0.0004 J, T	0.0594	0.132	---	0.0513	2.83	13.6	0.0031	0.121	0.386	0.0019 J, T	0.0121	0.001 J, T	0.0484	25.4

Table 8-5. Analytical Results for Metals – Building 25A

Abbreviations:

mg/L =	milligrams per liter
µg/100 cm² =	micrograms per 100 square centimeters
DUP =	field duplicate
mg/kg =	milligrams per kilogram
Sb =	antimony, As = arsenic, Ba = barium, Be = beryllium, Cd = cadmium, Cr = total chromium, Cr6 = hexavalent chromium, Co = cobalt, Cu = copper, Pb = lead, Hg = mercury, Mo = molybdenum, Ni = nickel, Se = selenium, Ag = silver, Tl = thallium, V = vanadium, Zn = zinc
STLC =	Soluble Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24
TCLP =	Toxicity Characteristic Leaching Procedure, Title 22 California Code of Regulations, Section 66261.24
TTLC =	Total Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24

Notes:

<n =	analyte not detected above reporting limit of 'n'
J =	estimated result
R =	result is rejected
T =	trace level compound, poor quantitation
UJ =	result is not detected at an estimated detection limit
2 =	method blank contamination
8 =	field duplicate precision outside limits
6H =	laboratory control sample recovery above normal limits
6L =	laboratory control sample recovery below normal limits
--- =	not analyzed
Italics =	no published bulk sample concentration (TTLC, STLC, TCLP) at which the constituent is deemed a hazardous waste
red =	detected above: 1) the TTLC for solid samples; 2) or the STLC or TCLP for aqueous samples; 3) or the wipe concentration limit
yellow =	detected above 10 x STLC or 20 x TCLP concentrations, for solid matrices (does not apply to wipe samples)

Analysis for Metals by USEPA Methods 6020, 7470A, 7471A and 7196A. All samples analyzed by Test America, Earth City, Missouri.

The comparison threshold for beryllium of 0.2 µg/100 cm2 (collected on wipes) applies to removable contamination on equipment or surfaces. Equipment or surfaces with beryllium concentrations below this threshold may be released to the general public or to a DOE facility for use in a manner not requiring controls for beryllium exposure per the Chronic Beryllium Disease Prevention Program (10 CFR 850).

Table 8-6. Analytical Results for PCBs – Building 25A

Sample Type	Sample Description	Sample Name	Units	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Aroclor 1262	Aroclor 1268
Caulk	Window sill caulking, room 119 north	B25ACK01	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	0.26	0.25	---	---
Caulk	Window sill caulking, room 124 southwest	B25ACK02	mg/kg	<0.033	<0.033	<0.033	<0.033	0.47	<0.033	<0.033	---	---
Paint	Wall paint sample, room 131A south	B25APC01	mg/kg	<0.098	<0.098	<0.098	<0.098	<0.098	0.61	<0.098	---	---
Paint	Paint sample from structural steel column, room 119 north	B25APC02	mg/kg	<0.097	<0.097	<0.097	<0.097	0.98	<0.097	<0.097	---	---
Paint	Wall paint sample, room 118 southwest	B25APC03	mg/kg	<0.099	<0.099	<0.099	<0.099	<0.099	1.3	<0.099	---	---
Concrete	Concrete core, room 131 west	B25ASC01	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	---	---
Concrete	Concrete core, room 119 southwest	B25ASC02	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	---	---
Concrete	Concrete core, room 119 east	B25ASC03	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	---	---
Concrete	Concrete core, room 101C northwest	B25ASC04	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	---	---
Concrete	Concrete core, room 101 northeast	B25ASC05	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	---	---
Concrete	Concrete core, room 101 northeast	B25ASC06 DUP	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	---	---
Concrete	Concrete core, room 101B east	B25ASC07	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	---	---
Concrete	Concrete core, room 101A north	B25ASC08	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	---	---
Concrete	Concrete core under carpet, room 104 east	B25ASC09	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	---	---
Concrete	Concrete core, room 131 south	B25ASC14	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	---	---
Concrete	Concrete core, room 131 south	B25ASC15 DUP	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	---	---
Wipe	Floor wipe, room 131 north	B25ASW01	µg/100 cm²	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1
Wipe	Floor wipe, room 119 central	B25ASW02	µg/100 cm²	<1.0 UJ, 1, 3L	<1.0 UJ, 1, 3L	<1.0 UJ, 1, 3L	<1.0 UJ, 1, 3L	<1.0 UJ, 1, 3L	<1.0 UJ, 1, 3L	<1.0 UJ, 1, 3L	<1.0 UJ, 1, 3L	<1.0 UJ, 1, 3L
Wipe	Floor wipe, room 119 east	B25ASW04	µg/100 cm²	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1
Wipe	Floor wipe, room 101D west	B25ASW07	µg/100 cm²	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1
Wipe	Floor wipe, room 101 central	B25ASW09	µg/100 cm²	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1
Wipe	Floor wipe, room 101 southeast	B25ASW10	µg/100 cm²	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1
Wipe	Floor wipe, room 101 southeast	B25ASW11 DUP	µg/100 cm²	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1	<1.0 UJ, 1
Wipe	Sewer cleanout wipe, outside, east of B25A	B25ASW18	µg/100 cm²	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Wipe	Sewer cleanout wipe, outside, east of B25A	B25ASW19	µg/100 cm²	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Table 8-6. Analytical Results for PCBs – Building 25A

Abbreviations:

µg/100 cm² = micrograms per 100 square centimeters
DUP = field duplicate
mg/kg = milligrams per kilogram
PCBs = polychlorinated biphenyls
STLC = Soluble Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24
TCLP = Toxicity Characteristic Leaching Procedure, Title 22 California Code of Regulations, Section 66261.24
TTLC = Total Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24

Notes:

<n = analyte not detected above reporting limit of 'n'
J = estimated result
UJ = the result is not detected at an estimated detection limit
1 = holding time violation
3L = surrogate recovery below normal limits
--- = not analyzed
Italics = no published bulk sample concentration (TTLC, STLC, TCLP) at which the constituent is deemed a hazardous waste
red = detected above: 1) the TTLC for solid samples; 2) or the STLC or TCLP for aqueous samples; 3) or the wipe concentration limit
yellow = detected above 10 x STLC or 20 x TCLP concentrations, for solid matrices (does not apply to wipe samples)

Analysis for PCBs by USEPA Method 8082. All samples analyzed by Test America St. Louis, Earth City, Missouri.

The comparison threshold for PCBs of 10 µg/100 cm2 (collected on wipes) applies to non-porous surfaces contaminated with PCBs. Surfaces containing PCB concentrations above this limit are considered to be contaminated (40 CFR 761).

The value used as the threshold for determining if PCBs exceed hazardous waste limits is applicable to the sum of the Aroclor mixtures reported.

Table 8-7. Analytical Results for TPH and pH – Building 25A

Sample Type	Sample Description	Sample Name	Units	TPH Diesel	TPH Motor Oil	pH
Exposed Wood	Wood Floor, room 218 south	B25AEW01	pH Units	---	---	*4.5*
Concrete	Concrete core, room 131 west	B25ASC01	mg/kg	*<25*	*<25*	---
Concrete	Concrete core, room 131 west	B25ASC01	pH Units	---	---	*11.9*
Concrete	Concrete core, room 131 south	B25ASC14	mg/kg	*<25*	*<25*	---
Concrete	Concrete core, room 131 south	B25ASC14	pH Units	---	---	*12.0*
Concrete	Concrete core, room 131 south	B25ASC15 DUP	mg/kg	*<25*	*<25*	---
Concrete	Concrete core, room 131 south	B25ASC15 DUP	pH Units	---	---	*11.5*

Abbreviations:

DUP = field duplicate
mg/kg = milligrams per kilogram
STLC = Soluble Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24
TCLP = Toxicity Characteristic Leaching Procedure, Title 22 California Code of Regulations, Section 66261.24
TPH = total petroleum hydrocarbons
TTLC = Total Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24

Notes:

<n = analyte not detected above reporting limit of 'n'
--- = not analyzed
Italics = no published bulk sample concentration (TTLC, STLC, TCLP) at which the constituent is deemed a hazardous waste
red = detected above: 1) the TTLC for solid samples; 2) or the STLC or TCLP for aqueous samples; 3) or the wipe concentration limit
yellow = detected above 10 x STLC or 20 x TCLP concentrations, for solid matices (does not apply to wipe samples)

Analysis for TPH by USEPA Method 8015 MOD, pH by USEPA Method 9045. All samples analyzed by Test America St. Louis, Earth City, Missouri

Table 8-8. Analytical Results for VOCs – Building 25A

Sample Type	Sample Description	Sample Name	Units	1,1,1-Trichloro-ethane	1,3-Dichloro-benzene	1,4-Dichloro-benzene	2-Buta-none	2-Hexa-none	4-Methyl-2-penta-none	Acetone	Benzene	Bromo-methane	Carbon disulfide	Chloro-benzene	Chloro-ethane	Chloro-form	Chloro-methane	Ethyl-benzene	Methylene chloride	Styrene	Toluene	Vinyl chloride	Xylenes (total)
Concrete	Concrete core, room 131 west	B25ASC01	mg/kg	*<0.005*	*<0.005*	<0.005	<0.02	*<0.02*	*<0.02*	*0.031*	<0.005	*<0.01*	*<0.005*	<0.005	*<0.01*	<0.005	*<0.01*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	<0.005	*<0.01*
Concrete	Concrete core, room 119 southwest	B25ASC02	mg/kg	*<0.005*	*<0.005 UJ, X*	<0.005 UJ, X	<0.02	*<0.02*	*<0.02*	*0.03*	<0.005	*<0.01*	*<0.005*	<0.005	*<0.01*	<0.005	*<0.01*	*0.00064 J, T*	*0.0011 J, T*	*<0.005*	*0.0011 J, T*	<0.005	*0.0068 J, T*
Concrete	Concrete core, room 119 east	B25ASC03	mg/kg	*<0.005*	*<0.005*	<0.005	<0.02	*0.011 J, T*	*0.012 J, T*	*0.022*	<0.005	*<0.01*	*<0.005*	<0.005	*<0.01*	<0.005	*<0.01*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	<0.005	*<0.01*
Concrete	Concrete core, room 101 northeast	B25ASC05	mg/kg	*<0.005*	*<0.005*	<0.005	<0.02	*<0.02*	*<0.02*	*0.013 J, T*	<0.005	*<0.01*	*<0.005*	<0.005	*<0.01*	<0.005	*<0.01*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	<0.005	*0.0038 J, T*
Concrete	Concrete core, room 101 northeast	B25ASC06 DUP	mg/kg	*<0.005*	*<0.005*	<0.005	0.0094 J, 3L, T	*<0.02*	*<0.02*	*0.072 J, 3L*	0.00095 J, T	*<0.01 UJ, 3L*	*<0.005 UJ, 3L*	<0.005	*<0.01 UJ, 3L*	<0.005 UJ, 3L	*<0.01 UJ, 3L*	*0.00034 J, T*	*<0.005 UJ, 3L*	*<0.005*	*0.00083 J, T*	<0.005 UJ, 3L	*0.0036 J, T*
Concrete	Concrete core, room 101A north	B25ASC08B	mg/kg	*<0.005*	*<0.005 UJ, X*	<0.005 UJ, X	0.032	*0.016 J, T*	*<0.02*	*0.11*	0.00066 J, T	*<0.01*	*<0.005*	<0.005	*<0.01*	<0.005	*<0.01*	*0.0013 J, T*	*<0.005*	*<0.005*	*0.0006 J, T*	<0.005	*0.012*
Concrete	Concrete core under carpet, room 104 east	B25ASC09	mg/kg	*<0.005*	*<0.005*	<0.005	<0.02	*0.0095 J, T*	*<0.02*	*0.044*	<0.005	*<0.01*	*<0.005*	<0.005	*<0.01*	<0.005	*<0.01*	*<0.005*	*<0.005*	*<0.005*	*0.0012 J, T*	<0.005	*<0.01*
Concrete	Concrete core under carpet, room 112 north	B25ASC10	mg/kg	*<0.005*	*<0.005 UJ, X*	<0.005 UJ, X	<0.02	*<0.02*	*<0.02*	*0.014 J, T*	<0.005	*<0.01*	*<0.005*	<0.005	*<0.01*	<0.005	*<0.01*	*<0.005*	*0.0017 J, T*	*<0.005*	*<0.005*	<0.005	*0.0048 J, T*
Concrete	Concrete core, room 118 south	B25ASC11	mg/kg	*<0.005*	*<0.005*	<0.005	<0.02	*0.019 J, T*	*<0.02*	*0.028*	<0.005	*<0.01*	*<0.005*	<0.005	*<0.01*	<0.005	*<0.01*	*0.032*	*<0.005*	*<0.005*	*0.016*	<0.005	*0.4*
Concrete	Concrete core, room 120 south	B25ASC12	mg/kg	*<0.005*	*<0.005*	<0.005	<0.02	*<0.02*	*<0.02*	*0.03*	<0.005	*<0.01*	*<0.005*	<0.005	*<0.01*	<0.005	*<0.01*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	<0.005	*<0.01*
Concrete	Concrete core, room 124 south	B25ASC13	mg/kg	*<0.005*	*<0.005*	<0.005	<0.02	*<0.02*	*<0.02*	*0.035*	<0.005	*<0.01*	*<0.005*	<0.005	*<0.01*	<0.005	*<0.01*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	<0.005	*0.0026 J, T*
Concrete	Concrete core, room 131 south	B25ASC14	mg/kg	*<0.005*	*<0.005*	<0.005	<0.02	*<0.02*	*<0.02*	*<0.02*	<0.005	*<0.01*	*<0.005*	<0.005	*<0.01*	<0.005	*<0.01*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	<0.005	*<0.01*
Concrete	Concrete core, room 131 south	B25ASC15 DUP	mg/kg	*<0.005*	*<0.005*	<0.005	<0.02	*0.012 J, T*	*0.009 J, T*	*0.038*	<0.005	*<0.01*	*<0.005*	<0.005	*<0.01*	<0.005	*<0.01*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	<0.005	*0.0029 J, T*
Exposed Wood	Wood Floor, room 218 south	B25AEW01	mg/kg	*<0.005*	*<0.005 R, X*	<0.005 R, X	0.1	*0.11 J, X*	*<0.02*	*2.3*	<0.005	*<0.01*	*4.1 J, 6H, S*	<0.005	*<0.01*	<0.005	*<0.01*	*0.0069 J, X*	*<0.005*	*<0.005 UJ, X*	*0.19 J, X*	<0.005	*0.044 J, X*

Abbreviations:

DUP = field duplicate
mg/kg = milligrams per kilogram
STLC = Soluble Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24
TCLP = Toxicity Characteristic Leaching Procedure, Title 22 California Code of Regulations, Section 66261.24
TTLC = Total Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24
VOCs = volatile organic compounds

Notes:

<n = analyte not detected above reporting limit of 'n'
J = estimated result
R = result is rejected
S = initial or continuing calibration check problem
T = trace level compound, poor quantitation
UJ = result is not detected at an estimated detection limit
X = internal standard recovery problem
3L = surrogate recovery below normal limits
6H = laboratory control sample recovery above normal limits
6L = laboratory control sample recovery below normal limits
--- = not analyzed
Italics = no published bulk sample concentration (TTLC, STLC, TCLP) at which the constituent is deemed a hazardous waste
red = detected above: 1) the TTLC for solid samples; 2) or the STLC or TCLP for aqueous samples; 3) or the wipe concentration limit
yellow = detected above 10 x STLC or 20 x TCLP concentrations, for solid matices (does not apply to wipe samples)

Analysis for VOCs by USEPA Method 8260B. All samples analyzed by Test America St. Louis, Earth City, Missouri

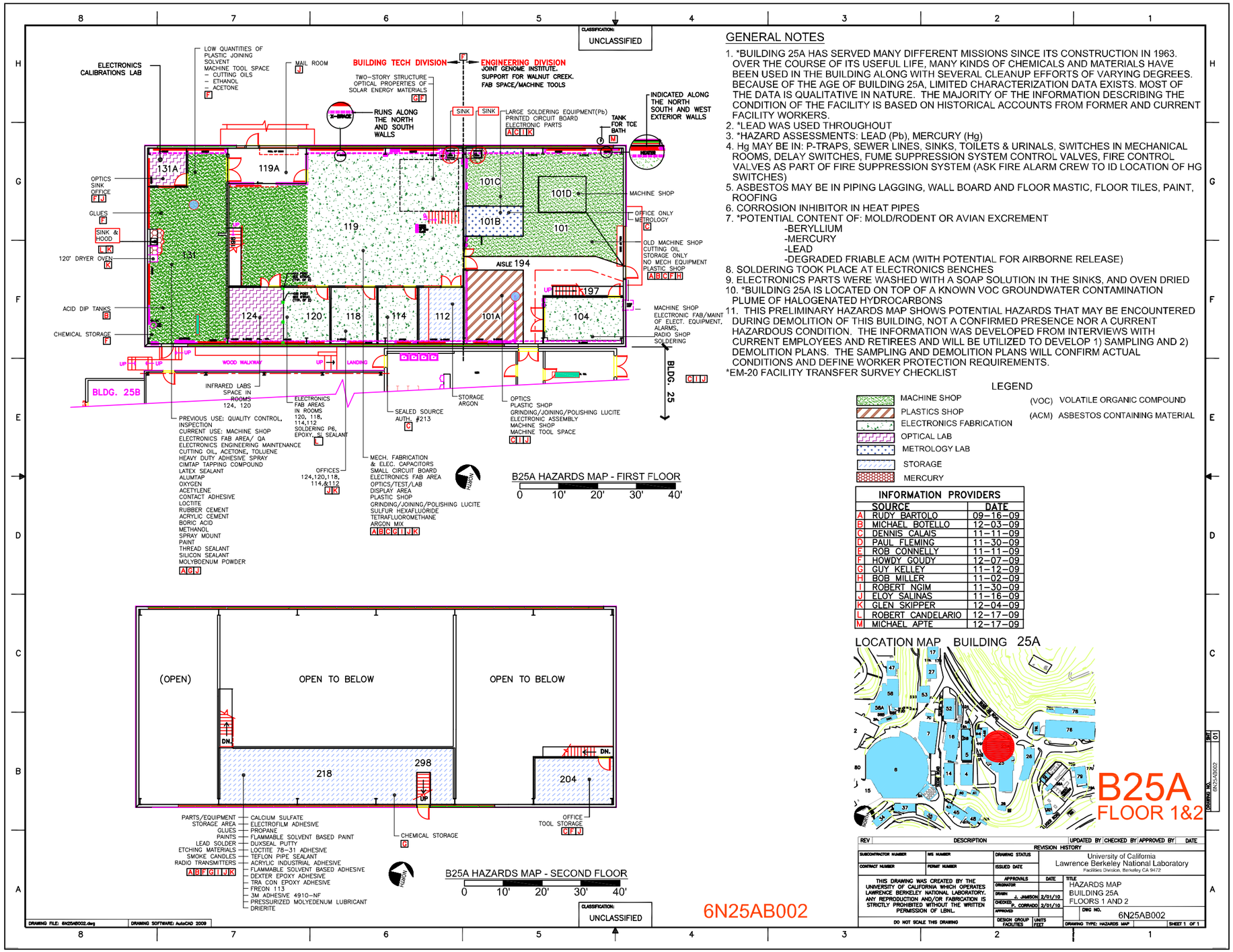
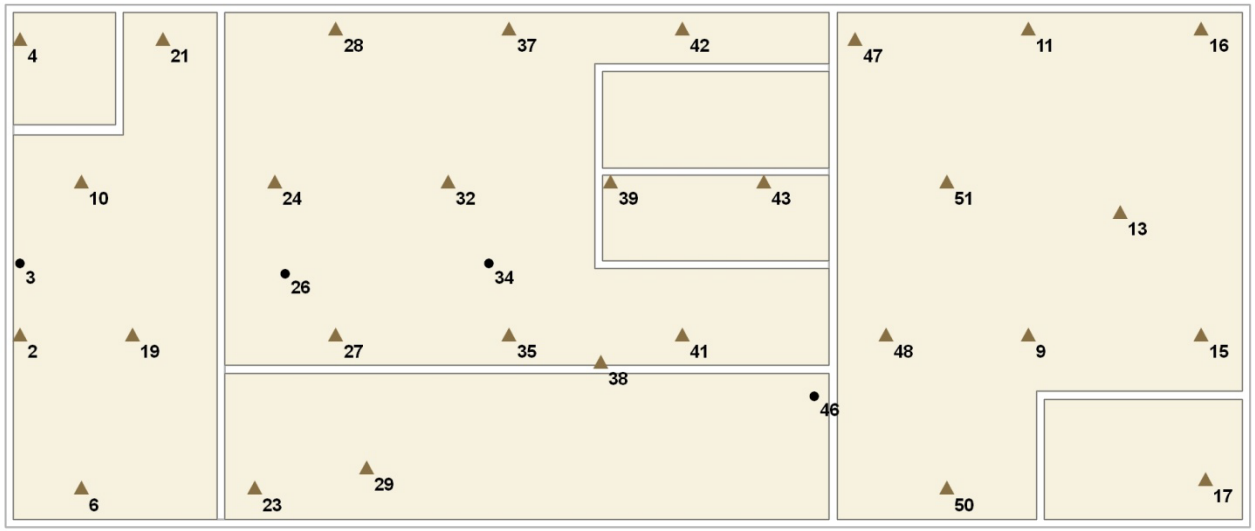
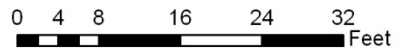


Figure 8-1. Hazard Map – Building 25A



Map ID	Sample ID
2	B25A-1F-04-18-00-B3-01
3	B25A-1F-04-25-00-B1-01
4	B25A-1F-04-47-00-B3-01
6	B25A-1F-10-03-00-B3-01
9	B25A-1F-103-18-00-B3-01
10	B25A-1F-10-33-00-B3-01
11	B25A-1F-103-48-00-B3-01
13	B25A-1F-112-30-00-B3-01
15	B25A-1F-120-18-00-B3-01
16	B25A-1F-120-48-00-B3-01
17	B25A-1F-123-04-00-B3-01
19	B25A-1F-15-18-00-B3-01
21	B25A-1F-18-47-00-B3-01
23	B25A-1F-27-03-00-B3-01
24	B25A-1F-29-33-00-B3-01
26	B25A-1F-30-24-00-B1-01
27	B25A-1F-35-18-00-B3-01

Map ID	Sample ID
28	B25A-1F-35-48-00-B3-01
29	B25A-1F-38-05-00-B3-01
32	B25A-1F-46-33-00-B3-01
34	B25A-1F-50-25-00-B1-01
35	B25A-1F-52-18-00-B3-01
37	B25A-1F-52-48-00-B3-01
38	B25A-1F-61-15-00-B3-01
39	B25A-1F-62-33-00-B3-01
41	B25A-1F-69-18-00-B3-01
42	B25A-1F-69-48-00-B3-01
43	B25A-1F-77-33-00-B3-01
46	B25A-1F-82-12-00-B1-01
47	B25A-1F-86-47-00-B3-01
48	B25A-1F-89-18-00-B3-01
50	B25A-1F-95-03-00-B3-01
51	B25A-1F-95-33-00-B3-01



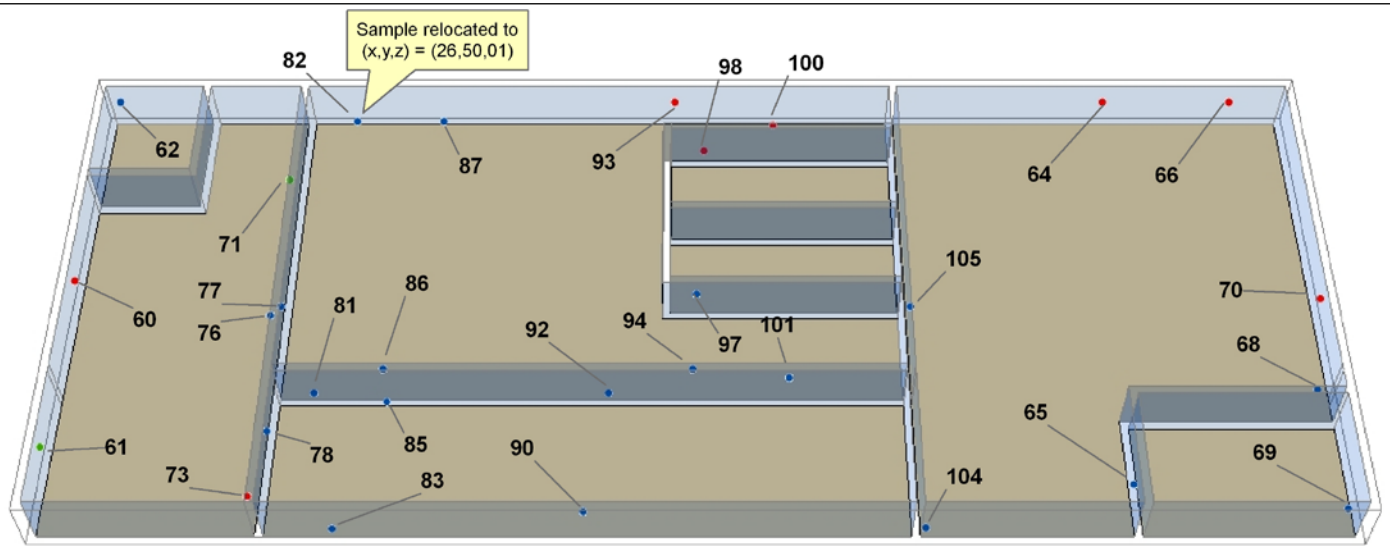
Building 25A
1st Floor
Surface Type - Floors

Material Type

Concrete

Tile

Figure 8-2. Radiological Sampling Locations – Building 25A, First Floor



Map ID	Sample ID
60	B25A-W-01-27-04-B5-01
61	B25A-W-02-07-05-B7-01
62	B25A-W-02-50-04-B4-01
64	B25A-W-103-50-04-B5-01
65	B25A-W-106-03-05-B4-01
66	B25A-W-116-50-04-B5-01
68	B25A-W-123-14-05-B4-01
69	B25A-W-126-03-01-B4-01
70	B25A-W-126-24-05-B5-01
71	B25A-W-18-42-01-B7-01
73	B25A-W-20-02-05-B5-01
76	B25A-W-20-22-05-B4-01
77	B25A-W-20-26-01-B4-01
78	B25A-W-21-09-05-B4-01
81	B25A-W-25-14-01-B4-01

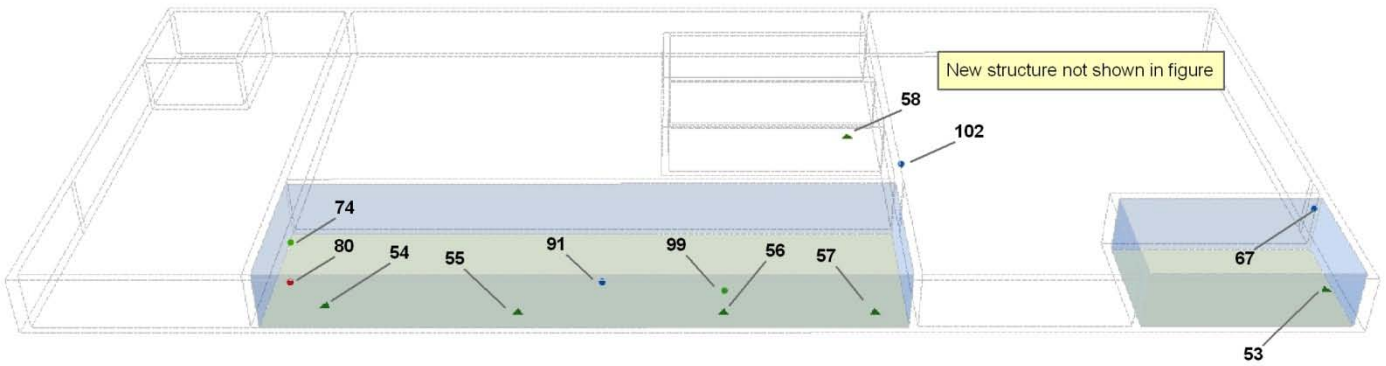
Map ID	Sample ID
82	B25A-W-26-40-01-B4-01
83	B25A-W-28-01-01-B4-01
85	B25A-W-32-13-01-B4-01
86	B25A-W-32-14-05-B4-01
87	B25A-W-35-50-01-B4-01
90	B25A-W-51-01-04-B4-01
92	B25A-W-53-14-01-B4-01
93	B25A-W-59-50-04-B5-01
94	B25A-W-61-14-05-B4-01
97	B25A-W-62-23-05-B4-01
98	B25A-W-62-46-01-B5-01
100	B25A-W-69-46-05-B5-01
101	B25A-W-70-13-05-B4-01
104	B25A-W-86-01-01-B4-01
105	B25A-W-86-26-01-B4-01

Building 25A
1st Floor
Surface Type - Walls

Material Type

- Drywall
- Painted Steel
- Wood

Figure 8-3. Radiological Sampling Locations – Building 25A, First Floor, Walls



Map ID	Sample ID
53	B25A-2F-122-07-00-B7-01
54	B25A-2F-27-04-00-B7-01
55	B25A-2F-45-03-00-B7-01
56	B25A-2F-64-03-00-B7-01
57	B25A-2F-78-03-00-B7-01
58	B25A-2F-78-33-00-B7-01
67	B25A-2W-122-13-05-B4-01
74	B25A-2W-20-12-01-B7-01
80	B25A-2W-25-01-05-B5-01
91	B25A-2W-53-01-05-B4-01
99	B25A-2W-64-01-04-B7-01
102	B25A-2W-83-26-01-B4-01

Building 25A
2nd Floor
Surface Type - Floors and Walls

Material Type
- Drywall
- Painted Steel
- Wood

Figure 8-4. Radiological Sampling Locations – Building 25A, Second Floor, Floors and Walls

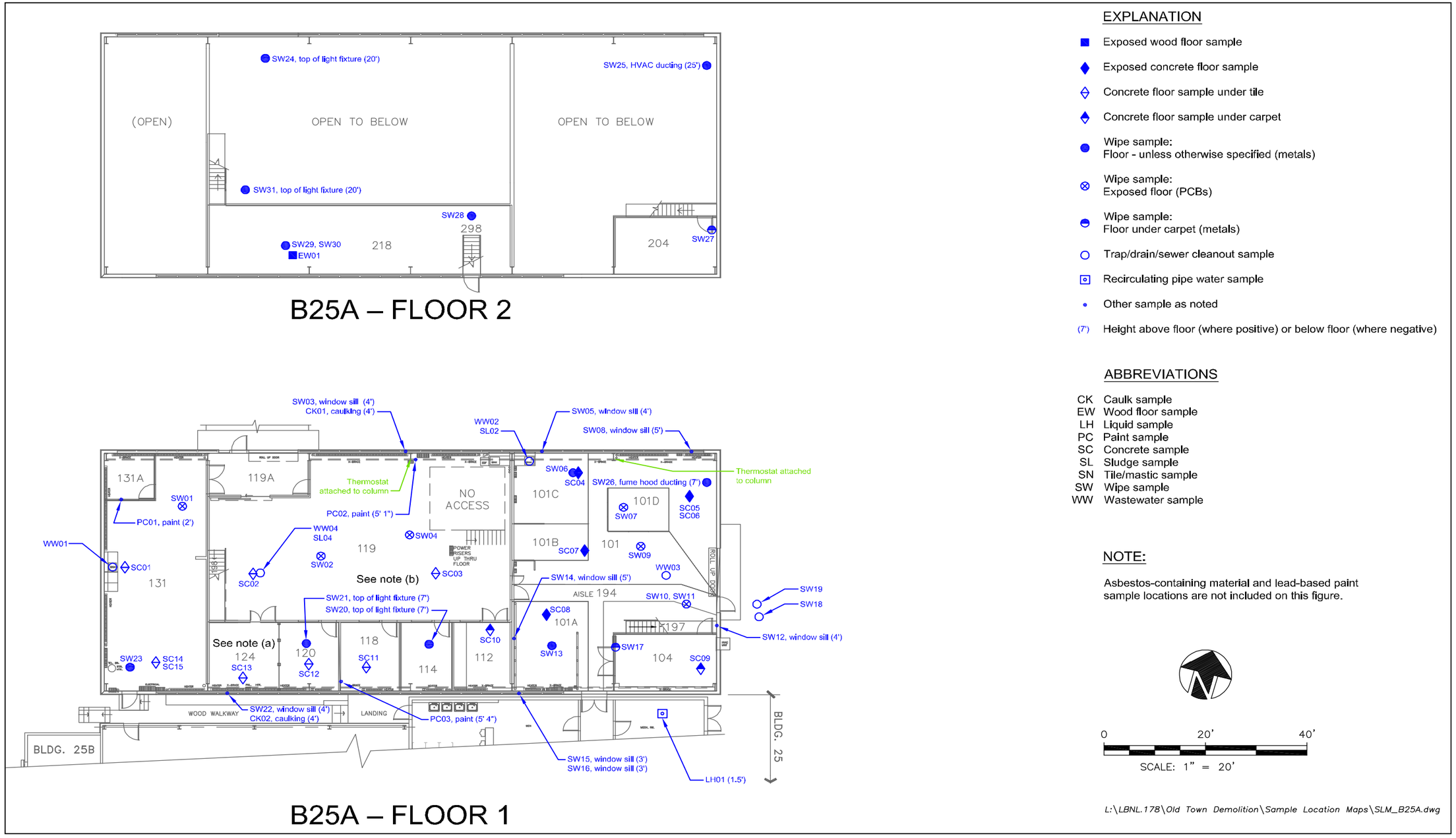


Figure 8-5. Non-Radiological Sampling Locations – Building 25A

9. CHARACTERIZATION OF BUILDING 40

Building 40 is an approximately 1,000-square-foot, one-story, wood frame barracks-type warehouse with wood plank walls. The building was constructed in 1947 as a general-purpose warehouse and was converted into an electronic development laboratory in the mid-1950s. The building was also used for storage of electronic equipment, computers, and books by the Facilities Engineering Division. Figure 9-1 provides the locations of historical hazards associated with the building obtained by LBNL from historical records, interviews, and site inspections.

Building 40 was characterized per the *Final Work Plan for Alternate 1 Buildings* (Weiss, 2010d).

9.1 Deviations from Work Plan

Non-radiological samples from the air-handling system were collected at the exit of the system as opposed to the intake registers as planned in the work plan. It was determined that the exit points represent the locations in the air-handling system with the greatest potential for contamination from constituents entrained in the building air.

There were no other deviations from the work plan during the characterization of Building 40.

9.2 Radiological Characterization Summary

The information provided on the hazard map developed by LBNL (Figure 9-1) and the historic information obtained by LBNL and summarized in the *Final Workplan for the Reconnaissance-Level Characterization of Buildings 4, 5, 14, 40, and 41* indicate that no radiological contamination should be present in Building 40. Consequently, the floor and wall areas were classified as Class 3 areas. The entire building was treated as one survey unit under the assumption that all gross measurement values will be less than the DCGLs in Table 5-1. The focus of the radiological characterization was the existing floors and lower walls, around sinks and drains, and storage cabinets, where present. Radiological survey locations were selected by biased and systematic methods.

9.2.1 Radiological Scanning

Radiological scanning was performed to determine if there were any areas of elevated radioactivity that would require biased static radiological measurements. Consistent with the workplan, the following areas were scanned using a gas-flow proportional floor monitor (Ludlum Model 239-1F) or a hand-held dual phosphor detector (Ludlum Model 43-89):

- ≥ 25 percent alpha/beta scans of Class 3 floor surfaces;
- ≥ 10 percent alpha/beta scans of Class 3 wall surfaces; and
- ≥ 25 percent alpha/beta scans of Class 3 accessible internal HVAC surfaces.

Scanning speeds using the gas proportional floor monitor were approximately 10 cm/s. Scanning speeds for the dual phosphor detectors were approximately 5 cm/s. No radioactivity above background levels was detected during radiological scanning of floors, walls, and the interior surfaces of The HVAC system; consequently, no biased radiological measurements were collected from these locations.

9.2.2 Systematic Radiological Measurements

Thirty floor locations were identified in the workplan for systematic direct measurements. The locations were based on a triangular grid system with a random starting point. Direct radiological measurements of the flooring were collected at 34 locations including duplicates. Removable radioactivity measurements were collected using surface smears at each of the systematic-identified locations. The floor sample locations are shown in Figure 9-2. Table 9-1 indicates the types of floor materials surveyed.

Seventeen wall locations were identified in the field for systematic direct measurements. The locations were equally spaced, alternating between 1 and 5 feet high along the wall unless obstructed by equipment. Shelving along one side of the building prevented wall measurements in that area. Removable radioactivity measurements were collected using surface smears at each of the systematic-identified sample locations. Wall sample locations are shown in Figure 9-3.

All direct radiological measurements were collected for a period of 1 minute using a hand-held gas proportional detector (Ludlum Model 43-68). Removable radioactivity measurements also were collected for 1minute using a channel alpha/beta sample counter (Ludlum Model 3030).

The results of the systematic direct and removable radiological measurements are contained in Table 9-1 and summarized in Table 9-2. The highest total alpha measurement was 16.7 dpm/100 cm^2, while the highest total beta measurement was 345.5 dpm/100 cm^2. The DCGLs for total alpha and total beta surface radioactivity are 100 and 5,000 dpm/100 cm^2, respectively.

The highest removable alpha measurement was 4.0 dpm/100 cm^2, while the highest removable beta measurement was 61.5 dpm/100 cm^2. The DCGLs for removable alpha and total beta surface radioactivity are 20 and 1,000 dpm/100 cm^2, respectively.

9.2.3 Tritium Sampling

Thirty-nine tritium samples consisting of twenty-four systematic samples, co-located with systematic floor (15) and wall (9) locations and fifteen biased samples of floors (6), walls (1), and the HVAC system (8), were collected from the floors and walls. All tritium samples were analyzed using a nearby off-site laboratory (Eberline Analytical).

The results of tritium sampling are presented in Table 9-1 and summarized in Table 9-3. The highest tritium surface activity was 5.28 dpm/100 cm2.

9.2.4 Volumetric Sampling

No volumetric samples were collected in Building 40.

9.3 Non-radiological Characterization Summary

9.3.1 Chemical Constituents

As shown in Table 9-4, samples of paint, caulk, concrete floor, and sediment and dust settled on floors and sills, and in vents were collected at Building 40. The locations of these samples are shown in Figure 9-4. Analytical data are summarized in Table 9-5 (metals) and Table 9-6 (PCBs). The complete analytical results are provided on a CD-ROM included in Appendix E.

Both of the two sediment samples collected in Building 40 and analyzed for lead, contained lead in concentrations greater than 10 times the STLC value (5 mg/kg). One of the samples of sediment collected beneath the steps in Room 101 east (B40SE01) contained lead at a concentration of 894 mg/kg. The second sediment sample collected from the southeast corner of the same room (B40SE01) had lead at a concentration of 85 mg/kg.

Metals were present at low concentrations in wipe samples collected from HVAC vents, floors, and windowsills at concentrations ranging up to 29.6 µg/100cm^2 for lead and up to 0.47 µg/100cm^2 for mercury. There are no comparison criteria for lead or mercury in wipe samples. The greatest lead concentration was detected in sediment collected in a windowsill wipe sample (B40SW04), while the greatest mercury concentration was detected in a wipe sample collected from an HVAC vent (B40SW02RS). Beryllium was not detected in the wipe samples.

Concentrations of PCBs were present in a sample of window caulk (B40CK01) and of wall paint (B40PC01); however, the concentrations were well below the surface contamination limit of 10 µg/100cm^2.

9.3.2 Lead-based Paint

Five paint samples were collected and submitted for metals analysis to Macs Lab, Inc. using EPA Method 6010B/3050. The paint samples were collected from the following locations:

- Grey paint on wood, exterior west wall;
- Grey and brown paint chip on wood, exterior northwest wall/ northwest corner;
- Interior white paint on concrete;
- White paint on concrete building exterior; and
- Brown paint on wood handrail, wooden walkway, west side of the building.

Three of the five samples contained more than 5,000 ppm of lead. These were:

- Grey and brown paint chip on wood, exterior northwest wall/ northwest corner;
- Interior white paint on concrete; and
- Brown paint on wood handrail, wooden walkway, west of building.

Lab results reporting the detectable presence of lead in these sampled paints and/or surface coatings should be assumed to be representative of all similar paints and/or surface coatings encountered in the building. The results are presented in Appendix C.

9.3.3 Asbestos-containing Materials

The report assessing asbestos-containing materials for Building 40 is provided in Appendix C. Approximately 10 square feet of asbestos were found in mastic present at roof penetrations. No asbestos was detected in any other building materials.

9.4 Conclusions and Recommendations

9.4.1 Radiological Constituents

The radiological scanning of floors, walls, and interior surfaces of The HVAC system showed no detectable radioactivity above background levels; consequently, no biased locations for direct radiation measurements were identified. No direct or removable radiological measurement exceeded the DCGLs in Table 5-1.

No tritium measurements were above the DCGL of 10,000 dpm/100 cm^2.

9.4.1.1 Final Status Survey Evaluation

Data collected in Building 40 show that the surfaces evaluated meet the release criteria in Table 5-1. Building 40 can be considered for unconditional release.

9.4.2 Chemical Constituents

Table 9-4 lists constituents reported in samples collected in Building 40 at concentrations potentially exceeding hazardous waste thresholds.

Lead concentrations exceeding 10 times the STLC were found in both of two sample of sediment collected in the building. Sediment samples were not collected from areas of Building 40 other than the two collected in the eastern portion of the building. Lead brick and sheet storage observed in the building during the site inspection and/or lead-based paint (discussed below) may be sources of the lead in the sediment samples. The lead detected in the samples could also be present in sediment throughout the building. Wipe samples collected from surfaces and the air-handling system confirm the presence of lead on building surfaces and dispersed into the air. The lead contamination appears to be surficial, as no elevated lead concentrations were reported in the sample of concrete

collected. Decontamination of building surfaces to remove dispersed lead prior to demolition may be warranted. Worker protection should be addressed to help ensure that lead exposure does not exceed regulatory exposure levels.

Beryllium was not detected in the wipe samples collected throughout the building. All wipe samples were reported to contain low concentrations (<1μg/100 cm^2) of mercury. PCBs were detected in caulk and paint but were reported at concentrations below hazardous waste thresholds. No PCBs were detected in a concrete sample or wipe samples collected from the building floor.

Two thermostats that potentially contain mercury switches were identified in Building 40 (Figure 9-4). Care should be taken when removing equipment that may contain mercury switches, to prevent breakage and release of liquid mercury. Additional thermostats or other mercury-containing equipment may be present.

No samples were collected under cabinets and shelving. If staining or other evidence of contamination is observed upon removal of these fixtures and equipment, additional samples should be collected.

9.4.3 Lead-based Paint

Lead in paint was reported at concentrations at which the paint is considered lead-based in: 1) grey and brown paint on the exterior wood wall on the northwest side/northwest corner of the building; 2) the white paint on an interior concrete surface; and 3) the brown paint on a wood handrail and wooden walkway at the west side of the building.

The presence of lead and/or lead-containing paint requires that specialized work practices be used during demolition work to ensure that individuals involved in the work are adequately protected against elevated exposure to lead. Contractors or employees involved in lead-related demolition activities must comply with the Construction Safety Orders for Lead (8 CCR §1532.1 et. seq.) and training requirements for those involved in lead-related demolition activities. The Construction Safety Orders for Lead [8 CCR 1532.1 (p)] also require that a “Lead-Work Pre-Job Notification” be filed with CalOSHA whenever a construction project involves work that includes “trigger tasks,” as defined by the standard, which will involve greater than 100 square feet of “lead-based paint.” Notification must be made 24 hours prior to the commencement of work.

Loose paint chips or other debris containing 0.5% lead by weight are likely to be characterized as hazardous waste; therefore, damaged paint containing lead at 0.5% or greater should be stabilized or removed prior to demolition. Disturbance of lead-containing paints and/or surface coatings should be conducted by a licensed contractor utilizing workers with CDPH training in lead-related construction. Lead-related construction waste should be segregated into discrete waste streams and characterized for proper disposal.

9.4.4 Asbestos-containing Materials

Asbestos-containing material totaling about 10 square feet was found in mastic at roof penetrations. Designation of a material as asbestos-containing should be applied to all homogenous material of the type reported to contain asbestos.

Since it appears that less than 100 linear or 100 square feet of regulated asbestos-containing material will be disturbed in demolition of Building 40, notification to the BAAQMD is not required.

Table 9-1. Systematic Radiological Measurement Results – Building 40

Sample ID	X	Y	Z	Surface Type	Material Type	Total Alpha (dpm/100cm^2)	Total Beta (dpm/100cm^2)	Removable Alpha (dpm/100cm^2)	Removable Beta (dpm/100cm^2)	Tritium (dpm/100cm^2)	Comments
B40-1F-18-01-00-B3-02	18	1	0	Floor	Tile					-1.0212	
B40-1F-48-12-00-B1-01	48	12	0	Floor	Concrete	0	420	0	62	2.3976	Weiss location SC01
B40-1F-43-03-00-B3-01	43	3	0	Floor	Tile					3.663	Rust spot on floor
B40-1F-18-01-00-B3-01	18	1	0	Floor	Tile					1.32312	
B40-1F-42-01-00-B3-01	42	1	0	Floor	Tile					-2.6418	
B40-1F-30-09-00-B3-01	30	9	0	Floor	Tile					1.14108	
B40-1F-18-02-00-B3-02	18	2	0	Floor	Tile	0	200	0	0		
B40-1F-27-06-00-B3-02	27	6	0	Floor	Tile	5.6	204.5	3.2	0		
B40-1F-42-01-00-B3-02	42	1	0	Floor	Tile	5	185	0	30		
B40-1F-06-04-00-B3-02	6	4	0	Floor	Tile					0.60162	
B40-1F-03-06-00-B3-01	3	6	0	Floor	Tile	0	257.1	0	0		
B40-1F-04-13-00-B3-01	4	13	0	Floor	Tile	0	345.5	0	0		
B40-1F-06-04-00-B3-01	6	4	0	Floor	Tile	0	177.9	0	0	-1.38306	
B40-1F-06-11-00-B3-01	6	11	0	Floor	Tile	0	227.3	0	0	0.78144	
B40-1F-09-06-00-B3-01	9	6	0	Floor	Tile	11.1	236.4	0	8.4	5.2836	
B40-1F-09-16-00-B3-01	9	16	0	Floor	Tile	0	204.5	0	16.9	1.50294	
B40-1F-12-02-00-B3-01	12	2	0	Floor	Tile	16.7	313.6	0	0		
B40-1F-12-11-00-B3-01	12	11	0	Floor	Tile	0	300	0	8.4		
B40-1F-15-06-00-B3-01	15	6	0	Floor	Tile	5.6	222.7	0	0		
B40-1F-15-16-00-B3-01	15	16	0	Floor	Tile	0	118.2	0	0		
B40-1F-18-02-00-B3-01	18	2	0	Floor	Tile	0	190.9	0	0		
B40-1F-18-11-00-B3-01	18	11	0	Floor	Tile	0	309.1	0	0	-1.20102	
B40-1F-21-06-00-B3-01	21	6	0	Floor	Tile	0	245.5	0	0	1.50294	
B40-1F-21-16-00-B3-01	21	16	0	Floor	Tile	0	190.1	0	0	0.05994	
B40-1F-24-09-00-B3-01	24	9	0	Floor	Tile	0	154.5	0	0		
B40-1F-27-06-00-B3-01	27	6	0	Floor	Tile	5.6	190.9	3.2	0		
B40-1F-27-16-00-B3-01	27	16	0	Floor	Tile	0	168.2	0	25.3		
B40-1F-30-01-00-B3-01	30	1	0	Floor	Tile	5	119	0	42	1.14108	
B40-1F-31-16-00-B3-01	31	16	0	Floor	Tile	0	222.7	0	0	-0.48174	
B40-1F-33-06-00-B3-01	33	6	0	Floor	Tile	0	62	3	47	-1.0212	
B40-1F-36-01-00-B3-01	36	1	0	Floor	Tile	0	203	5	0		
B40-1F-36-11-00-B3-01	36	11	0	Floor	Tile	0	22	0	59		
B40-1F-39-06-00-B3-01	39	6	0	Floor	Tile	0	225	0	4		
B40-1F-40-01-00-B3-01	40	1	0	Floor	Tile	0	204.5	0	0		
B40-1F-41-11-00-B3-01	41	11	0	Floor	Tile	0	119	0	51		
B40-1F-42-01-00-B3-01	42	1	0	Floor	Tile	0	132	0	34	-1.38306	
B40-1F-42-16-00-B3-01	42	16	0	Floor	Tile	0	278	0	0	-1.7427	
B40-1F-45-06-00-B3-01	45	6	0	Floor	Tile	0	189	0	51	1.32312	
B40-1F-45-16-00-B3-01	45	16	0	Floor	Tile	0	137	0	6.8		
B40-1F-48-01-00-B3-01	48	1	0	Floor	Tile	0	216	0	30		
B40-1F-48-11-00-B3-01	48	11	0	Floor	Tile	0	242	0	34	-2.10456	
B40-HVAC-48-05-08-B6-02	48	5	8	HVAC	Painted Steel					-1.38306	External Grate of Air Register
B40-HVAC-07-04-08-B5-01	7	4	8	HVAC	Painted Steel					0.60162	

Table 9-1. Systematic Radiological Measurement Results – Building 40

Sample ID	X	Y	Z	Surface Type	Material Type	Total Alpha (dpm/100cm^2)	Total Beta (dpm/100cm^2)	Removable Alpha (dpm/100cm^2)	Removable Beta (dpm/100cm^2)	Tritium (dpm/100cm^2)	Comments
B40-HVAC-21-16-08-B5-01	21	16	8	HVAC	Painted Steel					-2.2866	
B40-HVAC-43-05-08-B5-01	43	5	8	HVAC	Painted Steel					0.23976	
B40-HVAC-43-14-08-B5-01	43	14	8	HVAC	Painted Steel					1.14108	
B40-HVAC-48-05-08-B6-01	48	5	8	HVAC	Painted Steel					4.218	Air Register Interior
B40-HVAC-48-18-08-B6-01	48	18	8	HVAC	Painted Steel					1.14108	Air Register Interior
B40-HVAC-48-18-05-B6-01	48	18	5	HVAC	Painted Steel					-0.48174	External Grate of Air Register
B40-W-48-05-03-B4-01	48	5	3	Wall	Drywall					4.5066	Wall Ledge
B40-W-30-01-01-B1-02	30	1	1	Wall	Concrete	0	13.2	0	50.8		
B40-W-30-01-01-B1-01	30	1	1	Wall	Concrete	0	44.1	0	33.5		
B40-W-12-01-01-B1-01	12	1	1	Wall	Concrete	0	188	4	0	0.4218	
B40-W-33-19-01-B1-01	33	19	1	Wall	Concrete	0	165.9	0	33.5	0.05994	
B40-W-36-01-01-B1-01	36	1	1	Wall	Concrete	0	74.9	3.3	16.9	-1.0212	
B40-W-48-01-01-B1-01	48	1	1	Wall	Concrete	0	273.1	0	21.2	-0.2997	
B40-W-49-18-01-B1-01	49	18	1	Wall	Concrete	0	123.3	0	56.8		
B40-W-01-01-01-B4-01	1	1	1	Wall	Drywall	0	9	0	0	-1.56288	
B40-W-01-14-05-B4-01	1	14	5	Wall	Drywall	0	0	0	0	-2.8194	
B40-W-18-01-05-B4-01	18	1	5	Wall	Drywall	0	0	0	0		
B40-W-18-01-05-B4-01	18	1	5	Wall	Drywall	0	0	0	0		
B40-W-24-01-05-B4-01	24	1	5	Wall	Drywall	5.9	0	0	0	1.86258	
B40-W-39-19-05-B4-01	39	19	5	Wall	Drywall	0	0	0	33.9		
B40-W-42-01-05-B4-01	42	1	5	Wall	Drywall	5.4	0	0	25.4		
B40-W-45-19-05-B4-01	45	19	5	Wall	Drywall	0	0	0	55.1	1.86258	
B40-W-49-06-05-B4-01	49	6	5	Wall	Drywall	0	0	0	61.5		
B40-W-49-12-05-B4-01	49	12	5	Wall	Drywall	0	0	0	46.6	-2.4642	
B40-W-01-06-05-B7-01	1	6	5	Wall	Wood	0	0	0	0		
B40-W-06-01-04-B7-01	6	1	4	Wall	Wood	0	0	0	0		

Table 9-2. Summary of Surface Alpha and Beta Radioactivity Measurements – Building 40

Area	Matrix	Parameter[1]	Number of Measurements	dpm/100 cm^2 Median	Mean	Standard Deviation	Minimum	Maximum
Floor (systematic)	Tile	Total Alpha	34	0	1.6	3.7	0	16.7
		Removable Alpha	34	0	0	0	0	0
		Total Beta	34	204	200	69	22	345
		Removable Beta	34	0	13.2	19.1	0	59
Walls (systematic)	Concrete	Total Alpha	7	0	0	0	0	0
		Removable Alpha	7	0	1.0	1.8	0	4
		Total Beta	7	123	126	90	13.2	273
		Removable Beta	7	33.5	30.4	19.8	0	56.8
	Drywall	Total Alpha	10	0	1.1	2.4	0	5.9
		Removable Alpha	10	0	0	0	0	0
		Total Beta	10	0	0.9	2.8	0	9
		Removable Beta	10	12.7	22.3	25.5	0	61.5

Notes:
* Low energy beta emitters such as tritium are not included
dpm/100 cm^2 = decay per minute per 100 square centimeters of surface area

Table 9-3. Measurements of Tritium Surface Radioactivity Summary – Building 40

		dpm/100cm^2				
Area	Number of Measurements	Median	Mean	Standard Deviation	Minimum	Maximum
Floors (Systematic)	15	0.1	0.2	1.9	-2.1	5.28
Floors (Biased)	6	1.3	0.8	2.3	-2.6	3.7
Walls (Systematic)	9	-0.2	-0.4	1.7	-2.8	1.8
Walls (Biased)	1	4.5	4.5	-	4.5	4.5
HVAC	8	0.4	0.4	2.0	-2.3	4.2

Note:
dpm/100 cm^2 = decay per minute per 100 square centimeters of surface area

Table 9-4. Non-Radiological Sampling and Analysis Summary – Building 40

Location	Matrix/Sample Type	Assumptions/Collection Rationale	Analytes	Constituents Potentially Above Hazardous Waste Thresholds[1]
Room 101	Concrete slab below tile	Lead bricks and 1-inch lead sheets stored under stairs, electronics storage room	Lead, PCBs	None
Room 101	Bulk dust and sediment	Dust and sediment accumulations at/near locations of lead brick and sheet storage	Lead	Lead
Room 101	Oil on floor[2]	Fluorescent light storage	PCBs	None
Interior	Dust on horizontal surfaces such as floors, HVAC vents, sills	Potential release(s) of beryllium, lead, and mercury and dispersion in dust	Beryllium, lead, mercury	None
Room 101	Windowsill caulking	PCBs commonly used in caulking, pre-1979	PCBs	None
Room 101	Interior wall paint	PCBs commonly used in paint, pre-1979	PCBs	None

Note:
Asbestos and lead-based paint are not included in this table. See Appendix C for asbestos and lead-based paint results.
[1] Constituents above thresholds listed in Table 5-3 and described in Section 5.2.1. To determine if a constituent is considered a hazardous waste or is potentially a hazardous waste (based on leachability), consult analytical results tables.
[2] Wipe sample

Abbreviations:
CAM 17 California Administrative Code, Title 22 Priority Pollutant Metals
HVAC heating, ventilation, air conditioning
PCBs polychlorinated biphenyl compounds

Table 9-5. Analytical Results for Metals – Building 40

Sample Type	Sample Description	Sample Name	Units	Be	Pb	Hg
Concrete	Concrete core, room 101 northeast	B40SC01	mg/kg	---	6.0	---
Sediment	Sediment under steps, room 101 east	B40SE01	mg/kg	---	894	---
Sediment	Sediment in corner, room 101 southeast	B40SE02	mg/kg	---	85.0 J, 4H	0.76
Wipe	HVAC vent wipe, room 101 northeast	B40SW01	µg/100 cm²	<0.1	1.8	---
Wipe	HVAC vent wipe, room 101 northeast	B40SW01 RS	µg/100 cm²	---	---	0.39
Wipe	HVAC vent wipe, room 101 southeast	B40SW02	µg/100 cm²	<0.1	1.4	---
Wipe	HVAC vent wipe, room 101 southeast	B40SW02 RS	µg/100 cm²	---	---	0.47
Wipe	Floor wipe, room 101 southeast	B40SW03	µg/100 cm²	<0.1	0.80	---
Wipe	Floor wipe, room 101 southeast	B40SW03 RS	µg/100 cm²	---	---	0.20
Wipe	Window sill wipe, room 101 south	B40SW04	µg/100 cm²	<0.1	29.6	---
Wipe	Window sill wipe, room 101 south	B40SW04 RS	µg/100 cm²	---	---	0.22

Abbreviations:

µg/100 cm² = micrograms per 100 square centimeters
Be = Beryllium, Pb = lead, Hg = mercury
mg/kg = milligrams per kilogram
RS = s ample location resampled
STLC = Soluble Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24
TCLP = Toxicity Characteristic Leaching Procedure, Title 22 California Code of Regulations, Section 66261.24
TTLC = Total Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24

Notes:

<n = analyte not detected above reporting limit of 'n'
--- = no t analyzed
Italics = no published bulk sample concentration (TTLC, STLC, TCLP) at which the constituent is deemed a hazardous waste
red = detected above: 1) the TTLC for solid samples; 2) or the STLC or TCLP for aqueous samples; 3) or the wipe concentration limit.
yellow = detected above 10 x STLC or 20 x TCLP concentrations, for solid matrices (does not apply to wipe samples)
J = estimated result
4H = MS/MSD recovery above normal limits

Analysis for Metals by USEPA 6020 and 7471A. All samples analyzed by Test America St. Louis, Earth City, Missouri.

The comparison threshold for beryllium of 0.2 µg/100 cm2 (collected on wipes) applies to removable contamination on equipment or surfaces. Equipment or surfaces with beryllium concentrations below this threshold may be released to the general public or to a DOE facility for use in a manner not requiring controls for beryllium exposure per the Chronic Beryllium Disease Prevention Program (10 CFR 850).

Table 9-6. Analytical Results for PCBs – Building 40

Sample Type	Sample Description	Sample Name	Units	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Aroclor 1262	Aroclor 1268
Caulk	Window caulking sample, room 101 south	B40CK01	mg/kg	<0.097	<0.097	<0.097	<0.097	<0.097	0.34	<0.097	---	---
Paint	Wall paint sample, room 101 northeast	B40PC01	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	2.2	<0.2	---	---
Concrete	Concrete core, room 101 northeast	B40SC01	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	---	---
Wipe	Floor wipe, room 101 northwest	B40SW05	µg/100 cm²	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Abbreviations:

µg/100 cm² = micrograms per 100 square centimeters
mg/kg = milligrams per kilogram
PCBs = polychlorinated biphenyls
STLC = Soluble Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24
TCLP = Toxicity Characteristic Leaching Procedure, Title 22 California Code of Regulations, Section 66261.24
TTLC = Total Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24

Notes:

<n = analyte not detected above reporting limit of 'n'
--- = not analyzed
Italics = no published bulk sample concentration (TTLC, STLC, TCLP) at which the constituent is deemed a hazardous waste
red = detected above: 1) the TTLC for solid samples; 2) or the STLC or TCLP for aqueous samples; 3) or the wipe concentration limit.
yellow = detected above 10 x STLC or 20 x TCLP concentrations, for solid matrices (does not apply to wipe samples)

Analysis for PCBs by USEPA Method 8082. All samples analyzed by Test America St. Louis, Earth City, Missouri.

The comparison threshold for PCBs of 10 µg/100 cm2 (collected on wipes) applies to non-porous surfaces contaminated with PCBs. Surfaces containing PCB concentrations above this limit are considered to be contaminated (40 CFR 761).

The value used as the threshold for determining if PCBs exceed hazardous waste limits is applicable to the sum of the Aroclor mixtures reported.

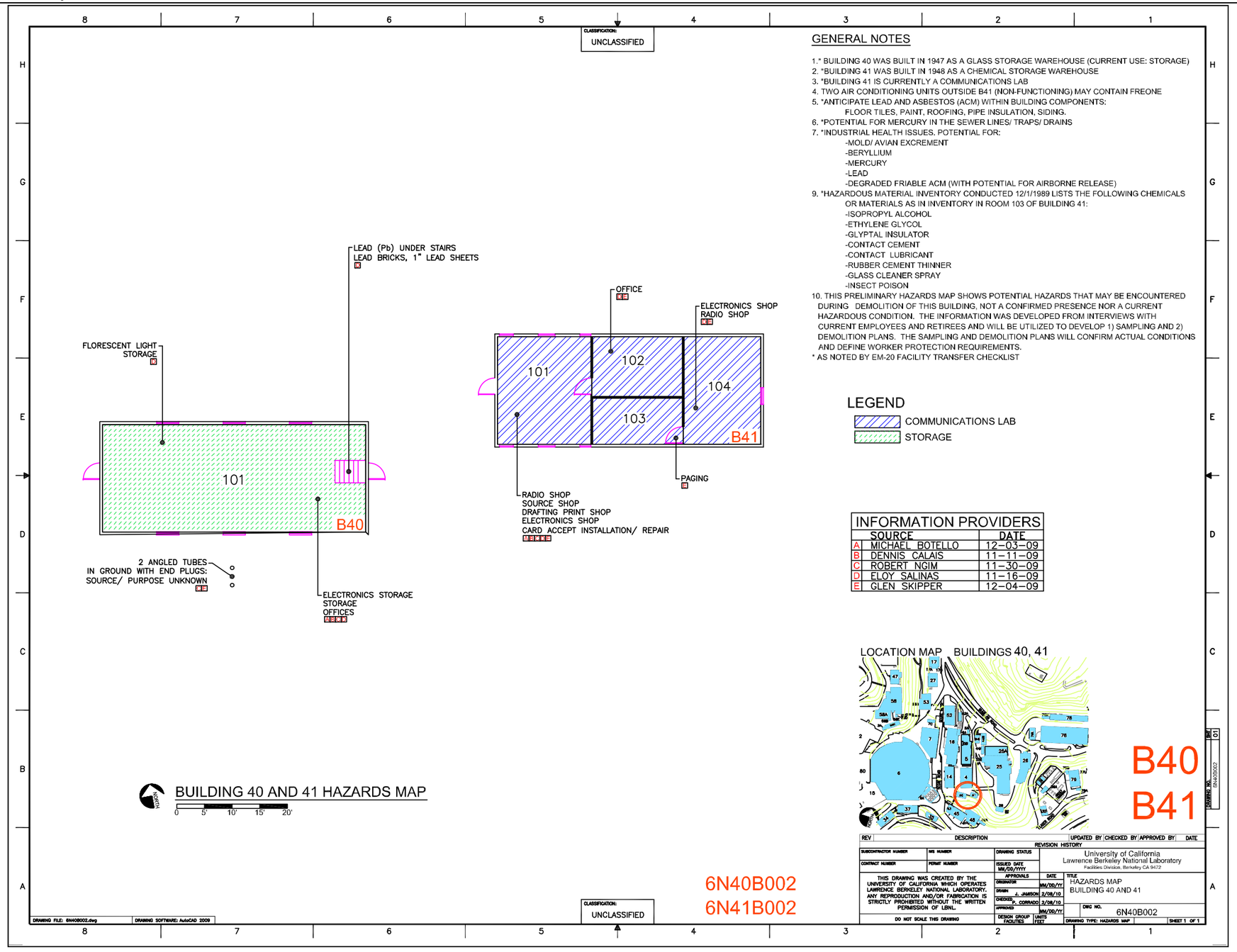
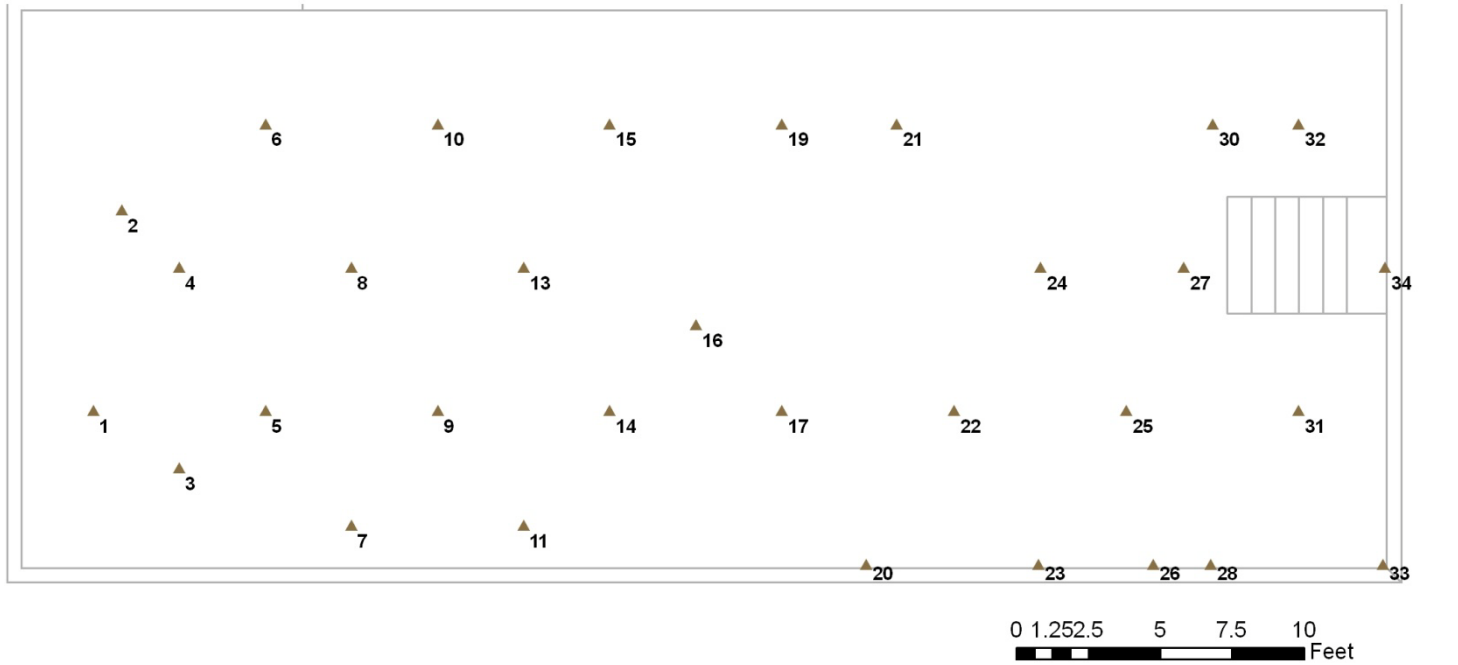


Figure 9-1. Hazard Map – Building 40 (includes Building 41)



MapID	SampleID
1	B40-1F-03-06-00-B3-01
2	B40-1F-04-13-00-B3-01
3	B40-1F-06-04-00-B3-01
4	B40-1F-06-11-00-B3-01
5	B40-1F-09-06-00-B3-01
6	B40-1F-09-16-00-B3-01
7	B40-1F-12-02-00-B3-01
8	B40-1F-12-11-00-B3-01
9	B40-1F-15-06-00-B3-01
10	B40-1F-15-16-00-B3-01
11	B40-1F-18-02-00-B3-01
13	B40-1F-18-11-00-B3-01
14	B40-1F-21-06-00-B3-01
15	B40-1F-21-16-00-B3-01
16	B40-1F-24-09-00-B3-01
17	B40-1F-27-06-00-B3-01

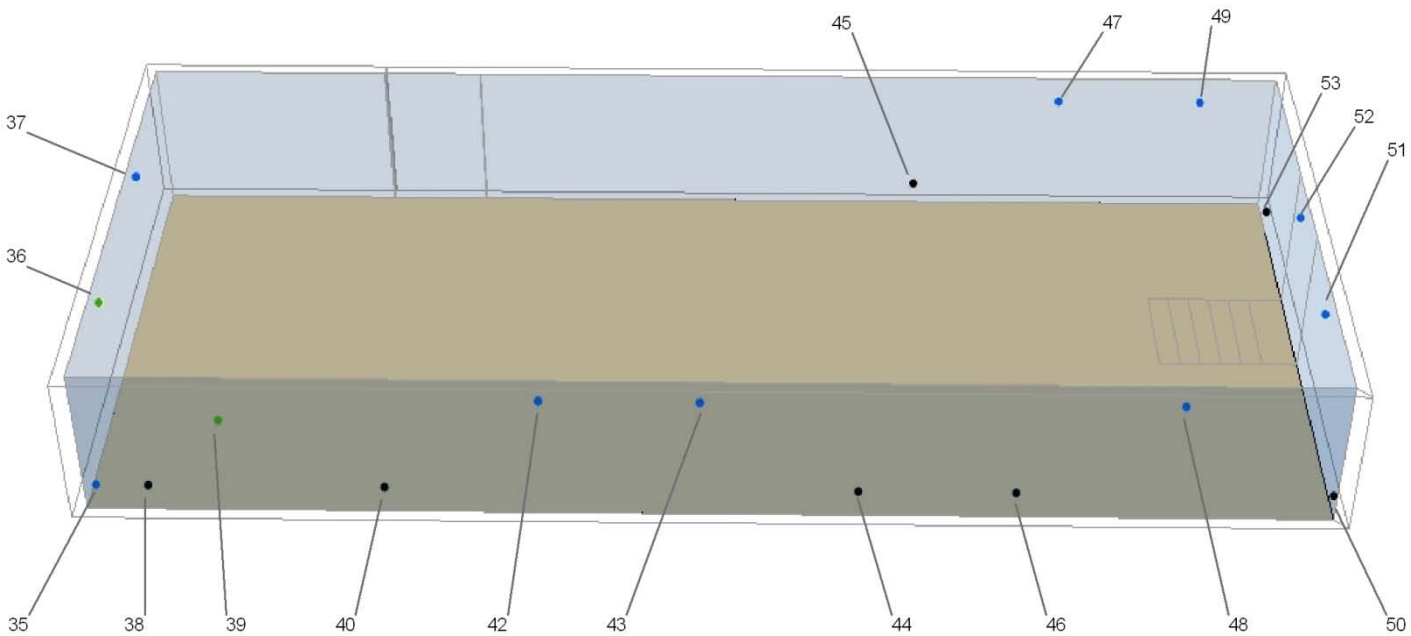
MapID	SampleID
19	B40-1F-27-16-00-B3-01
20	B40-1F-30-01-00-B3-01
21	B40-1F-31-16-00-B3-01
22	B40-1F-33-06-00-B3-01
23	B40-1F-36-01-00-B3-01
24	B40-1F-36-11-00-B3-01
25	B40-1F-39-06-00-B3-01
26	B40-1F-40-01-00-B3-01
27	B40-1F-41-11-00-B3-01
28	B40-1F-42-01-00-B3-01
30	B40-1F-42-16-00-B3-01
31	B40-1F-45-06-00-B3-01
32	B40-1F-45-16-00-B3-01
33	B40-1F-48-01-00-B3-01
34	B40-1F-48-11-00-B3-01

Building 40
1st Floor
Surface Type - Floors

Material Type

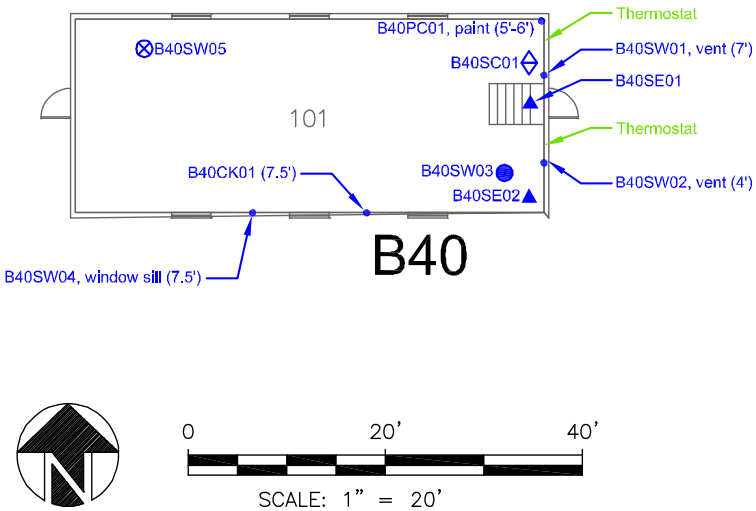
▲ B3 - Tile

Figure 9-2. Radiological Sampling Locations – Building 40, Floors



MapID	SampleID
35	B40-W-01-01-01-B4-01
36	B40-W-01-06-05-B7-01
37	B40-W-01-14-05-B4-01
38	B40-W-03-01-01-B1-01
39	B40-W-06-01-04-B7-01
40	B40-W-12-01-01-B1-01
41	B40-W-18-01-05-B4-01
42	B40-W-18-01-05-B4-01
43	B40-W-24-01-05-B4-01
44	B40-W-30-01-01-B1-02
45	B40-W-33-19-01-B1-01
46	B40-W-36-01-01-B1-01
47	B40-W-39-19-05-B4-01
48	B40-W-42-01-05-B4-01
49	B40-W-45-19-05-B4-01
50	B40-W-48-01-01-B1-01
51	B40-W-49-06-05-B4-01
52	B40-W-49-12-05-B4-01
53	B40-W-49-18-01-B1-01

Figure 9-3. Radiological Sampling Locations - Building 40, Walls



EXPLANATION

- Concrete floor sample under tile
- Wipe sample: Floor - unless otherwise specified (metals)
- Wipe sample: Floor (PCBs)
- Trap/drain/sewer cleanout sample
- Sediment sample: Floor unless otherwise specified
- Other sample as noted
- (7') Height above floor (where positive) or below floor (where negative)

ABBREVIATIONS

CK	Caulk sample
PC	Paint sample
SC	Concrete sample
SE	Sediment sample
SW	Wipe sample

NOTE:

Asbestos-containing material and lead-based paint sample locations are not included on this figure.

Figure 9-4. Non-Radiological Sampling Locations – Building 40

10. CHARACTERIZATION OF BUILDING 41

Building 41 is a one-story barracks-type warehouse that covers nearly 1,000 square feet. It is constructed of wood plank walls built on top of concrete block walls. The building was constructed in 1948 as a chemical storage warehouse, and was later converted into an electronics laboratory and, subsequently, into the LBNL radio shop. Figure 10-1 provides the locations of historical hazards associated with the building obtained by LBNL from historical records, interviews, and site inspections.

Building 41 was characterized per the *Final Work Plan for Alternate 1 Buildings* (Weiss, 2010d).

10.1 Deviations from Work Plan

No deviations occurred during the radiological characterization of Building 41. A sample of caulk material (B41CK01) was not collected because of the lack of caulking at the windows in Building 41. Non-radiological samples from the air-handling system were collected at the exit of the system as opposed to the intake registers as planned in the work plan. It was determined that the exit points represent the locations in the air-handling system with the greatest potential for contamination from constituents entrained in the building air.

10.2 Radiological Characterization Summary

The information provided on the hazard map developed by LBNL (Figure 10-1) and the historic information obtained by LBNL and summarized in the *Final Workplan for the Reconnaissance-Level Characterization of Buildings 4, 5, 14, 40, and 41* indicate that no radiological contamination should be present in Building 40. Consequently, the floor and walls areas were classified as a Class 3 area and the entire building was treated as one survey unit. The focus of the radiological characterization was the existing floors and lower walls, around sinks and drains, and storage cabinets, where present. Radiological survey locations were selected by biased and systematic methods.

10.2.1 Radiological Scanning

Radiological scanning was performed to determine if there were any areas of elevated radioactivity that would require biased static radiological measurements. Consistent with the workplan, the following areas were scanned using a gas-flow proportional floor monitor (Ludlum Model 239-1F) or a hand-held dual phosphor detector (Ludlum Model 43-89):

- ≥ 25 percent alpha/beta scans of Class 3 floor surfaces;

- ≥ 10 percent alpha/beta scans of Class 3 wall surfaces; and
- ≥ 25 percent alpha/beta scans of Class 3 accessible internal HVAC surfaces.

Scanning speeds using the gas proportional floor monitor were approximately 10 cm/s. Scanning speeds for the dual phosphor detectors were approximately 5 cm/s. No radioactivity above background levels was detected during radiological scanning of floors, walls, and the interior surfaces of The HVAC system; consequently, no biased radiological measurements were collected from these locations.

10.2.2 Systematic Radiological Measurements

Thirty floor locations were identified in the workplan for systematic direct measurements. The locations were based on a triangular grid system with a random starting point. Building features and equipment prevented sampling of all of the 30 systematic locations identified in the workplan. Twenty-five direct radiological measurements, including duplicates, were taken of the flooring. Removable radioactivity measurements were collected via surface smear sampling at each of the systematic sampling locations. The floor sampling locations are shown in Figure 10-2. Table 10-1 indicates the types of floor materials surveyed.

Thirteen wall locations were identified in the field for systematic direct measurements. The locations were based on equally spaced locations alternating between 1 and 5 feet high along the wall when not obstructed by building equipment or features. The presence of shelving and other building material and equipment significantly reduced the exposed wall area available for measurements. Removable radioactivity measurements were collected via surface smear sampling at each of the systematic sampling locations. Wall sampling locations are shown in Figure 10-3.

All direct radiological measurements were collected for a period of 1 minute using a hand-held gas proportional detector (Ludlum Model 43-68). Removable radioactivity measurements also were collected for 1 minute, using a channel alpha/beta sample counter (Ludlum Model 3030).

The results of the systematic direct and removable radiological measurement are presented in Table 10-1 and summarized in Table 10-2. The highest total alpha measurement was 0 dpm/100 cm^2, while the highest total beta measurement was 464 dpm/100 cm^2. The DCGLs for total alpha and total beta surface radioactivity are 100 and 5,000 dpm/100 cm^2, respectively. The highest removable alpha measurement was 3.2 dpm/100 cm^2, while the highest removable beta measurement was 84.7 dpm/100 cm^2. The DCGLs for removable alpha and total beta surface radioactivity are 20 and 1,000 dpm/100 cm^2, respectively.

10.2.3 Tritium Sampling

Thirty-four tritium samples consisting of fifteen systematic samples co-located with systematic floor (ten) and wall (five) samples and nineteen biased samples of floors (eleven), walls (three), and the HVAC system (five) were collected. All tritium samples were analyzed by a nearby off-site laboratory (Eberline Analytical).

The results of tritium sampling are presented in Table 10-1 and summarized in Table 10-3. The highest was 39 dpm/100 cm^2.

10.2.4 Volumetric Sampling

No volumetric samples were collected in Building 41.

10.3 Non-radiological Characterization Summary

10.3.1 Chemical Constituents

As shown in Table 10-4, samples of concrete slab, wall paint, water and sludge in drain traps, the inner surface of the sewer pipe, windowsill sealant, and dust on surfaces and in air ducts were collected at Building 41. The locations of these samples are shown in Figure 10-4. Analytical data are summarized in Table 10-5 (metals) and Table 10-6 (PCBs). The complete analytical results are provided on a CD-ROM included in Appendix E.

Of the five samples of solid and aqueous materials collected in Building 41, only a sludge sample collected in Room 103 – the sample collected from the sink trap (B41SL01) – contained concentrations of metals greater than comparison criteria. The sludge sample contained both copper (161 mg/L) and lead (16.4 mg/L) at concentrations greater than their respective STLC values (25 mg/L and 5 mg/L). The second sludge sample collected from the floor drain trap in Room 103 (B41Sl02) contained chromium (58.7 mg/kg), copper (395 mg/kg), lead (94.8 mg/kg), and silver (57.3 mg/kg) at concentrations greater than 10 times the respective STLC values (50 mg/L, 250 mg/L, 50, mg/L, and 50 mg/L). The metals concentrations were elevated, but none were more than twice its respective comparison criteria.

Metals were present at low concentrations in wipe samples collected from HVAC vents, floors, and windowsills at concentrations ranging up to 19.2 µg/100cm^2 for lead and 0.16 µg/100cm^2 for mercury. There are no comparison criteria for lead or mercury in wipe samples.

Nine metals (including chromium, cobalt, copper, lead, mercury, molybdenum, nickel, silver, and zinc) were also present in one of two wipe samples collected from the sewer cleanout located south of Building 41 (B41SW05 and B41SW05 RS). The greatest concentration of a metal in the wipe samples was lead at 20.9 µg/100cm^2. Three additional metals (antimony, arsenic, and cadmium) were also present at trace levels in the wipe samples. There are no regulatory comparison criteria for any of these metals in wipe samples.

Beryllium was below comparison criteria in all of the wipe samples. Concentrations of PCBs above reporting limits were not detected in either the paint sample (B41PC01) or a concrete core sample (B41SC01).

During sample collection, pH was measured at the sink and floor traps in Room 103 using field instruments and reported at 7.72 and 7.25, respectively.

10.3.2 Lead-based Paint

Three paint samples were collected and submitted for metals analysis to Macs Lab, Inc. using EPA Method 6010B/3050. The paint samples were collected from the following locations:

- Paint on metal and wood on the exterior of the building (composite);
- Exterior building paint (composite); and
- Roof coating paint.

All of the samples contained more than 5,000 ppm of lead. Lab results reporting the detectable presence of lead in these sampled paints and/or surface coatings should be assumed to be representative of all similar paints and/or surface coatings encountered in the building. The results are presented in Appendix C.

10.3.3 Asbestos-containing Materials

Asbestos was found in the following materials at these approximate quantities:

- 12-inch-by-12-inch brown floor tile and mastic (250 square feet);
- 12-inch-by-12-inch white floor tile and mastic (1,000 square feet);
- Duct joint compound at air exchange unit AHU 1 41 (20 square feet); and
- Duct joint compound, water heater closet (10 square feet).

The pre-demolition survey report assessing asbestos-containing materials in Building 41 is provided in Appendix C. That report is intended for submittal in its entirety to the BAAQMD to support demolition notification documentation.

10.4 Conclusions and Recommendations

10.4.1 Radiological Constituents

The radiological scanning of floors, walls, and the interior surfaces of The HVAC system showed no detectable radioactivity above background levels; consequently, no biased locations for direct radiation measurements were identified.

No systematic direct or removable radiological measurements were above the DCGLs in Table 5-1.

No tritium surface activity exceeded the DCGLs of 10,000 dpm/100 cm^2.

10.4.1.1 Final Status Survey Evaluation

Data suggest that the surfaces in Building 41 that were evaluated in this investigation meet the release criteria in Table 5-1 and can be considered for unconditional release.

10.4.2 Chemical Constituents

Table 10-4 lists constituents reported in samples collected in Building 41 at concentrations potentially exceeding hazardous waste thresholds.

The data from samples collected in Building 41 suggest that contamination could be limited to small volumes of accumulated sludge in the sink trap in Room 103 containing concentrations of copper and lead that exceed hazardous waste thresholds. The floor drain in Room 103 contained sludge with concentrations of metals (chromium, copper, lead, and silver) exceeding 10 times the STLC. Elevated concentrations of metals also were detected in a wipe sample collected from the sewer cleanout. The concentrations of these metals in water in the connected sink trap and floor drain were below hazardous waste thresholds. pH in sink and floor traps was reported to be neutral. Because of the detections of elevated metal concentrations in sewer traps and the general inaccessibility of large segments of the system during this characterization, it should be assumed that the sewer system is contaminated. Additional characterization during demolition could be considered to potentially minimize hazardous waste.

No metals were detected above hazardous waste thresholds in a sample of the concrete floor in Building 41. PCBs above laboratory reporting limits were not detected in this sample. The sample data and the building's historical use as a radio shop indicate that the concrete floor is not impacted.

Wipe samples collected from surfaces and the air-handling system confirm the presence of lead on building surfaces and dispersed into the air. The lead contamination appears to be superficial, as no elevated lead concentrations were reported in the sample of concrete collected. Decontamination of building surfaces to remove dispersed lead could be warranted prior to demolition. Worker protection should be addressed to ensure that lead exposure does not exceed regulatory exposure levels.

Beryllium was detected, at very low concentrations (0.012 $\mu g/100\ cm^2$) that are below the comparison threshold, in two wipe samples collected from the vents in the air-handling system. All wipe samples were reported to contain low concentrations ($<1 \mu g/100\ cm^2$) of mercury. PCBs were not detected in paint or in a concrete sample from the building floor.

Thermostats that potentially contain mercury switches or other mercury-containing equipment were identified in Building 41 (Figure 10-4). Care should be taken when removing equipment that may contain mercury switches to prevent breakage and release of liquid mercury. Additional thermostats or other mercury-containing equipment may be present.

No samples were collected under fixtures, such as sinks, benches, machine shop equipment, cabinets, and shelving. If staining or other evidence of contamination is observed upon removal of these fixtures and equipment, additional samples should be collected.

10.4.3 Lead-based Paint

The detected lead concentrations from the building exterior, including metal and wood surfaces, and from the roof paint/coating exceeded thresholds at which the paint is considered lead-based. The presence of lead and/or lead-containing paint requires that specialized work practices be used during demolition work to ensure that individuals involved in the work are adequately protected against elevated exposure to lead. Contractors or employees involved in lead-related demolition activities must comply with the Construction Safety Orders for Lead (8 CCR §1532.1 et. seq.) and training requirements for those involved in lead-related demolition activities. The Construction Safety Orders for Lead [8 CCR 1532.1 (p)] also require that a "Lead-Work Pre-Job Notification" be filed with CalOSHA whenever a construction project involves work that includes "trigger tasks," as defined by the standard, which will involve greater than 100 square feet of "lead-based paint." Notification must be made 24 hours prior to the commencement of work.

Loose paint chips or other debris containing 0.5% lead by weight are likely to be characterized as hazardous waste; therefore, damaged paint containing lead at 0.5% or greater should be stabilized or removed prior to demolition. Disturbance of lead-containing paints and/or surface coatings should be conducted by a licensed contractor utilizing workers with CDPH training in lead-related construction. Lead-related construction waste should be segregated into discrete waste streams and characterized for proper disposal.

10.4.4 Asbestos-containing Materials

Asbestos-containing material was found in brown and white floor tiles and mastic and in duct joint compound in the water heater closet at the air exchange unit. Designation of a material as asbestos-containing should be applied to all homogenous material of the type reported to contain asbestos.

Since more than 100 linear or 100 square feet of regulated asbestos-containing material will be disturbed in demolition of Building 41, the BAAQMD must be notified 10 days prior to demolition activities.

Table 10-1. Systematic Radiological Measurement Results – Building 41

Sample ID	X	Y	Z	Surface Type	Material Type	Total Alpha (dpm/100cm^2)	Total Beta (dpm/100cm^2)	Removable Alpha (dpm/100cm^2)	Removable Beta (dpm/100cm^2)	Tritium (dpm/100cm^2)	Comments
B41-1F-07-05-00-B3-01	7	5	0	Floor	Tile	-	-	-	-	14.0526	
B41-1F-20-04-00-B3-01	20	4	0	Floor	Tile	-	-	-	-	7.0152	
B41-1F-46-08-00-B3-01	46	8	0	Floor	Tile	-	-	-	-	13.7196	
B41-1F-45-16-00-B3-01	45	16	0	Floor	Tile	-	-	-	-	5.0172	Adjacent to tile removal (SC01)
B41-1F-31-05-01-B3-01	31	5	1	Floor	Tile	-	-	-	-	9.3684	Floor Drain
B41-1F-41-02-00-B3-01	41	2	0	Floor	Tile	-	-	-	-	29.082	Rust stain on floor
B41-1F-07-05-00-B3-02	7	5	0	Floor	Tile	-	-	-	-	0.66822	
B41-1F-20-04-00-B3-02	20	4	0	Floor	Tile	-	-	-	-	1.00344	
B41-1F-43-03-00-B3-02	43	3	0	Floor	Tile	-	-	-	-	4.0182	
B41-1F-31-03-00-B3-02	31	3	0	Floor	Tile	-	-	-	-	6.0162	
B41-1F-45-15-00-B3-01	45	15	0	Floor	Tile	5.6	495.1	0	128.6	14.6964	Weiss sample location SCO1
B41-1F-31-03-00-B3-01	31	3	0	Floor	Tile	0	171.8	0	46.6	20.0688	
B41-1F-43-03-00-B3-01	43	3	0	Floor	Tile	0	83.7	0	29.9	14.3856	
B41-1F-31-06-00-B3-01	31	6	0	Floor	Tile	0	163	0	21.2	4.3512	
B41-1F-16-08-00-B3-01	16	8	0	Floor	Tile	0	315.3	0	0	23.088	
B41-1F-04-08-00-B3-01	4	8	0	Floor	Tile	0	333.3	0	8.4	14.3856	
B41-1F-07-14-00-B3-01	7	14	0	Floor	Tile	0	324.2	0	16.9	-2.331	
B41-1F-19-13-00-B3-01	19	13	0	Floor	Tile	0	166.7	0	0	11.3664	Incorrectly labeled as B4 on field log
B41-1F-45-14-00-B3-01	45	14	0	Floor	Tile	0	189.4	0	84.7	39.072	
B41-1F-38-18-00-B3-01	38	18	0	Floor	Tile	0	207	0	21.2	5.6832	
B41-1F-20-12-00-B3-02	20	12	0	Floor	Tile	-	-	-	-	0	
B41-1F-01-13-00-B3-01	1	13	0	Floor	Tile	0	464	0	4.2	-	
B41-1F-07-04-00-B3-01	7	4	0	Floor	Tile	0	409.9	0	0	-	
B41-1F-10-07-00-B3-01	10	7	0	Floor	Tile	0	301.8	0	0	-	
B41-1F-10-13-00-B3-01	10	13	0	Floor	Tile	0	256.8	0	4.2	-	
B41-1F-13-04-00-B3-01	13	4	0	Floor	Tile	0	351.4	0	46.4	-	
B41-1F-19-03-00-B3-01	19	3	0	Floor	Tile	0	315.3	0	21.1	-	
B41-1F-20-12-00-B3-01	20	12	0	Floor	Tile	0	0	0	0	-	
B41-1F-23-17-00-B3-01	23	17	0	Floor	Tile	0	58.6	0	42.2	-	
B41-1F-25-03-00-B3-01	25	3	0	Floor	Tile	0	256.8	0	0	-	
B41-1F-25-03-00-B3-02	25	3	0	Floor	Tile	0	180.2	3.2	0	-	Incorrectly labeled as B4 on field log
B41-1F-28-06-00-B3-01	28	6	0	Floor	Tile	0	136.6	0	13	-	
B41-1F-31-03-00-B3-02	31	3	0	Floor	Tile	0	145.4	0	29.7	-	
B41-1F-37-03-00-B3-01	37	3	0	Floor	Tile	0	167.9	0	38.1	-	
B41-1F-39-08-00-B3-01	39	8	0	Floor	Tile	0	224.7	0	55.1	-	
B41-1F-45-08-00-B3-01	45	8	0	Floor	Tile	0	101.3	0	46.6	-	
B41-1F-47-03-00-B3-01	47	3	0	Floor	Tile	0	220.3	0	0	-	
B41-HVAC-17-06-08-B5-01	17	6	8	HVAC	Steel	-	-	-	-	5.0172	Interior of air register
B41-HVAC-17-19-08-B5-01	17	19	8	HVAC	Steel	-	-	-	-	5.3502	Interior of air register
B41-HVAC-22-06-07-B5-01	22	6	7	HVAC	Steel	-	-	-	-	2.664	Vent exterior
B41-HVAC-28-06-07-B5-01	28	6	7	HVAC	Steel	-	-	-	-	4.0182	Vent exterior
B41-HVAC-31-01-08-B5-01	31	1	8	HVAC	Steel	-	-	-	-	-2.664	Vent exterior
B41-W-48-03-03-B1-01	48	3	3	Wall	Concrete	0	48.5	0	38.1	-	

Table 10-1. Systematic Radiological Measurement Results – Building 41

Sample ID	X	Y	Z	Surface Type	Material Type	Total Alpha (dpm/100cm^2)	Total Beta (dpm/100cm^2)	Removable Alpha (dpm/100cm^2)	Removable Beta (dpm/100cm^2)	Tritium (dpm/100cm^2)	Comments
B41-W-48-03-03-B4-01	48	3	3	Wall	Drywall	-	-	-	-	-1.00344	Wall Ledge
B41-W-34-01-05-B4-01	34	1	5	Wall	Drywall	-	-	-	-	5.3502	Window ledge
B41-W-23-01-04-B4-01	23	1	4	Wall	Drywall	-	-	-	-	11.3664	
B41-W-27-01-05-B4-01	27	1	5	Wall	Drywall	0	108.1	0	0	15.7176	Incorrectly labeled as floor sample on field sheet.
B41-W-11-01-05-B4-01	11	1	5	Wall	Drywall	0	0	0	8.4	20.0688	Incorrectly labeled as floor sample on field sheet.
B41-W-39-01-01-B4-01	39	1	1	Wall	Drywall	0	123.3	0	0	-2.00688	
B41-W-01-09-04-B4-01	1	9	4	Wall	Drywall	0	0	0	0	15.0516	Incorrectly labeled as floor sample on field sheet.
B41-W-38-20-01-B4-01	38	20	1	Wall	Drywall	0	101.3	0	55.1	21.0678	
B41-W-03-01-05-B4-01	3	1	5	Wall	Drywall	0	22.5	0	0	-	Incorrectly labeled as floor sample on field sheet.
B41-W-19-06-04-B4-01	19	6	4	Wall	Drywall	0	0	0	0	-	Incorrectly labeled as floor sample on field sheet.
B41-W-19-06-04-B4-02	19	6	4	Wall	Drywall	0	0	0	0	-	Incorrectly labeled as floor sample on field sheet.
B41-W-23-20-04-B4-01	23	20	4	Wall	Drywall	0	0	0	0	-	Incorrectly labeled as floor sample on field sheet.
B41-W-35-06-05-B4-01	35	6	5	Wall	Drywall	0	0	0	12.7	-	
B41-W-45-20-04-B4-01	45	20	4	Wall	Drywall	0	30.8	0	50.8	-	
B41-W-45-20-04-B4-02	45	20	4	Wall	Drywall	0	0	0	21.2	-	

Table 10-2. Summary of Surface Alpha and Beta Radioactivity Measurements – Building 41

				dpm/100 cm^2				
Area	Matrix	Parameter[1]	Number of Measurements	Median	Mean	Standard Deviation	Minimum	Maximum
Floor (systematic)	Tile	Total Alpha	25	0	0	0	0	0
		Removable Alpha	25	0	0.1	0.6	0	3.2
		Total Beta	25	207	221	111	0	464
		Removable Beta	25	0	16.9	21	0	84.7
Walls (systematic)	Drywall	Total Alpha	13	0	0	0	0	0
		Removable Alpha	13	0	0	0	0	0
		Total Beta	13	0	33.4	46.9	0	123
		Removable Beta	13	0	14.3	20.6	0	55.1

Note:
[1] Low energy beta emitters such as tritium are not included
dpm/100 cm^2 = decay per minute per 100 square centimeters of surface area

Table 10-3. Measurements of Tritium Surface Radioactivity – Building 41

Area	Number of Measurements	dpm/100cm^2				
		Median	Mean	Standard Deviation	Minimum	Maximum
Floors (Systematic)	10	12.9	13.0	12.3	-2.3	39
Floors (Biased)	11	7.0	9.5	8.2	0.7	29
Walls (Systematic)	5	15.7	13.9	9.3	-2.0	21
Walls (Biased)	3	5.4	5.2	6.2	-1.0	11.4
HVAC	5	4.0	2.9	3.3	-2.7	5.4

Note:
dpm/100 cm^2 = decay per minute per 100 square centimeters of surface area

Table 10-4. Non-Radiological Sampling and Analysis Summary – Building 41

Location	Matrix/Sample Type	Assumptions/Collection Rationale	Analytes	Constituents Potentially Above Hazardous Waste Thresholds[1]
Room 104	Concrete slab below tile	Electronics shop, radio shop	CAM 17, PCBs	None
Interior	Dust on horizontal surfaces such as floors, HVAC ducting, sills[2]	Potential release(s) of beryllium, lead, and mercury and dispersion in dust	Beryllium, lead, mercury	None
Sink trap and floor drain trap in Room 103	Wastewater	Contaminant settling points	CAM 17, pH	None
	Sediment and sludge	Contaminant settling points	CAM 17	Copper and Lead (sink trap), chromium, copper, lead, silver (floor trap)
Sewer cleanout - outside, south of Building 41	Wipe sewer pipe inner surface.	Contamination conduit	CAM 17	None
Room 101	Windowsill caulking	PCBs commonly used in caulking, pre-1979	PCBs	None
Room 103	Interior wall paint	PCBs commonly used in paint, pre-1979	PCBs	None

Note:
Asbestos and lead-based paint are not included in this table. See Appendix C for asbestos and lead-based paint results.
[1] Constituents above thresholds listed in Table 5-3 and described in Section 5.2.1. To determine if a constituent is considered a hazardous waste or is potentially a hazardous waste (based on leachability), consult analytical results tables.
[2] Wipe sample

Abbreviations:
CAM 17 California Administrative Code, Title 22 Priority Pollutant Metals
HVAC heating, ventilation, air conditioning
PCBs polychlorinated biphenyl compounds

Table 10-5. Analytical Results for Metals – Building 41

Sample Type	Sample Description	Sample Name	Units	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Hg	Mo	Ni	Se	Ag	Tl	V	Zn
Concrete	Concrete core, room 104 northeast	B41SC01	mg/kg	<0.5	3.1	89.0	0.35 J, T	0.13	41.9	9.1	22.9	5.3	0.019 J, T	0.74	34.5	0.32 J, T	0.050 J, T	<0.2 UJ, 2	36.9	39.7
Sludge	Sink trap sludge, room 103 northeast	B41SL01	mg/L	0.0355	0.004 J, T	0.338	<0.001	0.0617	0.19	0.0127	161	16.4	0.0017	0.0532	0.88	0.0325	0.155	0.0046	0.022	10.2
Sludge	Floor drain trap sludge, room 103 northeast	B41SL02	mg/kg	3.5	6.1	12.0	<2.5	3.6	58.7	17.5	395	94.8	0.33	18.3	112	0.54 J, T	57.3	<0.4 UJ, 2	2.5	875
Wipe	HVAC vent wipe, room 101 north	B41SW01	µg/100 cm²	---	---	---	0.0080 J, T	---	---	---	---	17.2	---	---	---	---	---	---	---	---
Wipe	HVAC vent wipe, room 101 north	B41SW01 RS	µg/100 cm²	---	---	---	---	---	---	---	---	---	0.12	---	---	---	---	---	---	---
Wipe	HVAC vent wipe, room 101 north	B41SW02 DUP	µg/100 cm²	---	---	---	0.012 J, T	---	---	---	---	15.9	---	---	---	---	---	---	---	---
Wipe	HVAC vent wipe, room 101 north	B41SW02 DUP RS	µg/100 cm²	---	---	---	---	---	---	---	---	---	0.16	---	---	---	---	---	---	---
Wipe	Floor wipe, room 104 southeast	B41SW03	µg/100 cm²	---	---	---	<0.1	---	---	---	---	1.6	---	---	---	---	---	---	---	---
Wipe	Floor wipe, room 104 southeast	B41SW03 RS	µg/100 cm²	---	---	---	---	---	---	---	---	---	0.017 J, T	---	---	---	---	---	---	---
Wipe	Window sill wipe, room 101 southwest	B41SW04	µg/100 cm²	---	---	---	<0.1	---	---	---	---	19.2	0.016 J, T	---	---	---	---	---	---	---
Wipe	Sewer wipe at cleanout, outside, south of B41	B41SW05	µg/100 cm²	0.10 J, T	0.59 J, T	<2 UJ, 2	<0.1	0.046 J, T	4.8	0.85	16.6	20.9	---	2.1	11.7	<0.5	0.61	<0.2	<1	8.0
Wipe	Sewer wipe at cleanout, outside, south of B41	B41SW05 RS	µg/100 cm²	---	---	---	---	---	---	---	---	---	0.027	---	---	---	---	---	---	---
Wastewater	Sink trap water, room 103 northeast	B41WW01	mg/L	<0.005	0.00097 J, T	0.0136	<0.0005	0.0019	<0.01	0.00057 J, T	0.453	0.132	0.00013 J, T	0.00092 J, T	0.132	<0.005	0.00061 J, T	0.0033	<0.01	0.825
Wastewater	Floor drain trap water, room 103 northeast	B41WW02	mg/L	0.0181	0.0046 J, T	0.1	<0.025	0.05	0.383	0.0796	6.8	0.896	0.0056	0.0142	0.652	<0.005	0.675	<0.1	0.0188	6.49

Abbreviations:

mg/L = milligrams per liter
µg/100 cm² = micrograms per 100 square centimeters
DUP = field duplicate
mg/kg = milligrams per kilogram
RS = sample location resampled
Sb = antimony, As = arsenic, Ba = barium, Be = beryllium, Cd = cadmium, Cr = total chromium, Co = cobalt, Cu = copper, Pb = lead, Hg = mercury, Mo = molybdenum, Ni = nickel, Se = selenium, Ag = silver, Tl = thallium, V = vanadium, Zn = zinc
STLC = Soluble Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24
TCLP = Toxicity Characteristic Leaching Procedure, Title 22 California Code of Regulations, Section 66261.24
TTLC = Total Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24

Notes:

<n = analyte not detected above reporting limit of 'n'
J = estimated result
T = trace level compound, poor quantitation
UJ = result is not detected at an estimated detection limit
2 = method blank contamination
--- = not analyzed
Italics = no published bulk sample concentration (TTLC, STLC, TCLP) at which the constituent is deemed a hazardous waste
red = detected above: 1) the TTLC for solid samples; 2) or the STLC or TCLP for aqueous samples; 3) or the wipe concentration limit
yellow = detected above 10 x STLC or 20 x TCLP concentrations, for solid matrices (does not apply to wipe samples)

Analysis for Metals by USEPA Methods 6020, 7470A and 7471A. All samples analyzed by Test America St.Louis, Earth City, Missouri.

The comparison threshold for beryllium of 0.2 µg/100 cm2 (collected on wipes) applies to removable contamination on equipment or surfaces. Equipment or surfaces with beryllium concentrations below this threshold may be released to the general public or to a DOE facility for use in a manner not requiring controls for beryllium exposure per the Chronic Beryllium Disease Prevention Program (10 CFR 850).

Table 10-6. Analytical Results for PCBs – Building 41

Sample Type	Sample Description	Sample Name	Units	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260
Paint	Wall paint sample, room 103 south	B41PC01	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Concrete	Concrete core, room 104 northeast	B41SC01	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033

Abbreviations:

mg/kg = milligrams per kilogram
PCBs = polychlorinated biphenyls
STLC = Soluble Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24
TCLP = Toxicity Characteristic Leaching Procedure, Title 22 California Code of Regulations, Section 66261.24
TTLC = Total Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24

Notes:

<n = analyte not detected above reporting limit of 'n'
Italics = no published bulk sample concentration (TTLC, STLC, TCLP) at which the constituent is deemed a hazardous waste
red = detected above: 1) the TTLC for solid samples; 2) or the STLC or TCLP for aqueous samples; 3) or the wipe concentration limit.
yellow = detected above 10 x STLC or 20 x TCLP concentrations, for solid matrices (does not apply to wipe samples)

Analysis for PCBs by USEPA Method 8082. All samples analyzed by Test America St. Louis, Earth City, Missouri.

The comparison threshold for PCBs of 10 µg/100 cm2 (collected on wipes) applies to non-porous surfaces contaminated with PCBs. Surfaces containing PCB concentrations above this limit are considered to be contaminated (40 CFR 761).

The value used as the threshold for determining if PCBs exceed hazardous waste limits is applicable to the sum of the Aroclor mixtures reported.

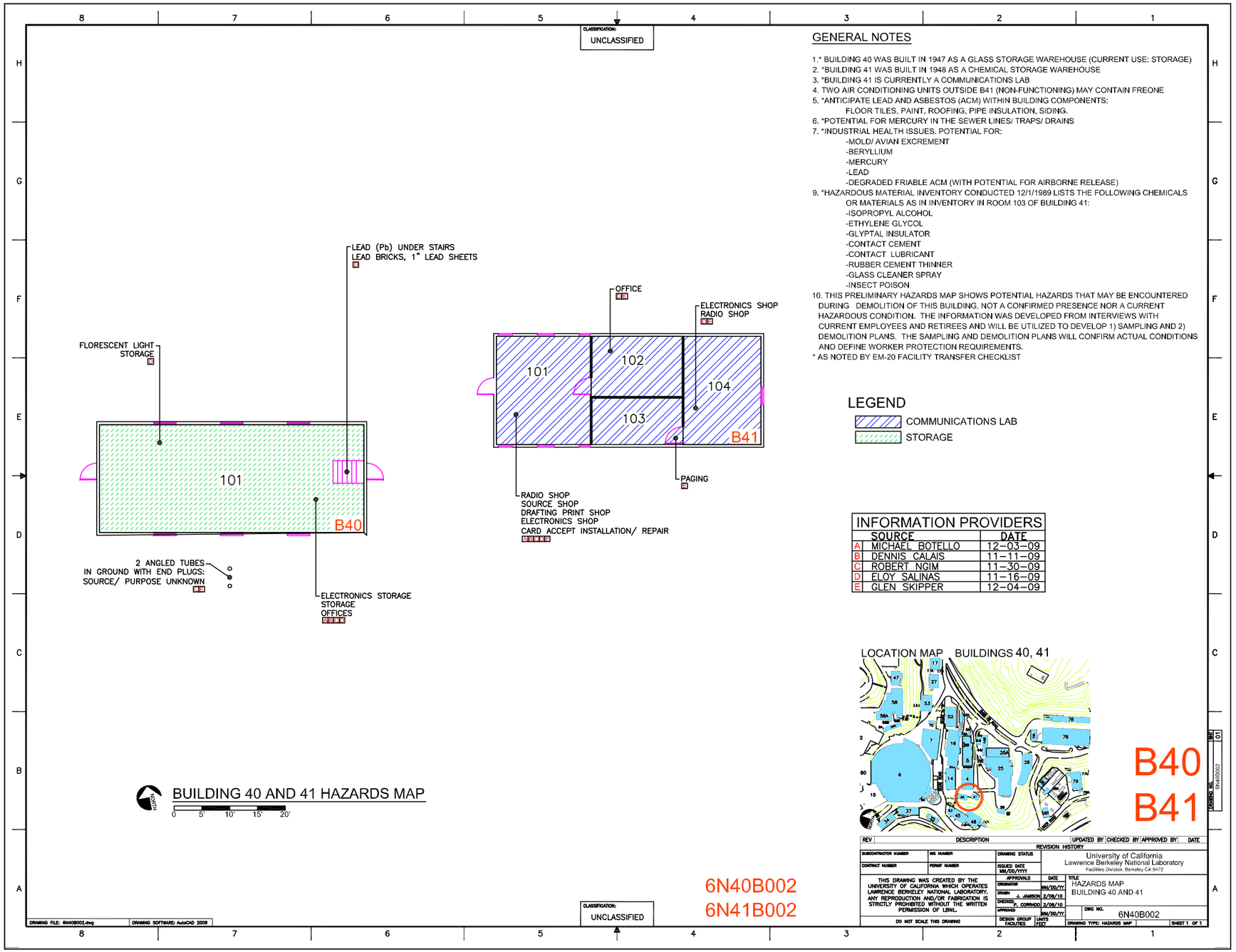
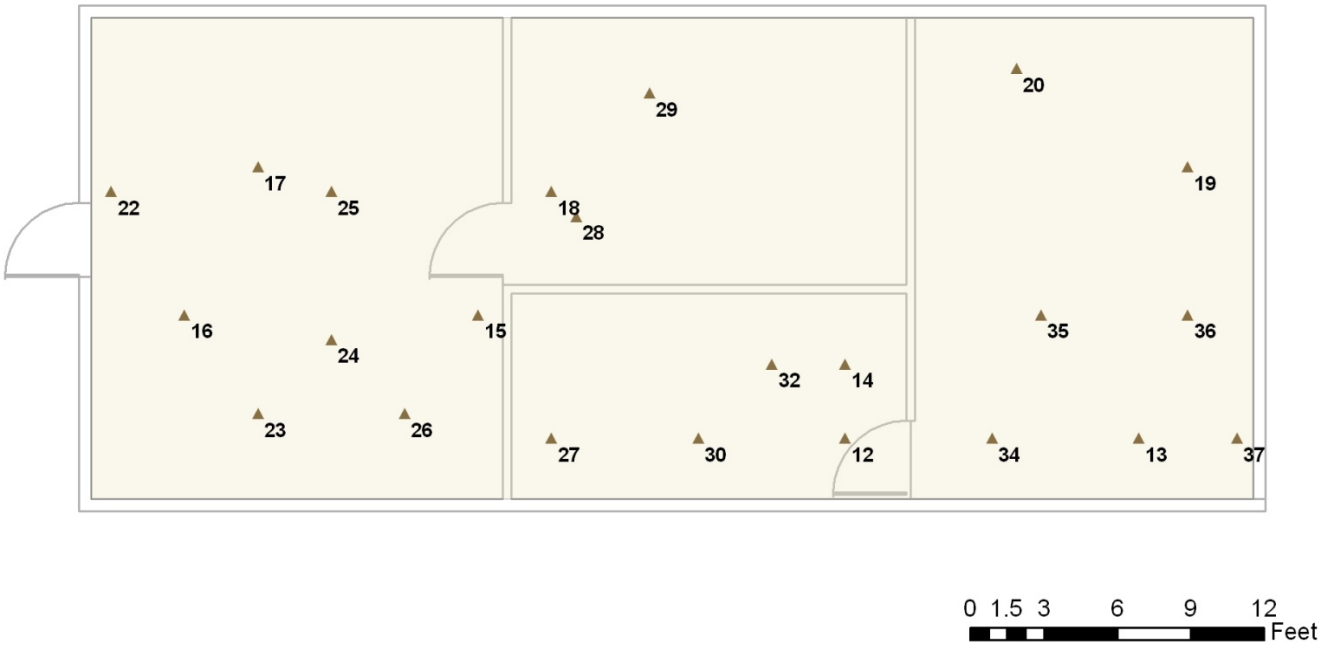


Figure 10-1. Hazard Map – Building 41 (includes Building 40)



Map ID	Sample ID
12	B41-1F-31-03-00-B3-01
13	B41-1F-43-03-00-B3-01
14	B41-1F-31-06-00-B3-01
15	B41-1F-16-08-00-B3-01
16	B41-1F-04-08-00-B3-01
17	B41-1F-07-14-00-B3-01
18	B41-1F-19-13-00-B3-01
19	B41-1F-45-14-00-B3-01
20	B41-1F-38-18-00-B3-01
22	B41-1F-01-13-00-B3-01
23	B41-1F-07-04-00-B3-01
24	B41-1F-10-07-00-B3-01

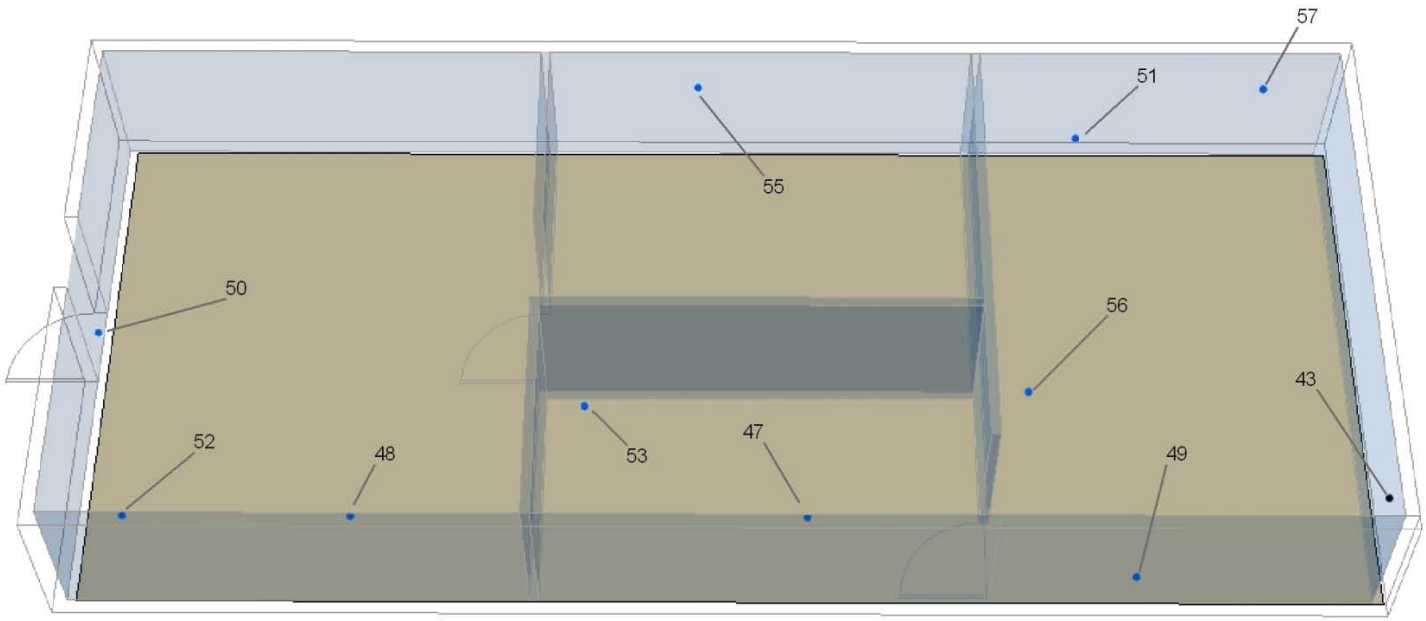
Map ID	Sample ID
25	B41-1F-10-13-00-B3-01
26	B41-1F-13-04-00-B3-01
27	B41-1F-19-03-00-B3-01
28	B41-1F-20-12-00-B3-01
29	B41-1F-23-17-00-B3-01
30	B41-1F-25-03-00-B3-01
32	B41-1F-28-06-00-B3-01
34	B41-1F-37-03-00-B3-01
35	B41-1F-39-08-00-B3-01
36	B41-1F-45-08-00-B3-01
37	B41-1F-47-03-00-B3-01

Building 41
1st Floor
Surface Type - Floors

Material Type

▲ Tile

Figure 10-2. Radiological Sampling Locations – Building 41, Floors



Map ID	Sample ID
43	B41-W-48-03-03-B1-01
47	B41-W-27-01-05-B4-01
48	B41-W-11-01-05-B4-01
49	B41-W-39-01-01-B4-01
50	B41-W-01-09-04-B4-01
51	B41-W-38-20-01-B4-01
52	B41-W-03-01-05-B4-01
53	B41-W-19-06-04-B4-01
55	B41-W-23-20-04-B4-01
56	B41-W-35-06-05-B4-01
57	B41-W-45-20-04-B4-01

Building 41
1st Floor
Surface Type - Walls

Material Type

- Concrete
- Drywall

Figure 10-3. Radiological Sampling Locations – Building 41, Walls

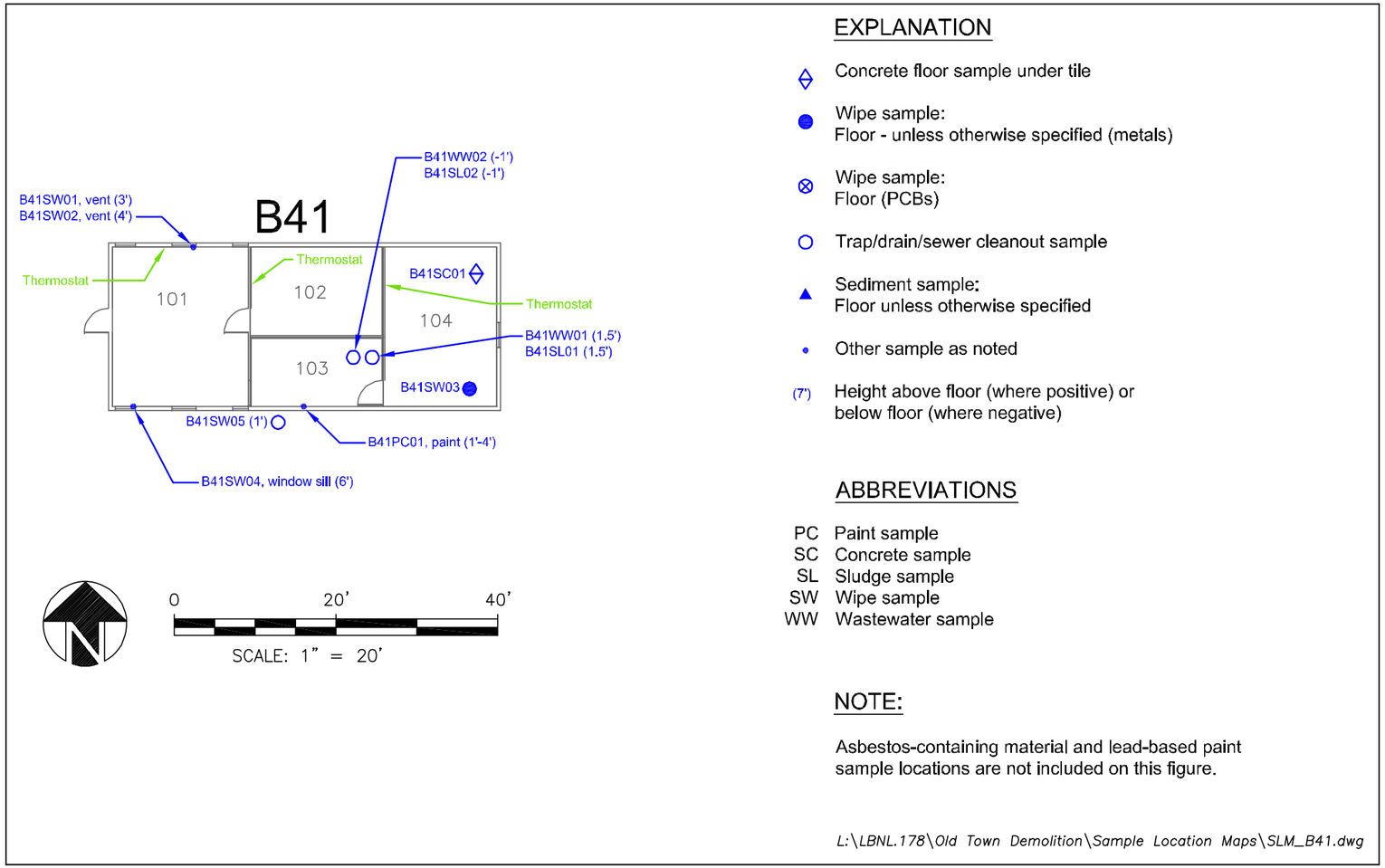


Figure 10-4. Non-Radiological Sampling Locations – Building 41

11. CHARACTERIZATION OF BUILDING 44

Building 44 was built in 1956 as a storage space or general warehouse facility. It was later used for offices and as a general-purpose laboratory. The building is approximately 800 square feet in area, has corrugated walls. and is accessible via a sliding metal garage-style door. Figure 11-1 provides the locations of historical hazards associated with the building obtained by LBNL from historical records, interviews, and site inspections.

Building 44 was characterized per the *Final Work Plan for Base Bid Buildings* (Weiss, 2010c).

11.1 Deviations from Work Plan

No deviations from the work plan occurred during the radiological sampling at Building 44. There were two deviations from the work plan during non-radiological sampling:

- Sludge sample (B44SL01) was not collected from a sink trap in the northwestern portion of Room 101 because there was no sludge in the trap.
- Wipe sample (B44SW02) was collected from the top of a light fixture instead of HVAC ducting because no ducting was found in Building 44.

11.2 Radiological Characterization Summary

The information provided on the hazard map developed by LBNL (Figure 11-1) and the historic information obtained by LBNL and summarized in the *Final Workplan for the Reconnaissance-Level Characterization of Buildings 25A, 44, 44A, 44B, 52, and 52A* indicate that potential contamination may be present in Building 44 resulting from storage of Bikini Atoll radiological samples. The samples were stored in the vicinity of Room 101. The floor and wall area near Room 101 was classified as a Class 1 survey unit. The remainder of the building floor and walls were classified as a Class 3 survey unit. The focus of the radiological characterization was the existing floors and lower walls including the concrete beneath the carpet flooring; around sinks and drains; and the machinery footprint, where noted. Radiological survey locations were selected using biased and systematic methods.

11.2.1 Radiological Scanning

Radiological scanning was performed to determine if there were any areas of elevated radioactivity that would require biased static radiological measurements. Consistent with the workplan, the following areas were scanned using a gas-flow proportional floor monitor (Ludlum Model 239-1F) or a hand-held duel phosphor detector (Ludlum Model 43-89):

- 100 percent alpha/beta scans of Class 1 floor surfaces;
- ≥ 50 percent alpha/beta scans of Class 1 wall surfaces;
- ≥ 10 percent alpha/beta scans of Class 3 wall surfaces; and
- ≥ 25 percent alpha/beta scans of Class 3 accessible internal HVAC surfaces.

Scanning speeds using the gas proportional floor monitor were approximately 10 cm/s. Scanning speeds for the duel phosphor detectors were approximately 5 cm/s.

No radioactivity above background levels was detected during radiological scanning of floors, walls, and the interior surfaces of The HVAC system; consequently, no biased radiological measurements were collected from these locations.

11.2.2 Systematic Radiological Measurements

Thirty floor locations were identified in the workplan for systematic direct measurements. The locations were based on a triangular grid system with a random starting point. Direct radiological measurements of the overlying carpet were collected at 29 locations and the underlying concrete was measured at 28 locations. Table 11-1 indicates the types of floor materials surveyed. Removable radioactivity measurements were collected using surface smears at each of the systematic sample locations. The floor sample locations are shown in Figure 11-2. Three duplicate measurements for each floor surface type were also collected.

Thirty wall locations were identified in the field for systematic direct measurements. The locations were equally spaced, alternating between 1 and 5 feet high along the wall when not obstructed by equipment. In cases where the sampling location was obstructed, the location was offset to allow access to the surface. Direct radiological measurements of various wall surface materials were collected at 30 locations. Removable radioactivity measurements were collected using surface smears at each of the systematically-identified sample location. Wall sample locations are shown in Figure 11-3. Three duplicate wall measurements were also collected.

All direct radiological measurements were collected for a period of 1 minute using a hand-held gas proportional detector (Ludlum Model 43-68). Removable radioactivity measurements also were collected for 1 minute, using a dual channel alpha/beta sample counter (Ludlum Model 3030).

The results for the systematic direct and removable radiological measurement are presented in Table 11-1 and summarized in Table 11-2. The highest total alpha measurement was 21 dpm/100 cm^2, while the highest total beta measurement was 492 dpm/100 cm^2. The DCGLs for total alpha and total beta surface radioactivity are 100 and 5,000 dpm/100 cm^2, respectively.

The highest removable alpha measurement was 3 dpm/100 cm^2, while the highest removable beta measurement was 107 dpm/100 cm^2. The DCGLs for removable alpha and total beta surface radioactivity are 20 and 1,000 dpm/100 cm^2, respectively.

11.2.3 Tritium Sampling

Consistent with the workplan, 30 systematic tritium samples were collected on the floor and wall surfaces using methods described in the workplan. Ten biased samples were also collected on the floors and lower walls. Eight samples of the HVAC system throughout the building were also collected. Duplicate samples were also taken in five locations where biased and systematic sample were taken. All tritium samples were counted for 2 minutes using an automated liquid scintillation counter (Beckman Model TR2550).

The results of tritium sampling are presented in Table 11-1 and summarized in Table 11-3. The highest tritium surface activity was 28 dpm/100 cm^2.

11.2.4 Volumetric Sampling

No volumetric samples were collected in Building 44.

11.3 Non-radiological Characterization Summary

11.3.1 Chemical Constituents

As shown in Table 11-4, samples were collected at Building 44 to characterize a sewer cleanout, residual dust on light fixtures and windowsills, wall paint, window caulk, a concrete core, and wastewater in a sink trap. The locations of these samples are shown in Figure 11-4. Analytical data are summarized in Table 11-5 (metals) and Table 11-6 (PCBs).

Samples were analyzed for metals by EPA Methods 6020A, and 7470A or 7471A, and for PCBs by EPA Method 8082. The complete analytical results are provided on a CD-ROM included in Appendix E.

Six samples were analyzed for metals and three samples were analyzed for PCBs. Neither metals nor PCBs were detected at concentrations greater than comparison thresholds in any of the samples collected from Building 44. The pH of the water in the sink trap was measured in the field and found to be 9.69.

During field work, equipment potentially containing mercury (such as thermostats) was observed in the building.

11.3.2 Lead-based Paint

Two paint samples were collected and submitted for metals analysis to Macs Lab, Inc. using EPA Method 6010B/3050. The paint samples were collected from the interior and exterior metal surfaces. Both contained lead in concentrations exceeding 5,000 ppm.

Lab results reporting the detectable presence of lead in these sampled paints and/or surface coatings should be assumed to be representative of all similar paints and/or surface coatings encountered in the building. The results are presented in Appendix C.

11.3.3 Asbestos-containing Materials

Asbestos was found in the following materials at these approximate quantities:

- Wall texture, drywall, and joint compound (500 square feet) and
- Roofing/penetration mastic (30 square feet).

The pre-demolition survey report assessing asbestos-containing materials in Building 44 is provided in Appendix C. That report is intended for submittal in its entirety to the BAAQMD to support demolition notification documentation.

11.4 Conclusions and Recommendations

11.4.1 Radiological Constituents

The radiological scanning of floors, walls, and the interior surfaces of The HVAC system showed no detectable radioactivity above background levels; consequently, no biased locations for direct radiation measurements were identified. The results of the systematic direct and removable radiological measurements show no measurements above the DCGLs in Table 5-1.

No tritium measurements were above the DCGL of 10,000 dpm/100 cm^2.

11.4.1.1 Final Status Survey Evaluation

Data suggest that the surfaces in Building 44 evaluated in this investigation meet the release criteria Table 5-1 and can be considered for unconditional release.

11.4.2 Chemical Constituents

Table 11-4 lists constituents reported in samples collected in Building 44 at concentrations potentially exceeding hazardous waste thresholds.

The data from a sample collected in Building 44 indicate that no contamination is present in the sewer system. The pH of the water in the sink trap was slightly high but below the hazardous waste limit. Mercury in a sample collected from the same sink trap was reported as below hazardous waste thresholds. A wipe sample collected from the sewer cleanout was reported to contain a low concentration of mercury.

No metals were detected above hazardous waste thresholds in a sample of the concrete floor in Building 44. The sample data indicate that the concrete floor is not impacted.

There is some evidence of lead dust on the floor in Room 101 (173 μg/100 cm^2 in wipe sample B44SW01) and the windowsill in Room 101A (44.9 μg/100 cm2 in wipe sample B44SW04). The lead contamination appears to be superficial, as no elevated lead concentrations were reported in the sample of concrete collected. Decontamination of building surfaces to remove dispersed lead

could be warranted prior to demolition. Worker protection should be addressed to ensure that lead exposure does not exceed regulatory exposure levels.

Beryllium was detected in two wipe samples collected from the floor and windowsill at very low concentrations (0.032 μg/100 cm^2) that are below the comparison threshold. All wipe samples were reported to contain low concentrations of mercury. PCBs were detected in paint and window caulk below comparison thresholds.

Thermostats that potentially contain mercury switches or other mercury-containing equipment were identified in Building 44 (Figure 11-4). Care should be taken when removing equipment that could contain mercury switches to prevent breakage and release of liquid mercury. Additional thermostats or other mercury-containing equipment could be present.

11.4.3 Lead-based Paint

The interior and exterior metal surfaces of Building 44 contain lead in paint at concentrations at which the paint is considered lead-based. The presence of lead and/or lead-containing paint requires that specialized work practices be used during demolition work to ensure that individuals involved in the work are adequately protected against elevated exposure to lead. Contractors or employees involved in lead-related demolition activities must comply with the Construction Safety Orders for Lead (8 CCR §1532.1 et. seq.) and training requirements for those involved in lead-related demolition activities. The Construction Safety Orders for Lead [8 CCR 1532.1 (p)] also require that a "Lead-Work Pre-Job Notification" be filed with CalOSHA whenever a construction project involves work that includes "trigger tasks," as defined by the standard, which will involve greater than 100 square feet of "lead-based paint." Notification must be made 24 hours prior to the commencement of work.

Loose paint chips or other debris containing 0.5% lead by weight are likely to be characterized as hazardous waste; therefore, damaged paint containing lead at 0.5% or greater should be stabilized or removed prior to demolition. Disturbance of lead-containing paints and/or surface coatings should be conducted by a licensed contractor utilizing workers with CDPH training in lead-related construction. Lead-related construction waste should be segregated into discrete waste streams and characterized for proper disposal.

11.4.4 Asbestos-containing Materials

The wall texture and drywall in Building 44 and the roofing/penetration mastic contain asbestos-containing material. Designation of a material as asbestos-containing should be applied to all homogenous material of the type reported to contain asbestos.

Since more than 100 square feet of regulated asbestos-containing material will be disturbed in demolition of Building 5, the BAAQMD must be notified 10 days prior to demolition activities

Table 11-1. Systematic Radiological Measurement Results – Building 44

Sample ID	Location X	Location Y	Location Z	Surface Type	Material Type	Total Alpha dpm/100cm^2	Beta Total dpm/100cm^2	Removable Alpha dpm/100cm^2	Removable Beta dpm/100cm^2	Tritium dpm/100cm^2	Comments
AC in Room 101A				HVAC	Plastic/Steel	N	NA	NA		4.5	Biased/ Air Conditioner in Room 101
B44-C-21-11-H3-01	21	11		Ceiling	Steel (painted)					0	Biased/ Duct hanging from ceiling
B44-HVAC-18-20-H3-02	18	20		HVAC	Filter					0	Biased/ Filter in HVAC system
B44-1F-22-01-H3-01	22	1	0	Floor	Steel (painted)					0	Biased/ steel strip on floor
B44-1F-25-20-H3-01	25	20	0	Floor	Steel (painted)					0	Biased/ steel strip on floor
B44-W-18-20-7-H3-01	18	20	7	Object	Plywood					17.5	Biased/Base of Duct Box
B44-W-07-01-03-H3-01	7	1	3	Object	porcelain					0	Biased/Bathroom Sink
B44-W-01-05-05-H3-01	1	5	5	Object	wood					4.4	Biased/Bathroom window seal
B44-W-16-20-7-H3-01	16	20	7	Wall	Steel (painted)					0	Biased/Elevated Horizontal Surface
B44-W-29-01-05-H3-01	29	1	5	Horizontal Surface	Steel (painted)					0	Biased/Elevated Horizontal Surface
B44-C-36-11-H3-01	36	10		Heater	Steel (painted)					0	Biased/Heater
B44-11-17-8-H3-01	11	17	8	Ceiling	Gypsum Wall Board					0	Biased/horizontal surface of ceiling in Room 101A
B44-HVAC-18-20-H3-01	18	20		HVAC	Steel (painted)					0	Biased/Inside of HVAC return
B44-C-30-16-H3-01	30	16		Ceiling	Gypsum Wall Board					0	Biased/Open hole in ceiling
B44-C-36-10-H3-01	36	10		Ceiling	PVC					0	Biased/PVC pipe hanging from ceiling
B44-W-15-01-03-H3-01	15	1	3	Object	porcelain					5	Biased/Sink of main room
B44-1F-21-11-H3-01	21	11	0	Floor	Carpet					0	Biased/Stain on carpet
B44-WH-H3--01				Object	Metal					6.1	Biased/Water Heater
B44-1F-03-11-B2-01	3	11	0	Floor	Concrete	0	235	0	25	0	Sample ID is duplicated. Assume concrete based on Total Beta data.
B44-1F-36-16-B2-01	36	16	0	Floor	Carpet	0	54	0	87		
B44-1F-33-20-B2-01	33	20	0	Floor	Carpet	0	183	0	0		
B44-1F-18-16-B2-01	18	16	0	Floor	Carpet	0	4	0	0		
B44-1F-24-16-B2-01	24	16	0	Floor	Carpet	0	64	0	17		
B44-1F-30-16-B2-01	30	16	0	Floor	Carpet	0	177	0	0		
B44-1F-21-01-B2-01	21	1	0	Floor	Carpet	0	98	0	0		
B44-1F-01-08-B2-01	1	8	0	Floor	Carpet	0	285	0	0		
B44-1F-01-19-B2-01	1	19	0	Floor	Carpet	0	0	0	62		
B44-1F-06-06-B2-01	6	6	0	Floor	Carpet	0	197	0	33	0	
B44-1F-09-01-B2-01	9	1	0	Floor	Carpet	0	71	0	58		
B44-1F-12-06-B2-01	12	6	0	Floor	Carpet	0	122	0	41		
B44-1F-15-01-B2-01	15	1	0	Floor	Carpet	0	28	0	25		
B44-1F-18-06-B2-01	18	6	0	Floor	Carpet	0	4	0	29		
B44-1F-24-06-B2-01	24	6	0	Floor	Carpet	0	80	0	0		
B44-1F-27-01-B2-01	27	1	0	Floor	Carpet	0	134	0	37		
B44-1F-30-06-B2-01	30	6	0	Floor	Carpet	0	165	0	58		
B44-1F-32-01-B2-01	32	1	0	Floor	Carpet	0	88	0	25		
B44-1F-36-06-B2-01	36	6	0	Floor	Carpet	0	151	0	66		
B44-1F-39-03-B2-01	39	3	0	Floor	Carpet	0	244	0	37		
B44-1F-39-11-B2-01	39	11	0	Floor	Carpet	0	269	0	58		
B44-1F-33-11-B2-01	33	11	0	Floor	Carpet	0	71	0	62		
B44-1F-27-10-B2-01	27	10	0	Floor	Carpet	0	122	0	37		
B44-1F-21-11-B2-01	21	11	0	Floor	Carpet	0	134	0	37		
B44-1F-15-11-B2-01	15	11	0	Floor	Carpet	0	0	0	74		

Table 11-1. Systematic Radiological Measurement Results – Building 44

Sample ID	Location X	Location Y	Location Z	Surface Type	Material Type	Total Alpha dpm/100cm^2	Beta Total dpm/100cm^2	Removable Alpha dpm/100cm^2	Removable Beta dpm/100cm^2	Tritium dpm/100cm^2	Comments
B44-1F-09-11-B2-01	9	11	0	Floor	Carpet	0	67	0	45		
B44-1F-03-11-B2-01	3	11	0	Floor	Carpet	0	130	0	0		
B44-1F-06-16-B2-01	6	16	0	Floor	Carpet	0	239	0	37		
B44-1F-09-20-B2-01	9	20	0	Floor	Carpet	0	256	0	33		
B44-1F-12-16-B2-01	12	16	0	Floor	Carpet	0	164	0	29		
B44-1F-12-06-B1-01	12	6	0	Floor	Concrete	0	286	3	4		
B44-1F-18-06-B1-01	18	6	0	Floor	Concrete	0	273	0	29	0	
B44-1F-15-01-B1-01	15	1	0	Floor	Concrete	0	492	0	41	0	
B44-1F-24-06-B1-01	24	6	0	Floor	Concrete	0	332	0	25		
B44-1F-27-01-B1-01	27	1	0	Floor	Concrete	0	391	0	4		
B44-1F-30-06-B1-01	30	6	0	Floor	Concrete	0	286	0	0	0	
B44-1F-32-01-B1-01	32	1	0	Floor	Concrete	0	286	0	41		
B44-1F-36-08-B1-01	36	8	0	Floor	Concrete	0	282	0	25		
B44-1F-39-03-B1-01	39	3	0	Floor	Concrete	0	366	0	58	0	
B44-1F-39-11-B1-01	39	11	0	Floor	Concrete	0	357	0	41	0	
B44-1F-33-11-B1-01	33	11	0	Floor	Concrete	0	273	0	25		
B44-1F-27-10-B1-01	27	10	0	Floor	Concrete	0	429	0	41	0	
B44-1F-15-11-B1-01	15	11	0	Floor	Concrete	0	332	3	0	0	
B44-1F-12-16-B1-01	12	16	0	Floor	Concrete	0	286	0	0		
B44-1F-06-16-B1-01	6	16	0	Floor	Concrete	0	286	3	17	0	
B44-1F-21-11-B1-01	21	11	0	Floor	Concrete	0	282	0	41		
B44-1F-09-20-B1-01	9	20	0	Floor	Concrete	0	366	0	4	0	
B44-1F-36-16-B1-01	36	16	0	Floor	Concrete	0	234	0	50		
B44-1F-33-20-B1-01	33	20	0	Floor	Concrete	4	174	0	4		
B44-1F-18-16-B1-01	18	16	0	Floor	Concrete	0	123	0	21	0	
B44-1F-24-16-B1-01	24	16	0	Floor	Concrete	0	302	0	0		
B44-1F-30-16-B1-01	30	16	0	Floor	Concrete	0	274	0	50	17.8	
B44-1F-21-01-B1-01	21	1	0	Floor	Concrete	0	102	0	25	0	
B44-1F-01-08-B1-01	21	3	0	Floor	Concrete	0	306	0	12		
B44-1F-01-19-B1-01	1	19	0	Floor	Concrete	6	110	0	29		
B44-1F-03--01-B1-01	3	1	0	Floor	Concrete	0	157	0	45	0	
B44-1F-09-11-B1-01	9	11	0	Floor	Concrete	0	187	0	37		
B44-W-11-17-01-B4-01	11	17	1	Wall	Gypsum Wall Board	12	237	0	0	0	
B44-W-09-06-01-B4-01	9	6	1	Wall	Gypsum Wall Board	6	83	0	0		
B44-W-01-06-05-B4-01	1	6	5	Wall	Gypsum Wall Board	21	193	0	0		
B44-W-07-03-05-B4-01	7	3	5	Wall	Gypsum Wall Board	5	17	0	0		
B44-W-06-07-01-B401	6	7	1	Wall	Gypsum Wall Board	16	25	0	0		
B44-W-01-10-04-B4-01	1	10	4	Wall	Gypsum Wall Board	5	235	0	0	0	
B44-W-03-20-05-B4-01	3	20	5	Wall	Gypsum Wall Board	5	17	0	0		
B44-W-01-17-01-B4-01	1	17	1	Wall	Gypsum Wall Board	21	71	0	0	0	
B44-W-09-20-01-B4-01	9	20	1	Wall	Gypsum Wall Board	16	0	0	0	3.03	
B44-W-09-14-05-B4-01	9	14	5	Wall	Gypsum Wall Board	11	55	3	0		
B44-W-09-08-01-B4-01	9	8	1	Wall	Gypsum Wall Board	16	0	0	0	4.2	
B44-W-06-06-05-B4-01	6	6	5	Wall	Gypsum Wall Board	5	0	0	0		

Table 11-1. Systematic Radiological Measurement Results – Building 44

Sample ID	Location X	Location Y	Location Z	Surface Type	Material Type	Total Alpha dpm/100cm^2	Beta Total dpm/100cm^2	Removable Alpha dpm/100cm^2	Removable Beta dpm/100cm^2	Tritium dpm/100cm^2	Comments
B44-W-04-06-01-B4-01	4	6	1	Wall	Gypsum Wall Board	11	168	0	0		
B44-W-39-01-05-B5-01	39	1	5	Wall	Steel (painted)	6	140	0	0	10.6	
B44-W-33-01-01-B5-01	33	1	1	Wall	Steel (painted)	6	0	0	0	0	
B44-W-40-06-01-B5-01	40	6	1	Wall	Steel (painted)	12	206	0	0		
B44-W-40-12-05-B5-01	40	12	5	Wall	Steel (painted)	0	26	0	0	0	
B44-W-40-18-01-B5-01	40	18	1	Wall	Steel (painted)	12	127	3	0		
B44-W-37-20-05-B5-01	37	20	5	Wall	Steel (painted)	0	206	0	25		
B44-W-31-20-01-B5-01	31	20	1	Wall	Steel (painted)	6	184	0	0	0	
B44-W-25-20-05-B5-01	25	20	5	Wall	Steel (painted)	6	101	0	0	0	
B44-W-19-20-01-B5-01	19	20	1	Wall	Steel (painted)	6	162	0	0		
B44-W-13-20-05-B5-01	13	20	5	Wall	Steel (painted)	0	61	0	0	0	
B44-W-27-01-05-B5-01	27	1	5	Wall	Steel (painted)	6	18	0	0		
B44-W-21-01-01-B5-01	21	1	1	Wall	Steel (painted)	0	13	0	0		
B44-W-15-01-05-B5-01	15	1	5	Wall	Steel (painted)	11	0	0	0	0	
B44-W-25-01-01-B5-01	25	1	1	Wall	Steel (painted)	11	0	0	0	0.5	
B44-W-01-01-05-B5-01	1	1	5	Wall	Steel (painted)	5	147	0	0	0	
B44-1F-33-20-00-B2-02	33	20	0	Floor	Carpet	0	187	0	0		
B44-1F-09-20-00-B2-02	9	20	0	Floor	Carpet	0	214	0	12		
B44-1F-24-06-00-B2-02	24	6	0	Floor	Carpet	0	185	0	107		
B44-1F-21-11-00-B2-02	21	11	0	Floor	Carpet					0	
B44-1F-39-11-00-B1-02	39	11	0	Floor	Concrete	0	387	0	25		
B44-1F-15-11-00-B1-02	15	11	0	Floor	Concrete	0	391	0	45		
B44-1F-33-20-00-B1-02	33	20	0	Floor	Concrete	6	183	0	41		
B44-HVAC-18-20-02	18	20	8	HVAC	HVAC					1.9	
B44-W-09-20-01-B4-02	9	20	1	Wall	Gypsum Wall Board	5	34	0	0	24	
B44-W-04-06-01-B4-02	4	6	1	Wall	Gypsum Wall Board	16	8	0	0	28	
B44-W-09-06-01-B4-02	9	6	1	Wall	Gypsum Wall Board	6	92	0	0		
B44-W-11-11-05-B7-01	11	11	5	Wall	Wood	6	88	0	0		

Table 11-2. Summary of Surface Alpha and Beta Radioactivity Measurements – Building 44

Area	Matrix	Parameter[1]	Number of Measurements	dpm/100cm^2 Median	Mean	Standard Deviation	Minimum	Maximum
Floor	Carpet	Total Alpha	32	0	0	0	0	0
		Removable Alpha	32	0	0	0	0	0
		Total Beta	32	132	130.8	82.7	0	285
		Removable Beta	32	35	34.5	28	0	107
	Concrete	Total Alpha	31	0	0.5	1.6	0	6
		Removable Alpha	31	0	0.3	0.9	0	3
		Total Beta	31	286	282.9	93.9	102	492
		Removable Beta	31	25	26	17.6	0	58
Walls	Gypsum Wall Board	Total Alpha	15	11.0	11.1	6.0	5	21
		Removable Alpha	15	0	0.2	0.8	0	3
		Total Beta	15	44.5	77.1	84.6	0	237
		Removable Beta	15	0	0	0	0	0
	Painted Steel	Total Alpha	15	6	5.8	4.4	0	12
		Removable Alpha	15	0	0.2	0.8	0	3
		Total Beta	15	101	92.7	79.5	0	206
		Removable Beta	15	0	1.7	6.5	0	25
	Wood	Total Alpha	2	5.5	5.5	0.7	5	6
		Removable Alpha	2	0	0	0	0	0
		Total Beta	2	44	44	62.2	0	88
		Removable Beta	2	0	0	0	0	0

Notes:
* Low energy beta emitters such as tritium are not included
dpm/100 cm^2 = decay per minute per 100 square centimeters of surface area

Table 11-3. Measurements of Tritium Surface Radioactivity – Building 44

Area	Number of Measurements	dpm/100cm^2 Median (dpm/100 cm^2)	Mean (dpm/100 cm^2)	Standard Deviation	Minimum (dpm/100 cm^2)	Maximum (dpm/100 cm^2)
Floors (Systematic)	16	0	1.1	4.6	0	17.8
Walls (Systematic)	17	0	4.1	8.7	0	28
Biased Locations	18	0	2.1	4.4	0	17.5

Note:
dpm/100 cm^2 = decay per minute per 100 square centimeters of surface area

Table 11-4. Non-Radiological Sampling and Analysis Summary – Building 44

Location	Matrix	Collection Rationale	Analytes	Constituents Potentially Above Hazardous Waste Thresholds[1]
Interior	Dust on floors, light fixtures, sills[2]	Potential release(s) of beryllium, lead, and mercury and dispersion in dust	Beryllium, mercury, lead	None
Sink trap in room 101	Wastewater	Contaminant settling points	Mercury	None
B44 sewer cleanout	Wipe sewer pipe inner surface	Contamination conduit	Mercury	None
Interior	Interior wall paint	PCBs commonly used in paint, pre-1979	PCBs	None
Interior	Window sill caulking	PCBs commonly used in caulking, pre-1979	PCBs	None
Room 101	Concrete floor	Sample storage, electronics storage	Lead, mercury	None

Notes:
Asbestos and lead-based paint are not included in this table. See Appendix C for asbestos and lead-based paint results.
[1] Constituents above thresholds listed in Table 5-3 and described in Section 5.2.1. To determine if a constituent is considered a hazardous waste or is potentially a hazardous waste (based on leachability), consult analytical results tables.
[2] Wipe sample

Abbreviations:
PCBs polychlorinated biphenyl compounds
ft feet

Table 11-5. Analytical Results for Metals – Building 44

Sample Type	Sample Description	Sample Name	Units	Be	Pb	Hg
Concrete	Concrete core, room 101 northwest	B44SC01	mg/kg	---	4.2	0.021 J, T
Wastewater	Sink trap water, room 101 northwest	B44WW01	mg/L	---	---	0.000075 J, T
Wipe	Floor wipe, room 101 southeast	B44SW01	µg/100 cm²	0.032 J, T	173 J, 6L	0.015 J, T
Wipe	Light fixture top wipe, room 101 center	B44SW02	µg/100 cm²	<0.1	6.4 J, 6L	0.015 J, T
Wipe	Sewer cleanout wipe, outside along west wall of B44	B44SW03	µg/100 cm²	---	---	0.050
Wipe	Window sill wipe, room 101A northwest	B44SW04	µg/100 cm²	0.015 J, T	44.9 J, 6L	0.14

Abbreviations:

mg/L = milligrams per liter
µg/100 cm² = micrograms per 100 square centimeters
mg/kg = milligrams per kilogram
Be = Beryllium, Pb = lead, Hg = mercury
STLC = Soluble Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24
TCLP = Toxicity Characteristic Leaching Procedure, Title 22 California Code of Regulations, Section 66261.24
TTLC = Total Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24

Notes:

<n = analyte not detected above reporting limit of 'n'
J = estimated result
T = trace level compound, poor quantitation
6L = laboratory control sample recovery below normal limits
--- = not analyzed
Italics = no published bulk sample concentration (TTLC, STLC, TCLP) at which the constituent is deemed a hazardous waste
red = detected above: 1) the TTLC for solid samples; 2) or the STLC or TCLP for aqueous samples; 3) or the wipe concentration limit
yellow = detected above 10 x STLC or 20 x TCLP concentrations, for solid matrices (does not apply to wipe samples)

Analysis for Metals by USEPA Methods 6020 and 7471A. All samples analyzed by Test America St. Louis, Earth City, Missouri.

The comparison threshold for beryllium of 0.2 µg/100 cm2 (collected on wipes) applies to removable contamination on equipment or surfaces. Equipment or surfaces with beryllium concentrations below this threshold may be released to the general public or to a DOE facility for use in a manner not requiring controls for beryllium exposure per the Chronic Beryllium Disease Prevention Program (10 CFR 850).

Table 11-6. Analytical Results for PCBs – Building 44

Sample Type	Sample Description	Sample Name	Units	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260
Caulk	Window sill caulking, room 101A northwest	B44CK01	mg/kg	0.46	<0.033	<0.033	<0.033	<0.033	1.3	<0.033
Paint	Wall paint sample, room 101 southeast	B44PC01	mg/kg	1.4	<0.078	<0.078	<0.078	<0.078	1.9	<0.078
Paint	Wall paint sample, room 101 southeast	B44PC02 DUP	mg/kg	1.7	<0.057	<0.057	<0.057	<0.057	2.8	<0.057

Abbreviations:

DUP = field duplicate
mg/kg = milligrams per kilogram
PCBs = polychlorinated biphenyls
STLC = Soluble Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24
TCLP = Toxicity Characteristic Leaching Procedure, Title 22 California Code of Regulations, Section 66261.24
TTLC = Total Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24

Notes:

<n = analyte not detected above reporting limit of 'n'
--- = not analyzed
Italics = no published bulk sample concentration (TTLC, STLC, TCLP) at which the constituent is deemed a hazardous waste
red = detected above: 1) the TTLC for solid samples; 2) or the STLC or TCLP for aqueous samples; 3) or the wipe concentration limit
yellow = detected above 10 x STLC or 20 x TCLP concentrations, for solid matrices (does not apply to wipe samples)

Analysis for PCBs by USEPA Method 8082. All samples analyzed by Test America St. Louis, Earth City, Missouri.

The comparison threshold for PCBs of 10 µg/100 cm2 (collected on wipes) applies to non-porous surfaces contaminated with PCBs. Surfaces containing PCB concentrations above this limit are considered to be contaminated (40 CFR 761).

The value used as the threshold for determining if PCBs exceed hazardous waste limits is applicable to the sum of the Aroclor mixtures reported.

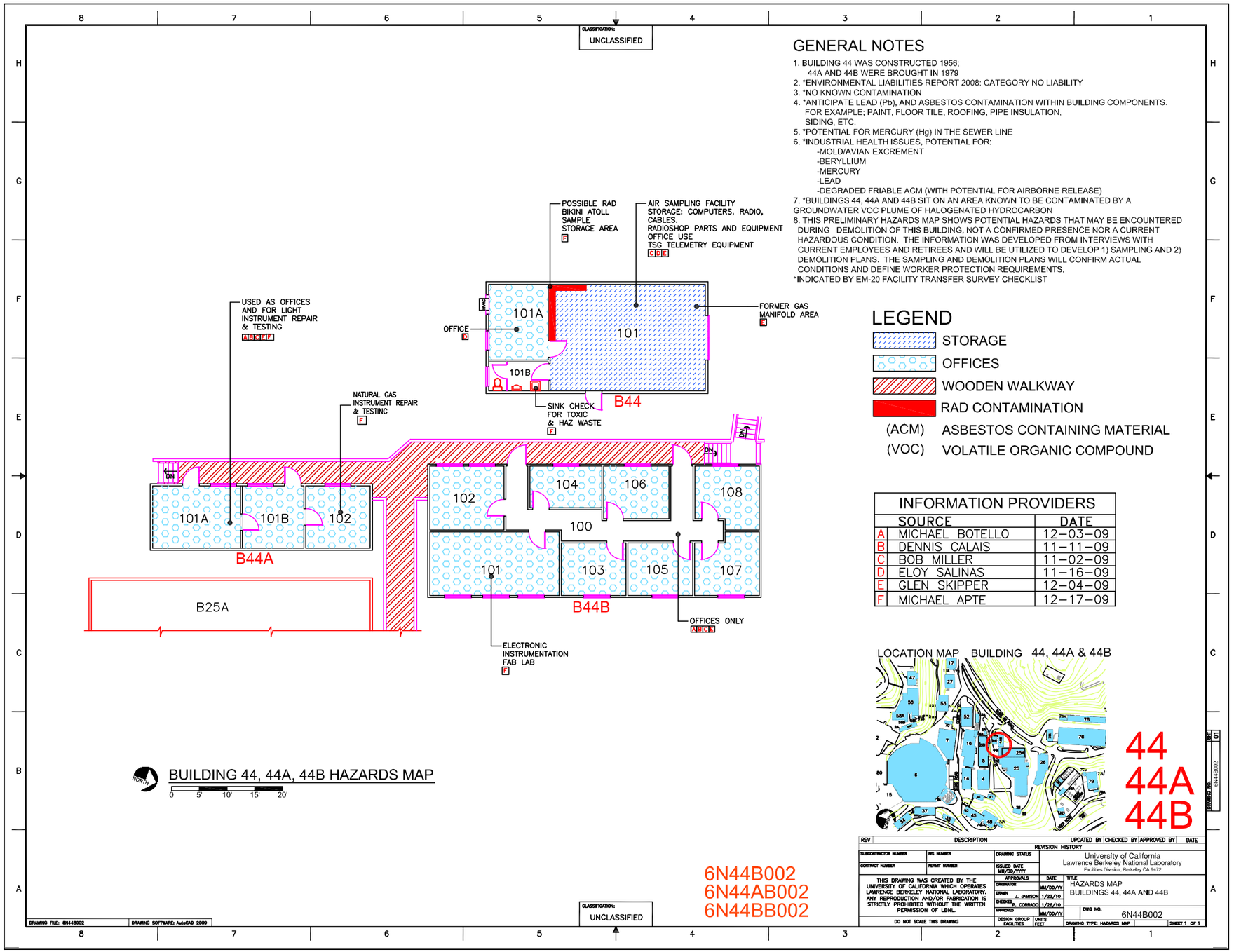
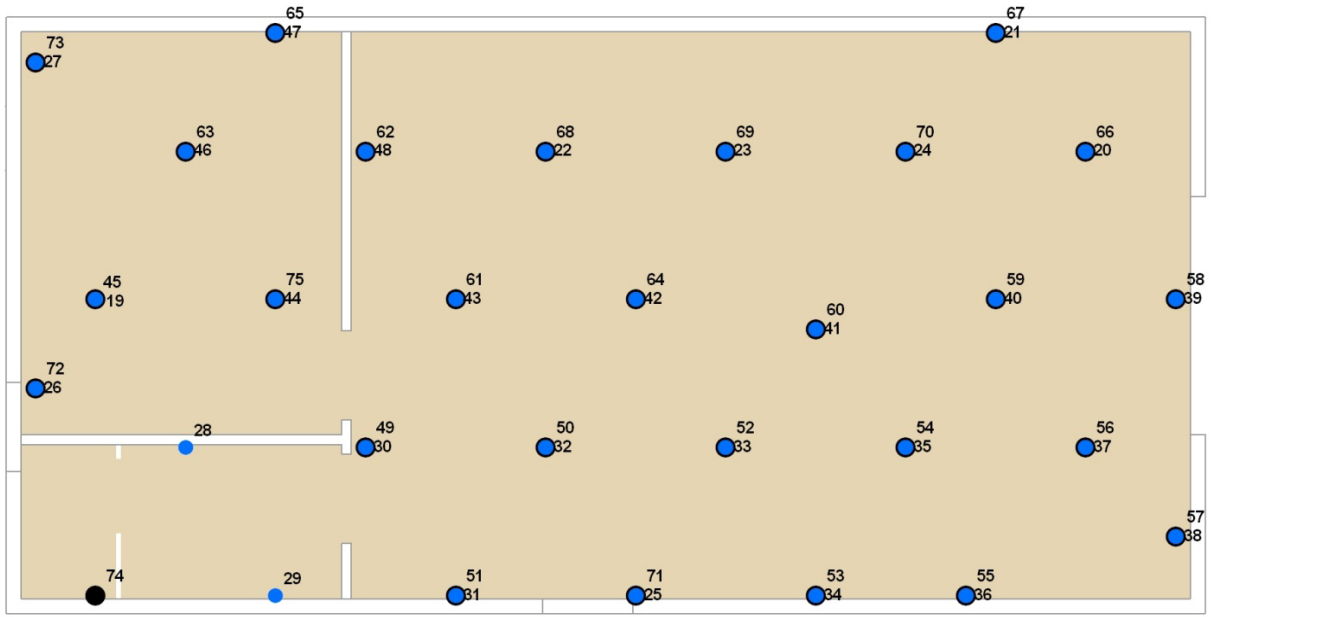


Figure 11-1. Hazard Map – Building 44 (includes Buildings 44A and 44B)

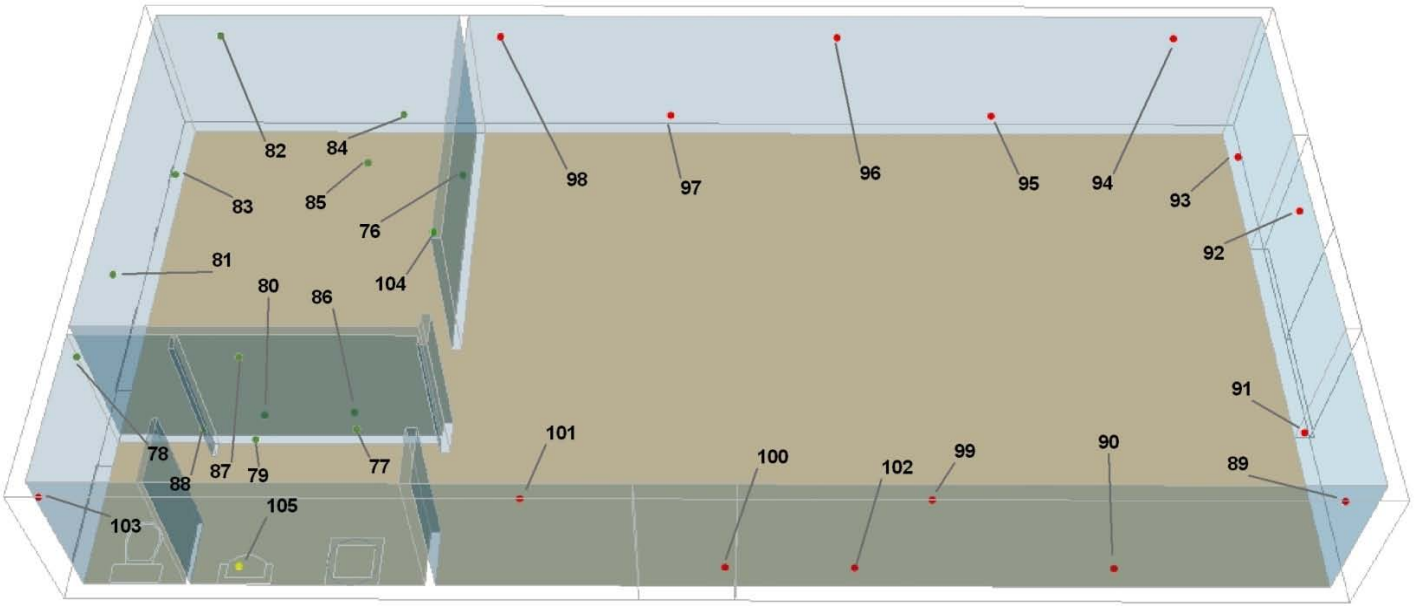


Map ID	Sample ID
19	B44-1F-03-11-B2-01
20	B44-1F-36-16-B2-01
21	B44-1F-33-20-B2-01
22	B44-1F-18-16-B2-01
23	B44-1F-24-16-B2-01
24	B44-1F-30-16-B2-01
25	B44-1F-21-01-B2-01
26	B44-1F-01-08-B2-01
27	B44-1F-01-19-B2-01
28	B44-1F-06-06-B2-01
29	B44-1F-09-01-B2-01
30	B44-1F-12-06-B2-01
31	B44-1F-15-01-B2-01
32	B44-1F-18-06-B2-01
33	B44-1F-24-06-B2-01
34	B44-1F-27-01-B2-01
35	B44-1F-30-06-B2-01
36	B44-1F-32-01-B2-01
37	B44-1F-36-06-B2-01
38	B44-1F-39-03-B2-01

Map ID	Sample ID
39	B44-1F-39-11-B2-01
40	B44-1F-33-11-B2-01
41	B44-1F-27-10-B2-01
42	B44-1F-21-11-B2-01
43	B44-1F-15-11-B2-01
44	B44-1F-09-11-B2-01
45	B44-1F-03-11-B2-01
46	B44-1F-06-16-B2-01
47	B44-1F-09-20-B2-01
48	B44-1F-12-16-B2-01
49	B44-1F-12-06-B1-01
50	B44-1F-18-06-B1-01
51	B44-1F-15-01-B1-01
52	B44-1F-24-06-B1-01
53	B44-1F-27-01-B1-01
54	B44-1F-30-06-B1-01
55	B44-1F-32-01-B1-01
56	B44-1F-36-06-B1-01
57	B44-1F-39-03-B1-01
58	B44-1F-39-11-B1-01

Map ID	Sample ID
59	B44-1F-33-11-B1-01
60	B44-1F-27-10-B1-01
61	B44-1F-15-11-B1-01
62	B44-1F-12-16-B1-01
63	B44-1F-06-16-B1-01
64	B44-1F-21-11-B1-01
65	B44-1F-09-20-B1-01
66	B44-1F-36-16-B1-01
67	B44-1F-33-20-B1-01
68	B44-1F-18-16-B1-01
69	B44-1F-24-16-B1-01
70	B44-1F-30-16-B1-01
71	B44-1F-21-01-B1-01
72	B44-1F-01-08-B1-01
73	B44-1F-01-19-B1-01
74	B44-1F-03-01-B1-01
75	B44-1F-09-11-B1-01

Figure 11-2. Radiological Sampling Locations – Building 44, Floors



Map ID	Sample ID
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77	B44-W-09-06-01-B4-01
78	B44-W-01-06-05-B4-01
79	B44-W-07-03-05-B4-01
80	B44-W-06-07-01-B4-01
81	B44-W-01-10-04-B4-01
82	B44-W-03-20-05-B4-01
83	B44-W-01-17-01-B4-01
84	B44-W-09-20-01-B4-01
85	B44-W-09-14-05-B4-01
86	B44-W-09-08-01-B4-01
87	B44-W-06-06-05-B4-01
88	B44-W-04-06-01-B4-01
89	B44-W-39-01-05-B5-01
90	B44-W-33-01-01-B5-01

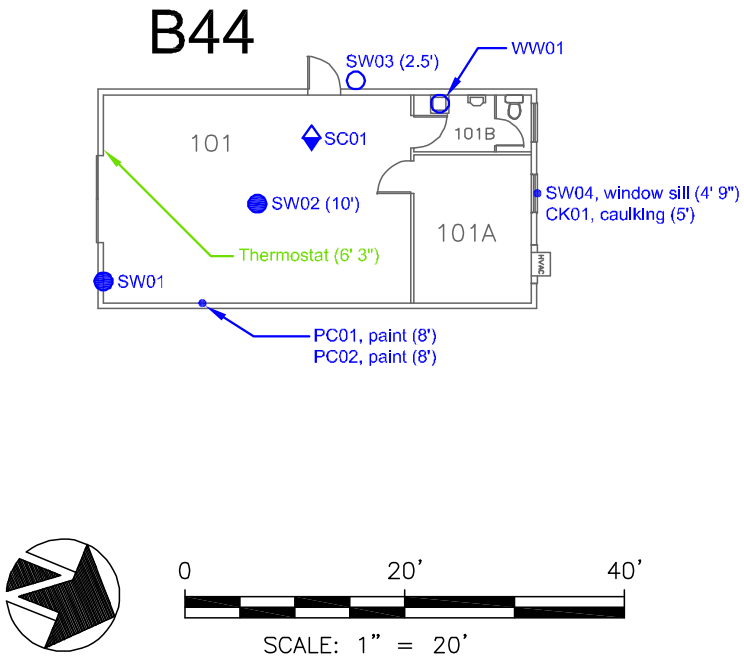
Map ID	Sample ID
91	B44-W-40-06-01-B5-01
92	B44-W-40-12-05-B5-01
93	B44-W-40-18-01-B5-01
94	B44-W-37-20-05-B5-01
95	B44-W-31-20-01-B5-01
96	B44-W-25-20-05-B5-01
97	B44-W-19-20-01-B5-01
98	B44-W-13-20-05-B5-01
99	B44-W-27-01-05-B5-01
100	B44-W-21-01-01-B5-01
101	B44-W-15-01-05-B5-01
102	B44-W-25-01-01-B5-01
103	B44-W-01-01-05-B5-01
104	B44-W-11-11-05-B7-01
105	B44-W-06-01-01-B6-01

Building 44
1st Floor
Surface Type - Walls

Material Type

- Drywall
- Painted Steel
- Plywood/Panel
- Wood

Figure 11-3. Radiological Sampling Locations – Building 44, Walls



EXPLANATION

- Concrete floor sample under carpet
- Wipe sample: Floor - unless otherwise specified (metals)
- Trap/drain/sewer cleanout sample
- Other sample as noted
- (5') Height above floor (where positive) or below floor (where negative)

ABBREVIATIONS

SC	Concrete sample
WW	Wastewater sample
SW	Wipe sample
PC	Paint sample
CK	Caulk sample

NOTE:

Asbestos-containing material and lead-based paint sample locations are not included on this figure.

Figure 11-4 Non-Radiological Sampling Locations – Building 44

12. CHARACTERIZATION OF BUILDINGS 44A AND 44B

Buildings 44A and 44B are trailers situated next to each other, with a common stair and platform for access. Both buildings, placed at their current locations in 1979, have been used for general-purpose offices and laboratories. Building 44A is nearly 500 square feet and is constructed of corrugated metals walls with a flat roof. Building 44B is more than 1,400 square feet and constructed similarly to Building 44A. Building 44A contained a laboratory with a lab bench and sink. This lab was later used for instrument repair and testing. Building 44B housed an electronic instrumentation fabrication laboratory.

Figure 12-1 provides the locations of historical hazards associated with these buildings obtained by LBNL from historical records, interviews, and site inspections.

Buildings 44A and 44B were characterized per the *Final Work Plan for Base Bid Buildings* (Weiss, 2010c).

12.1 Deviations from Work Plan

There were no deviations from the work plan during the radiological sampling at Buildings 44A and 44B:

Non-radiological samples from the air-handling system were collected at the exit of the system as opposed to the intake registers as planned in the work plan. It was determined that the exit points represent the locations in the air-handling system with the greatest potential for contamination from constituents entrained in the building air.

12.2 Radiological Characterization Summary

The information provided on the hazard map developed by LBNL (Figure 12-1) and the historic information obtained by LBNL and summarized in the *Final Workplan for the Reconnaissance-Level Characterization of Buildings 25A, 44, 44A, 44B, 52, and 52A* indicate that no contamination should be present in Building 44A. The floors and walls of both buildings were classified as a Class 3 areas and each building was treated as one survey unit. The focus of the radiological characterization was the floors and lower walls, including a plywood subfloor beneath the carpet flooring in building 44B; around sinks and drains; and storage cabinets. Radiological survey locations were selected using biased and systematic methods. The tile flooring in Building 44A was not removed to provide access to scan the subfloor material.

12.2.1 Radiological Scanning

Radiological scanning was performed to determine if there were any areas of elevated radioactivity that would require biased static radiological measurements. Consistent with the

workplan, the following areas were scanned using a gas-flow proportional floor monitor (Ludlum Model 239-1F) or a hand-held duel phosphor detector (Ludlum Model 43-89):

- ≥ 25 percent alpha/beta scans of Class 3 floor surfaces;
- ≥ 10 percent alpha/beta scans of Class 3 wall surfaces; and
- ≥ 25 percent alpha/beta scans of Class 3 accessible internal HVAC surfaces.

Scanning speeds using the gas proportional floor monitor were approximately 10 cm/s. Scanning speeds for the duel phosphor detectors were approximately 5 cm/s.

No radioactivity above background levels was detected during radiological the scanning of floors, walls, and the interior surfaces of The HVAC system; consequently, no biased radiological measurements were collected from these locations.

12.2.2 Systematic Radiological Measurements

Thirty floor locations were identified in the workplan for systematic direct measurements. The locations were based on a triangular grid system with a random starting point. In Building 44A, direct radiological measurements of the overlying tile were collected at 30 locations. Duplicate measurements were collected at three locations. Tile was not removed to allow radiological measurements of the underlying floor surface. Removable radioactivity measurements were collected using surface smears at each of the systematically-identified sample locations. The floor sample locations for Building 44A are shown in Figure 12-2. Table 12-1 indicates the types of floor material surveyed.

In Building 44B, direct radiological measurements of the overlying carpet were collected at 29 locations and 31 measurements of the underlying plywood were collected. It is not clear why the numbers of measurements differ, and the discrepancy could not be resolved from the field data sheets. Duplicate measurements were collected at three locations. Removable radioactivity measurements were collected using surface smears at each of the systematically-identified sample locations. The floor sample locations for Building 44B are shown in Figure 12-4.

Thirty-one wall locations were identified in the field for systematic direct measurements. The locations were based on equally spaced locations alternating between 1 and 5 feet high along the wall when not obstructed by building equipment or features. In cases where the sampling location was obstructed, the location was offset to allow access to the surface. In Building 44A, direct radiological measurements of various wall surface materials were collected at 31 locations. Duplicate measurements were taken at three locations. Removable radioactivity measurements were collected using surface smears at each of the systematically-identified sample locations. Wall sampling locations are shown in Figure 12-3.

In Building 44B, direct radiological measurements of various wall surface materials were collected at 29 locations. Duplicate measurements were taken at four locations. Removable radioactivity measurements were collected using surface smears at each of the systematically-identified sample locations. Wall sample locations are shown on Figure 12-5.

All direct radiological measurements were collected for a period of 1 minute using a hand-held gas proportional detector (Ludlum Model 43-68). Removable radioactivity measurements also were collected for 1 minute, using a duel channel alpha/beta sample counter (Ludlum Model 3030).

The results of the systematic direct and removable radiological measurement are presented in Table 12-1 for Building 44A, and Table 12-2 for Building 44B. The results are summarized in Table 12-3 for Building 44A and in Table 12-4 for 44B. For Building 44A, the highest total alpha measurement was 21 dpm/100 cm^2, while the highest total beta measurement was 333 dpm/100 cm^2. For Building 44B, the highest total alpha measurement was 21 dpm/100 cm^2 while the highest total beta measurement was 241 dpm/100 cm^2. The DCGLs for total alpha and total beta surface radioactivity are 100 and 5,000 dpm/100 cm^2, respectively. The highest removable alpha measurement in Building 44A was 3 dpm/100 cm^2, while the highest removable beta measurement was 65 dpm/100 cm^2. The highest removable alpha measurement in Building 44B was 6 dpm/100 cm^2 while the highest removable beta measurement was 58 dpm/100 cm^2. The DCGLs for removable alpha and total beta surface radioactivity are 20 and 1,000 dpm/100 cm^2 respectively.

12.2.3 Tritium Sampling

In Building 44A, 39 samples of systematic and biased locations were collected on the floor and wall surfaces using methods described in the workplan. Two duplicate samples were also collected. Eleven biased samples were also collected on the floors and lower walls. Eight samples of the HVAC system were also collected throughout the building.

In Building 44B, 41 samples of systematic and biased locations were collected on the floor and lower wall surfaces using methods described in the workplan. Three duplicate samples were collected. Ten biased samples were also collected from the HVAC system.

All tritium samples were counted for 2 minutes using an automated liquid scintillation counter (Beckman Model TR2550).

The results of tritium sampling are presented in Table 12-1 and Table 12-2, and summarized in Table 12-5 and Table 12-6, for Buildings 44A and 44B, respectively. The highest tritium surface activity in Building 44A was 134.5 dpm/100 cm^2. The highest tritium surface activity in Building 44B was 155.7 dpm/100 cm^2. The DCGL for tritium is 10,000 dpm/100 cm^2.

12.2.4 Volumetric Sampling

No volumetric samples were collected in Building 44A or 44B.

12.3 Non-radiological Characterization Summary

12.3.1 Chemical Constituents

As shown in Table 12-7, samples were collected at Buildings 44A and 44B to characterize wood flooring, a sewer pipe, residual dust on windowsills and in HVAC ducting, and exterior wall

paint. The locations of these samples are shown on Figure 12-6. Analytical data are summarized in Table 12-8 (metals) and Table 12-9 (PCBs).

Samples were analyzed for metals by EPA Methods 6020A and 7471A and for PCBs by EPA Method 8082. The complete analytical results are provided on a CD-ROM included in Appendix E.

Four samples from each of the two buildings were analyzed for metals and one sample from each building was analyzed for PCBs. Neither metals nor PCBs were present at concentrations above comparison thresholds in any of the samples collected from either building.

Equipment potentially containing mercury (thermostats) was observed in both Buildings 44A and 44B.

12.3.2 Lead-based Paint

Three paint samples were collected in Building 44A and submitted for metals analysis to Macs Lab, Inc. using EPA Method 6010B/3050, as follows:

- Paint on wooden walkway outside building;
- Paint on lower wood panels from south side of building; and
- Paint off metal from eastern exterior wall.

Two of the three samples – other than the sample collected from the wood panels on the south side of the building – contained lead at concentrations exceeding 5,000 ppm.

Six paint samples were collected in Building 44B, as follows:

- Green paint on wood (exterior east side of building);
- Green paint on metal (exterior east side of building);
- Maroon/brown paint on wood (collected from broken wood, walkway northwest side of building);
- Maroon paint on metal I-beam under structure (northwest corner);
- Red paint on wood (wooden walkway east entrance); and
- Grey paint on metal roof.

All samples except the sample collected from wood on the eastern exterior side of the building contained lead at concentrations greater than 5,000 ppm.

Lab results reporting the detectable presence of lead in these sampled paints and/or surface coatings should be assumed to be representative of all similar paints and/or surface coatings encountered in the building. The results are presented in Appendix C.

12.3.3 Asbestos-containing Materials

Asbestos was found in the following materials at these approximate quantities in Building 44A:

- Exterior walls weather strip caulking (40 square feet);
- Black exterior wall patch (35 square feet);
- Roofing patch (30 square feet); and
- 12-foot-by 12-foot floor tile and mastic (500 square feet).

Asbestos was found in the following materials at these approximate quantities in Building 44B:

- Exterior walls and window weather strip caulking (40 square feet);
- Black exterior wall patch (70 square feet); and
- Roof patching (50 square feet).

A pre-demolition survey report assessing asbestos-containing materials in Buildings 44A and 44B is provided in Appendix C. That report is intended for submittal in its entirety to the BAAQMD to support demolition notification documentation.

12.4 Conclusions and Recommendations

12.4.1 Radiological Constituents

The radiological scanning of floors, walls, and the interior surfaces of the HVAC system showed no detectable radioactivity above background levels; consequently, no biased locations for direct radiation measurements were identified.

No systematic direct and removable radiological measurements in Buildings 44A and 44B were above the DCGLs in Table 5-1.

No tritium measurements were above the DCGL in Table 5-1.

12.4.1.1 Final Status Survey Evaluation

Data suggest that the surfaces in Buildings 44A and 44B evaluated in this investigation meet the release criteria in Table 5-1 and can be considered for unconditional release.

12.4.2 Chemical Constituents

Table 12-7 provides a summary of samples collected. It shows that no samples in Buildings 44A and 44B contained constituents at concentrations exceeding hazardous waste thresholds. No additional chemical sampling is recommended.

No sewer system exists in either Building 44A or 44B. One wipe sample was collected from a former sink drain and analyzed for mercury. Mercury was not detected in this sample.

Wipe samples collected from surfaces and the air-handling system confirm the presence of low concentrations of lead on building surfaces and in the air-handling system. The lead contamination appears to be superficial, as no elevated lead concentrations were reported in the wipe sample of wood floor collected. Worker protection should be addressed to ensure that lead exposure does not exceed regulatory exposure levels.

as no elevated lead concentrations were reported in the sample of concrete collected. Decontamination of building surfaces to remove dispersed lead may be warranted prior to demolition. Worker protection should be addressed to ensure that lead exposure does not exceed regulatory exposure levels.

Thermostats that potentially contain mercury switches or other mercury-containing equipment were identified in Buildings 44A and 44B (Figure 12-6). Care should be taken when removing equipment that may contain mercury switches to prevent breakage and release of liquid mercury. Additional thermostats or other mercury-containing equipment may be present.

If staining or other evidence of contamination is observed upon removal of these fixtures and of the carpet in Building 44B, additional samples should be collected.

12.4.3 Lead-based Paint

Two of the three samples collected from wood paint and metal paint in Building 44A contain concentrations of lead at which the paint is considered lead-based. All samples of paint collected from walls, I-beam, the metal roof, and wood, except one sample of green paint on wood at the east side of the building, in Building 44B contain concentrations of lead at which the paint is considered lead-based. The presence of lead and/or lead-containing paint requires that specialized work practices be used during demolition work to ensure that individuals involved in the work are adequately protected against elevated exposure to lead. Contractors or employees involved in lead-related demolition activities must comply with the Construction Safety Orders for Lead (8 CCR §1532.1 et. seq.) and training requirements for those involved in lead-related demolition activities. The Construction Safety Orders for Lead [8 CCR 1532.1 (p)] also require that a “Lead-Work Pre-Job Notification” be filed with CalOSHA whenever a construction project involves work that includes “trigger tasks,” as defined by the standard, which will involve greater than 100 square feet of “lead-based paint.” It should be determined if more than 100 square feet of lead-based paint will be demolished; if so, notification must be made 24 hours prior to the commencement of work.

Loose paint chips or other debris containing 0.5% lead by weight are likely to be characterized as hazardous waste; therefore, damaged paint containing lead at 0.5% or greater should be stabilized or removed prior to demolition. Disturbance of lead-containing paints and/or surface coatings should be conducted by a licensed contractor utilizing workers with CDPH training in lead-related construction. Lead-related construction waste should be segregated into discrete waste streams and characterized for proper disposal.

12.4.4 Asbestos-containing Material

The tile floor in Building 44A is asbestos-containing material. Wall and roof patch materials and weather strip caulking in Building 44A are also asbestos-containing material. The weather caulking and patching materials (wall and roof) are asbestos-containing material. Designation of a material as asbestos-containing should be applied to all homogenous material of the type reported to contain asbestos.

Since more than 100 linear or 100 square feet of regulated asbestos-containing material will be disturbed in demolition of each of the Buildings 44A and 44B, the BAAQMD must be notified 10 days prior to demolition activities.

Table 12-1. Systematic Radiological Measurement Results – Building 44A

Sample ID	Location X	Location Y	Location Z	Surface Type	Material Type	Total Alpha dpm/100cm^2	Beta Total dpm/100cm^2	Removable Alpha dpm/100cm^2	Removable Beta dpm/100cm^2	Tritium dpm/100cm^2	Comments
B44A-1F-01-01-00-B3-01	1	1	0	Floor	Tile	0	56.4	0	8	7.13	
B44A-1F-01-09-00-B3-01	1	9	0	Floor	Tile	0	0	0	0	0	
B44A-1F-03-05-00-B3-01	3	5	0	Floor	Tile	0	0	0	4		
B44A-1F-05-01-00-B3-01	5	1	0	Floor	Tile	0	77.6	0	0		
B44A-1F-05-09-00-B3-01	5	9	0	Floor	Tile	0	0	0	4		
B44A-1F-07-05-00-B3-01	7	5	0	Floor	Tile	0	0	0	11	0	
B44A-1F-08-06-00-B3-01	8	6	0	Floor	Tile					5.77	
B44A-1F-09-01-00-B3-01	9	1	0	Floor	Tile	0	112.3	0	4	0	
B44A-1F-09-09-00-B3-01	9	9	0	Floor	Tile	0	0	0	4	0	
B44A-1F-13-01-00-B3-01	13	1	0	Floor	Tile	0	21.2	0	0		
B44A-1F-13-05-00-B3-01	13	5	0	Floor	Tile	0	17.6	0	0		
B44A-1F-13-09-00-B3-01	13	9	0	Floor	Tile	0	0	0	15		
B44A-1F-15-05-00-B3-01	15	5	0	Floor	Tile	0	0	0	0	0	
B44A-1F-17-01-00-B3-01	17	1	0	Floor	Tile	0	0	0	27	0.68	
B44A-1F-17-09-00-B3-01	17	9	0	Floor	Tile	0	0	0	0	0	
B44A-1F-19-04-00-B3-01	19	4	0	Floor	Tile					29.6	
B44A-1F-19-05-00-B3-01	19	5	0	Floor	Tile	0	0	0	15		
B44A-1F-21-01-00-B3-01	21	1	0	Floor	Tile	5	58	0	18		
B44A-1F-21-09-00-B3-01	21	9	0	Floor	Tile	0	0	0	11		
B44A-1F-23-01-00-B3-01	23	1	0	Floor	Tile					0	
B44A-1F-23-08-00-B3-01	23	8	0	Floor	Tile	5.4	224	0	0		
B44A-1F-25-01-00-B3-01	25	1	0	Floor	Tile	0	228	0	0	17.31	
B44A-1F-25-09-00-B3-01	25	9	0	Floor	Tile	0	154	0	8	0	
B44A-1F-27-05-00-B3-01	27	5	0	Floor	Tile	0	333	0	38		
B44A-1F-27-06-00-B3-01	27	6	0	Floor	Tile					17.5	
B44A-1F-29-01-00-B3-01	29	1	0	Floor	Tile	0	39	0	0		
B44A-1F-29-09-00-B3-01	29	9	0	Floor	Tile	0	197	0	8		
B44A-1F-31-05-00-B3-01	31	5	0	Floor	Tile	0	237	0	4	2.03	
B44A-1F-31-05-00-B3-01	31	5	0	Floor	Tile					3.62	
B44A-1F-31-05-00-B3-02	31	5	0	Floor	Tile					10.16	BIASED FLOOR AND WALL SAMPLE. DUPLICATE SAMPLE ID CHANGED TO -02
B44A-1F-32-01-00-B3-01	32	1	0	Floor	Tile					19.34	
B44A-1F-33-01-00-B3-01	33	1	0	Floor	Tile	5.4	257	0	0	4.36	
B44A-1F-33-09-00-B3-01	33	9	0	Floor	Tile	0	114	0	11	0	
B44A-1F-34-04-00-B3-01	34	4	0	Floor	Tile					23.69	
B44A-1F-35-05-00-B3-01	35	5	0	Floor	Tile	0	285	0	11		
B44A-1F-37-01-00-B3-01	37	1	0	Floor	Tile	0	158	0	0		
B44A-1F-37-09-00-B3-01	37	9	0	Floor	Tile	0	189	0	0		
B44A-1F-39-05-00-B3-01	39	5	0	Floor	Tile	0	162	0	0	9.59	
B44A-W-01-01-05-B6-01	1	1	5	Wall	Wood Panel	0	0	0	0	0	
B44A-W-01-05-05-B6-01	1	5	5	Wall	Wood Pane	0	102	0	0		
B44A-W-01-11-01-B6-01	1	11	1	Wall	Wood Pane	0	64	0	39		
B44A-W-01-12-05-B6-01	1	12	5	Wall	Wood Pane	0	64	0	0		
B44A-W-04-12-05-B6-01	4	12	5	Wall	Wood Pane	5	7	0	0		
B44A-W-06-01-01-B6-01	6	1	1	Wall	Wood Pane	0	0	0	0		
B44A-W-08-12-01-B6-01	8	12	1	Wall	Wood Pane	10	0	0	26		

Table 12-1. Systematic Radiological Measurement Results – Building 44A

Sample ID	Location X	Location Y	Location Z	Surface Type	Material Type	Total Alpha dpm/100cm^2	Beta Total dpm/100cm^2	Removable Alpha dpm/100cm^2	Removable Beta dpm/100cm^2	Tritium dpm/100cm^2	Comments
B44A-W-11-01-05-B6-01	11	1	5	Wall	Wood Pane	5	68	0	0	0	
B44A-W-11-04-01-B6-01	11	4	1	Wall	Wood Pane	0	0	0	0	0	
B44A-W-11-10-05-B6-01	11	10	5	Wall	Wood Pane	10	14	0	0	0	
B44A-W-12-01-01-B6-01	12	1	1	Wall	Wood Pane	0	0	0	0	0	
B44A-W-12-02-02-B6-01	12	2	2	Wall	Wood Pane	21	0	0	0		
B44A-W-12-02-02-B6-02	12	2	2	Wall	Wood Pane	0	0	0	28		
B44A-W-12-08-05-B6-01	12	8	5	Wall	Wood Pane					4.82	
B44A-W-12-09-05-B6-01	12	9	5	Wall	Wood Pane	5	0	0	26	0	
B44A-W-17-01-05-B6-01	17	1	5	Wall	Wood Pane	10	0	0	17		
B44A-W-18-01-02-B6-01	18	1	2	Wall	Wood Pane	0	0	0	28		
B44A-W-19-12-05-B6-01	19	12	5	Wall	Wood Pane	5	64	0	0		
B44A-W-23-01-05-B6-01	23	1	5	Wall	Wood Pane	5	0	0	65	5.95	
B44A-W-23-05-05-B6-01	23	5	5	Wall	Wood Pane	16	0	0	13		
B44A-W-23-05-06-B6-01	23	5	6	Wall	Wood Pane					11.83	
B44A-W-23-10-01-B6-01	23	10	1	Wall	Wood Pane	5	41	0	0	0	
B44A-W-24-03-05-B6-01	24	3	5	Wall	Wood Pane	5	0	0	0		
B44A-W-24-08-01-B6-01	24	8	1	Wall	Wood Pane	0	0	0	28		
B44A-W-24-10-05-B6-01	24	10	5	Wall	Wood Pane	0	10	0	0		
B44A-W-24-12-01-B6-01	24	12	1	Wall	Wood Pane	10	27	0	57		
B44A-W-29-01-05-B6-01	29	1	5	Wall	Wood Pane	5	0	0	0	134.52	
B44A-W-30-12-05-B6-01	30	12	5	Wall	Wood Pane	5	81	0	0		
B44A-W-35-01-01-B6-01	35	1	1	Wall	Wood Pane	10	27	0	0	51.22	
B44A-W-36-12-01-B6-01	36	12	1	Wall	Wood Pane	5	0	0	0	0	
B44A-W-36-12-04-B6-01	36	12	4	Wall	Wood Pane					10.14	
B44A-W-39-01-05-B6-01	39	1	5	Wall	Wood Pane	0	20	0	0	0.67	
B44A-W-40-05-01-B6-01	40	5	1	Wall	Wood Pane	16	10	0	0		
B44A-W-40-06-03-B6-01	40	6	3	Wall	Wood Pane					0	
B44A-W-40-10-05-B6-01	40	10	5	Wall	Wood Pane	5	0	0	0	0	
RM101 RETURN										20.41	
RM101 RETURN										29.49	
RM101 RETURN										41.83	
RM101 RETURN										16.15	
RM101 RETURN										19.53	
RM101B SUPPLY										2.86	
RM101B SUPPLY										8.61	
RM101B SUPPLY										8.19	
RM101B SUPPLY VENT										2.7	
RM101B SUPPLY VENT										91.91	
RM101B SUPPLY VENT										34.23	
B44A-1F-25-01-00-B3-02	25	1	0	Floor	Tile					11.8	
B44A-1F-17-01-00-B3-02	17	1	0	Floor	Tile	0	0	0	0		
B44A-1F-19-05-00-B3-02	19	5	0	Floor	Tile	0	0	0	0		
B44A-1F-21-09-00-B3-02	21	9	0	Floor	Tile	0	0	0	0		
B44A-W-40-10-05-B6-02	40	10	5	Wall	Wood Panel					0	
B44A-W-11-01-05-B6-02	11	1	5	Wall	Wood Panel	5	10	3	0		

Table 12-1. Systematic Radiological Measurement Results – Building 44A

Sample ID	Location X	Location Y	Location Z	Surface Type	Material Type	Total Alpha dpm/100cm^2	Beta Total dpm/100cm^2	Removable Alpha dpm/100cm^2	Removable Beta dpm/100cm^2	Tritium dpm/100cm^2	Comments
B44A-W-12-02-02-B6-02	12	2	2	Wall	Wood Panel	16	10	0	0		
B44A-W-19-12-05-B6-02	19	12	5	Wall	Wood Panel	5	31	0	26		

Table 12-2. Systematic Radiological Measurement Results – Building 44B

Sample ID	Location X	Location Y	Location Z	Surface Type	Material Type	Total Alpha dpm/100cm^2	Beta Total dpm/100cm^2	Removable Alpha dpm/100cm^2	Removable Beta dpm/100cm^2	Tritium dpm/100cm^2	Comments
B44B-1F-04-11-00-B2-01	4	11	0	Floor	Carpet	0	61	0	0	6.53	
B44B-1F-04-23-00-B2-01	4	23	0	Floor	Carpet	0	22	0	0		
B44B-1F-06-20-00-B2-01	6	20	0	Floor	Carpet					19.01	
B44B-1F-07-05-00-B2-01	7	5	0	Floor	Carpet	0	110	0	0	0.51	
B44B-1F-07-17-00-B2-01	7	17	0	Floor	Carpet	6	31	0	0		
B44B-1F-11-11-00-B2-01	11	11	0	Floor	Carpet	0	136	0	0		
B44B-1F-12-03-00-B2-01	12	3	0	Floor	Carpet					4.27	
B44B-1F-14-05-00-B2-01	14	5	0	Floor	Carpet	0	0	0	14		
B44B-1F-14-17-00-B2-01	14	17	0	Floor	Carpet	0	79	0	11	7.91	
B44B-1F-18-11-00-B2-01	18	11	0	Floor	Carpet	12	88	0	0	10.88	
B44B-1F-18-23-00-B2-01	18	23	0	Floor	Carpet	18	53	0	0		
B44B-1F-19-23-00-B2-01	19	23	0	Floor	Carpet					7.34	
B44B-1F-21-05-00-B2-01	21	5	0	Floor	Carpet	0	96	0	0	22.3	
B44B-1F-21-17-00-B2-01	21	17	0	Floor	Carpet	0	118	0	0		
B44B-1F-25-11-00-B2-01	25	11	0	Floor	Carpet	0	35	0	11		
B44B-1F-25-23-00-B2-01	25	23	0	Floor	Carpet	0	0	3	50		
B44B-1F-26-23-00-B2-01	26	23	0	Floor	Carpet					0	
B44B-1F-28-16-00-B2-01	28	16	0	Floor	Carpet	0	57	0	4	0.1	
B44B-1F-32-11-00-B2-01	32	11	0	Floor	Carpet	0	79	0	39	14.29	
B44B-1F-32-11-00-B2-02	32	11	0	Floor	Carpet					3.03	
B44B-1F-32-23-00-B2-01	32	23	0	Floor	Carpet	6	22	0	7	118.72	
B44B-1F-35-05-00-B2-01	35	5	0	Floor	Carpet	0	18	0	4	14.11	
B44B-1F-35-16-00-B2-01	35	16	0	Floor	Carpet	0	123	0	0		
B44B-1F-39-11-00-B2-01	39	11	0	Floor	Carpet	6	206	0	0		
B44B-1F-39-23-00-B2-01	39	23	0	Floor	Carpet	12	79	0	0		
B44B-1F-40-11-00-B2-01	40	11	0	Floor	Carpet					34.63	
B44B-1F-42-05-00-B2-01	42	5	0	Floor	Carpet	6	92	0	0		
B44B-1F-42-17-00-B2-01	42	17	0	Floor	Carpet	6	123	0	0	55.41	
B44B-1F-46-11-00-B2-01	46	11	0	Floor	Carpet	0	136	0	0	155.66	
B44B-1F-46-23-00-B2-01	46	23	0	Floor	Carpet	0	171	0	0	0	
B44B-1F-50-15-00-B2-01	50	15	0	Floor	Carpet	6	241	0	0		
B44B-1F-53-11-00-B2-01	53	11	0	Floor	Carpet	0	237	3	21		
B44B-1F-56-05-00-B2-01	56	5	0	Floor	Carpet	0	211	0	0		
B44B-1F-58-20-00-B2-01	58	20	0	Floor	Carpet	6	123	0	4	8.28	
B44B-1F-60-11-00-B2-01	60	11	0	Floor	Carpet	0	88	0	0	24.34	
B44B-1F-04-11-00-B6-01	4	11	0	Floor	Plywood	0	0	0	0		
B44B-1F-04-23-00-B6-01	4	23	0	Floor	Plywood	0	0	0	0		
B44B-1F-07-05-00-B6-01	7	5	0	Floor	Plywood	0	0	0	0		
B44B-1F-07-17-00-B6-01	7	17	0	Floor	Plywood	0	0	0	0		
B44B-1F-11-11-00-B6-01	11	11	0	Floor	Plywood	0	0	0	0		
B44B-1F-11-23-00-B6-01	11	23	0	Floor	Plywood	6	215	0	58		

Table 12-2. Systematic Radiological Measurement Results – Building 44B

Sample ID	Location X	Location Y	Location Z	Surface Type	Material Type	Total Alpha dpm/100cm^2	Beta Total dpm/100cm^2	Removable Alpha dpm/100cm^2	Removable Beta dpm/100cm^2	Tritium dpm/100cm^2	Comments
B44B-1F-14-05-00-B6-01	14	5	0	Floor	Plywood	0	0	0	0		
B44B-1F-14-17-00-B6-01	14	17	0	Floor	Plywood	0	0	0	0		
B44B-1F-18-11-00-B6-01	18	11	0	Floor	Plywood	17	0	0	0		
B44B-1F-18-23-00-B6-01	18	23	0	Floor	Plywood	0	26	0	0		
B44B-1F-21-05-00-B6-01	21	5	0	Floor	Plywood	0	0	0	0		
B44B-1F-21-17-00-B6-01	21	17	0	Floor	Plywood	0	18	0	0		
B44B-1F-25-11-00-B6-01	25	11	0	Floor	Plywood	17	0	0	0		
B44B-1F-25-23-00-B6-01	25	23	0	Floor	Plywood	11	0	0	0		
B44B-1F-28-05-00-B6-01	28	5	0	Floor	Plywood	0	194	0	50		
B44B-1F-28-16-00-B6-01	28	16	0	Floor	Plywood	0	0	0	8		
B44B-1F-31-11-00-B6-01	31	11	0	Floor	Plywood	0	122	0	0		
B44B-1F-32-11-00-B6-01	32	11	0	Floor	Plywood	0	0	0	0	0.5	
B44B-1F-32-23-00-B6-01	32	23	0	Floor	Plywood	11	211	3	17		
B44B-1F-33-05-00-B6-01	33	5	0	Floor	Plywood	0	59	3	21		
B44B-1F-35-17-00-B6-01	35	17	0	Floor	Plywood	6	0	0	0		
B44B-1F-39-23-00-B6-01	39	23	0	Floor	Plywood	0	4	0	58		
B44B-1F-42-05-00-B6-01	42	5	0	Floor	Plywood	0	198	0	17		
B44B-1F-42-17-00-B6-01	42	17	0	Floor	Plywood	0	34	0	67		
B44B-1F-46-11-00-B6-01	46	11	0	Floor	Plywood	0	127	0	8		
B44B-1F-46-23-00-B6-01	46	23	0	Floor	Plywood	11	97	3	17		
B44B-1F-49-11-00-B6-01	49	11	0	Floor	Plywood					35.59	
B44B-1F-50-15-00-B6-01	50	15	0	Floor	Plywood	0	55	0	4		
B44B-1F-53-11-00-B6-01	53	11	0	Floor	Plywood	6	207	0	8		
B44B-1F-56-05-00-B6-01	56	5	0	Floor	Plywood	0	190	0	13		
B44B-1F-58-20-00-B6-01	58	20	0	Floor	Plywood	6	0	0	13		
B44B-1F-60-11-00-B6-01	60	11	0	Floor	Plywood	0	165	0	17		
B44B-W-01-01-01-B6-01	1	1	1	Wall	Plywood	0	17	0	0	2	
B44B-W-01-10-05-B6-01	1	10	5	Wall	Plywood	5	0	0	0		
B44B-W-01-21-05-B6-01	1	21	5	Wall	Plywood	0	0	0	0	2	
B44B-W-06-24-02-B6-01	6	24	2	Wall	Plywood	21	0	0	0		
B44B-W-07-10-05-B6-01	7	10	5	Wall	Plywood					2.6	
B44B-W-07-14-01-B6-01	7	14	1	Wall	Plywood	5	0	0	0	2.5	
B44B-W-11-05-05-B6-01	11	5	5	Wall	Plywood	0	0	0	0	0	
B44B-W-11-09-01-B6-01	11	9	1	Wall	Plywood	21	0	0	0		
B44B-W-11-18-01-B6-01	11	18	1	Wall	Plywood	5	0	0	0	0	
B44B-W-12-15-05-B6-01	12	15	5	Wall	Plywood	16	0	0	0		
B44B-W-12-16-05-B6-01	12	16	5	Wall	Plywood	11	0	0	0		
B44B-W-15-07-01-B6-01	15	7	1	Wall	Plywood	11	0	0	13		
B44B-W-15-24-03-B6-01	15	24	3	Wall	Plywood	5	0	0	4	3.3	
B44B-W-18-07-01-B6-01	18	7	1	Wall	Plywood	11	0	0	17		
B44B-W-19-01-05-B6-01	19	1	5	Wall	Plywood	5	0	0	25	0	
B44B-W-20-10-01-B6-01	20	10	1	Wall	Plywood	11	0	0	0	0	
B44B-W-22-20-05-B6-01	22	20	5	Wall	Plywood	0	0	0	0		

Table 12-2. Systematic Radiological Measurement Results – Building 44B

Sample ID	Location X	Location Y	Location Z	Surface Type	Material Type	Total Alpha dpm/100cm^2	Beta Total dpm/100cm^2	Removable Alpha dpm/100cm^2	Removable Beta dpm/100cm^2	Tritium dpm/100cm^2	Comments
B44B-W-31-24-01-B6-01	31	24	1	Wall	Plywood	0	0	0	0		
B44B-W-32-01-01-B6-01	32	1	1	Wall	Plywood	0	0	0	0		
B44B-W-32-01-03-B6-01	32	1	3	Wall	Plywood					7.52	
B44B-W-32-15-04-B6-01	32	15	4	Wall	Plywood	0	0	0	0	4.5	
B44B-W-33-08-01-B6-01	33	8	1	Wall	Plywood	0	0	0	0	0.1	
B44B-W-34-18-01-B6-01	34	18	1	Wall	Plywood	0	0	0	0		
B44B-W-35-08-05-B6-01	35	8	5	Wall	Plywood	0	0	0	12		
B44B-W-40-01-08-B6-01	40	1	8	Wall	Plywood					2.7	
B44B-W-40-02-05-B6-01	40	2	5	Wall	Plywood	12	0	0	0	0	
B44B-W-40-14-08-B6-01	40	14	8	Wall	Plywood					8.8	
B44B-W-40-15-08-B6-01	40	15	8	Wall	Plywood					7.43	
B44B-W-42-24-05-B6-01	42	24	5	Wall	Plywood	12	0	6	4	2	
B44B-W-44-14-05-B6-01	44	14	5	Wall	Plywood	0	0	0	0		
B44B-W-45-05-01-B6-01	45	5	1	Wall	Plywood	6	0	0	4		
B44B-W-45-13-05-B6-01	45	13	5	Wall	Plywood	12	0	0	8	2	
B44B-W-58-14-01-B6-01	58	14	1	Wall	Plywood	6	0	0	0	0	
B44B-W-60-01-03-B6-01	60	1	3	Wall	Plywood	6	0	0	0		
RM101 VENT. SUPPLY										0	
RM101 VENT. SUPPLY										14	
RM105 VENT. SUPPLY										14.22	
RM105 VENT. SUPPLY										0.1	
RM105 VENT. SUPPLY										0	
RM108 VENT. RETURN										36.72	
RM108 VENT. RETURN										26.59	
RM108 VENT. RETURN										47.11	
RM108 VENT. RETURN										12.26	
RM108 VENTILATION RETURN										17.64	
B44B-1F-32-11-00-B2-02	32	11	0	Floor	B2					3.03	
B44B-1F-32-11-00-B2-03	32	11	0	Floor	Carpet					21.11	
B44B-W-15-24-03-B6-02	15	24	3	Wall	Wood Panel					33.08	
B44B-1F-07-05-00-B2-02	7	5	0	Floor	Carpet	0	96	0	0	0	
B44B-1F-21-05-00-B2-02	21	5	0	Floor	Carpet	12	88	0	7		
B44B-1F-42-17-00-B2-02	42	17	0	Floor	Carpet	12	84	0	0		
B44B-1F-21-17-00-B6-02	21	17	0	Floor	Plywood	6	0	0	0		
B44B-1F-32-11-00-B6-02	32	11	0	Floor	Plywood	11	0	0	0		
B44B-1F-53-11-00-B6-02	53	11	0	Floor	Plywood	0	68	0	42		
B44B-W-01-21-05-B6-02	1	21	5	Wall	Wood Panel	5	0	0	0		
B44B-W-07-14-01-B6-02	7	14	1	Wall	Wood Panel	16	38	0	0		
B44B-W-19-01-05-B6-02	19	1	5	Wall	Wood Panel	16	0	0	4		
B44B-W-31-24-01-B6-02	31	24	1	Wall	Wood Panel	0	0	0	0		

Table 12-3. Summary of Surface Alpha and Beta Radioactivity Measurements – Building 44A

				dpm/100 cm^2				
Area	Matrix	Parameter[1]	Number of Measurements	Median	Mean	Standard Deviation	Minimum	Maximum
Floor	Tile	Total Alpha	33	0	0.5	1.5	0	5.4
		Removable Alpha	33	0	0	0	0	0
		Total Beta	33	39	88.4	104.3	0	333
		Removable Beta	33	4	6.1	8.8	0	38
Walls	Wood Panel	Total Alpha	34	5	5.4	5.6	0	21
		Removable Alpha	34	0	0.1	0.5	0	3
		Total Beta	34	0	19.1	28.4	0	102
		Removable Beta	34	0	10.4	17.6	0	65

Notes:
[1] Low energy beta emitters such as tritium are not included
dpm/100 cm^2 = decay per minute per 100 square centimeters of surface area

Table 12-4. Summary of Surface Alpha and Beta Radioactivity Measurements – Building 44B

Area	Matrix	Parameter[1]	Number of Measurements	dpm/100cm^2 Median	Mean	Standard Deviation	Minimum	Maximum
Floor	Carpet	Total Alpha	32	0	3.4	5.0	0	18
		Removable Alpha	32	0	0.2	0.7	0	3
		Total Beta	32	88	97.0	64.0	0	241
		Removable Beta	32	0	5.4	11.5	0	50
	Plywood	Total Alpha	34	0	3.2	5.2	0	17
		Removable Alpha	34	0	0.3	0.9	0	3
		Total Beta	34	2	58.6	80.0	0	215
		Removable Beta	34	0	12.3	19.6	0	67
Walls	Wood Panel	Total Alpha	33	5	6.6	6.6	0	21
		Removable Alpha	33	0	0.2	1.1	0	6
		Total Beta	33	0	1.7	7.2	0	38
		Removable Beta	33	0	2.8	5.9	0	25

Notes:
[1] Low energy beta emitters such as tritium are not included
dpm/100 cm^2 = decay per minute per 100 square centimeters of surface area

Table 12-5. Measurements of Tritium Surface Radioactivity – Building 44A

		dpm/100cm^2				
Area	Number of Measurements	Median)	Mean	Standard Deviation	Minimum	Maximum
Floors (Systematic and Biased)	23	3.6	7.1	8.9	0	29.6
Walls (Systematic and Biased)	18	0	12.2	32.8	0	134.5
HVAC (Biased)	11	19.5	25.1	25.5	2.7	91.9

Notes:
dpm/100 cm^2 = decay per minute per 100 square centimeters of surface area

Table 12-6. Measurements of Tritium Surface Radioactivity – Building 44B

Area	Number of Measurements	dpm/100cm^2				
		Median	Mean	Standard Deviation	Minimum	Maximum
Floors (Systematic and Biased)	24	9.6	23.5	38.0	0	155.7
Walls (Systematic and Biased)	20	2	4.0	7.3	0	33.1
HVAC (Biased)	10	0	16.9	15.9	0	47.1

Notes:
dpm/100 cm^2 = decay per minute per 100 square centimeters of surface area

Table 12-7. Non-Radiological Sampling and Analysis Summary – Buildings 44A and 44B

Location	Matrix	Collection Rationale	Analytes	Constituents Potentially Above Hazardous Waste Thresholds[1]
Interior	Dust on floors, HVAC ducting, sills[2]	Potential release/s of beryllium, lead, and mercury and dispersion in dust	Beryllium, mercury, lead	None
B44A pipe stub	Wipe of sewer pipe inner surface	Contamination conduit	Mercury	None
B44A, Room 101A	Wood floor	Former laboratory with bench and lab sink; room later used for instrument repair and testing	Lead, mercury	None
B44B, Room 101	Wood floor	Electronic instrumentation fabrication laboratory	Lead, mercury	None
Exterior	Exterior wall paint	PCBs commonly used in paint, pre-1979	PCBs	None

Notes:
[1] Constituents above thresholds listed in Table 5-3 and described in Section 5.2.1. To determine if a constituent is considered a hazardous waste or is potentially a hazardous waste (based on leachability), consult analytical results tables.
[2] Wipe sample

Abbreviations:
PCBs polychlorinated biphenyl compounds
ft feet

Table 12-8. Analytical Results for Metals – Buildings 44A and 44B

Sample Type	Sample Description	Sample Name	Units	Be	Pb	Hg
Building B44A						
Exposed Wood	Wood Floor, room 101A northeast	B44AEW01	mg/kg	---	4.5	0.0072 J, T
Wipe	HVAC ducting wipe, room 101A south	B44ASW05	µg/100 cm²	<0.1	2.1 J, 6L	<0.02
Wipe	Window sill wipe, room 101A northwest	B44ASW06	µg/100 cm²	<0.1	2.4 J, 6L	<0.02
Wipe	Sewer pipe wipe, in crawl space underneath B44A east	B44ASW07	µg/100 cm²	---	---	<0.02
Building B44B						
Exposed Wood	Wood Floor, room 101 north	B44BEW02	mg/kg	---	1.6	0.044
Wipe	HVAC ducting wipe, room 107 north	B44BSW08	µg/100 cm²	<0.1	1.9 J, 6L	0.028
Wipe	Window sill wipe, room 101 east	B44BSW09	µg/100 cm²	<0.1	4.1 J, 6L	<0.02
Wipe	Window sill wipe, room 101 east	B44BSW10 DUP	µg/100 cm²	<0.1	3.1 J, 6L	<0.02

Abbreviations:

µg/100 cm² = micrograms per 100 square centimeters
Be = Beryllium, Pb = lead, Hg = mercury
DUP = field duplicate
mg/kg = milligrams per kilogram
STLC = Soluble Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24
TCLP = Toxicity Characteristic Leaching Procedure, Title 22 California Code of Regulations, Section 66261.24
TTLC = Total Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24

Notes:

<n = analyte not detected above reporting limit of 'n'
J = estimated result
T = trace level compound, poor quantitation
6L = laboratory control sample recovery below normal limits
--- = not analyzed
Italics = no published bulk sample concentration (TTLC, STLC, TCLP) at which the constituent is deemed a hazardous waste
red = detected above: 1) the TTLC for solid samples; 2) or the STLC or TCLP for aqueous samples; 3) or the wipe concentration limit
yellow = detected above 10 x STLC or 20 x TCLP concentrations, for solid matrices (does not apply to wipe samples)

Analysis for Metals by USEPA 6020 and 7471A. All samples analyzed by Test America St. Louis, Earth City, Missouri.

The comparison threshold for beryllium of 0.2 µg/100 cm2 (collected on wipes) applies to removable contamination on equipment or surfaces. Equipment or surfaces with beryllium concentrations below this threshold may be released to the general public or to a DOE facility for use in a manner not requiring controls for beryllium exposure per the Chronic Beryllium Disease Prevention Program (10 CFR 850).

Table 12-9. Analytical Results for PCBs – Buildings 44A and 44B

Sample Type	Sample Description	Sample Name	Units	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260
Building B44A										
Paint	Outside wall paint sample	B44APC03	mg/kg	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Building B44B										
Paint	Outside wall paint sample	B44BPC04	mg/kg	<0.37	<0.37	<0.37	<0.37	<0.37	<0.37	<0.37

Abbreviations:

mg/kg = milligrams per kilogram
PCBs = polychlorinated biphenyls
STLC = Soluble Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24
TCLP = Toxicity Characteristic Leaching Procedure, Title 22 California Code of Regulations, Section 66261.24
TTLC = Total Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24

Notes:

<n = analyte not detected above reporting limit of 'n'
--- = not analyzed
Italics = no published bulk sample concentration (TTLC, STLC, TCLP) at which the constituent is deemed a hazardous waste
red = detected above: 1) the TTLC for solid samples; 2) or the STLC or TCLP for aqueous samples; 3) or the wipe concentration limit
yellow = detected above 10 x STLC or 20 x TCLP concentrations, for solid matrices (does not apply to wipe samples)

Analysis for PCBs by USEPA Method 8082. All samples analyzed by Test America St. Louis, Earth City, Missouri.

The comparison threshold for PCBs of 10 µg/100 cm2 (collected on wipes) applies to non-porous surfaces contaminated with PCBs. Surfaces containing PCB concentrations above this limit are considered to be contaminated (40 CFR 761).

The value used as the threshold for determining if PCBs exceed hazardous waste limits is applicable to the sum of the Aroclor mixtures reported.

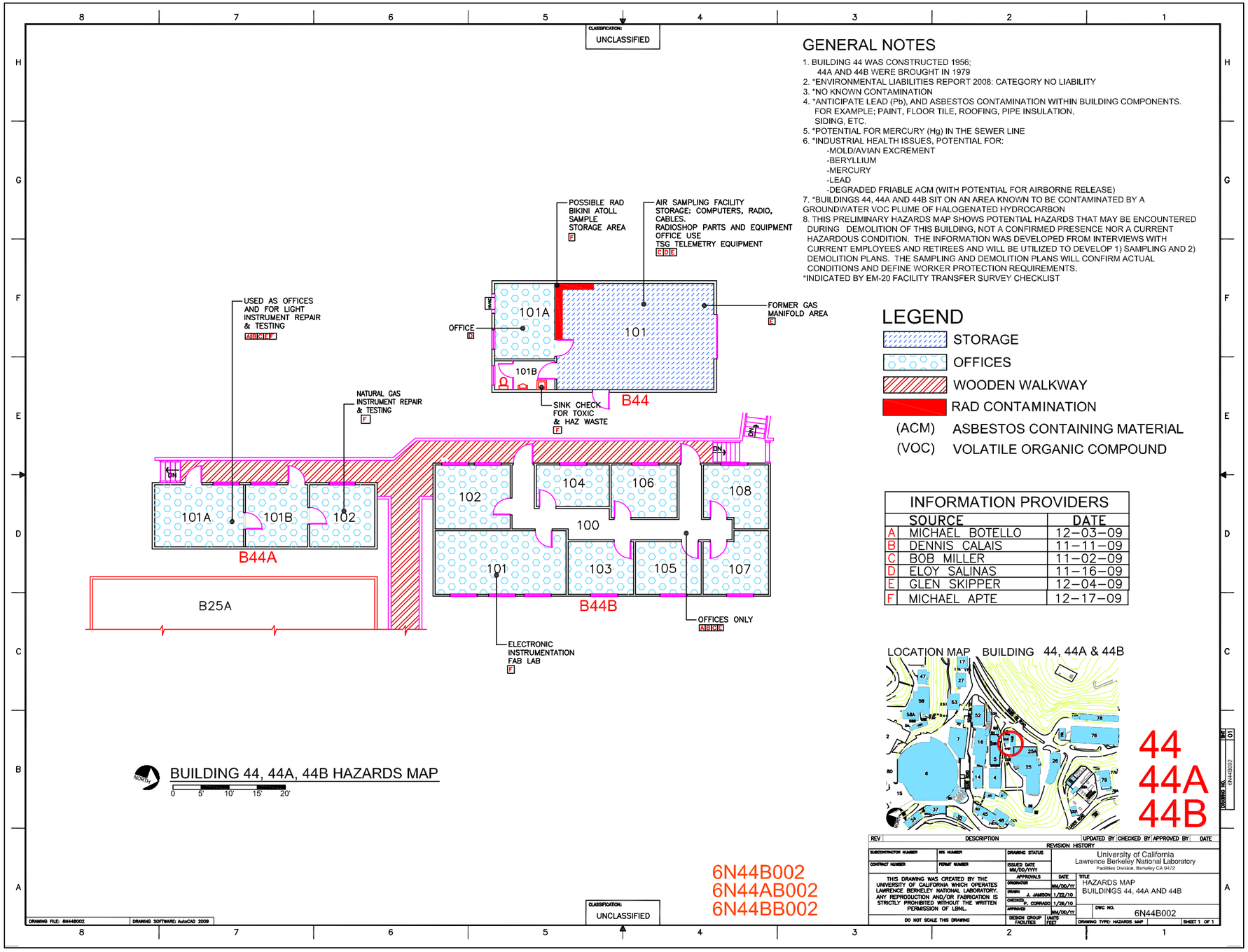
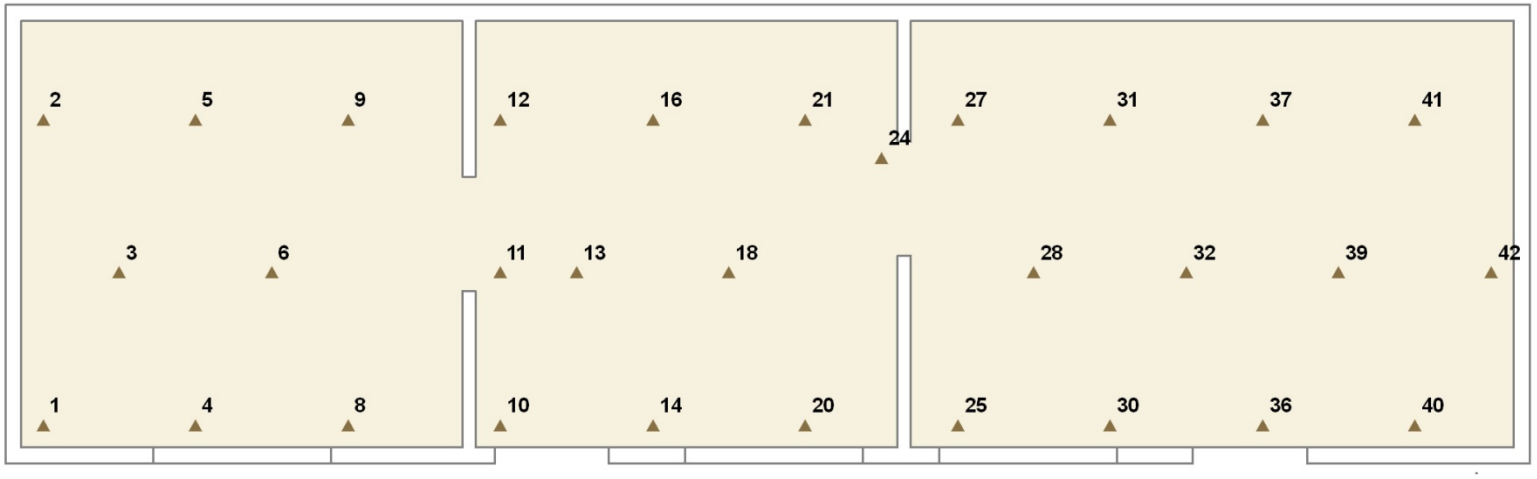
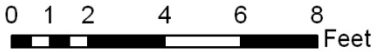


Figure 12-1 Hazard Map – Buildings 44A and 44B (includes Building 44)



Map ID	Sample ID
1	B44A-1F-01-01-00-B3-01
2	B44A-1F-01-09-00-B3-01
3	B44A-1F-03-05-00-B3-01
4	B44A-1F-05-01-00-B3-01
5	B44A-1F-05-09-00-B3-01
6	B44A-1F-07-05-00-B3-01
8	B44A-1F-09-01-00-B3-01
9	B44A-1F-09-09-00-B3-01
10	B44A-1F-13-01-00-B3-01
11	B44A-1F-13-05-00-B3-01
12	B44A-1F-13-09-00-B3-01
13	B44A-1F-15-05-00-B3-01
14	B44A-1F-17-01-00-B3-01
16	B44A-1F-17-09-00-B3-01
18	B44A-1F-19-05-00-B3-01

Map ID	Sample ID
20	B44A-1F-21-01-00-B3-01
21	B44A-1F-21-09-00-B3-01
24	B44A-1F-23-08-00-B3-01
25	B44A-1F-25-01-00-B3-01
27	B44A-1F-25-09-00-B3-01
28	B44A-1F-27-05-00-B3-01
30	B44A-1F-29-01-00-B3-01
31	B44A-1F-29-09-00-B3-01
32	B44A-1F-31-05-00-B3-01
36	B44A-1F-33-01-00-B3-01
37	B44A-1F-33-09-00-B3-01
39	B44A-1F-35-05-00-B3-01
40	B44A-1F-37-01-00-B3-01
41	B44A-1F-37-09-00-B3-01
42	B44A-1F-39-05-00-B3-01

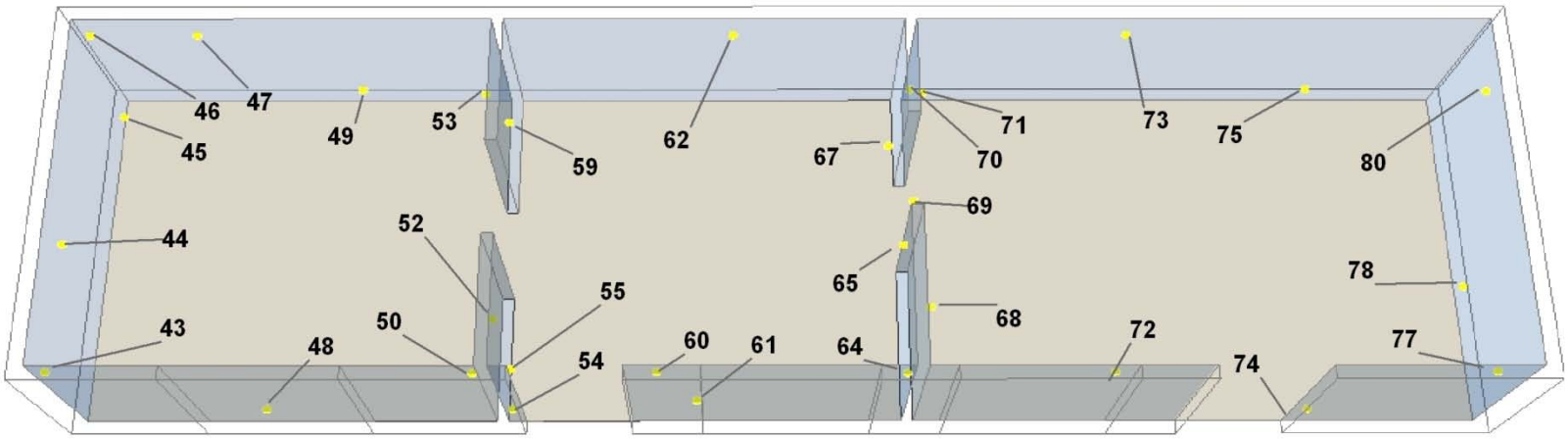


Building 44A
1st Floor
Surface Type - Floors

Material Type

Tile

Figure 12-2. Radiological Sampling Locations – Building 44A, Floors



Map ID	Sample ID
43	B44A-W-01-01-05-B6-01
44	B44A-W-01-05-05-B6-01
45	B44A-W-01-11-01-B6-01
46	B44A-W-01-12-05-B6-01
47	B44A-W-04-12-05-B6-01
48	B44A-W-06-01-01-B6-01
49	B44A-W-08-12-01-B6-01
50	B44A-W-11-01-05-B6-01
52	B44A-W-11-04-01-B6-01
53	B44A-W-11-10-05-B6-01
54	B44A-W-12-01-01-B6-01
55	B44A-W-12-02-02-B6-01
59	B44A-W-12-09-05-B6-01
60	B44A-W-17-01-05-B6-01
61	B44A-W-18-01-02-B6-01

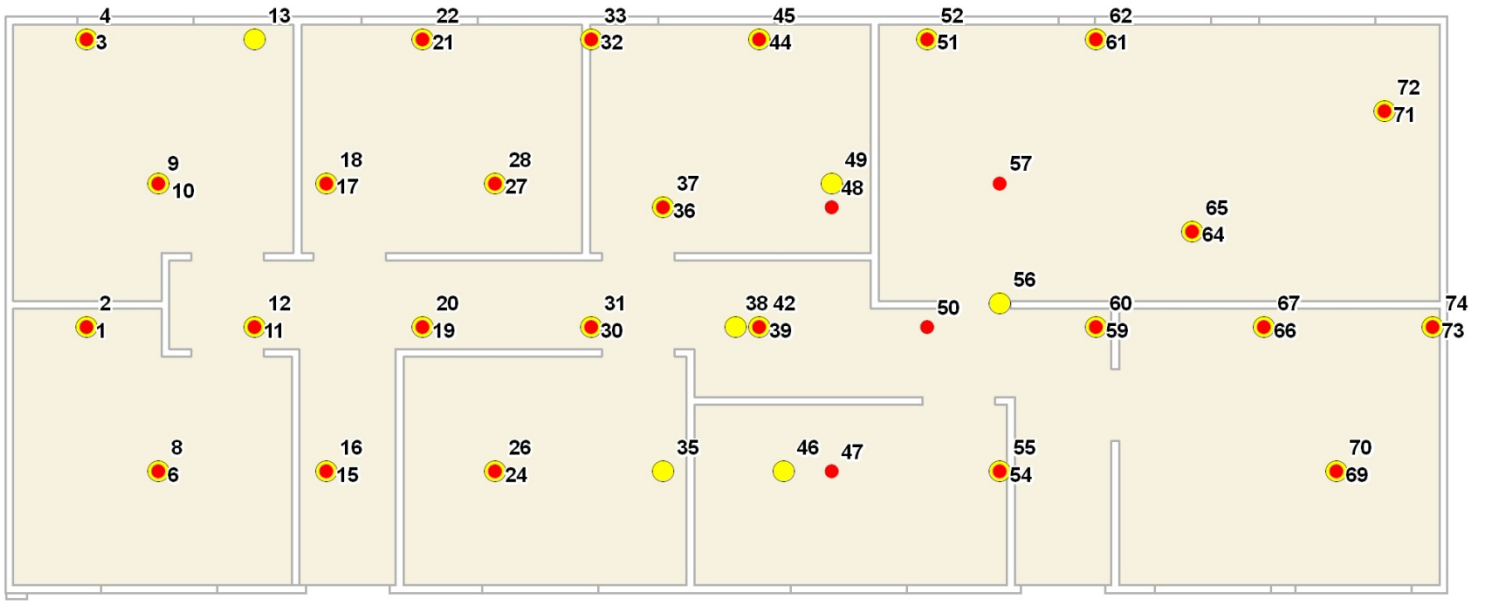
Map ID	Sample ID
62	B44A-W-19-12-05-B6-01
64	B44A-W-23-01-05-B6-01
65	B44A-W-23-05-05-B6-01
67	B44A-W-23-10-01-B6-01
68	B44A-W-24-03-05-B6-01
69	B44A-W-24-08-01-B6-01
70	B44A-W-24-10-05-B6-01
71	B44A-W-24-12-01-B6-01
72	B44A-W-29-01-05-B6-01
73	B44A-W-30-12-05-B6-01
74	B44A-W-35-01-01-B6-01
75	B44A-W-36-12-01-B6-01
77	B44A-W-39-01-05-B6-01
78	B44A-W-40-05-01-B6-01
80	B44A-W-40-10-05-B6-01

Building 44A
1st Floor
Surface Type - Walls

Material Type

Plywood/Panel

Figure 12-3. Radiological Sampling Locations – Building 44A, Walls

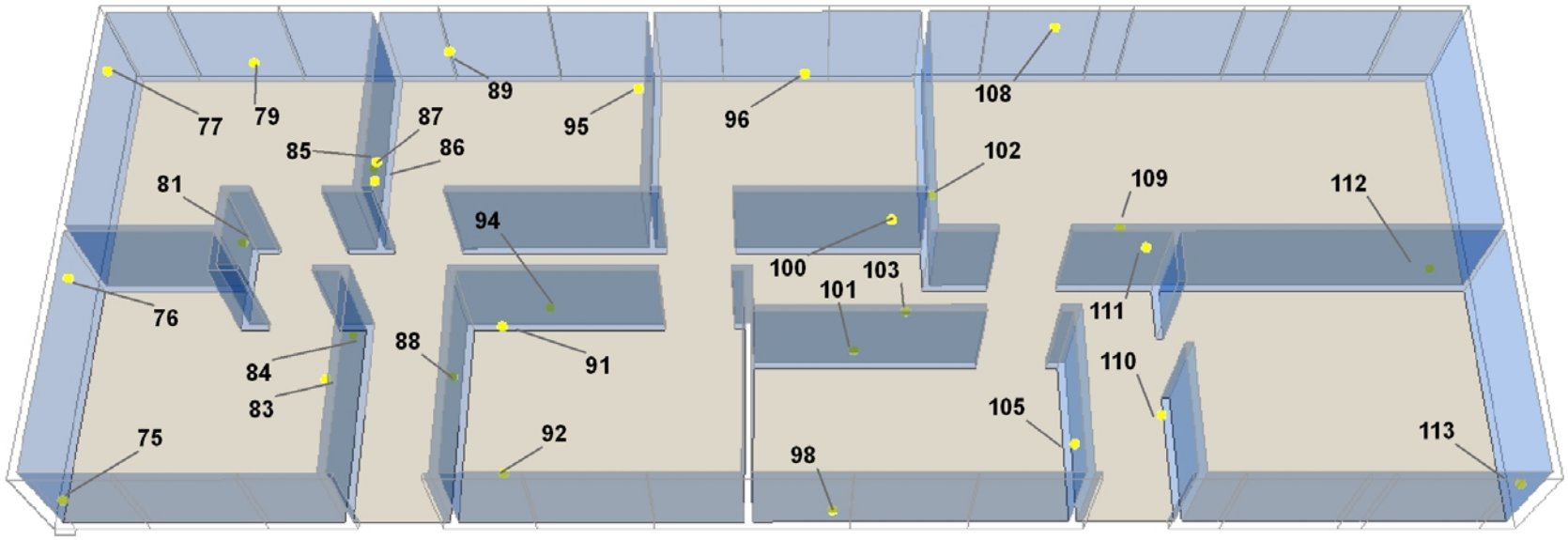


Map ID	Sample ID
1	B44B-1F-04-11-00-B2-01
2	B44B-1F-04-11-00-B6-01
3	B44B-1F-04-23-00-B2-01
4	B44B-1F-04-23-00-B6-01
6	B44B-1F-07-05-00-B2-01
8	B44B-1F-07-05-00-B6-01
9	B44B-1F-07-17-00-B2-01
10	B44B-1F-07-17-00-B6-01
11	B44B-1F-11-11-00-B2-01
12	B44B-1F-11-11-00-B6-01
13	B44B-1F-11-23-00-B6-01
15	B44B-1F-14-05-00-B2-01
16	B44B-1F-14-05-00-B6-01
17	B44B-1F-14-17-00-B2-01
18	B44B-1F-14-17-00-B6-01
19	B44B-1F-18-11-00-B2-01
20	B44B-1F-18-11-00-B6-01
21	B44B-1F-18-23-00-B2-01
22	B44B-1F-18-23-00-B6-01
24	B44B-1F-21-05-00-B2-01

Map ID	Sample ID
26	B44B-1F-21-05-00-B6-01
27	B44B-1F-21-17-00-B2-01
28	B44B-1F-21-17-00-B6-01
30	B44B-1F-25-11-00-B2-01
31	B44B-1F-25-11-00-B6-01
32	B44B-1F-25-23-00-B2-01
33	B44B-1F-25-23-00-B6-01
35	B44B-1F-28-05-00-B6-01
36	B44B-1F-28-16-00-B2-01
37	B44B-1F-28-16-00-B6-01
38	B44B-1F-31-11-00-B6-01
39	B44B-1F-32-11-00-B2-01
42	B44B-1F-32-11-00-B6-01
44	B44B-1F-32-23-00-B2-01
45	B44B-1F-32-23-00-B6-01
46	B44B-1F-33-05-00-B6-01
47	B44B-1F-35-05-00-B2-01
48	B44B-1F-35-16-00-B2-01
49	B44B-1F-35-17-00-B6-01
50	B44B-1F-39-11-00-B2-01

Map ID	Sample ID
51	B44B-1F-39-23-00-B2-01
52	B44B-1F-39-23-00-B6-01
54	B44B-1F-42-05-00-B2-01
55	B44B-1F-42-05-00-B6-01
56	B44B-1F-42-12-00-B6-01
57	B44B-1F-42-17-00-B2-01
59	B44B-1F-46-11-00-B2-01
60	B44B-1F-46-11-00-B6-01
61	B44B-1F-46-23-00-B2-01
62	B44B-1F-46-23-00-B6-01
64	B44B-1F-50-15-00-B2-01
65	B44B-1F-50-15-00-B6-01
66	B44B-1F-53-11-00-B2-01
67	B44B-1F-53-11-00-B6-01
69	B44B-1F-56-05-00-B2-01
70	B44B-1F-56-05-00-B6-01
71	B44B-1F-58-20-00-B2-01
72	B44B-1F-58-20-00-B6-01
73	B44B-1F-60-11-00-B2-01
74	B44B-1F-60-11-00-B6-01

Figure 12-4. Radiological Sampling Locations – Building 44B, Floors



Map ID	Sample ID
75	B44B-W-01-01-01-B6-01
76	B44B-W-01-10-05-B6-01
77	B44B-W-01-21-05-B6-01
79	B44B-W-06-24-02-B6-01
81	B44B-W-07-14-01-B6-01
83	B44B-W-11-05-05-B6-01
84	B44B-W-11-09-01-B6-01
85	B44B-W-11-18-01-B6-01
86	B44B-W-12-15-05-B6-01
87	B44B-W-12-16-05-B6-01
88	B44B-W-15-07-01-B6-01
89	B44B-W-15-24-03-B6-01
91	B44B-W-18-07-01-B6-01
92	B44B-W-19-01-05-B6-01
94	B44B-W-20-10-01-B6-01

Map ID	Sample ID
95	B44B-W-22-20-05-B6-01
96	B44B-W-31-24-01-B6-01
98	B44B-W-32-01-01-B6-01
100	B44B-W-32-15-04-B6-01
101	B44B-W-33-08-01-B6-01
102	B44B-W-34-18-01-B6-01
103	B44B-W-35-08-05-B6-01
105	B44B-W-40-02-05-B6-01
108	B44B-W-42-24-05-B6-01
109	B44B-W-44-14-05-B6-01
110	B44B-W-45-05-01-B6-01
111	B44B-W-45-13-05-B6-01
112	B44B-W-58-14-01-B6-01
113	B44B-W-60-01-03-B6-01

Building 44B
1st Floor
Surface Type - Walls

Material Type

Plywood/Panel

Figure 12-5. Radiological Sampling Locations – Building 44B, Walls

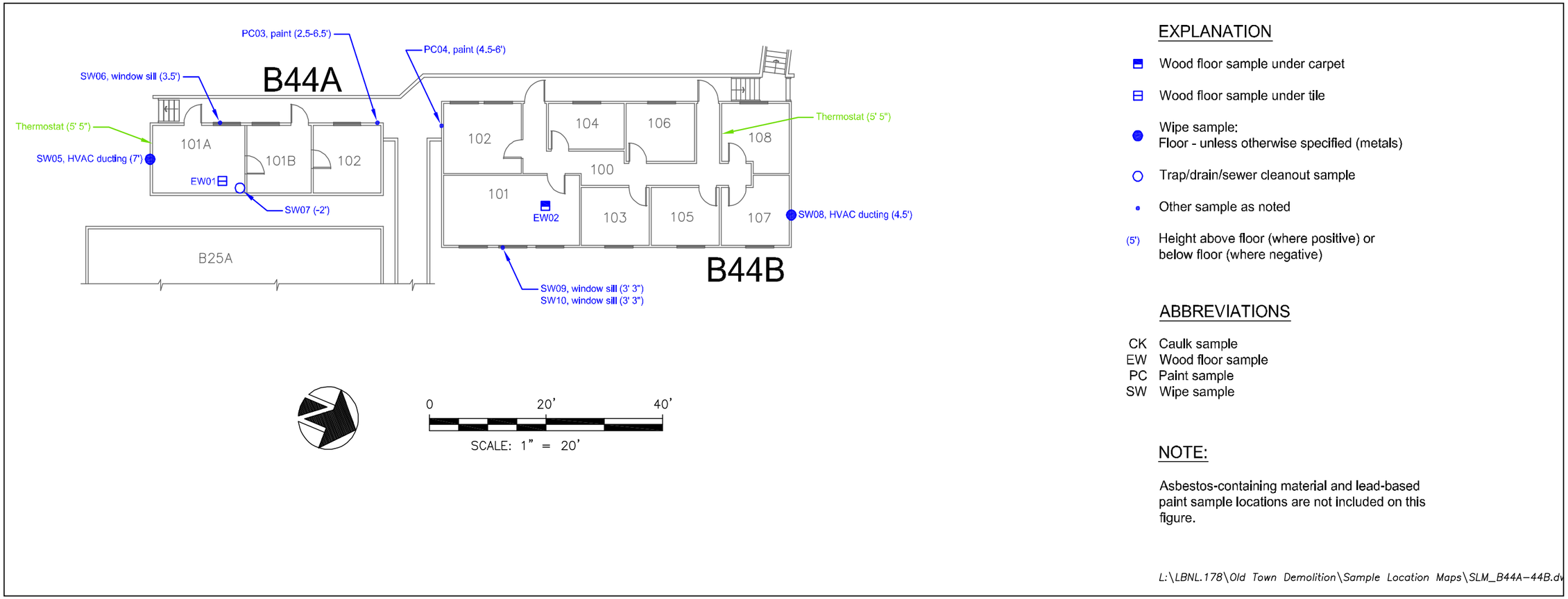


Figure 12-6. Non-Radiological Sampling Locations – Buildings 44A and 44B

13. CHARACTERIZATION OF BUILDING 52

Building 52 is a 6,425-square-foot building built in 1943 for use as a warehouse, a shop, and a general-purpose laboratory. In 1949, a quarter-scale Bevatron model was moved into the facility to assist scientists in working on accelerator design problems. The model included a cyclotron injector, a magnet, and a vacuum system. The model operated out of Building 52 until 1955 or 1956, when it was sold. During the 1950s, the building housed research associated with the materials testing accelerator located in Livermore. By the early 1960s, Building 52 had become a general research and shop facility, and it was later used as a cable winding facility, where research on superconducting cable wire was conducted (Harvey, 2003). The building currently houses a cryostat pit with a sump. Figure 13-1 and Figure 13-2 provide the locations of historical hazards associated with this building obtained by LBNL from historical records, interviews, and site inspections.

Building 52 was characterized per the *Final Work Plan for Base Bid Buildings* (Weiss, 2010c).

13.1 Deviations from Work Plan

Three samples were not collected within Building 52:

- A water sample (B52LH01) was not collected from the cryostat pit, because the pit contained no water.
- Field duplicate sediment sample B52SE09 was not collected from the trench floor located in the southern portion of Room 100. Insufficient sediment was present.
- Sludge sample B52SL03 was not collected from the toilet trap located in Room 117 because no sludge was found in the trap. A wipe sample was collected in a downstream cleanout.

Samples from the air-handling system were collected at the exit of the system as opposed to the intake registers as planned in the work plan. It was determined that the exit points represent the locations in the air-handling system with the greatest potential for contamination from constituents entrained in the building air.

An additional wipe sample was collected in Room 100 (between the restroom and Room 111) and analyzed for PCBs. The sample was collected because a stain that appeared to be associated with a transformer was noted on the floor during characterization activities.

13.2 Radiological Characterization Summary

The information provided on the hazard map developed by LBNL (Figure 13-1) and the historic information obtained by LBNL and summarized in the *Final Workplan for the*

Reconnaissance-Level Characterization of Buildings 25A, 44, 44A, 44B, 52, and 52A indicate that Building 52 is potentially contaminated as a result of the historical operation of a working model of the Bevatron and current use of a neutron generator in Room 111. Also of note is the fact that Room 109 is a counting room for the neutron generator. Room 298 on the second floor is the potential site of an historic radiological spill and neutron activation of structural materials. Floors including a 15-foot radius around the historic locations of the Bevatron in Room 100 and Rooms 109, 111, and 298 are considered Class 1 areas. The remainder of the building floors and walls were classified as a Class 3 area. As described in Section 4.2, based on the reconnaissance-level characterization data, all of Building 52 has been re-classified as a Class 3 area and the entire building was treated as one survey unit. The focus of the radiological characterization was the floor around the Bevatron working model and the neutron generator, including subsurface core samples to identify potential activation products. Radiological survey locations were based on biased and systematic methods.

13.2.1 Radiological Scanning

Radiological scanning was performed to determine if there were any areas of elevated radioactivity that would require biased static radiological measurements. Consistent with the workplan, the following areas were scanned using a gas-flow proportional floor monitor (Ludlum Model 239-1F) or a hand-held duel phosphor detector (Ludlum Model 43-89):

- 100 percent alpha/beta scans of Class 1 floor surfaces;
- ≥ 50 percent alpha/beta scans of Class 1 wall surfaces;
- ≥ 25 percent alpha/beta scans of Class 3 floor surfaces;
- ≥ 10 percent alpha/beta scans of Class 3 wall surfaces; and
- ≥ 25 percent alpha/beta scans of Class 3 accessible internal HVAC surfaces.

Scanning speeds using the gas proportional floor monitor were approximately 10 cm/s. Scanning speeds for the duel phosphor detectors were approximately 5 cm/s.

The radiological scanning of floors, walls, and the interior surfaces of HVAC system showed no detectable radioactivity above background levels; consequently, no biased locations for direct radiation measurements were identified.

13.2.2 Systematic Radiological Measurements

Thirty floor locations were identified in the workplan for systematic direct measurements. The locations were based on a triangular grid system with a random starting point. Direct radiological measurements of the concrete or overlying tile were collected at 32 locations. Duplicate measurements were taken at four locations. Removable radioactivity measurements were collected using surface smears at each of the systematic sampling locations. The floor sampling locations are shown on Figure 13-3 for the first floor and Figure 13-4 for the second floor. Table 13-1 indicates the types of floor material surveyed.

Thirty wall locations were identified in the field for systematic direct measurements. The locations were based on equally spaced locations, alternating between 1 and 5 feet high along the wall when not obstructed by building equipment or features. In cases where the sampling location was obstructed, the location was offset to allow access to the surface. Direct radiological measurements of various wall surface materials were collected at 30 locations. Duplicate measurements were taken at three locations. Removable radioactivity measurements were collected via surface smear sampling at each of the systematic sampling locations. Wall sampling locations are shown in Figure 13-5.

All direct radiological measurements were collected for a period of 1 minute using a hand-held gas proportional detector (Ludlum Model 43-68). Removable radioactivity measurements also were collected for 1 minute, using a duel phosphor sample counter (Ludlum Model 3030).

The results of the systematic direct and removable radiological measurements are presented in Table 13-1 and summarized in Table 13-2. The highest total alpha measurement was 29 dpm/100 cm^2, while the highest total beta measurement was 661 dpm/100 cm^2. The DCGLs for total alpha and total beta surface radioactivity are 100 and 5,000 dpm/100 cm^2, respectively. The highest removable alpha measurement was 6 dpm/100 cm^2, while the highest removable beta measurement was 68 dpm/100 cm^2. The DCGLs for removable alpha and total beta surface radioactivity are 20 and 1,000 dpm/100 cm^2, respectively.

13.2.3 Tritium Sampling

Consistent with the workplan, 30 systematic tritium samples were collected on the floor and wall surfaces using methods described in the workplan. Ten biased samples were also collected on the floors and lower walls. All tritium samples were analyzed off-site using Eberline Analytics Laboratory.

The results of tritium sampling are presented in Table 13-1 and summarized in Table 13-3. The highest tritium surface activity was 148 dpm/100 cm^2.

13.2.4 Volumetric Sampling

Six concrete core samples (0-3 inches) were collected within the Class 1 areas. Three steel coupons were sampled from structures near the Bevatron working model area. The locations of these samples are shown in Figure 13-6. All samples were analyzed for Cobalt-60, Europium-152, and Europium-154 via gamma spectroscopy at the off-site analytical laboratory, Test America.

The results of volumetric sampling of concrete and steel are presented in Table 13-4. No samples were above their respective Minimal Detectable Concentrations (MDC) and all were assigned data qualifier of non-detects (U).

13.3 Non-radiological Characterization Summary

13.3.1 Chemical Constituents

As shown in Table 13-5, samples were collected at Building 52 including wipe, sediment, wastewater, sludge, paint, caulk, and concrete floor samples. The locations of these samples are shown on Figure 13-7. This figure also shows the locations of equipment that may contain mercury (such as thermostats) that were observed in the building. Analytical data are summarized in Table 13-6 through Table 13-10. The complete analytical results are provided on a CD-ROM included in Appendix E.

Of the 32 solid, sediment, or sludge samples collected at Building 52 and analyzed for metals, 10 samples contained concentrations above the TTLC. The lead TTLC was exceeded in six of seven sediment samples collected from the floors of trenches in Rooms 100 and 111. Lead was greater than 10 times the STLC in the seventh trench sediment sample (B52SE11 in Room 111). The TTLC for copper was exceeded in all seven samples of trench sediment. Mercury and zinc concentrations exceeded the TTLC in two trench sediment samples. Antimony, barium, cadmium, chromium, nickel, and silver concentrations were greater than 10 times the STLC in various trench sediment samples.

The trenches in Room 100 were found to contain very small quantities of sediment such that sample volume was limited, while trenches in Room 111 contained quantities of accumulated sediment that did not limit sample collection volume. None of the trenches contained standing water during the characterization. (Standing water was observed in these trenches during the earlier building inspections.)

In the sediment sample collected from the floor of the cryostat pit, the TTLC for copper was exceeded and barium, chromium, and lead concentrations were greater than 10 times STLC. Very small amounts of sediment were found in the cryostat pit.

In the sediment sample collected behind the air conditioning motor in the adjoined room northeast of B52 (sample B52SE03), cadmium, chromium, copper, and lead were greater than 10 times the STLC. An accumulated volume of sediment was present behind the motor.

The lead TTLC was exceeded in the sludge sample collected from the sink trap in Room 100. The STLC for lead was exceeded in both sludge samples collected from sink traps in Rooms 107 and 117. Lead concentrations exceeded the STLC and TCLP in water samples collected from sink traps in Rooms 107 and 117. The concentration of lead in the water sample collected from the sink trap in Room 100 was slightly below the STLC and TCLP.

Metals concentrations were below the TTLC in all 20 of the concrete core samples collected in Building 52. Chromium, copper, and lead concentrations were greater than 10 times the STLC in only one of the 12 concrete core samples collected in Room 100 and in the vicinity of the former Bevatron model (Sample B52SC11). Both of the concrete cores collected in Room 107 had metals concentrations greater than 10 times the STLC.

Beryllium concentrations were below the chronic disease prevention program limit (10 CFR 850) in all 20 of the wipe samples collected from Building 52 surfaces. The greatest concentrations of lead in wipe samples were found on the top surface of the south light fixture (3,010 μg/100 cm^2 in Sample B52SW31) and the windowsill in Room 109 (1,370 μg/100 cm^2 in Sample B52SW25). A relatively low concentration of lead (1.6 μg/100 cm^2) was measured in the wipe sample collected from the sewer cleanout outside of Building 52 (Sample B52SW15). The greatest concentration of mercury in wipe samples (8.2 μg/100 cm^2) was in the sample collected from the sewer cleanout in Room 103.

Arsenic was analyzed, in wipe samples, because of an engineering drawing in as-built records indicating construction of an arsenic ventilation hood at an unknown location within Building 52. The greatest concentration of arsenic for Building 52 was 5.7 μg/100 cm^2 in Sample B52SW25, taken on the windowsill in Room 109. This greatest arsenic concentration is co-located with the second-greatest lead concentration in wipe samples for this building (2.2 μg/100 cm^2), which was in a sample collected from the wood platform on the east side of Room 100. Arsenic was below hazardous waste criteria in all bulk and aqueous samples. The greatest concentration of arsenic in bulk samples was 15.8 mg/kg in sediment Sample B52SE04.

Of the 28 solid, sediment, or sludge samples collected at Building 52 and analyzed for PCBs, five samples contained concentrations above the TTLC. All five samples containing PCBs above the TTLC were sediment samples collected from the floors of trenches in Rooms 100 and 111. None of the concrete cores, windowsill caulking, wood floor, paint, or sludge samples had PCB concentrations greater than the TTLC. It should be noted, however, that PCB concentrations in a sample of wall paint in Room 100 southwest (B52PC02), a concrete core in Room 100 southwest (B52SC12), and the sludge sample collected from the sink trap in Room 100 (B52SL01) were near the TTLC.

Four samples of the 19 wipe samples collected at Building 52 and analyzed for PCBs contained concentrations of PCBs above the surface contamination limit (40 CFR 761). The greatest concentration of PCBs in wipe samples was 730 μg/100 cm^2 in Sample B52SW41 collected in Room 100 from a floor stain below a transformer. This sample was taken from a location near the sample containing the highest PCB concentration in concrete. The second-greatest concentration of PCBs in wipe samples was 38 μg/100 cm^2 in Sample B52SW05, collected near the east wall of Room 100, where a former capacitor bank was noted on the hazard map. The other two PCBs wipe sample concentrations exceeding the surface contamination limit were field duplicates located on the floor of Room 211 (Samples B52SW39 and B52SW40). The greatest concentration of PCBs in Room 111 (location of transformer noted on hazard maps) was 4.2 mg/kg in the concrete core located on the east side of the room (Sample B52SC13).

Of the five concrete core samples, seven trench samples of trench sediment, and one sample of sediment from the cryostat pit collected at Building 52 and analyzed for VOCs, all concentrations were more than an order of magnitude below the TTLC, the 10-times STLC, and the 20-times TCLP. Analytes that did not have toxicity characteristic criteria were reported either in low concentrations or as non-detected.

Of the four concrete cores and one wood floor sample collected at Building 52 and analyzed for PAHs, and the seven trench sediment samples and one cryostat pit sediment sample analyzed for

SVOCs, all concentrations were well below the TTLC, the 10-times STLC, and the 20-times TCLP. Significant concentrations of phthalate compounds were detected in some trench sediment samples (390 mg/kg in Sample B52SE11). All other SVOC and PAH analytes that did not have toxicity characteristic criteria were either small in concentration or non-detected.

TPH diesel and TPH motor oil were analyzed in 13 solid samples. Diesel range petroleum hydrocarbons were detected in only one sample (330 mg/kg in concrete core B52SC19). Motor oil range hydrocarbons were detected in all of the bulk samples (57 mg/kg to 9,300 mg/kg).

The laboratory analyzed pH in 11 solid samples. All of the pH measurements were neutral except concrete core pH values ranging from 11.4 to 12.0. The pH of water in the toilet trap in Room 117 was measured in the field and reported at 8.5.

13.3.2 Lead-based Paint

Six paint samples were collected and submitted for metals analysis to Macs Lab, Inc. using EPA Method 6010B/3050. Paint samples were taken to determine the presence of metals, primarily lead, in the paint. Vive of the six samples analyzed contained lead in concentrations greater than 5,000 ppm. These samples were collected from paint in the following areas:

- Second floor metal wall;
- Area 150 windowsill;
- Refrigeration closet;
- Exterior wall; and
- Bathroom wall.

The sixth sample collected from the roof did not contain lead at concentrations greater than 5,000 ppm.

Lab results reporting the detectable presence of lead in these sampled paints and/or surface coatings should be assumed to be representative of all similar paints and/or surface coatings encountered in the building. The results are presented in Appendix C.

13.3.3 Asbestos-containing Materials

Asbestos was found in the following materials at these approximate quantities:

- 12-foot-by-12-foot floor tile and mastic (850 square feet);
- Wall texture, drywall and joint compound (9,250 square feet);
- Wall patching (65 square feet);
- Rolled roof mastic (120 square feet);
- Refrigeration closet and miscellaneous black pipe insulation (20 linear feet); and

- Roof and duct vent sealant (40 square feet).

The pre-demolition survey report assessing asbestos-containing materials in Building 52 is provided in Appendix C. That report is intended for submittal in its entirety to the BAAQMD to support demolition notification documentation.

13.4 Conclusions and Recommendations

13.4.1 Radiological Constituents

The radiological scanning of floors, walls, and the interior surfaces of The HVAC system showed no detectable radioactivity above background levels; consequently, no biased locations for direct radiation measurements were identified.

No systematic direct and removable radiological measurements were above the DCGLs in Table 5-1. No tritium measurements were above the DCGL of 10,000 dpm/100 cm^2.

All volumetric samples were below the LBNL Institutional Volumetric Release Limits contained in Table 5-2.

13.4.1.1 Final Status Survey Evaluation

The data suggest that the surfaces in Building 52 evaluated in this investigation meet the release criteria established in Table 5-1 for surface radioactivity and Table 5-2 for volumetric radioactivity. Building 52 may be considered for unconditional release.

13.4.2 Chemical Constituents

Table 13-5 lists constituents reported in samples collected in Building 52 at concentrations potentially exceeding hazardous waste thresholds.

Building 52 contains trench sediment that is hazardous waste due to concentrations of metals and PCBs. Available data suggest that the sewer system is also contaminated with metals. None of the bulk structural materials sampled contained concentrations greater than the TTLC and only a few concrete core samples had metals concentrations greater than 10 times the STLC.

Sludge collected from a sink trap in Room 100 exceeded hazardous waste concentrations for lead. Lead was also reported in sludge collected from sewer traps in Rooms 107 and 117 at concentrations greater than the STLC. Mercury was detected at concentrations below hazardous waste thresholds in samples from these same traps. Low concentrations of lead and trace concentrations of mercury were found in a wipe sample collected at the sewer cleanout outside Building 52. Because of the detections of elevated metal concentrations in the sewer traps and the general inaccessibility of the system during the characterization, it should be assumed that the sewer system is contaminated. Additional characterization during demolition could be considered to potentially minimize hazardous waste.

All samples of sediment collected from trench floors showed concentrations of metals that exceeded hazardous waste thresholds. Five out of seven samples analyzed contained PCBs at concentrations in excess of the hazardous waste thresholds. No samples of concrete from the trench floors were collected. Observations of the trench floors and sidewall integrity were limited, as the trenches are covered with metal plates that required removal for sample collection, and the trenches contain conduit and equipment that obscures the floors. It is possible that cracks or other penetrations are present in the trenches and could allow contaminant migration from the surface to deeper concrete and underlying soil. The concrete in the trenches should be considered contaminated unless additional samples indicate otherwise. During the demolition, exposed soils beneath these trenches should be inspected for evidence of contamination, such as staining, organic vapors, or odors. Soil samples should be collected and analyzed for metals and organic compounds, including PCBs.

Samples of sediment collected from the floor of the cryostat pit contained copper at a concentration above hazardous waste thresholds and other metals at concentrations that may exceed the hazardous waste thresholds. Very little sediment was observed in the pit. No core samples of the floor were collected. Since no building drainage is associated with the pit and no standing water had been observed during the site inspection or the sample collection, and the pit is presently not in use, it is reasonable to assume that the contamination is limited to the sediment contained on the floor of the pit.

Cadmium, chromium, copper, and lead were detected in concentrations greater than 10 times the STLC in a sample of sediment collected behind an air-conditioning motor in an outbuilding adjoining Building 52 (on the northeastern side of the building). The sediment should be managed as hazardous waste unless additional analysis for the STLC is performed on these samples before holding times expire.

Metal concentrations (including mercury) were detected at elevated concentrations in 3 of 20 concrete samples collected from the floor throughout Building 52. Two of these samples were collected in Room 107, previously used a wet lab. The third sample was collected in the southwest corner of Room 100 where a small machine shop had been located. Given the concrete matrix, it is not clear whether the metals will leach out of the concrete matrix at concentrations that exceed the STLC. Without additional data, it should be assumed that the concrete floor in the southwest corner of Room 100 (south of Room 117) and in Room 107 is impacted. If additional certainty about the characterization of the concrete is desired, one or more of the previously collected concrete samples could be analyzed in advance of the six-month holding time limit.

PCBs were reported at concentrations greater than the surface contamination limit in one of two wipe samples collected at the east side of Room 100, where a capacitor bank was noted on the hazard map. PCBs were also reported at concentrations above the surface contamination limit in a wipe sample collected on the floor outside the south wall of Room 111, where a floor stain was observed below a transformer that had not been identified on the hazard map. A concrete core sample collected in this general location contained a relatively great concentration of PCBs (20 mg/kg). PCBs were also detected above the surface release limits in a wipe sample and a duplicate sample collected from the wood floor in Room 211. The data collected indicate that PCBs have impacted the floors in the locations sampled. The extent of the PCB contamination in and around Rooms 100, 111, and 211 should be delineated by collection of additional samples prior to demolition. Additional

samples should be collected from the floor in Room 111 once the concrete floor becomes accessible (after removal of the neutron generator and sheet metal and/or lead shielding covering the floor).

Samples were collected and analyzed for arsenic because a fume hood labeled as "arsenic hood" was discovered on an as-built drawing during the characterization activities (arsenic was not noted on the hazard maps). Arsenic was found at low concentrations in wipe samples collected throughout the building. Concentrations of arsenic in concrete and sediment samples were reported as below hazardous waste thresholds.

Lead was found in 20 out of 21 wipe samples collected in the building. The greatest lead concentrations were reported on the light fixture in the southern portion of Room 100. Lead and mercury concentrations in air ducting were slightly elevated. Components of the building air-handling units should be segregated and evaluated for disposal. Demolition work in the building should be conducted in a manner that protects the workers from exposure to lead.

Sample results for VOCs, SVOCs, and PAHs indicated that these compounds are not a concern at Building 52. Although significant concentrations of phthalate compounds were detected in some trench sediment samples, phthalates are expected in these samples because phthalates are common plasticizers and the trenches had fragments of plastic materials collected in the samples.

Diesel and motor oil range hydrocarbons were detected in concrete and sediment accumulated on the floors and in trenches at concentrations typical of those found in an industrial facility that uses petroleum-based oils and greases for machinery lubrication. All concentrations of TPH motor oil greater than 1,000 ppm are associated with sediment present in the trenches and should be addressed when the sediment is removed. A sample of the concrete floor in Room 107 contained low concentrations of diesel and motor oil and potentially contains mercury and copper above the STEL. As discussed above, the floor in this room should be considered impacted unless additional analyses indicate otherwise. The other detections of TPH-diesel and TPH-motor oil in concrete are not associated with hazardous waste constituents and do not affect the disposition of the concrete. Sediment collected from the cryostat pit was reported to contain elevated TPH-motor oil concentrations and should be managed in accordance with the requirements that apply to the other contaminants that were reported in this sediment as discussed above.

All reported pH values were neutral or consistent with expected pH levels of the building materials (concrete) from which they were collected.

Several thermostats that potentially contain mercury switches were identified in Building 52 (Figure 13-7). Care should be taken when removing equipment that may contain mercury switches to prevent breakage and release of liquid mercury. Additional thermostats and other mercury-containing equipment could be present.

No samples were collected under fixtures, such as fume hoods, laboratory sinks, and benches in Room 107 where wet chemistry had occurred, nor under machine shop equipment, cabinets, and shelving in Room 100. If staining or other evidence of contamination is observed upon removal of these fixtures and equipment, additional samples should be collected. The southern portion of Room 298 was not characterized because of accessibility issues (air-handling unit blocks access to floor surface).

13.4.3 Lead-based Paint

Lead was found in five paint samples at concentrations at which the paint is considered lead-based paint. The exterior paint appears to be lead-based. The concentration of lead in roof material was found to be below lead-based paint levels. The presence of lead and/or lead-containing paint requires that specialized work practices be used during demolition work to ensure that individuals involved in the work are adequately protected against elevated exposure to lead. Contractors or employees involved in lead-related demolition activities must comply with the Construction Safety Orders for Lead (8 CCR §1532.1 et. seq.) and training requirements for those involved in lead-related demolition activities. The Construction Safety Orders for Lead [8 CCR 1532.1 (p)] also require that a "Lead-Work Pre-Job Notification" be filed with CalOSHA whenever a construction project involves "trigger tasks," as defined by the standard, which will involve greater than 100 square feet of "lead-based paint." Notification must be made 24 hours prior to the commencement of work.

Loose paint chips or other debris containing 0.5% lead by weight are likely to be characterized as hazardous waste; therefore, damaged paint containing lead at 0.5% or greater should be stabilized or removed prior to demolition. Disturbance of lead-containing paints and/or surface coatings should be conducted by a licensed contractor utilizing workers with CDPH training in lead-related construction. Lead-related construction waste should be segregated into discrete waste streams and characterized for proper disposal.

13.4.4 Asbestos-containing Material

The floor tiles and mastic in Building 52 were found to contain asbestos. Asbestos is also present in the wall texture and drywall, roof mastic, and miscellaneous caulking and insulation materials. Designation of a material as asbestos-containing should be applied to all homogenous material of the type reported to contain asbestos.

Since more than 100 linear or 100 square feet of regulated asbestos-containing material will be disturbed in demolition of Building 5, the BAAQMD must be notified 10 days prior to demolition activities.

Table 13-1. Systematic Radiological Measurement Results – Building 52

Sample ID	Location X	Location Y	Location Z	Surface Type	Material Type	Total Alpha dpm/100cm^2	Beta Total dpm/100cm^2	Removable Alpha dpm/100cm^2	Removable Beta dpm/100cm^2	Tritium dpm/100cm^2	Comments
B52-2F-40-10-00-B7-01	40	10	0	2nd Floor	Unknown	0	0	0	0	4.5066	
B52-2F-50-10-00-B7-01	50	10	0	2nd Floor	Unknown	6	0	0	0		
B52-2F-93-10-00-B7-01	93	10	0	2nd Floor	Unknown	0	0	0	38		
B52-1F-05-22-00-B1-01	5	22	0	Floor	Concrete	12	415	0	0		
B52-1F-05-47-00-B1-01	5	47	0	Floor	Concrete	12	470	0	0	148.074	
B52-1F-12-34-00-B1-01	12	34	0	Floor	Concrete	6	395	0	0	1.75158	
B52-1F-19-22-00-B1-01	19	22	0	Floor	Concrete	6	385	0	0		
B52-1F-19-36-00-B1-01	19	36	0	Floor	Concrete	12	335	0	0		
B52-1F-26-34-00-B1-01	26	34	0	Floor	Concrete	6	300	0	0	9.5016	
B52-1F-33-22-00-B1-01	33	22	0	Floor	Concrete	6	120	3	0	2.7528	
B52-1F-33-47-00-B1-01	33	47	0	Floor	Concrete	0	0	0	0	0	
B52-1F-33-47-00-B1-02	33	47	0	Floor	Concrete	6	370	0	0		
B52-1F-35-03-00-B1-01	35	3	0	Floor	Concrete	6	0	0	0	0.75036	
B52-1F-40-34-00-B1-01	40	34	0	Floor	Concrete	29	140	0	8	76.59	
B52-1F-47-22-00-B1-01	47	22	0	Floor	Concrete	12	355	0	0		
B52-1F-47-47-00-B1-01	47	47	0	Floor	Concrete	0	161	0	25		
B52-1F-54-36-00-B1-01	54	36	0	Floor	Concrete	0	241	0	38		
B52-1F-54-36-00-B1-02	54	36	0	Floor	Concrete	0	85	0	21		
B52-1F-57-15-00-B1-01	57	15	0	Floor	Concrete	12	232	0	47		
B52-1F-61-22-00-B1-01	61	22	0	Floor	Concrete	0	100	0	0		
B52-1F-68-10-00-B1-01	68	10	0	Floor	Concrete	0	71	0	68		
B52-1F-68-34-00-B1-01	68	34	0	Floor	Concrete	0	259	0	42		
B52-1F-74-47-00-B1-01	74	47	0	Floor	Concrete	0	449	0	47	2.00022	
B52-1F-74-47-00-B1-02	74	47	0	Floor	Concrete	0	335	0	25		
B52-1F-75-22-00-B1-01	75	22	0	Floor	Concrete	0	451	0	8		
B52-1F-82-10-00-B1-01	82	10	0	Floor	Concrete	0	549	0	34	-1.75158	
B52-1F-82-34-00-B1-01	82	34	0	Floor	Concrete	0	518	0	47	-1.75158	
B52-1F-89-01-00-B1-01	89	1	0	Floor	Concrete	0	540	0	4	0	
B52-1F-89-10-00-B1-01	89	10	0	Floor	Concrete	0	661	0	17		
B52-1F-89-22-00-B1-01	89	22	0	Floor	Concrete	0	603	0	25		
B52-1F-89-47-00-B1-01	89	47	0	Floor	Concrete	0	357	0	51		
B52-1F-96-34-00-B1-01	96	34	0	Floor	Concrete	0	558	0	38	0.25086	
B52-1F-05-01-00-B3-01	5	1	0	Floor	Tile	0	275	0	0	2.997	
B52-1F-30-10-00-B3-01	30	10	0	Floor	Tile	6	80	0	0	-0.75036	
B52-1F-61-47-00-B5-01	61	47	0	Floor	Painted steel	6	375	0	42		
B52-1F-40-40-00-B7-02	40	40	0	Floor	Unknown	6	0	0	0		
B52-1F-20-03-00--01	20	3	0	Floor						0.75036	
B52-1F-19-07-00--01	19	7	0	Floor						-1.00122	
B52-1F-35-03-00--01	35	3	0	Floor						0.75036	
B52-1F-54-07-00--01	54	7	0	Floor						-2.5086	
B52-1F-71-28-00--01	71	28	0	Floor						-1.50072	
B52-1F-89-22-00--01	89	22	0	Floor						6.0162	
B52-1F-62-45-00--01	62	45	0	Floor						6.3492	

Table 13-1. Systematic Radiological Measurement Results – Building 52

Sample ID	Location X	Location Y	Location Z	Surface Type	Material Type	Total Alpha dpm/100cm^2	Beta Total dpm/100cm^2	Removable Alpha dpm/100cm^2	Removable Beta dpm/100cm^2	Tritium dpm/100cm^2	Comments
B52-1F-94-48-00--01	94	48	0	Floor						20.7126	
B52-1F-90-07-00--01	90	7	0	Floor						6.6822	
B52-1F-13-12-00--01	13	12	0	Floor						1.00122	
B52-W-01-40-01-B4-01	1	40	1	Wall	Dry Wall	0	0	0	0	-1.00122	
B52-W-05-01-01-B4-01	5	1	1	Wall	Dry Wall	6	0	0	0	-0.25086	
B52-W-14-13-05-B4-01	14	13	5	Wall	Dry Wall	0	0	0	0		
B52-W-14-19-05-B4-01	14	19	5	Wall	Dry Wall	6	55	0	0		
B52-W-15-02-05-B4-01	15	2	5	Wall	Dry Wall	6	0	0	0		
B52-W-17-19-01-B4-01	17	19	1	Wall	Dry Wall	0	20	0	0	-0.25086	
B52-W-20-01-05-B4-01	20	1	5	Wall	Dry Wall	12	0	0	0	-1.75158	
B52-W-25-03-01-B4-01	25	3	1	Wall	Dry Wall	12	0	0	0		
B52-W-26-05-05-B4-01	26	5	5	Wall	Dry Wall	0	0	6	0		
B52-W-26-19-01-B4-01	26	19	1	Wall	Dry Wall	12	0	0	0	-1.00122	
B52-W-27-48-05-B4-01	27	48	5	Wall	Dry Wall	6	0	0	0	0.25086	
B52-W-36-19-01-B4-01	36	19	1	Wall	Dry Wall	0	0	0	0		
B52-W-40-01-01-B4-01	40	1	1	Wall	Dry Wall	6	0	0	0	0	
B52-W-40-19-05-B4-01	40	19	5	Wall	Dry Wall	12	0	0	0	-0.75036	
B52-W-41-48-01-B4-01	41	48	1	Wall	Dry Wall	0	0	3	0		
B52-W-41-48-01-B4-02	41	48	1	Wall	Dry Wall	0	0	0	0		
B52-W-52-20-05-B4-01	52	20	5	Wall	Dry Wall	0	0	0	0		
B52-W-54-19-05-B4-01	54	19	5	Wall	Dry Wall	12	95	0	0	-1.75158	
B52-W-54-19-05-B4-02	54	19	5	Wall	Dry Wall	0	5	0	0	-1.24986	
B52-W-62-48-05-B4-01	62	48	5	Wall	Dry Wall	0	0	0	0		
B52-W-73-19-01-B4-01	73	19	1	Wall	Dry Wall	0	0	0	0		
B52-W-74-03-05-B4-01	74	3	5	Wall	Dry Wall	0	65	0	0	1.00122	
B52-W-80-01-04-B4-01	80	1	4	Wall	Dry Wall	0	0	0	0	-1.00122	
B52-W-80-48-01-B4-01	80	48	1	Wall	Dry Wall	0	0	0	0	0.75036	
B52-W-98-05-01-B4-01	98	5	1	Wall	Dry Wall	0	0	0	0		
B52-W-98-40-05-B4-01	98	40	5	Wall	Dry Wall	0	0	0	0		
B52-W-98-40-05-B4-02	98	40	5	Wall	Dry Wall	0	0	0	0		
B52-W-55-19-05-B5-01	55	19	5	Wall	Painted Steel	0	0	0	0	1.24986	
B52-W-60-19-01-B5-01	60	19	1	Wall	Painted Steel	0	0	0	0		
B52-W-61-05-05-B5-01	61	5	5	Wall	Painted Steel	0	0	0	0		
B52-W-74-12-01-B5-01	74	12	1	Wall	Painted Steel	0	0	0	0		
B52-W-85-10-05-B5-01	85	10	5	Wall	Painted Steel	0	0	0	0		
B52-W-98-20-01-B7-01	98	20	1	Wall	Unknown	0	80	0	0	0.25086	
B52-W-65-01-05--01	65	1	5	Wall						2.00022	

Table 13-2. Summary of Surface Alpha and Beta Radioactivity Measurements – Building 52

				dpm/100 cm^2				
Area	Matrix	Parameter[1]	Number of Measurements	Median	Mean	Standard Deviation	Minimum	Maximum
Floors	Concrete/Tile	Total Alpha	36	0	4.1	6.1	0	29
		Removable Alpha	36	0	0.1	0.5	0	3
		Total Beta	36	317	282	199	0	661
		Removable Beta	36	6	17	20.5	0	68
Walls	Gypsum Wall Board/Painted Steel	Total Alpha	33	0	2.7	4.5	0	12
		Removable Alpha	33	0	0.3	1.2	0	6
		Total Beta	33	0	9.6	25.0	0	95
		Removable Beta	13	0	0	0	0	0

Notes:
[1] Low energy beta emitters such as tritium are not included
dpm/100 cm^2 = decay per minute per 100 square centimeters of surface area

Table 13-3. Measurements of Tritium Surface Radioactivity – Building 52

	Number of Measurements	dpm/100 cm^2				
		Median	Mean	Standard Deviation	Minimum	Maximum
Floors (Systematic and Biased)	25	1.0	11.2	32.5	0	148
Walls (Systematic and Biased)	16	0	0	1.1	0	2.0

Note: dpm/100 cm^2 = decay per minute per 100 square centimeters of surface area

Table 13-4. Volumetric Sampling Results - Building 52

Sample ID	Matrix	Method	Analyte	Result (pCi/g)	TPU (pCi/g)	MDA (pCi/g)	Data Qualifiers	Comments
B52SC006	Concrete	EPA 901.1 MOD	Cobalt-60	0	0.11	0.39	U	
			Europium-152	-0.09	0.38	0.74	U	
			Europium-154	0	0.59	2.2	U	
B52SC007	Concrete	EPA 901.1 MOD	Cobalt-60	0	0.066	0.24	U	
			Europium-152	-0.14	0.42	0.76	U	
			Europium-154	0.003	1.1	2.3	U	
B52SC10	Concrete	EPA 901.1 MOD	Cobalt-60	-0.05	0.23	0.48	U	
			Europium-152	0	0.47	0.92	U	
			Europium-154	0	0.55	2	U	
B52SC13	Concrete	EPA 901.1 MOD	Cobalt-60	0	0.11	0.4	U	
			Europium-152	-0.07	0.37	0.73	U	
			Europium-154	0	0.6	2.2	U	
B52SC14	Concrete	EPA 901.1 MOD	Cobalt-60	0	0.11	0.41	U	
			Europium-152	-0.15	0.59	1.1	U	
			Europium-154	0	0.62	2.3	U	
B52SC15	Concrete	EPA 901.1 MOD	Cobalt-60	-0.03	0.24	0.51	U	
			Europium-152	-0.07	0.37	0.73	U	
			Europium-154	-0.2	1.4	2.9	U	
B52SM01	Steel	EPA 901.1 MOD	Cobalt-60	0.0	0.11	0.40	U	
			Europium-152	0.0	0.13	0.47	U	
			Europium-154	0.0	0.61	2.2	U	
B52SM02	Steel	EPA 901.1 MOD	Cobalt-60	0.0	0.061	0.23	U	
			Europium-152	0.0	0.20	0.42	U	
			Europium-154	-0.18	0.99	2.0	U	

Table 13-5. Non-Radiological Sampling and Analysis Summary – Building 52

Location	Matrix	Collection Rationale	Analytes	Constituents Potentially Above Hazardous Waste Thresholds[1]
Room 100 north	Concrete floor	Capacitor bank, cable winding, electronics, lubricants, solvents, refrigeration equipment	CAM 17, PCBs, TPH, VOCs	None
Room 100 southeast	Concrete floor	Lead and mercury releases	Lead, mercury, arsenic	None
Room 100 at former Bevatron scale model	Concrete floor	Mercury diffusion pumps	Mercury	None
Room 100 southwest	Concrete floor	Former machine shop with lathe and drill press	CAM 17, PCBs	Copper, chromium, lead
Trenches	Bulk dust/sediment accumulations	High potential for waste, contaminant settling point	CAM 17, PCBs, TPH, VOCs, SVOCs, pH	Antimony, barium, cadmium, chromium, copper, lead, mercury, nickel, silver, zinc, Aroclor 1254,
Cryostat pit	Sediment accumulations	High potential for waste, contaminant settling point	CAM 17, PCBs, TPH, VOCs, SVOCs, pH	Barium, chromium, copper, lead
Sink trap samples in Rooms 100 southwest, 107, 117; toilet trap sample in Room 117	Wastewater	Contaminant settling points	Mercury, lead, PCBs, pH	Lead (Rooms 107 and 117 sink traps)
	Sediment and/or sludge	Contaminant settling points	Mercury, lead, PCBs	Lead (Rooms 100, 107, and 117 sink traps)
Sewer cleanout - Room 103; outside, adjacent to southwest wall of B52	Wipe of sewer pipe inner surface	Contamination conduit	Mercury, lead, PCBs	None
Room 111	Concrete floor	Lead-lined room, capacitor bank (PCBs),fire (PAHs)	Lead, PCBs, PAHs	None
Room 109	Concrete slab below tile	Machine shop, electronics fabrication shop, potential lead solder, PCBs	CAM 17, PCBs	None

Table 13-5. Non-Radiological Sampling and Analysis Summary – Building 52

Location	Matrix	Collection Rationale	Analytes	Constituents Potentially Above Hazardous Waste Thresholds[1]
Room 107	Concrete slab below tile	Wet lab, machine shop, acids, etching, grinding solvents, oils	CAM 17, pH, VOCs, TPH, PCBs	Chromium, copper, nickel, mercury
Room 107	Floor, bulk dust/sediment accumulations	Contaminant settling point	Beryllium, lead, mercury, arsenic	Lead
Room 103	Concrete slab below tile	Office adjacent to wet lab/machine shop, acids, etching, grinding solvents, oils	pH, lead, mercury, PCBs	None
Floors 1 and 2	Dust on horizontal surfaces such as floors, sills, platform, HVAC ducting, light fixtures[2]	Potential release(s) of beryllium, lead, and mercury and dispersion in dust	Beryllium, lead, mercury, arsenic	None
Rooms 100, 111, 211, 219	Oil on floor, walls[2]	Capacitor banks, PCB concern	PCBs	Aroclor 1254 and Arcolor 1260 (Rooms 100 and 211 only)
Rooms 100, 109	Windowsill caulking	PCBs commonly used in caulking, pre-1979	PCBs	None
	Sediment accumulation behind motor in adjoined room northeast of B52	Stained sediment	CAM 17	Cadmium, chromium, copper, lead
	Interior wall paint	PCBs commonly used in paint, pre-1979	PCBs	None
Room 298	Wood floor	Floor stain at HVAC equipment, potential contaminant dispersion from fire in Room 111 (PAHs, PCBs)	Cam 17, PAHs, PCBs	None

Notes:
Asbestos and lead-based paint are not included in this table. See Appendix C for asbestos and lead-based paint results.
[1] Constituents above thresholds listed in Table 5-3 and described in Section 5.2.1. To determine if a constituent is considered a hazardous waste or is potentially a hazardous waste (based on leachability), consult analytical results tables.
[2] Wipe sample

Table 13–5. Non-Radiological Sampling and Analysis Summary – Building 52

Abbreviations:

PAHs	polycyclic aromatic hydrocarbons
PCBs	polychlorinated biphenyl compounds
TPH	total petroleum hydrocarbons, diesel and motor oil range organics
VOCs	volatile organic compounds
ft	feet

Table 13-6. Analytical Results for Metals – Building 52

Sample Type	Sample Description	Sample Name	Units	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Hg	Mo	Ni	Se	Ag	Tl	V	Zn
Exposed Wood	Wood Floor, room 298 north	B52EW01	mg/kg	8.0	0.51 J, T	12.2	<0.1	0.21	0.76 J, T	15.1	12.7	16.6	<0.033	0.20 J, T	0.59	0.21 J, T	0.17 J, T	<0.2	<1	20.5
Concrete	Concrete core, room 100 northeast	B52SC01	mg/kg	<1	3.8	182	0.22	0.17	34.9	50.2	93.7	9.4	<0.033 UJ, 2	0.73 J, T	34.6	0.39 J, T	0.089 J, T	<0.4	53.3	65.1
Concrete	Concrete core, room 100 northeast	B52SC02	mg/kg	0.17 J, T	4.7	140	0.26	0.46	44.9	27.4 J, 8	49.4	8.1	0.062	0.99	36.7	0.39 J, T	0.82	<0.2 UJ, 2	27.1	51.9
Concrete	Concrete core, room 100 northeast	B52SC03 DUP	mg/kg	<0.5	4.4	114	0.30	0.27	36.2	90.9 J, 8	145	7.2	0.052	0.48 J, T	34.5	0.43 J, T	0.13 J, T	<0.2 UJ, 2	30.6	61.8
Concrete	Concrete core, at former Bevatron model	B52SC04	mg/kg	---	---	---	---	---	---	---	---	---	<0.037 UJ, 2	---	---	---	---	---	---	---
Concrete	Concrete core, at former Bevatron model	B52SC05	mg/kg	---	---	---	---	---	---	---	---	---	0.079	---	---	---	---	---	---	---
Concrete	Concrete core, at former Bevatron model	B52SC06	mg/kg	---	---	---	---	---	---	---	---	---	0.18	---	---	---	---	---	---	---
Concrete	Concrete core, at former Bevatron model	B52SC07	mg/kg	---	---	---	---	---	---	---	---	---	0.0062 J, T	---	---	---	---	---	---	---
Concrete	Concrete core, room 100 southeast	B52SC08	mg/kg	---	4.1	---	---	---	---	---	---	5.6	<0.035 UJ, 2	---	---	---	---	---	---	---
Concrete	Concrete core, room 100 southeast	B52SC09	mg/kg	---	4.2	---	---	---	---	---	---	17.3	<0.038 UJ, 2	---	---	---	---	---	---	---
Concrete	Concrete core, at former Bevatron model	B52SC10	mg/kg	---	---	---	---	---	---	---	---	---	0.031 J, T	---	---	---	---	---	---	---
Concrete	Concrete core, room 100 southwest	B52SC11	mg/kg	<1	4.0	139	0.28	2.5	120	121	878	72.5	0.87	25.8	63.0	0.38 J, T	3.7	<0.4	38.0	228
Concrete	Concrete core, room 100 southwest	B52SC12	mg/kg	<0.5 R, 4L	4.0	163	0.31	0.33	46.5 J, SH	94.9 J, 4L, SH	142 J, 4L, SH	8.0	0.030 J, T	0.46 J, T	48.0	0.63	0.067 J, T	<0.2	41.7 J, SH	206 J, 4H
Concrete	Concrete core, room 111 east	B52SC13	mg/kg	---	---	---	---	---	---	---	---	13.4	---	---	---	---	---	---	---	---
Concrete	Concrete core, room 111 northwest	B52SC14	mg/kg	---	---	---	---	---	---	---	---	4.4	---	---	---	---	---	---	---	---
Concrete	Concrete core, room 111 west	B52SC15	mg/kg	---	---	---	---	---	---	---	---	5.5	---	---	---	---	---	---	---	---
Concrete	Concrete core, room 109 west	B52SC16	mg/kg	<0.5	3.0	86.3	0.24	0.27	22.9	6.8	25.7	7.1	0.026 J, 6L	0.76	15.8	<0.49 UJ, 2	0.10 J, T	<0.4 UJ, 2	23.6	53.4
Concrete	Concrete core, room 109 west	B52SC17 DUP	mg/kg	<0.5	2.8	72.0	0.22	0.13	21.5	9.1	27.2	11.3	0.0078 J, 6L	0.63	11.0	<0.55 UJ, 2	0.042 J, T	<0.41 UJ, 2	14.7	32.3
Concrete	Concrete core, room 107 southwest	B52SC18	mg/kg	<0.5	4.9	214	0.25	0.18	77.9	20.9	21.1	6.2	0.046 J, 6L	0.62	333	<0.61 UJ, 2	0.068 J, T	<0.2 UJ, 2	23.8	57.3
Concrete	Concrete core, room 107 center	B52SC19	mg/kg	0.26 J, T	4.0	107	0.30	1.1	24.7	9.3	304	26.2	12.7 J, 6L	0.78	29.1	<0.89 UJ, 2	3.2	<0.3 UJ, 2	22.3	83.2
Concrete	Concrete core, room 103 south	B52SC20	mg/kg	---	---	---	---	---	---	---	---	4.8	0.077 J, 6L	---	---	---	---	---	---	---
Sediment	Sediment Behind AC Motor in adjoined room northeast of B52	B52SE03	mg/kg	1.4	6.1	116	0.41	66.2	82.6	9.9	583	480	0.24	6.2	86.4	0.62	18.5	<0.2 UJ, 2	58.6	2,470
Sediment	Trench floor sediment, room 100 east	B52SE04	mg/kg	20.4	15.8	3,780	0.25 J, T	77.7	226	20.6	10,400	44,600	52.3	11.1	164	<2.5	76.5	<1	82.6	4,020
Sediment	Trench floor sediment at former Bevatron model	B52SE05	mg/kg	48.1	8.9	2,420	0.14 J, T	56.5	881	29.1	14,800	15,000	6.9	131	499	<2.5	141	<1	27.3	3,550
Sediment	Trench floor sediment, room 100 southeast	B52SE06	mg/kg	175	12.6	720	0.13 J, T	67.5	314	19.4	15,000	28,800	20.4	31.4	371	<2.5	190	<1	32.2	3,710
Sediment	Trench floor sediment at former Bevatron model	B52SE07	mg/kg	54.9	7.7	1,600	0.12 J, T	35.0	1,280	32.5	24,100	7,520	1.0	104	619	<2.5	156	<1	26.8	2,970
Sediment	Trench floor sediment, room 100 south	B52SE08	mg/kg	16.1	11.8	1,060	0.27 J, T	82.0	310	23.2	17,700	6,850	0.42	35.3	220	<2.5	170	<1	47.8	10,100
Sediment	Trench floor sediment, room 111 northeast	B52SE10	mg/kg	52.8	8.0	398	0.21 J, T	66.6	177	24.8	172,000	36,000	6.4	21.7	274	1.4 J, T	181	<1 UJ, 2	19.9	15,900
Sediment	Trench floor sediment, room 111 north	B52SE11	mg/kg	5.3	3.0	81.3	0.092 J, T	12.6	128	5.8	9,750	532	0.080 J, 6L	4.9	18.6	<0.65 UJ, 2	5.0	<0.25 UJ, 2	11.5	2,260
Sediment	Floor sediment, room 107 northwest	B52SE12	mg/kg	---	6.0 J, T	---	<1	---	---	---	---	4,740	1.1	---	---	---	---	---	---	---
Sediment	Cryostat pit sediment	B52SE13	mg/kg	9.7	4.3	4,560	0.22	9.1	206	7.1	4,340	608	0.13	7.1	93.0	0.98 J, T	22.3	<0.4 UJ, 2	67.0	704
Sludge	Sink trap sludge, room 100 southwest, sink outside bathroom	B52SL01	mg/kg	---	---	---	---	---	---	---	---	12,200 J, E	0.043	---	---	---	---	---	---	---
Sludge	Sink trap sludge, room 117	B52SL02	mg/L	---	---	---	---	---	---	---	---	11.8	0.0258	---	---	---	---	---	---	---
Sludge	Sink trap sludge, room 107 southwest	B52SL04	mg/L	---	---	---	---	---	---	---	---	90.5	0.114 J, T	---	---	---	---	---	---	---
Wipe	Floor wipe, room 100 northeast	B52SW03	µg/100 cm²	---	0.33 J, T	---	<0.1	---	---	---	---	15.2	<0.02	---	---	---	---	---	---	---
Wipe	Window sill wipe, room 100 east	B52SW07	µg/100 cm²	---	0.48 J, T	---	<0.1	---	---	---	---	139	<0.02	---	---	---	---	---	---	---
Wipe	Window sill wipe, room 100 southeast	B52SW09	µg/100 cm²	---	1.6	---	<0.1	---	---	---	---	248	0.068	---	---	---	---	---	---	---
Wipe	Floor wipe, room 100 southeast	B52SW10	µg/100 cm²	---	0.29 J, T	---	<0.1	---	---	---	---	29.0	<0.02	---	---	---	---	---	---	---
Wipe	Floor wipe, room 100 southeast	B52SW11	µg/100 cm²	---	<1	---	<0.1	---	---	---	---	12.1	<0.02	---	---	---	---	---	---	---
Wipe	Floor wipe, room 100 southeast	B52SW12 DUP	µg/100 cm²	---	<1	---	<0.1	---	---	---	---	17.2	<0.02	---	---	---	---	---	---	---
Wipe	Floor wipe, room 100 south	B52SW13	µg/100 cm²	---	<1	---	<0.1	---	---	---	---	7.0	<0.02	---	---	---	---	---	---	---
Wipe	Floor wipe, room 111 southwest	B52SW14	µg/100 cm²	---	0.36 J, T	---	<0.1	---	---	---	---	48.2	<0.02	---	---	---	---	---	---	---
Wipe	Sewer cleanout wipe, Outside B52, opposite bathroom.	B52SW15	µg/100 cm²	---	---	---	---	---	---	---	---	1.6	0.0090 J, T	---	---	---	---	---	---	---
Wipe	Window sill wipe, room 109 west	B52SW25	µg/100 cm²	---	5.7	---	0.074 J, T	---	---	---	---	1,370	0.12	---	---	---	---	---	---	---
Wipe	Floor wipe, room 107 northeast	B52SW26	µg/100 cm²	---	<1	---	<0.1	---	---	---	---	8.5	0.0091 J, T	---	---	---	---	---	---	---
Wipe	Sewer cleanout wipe, room 103 northwest	B52SW27	µg/100 cm²	---	---	---	---	---	---	---	---	15.4	8.2	---	---	---	---	---	---	---
Wipe	Wood platform wipe, room 100 east	B52SW28	µg/100 cm²	---	1.6	---	0.019 J, T	---	---	---	---	64.2	0.095	---	---	---	---	---	---	---

Table 13-6. Analytical Results for Metals – Building 52

Sample Type	Sample Description	Sample Name	Units	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Hg	Mo	Ni	Se	Ag	Tl	V	Zn
Wipe	Wood platform wipe, room 100 east	B52SW29	µg/100 cm²	---	2.2	---	0.027 J, T	---	---	---	---	114	0.16	---	---	---	---	---	---	---
Wipe	Light fixture top wipe, room 100 southeast	B52SW30	µg/100 cm²	---	0.71 J, T	---	<0.1	---	---	---	---	26.8	0.012 J, T	---	---	---	---	---	---	---
Wipe	Light fixture top wipe, room 100 south	B52SW31	µg/100 cm²	---	1.2	---	<0.1	---	---	---	---	3,010	0.053	---	---	---	---	---	---	---
Wipe	Floor wipe, room 219 northwest	B52SW33	µg/100 cm²	---	<1	---	<0.1	---	---	---	---	<0.3 J, 8	0.097	---	---	---	---	---	---	---
Wipe	Floor wipe, room 219 northwest	B52SW34 DUP	µg/100 cm²	---	<5	---	<0.5	---	---	---	---	111 J, 8	0.17	---	---	---	---	---	---	---
Wipe	HVAC top wipe, room 211	B52SW35	µg/100 cm²	---	1.0	---	0.019 J, T	---	---	---	---	65.2	0.094	---	---	---	---	---	---	---
Wipe	HVAC vent wipe, room 100 west	B52SW36	µg/100 cm²	---	1.2	---	0.014 J, T	---	---	---	---	34.2	0.15	---	---	---	---	---	---	---
Wipe	HVAC vent wipe, room 100 west	B52SW37	µg/100 cm²	---	1.8	---	0.020 J, T	---	---	---	---	35.5	0.22	---	---	---	---	---	---	---
Wipe	Floor wipe, room 211 south	B52SW38	µg/100 cm²	---	0.40 J, T	---	<0.1	---	---	---	---	25.8	<0.02	---	---	---	---	---	---	---
Wastewater	Sink trap water, room 100 southwest, sink outside bathroom	B52WW01	mg/L	---	---	---	---	---	---	---	---	3.07	0.0036	---	---	---	---	---	---	---
Wastewater	Sink trap water, room 117, sink in bathroom	B52WW02	mg/L	---	---	---	---	---	---	---	---	8.58	0.0029	---	---	---	---	---	---	---
Wastewater	Toilet trap water, room 117	B52WW03	mg/L	---	---	---	---	---	---	---	---	0.0086	0.00014 J, T	---	---	---	---	---	---	---
Wastewater	Sink trap water, room 107 southwest	B52WW04	mg/L	---	---	---	---	---	---	---	---	39.6	0.0004	---	---	---	---	---	---	---

Abbreviations:

DUP = field duplicate
mg/L = milligrams per liter
µg/100 cm² = micrograms per 100 square centimeters
mg/kg = milligrams per kilogram
Sb = antimony, As = arsenic, Ba = barium, Be = beryllium, Cd = cadmium, Co = cobalt, Cr = total chromium, Cu = copper, Pb = lead, Hg = mercury, Mo = molybdenum, Ni = nickel, Se = selenium, Ag = silver, Tl = thalium, V = vanadium, Zn = zinc
STLC = Soluble Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24
TCLP = Toxicity Characteristic Leaching Procedure, Title 22 California Code of Regulations, Section 66261.24
TTLC = Total Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24

Notes:

<n = analyte not detected above reporting limit of 'n'
E= value exceeds linear calibration range
J = estimated result
R = result rejected
SH = initial or continuing calibration check problem - high bias
T = trace level compound, poor quantitation
UJ = result is not detected at an estimated detection limit
2 = method blank contamination
4H = matrix spike recovery above normal limits
4L = matrix spike recovery below normal limits
6L = laboratory control sample recovery below normal limits
8 = field duplicate precision outside limits
--- = not analyzed
Italics = no published bulk sample concentration (TTLC, STLC, TCLP) at which the constituent is deemed a hazardous waste
red = detected above: 1) the TTLC for solid samples; 2) or the STLC or TCLP for aqueous samples; 3) or the wipe concentration limit
yellow = detected above 10 x STLC or 20 x TCLP concentrations, for solid matices (does not apply to wipe samples)

Analysis for Metals by USEPA Methods 6020, 7470A and 7471A. All samples analyzed by Test America St. Louis, Earth City, Missouri

The comparison threshold for beryllium of 0.2 µg/100 cm2 (collected on wipes) applies to removable contamination on equipment or surfaces. Equipment or surfaces with beryllium concentrations below this threshold may be released to the general public or to a DOE facility for use in a manner not requiring controls for beryllium exposure per the Chronic Beryllium Disease Prevention Program (10 CFR 850).

If chromium STLC and TCLP analyses are performed on future waste characterization samples, the optional 560 mg/L STLC limit can be applied if the TCLP concentration is below 5 mg/L per California Code of Regulations, Title 22, Section 66261.24.

Table 13-7. Analytical Results for PCBs – Building 52

Sample Type	Sample Description	Sample Name	Units	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Aroclor 1262	Aroclor 1268
Caulk	Window sill caulking, room 100 east	B52CK01	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	1.8	<0.033	---	---
Caulk	Window sill caulking, room 100 southeast	B52CK02	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	2.1	<0.033	---	---
Caulk	Window sill caulking, room 109 west	B52CK03	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	0.87	<0.033	---	---
Exposed Wood	Wood Floor, room 298 north	B52EW01	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	0.069	<0.033 UJ, 6L	---	---
Paint	Wall paint, room 100 southwest	B52PC02	mg/kg	<0.099	<0.099	<0.099	<0.099	<0.099	38	<0.099 UJ, 6L	---	---
Paint	Wall paint, room 109	B52PC03	mg/kg	<0.098	<0.098	<0.098	<0.098	<0.098	11	<0.098 UJ, 6L	---	---
Concrete	Concrete core, room 100 northeast	B52SC01	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	0.09	<0.033 UJ, 6L	---	---
Concrete	Concrete core, room 100 northeast	B52SC02	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	0.47 J, 8	<0.033 UJ, 6L	---	---
Concrete	Concrete core, room 100 northeast	B52SC03 DUP	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	7 J, 8	<0.033 UJ, 6L	---	---
Concrete	Concrete core, room 100 southwest	B52SC11	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	1.2	<0.033 UJ, 6L	---	---
Concrete	Concrete core, room 100 southwest	B52SC12	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	20	<0.033	---	---
Concrete	Concrete core, room 111 east	B52SC13	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	4.2	<0.033	---	---
Concrete	Concrete core, room 111 northwest	B52SC14	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	---	---
Concrete	Concrete core, room 111 west	B52SC15	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	0.0071 J, T	<0.033	---	---
Concrete	Concrete core, room 109 west	B52SC16	mg/kg	<0.077	<0.077	<0.077	<0.077	<0.077	0.33 J, 8, 1	<0.077	---	---
Concrete	Concrete core, room 109 west	B52SC17 DUP	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	0.075 J, 8	0.053	---	---
Concrete	Concrete core, room 107 southwest	B52SC18	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	0.61	0.44	---	---
Concrete	Concrete core, room 107 center	B52SC19	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	0.2	<0.033	---	---
Concrete	Concrete core, room 103 south	B52SC20	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	0.25	<0.033	---	---
Sediment	Trench floor sediment, room 100 east	B52SE04	mg/kg	<0.066	<0.066	<0.066	<0.066	<0.066	51	<0.066 UJ, 6L	---	---
Sediment	Trench floor sediment at former Bevatron model	B52SE05	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	29	<0.033 UJ, 6L	---	---
Sediment	Trench floor sediment, room 100 southeast	B52SE06	mg/kg	<16	<16	<16	<16	<16	240	<16 UJ, 6L	---	---
Sediment	Trench floor sediment at former Bevatron model	B52SE07	mg/kg	<19	<19	<19	<19	<19	270	<19 UJ, 6L	---	---
Sediment	Trench floor sediment, room 100 south	B52SE08	mg/kg	<0.097	<0.097	<0.097	<0.097	<0.097	120	<0.097 UJ, 6L	---	---
Sediment	Trench floor sediment, room 111 northeast	B52SE10	mg/kg	<3.3	<3.3	<3.3	<3.3	<3.3	140	<3.3 UJ, 6L	---	---
Sediment	Trench floor sediment, room 111 north	B52SE11	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	0.078	<0.033	---	---
Sediment	Cryostat pit sediment	B52SE13	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	2.4	<0.033 UJ, 6L	---	---
Sludge	Sink trap sludge, room 100 southwest, sink outside bathroom	B52SL01	mg/kg	<0.19	<0.19	<0.19	<0.19	<0.19	37	<0.19	---	---
Sludge	Sink trap sludge, room 117	B52SL02	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	0.00011 J, T	<0.001	---	---
Sludge	Sink trap sludge, room 107 southwest	B52SL04	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	0.018 J, T	<0.1 UJ, 6L	---	---
Wipe	Floor wipe, room 100 northeast	B52SW04	µg/100 cm²	<1.0	<1.0	<1.0	<1.0	<1.0	1.8	1.2	<1.0	<1.0
Wipe	Floor wipe, room 100 east	B52SW05	µg/100 cm²	<1.0	<1.0	<1.0	<1.0	<1.0	38	<1.0	<1.0	<1.0
Wipe	Floor wipe, room 100 east	B52SW06	µg/100 cm²	<1.0	<1.0	<1.0	<1.0	<1.0	1.6	1.6	<1.0	<1.0
Wipe	Floor wipe at former Bevatron model	B52SW08	µg/100 cm²	<1.0	<1.0	<1.0	<1.0	<1.0	4.0	3.6	<1.0	<1.0
Wipe	Sewer cleanout wipe, Outside B52, opposite bathroom.	B52SW15	µg/100 cm²	<1.0	<1.0	<1.0	<1.0	<1.0	0.67 J, T	<1.0	<1.0	<1.0
Wipe	Floor wipe, room 111 southwest	B52SW16	µg/100 cm²	<1.0	<1.0	<1.0	<1.0	<1.0	0.98 J, T	1.1	<1.0	<1.0

Table 13-7. Analytical Results for PCBs – Building 52

Sample Type	Sample Description	Sample Name	Units	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Aroclor 1262	Aroclor 1268
Wipe	Floor wipe, room 111 southwest	B52SW17 DUP	µg/100 cm²	<1.0	<1.0	<1.0	<1.0	<1.0	0.95 J, T	1.3	<1.0	<1.0
Wipe	Floor wipe, room 111 southeast	B52SW18	µg/100 cm²	<1.0	<1.0	<1.0	<1.0	<1.0	0.95 J, T	1.4	<1.0	<1.0
Wipe	Wall wipe, room 111 southwest	B52SW19	µg/100 cm²	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Wipe	Wall wipe, room 111 southwest	B52SW20	µg/100 cm²	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Wipe	Wall wipe, room 111 west	B52SW21	µg/100 cm²	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Wipe	Wall wipe, room 111 northwest	B52SW22	µg/100 cm²	<1.0	<1.0	<1.0	<1.0	<1.0	0.52	<1.0	<1.0	<1.0
Wipe	Wall wipe, room 111 northeast	B52SW23	µg/100 cm²	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Wipe	Wall wipe, room 111 southeast	B52SW24	µg/100 cm²	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Wipe	Sewer cleanout wipe, room 103 northwest	B52SW27	µg/100 cm²	<1.0	<1.0	<1.0	<1.0	<1.0	2.7	<1.0	<1.0	<1.0
Wipe	Floor wipe, room 219 northeast	B52SW32	µg/100 cm²	<1.0	<1.0	<1.0	<1.0	<1.0	1.6	2.9	<1.0	<1.0
Wipe	Floor wipe, room 211 northeast	B52SW39	µg/100 cm²	<1.0	<1.0	<1.0	<1.0	<1.0	8.0	5.0	<1.0	<1.0
Wipe	Floor wipe, room 211 northeast	B52SW40 DUP	µg/100 cm²	<1.0	<1.0	<1.0	<1.0	<1.0	9.6	5.8	<1.0	<1.0
Wipe	Floor wipe, room 100 southwest	B52SW41	µg/100 cm²	<1.0	<1.0	<1.0	<1.0	<1.0	730	<1.0	<1.0	<1.0
Wastewater	Toilet trap water, room 117	B52WW03	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	0.00021 J, T	<0.001	---	---

Abbreviations:

mg/L = milligrams per liter
µg/100 cm² = micrograms per 100 square centimeters
DUP = field duplicate
mg/kg = milligrams per kilogram
PCBs = polychlorinated biphenyls
STLC = Soluble Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24
TCLP = Toxicity Characteristic Leaching Procedure, Title 22 California Code of Regulations, Section 66261.24
TTLC = Total Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24

Notes:

<n = analyte not detected above reporting limit of 'n'
J = estimated result
T = trace level compound, poor quantitation
UJ = the result is not detected at an estimated detection limit
1 = holding time violation
6L = laboratory control sample recovery below normal limits
8 = field duplicate precision outside limits
--- = not analyzed
Italics = no published bulk sample concentration (TTLC, STLC, TCLP) at which the constituent is deemed a hazardous waste
red = detected above: 1) the TTLC for solid samples; 2) or the STLC or TCLP for aqueous samples; 3) or the wipe concentration limit
yellow = detected above 10 x STLC or 20 x TCLP concentrations, for solid matrices (does not apply to wipe samples)

Analysis for PCBs by USEPA Method 8082. All samples analyzed by Test America St. Louis, Earth City, Missouri.

The comparison threshold for PCBs of 10 µg/100 cm2 (collected on wipes) applies to non-porous surfaces contaminated with PCBs. Surfaces containing PCB concentrations above this limit are considered to be contaminated (40 CFR 761).

The value used as the threshold for determining if PCBs exceed hazardous waste limits is applicable to the sum of the Aroclor mixtures reported.

Table 13-8 Analytical Results for TPH and pH – Building 52

Sample Type	Sample Description	Sample Name	Units	TPH Diesel	TPH Motor Oil	pH
Concrete	Concrete core, room 100 northeast	B52SC01	mg/kg	*<25*	*140*	---
Concrete	Concrete core, room 100 northeast	B52SC02	mg/kg	*<250*	*920 J, 3H*	---
Concrete	Concrete core, room 100 northeast	B52SC03 DUP	mg/kg	*<25*	*340 J, 3H*	---
Concrete	Concrete core, room 107 southwest	B52SC18	mg/kg	*<25*	*57*	---
Concrete	Concrete core, room 107 southwest	B52SC18	pH Units	---	---	*12.0*
Concrete	Concrete core, room 107 center	B52SC19	mg/kg	*330*	*190*	---
Concrete	Concrete core, room 107 center	B52SC19	pH Units	---	---	*11.4*
Concrete	Concrete core, room 103 south	B52SC20	pH Units	---	---	*11.8*
Sediment	Trench floor sediment, room 100 east	B52SE04	mg/kg	*<560*	*3,800*	---
Sediment	Trench floor sediment, room 100 east	B52SE04	pH Units	---	---	*7.5*
Sediment	Trench floor sediment at former Bevatron model	B52SE05	mg/kg	*<300*	*1,700*	---
Sediment	Trench floor sediment at former Bevatron model	B52SE05	pH Units	---	---	*6.4*
Sediment	Trench floor sediment, room 100 southeast	B52SE06	mg/kg	*<100*	*2,500*	---
Sediment	Trench floor sediment, room 100 southeast	B52SE06	pH Units	---	---	*8.4*
Sediment	Trench floor sediment at former Bevatron model	B52SE07	mg/kg	*<2300*	*9,300*	---
Sediment	Trench floor sediment at former Bevatron model	B52SE07	pH Units	---	---	*6.4*
Sediment	Trench floor sediment, room 100 south	B52SE08	mg/kg	*<600*	*2,800*	---
Sediment	Trench floor sediment, room 100 south	B52SE08	pH Units	---	---	*7.9*
Sediment	Trench floor sediment, room 111 northeast	B52SE10	mg/kg	*<1500*	*3,000*	---
Sediment	Trench floor sediment, room 111 northeast	B52SE10	pH Units	---	---	*7.5*
Sediment	Trench floor sediment, room 111 north	B52SE11	mg/kg	*<100*	*510*	---
Sediment	Trench floor sediment, room 111 north	B52SE11	pH Units	---	---	*7.8*
Sediment	Cryostat pit sediment	B52SE13	mg/kg	*<250*	*680*	---
Sediment	Cryostat pit sediment	B52SE13	pH Units	---	---	*7.7*

Table 13-9 Analytical Results for VOCs – Building 52

Sample Type	Sample Description	Sample Name	Units	1,1,1-Trichloro-ethane	1,3-Dichloro-benzene	1,4-Dichloro-benzene	2-Buta-none	2-Hexa-none	4-Methyl-2-penta-none	Acetone	Benzene	Bromo-methane	Carbon disulfide	Chloro-benzene	Chloro-ethane	Chloro-form	Chloro-methane	Ethyl-benzene	Methylene chloride	Styrene	Toluene	Vinyl chloride	Xylenes (total)
Concrete	Concrete core, room 100 northeast	B52SC01	mg/kg	*<0.005*	*<0.005*	<0.005	<0.02	*<0.02*	*<0.02*	*<0.86 UJ, 2*	<0.005	*<0.01*	*<0.005*	<0.005	*<0.01*	<0.005	*<0.01*	*<0.005*	*<0.005*	*<0.005*	*0.00076 J, T*	<0.005	*<0.01*
Concrete	Concrete core, room 100 northeast	B52SC02	mg/kg	*<0.005*	*<0.005*	<0.005	0.0085 J, T	*0.0076 J, T*	*<0.02*	*<0.055 UJ, 2*	<0.005	*<0.01*	*<0.005*	<0.005	*<0.01*	<0.005	*<0.01*	*<0.005*	*<0.005*	*<0.005*	*0.0013 J, T*	<0.005	*0.0017 J, T*
Concrete	Concrete core, room 100 northeast	B52SC03 DUP	mg/kg	*<0.005*	*<0.005*	<0.005	0.013 J, T	*0.011 J, T*	*<0.02*	*<0.07 UJ, 2*	<0.005	*0.00091 J, T*	*<0.005*	<0.005	*<0.01*	<0.005	*<0.01*	*<0.005*	*<0.005*	*0.0012 J, T*	*<0.005*	<0.005	*0.0017 J, T*
Concrete	Concrete core, room 107 southwest	B52SC18	mg/kg	*<0.005*	*<0.005*	<0.005	0.0051 J, 3L, T	*0.0064 J, T*	*<0.02*	*0.04 J, 3L*	0.00062 J, T	*<0.01 R, 3L*	*<0.005 R, 3L*	<0.005	*<0.01 R, 3L*	<0.005 R, 3L	*<0.01 R, 3L*	*0.00048 J, T*	*<0.005 R, 3L*	*<0.005*	*0.0021 J, T*	<0.005 R, 3L	*0.0025 J, T*
Concrete	Concrete core, room 107 center	B52SC19	mg/kg	*<0.005*	*<0.005*	<0.005	<0.02	*<0.02*	*<0.02*	*0.02*	<0.005	*<0.01*	*<0.005*	<0.005	*<0.01*	<0.005	*<0.01*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	<0.005	*<0.01*
Sediment	Trench floor sediment, room 100 east	B52SE04	mg/kg	*<0.005*	*0.0014 J, T, 3H, X*	0.0013 J, T, 3H, X	0.3	*0.03*	*<0.02*	*<1.9 UJ, 2, 3H*	0.006	*0.0013 J, T*	*<0.005*	<0.005	*0.0037 J, T*	<0.005	*<0.01*	*0.00049 J, T*	*<0.005*	*0.0014 J, T*	*0.0069*	<0.005	*<0.01*
Sediment	Trench floor sediment at former Bevatron model	B52SE05	mg/kg	*<0.005*	*<0.005 R, X*	<0.005 R, X	0.6	*0.16 J, 3H, X*	*0.036 J, 3H, X*	*4.8*	0.013 J, 3H	*0.016*	*<0.005*	<0.005	*0.034*	<0.005	*0.16*	*0.00093 J, T, 3H, X*	*<0.005*	*0.008 J, 3H, X*	*0.0083 J, 3H, X*	0.0017 J, T	*0.0041 J, T, 3H, X*
Sediment	Trench floor sediment, room 100 southeast	B52SE06	mg/kg	*<0.005*	*<0.005 R, X*	<0.005 R, X	2.4	*0.79 J, X*	*<0.02 UJ, X*	*7.7*	0.014 J, 3H	*0.01*	*<0.005*	<0.005	*0.049*	<0.005	*0.092*	*<0.005 UJ, X*	*<0.005*	*0.0022 J, X, T*	*0.0024 J, X, T*	<0.005	*<0.01 UJ, X*
Sediment	Trench floor sediment at former Bevatron model	B52SE07	mg/kg	*0.0012 J, T, 3H*	*<0.005 R, X*	<0.005 R, X	0.67	*0.22 J, 3H, X*	*<0.02 UJ, X*	*4.5*	0.013 J, 3H	*0.0048 J, T*	*<0.005*	<0.005	*0.012*	<0.005	*0.051*	*0.00062 J, T, 3H, X*	*<0.005*	*0.006 J, 3H, X*	*0.0069 J, 3H, X*	<0.005	*<0.01 UJ, X*
Sediment	Trench floor sediment, room 100 south	B52SE08	mg/kg	*<0.005*	*<0.005 J, X*	<0.005 J, X	0.43	*0.083*	*<0.02*	*<2.2 UJ, 2*	0.012	*0.012*	*<0.005*	0.00092 J, T	*0.022*	<0.005	*0.1*	*0.00091 J, T*	*<0.005*	*0.0039 J, T*	*0.0054*	<0.005	*0.0044 J, T*
Sediment	Trench floor sediment, room 111 northeast	B52SE10	mg/kg	*<0.005*	*<0.005*	<0.005	0.11	*0.0097 J, T*	*<0.02*	*<0.6 UJ, 2*	0.0029 J, T	*0.003 J, T*	*<0.005*	<0.005	*0.0046 J, T*	<0.005	*0.016*	*<0.005*	*<0.005*	*0.0018 J, T*	*0.0031 J, T*	<0.005	*0.0022 J, T*
Sediment	Trench floor sediment, room 111 north	B52SE11	mg/kg	*<0.005*	*<0.005*	<0.005	0.12	*0.036*	*<0.02*	*0.77*	0.0017 J, T	*0.00076 J, T*	*<0.005*	<0.005	*<0.01*	<0.005	*0.00097 J, T*	*<0.005*	*<0.005*	*0.0013 J, T*	*0.0015 J, T*	<0.005	*<0.01*
Sediment	Cryostat pit sediment	B52SE13	mg/kg	*<0.005*	*<0.005*	<0.005	0.047	*0.0058 J, T*	*<0.02*	*<0.4 UJ, 2*	0.00061 J, T	*<0.01*	*<0.005*	<0.005	*<0.01*	<0.005	*0.00068 J, T*	*<0.005*	*<0.005*	*<0.005*	*0.00056 J, T*	<0.005	*<0.01*

Abbreviations:

DUP = field duplicate
mg/kg = milligrams per kilogram
STLC = Soluble Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24
TCLP = Toxicity Characteristic Leaching Procedure, Title 22 California Code of Regulations, Section 66261.24
TTLC = Total Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24
VOCs = volatile organic compounds

Notes:

<n = analyte not detected above reporting limit of 'n'
J = estimated result
R = result rejected
T = trace level compound, poor quantitation
UJ = result is not detected at an estimated detection limit
X = internal standard recovery problem
2 = method blank contamination
3 = surrogate recovery outside limits
3H = surrogate recovery above normal limits
3L = surrogate recovery below normal limits
--- = not analyzed
Italics = no published bulk sample concentration (TTLC, STLC, TCLP) at which the constituent is deemed a hazardous waste
red = detected above: 1) the TTLC for solid samples; 2) or the STLC or TCLP for aqueous samples; 3) or the wipe concentration limit
yellow = detected above 10 x STLC or 20 x TCLP concentrations, for solid matices (does not apply to wipe samples)

Analysis for VOCs by USEPA Method 8260B. All samples analyzed by Test America St. Louis, Earth City, Missouri

Table 13-10 Analytical Results for SVOCs – Building 52

Sample Type	Sample Description	Sample Name	Units	1,3-Dichloro-benzene	1,4-Dichloro-benzene	Benzo-(ghi)-perylene	Benzoic acid	bis-(2-Ethylhexyl) phthalate	Butyl benzyl phthalate	Chrysene	Diethyl phthalate	Di-n-butyl phthalate	Di-n-octyl phthalate	Fluoran-thene	Phenan-threne	Phenol	Pyrene
Concrete	Concrete core, room 100 southwest	B52SC12	mg/kg	---	---	*<0.33*	---	---	---	*<0.33*	---	---	---	*0.044 J, T*	*<0.33*	---	*<0.33*
Concrete	Concrete core, room 111 east	B52SC13	mg/kg	---	---	*<0.33*	---	---	---	*<0.33*	---	---	---	*<0.33*	*<0.33*	---	*<0.33*
Concrete	Concrete core, room 111 northwest	B52SC14	mg/kg	---	---	*<0.98*	---	---	---	*<0.98*	---	---	---	*<0.98*	*<0.98*	---	*<0.98*
Concrete	Concrete core, room 111 west	B52SC15	mg/kg	---	---	*<3.3*	---	---	---	*<3.3*	---	---	---	*<3.3*	*<3.3*	---	*<3.3*
Exposed Wood	Wood Floor, room 298 north	B52EW01	mg/kg	---	---	*<0.33 UJ, X*	---	---	---	*<0.33*	---	---	---	*<0.33*	*<0.33*	---	*<0.33*
Sediment	Trench floor sediment, room 100 east	B52SE04	mg/kg	*<2*	<2	*<2 UJ, X*	*<9.6*	*16*	*5.5*	*<2*	*<2*	*16*	*<2 UJ, X*	*<2*	*<2*	*<2*	*<2*
Sediment	Trench floor sediment at former Bevatron model	B52SE05	mg/kg	*<0.33*	<0.33	*<0.33 UJ, X*	*1.1 J, T*	*33*	*8.4*	*<0.33*	*0.88*	*31*	*2.7 J, X*	*<0.33*	*<0.33*	*0.4*	*<0.33*
Sediment	Trench floor sediment, room 100 southeast	B52SE06	mg/kg	*<0.33*	<0.33	*<0.33 UJ, X*	*<1.6*	*7.1*	*0.82*	*<0.33*	*0.51*	*120*	*1.4 J, X*	*<0.33*	*<0.33*	*<0.33*	*<0.33*
Sediment	Trench floor sediment at former Bevatron model	B52SE07	mg/kg	*<3.3*	<3.3	*<3.3 UJ, X*	*6.3 J, T*	*100*	*48*	*<3.3*	*0.79 J, T*	*57*	*3.6 J, X*	*<3.3*	*<3.3*	*<3.3*	*<3.3*
Sediment	Trench floor sediment, room 100 south	B52SE08	mg/kg	*<1.9*	<1.9	*<1.9 UJ, X*	*1.3 J, T*	*72*	*31*	*<1.9*	*0.51 J, T*	*19*	*2 J, X*	*<1.9*	*<1.9*	*<1.9*	*<1.9*
Sediment	Trench floor sediment, room 111 northeast	B52SE10	mg/kg	*<0.33 UJ, X*	<0.33 UJ, X	*<0.33 UJ, X*	*<1.6 UJ, X*	*<26 UJ, 3L*	*1.9 J, 3L*	*<0.33 UJ, 3L*	*0.37 J, 3L, X*	*<9.2 UJ, X*	*1.1 J, 3L, X*	*0.04 J, 3L, T, X*	*<0.33 UJ, X*	*0.086 J, 3L, T, X*	*<0.33 UJ, 3L*
Sediment	Trench floor sediment, room 111 north	B52SE11	mg/kg	*<0.33*	<0.33	*<0.33 UJ, X*	*<1.6*	*390*	*3 J, X*	*<0.33 UJ, X*	*0.29 J, T*	*1.1*	*4.3 J, 6H*	*0.038 J, T*	*<0.33*	*<0.33*	*0.1 J, X, T*
Sediment	Cryostat pit sediment	B52SE13	mg/kg	*<0.33*	<0.33	*<0.33 UJ, X*	*<1.6*	*<800 UJ, X*	*<0.33 UJ, X*	*<0.33 UJ, X*	*0.46*	*9.4*	*2.1 J, X*	*0.093 J, T*	*0.19 J, T*	*<0.33*	*0.93 J, X*

Abbreviations:

mg/kg = milligrams per kilogram
PAHs = polycyclic aromatic hydrocarbon
STLC = Soluble Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24
SVOCs = semivolatile organic compounds
TCLP = Toxicity Characteristic Leaching Procedure, Title 22 California Code of Regulations, Section 66261.24
TTLC = Total Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24

Notes:

<n = analyte not detected above reporting limit of 'n'
J = estimated result
T = trace level compound, poor quantitation
UJ = the result is not detected at an estimated detection limit
X = internal standard recovery problem
3L = surrogate recovery below normal limits
6H = laboratory control sample recovery above normal limits
--- = not analyzed
Italics = no published bulk sample concentration (TTLC, STLC, TCLP) at which the constituent is deemed a hazardous waste
red = detected above: 1) the TTLC for solid samples; 2) or the STLC or TCLP for aqueous samples; 3) or the wipe concentration limit
yellow = detected above 10 x STLC or 20 x TCLP concentrations, for solid matices (does not apply to wipe samples)

Analysis for SVOCs by USEPA Method 8270C. All samples analyzed by Test America St. Louis, Earth City, Missouri

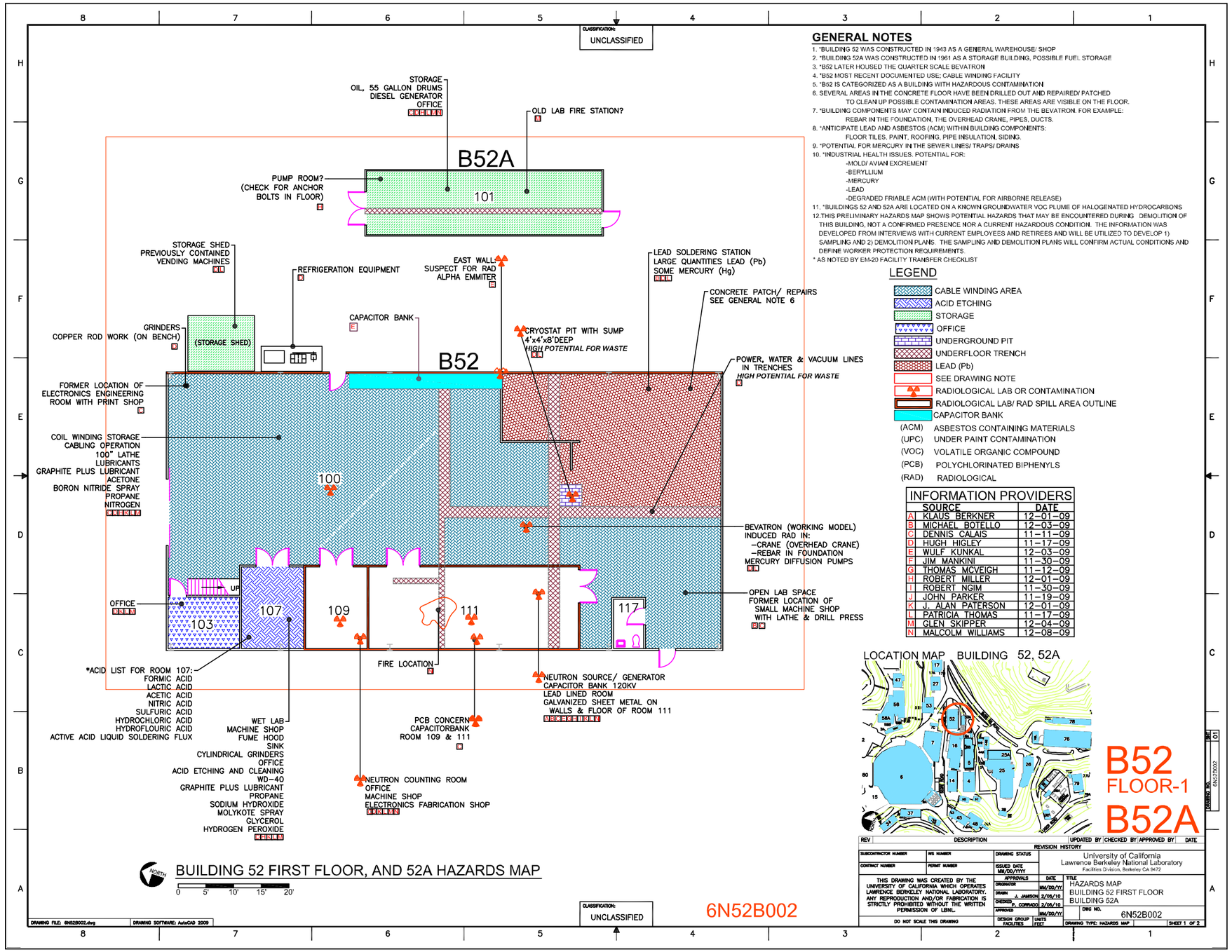


Figure 13-1. Hazard Map – Building 52, First Floor (includes Building 52A)

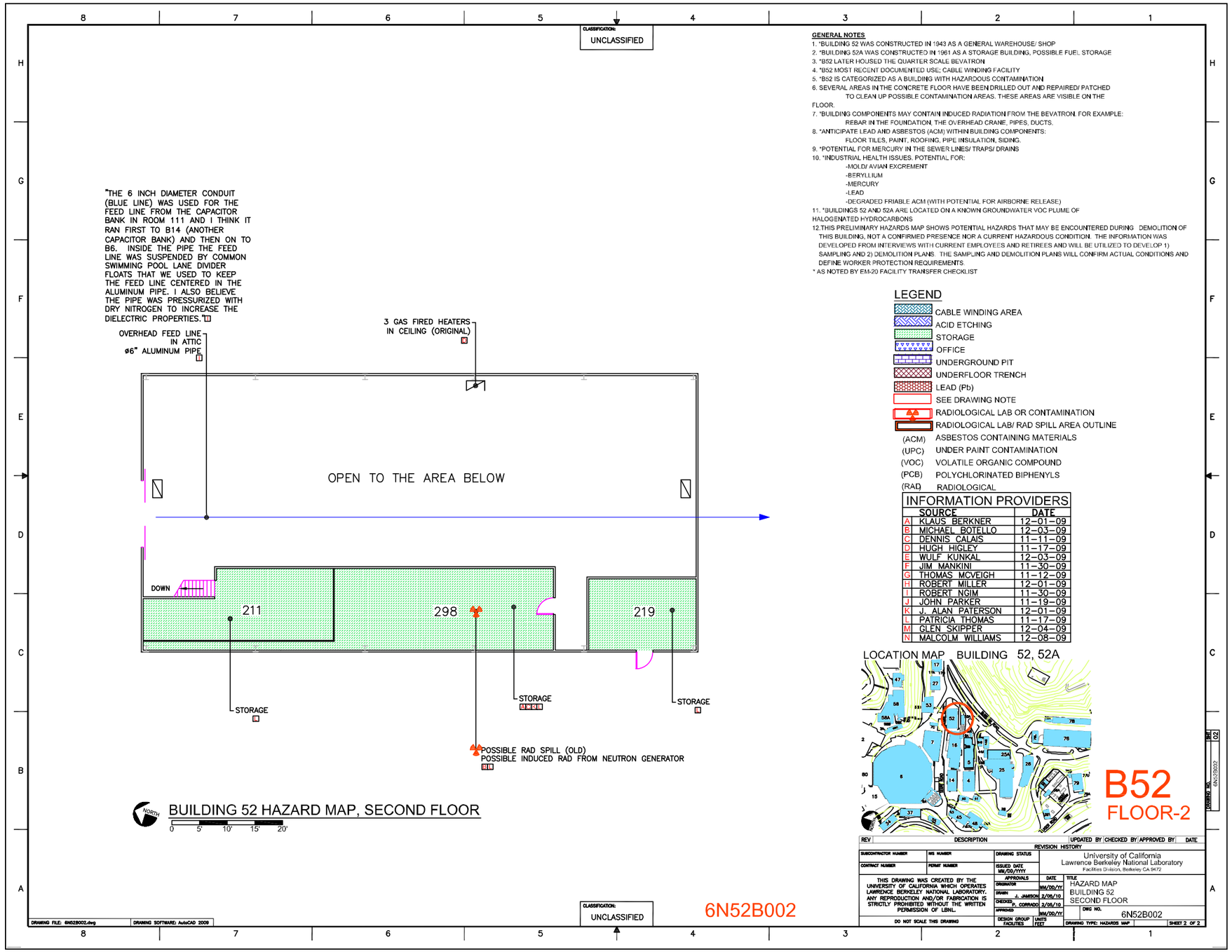
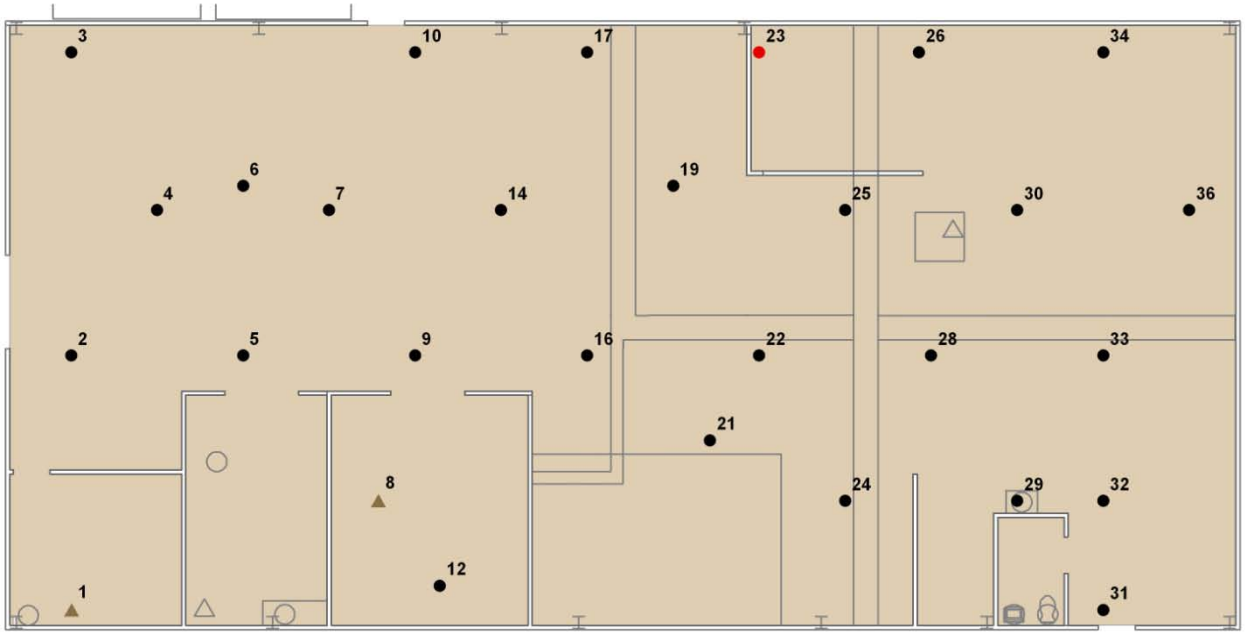


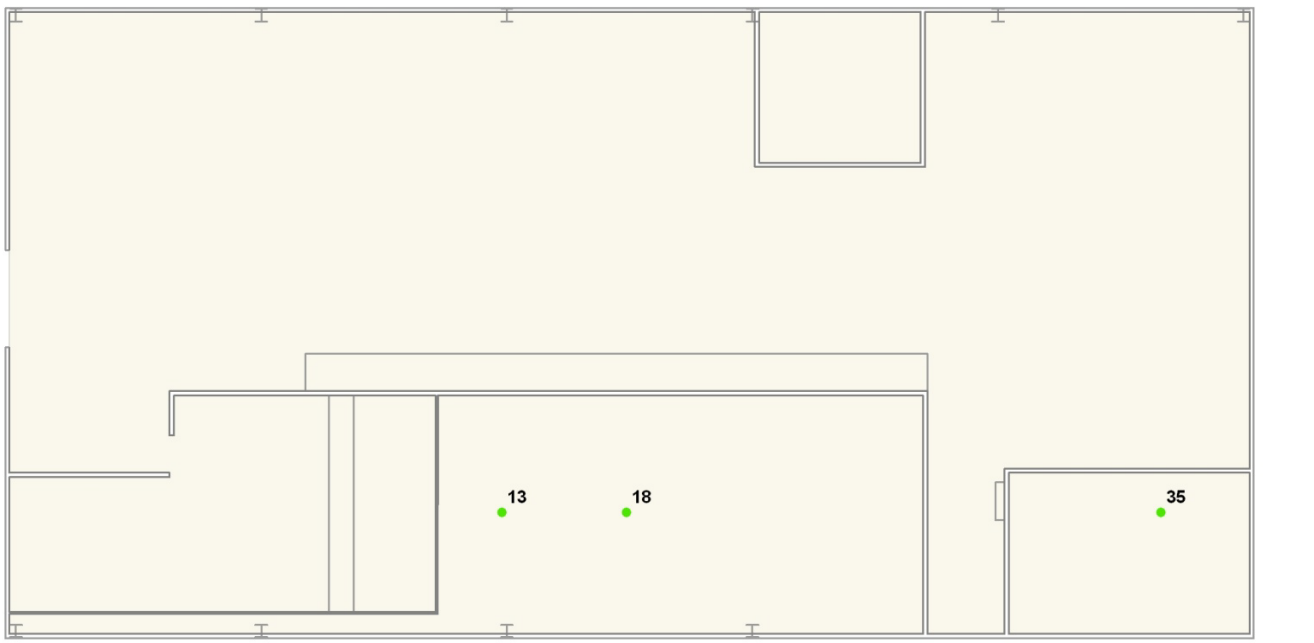
Figure 13-2. Hazard Map – Building 52, Second Floor



Map ID	Sample ID
1	B52-1F-05-01-00-B3-01
2	B52-1F-05-22-00-B1-01
3	B52-1F-05-47-00-B1-01
4	B52-1F-12-34-00-B1-01
5	B52-1F-19-22-00-B1-01
6	B52-1F-19-36-00-B1-01
7	B52-1F-26-34-00-B1-01
8	B52-1F-30-10-00-B3-01
9	B52-1F-33-22-00-B1-01
10	B52-1F-33-47-00-B1-01
12	B52-1F-35-03-00-B1-01
14	B52-1F-40-34-00-B1-01
16	B52-1F-47-22-00-B1-01
17	B52-1F-47-47-00-B1-01
19	B52-1F-54-36-00-B1-01

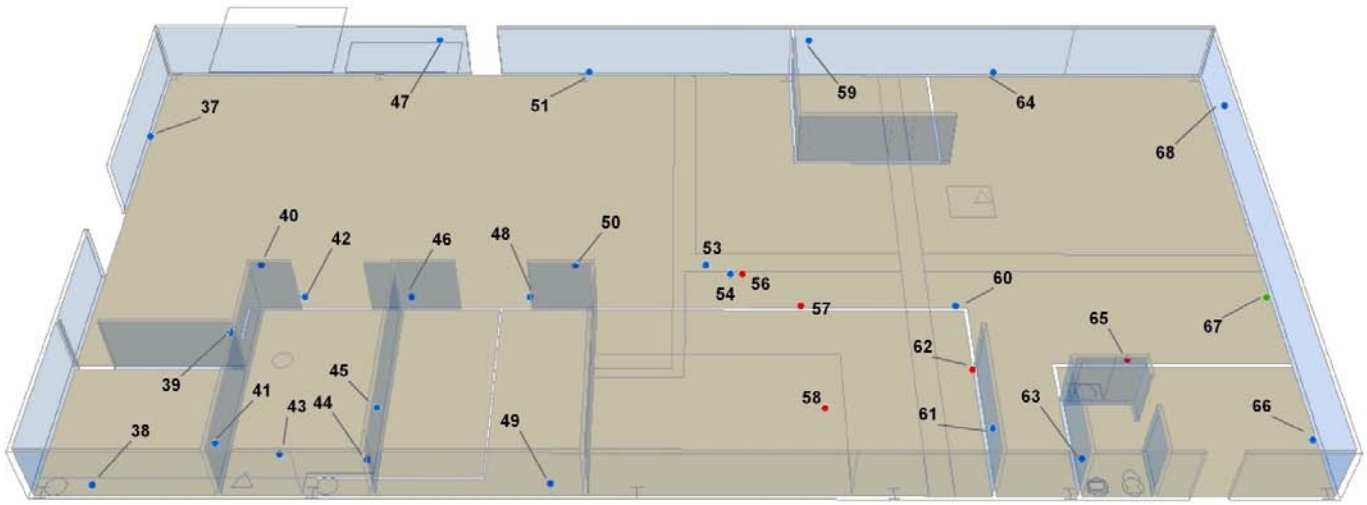
Map ID	Sample ID
21	B52-1F-57-15-00-B1-01
22	B52-1F-61-22-00-B1-01
23	B52-1F-61-47-00-B5-01
24	B52-1F-68-10-00-B1-01
25	B52-1F-68-34-00-B1-01
26	B52-1F-74-47-00-B1-01
28	B52-1F-75-22-00-B1-01
29	B52-1F-82-10-00-B1-01
30	B52-1F-82-34-00-B1-01
31	B52-1F-89-01-00-B1-01
32	B52-1F-89-10-00-B1-01
33	B52-1F-89-22-00-B1-01
34	B52-1F-89-47-00-B1-01
36	B52-1F-96-34-00-B1-01

Figure 13-3. Radiological Sampling Locations – Building 52, First Floor, Floors



Map ID	Sample ID
13	B52-2F-40-10-00-B7-01
18	B52-2F-50-10-00-B7-01
35	B52-2F-93-10-00-B7-01

Figure 13-4. Radiological Sampling Locations – Building 52, Second Floor, Floors



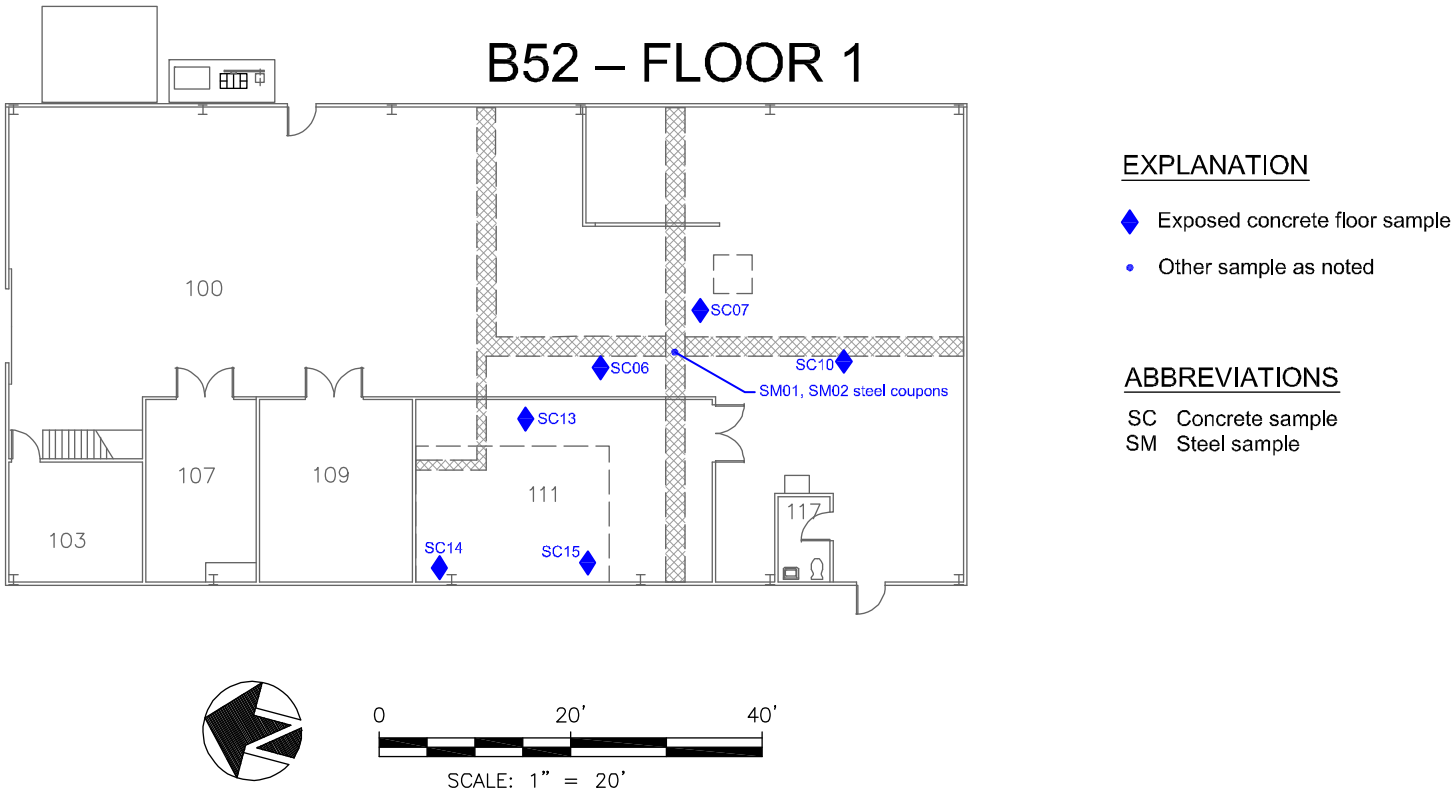
Map ID	Sample ID	Map ID	Sample ID
37	B52-W-01-40-01-B4-01	53	B52-W-52-20-05-B4-01
38	B52-W-05-01-01-B4-01	54	B52-W-54-19-05-B4-01
39	B52-W-14-13-05-B4-01	56	B52-W-55-19-05-B5-01
40	B52-W-14-19-05-B4-01	57	B52-W-60-19-01-B5-01
41	B52-W-15-02-05-B4-01	58	B52-W-61-05-05-B5-01
42	B52-W-17-19-01-B4-01	59	B52-W-62-48-05-B4-01
43	B52-W-20-01-05-B4-01	60	B52-W-73-19-01-B4-01
44	B52-W-25-03-01-B4-01	61	B52-W-74-03-05-B4-01
45	B52-W-26-05-05-B4-01	62	B52-W-74-12-01-B5-01
46	B52-W-26-19-01-B4-01	63	B52-W-80-01-04-B4-01
47	B52-W-27-48-05-B4-01	64	B52-W-80-48-01-B4-01
48	B52-W-36-19-01-B4-01	65	B52-W-85-10-05-B5-01
49	B52-W-40-01-01-B4-01	66	B52-W-98-05-01-B4-01
50	B52-W-40-19-05-B4-01	67	B52-W-98-20-01-B7-01
51	B52-W-41-48-01-B4-01	68	B52-W-98-40-05-B4-01

Building 52
1st Floor
Surface Type - Walls

Material Type
- Drywall
- Painted Steel
- Wood

Note: Some internal walls are not shown on figure.

Figure 13-5. Radiological Sampling Locations – Building 52, First Floor, Walls



L:\LBNL.178\Old Town Demolition\Sample Location Maps\Volumetric Maps\SLM_VM_B52.dwg

Figure 13-6. Volumetric Radiological Sampling Locations – Building 52

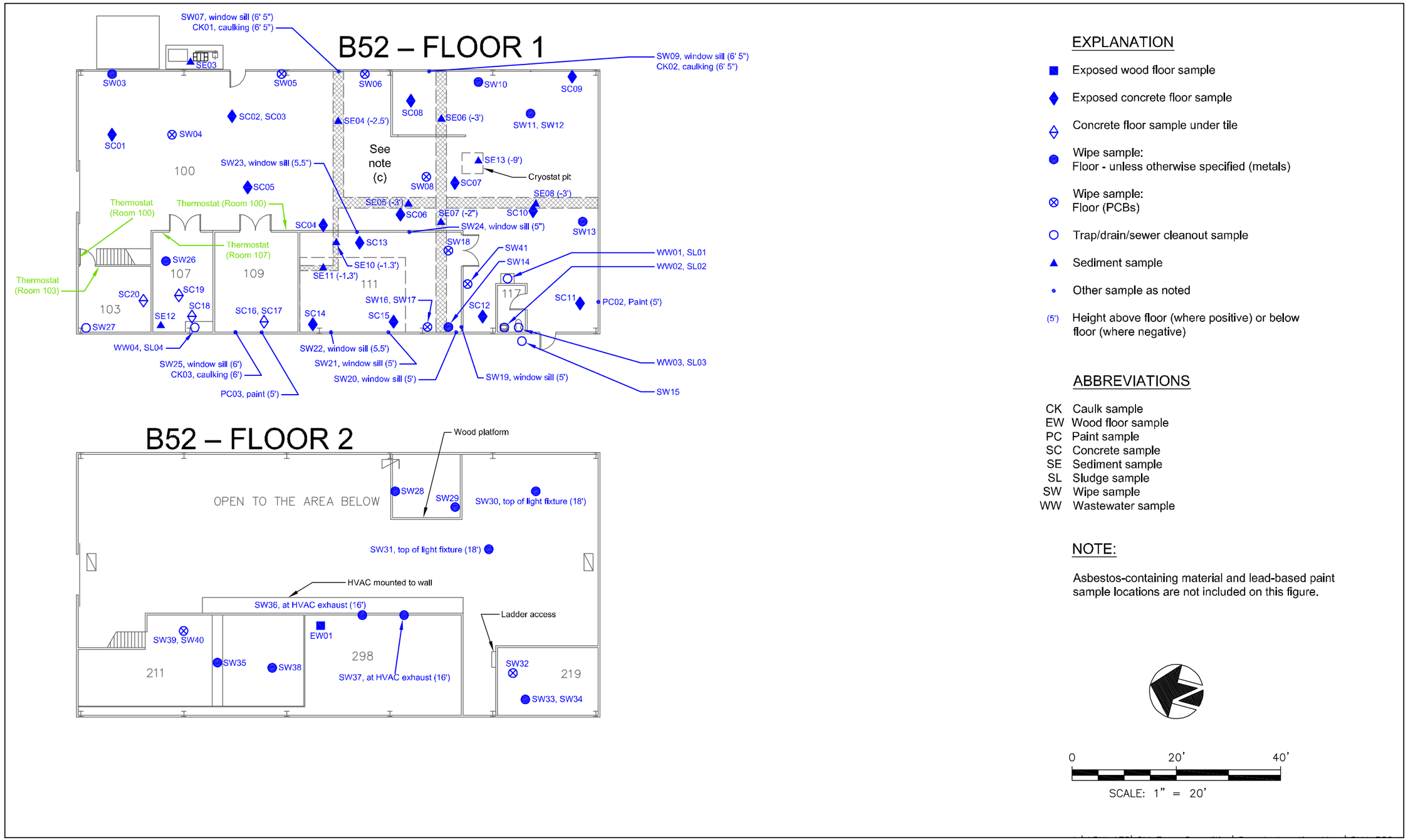


Figure 13-7. Non-Radiological Sampling Locations – Building 52

14. CHARACTERIZATION OF BUILDING 52A

Building 52A is a small (516 square feet), windowless building used as a general storage facility. The building has a concrete floor, corrugated metal walls, and a metal ceiling with fluorescent lights. The building housed a diesel-fuel-powered generator and 55-gallon drums of diesel fuel were historically stored in the building. Figure 14-1 provides the locations of historical hazards associated with this building obtained by LBNL from historical records, interviews, and site inspections.

Building 52A was characterized per the *Final Work Plan for Base Bid Buildings* (Weiss, 2010c).

14.1 Deviations from Work Plan

No deviations from the work plan were noted in Building 52A.

14.2 Radiological Characterization Summary

The information provided on the hazard map developed by LBNL (Figure 14-1) and the historic information obtained by LBNL and summarized in the *Final Workplan for the Reconnaissance-Level Characterization of Buildings 25A, 44, 44A, 44B, 52, and 52A* indicate that no contamination should be present in Building 52A. Consequently, the floor and walls areas were classified as a Class 3 area and the entire building was treated as one survey unit. The focus of the radiological characterization was the existing floors and lower walls, around sinks and drains, and machinery footprints if evident. Radiological survey locations were based on biased and systematic sampling methods.

14.2.1 Radiological Scanning

Radiological scanning was performed to determine if there were any areas of elevated radioactivity that would require biased static radiological measurements. Consistent with the workplan, the following areas were scanned using a gas-flow proportional floor monitor (Ludlum Model 239-1F) or a hand-held duel phosphor detector (Ludlum Model 43-89):

- 100 percent alpha/beta scans of Class 1 floor surfaces;
- ≥ 50 percent alpha/beta scans of Class 1 wall surfaces;
- ≥ 10 percent alpha/beta scans of Class 3 wall surfaces; and
- ≥ 25 percent alpha/beta scans of Class 3 accessible internal HVAC surfaces.

Scanning speeds using the gas proportional floor monitor were approximately 10 cm/s. Scanning speeds for the duel phosphor detectors were approximately 5 cm/s.

The radiological scanning of floors, walls, and the interior surfaces of the HVAC system showed no detectable radioactivity above background levels; consequently, no biased locations for direct radiation measurements were identified.

14.2.2 Systematic Radiological Measurements

Thirty floor locations were identified in the workplan for systematic direct measurements. The locations were based on a triangular grid system with a random starting point. Direct radiological measurements of the concrete flooring were collected at 18 locations. Duplicate measurements were taken at three locations. Thirty measurements could not be collected because of the large amount of material stored within the building. Removable radioactivity measurements were collected via surface smear sampling at each of the systematic sampling locations. The floor sampling locations are shown in Figure 14-2. Table 14-1 indicates the types of floor materials surveyed.

Ten wall locations were identified in the field for direct systematic measurements. The locations were equally spaced, alternating between 1 and 5 feet high along the wall when not obstructed by building equipment or features. A duplicate measurement was taken at one location. Removable radioactivity measurements were collected via surface smear sampling at each of the systematic sampling locations. As with the floors, the available wall surface for direct measurements was limited due to obstructions. Wall sampling locations are shown in Figure 14-2.

All direct radiological measurements were collected for a period of 1 minute using a hand-held gas proportional detector (Ludlum Model 43-68). Removable radioactivity measurements also were collected for 1 minute, using a duel phosphor sample counter (Ludlum Model 3030).

The results of the systematic direct and removable radiological measurements are presented in Table 14-1 and summarized in Table 14-2. Wall measurements are not included in the summary table because no measureable radioactivity above background was observed. The highest total alpha measurement was 18 dpm/100 cm^2, while the highest total beta measurement was 717 dpm/100 cm^2. The DCGLs for total alpha and total beta surface radioactivity are 100 and 5,000 dpm/100 cm^2, respectively.

The highest removable alpha measurement was 3 dpm/100 cm^2, while the highest removable beta measurement was 4 dpm/100 cm^2. The DCGLs for removable alpha and total beta surface radioactivity are 20 and 1,000 dpm/100 cm^2, respectively.

14.2.3 Tritium Sampling

Thirty-five tritium samples consisting of systematic and biased locations were collected from the floors and walls. Duplicate samples were collected at three locations. All tritium samples were analyzed off-site by Eberline Analytical Laboratory.

The results of tritium sampling are presented in Table 14-1 and summarized in Table 14-3. The highest tritium surface activity was 109 dpm/100 cm^2.

14.2.4 Volumetric Sampling

No volumetric samples were collected in Building 52A.

14.3 Non-radiological Characterization Summary

14.3.1 Chemical Constituents

As shown in Table 14-4, samples were collected at Building 52A to characterize the floor, trench sediment, and wall paint. The locations of these samples are shown in Figure 14-3. This figure also shows the locations of equipment that may contain mercury (such as a thermostat) that was observed in the building. Analytical data are summarized in Table 14-5 through Table 14-8.

Samples were analyzed for metals by EPA Methods 6020A and 7471A, for PAHs by EPA Method 8270C, for PCBs by EPA Method 8082, and for TPH by EPA Method 8015MOD. The complete analytical results are provided on a CD-ROM included in Appendix E.

Neither of the two floor wipe samples analyzed for metals contained concentrations above hazardous waste thresholds. One of two trench sediment samples analyzed for PAHs contained only trace amounts of four compounds at estimated concentrations (B52ASE01). The greatest concentration was 0.063 mg/kg. There are no thresholds for comparison for PAHs.

None of the three samples, one of wall paint and two of trench sediment, analyzed for PCBs contained concentrations above hazardous waste thresholds.

Trace amounts of TPH as motor oil were present in both the trench sediment samples analyzed (B52ASE01 and B52ASE02) at concentrations up to 420 mg/kg. There are no thresholds for comparison for TPH.

14.3.2 Lead-based Paint

One paint sample of exterior paint was collected and submitted for metals analysis to Macs Lab, Inc. using EPA Method 6010B/3050. Results indicate that lead is present in concentrations exceeding 5,000 ppm. Lab results reporting the detectable presence of lead in this sample should be assumed to be representative of all similar paints and/or surface coatings encountered in this building. The results are presented in Appendix C.

14.3.3 Asbestos-containing Materials

Asbestos was found in exterior wall caulking (30 square feet).

The pre-demolition survey report assessing asbestos-containing materials in Building 52A is provided in Appendix C. That report is intended for submittal in its entirety to the BAAQMD to support demolition notification documentation.

14.4 Conclusions and Recommendations

14.4.1 Radiological Constituents

The radiological scanning of floors, walls, and the interior surfaces of The HVAC system showed no detectable radioactivity above background levels; consequently, no biased locations for direct radiation measurements were identified.

No systematic direct and removable radiological measurements were above the DCGLs in Table 5-1.

No tritium measurements were above the DCGL of 10,000 dpm/100 cm^2.

14.4.1.1 Final Status Survey Evaluation

Data suggest that the surfaces in Building 52A evaluated in this investigation meet the release criteria established in Table 5-1 and can be considered for unconditional release.

14.4.2 Chemical Constituents

No evidence of chemical concentrations near or exceeding hazardous waste limits was found in Building 52A (Table 14-4).

No sewer system or air-handling system exists in Building 52A.

Two wipe samples collected from floor surfaces confirm the presence of lead on building surfaces. Decontamination of building surfaces to remove dispersed lead may be warranted prior to demolition. Worker protection should be addressed to ensure that lead exposure does not exceed regulatory exposure limits.

Samples of sediment from the trenches in Building 52A were analyzed for PCBs, PAHs, and TPH, none of which were detected at concentrations above hazardous waste thresholds. The sediment should be analyzed for lead prior to its disposal because lead may be present in the sediment, since it was detected at an elevated concentration on the building floor.

Beryllium was detected at very low concentrations below the comparison threshold in one of two wipe samples collected from the floor. Mercury was not detected in any wipe samples. PCBs were not detected in a paint sample collected from the building wall.

Thermostats that potentially contain mercury switches or other mercury-containing equipment were identified in Building 52A (Figure 14-3). Care should be taken when removing

equipment that may contain mercury switches to prevent breakage and release of liquid mercury. Additional thermostats or other mercury-containing equipment may be present.

No samples were collected under benches or cabinets. If staining or other evidence of contamination is observed upon removal of these fixtures, additional samples should be collected.

14.4.3 Lead-based Paint

The exterior of Building 52A appears to contain lead-based paint. The presence of lead and/or lead-containing paint requires that specialized work practices be used during demolition work to ensure that individuals involved in the work are adequately protected against elevated exposure to lead. Contractors or employees involved in lead-related demolition activities must comply with the Construction Safety Orders for Lead (8 CCR §1532.1 et. seq.) and training requirements for those involved in lead-related demolition activities. The Construction Safety Orders for Lead [8 CCR 1532.1 (p)] also require that a "Lead-Work Pre-Job Notification" be filed with CalOSHA whenever a construction project involves "trigger tasks," as defined by the standard, which will involve greater than 100 square feet of "lead-based paint." Notification must be made 24 hours prior to the commencement of work.

Loose paint chips or other debris containing 0.5% lead by weight are likely to be characterized as hazardous waste; therefore, any damaged paint containing lead at 0.5% or greater should be stabilized or removed prior to demolition. Disturbance of lead-containing paints and/or surface coatings should be conducted by a licensed contractor utilizing workers with CDPH training in lead-related construction. Lead-related construction waste should be segregated into discrete waste streams and characterized for proper disposal.

14.4.4 Asbestos-containing Materials

Approximately 30 square feet of asbestos were found in exterior wall caulking. No asbestos was found in the concrete floor, exterior wall coating, or wall/insulation at the south end of the building. Designation of a material as asbestos-containing should be applied to all homogenous material of the type reported to contain asbestos.

Since it appears that less than 100 square feet of regulated asbestos-containing material will be disturbed in demolition of Building 52A, notification to the BAAQMD is not required.

Table 14-1. Systematic Radiological Measurement Results – Building 52A

Sample ID	X	Y	Z	Surface Type	Material Type	Total Alpha Activity dpm/100cm^2	Total Beta Activity dpm/100cm^2	Removable Alpha Activity dpm/100cm^2	Removable Beta Activity dpm/100cm^2	Tritium Surface Activity dpm/100cm^2	Comments
B52A-1F-02-08-00-B1-01	2	8	0	Floor	Concrete	12	319	0	0	-1.67	
B52A-1F-04-04-00-B1-01	4	4	0	Floor	Concrete	0	301	0	0	13.03	
B52A-1F-06-08-00-B1-01	6	8	0	Floor	Concrete	6	603	0	0		
B52A-1F-08-04-00-B1-01	8	4	0	Floor	Concrete	0	415	0	0	8.68	
B52A-1F-10-08-00-B1-01	10	8	0	Floor	Concrete	12	459	3	0	-1.00	
B52A-1F-12-04-00-B1-01	12	4	0	Floor	Concrete	0	362	0	0		
B52A-1F-14-08-00-B1-01	14	8	0	Floor	Concrete	0	611	0	0	0.33	
B52A-1F-16-04-00-B1-01	16	4	0	Floor	Concrete	18	362	3	0	-1.00	
B52A-1F-16-04-00-B1-02	16	4	0	Floor	Concrete	0	284	0	0		
B52A-1F-18-08-00-B1-01	18	8	0	Floor	Concrete	0	550	0	0	2.66	
B52A-1F-22-08-00-B1-01	22	8	0	Floor	Concrete	0	559	0	0	1.34	
B52A-1F-26-08-00-B1-01	26	8	0	Floor	Concrete	6	637	3	0	12.37	
B52A-1F-30-04-00-B1-01	30	4	0	Floor	Concrete	0	397	3	0	5.02	
B52A-1F-30-08-00-B1-01	30	8	0	Floor	Concrete	0	469	0	0	5.02	
B52A-1F-34-08-00-B1-01	34	8	0	Floor	Concrete	16	237	0	0	12.37	
B52A-1F-38-08-00-B1-01	38	8	0	Floor	Concrete	6	690	3	0	17.72	
B52A-1F-40-04-00-B1-01	40	4	0	Floor	Concrete	0	305	0	0	14.03	
B52A-1F-40-04-00-B1-02	40	4	0	Floor	Concrete	6	416	0	4		
B52A-1F-40-12-00-B1-01	40	12	0	Floor	Concrete	3	106	0	0	109.00	
B52A-1F-40-12-00-B1-02	40	12	0	Floor	Concrete	0	49	0	0		
B52A-1F-42-08-00-B1-01	42	8	0	Floor	Concrete	13	717	0	0	31.75	
B52A-1F-09-06-00--01	9	6	0	Floor	Concrete					0.15	
B52A-1F-10-06-00--01	10	6	0	Floor	Concrete					1.96	
B52A-1F-17-06-00--01	17	6	0	Floor	Concrete					0.60	
B52A-1F-21-09-00--01	21	9	0	Floor	Concrete					1.20	
B52A-1F-25-07-00--01	25	7	0	Floor	Concrete					0.00	
B52A-1F-39-09-00--01	39	9	0	Floor	Concrete					2.56	
B52A-1F-04-10-00--01	4	10	0	Floor	Concrete					-0.75	
B52A-1F-04-10-00--02	4	10	0	Floor	Concrete					0.00	
B52A-W-01-06-04-B8-01	1	6	4	Wall	Insulation	0	0	0	0	0.33	
B52A-W-03-01-01-B8-01	3	1	1	Wall	Insulation	0	0	0	0	-0.33	
B52A-W-08-01-01-B8-01	8	1	1	Wall	Insulation	0	0	0	0	-1.34	
B52A-W-14-01-05-B8-01	14	1	5	Wall	Insulation	0	0	0	0	-1.00	
B52A-W-18-01-05-B5-01	18	1	5	Wall	Painted Steel	0	0	0	0	-2.00	
B52A-W-32-01-05-B5-01	32	1	5	Wall	Painted Steel	0	0	0	0		
B52A-W-32-01-05-B5-02	32	1	5	Wall	Painted Steel	0	0	0	0	-10.37	
B52A-W-42-03-01-B5-01	42	3	1	Wall	Painted Steel	0	0	0	0	-2.00	
B52A-W-42-11-04-B5-01	42	11	4	Wall	Painted Steel	0	0	0	0	4.02	
B52A-W-43-06-01-B5-01	43	6	1	Wall	Painted Steel	0	0	0	0	1.34	
B52A-W-43-11-04-B5-01	43	11	4	Wall	Painted Steel	0	0	0	0	-1.00	
B52A-W-43-10-04--02	43	10	4	Wall						0.60	
B52A-W-43-02-05--01	43	2	5	Wall						4.97	

Table 14-1. Systematic Radiological Measurement Results – Building 52A

Sample ID	X	Y	Z	Surface Type	Material Type	Total Alpha Activity dpm/100cm^2	Total Beta Activity dpm/100cm^2	Removable Alpha Activity dpm/100cm^2	Removable Beta Activity dpm/100cm^2	Tritium Surface Activity dpm/100cm^2	Comments
B52A-W-01-10-05--01	1	10	5	Wall						0.30	
B52A-W-20-01-01--01	20	1	1	Wall						1.05	
B52A--00-00-00--01											
HVAC System										3.02	

Table 14-2. Summary of Surface Alpha and Beta Radioactivity Measurements – Building 52A

				dpm/100cm^2				
Area	Matrix	Parameter[1]	Number of Measurements	Median	Mean	Standard Deviation	Minimum	Maximum
	Concrete	Total Alpha	21	0	4.7	6.1	0	18
		Removable Alpha	21	0	0.7	1.3	0	3
		Total Beta	21	415	421	180.5	49	717
		Removable Beta	21	0	0.2	0.9	0	4

Notes:
[1] Low energy beta emitters such as tritium are not included
dpm/100 cm^2 = decay per minute per 100 square centimeters of surface area

Table 14-3. Measurements of Tritium Surface Radioactivity – Building 52A

		dpm/100cm^2				
Area	Number of Measurements	Median	Mean	Standard Deviation	Minimum	Maximum
Floors (Systematic and biased)	24	2.3	9.8	22.6	0	109
Walls (Systematic and biased)	14	0	0	3.5	0	5
HVAC	1	3	NA	NA	NA	NA

Note:
dpm/100 cm^2 = decay per minute per 100 square centimeters of surface are

Table 14-4. Non-Radiological Sampling and Analysis Summary – Building 52A

Location	Matrix	Collection Rationale	Analytes	Constituents Potentially Above Hazardous Waste Thresholds[1]
Trench Floors	Sediment and dust	Fuel and oil storage building	TPH, PAH, PCBs	None
Floors	Dust on horizontal surfaces such as floors, sills, platform, HVAC ducting, light fixtures[2]	Potential release(s) of beryllium, lead, and mercury and dispersion in dust	Beryllium, lead, mercury	None
Walls	Paint	PCBs commonly used in paint, pre-1979	PCBs	None

Notes:
Asbestos and lead-based paint are not included in this table. See Appendix C for asbestos and lead-based paint results.
[1] Constituents above thresholds listed in Table 5-3 and described in Section 5.2.1. To determine if a constituent is considered a hazardous waste or is potentially a hazardous waste (based on leachability), consult analytical results tables.
[2] Wipe sample

Abbreviations:
PAHs polycyclic aromatic hydrocarbons
PCBs polychlorinated biphenyl compounds
TPH total petroleum hydrocarbons, diesel and motor oil range organics
ft feet

Table 14-5. Analytical Results for Metals – Building 52A

Sample Type	Sample Description	Sample Name	Units	Be	Pb	Hg
Wipe	Floor wipe, room 101 central	B52ASW01	µg/100 cm²	0.013 J, T	30.0	<0.02
Wipe	Floor wipe, room 101 south	B52ASW02	µg/100 cm²	<0.1	8.0	<0.02

Abbreviations:

Be = beryllium, Pb = lead, Hg = mercury
µg/100 cm² = micrograms per 100 square centimeters
STLC = Soluble Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24
TCLP = Toxicity Characteristic Leaching Procedure, Title 22 California Code of Regulations, Section 66261.24
TTLC = Total Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24

Notes:

<n = analyte not detected above reporting limit of 'n'
J = estimated result
T = trace level compound, poor quantitation
Italics = no published bulk sample concentration (TTLC, STLC, TCLP) at which the constituent is deemed a hazardous waste
red = detected above: 1) the TTLC for solid samples; 2) or the STLC or TCLP for aqueous samples; 3) or the wipe concentration limit
yellow = detected above 10 x STLC or 20 x TCLP concentrations, for solid matrices (does not apply to wipe samples)

Analysis for Metals by USEPA Methods 6020 and 7471A. All samples analyzed by Test America St. Louis, Earth City, Missouri.

The comparison threshold for beryllium of 0.2 µg/100 cm2 (collected on wipes) applies to removable contamination on equipment or surfaces. Equipment or surfaces with beryllium concentrations below this threshold may be released to the general public or to a DOE facility for use in a manner not requiring controls for beryllium exposure per the Chronic Beryllium Disease Prevention Program (10 CFR 850).

Table 14-6. Analytical Results for PAHs – Building 52A

Sample Type	Sample Description	Sample Name	Units	Benzo-(ghi)-perylene	Chrysene	Fluoran-thene	Phenan-threne	Pyrene
Sediment	Trench Sediment, room 101 north	B52ASE01	mg/kg	*0.034 J, T*	*0.063 J, 6H, T*	*0.05 J, T*	*<0.33*	*0.041 J, T*
Sediment	Trench Sediment, room 101 south	B52ASE02	mg/kg	*<0.33 UJ, X*	*<0.33 UJ, X*	*<0.33*	*<0.33*	*<0.33 UJ, X*

Abbreviations:

mg/kg = milligrams per kilogram
PAHs = polycyclic aromatic hydrocarbon
STLC = Soluble Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24
TCLP = Toxicity Characteristic Leaching Procedure, Title 22 California Code of Regulations, Section 66261.24
TTLC = Total Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24

Notes:

<n = analyte not detected above reporting limit of 'n'
J = estimated result
T = trace level compound, poor quantitation
UJ = the result is not detected at an estimated detection limit
X = internal standard recovery problem
6H = laboratory control sample recovery above normal limits
--- = not analyzed
Italics = no published bulk sample concentration (TTLC, STLC, TCLP) at which the constituent is deemed a hazardous waste
red = detected above: 1) the TTLC for solid samples; 2) or the STLC or TCLP for aqueous samples; 3) or the wipe concentration limit
yellow = detected above 10 x STLC or 20 x TCLP concentrations, for solid matices (does not apply to wipe samples)

Analysis for PAHs by USEPA Method 8270C. All samples analyzed by Test America St. Louis, Earth City, Missouri

Table 14-7. Analytical Results for PCBs – Building 52A

Sample Type	Sample Description	Sample Name	Units	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260
Paint	Wall paint, room 101	B52APC01	mg/kg	<0.066	<0.066	<0.066	<0.066	<0.066	<0.066	<0.066 UJ, 6L
Sediment	Trench Sediment, room 101 north	B52ASE01	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	1.2	<0.033 UJ, 6L
Sediment	Trench Sediment, room 101 south	B52ASE02	mg/kg	<0.033	<0.033	<0.033	<0.033	<0.033	1.2	<0.033 UJ, 6L

Abbreviations:

mg/kg = milligrams per kilogram
PCBs = polychlorinated biphenyls
STLC = Soluble Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24
TCLP = Toxicity Characteristic Leaching Procedure, Title 22 California Code of Regulations, Section 66261.24
TTLC = Total Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24

Notes:

<n = analyte not detected above reporting limit of 'n'
UJ = the result is not detected at an estimated detection limit
6L = laboratory control sample recovery below normal limits
--- = not analyzed
Italics = no published bulk sample concentration (TTLC, STLC, TCLP) at which the constituent is deemed a hazardous waste
red = detected above: 1) the TTLC for solid samples; 2) or the STLC or TCLP for aqueous samples; 3) or the wipe concentration limit
yellow = detected above 10 x STLC or 20 x TCLP concentrations, for solid matrices (does not apply to wipe samples)

Analysis for PCBs by USEPA Method 8082. All samples analyzed by Test America St. Louis, Earth City, Missouri.

The comparison threshold for PCBs of 10 µg/100 cm2 (collected on wipes) applies to non-porous surfaces contaminated with PCBs. Surfaces containing PCB concentrations above this limit are considered to be contaminated (40 CFR 761).

The value used as the threshold for determining if PCBs exceed hazardous waste limits is applicable to the sum of the Aroclor mixtures reported.

Table 14-8. Analytical Results for TPH – Building 52A

Sample Type	Sample Description	Sample Name	Units	TPH Diesel	TPH Motor Oil
Sediment	Trench Sediment, room 101 north	B52ASE01	mg/kg	*<500*	*420 J, T*
Sediment	Trench Sediment, room 101 south	B52ASE02	mg/kg	*<500*	*200 J, T*

Abbreviations:

mg/kg = milligrams per kilogram
STLC = Soluble Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24
TCLP = Toxicity Characteristic Leaching Procedure, Title 22 California Code of Regulations, Section 66261.24
TPH = total petroleum hydrocarbons
TTLC = Total Threshold Limit Concentration, Title 22 California Code of Regulations, Section 66261.24

Notes:

<n = analyte not detected above reporting limit of 'n'
J = estimated result
T = trace level compound, poor quantitation
--- = not analyzed
Italics = no published bulk sample concentration (TTLC, STLC, TCLP) at which the constituent is deemed a hazardous waste
red = detected above: 1) the TTLC for solid samples; 2) or the STLC or TCLP for aqueous samples; 3) or the wipe concentration limit
yellow = detected above 10 x STLC or 20 x TCLP concentrations, for solid matrices (does not apply to wipe samples)

Analysis for TPH by USEPA Method 8015 MOD. All samples analyzed by Test America St. Louis, Earth City, Missouri

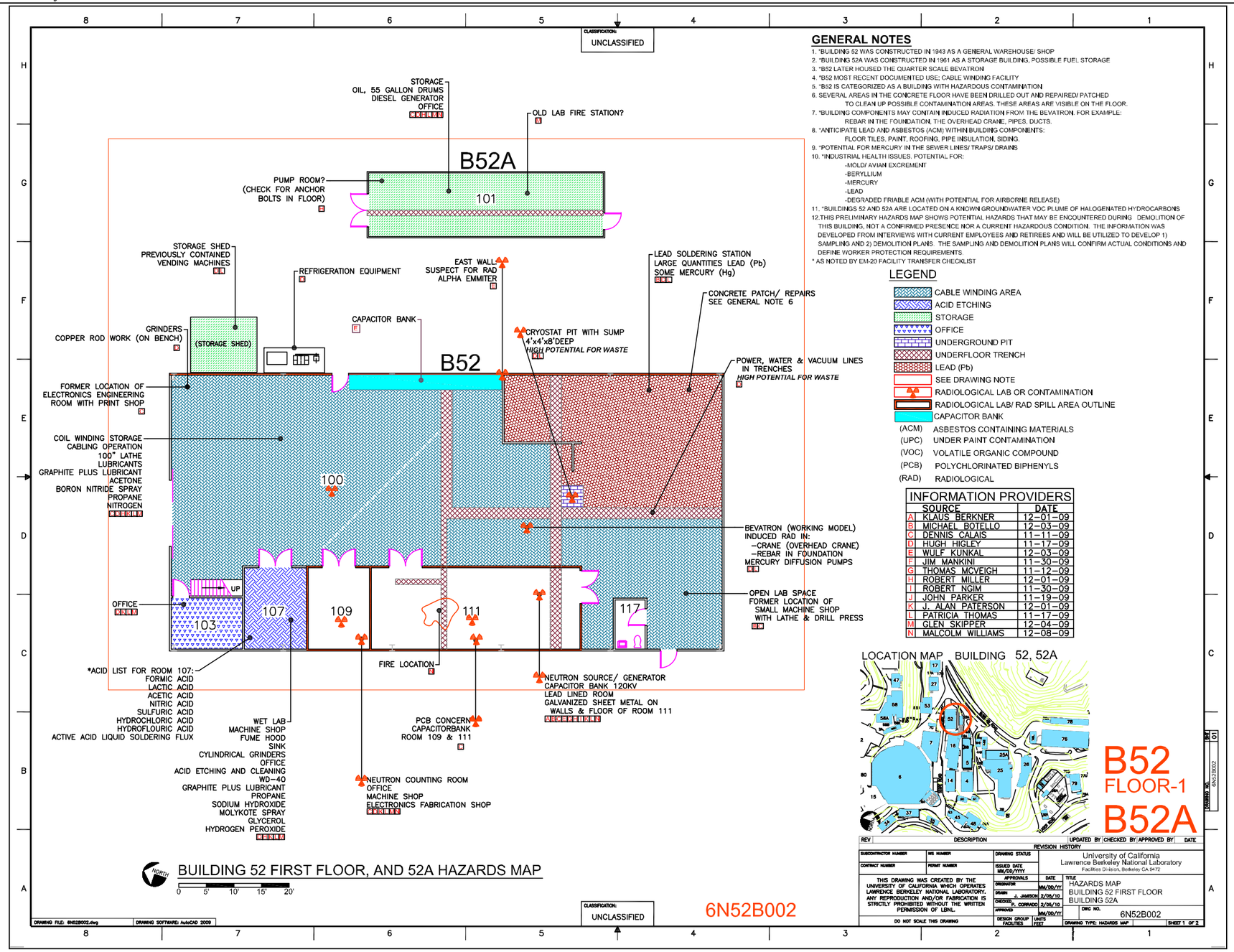
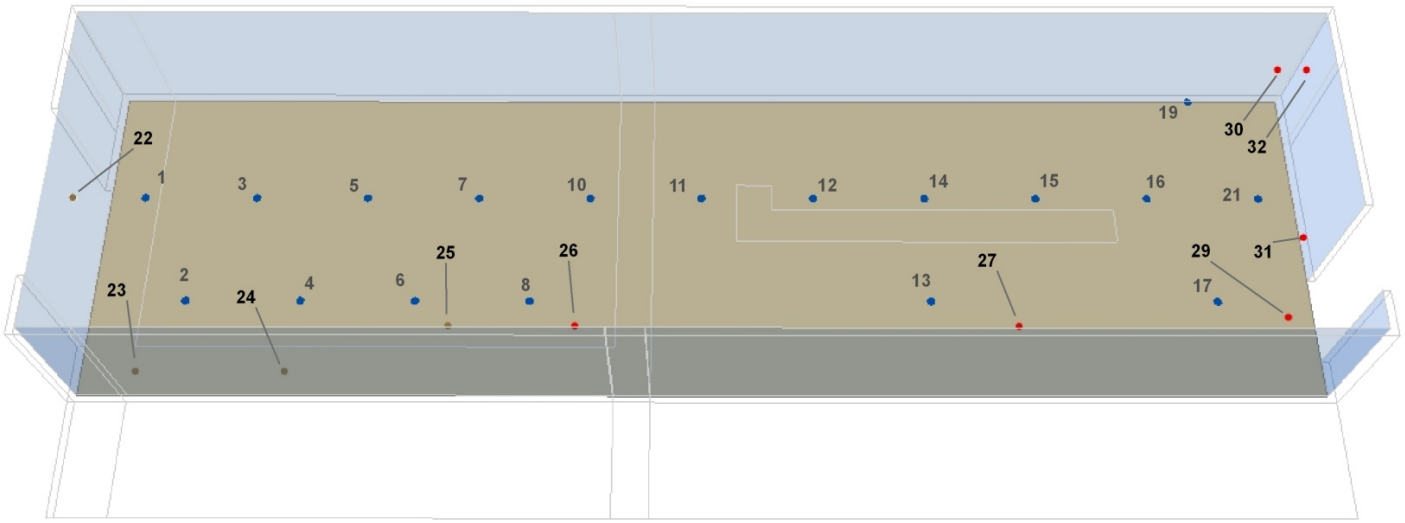


Figure 14-1. Hazard Map – Building 52A (includes Building 52)



Map ID	Sample ID
1	B52A-1F-02-08-00-B1-01
2	B52A-1F-04-04-00-B1-01
3	B52A-1F-06-08-00-B1-01
4	B52A-1F-08-04-00-B1-01
5	B52A-1F-10-08-00-B1-01
6	B52A-1F-12-04-00-B1-01
7	B52A-1F-14-08-00-B1-01
8	B52A-1F-16-04-00-B1-01
10	B52A-1F-18-08-00-B1-01
11	B52A-1F-22-08-00-B1-01
12	B52A-1F-26-08-00-B1-01
13	B52A-1F-30-04-00-B1-01
14	B52A-1F-30-08-00-B1-01
15	B52A-1F-34-08-00-B1-01

Map ID	Sample ID
16	B52A-1F-38-08-00-B1-01
17	B52A-1F-40-04-00-B1-01
19	B52A-1F-40-12-00-B1-01
21	B52A-1F-42-08-00-B1-01
22	B52A-W-01-06-04-B8-01
23	B52A-W-03-01-01-B8-01
24	B52A-W-08-01-01-B8-01
25	B52A-W-14-01-05-B8-01
26	B52A-W-18-01-05-B5-01
27	B52A-W-32-01-05-B5-01
29	B52A-W-42-03-01-B5-01
30	B52A-W-42-11-04-B5-01
31	B52A-W-43-06-01-B5-01
32	B52A-W-43-11-04-B5-01

Building 52A
1st Floor
Surface Type - Floor and Walls

Material Type

- Painted Steel
- Insulation
- Concrete

Figure 14-2. Radiological Sampling Locations – Building 52A, Floors and Walls

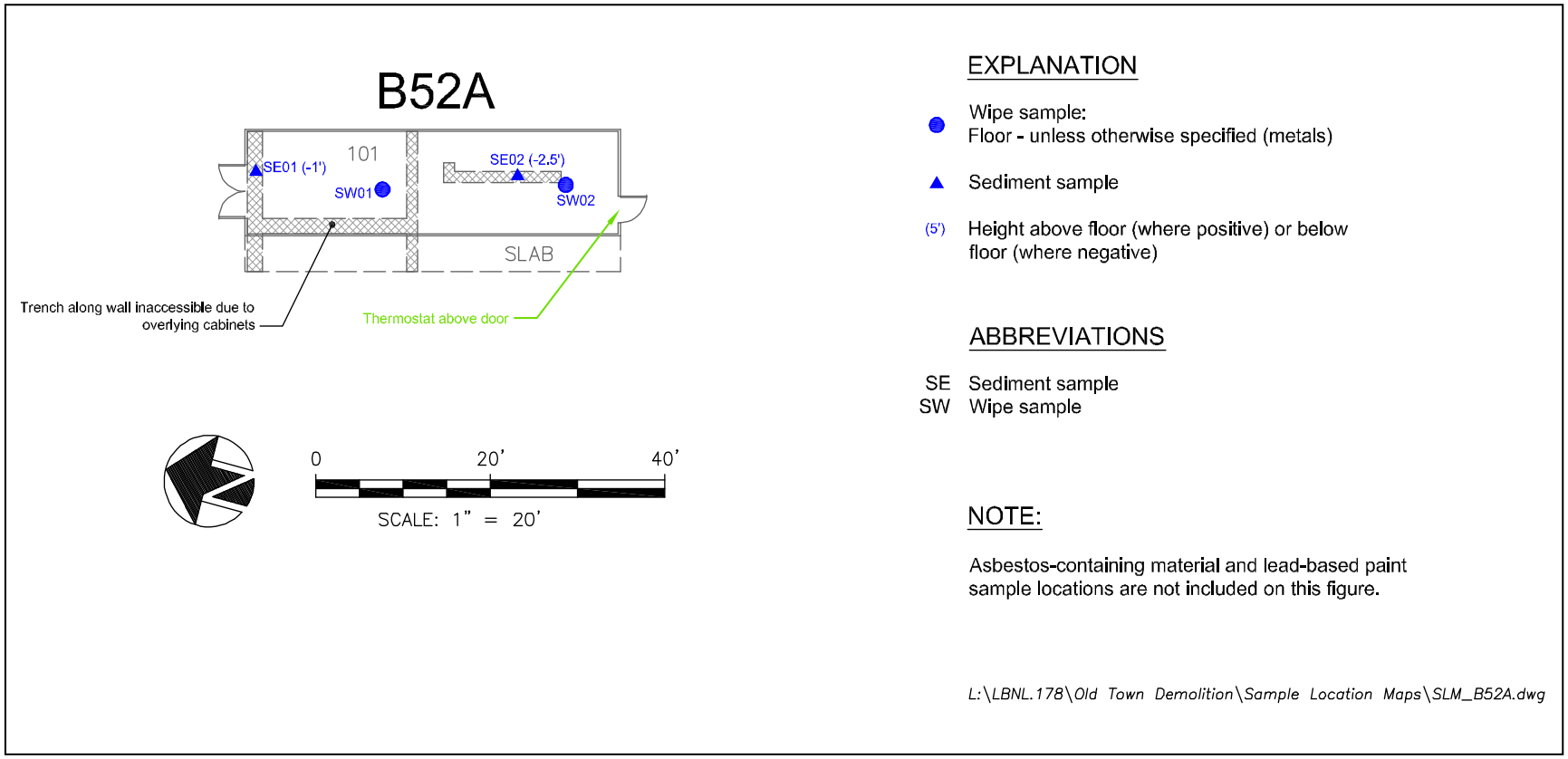


Figure 14-3. Non-Radiological Sampling Locations – Building 52A

15. CHARACTERIZATION OF THE GARDENER SHED

The Gardener Shed is located behind Building 41. Presently unoccupied, it was purportedly used for storage of gardening tools and materials and likely contained storage of pesticides and herbicide. The Gardener Shed was not included on hazard maps or other documents reviewed prior to the development of the characterization work plan, after which its characterization was requested by LBNL.

The building was evaluated only for lead-based paint and asbestos-containing materials. The analysis is provided in the report included in Appendix C.

15.1 Non-radiological Characterization Summary

15.1.1 Lead-based Paint

One composite sample of exterior paint was collected and submitted for metals analysis to Macs Lab, Inc. using EPA Method 6010B/3050. The results indicate that lead is present in concentrations exceeding 5,000 ppm. Lab results reporting the detectable presence of lead in this sample should be assumed to be representative of all similar paints and/or surface coatings encountered in this building. The results are presented in Appendix C

15.1.2 Asbestos-containing Materials

Asbestos was found in exterior wall caulking (30 square feet).

The pre-demolition survey report assessing asbestos-containing materials in the Gardener Shed is provided in Appendix C. That report is intended for submittal in its entirety to the BAAQMD to support demolition notification documentation.

15.2 Conclusions and Recommendations

15.2.1 Lead-based Paint

The exterior of the Gardener Shed appears to contain lead-based paint. The presence of lead and/or lead-containing paint requires that specialized work practices be used during demolition work to ensure that individuals involved in the work are adequately protected against elevated exposure to lead. Contractors or employees involved in lead-related demolition activities must comply with the Construction Safety Orders for Lead (8 CCR §1532.1 et. seq.) and training requirements for those involved in lead-related demolition activities. The Construction Safety Orders for Lead [8 CCR 1532.1 (p)] also require that a “Lead-Work Pre-Job Notification” be filed with CalOSHA whenever a

construction project involves "trigger tasks," as defined by the standard, which will involve greater than 100 square feet of "lead-based paint." Notification must be made 24 hours prior to the commencement of work.

Loose paint chips or other debris containing 0.5% lead by weight are likely to be characterized as hazardous waste; therefore, any damaged paint containing lead at 0.5% or greater should be stabilized or removed prior to demolition. Disturbance of lead-containing paints and/or surface coatings should be conducted by a licensed contractor utilizing workers with CDPH training in lead-related construction. Lead-related construction waste should be segregated into discrete waste streams and characterized for proper disposal.

15.2.2 Asbestos-containing Materials

Approximately 50 square feet of asbestos were found in roof material, and the same approximate amount was found in roof coating. Designation of a material as asbestos-containing should be applied to all homogenous material of the type reported to contain asbestos.

Since it appears that more than 100 square feet of regulated asbestos-containing material will be disturbed in demolition of Building 52A, notification to the BAAQMD is required prior to demolition.

16. ACRONYMS AND ABBREVIATIONS

AHERA	Asbestos Hazard Emergency Response Act impact
ATSM	American Society for Testing and Materials
BAAQMD	Bay Area Air Quality Management District
CalOSHA	California Division of Occupational Safety and Health
CCR	California Code of Regulations
cm/s	centimeter(s) per second
COC	chain-of-custody
DCGL	Derived Concentration Guideline Level
DOE	United States Department of Energy
DQO	data quality objectives
EPA	United State Environmental Protection Agency
HVAC	heating, venting, air conditioning
LBNL	Lawrence Berkeley National Laboratory
MARSSIM	Multi-agency Radiation Survey and Site Investigation Manual
MDC	minimum detectable concentration
mg/kg	milligrams per kilogram
NELAP	National Environmental Laboratory Accreditation Program
NESHAPs	National Emission Standards for Hazardous Air Pollutants
NIOSH	National Institute of Occupational Safety and Health
PBTS	persistent bio-accumulative toxic substances
PEL	permissible exposure limit

PPE	personal protective equipment
ppm	parts per million
STLC	soluble threshold limit concentration
SVOC	semi-volatile organic compound
TCLP	toxicity characteristic leaching procedure
TLB	threshold limit values
TSI	thermal system installation
TTLC	total threshold limit concentration
UC	University of California
VOC	volatile organic compound
Weiss	Weiss Associates
µg	microgram(s)

17. REFERENCES

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APPENDIX A

BUILDING SURFACE SURVEY PLANS

BUILDING 5

Building 5

BUILDING SURFACE SURVEY PLAN

Survey Plan Summary

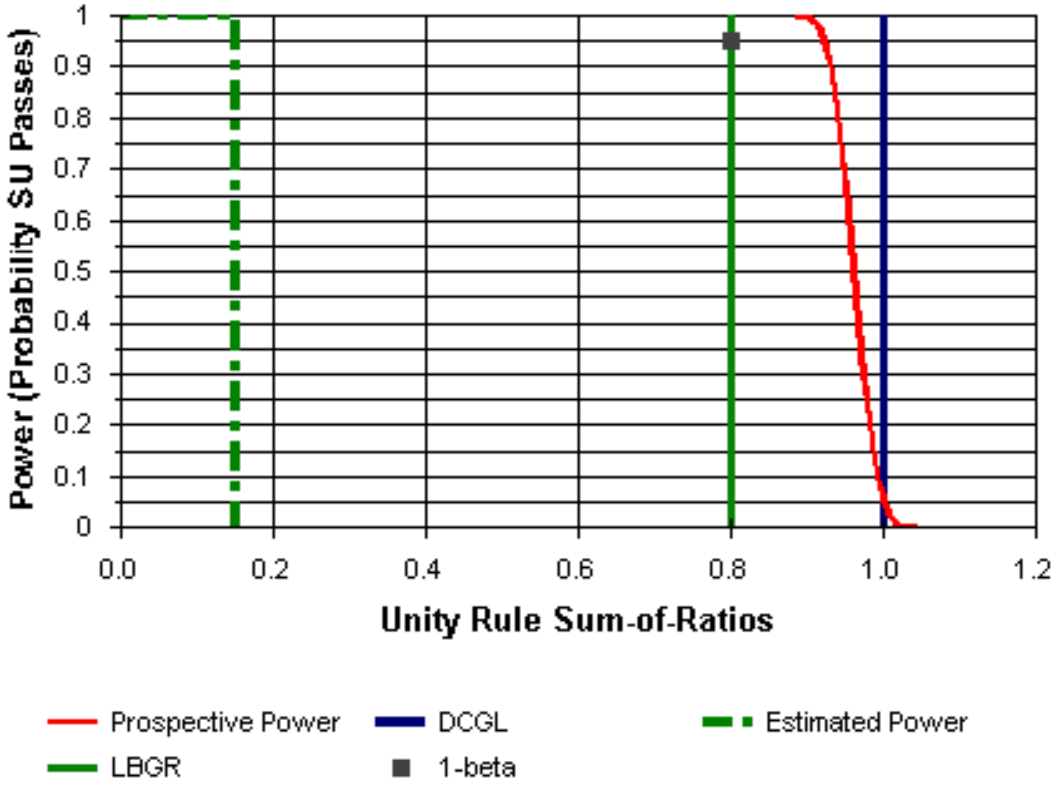
Site Name:	LBNL Old Town Buildings
Planner(s):	ERG/ProRadCon
Survey Unit Name:	Bldg 5 floors
Comments:	N/A

Statistical Design Details

Area (m²):	705	Classification:	3
Selected Test:	Sign	Estimated Sigma (SOR):	0.07
DCGL (SOR):	1	Sample Size (N):	**14**
LBGR (SOR):	0.80	Estimated Conc. (SOR):	0.15
Alpha:	0.050	Estimated Power:	1.0
Beta:	0.050		

NOTE: SOR = Sum-of-Ratios

Prospective Power Curve



Gross Alpha Efficiency Data

Instrument Description:	Gas Flow Proportional Detector (Ludlum 43-68)
Physical Detector Area (cm²):	126
DCGLw (dpm/100 cm²):	100
Total Efficiency:	0.22
DCGLw (cpm/100 cm²):	28

Contaminant	HTDC[a]	Energy[b]	Fract[c]	Inst. Eff.	Surf. Eff.	Total Eff.
Am-241	No	N/A	1.0	0.22	1.0	0.22

[a]Hard-to-detect contaminant [b]Average beta energy (keV) [N/A indicates alpha emission] [c]Activity fraction

Gross Beta Efficiency Data

Instrument Description:	Gas Flow Proportional Detector (Ludlum 43-68)
Physical Detector Area (cm²):	126
DCGLw (dpm/100 cm²):	5,000
Total Efficiency:	0.27
DCGLw (cpm/100 cm²):	1,701

Contaminant	HTDC[a]	Energy[b]	Fract[c]	Inst. Eff.	Surf. Eff.	Total Eff.
Co-60	No	96.09	1.0	0.27	1.0	0.27

[a]Hard-to-detect contaminant [b]Average beta energy (keV) [N/A indicates alpha emission] [c]Activity fraction

Gross Alpha Mean and Sigma Data

Count Time (min):	1
Sign Test Sigma (cpm/100 cm²):	1.8

Data/Material	Mean (cpm/100 cm²)	Std. Dev. (cpm/100 cm²)	MDC (dpm/100 cm²)
SU	1.4	1.8	31

Gross Beta Mean and Sigma Data

Count Time (min):	1
Sign Test Sigma (cpm/100 cm²):	45

Data/Material	Mean (cpm/100 cm²)	Std. Dev. (cpm/100 cm²)	MDC (dpm/100 cm²)
SU	169	45	187

Report Created 10/05/2010 0944 (*COMPASS v1.1.0*)

BUILDING SURFACE SURVEY PLAN

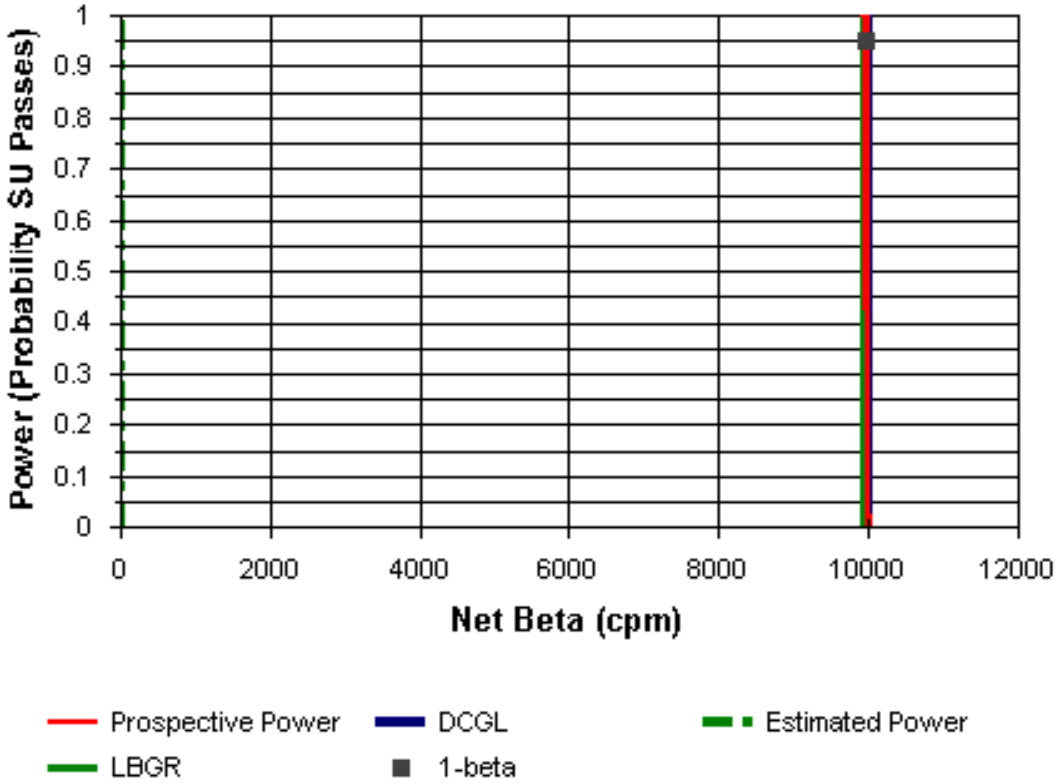
Survey Plan Summary

Site Name:	LBNL Old Town Buildings
Planner(s):	ERG/ProRadCon
Survey Unit Name:	Bldg 5 floor tritium (R1)
Comments:	N/A

Statistical Design Details

Area (m²):	705	Classification:	3
Selected Test:	Sign	Estimated Sigma (cpm/100 cm²):	18
DCGL (cpm/100 cm²):	10,000	Sample Size (N):	**14**
LBGR (cpm/100 cm²):	9,950	Estimated Conc. (cpm/100 cm²):	11
Alpha:	0.050	Estimated Power:	1.0
Beta:	0.050		

Prospective Power Curve



Gross Beta Efficiency Data

Instrument Description:	Analytical Laboratory
Physical Detector Area (cm²):	100
DCGLw (dpm/100 cm²):	10,000
Total Efficiency:	1.0
DCGLw (cpm/100 cm²):	10,000

Contaminant	HTDC[a]	Energy[b]	Fract[c]	Inst. Eff.	Surf. Eff.	Total Eff.
H-3	No	5.69	1.0	1.0	1.0	1.0

[a]Hard-to-detect contaminant [b]Average beta energy (keV) [N/A indicates alpha emission] [c]Activity fraction

Gross Beta Mean and Sigma Data

Count Time (min):	1
Sign Test Sigma (cpm/100 cm²):	18

Data/Material	Mean (cpm/100 cm²)	Std. Dev. (cpm/100 cm²)	MDC (dpm/100 cm²)
SU	11	18	18

Report Created 10/05/2010 0955 (*COMPASS v1.1.0*)

BUILDING SURFACE SURVEY PLAN

Survey Plan Summary

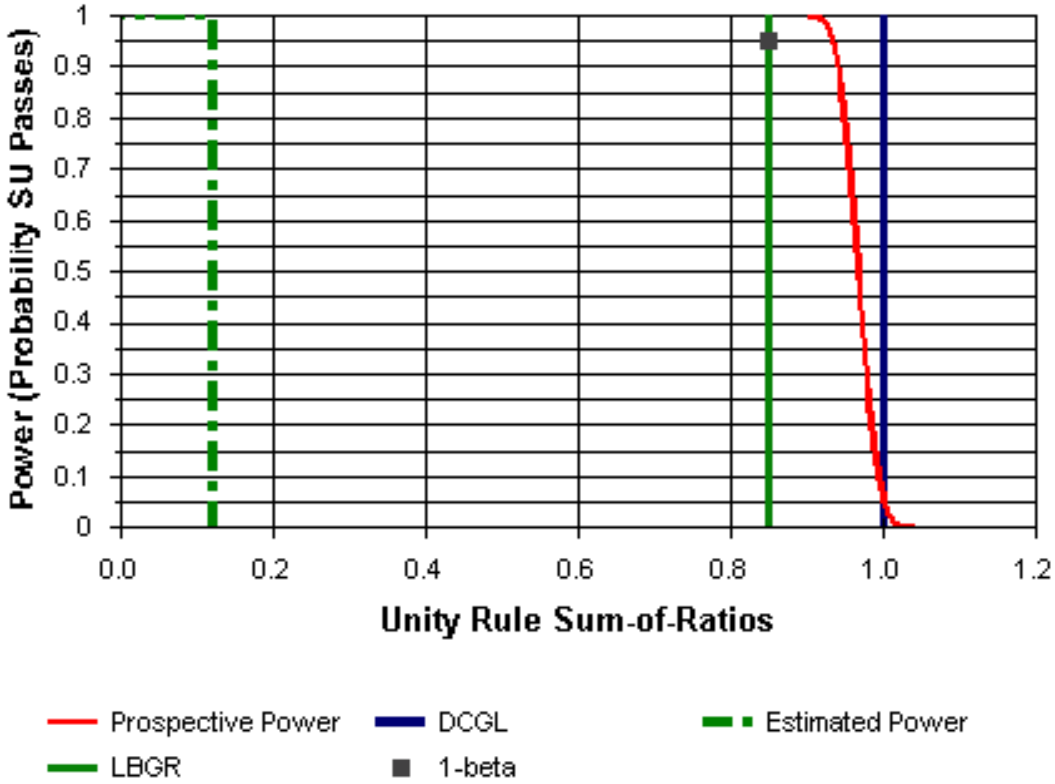
Site Name:	LBNL Old Town Buildings
Planner(s):	ERG/ProRadCon
Survey Unit Name:	Bldg 5 Walls
Comments:	Walls below 6 feet.

Statistical Design Details

Area (m²):	785	Classification:	2
Selected Test:	Sign	Estimated Sigma (SOR):	0.06
DCGL (SOR):	1	Sample Size (N):	**14**
LBGR (SOR):	0.85	Estimated Conc. (SOR):	0.12
Alpha:	0.050	Estimated Power:	1.0
Beta:	0.050		

NOTE: SOR = Sum-of-Ratios

Prospective Power Curve



Gross Alpha Efficiency Data

Instrument Description:	Gas Flow Proportional Detector (Ludlum 43-68)
Physical Detector Area (cm²):	126
DCGLw (dpm/100 cm²):	100
Total Efficiency:	0.22
DCGLw (cpm/100 cm²):	28

Contaminant	HTDC[a]	Energy[b]	Fract[c]	Inst. Eff.	Surf. Eff.	Total Eff.
Am-241	No	N/A	1.0	0.22	1.0	0.22

[a]Hard-to-detect contaminant [b]Average beta energy (keV) [N/A indicates alpha emission] [c]Activity fraction

Gross Beta Efficiency Data

Instrument Description:	Gas Flow Proportional Detector (Ludlum 43-68)
Physical Detector Area (cm²):	126
DCGLw (dpm/100 cm²):	5,000
Total Efficiency:	0.27
DCGLw (cpm/100 cm²):	1,701

Contaminant	HTDC[a]	Energy[b]	Fract[c]	Inst. Eff.	Surf. Eff.	Total Eff.
Co-60	No	96.09	1.0	0.27	1.0	0.27

[a]Hard-to-detect contaminant [b]Average beta energy (keV) [N/A indicates alpha emission] [c]Activity fraction

Gross Alpha Mean and Sigma Data

Count Time (min):	1
Sign Test Sigma (cpm/100 cm²):	0.80

Data/Material	Mean (cpm/100 cm²)	Std. Dev. (cpm/100 cm²)	MDC (dpm/100 cm²)
SU	0.95	0.80	27

Gross Beta Mean and Sigma Data

Count Time (min):	1
Sign Test Sigma (cpm/100 cm²):	91

Data/Material	Mean (cpm/100 cm²)	Std. Dev. (cpm/100 cm²)	MDC (dpm/100 cm²)
SU	144	91	173

Report Created 10/05/2010 0951 (*COMPASS v1.1.0*)

BUILDING SURFACE SURVEY PLAN

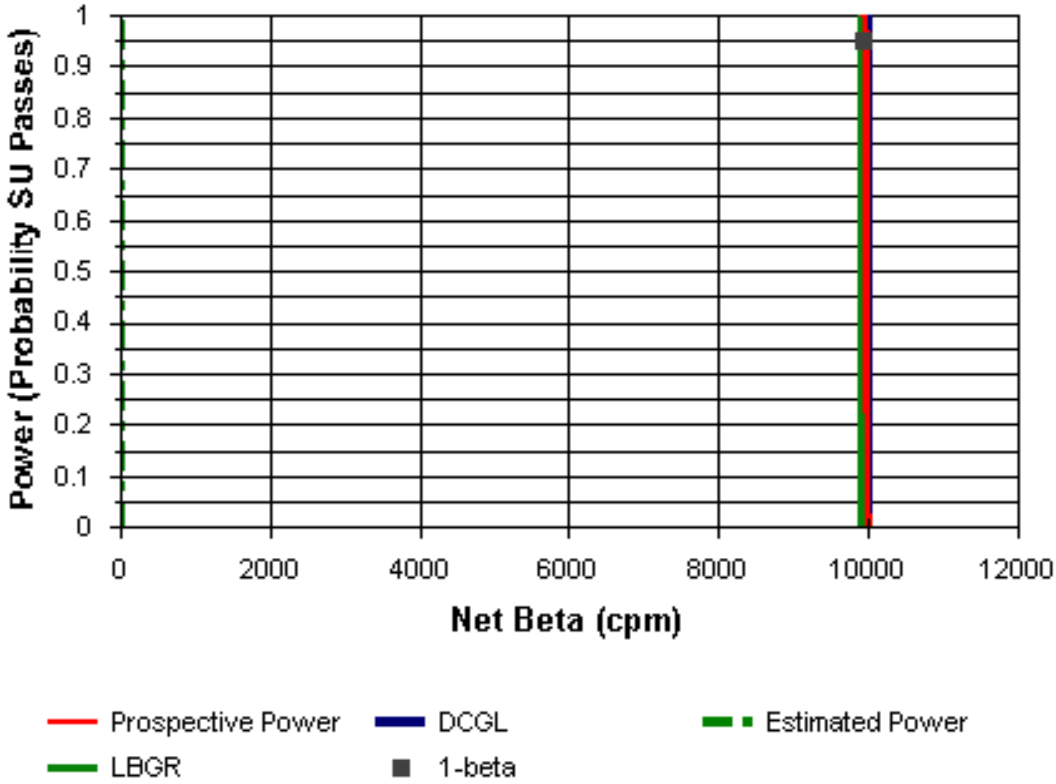
Survey Plan Summary

Site Name:	LBNL Old Town Buildings
Planner(s):	ERG/ProRadCon
Survey Unit Name:	Bldg 5 walls (tritium)
Comments:	N/A

Statistical Design Details

Area (m²):	785	Classification:	2
Selected Test:	Sign	Estimated Sigma (cpm/100 cm²):	27
DCGL (cpm/100 cm²):	10,000	Sample Size (N):	**14**
LBGR (cpm/100 cm²):	9,925	Estimated Conc. (cpm/100 cm²):	8.0
Alpha:	0.050	Estimated Power:	1.0
Beta:	0.050		

Prospective Power Curve



Gross Beta Efficiency Data

Instrument Description:	Analytical Laboratory
Physical Detector Area (cm²):	100
DCGLw (dpm/100 cm²):	10,000
Total Efficiency:	1.0
DCGLw (cpm/100 cm²):	10,000

Contaminant	HTDC[a]	Energy[b]	Fract[c]	Inst. Eff.	Surf. Eff.	Total Eff.
H-3	No	5.69	1.0	1.0	1.0	1.0

[a]Hard-to-detect contaminant [b]Average beta energy (keV) [N/A indicates alpha emission] [c]Activity fraction

Gross Beta Mean and Sigma Data

Count Time (min):	1
Sign Test Sigma (cpm/100 cm²):	27

Data/Material	Mean (cpm/100 cm²)	Std. Dev. (cpm/100 cm²)	MDC (dpm/100 cm²)
SU	8.0	27	16

Report Created 10/05/2010 0958 (*COMPASS v1.1.0*)

BUILDING 14

Building 14

BUILDING SURFACE SURVEY PLAN

Survey Plan Summary

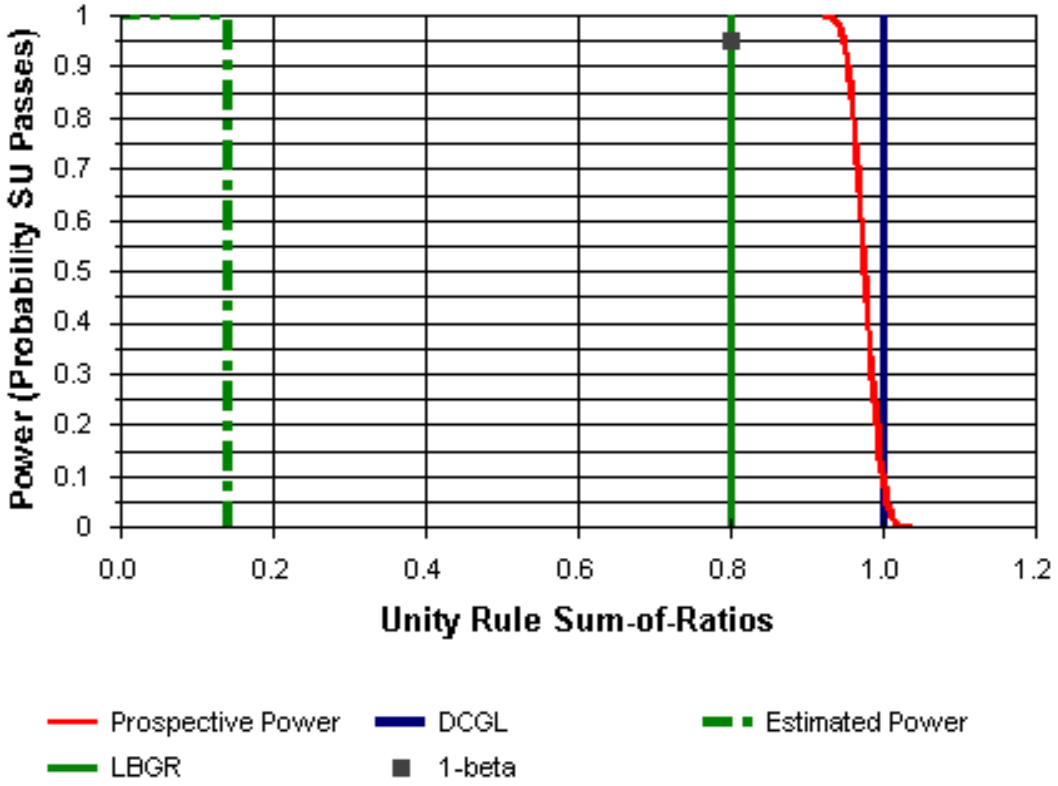
Site Name:	LBNL Old Town Buildings
Planner(s):	ERG/ProRadCon
Survey Unit Name:	Bdlg 14 floors and lower walls
Comments:	Area is for floor surface.

Statistical Design Details

Area (m²):	400	Classification:	3
Selected Test:	Sign	Estimated Sigma (SOR):	0.05
DCGL (SOR):	1	Sample Size (N):	**13**
LBGR (SOR):	0.80	Estimated Conc. (SOR):	0.14
Alpha:	0.050	Estimated Power:	1.0
Beta:	0.050		

NOTE: SOR = Sum-of-Ratios

Prospective Power Curve



Gross Alpha Efficiency Data

Instrument Description:	Gas Flow Proportional Detector (Ludlum 43-68)
Physical Detector Area (cm²):	126
DCGLw (dpm/100 cm²):	100
Total Efficiency:	0.22
DCGLw (cpm/100 cm²):	28

Contaminant	HTDC[a]	Energy[b]	Fract[c]	Inst. Eff.	Surf. Eff.	Total Eff.
Am-241	No	N/A	1.0	0.22	1.0	0.22

[a]Hard-to-detect contaminant [b]Average beta energy (keV) [N/A indicates alpha emission] [c]Activity fraction

Gross Beta Efficiency Data

Instrument Description:	Gas Flow Proportional Detector (Ludlum 43-68)
Physical Detector Area (cm²):	126
DCGLw (dpm/100 cm²):	5,000
Total Efficiency:	0.27
DCGLw (cpm/100 cm²):	1,701

Contaminant	HTDC[a]	Energy[b]	Fract[c]	Inst. Eff.	Surf. Eff.	Total Eff.
Co-60	No	96.09	1.0	0.27	1.0	0.27

[a]Hard-to-detect contaminant [b]Average beta energy (keV) [N/A indicates alpha emission] [c]Activity fraction

Gross Alpha Mean and Sigma Data

Count Time (min):	1
Sign Test Sigma (cpm/100 cm²):	1.3

Data/Material	Mean (cpm/100 cm²)	Std. Dev. (cpm/100 cm²)	MDC (dpm/100 cm²)
SU	1.6	1.3	32

Gross Beta Mean and Sigma Data

Count Time (min):	1
Sign Test Sigma (cpm/100 cm²):	26

Data/Material	Mean (cpm/100 cm²)	Std. Dev. (cpm/100 cm²)	MDC (dpm/100 cm²)
SU	142	26	172

Report Created 09/27/2010 0929 (*COMPASS v1.1.0*)

BUILDING SURFACE SURVEY PLAN

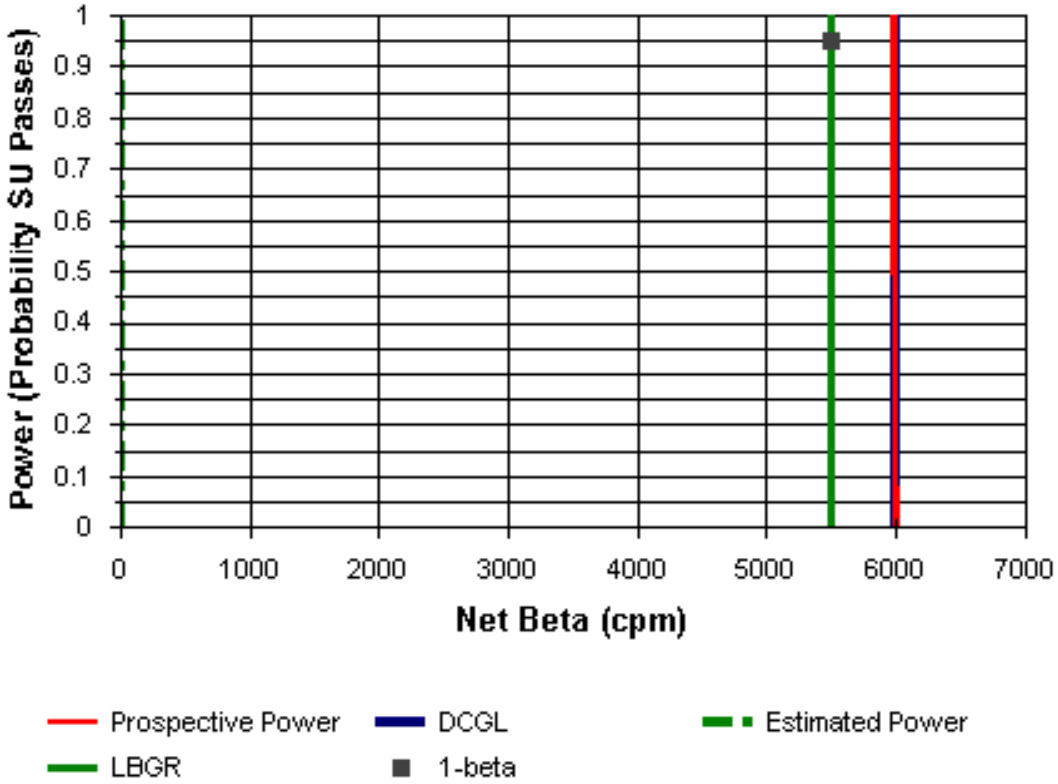
Survey Plan Summary

Site Name:	LBNL Old Town Buildings
Planner(s):	ERG/ProRadCon
Survey Unit Name:	Bldg 14 floors and lower walls (tritium)
Comments:	Surface area is for floors only

Statistical Design Details

Area (m^2):	400	Classification:	3
Selected Test:	Sign	Estimated Sigma (cpm/100 cm^2):	13
DCGL (cpm/100 cm^2):	6,000	Sample Size (N):	**13**
LBGR (cpm/100 cm^2):	5,500	Estimated Conc. (cpm/100 cm^2):	5.0
Alpha:	0.050	Estimated Power:	1.0
Beta:	0.050		

Prospective Power Curve



Gross Beta Efficiency Data

Instrument Description:	Beckman Liquid Scintilaiton Counter (TR2550)
Physical Detector Area (cm²):	100
DCGLw (dpm/100 cm²):	10,000
Total Efficiency:	0.60
DCGLw (cpm/100 cm²):	6,000

Contaminant	HTDC[a]	Energy[b]	Fract[c]	Inst. Eff.	Surf. Eff.	Total Eff.
H-3	No	5.69	1.0	0.60	1.0	0.60

[a]Hard-to-detect contaminant [b]Average beta energy (keV) [N/A indicates alpha emission] [c]Activity fraction

Gross Beta Mean and Sigma Data

Count Time (min):	1
Sign Test Sigma (cpm/100 cm²):	13

Data/Material	Mean (cpm/100 cm²)	Std. Dev. (cpm/100 cm²)	MDC (dpm/100 cm²)
SU	5.0	13	22

Report Created 09/27/2010 0950 (*COMPASS v1.1.0*)

BUILDING 25A

Building 25A

BUILDING SURFACE SURVEY PLAN

Survey Plan Summary

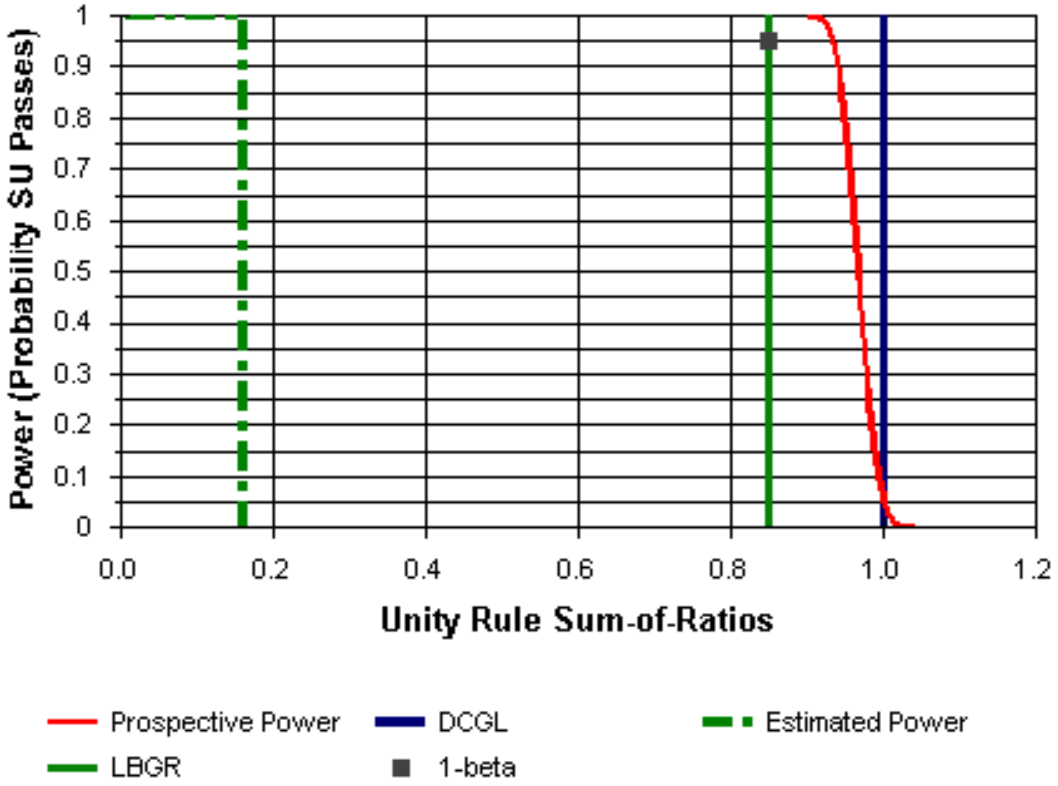
Site Name:	LBNL Old Town Buildings
Planner(s):	ERG/ProRadCon
Survey Unit Name:	Bldg 25A
Comments:	Area is for floor footprint only.

Statistical Design Details

Area (m²):	697	Classification:	3
Selected Test:	Sign	Estimated Sigma (SOR):	0.06
DCGL (SOR):	1	Sample Size (N):	**14**
LBGR (SOR):	0.85	Estimated Conc. (SOR):	0.16
Alpha:	0.050	Estimated Power:	1.0
Beta:	0.050		

NOTE: SOR = Sum-of-Ratios

Prospective Power Curve



Gross Alpha Efficiency Data

Instrument Description:	Gas Proportional Detector (Ludlum 43-68)
Physical Detector Area (cm²):	126
DCGLw (dpm/100 cm²):	100
Total Efficiency:	0.22
DCGLw (cpm/100 cm²):	28

Contaminant	HTDC[a]	Energy[b]	Fract[c]	Inst. Eff.	Surf. Eff.	Total Eff.
Am-241	No	N/A	1.0	0.22	1.0	0.22

[a]Hard-to-detect contaminant [b]Average beta energy (keV) [N/A indicates alpha emission] [c]Activity fraction

Gross Beta Efficiency Data

Instrument Description:	Gas Proportional Detector (Ludlum 43-68)
Physical Detector Area (cm²):	126
DCGLw (dpm/100 cm²):	5,000
Total Efficiency:	0.27
DCGLw (cpm/100 cm²):	1,701

Contaminant	HTDC[a]	Energy[b]	Fract[c]	Inst. Eff.	Surf. Eff.	Total Eff.
Co-60	No	96.09	1.0	0.27	1.0	0.27

[a]Hard-to-detect contaminant [b]Average beta energy (keV) [N/A indicates alpha emission] [c]Activity fraction

Gross Alpha Mean and Sigma Data

Count Time (min):	1
Sign Test Sigma (cpm/100 cm²):	1.5

Data/Material	Mean (cpm/100 cm²)	Std. Dev. (cpm/100 cm²)	MDC (dpm/100 cm²)
SU	1.4	1.5	31

Gross Beta Mean and Sigma Data

Count Time (min):	1
Sign Test Sigma (cpm/100 cm²):	59

Data/Material	Mean (cpm/100 cm²)	Std. Dev. (cpm/100 cm²)	MDC (dpm/100 cm²)
SU	188	59	196

Report Created 10/06/2010 0719 (*COMPASS v1.1.0*)

BUILDING SURFACE SURVEY PLAN

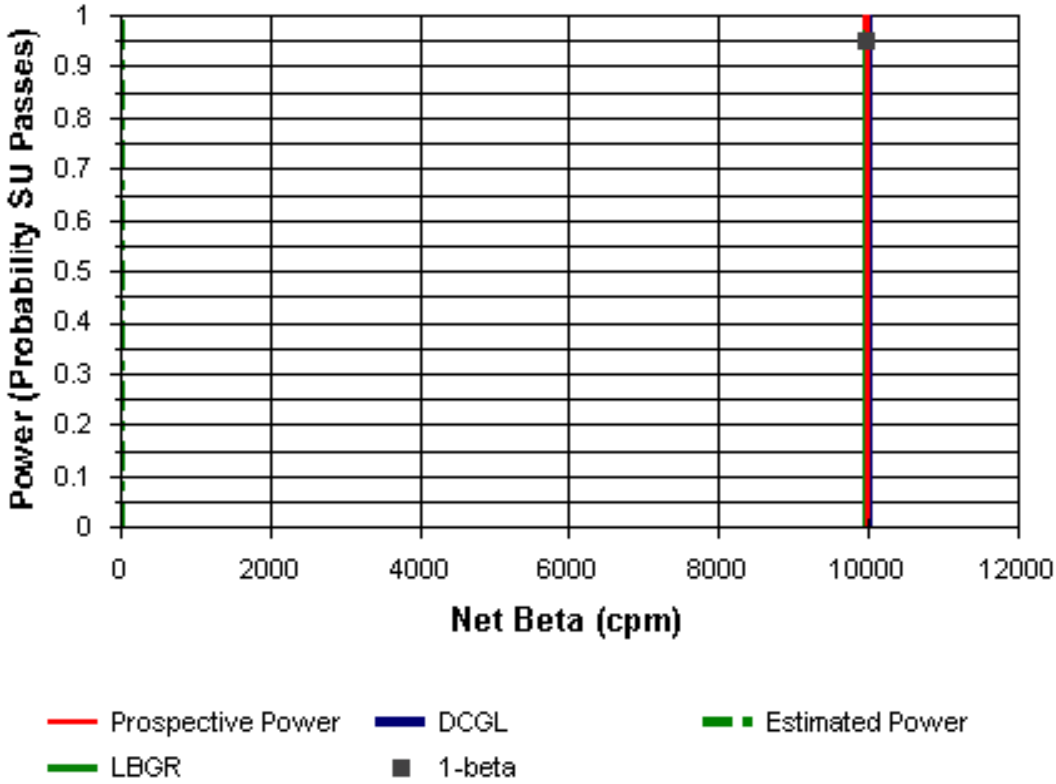
Survey Plan Summary

Site Name:	LBNL Old Town Buildings
Planner(s):	ERG/ProRadCon
Survey Unit Name:	Building 25A tritium
Comments:	Area is for floor footprint only.

Statistical Design Details

Area (m²):	698	Classification:	3
Selected Test:	Sign	Estimated Sigma (cpm/100 cm²):	6.8
DCGL (cpm/100 cm²):	10,000	Sample Size (N):	**14**
LBGR (cpm/100 cm²):	9,980	Estimated Conc. (cpm/100 cm²):	5.2
Alpha:	0.050	Estimated Power:	1.0
Beta:	0.050		

Prospective Power Curve



Gross Beta Efficiency Data

Instrument Description:	Offsite Lab and On-site LSC
Physical Detector Area (cm²):	100
DCGLw (dpm/100 cm²):	10,000
Total Efficiency:	1.0
DCGLw (cpm/100 cm²):	10,000

Contaminant	HTDC[a]	Energy[b]	Fract[c]	Inst. Eff.	Surf. Eff.	Total Eff.
H-3	No	5.69	1.0	1.0	1.0	1.0

[a]Hard-to-detect contaminant [b]Average beta energy (keV) [N/A indicates alpha emission] [c]Activity fraction

Gross Beta Mean and Sigma Data

Count Time (min):	1
Sign Test Sigma (cpm/100 cm²):	6.8

Data/Material	Mean (cpm/100 cm²)	Std. Dev. (cpm/100 cm²)	MDC (dpm/100 cm²)
SU	5.2	6.8	14

Report Created 10/06/2010 0722 (*COMPASS v1.1.0*)

BUILDING 40

Building 40

BUILDING SURFACE SURVEY PLAN

Survey Plan Summary

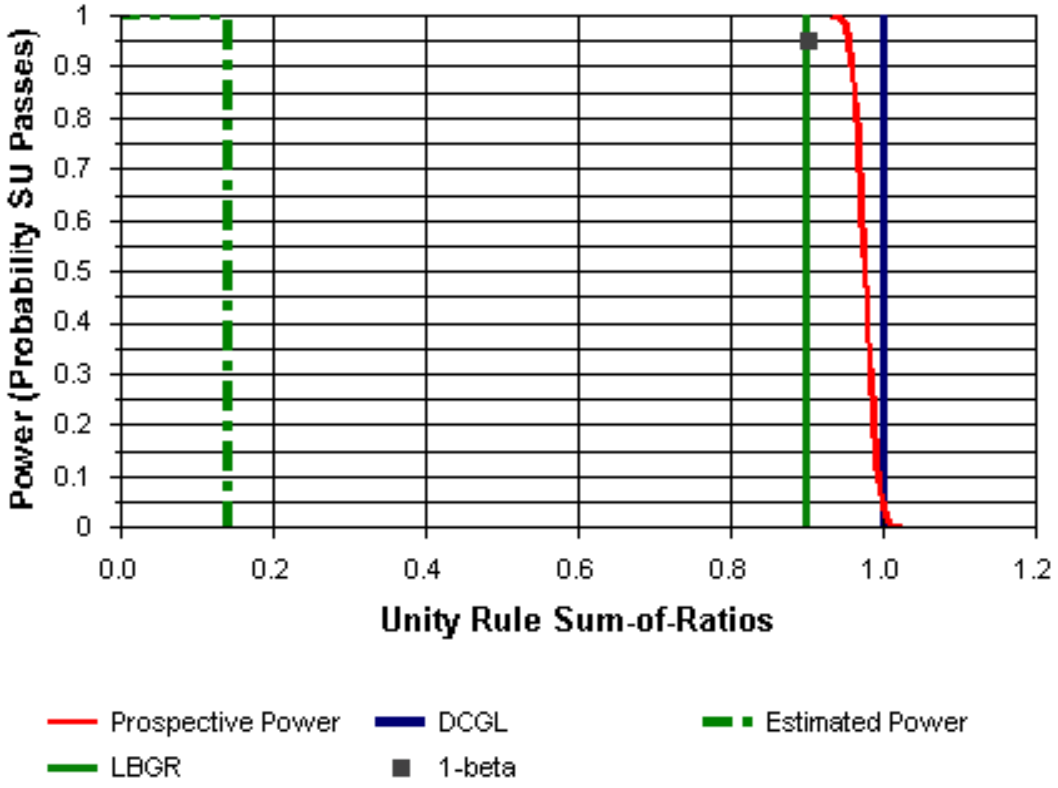
Site Name:	LBNL Old Town Buildings
Planner(s):	ERG/ProRadCon
Survey Unit Name:	Building 40 floor and walls
Comments:	Area is for floor, walls are additional

Statistical Design Details

Area (m²):	92	Classification:	3
Selected Test:	Sign	Estimated Sigma (SOR):	0.04
DCGL (SOR):	1	Sample Size (N):	**15**
LBGR (SOR):	0.90	Estimated Conc. (SOR):	0.14
Alpha:	0.050	Estimated Power:	1.0
Beta:	0.050		

NOTE: SOR = Sum-of-Ratios

Prospective Power Curve



Gross Alpha Efficiency Data

Instrument Description:	Gas Flow Prortional Detector (Ludlum 43-68)
Physical Detector Area (cm²):	126
DCGLw (dpm/100 cm²):	100
Total Efficiency:	0.22
DCGLw (cpm/100 cm²):	28

Contaminant	HTDC[a]	Energy[b]	Fract[c]	Inst. Eff.	Surf. Eff.	Total Eff.
Am-241	No	N/A	1.0	0.22	1.0	0.22

[a]Hard-to-detect contaminant [b]Average beta energy (keV) [N/A indicates alpha emission] [c]Activity fraction

Gross Beta Efficiency Data

Instrument Description:	Gas Flow Prortional Detector (Ludlum 43-68)
Physical Detector Area (cm²):	126
DCGLw (dpm/100 cm²):	5,000
Total Efficiency:	0.27
DCGLw (cpm/100 cm²):	1,701

Contaminant	HTDC[a]	Energy[b]	Fract[c]	Inst. Eff.	Surf. Eff.	Total Eff.
Co-60	No	96.09	1.0	0.27	1.0	0.27

[a]Hard-to-detect contaminant [b]Average beta energy (keV) [N/A indicates alpha emission] [c]Activity fraction

Gross Alpha Mean and Sigma Data

Count Time (min):	1
Sign Test Sigma (cpm/100 cm²):	1.0

Data/Material	Mean (cpm/100 cm²)	Std. Dev. (cpm/100 cm²)	MDC (dpm/100 cm²)
SU	0.90	1.0	27

Gross Beta Mean and Sigma Data

Count Time (min):	1
Sign Test Sigma (cpm/100 cm²):	34

Data/Material	Mean (cpm/100 cm²)	Std. Dev. (cpm/100 cm²)	MDC (dpm/100 cm²)
SU	191	34	198

Report Created 09/29/2010 1508 (*COMPASS v1.1.0*)

BUILDING SURFACE SURVEY PLAN

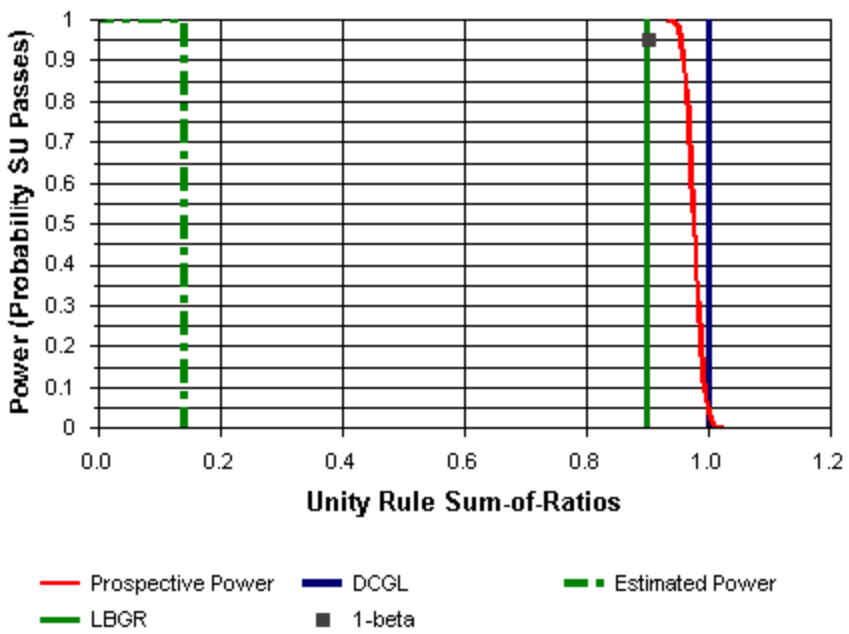
Survey Plan Summary

Site Name:	LBNL Old Town Buildings
Planner(s):	ERG/ProRadCon
Survey Unit Name:	Building 40 Floor and Walls (Tritium)
Comments:	Area is for Floor, walls are additional

Statistical Design Details

Area (m^2):	92	Classification:	3
Selected Test:	Sign	Estimated Sigma (cpm/100 cm^2):	1.8
DCGL (cpm/100 cm^2):	10,000	Sample Size (N):	**13**
LBGR (cpm/100 cm^2):	8,000	Estimated Conc. (cpm/100 cm^2):	0.01
Alpha:	0.050	Estimated Power:	1.0
Beta:	0.050		

Prospective Power Curve



Gross Beta Efficiency Data

Instrument Description:	Labortory determined
Physical Detector Area (cm²):	100
DCGLw (dpm/100 cm²):	10,000
Total Efficiency:	1.0
DCGLw (cpm/100 cm²):	10,000

Contaminant	HTDC[a]	Energy[b]	Fract[c]	Inst. Eff.	Surf. Eff.	Total Eff.
H-3	No	5.69	1.0	1.0	1.0	1.0

[a]Hard-to-detect contaminant [b]Average beta energy (keV) [N/A indicates alpha emission] [c]Activity fraction

Gross Beta Mean and Sigma Data

Count Time (min):	1
Sign Test Sigma (cpm/100 cm²):	1.8

Data/Material	Mean (cpm/100 cm²)	Std. Dev. (cpm/100 cm²)	MDC (dpm/100 cm²)
SU	0.01	1.8	3.5

Report Created 09/29/2010 1516 (*COMPASS v1.1.0*)

BUILDING 41

Building 41

BUILDING SURFACE SURVEY PLAN

Survey Plan Summary

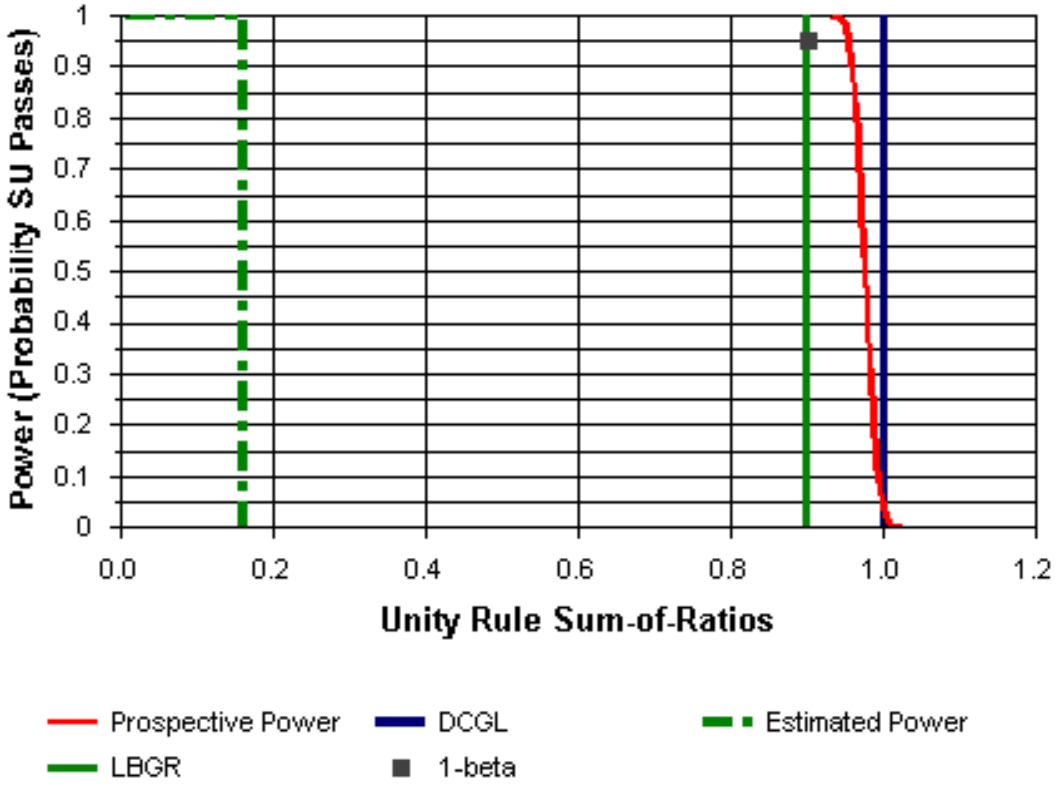
Site Name:	LBNL Old Town Buildings
Planner(s):	ERG/ProRadCon
Survey Unit Name:	Building 41
Comments:	Survey unit area includes floor...no wall area.

Statistical Design Details

Area (m²):	92	Classification:	3
Selected Test:	Sign	Estimated Sigma (SOR):	0.04
DCGL (SOR):	1	Sample Size (N):	**15**
LBGR (SOR):	0.90	Estimated Conc. (SOR):	0.16
Alpha:	0.050	Estimated Power:	1.0
Beta:	0.050		

NOTE: SOR = Sum-of-Ratios

Prospective Power Curve



Gross Alpha Efficiency Data

Instrument Description:	Gas Flow Proportional Detector (Ludlum 43-68)
Physical Detector Area (cm²):	126
DCGLw (dpm/100 cm²):	100
Total Efficiency:	0.22
DCGLw (cpm/100 cm²):	28

Contaminant	HTDC[a]	Energy[b]	Fract[c]	Inst. Eff.	Surf. Eff.	Total Eff.
Am-241	No	N/A	1.0	0.22	1.0	0.22

[a]Hard-to-detect contaminant [b]Average beta energy (keV) [N/A indicates alpha emission] [c]Activity fraction

Gross Beta Efficiency Data

Instrument Description:	Gas Flow Proportional Detector (Ludlum 43-68)
Physical Detector Area (cm²):	126
DCGLw (dpm/100 cm²):	5,000
Total Efficiency:	0.27
DCGLw (cpm/100 cm²):	1,701

Contaminant	HTDC[a]	Energy[b]	Fract[c]	Inst. Eff.	Surf. Eff.	Total Eff.
Co-60	No	96.09	1.0	0.27	1.0	0.27

[a]Hard-to-detect contaminant [b]Average beta energy (keV) [N/A indicates alpha emission] [c]Activity fraction

Gross Alpha Mean and Sigma Data

Count Time (min):	1
Sign Test Sigma (cpm/100 cm²):	0.90

Data/Material	Mean (cpm/100 cm²)	Std. Dev. (cpm/100 cm²)	MDC (dpm/100 cm²)
SU	1.2	0.90	29

Gross Beta Mean and Sigma Data

Count Time (min):	1
Sign Test Sigma (cpm/100 cm²):	33

Data/Material	Mean (cpm/100 cm²)	Std. Dev. (cpm/100 cm²)	MDC (dpm/100 cm²)
SU	197	33	201

Report Created 09/30/2010 1409 (*COMPASS v1.1.0*)

BUILDING SURFACE SURVEY PLAN

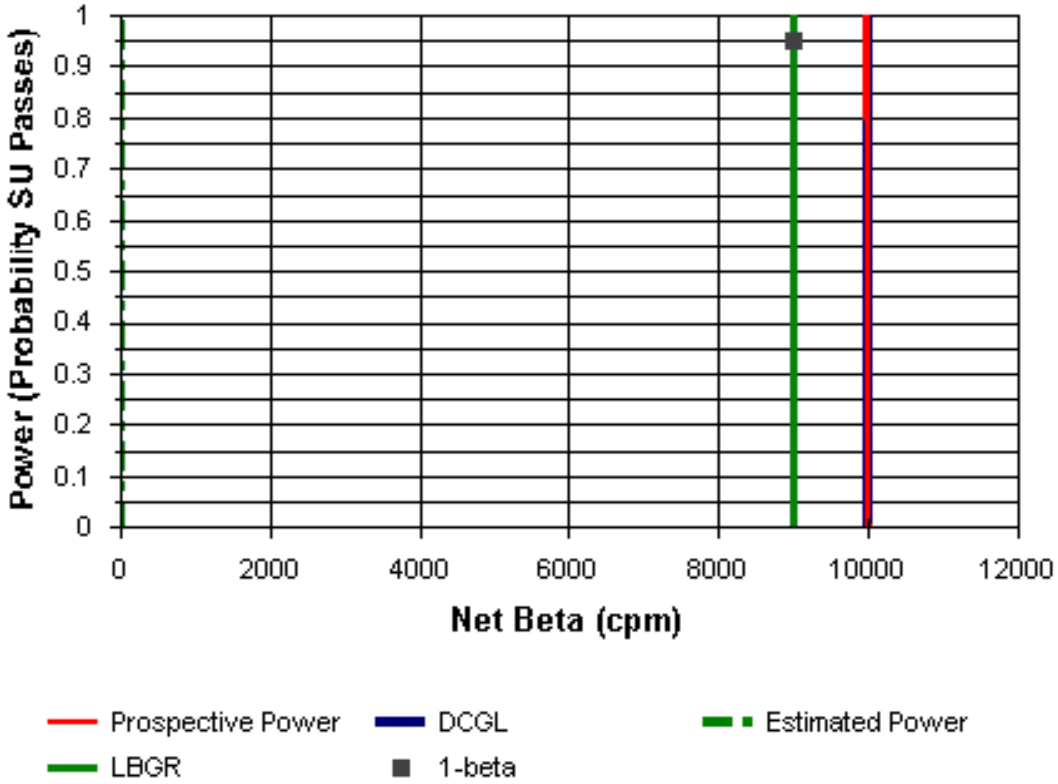
Survey Plan Summary

Site Name:	LBNL Old Town Buildings
Planner(s):	ERG/ProRadCon
Survey Unit Name:	Building 41 (tritium)
Comments:	SU area is for floors..walls are not included.

Statistical Design Details

Area (m²):	92	Classification:	3
Selected Test:	Sign	Estimated Sigma (cpm/100 cm²):	11
DCGL (cpm/100 cm²):	10,000	Sample Size (N):	**13**
LBGR (cpm/100 cm²):	9,000	Estimated Conc. (cpm/100 cm²):	13
Alpha:	0.050	Estimated Power:	1.0
Beta:	0.050		

Prospective Power Curve



Gross Beta Efficiency Data

Instrument Description:	Off-site Laboratory
Physical Detector Area (cm²):	100
DCGLw (dpm/100 cm²):	10,000
Total Efficiency:	1.0
DCGLw (cpm/100 cm²):	10,000

Contaminant	HTDC[a]	Energy[b]	Fract[c]	Inst. Eff.	Surf. Eff.	Total Eff.
H-3	No	5.69	1.0	1.0	1.0	1.0

[a]Hard-to-detect contaminant [b]Average beta energy (keV) [N/A indicates alpha emission] [c]Activity fraction

Gross Beta Mean and Sigma Data

Count Time (min):	1
Sign Test Sigma (cpm/100 cm²):	11

Data/Material	Mean (cpm/100 cm²)	Std. Dev. (cpm/100 cm²)	MDC (dpm/100 cm²)
SU	13	11	20

Report Created 09/30/2010 1414 (*COMPASS v1.1.0*)

BUILDING 44

Building 44

BUILDING SURFACE SURVEY PLAN

Survey Plan Summary

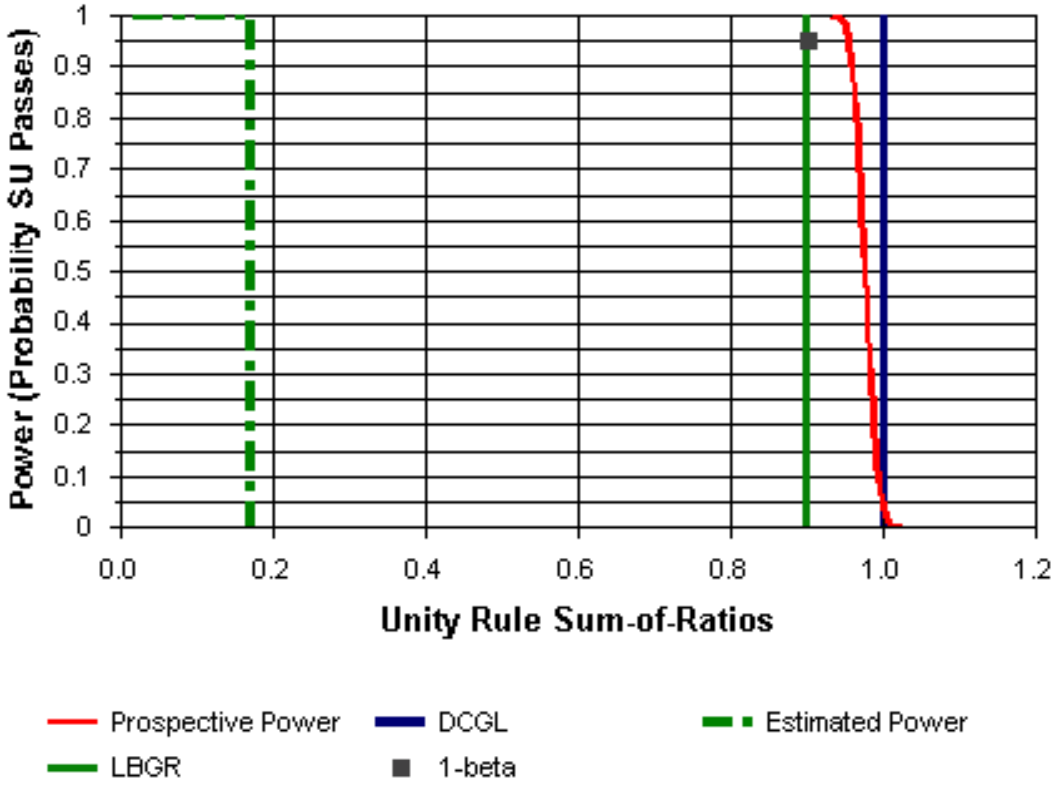
Site Name:	LBNL Old Town Buildings
Planner(s):	ERG/ProRadCon
Survey Unit Name:	Building 44
Comments:	Area is floor footprint only

Statistical Design Details

Area (m²):	134	Classification:	3
Selected Test:	Sign	Estimated Sigma (SOR):	0.04
DCGL (SOR):	1	Sample Size (N):	**15**
LBGR (SOR):	0.90	Estimated Conc. (SOR):	0.17
Alpha:	0.050	Estimated Power:	1.0
Beta:	0.050		

NOTE: SOR = Sum-of-Ratios

Prospective Power Curve



Gross Alpha Efficiency Data

Instrument Description:	Gas Proportional Detector
Physical Detector Area (cm²):	126
DCGLw (dpm/100 cm²):	100
Total Efficiency:	0.22
DCGLw (cpm/100 cm²):	28

Contaminant	HTDC[a]	Energy[b]	Fract[c]	Inst. Eff.	Surf. Eff.	Total Eff.
Am-241	No	N/A	1.0	0.22	1.0	0.22

[a]Hard-to-detect contaminant [b]Average beta energy (keV) [N/A indicates alpha emission] [c]Activity fraction

Gross Beta Efficiency Data

Instrument Description:	Gas Proportional Detector
Physical Detector Area (cm²):	126
DCGLw (dpm/100 cm²):	5,000
Total Efficiency:	0.27
DCGLw (cpm/100 cm²):	1,701

Contaminant	HTDC[a]	Energy[b]	Fract[c]	Inst. Eff.	Surf. Eff.	Total Eff.
Co-60	No	96.09	1.0	0.27	1.0	0.27

[a]Hard-to-detect contaminant [b]Average beta energy (keV) [N/A indicates alpha emission] [c]Activity fraction

Gross Alpha Mean and Sigma Data

Count Time (min):	1
Sign Test Sigma (cpm/100 cm²):	1.1

Data/Material	Mean (cpm/100 cm²)	Std. Dev. (cpm/100 cm²)	MDC (dpm/100 cm²)
SU	1.2	1.1	29

Gross Beta Mean and Sigma Data

Count Time (min):	1
Sign Test Sigma (cpm/100 cm²):	37

Data/Material	Mean (cpm/100 cm²)	Std. Dev. (cpm/100 cm²)	MDC (dpm/100 cm²)
SU	208	37	206

Report Created 10/05/2010 1300 (*COMPASS v1.1.0*)

BUILDING SURFACE SURVEY PLAN

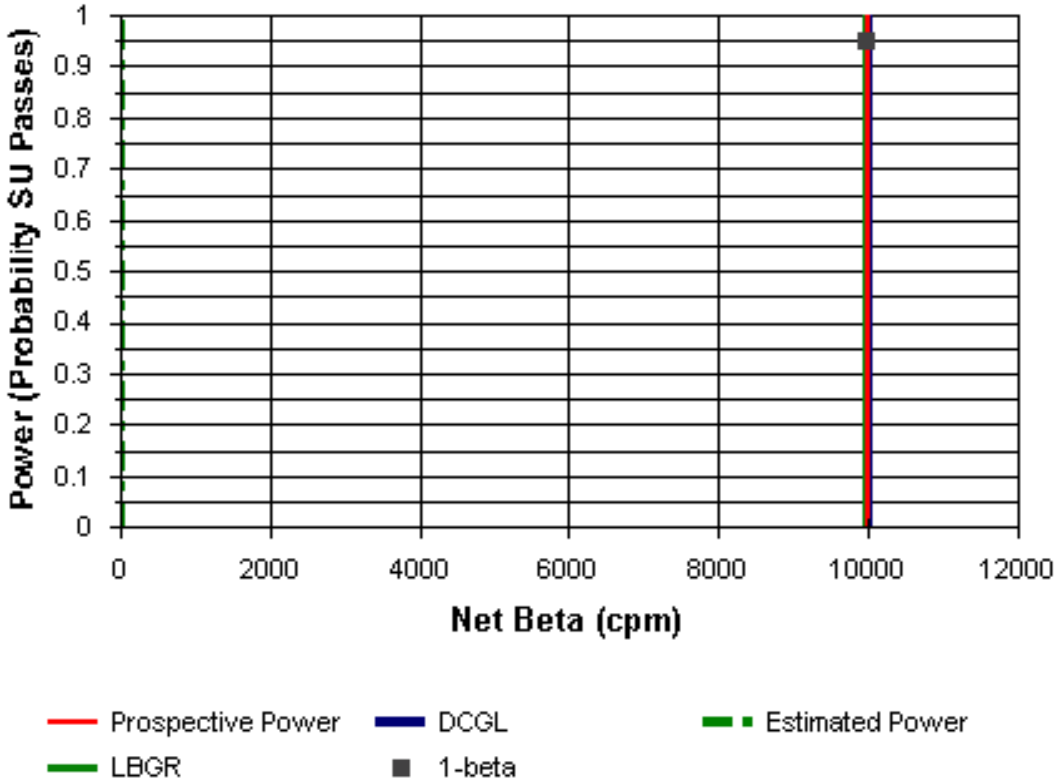
Survey Plan Summary

Site Name:	LBNL Old Town Buildings
Planner(s):	ERG/ProRadCon
Survey Unit Name:	Building 44 Tritium
Comments:	Area is floor footprint only

Statistical Design Details

Area (m²):	104	Classification:	3
Selected Test:	Sign	Estimated Sigma (cpm/100 cm²):	4.0
DCGL (cpm/100 cm²):	10,000	Sample Size (N):	**13**
LBGR (cpm/100 cm²):	9,975	Estimated Conc. (cpm/100 cm²):	1.5
Alpha:	0.050	Estimated Power:	1.0
Beta:	0.050		

Prospective Power Curve



Gross Beta Efficiency Data

Instrument Description:	Liquid Scintilation Counter (beckman)
Physical Detector Area (cm²):	100
DCGLw (dpm/100 cm²):	10,000
Total Efficiency:	1.0
DCGLw (cpm/100 cm²):	10,000

Contaminant	HTDC[a]	Energy[b]	Fract[c]	Inst. Eff.	Surf. Eff.	Total Eff.
H-3	No	5.69	1.0	1.0	1.0	1.0

[a]Hard-to-detect contaminant [b]Average beta energy (keV) [N/A indicates alpha emission] [c]Activity fraction

Gross Beta Mean and Sigma Data

Count Time (min):	1
Sign Test Sigma (cpm/100 cm²):	4.0

Data/Material	Mean (cpm/100 cm²)	Std. Dev. (cpm/100 cm²)	MDC (dpm/100 cm²)
SU	1.5	4.0	8.7

Report Created 10/05/2010 1304 (*COMPASS v1.1.0*)

BUILDINGS 44A AND 44B

Buildings 44A and 44B

BUILDING SURFACE SURVEY PLAN

Survey Plan Summary

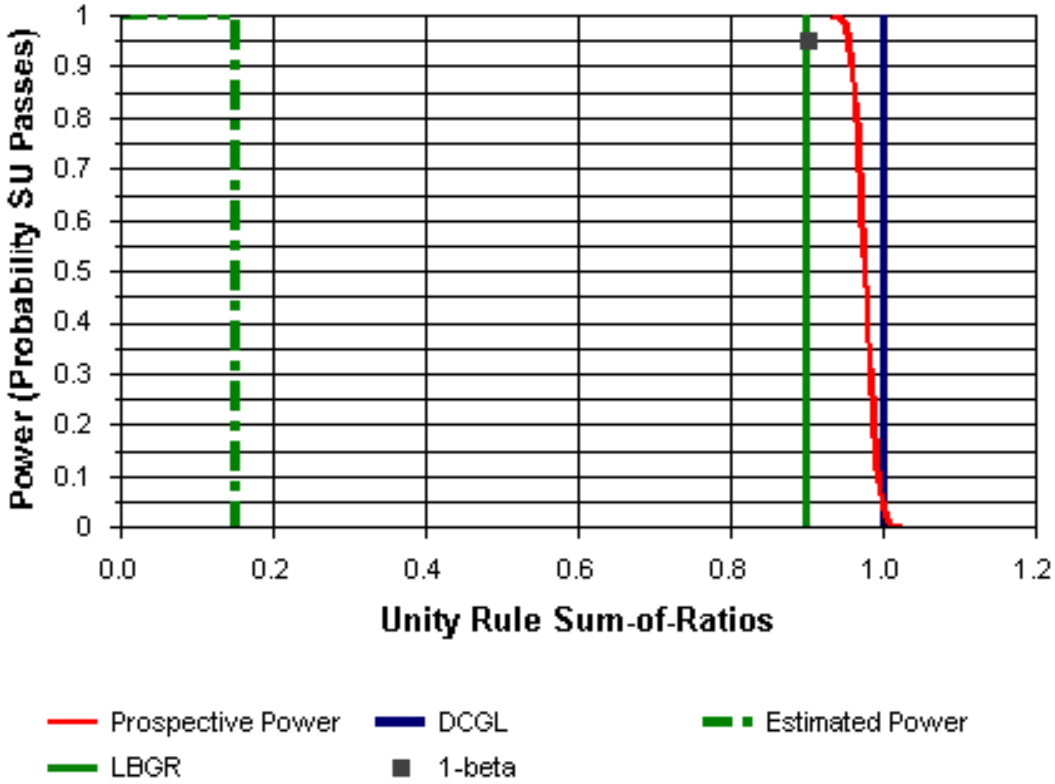
Site Name:	LBNL Old Town Buildings
Planner(s):	ERG/ProRadCon
Survey Unit Name:	Bldg 44A
Comments:	Area is floor footprint only

Statistical Design Details

Area (m²):	45	Classification:	3
Selected Test:	Sign	Estimated Sigma (SOR):	0.04
DCGL (SOR):	1	Sample Size (N):	**15**
LBGR (SOR):	0.90	Estimated Conc. (SOR):	0.15
Alpha:	0.050	Estimated Power:	1.0
Beta:	0.050		

NOTE: SOR = Sum-of-Ratios

Prospective Power Curve



Gross Alpha Efficiency Data

Instrument Description:	Gas Proportional Detector (Ludlum 43-68)
Physical Detector Area (cm²):	126
DCGLw (dpm/100 cm²):	100
Total Efficiency:	0.22
DCGLw (cpm/100 cm²):	28

Contaminant	HTDC[a]	Energy[b]	Fract[c]	Inst. Eff.	Surf. Eff.	Total Eff.
Am-241	No	N/A	1.0	0.22	1.0	0.22

[a]Hard-to-detect contaminant [b]Average beta energy (keV) [N/A indicates alpha emission] [c]Activity fraction

Gross Beta Efficiency Data

Instrument Description:	Gas Proportional Detector (Ludlum 43-68)
Physical Detector Area (cm²):	126
DCGLw (dpm/100 cm²):	5,000
Total Efficiency:	0.27
DCGLw (cpm/100 cm²):	1,701

Contaminant	HTDC[a]	Energy[b]	Fract[c]	Inst. Eff.	Surf. Eff.	Total Eff.
Co-60	No	96.09	1.0	0.27	1.0	0.27

[a]Hard-to-detect contaminant [b]Average beta energy (keV) [N/A indicates alpha emission] [c]Activity fraction

Gross Alpha Mean and Sigma Data

Count Time (min):	1
Sign Test Sigma (cpm/100 cm²):	1.1

Data/Material	Mean (cpm/100 cm²)	Std. Dev. (cpm/100 cm²)	MDC (dpm/100 cm²)
SU	1.0	1.1	28

Gross Beta Mean and Sigma Data

Count Time (min):	1
Sign Test Sigma (cpm/100 cm²):	30

Data/Material	Mean (cpm/100 cm²)	Std. Dev. (cpm/100 cm²)	MDC (dpm/100 cm²)
SU	195	30	200

Report Created 10/05/2010 1401 (*COMPASS v1.1.0*)

BUILDING SURFACE SURVEY PLAN

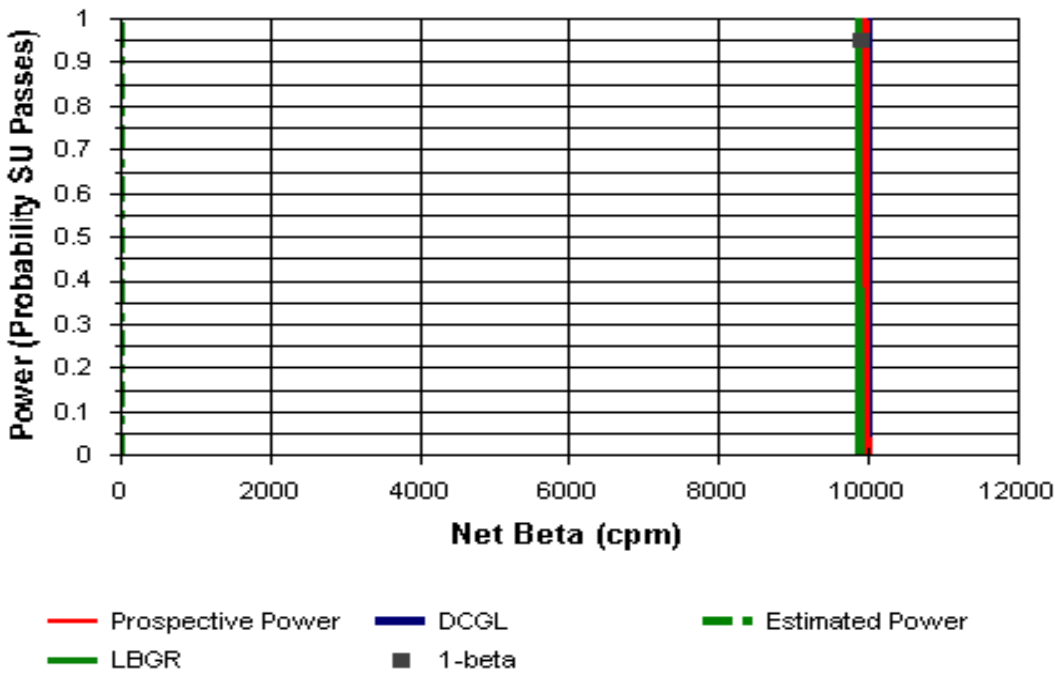
Survey Plan Summary

Site Name:	LBNL Old Town Buildings
Planner(s):	ERG/ProRadCon
Survey Unit Name:	BLDG 44A Tritium
Comments:	Area is for floor footprint only.

Statistical Design Details

Area (m²):	45	Classification:	3
Selected Test:	Sign	Estimated Sigma (cpm/100 cm²):	23
DCGL (cpm/100 cm²):	10,000	Sample Size (N):	**13**
LBGR (cpm/100 cm²):	9,900	Estimated Conc. (cpm/100 cm²):	9.5
Alpha:	0.050	Estimated Power:	1.0
Beta:	0.050		

Prospective Power Curve



Gross Beta Efficiency Data

Instrument Description:	Beckman Liquid Scintilation Counter
Physical Detector Area (cm²):	100
DCGLw (dpm/100 cm²):	10,000
Total Efficiency:	1.0
DCGLw (cpm/100 cm²):	10,000

Contaminant	HTDC[a]	Energy[b]	Fract[c]	Inst. Eff.	Surf. Eff.	Total Eff.
H-3	No	5.69	1.0	1.0	1.0	1.0

[a]Hard-to-detect contaminant [b]Average beta energy (keV) [N/A indicates alpha emission] [c]Activity fraction

Gross Beta Mean and Sigma Data

Count Time (min):	1
Sign Test Sigma (cpm/100 cm²):	23

Data/Material	Mean (cpm/100 cm²)	Std. Dev. (cpm/100 cm²)	MDC (dpm/100 cm²)
SU	9.5	23	17

BUILDING SURFACE SURVEY PLAN

Survey Plan Summary

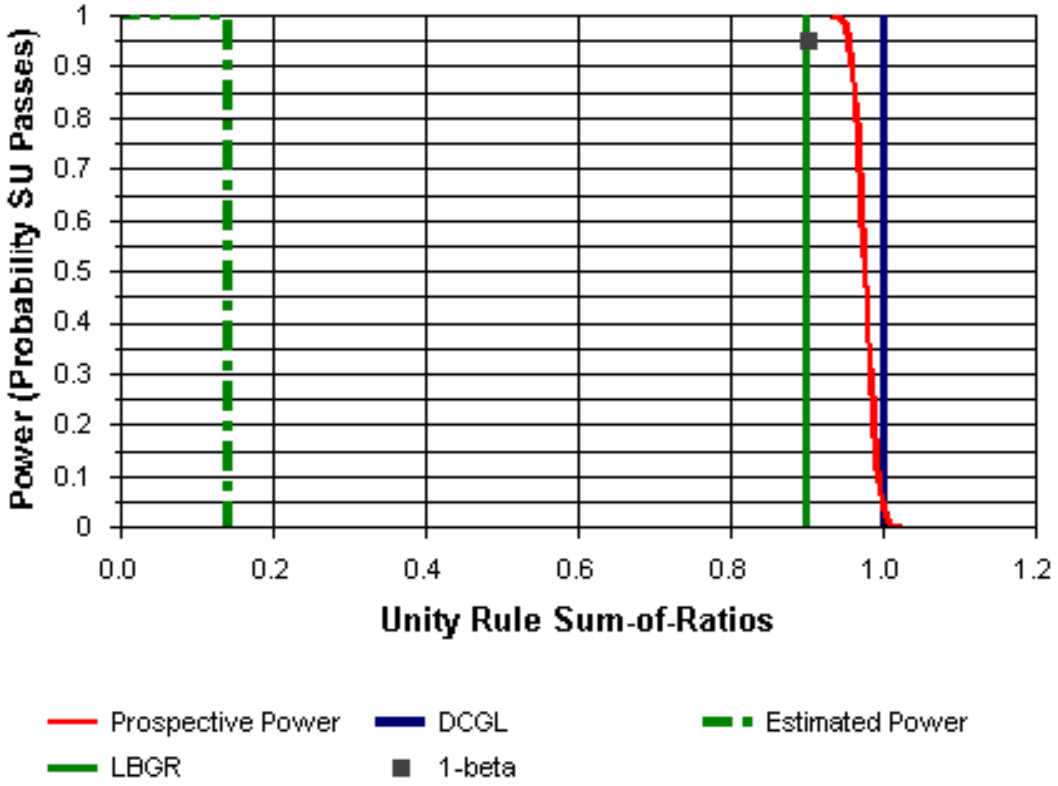
Site Name:	LBNL Old Town Buildings
Planner(s):	ERG/ProRadCon
Survey Unit Name:	Bldg 44B
Comments:	Area is floor footprint only

Statistical Design Details

Area (m²):	134	Classification:	3
Selected Test:	Sign	Estimated Sigma (SOR):	0.04
DCGL (SOR):	1	Sample Size (N):	**15**
LBGR (SOR):	0.90	Estimated Conc. (SOR):	0.14
Alpha:	0.050	Estimated Power:	1.0
Beta:	0.050		

NOTE: SOR = Sum-of-Ratios

Prospective Power Curve



Gross Alpha Efficiency Data

Instrument Description:	Gas Proportional Detector (Ludlum 43-68)
Physical Detector Area (cm²):	126
DCGLw (dpm/100 cm²):	100
Total Efficiency:	0.22
DCGLw (cpm/100 cm²):	28

Contaminant	HTDC[a]	Energy[b]	Fract[c]	Inst. Eff.	Surf. Eff.	Total Eff.
Am-241	No	N/A	1.0	0.22	1.0	0.22

[a]Hard-to-detect contaminant [b]Average beta energy (keV) [N/A indicates alpha emission] [c]Activity fraction

Gross Beta Efficiency Data

Instrument Description:	Gas Proportional Detector (Ludlum 43-68)
Physical Detector Area (cm²):	126
DCGLw (dpm/100 cm²):	5,000
Total Efficiency:	0.27
DCGLw (cpm/100 cm²):	1,701

Contaminant	HTDC[a]	Energy[b]	Fract[c]	Inst. Eff.	Surf. Eff.	Total Eff.
Co-60	No	96.09	1.0	0.27	1.0	0.27

[a]Hard-to-detect contaminant [b]Average beta energy (keV) [N/A indicates alpha emission] [c]Activity fraction

Gross Alpha Mean and Sigma Data

Count Time (min):	1
Sign Test Sigma (cpm/100 cm²):	1.1

Data/Material	Mean (cpm/100 cm²)	Std. Dev. (cpm/100 cm²)	MDC (dpm/100 cm²)
SU	1.2	1.1	29

Gross Beta Mean and Sigma Data

Count Time (min):	1
Sign Test Sigma (cpm/100 cm²):	17

Data/Material	Mean (cpm/100 cm²)	Std. Dev. (cpm/100 cm²)	MDC (dpm/100 cm²)
SU	164	17	184

Report Created 10/05/2010 1418 (*COMPASS v1.1.0*)

BUILDING SURFACE SURVEY PLAN

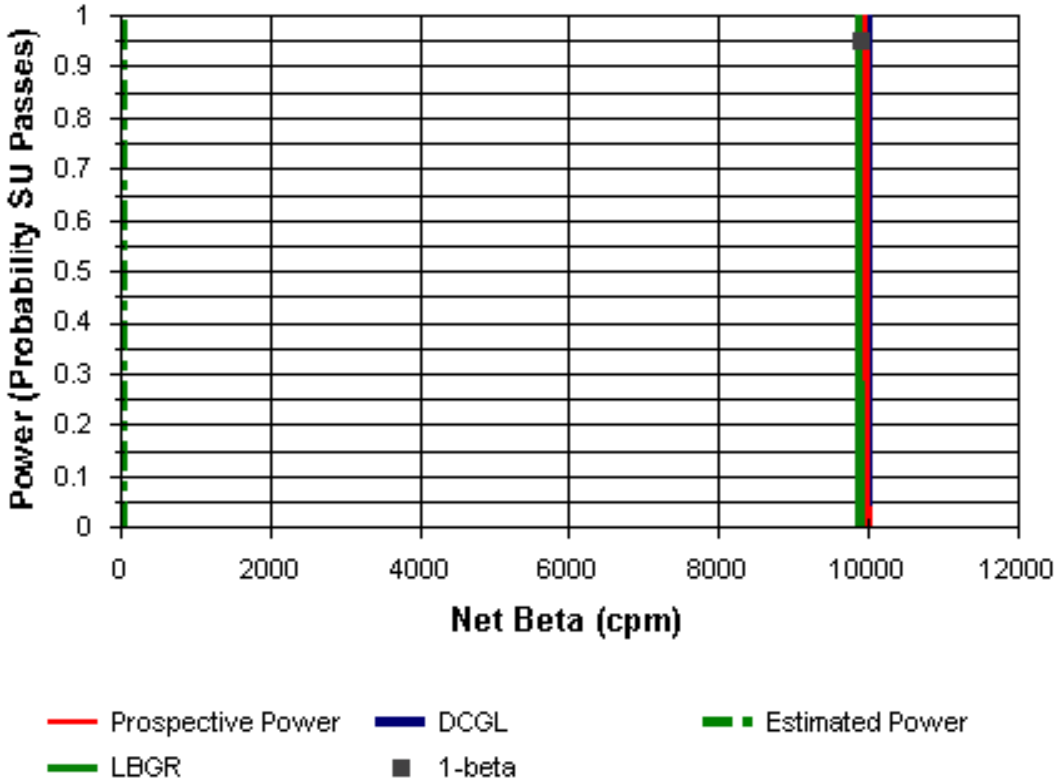
Survey Plan Summary

Site Name:	LBNL Old Town Buildings
Planner(s):	ERG/ProRadCon
Survey Unit Name:	Building 44B
Comments:	Area is for floor footprint only

Statistical Design Details

Area (m²):	134	Classification:	3
Selected Test:	Sign	Estimated Sigma (cpm/100 cm²):	28
DCGL (cpm/100 cm²):	10,000	Sample Size (N):	**13**
LBGR (cpm/100 cm²):	9,900	Estimated Conc. (cpm/100 cm²):	15
Alpha:	0.050	Estimated Power:	1.0
Beta:	0.050		

Prospective Power Curve



Gross Beta Efficiency Data

Instrument Description:	Beckman Liquid Scintillation Counter
Physical Detector Area (cm²):	100
DCGLw (dpm/100 cm²):	10,000
Total Efficiency:	1.0
DCGLw (cpm/100 cm²):	10,000

Contaminant	HTDC[a]	Energy[b]	Fract[c]	Inst. Eff.	Surf. Eff.	Total Eff.
H-3	No	5.69	1.0	1.0	1.0	1.0

[a]Hard-to-detect contaminant [b]Average beta energy (keV) [N/A indicates alpha emission] [c]Activity fraction

Gross Beta Mean and Sigma Data

Count Time (min):	1
Sign Test Sigma (cpm/100 cm²):	28

Data/Material	Mean (cpm/100 cm²)	Std. Dev. (cpm/100 cm²)	MDC (dpm/100 cm²)
SU	15	28	21

Report Created 10/05/2010 1424 (*COMPASS v1.1.0*)

BUILDING 52

Building 52

BUILDING SURFACE SURVEY PLAN

Survey Plan Summary

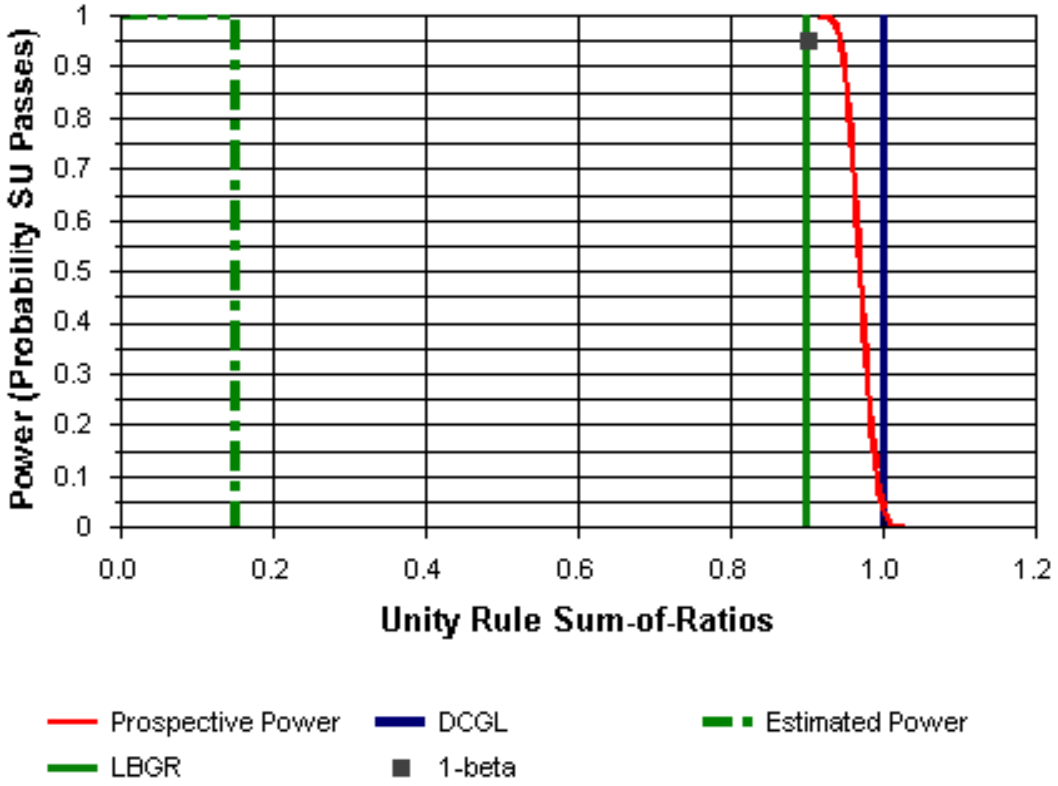
Site Name:	LBNL Old Town Buildings
Planner(s):	ERG/ProRadCon
Survey Unit Name:	Building 52
Comments:	Area is for floor footprint only.

Statistical Design Details

Area (m²):	465	Classification:	3
Selected Test:	Sign	Estimated Sigma (SOR):	0.05
DCGL (SOR):	1	Sample Size (N):	**15**
LBGR (SOR):	0.90	Estimated Conc. (SOR):	0.15
Alpha:	0.050	Estimated Power:	1.0
Beta:	0.050		

NOTE: SOR = Sum-of-Ratios

Prospective Power Curve



Gross Alpha Efficiency Data

Instrument Description:	Gas Proportional Detector (Ludlum 43-68)
Physical Detector Area (cm²):	126
DCGLw (dpm/100 cm²):	100
Total Efficiency:	0.22
DCGLw (cpm/100 cm²):	28

Contaminant	HTDC[a]	Energy[b]	Fract[c]	Inst. Eff.	Surf. Eff.	Total Eff.
Am-241	No	N/A	1.0	0.22	1.0	0.22

[a]Hard-to-detect contaminant [b]Average beta energy (keV) [N/A indicates alpha emission] [c]Activity fraction

Gross Beta Efficiency Data

Instrument Description:	Gas Proportional Detector (Ludlum 43-68)
Physical Detector Area (cm²):	126
DCGLw (dpm/100 cm²):	5,000
Total Efficiency:	0.27
DCGLw (cpm/100 cm²):	1,701

Contaminant	HTDC[a]	Energy[b]	Fract[c]	Inst. Eff.	Surf. Eff.	Total Eff.
Co-60	No	96.09	1.0	0.27	1.0	0.27

[a]Hard-to-detect contaminant [b]Average beta energy (keV) [N/A indicates alpha emission] [c]Activity fraction

Gross Alpha Mean and Sigma Data

Count Time (min):	1
Sign Test Sigma (cpm/100 cm²):	1.1

Data/Material	Mean (cpm/100 cm²)	Std. Dev. (cpm/100 cm²)	MDC (dpm/100 cm²)
SU	1.2	1.1	29

Gross Beta Mean and Sigma Data

Count Time (min):	1
Sign Test Sigma (cpm/100 cm²):	51

Data/Material	Mean (cpm/100 cm²)	Std. Dev. (cpm/100 cm²)	MDC (dpm/100 cm²)
SU	183	51	194

Report Created 10/06/2010 0729 (*COMPASS v1.1.0*)

BUILDING SURFACE SURVEY PLAN

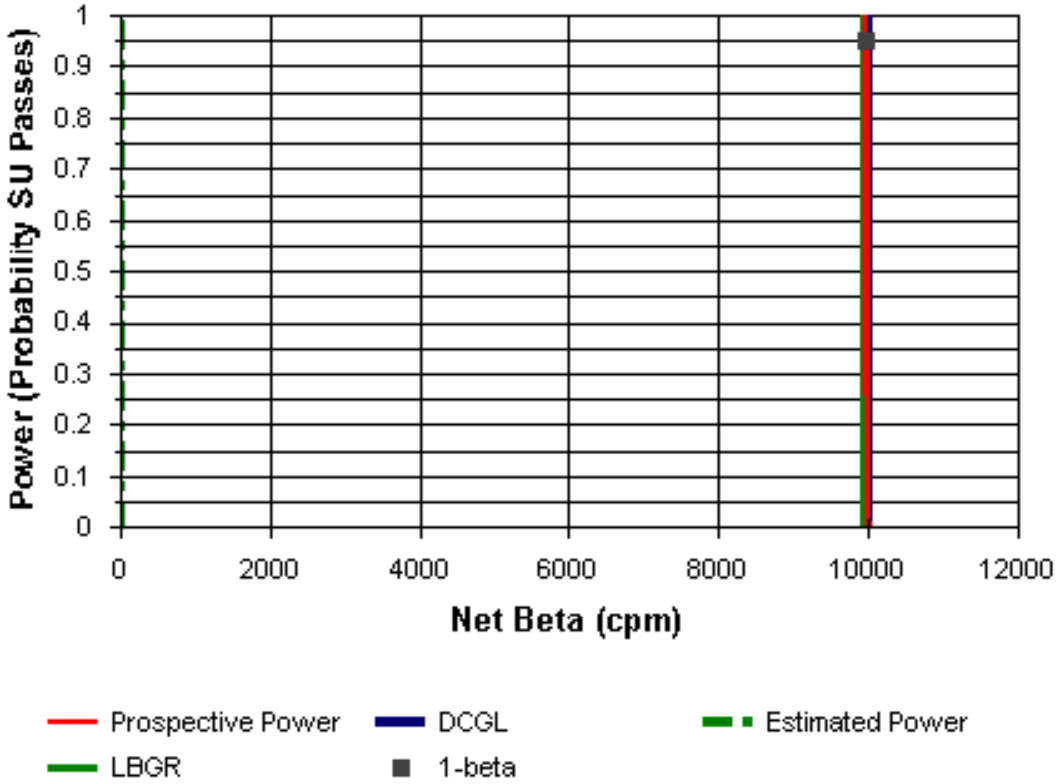
Survey Plan Summary

Site Name:	LBNL Old Town Buildings
Planner(s):	ERG/ProRadCon
Survey Unit Name:	Bldg 52 Tritium
Comments:	N/A

Statistical Design Details

Area (m²):	465	Classification:	3
Selected Test:	Sign	Estimated Sigma (cpm/100 cm²):	26
DCGL (cpm/100 cm²):	10,000	Sample Size (N):	**15**
LBGR (cpm/100 cm²):	9,950	Estimated Conc. (cpm/100 cm²):	6.8
Alpha:	0.050	Estimated Power:	1.0
Beta:	0.050		

Prospective Power Curve



Gross Beta Efficiency Data

Instrument Description:	Off-site Analytical Laboratory
Physical Detector Area (cm²):	100
DCGLw (dpm/100 cm²):	10,000
Total Efficiency:	1.0
DCGLw (cpm/100 cm²):	10,000

Contaminant	HTDC[a]	Energy[b]	Fract[c]	Inst. Eff.	Surf. Eff.	Total Eff.
H-3	No	5.69	1.0	1.0	1.0	1.0

[a]Hard-to-detect contaminant [b]Average beta energy (keV) [N/A indicates alpha emission] [c]Activity fraction

Gross Beta Mean and Sigma Data

Count Time (min):	1
Sign Test Sigma (cpm/100 cm²):	26

Data/Material	Mean (cpm/100 cm²)	Std. Dev. (cpm/100 cm²)	MDC (dpm/100 cm²)
SU	6.8	26	15

Report Created 10/06/2010 0734 (*COMPASS v1.1.0*)

BUILDING 52A

Building 52A

BUILDING SURFACE SURVEY PLAN

Survey Plan Summary

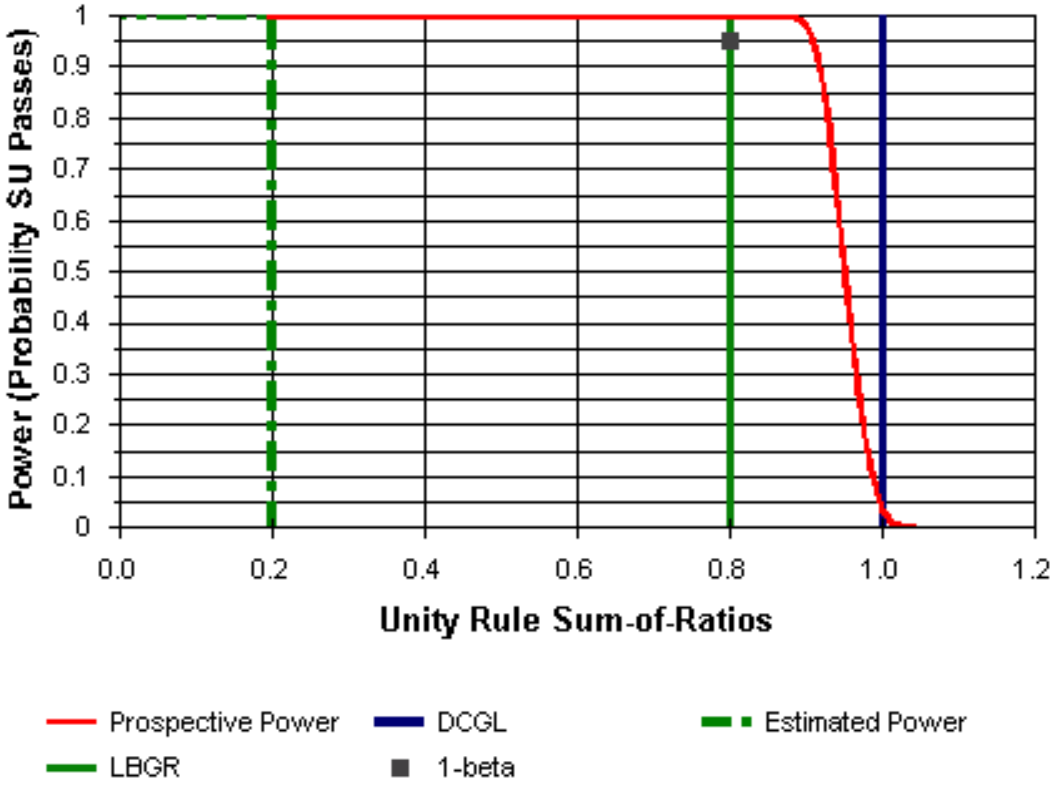
Site Name:	LBNL Old Town Buildings
Planner(s):	ERG/ProRadCon
Survey Unit Name:	Building 52A
Comments:	Area is for floor footprint only

Statistical Design Details

Area (m²):	48	Classification:	3
Selected Test:	Sign	Estimated Sigma (SOR):	0.08
DCGL (SOR):	1	Sample Size (N):	**15**
LBGR (SOR):	0.80	Estimated Conc. (SOR):	0.20
Alpha:	0.050	Estimated Power:	1.0
Beta:	0.050		

NOTE: SOR = Sum-of-Ratios

Prospective Power Curve



Gross Alpha Efficiency Data

Instrument Description:	Gas Proportional Detector (Ludlum 43-68)
Physical Detector Area (cm²):	126
DCGLw (dpm/100 cm²):	100
Total Efficiency:	0.22
DCGLw (cpm/100 cm²):	28

Contaminant	HTDC[a]	Energy[b]	Fract[c]	Inst. Eff.	Surf. Eff.	Total Eff.
Am-241	No	N/A	1.0	0.22	1.0	0.22

[a]Hard-to-detect contaminant [b]Average beta energy (keV) [N/A indicates alpha emission] [c]Activity fraction

Gross Beta Efficiency Data

Instrument Description:	Gas Proportional Detector (Ludlum 43-68)
Physical Detector Area (cm²):	126
DCGLw (dpm/100 cm²):	5,000
Total Efficiency:	0.27
DCGLw (cpm/100 cm²):	1,701

Contaminant	HTDC[a]	Energy[b]	Fract[c]	Inst. Eff.	Surf. Eff.	Total Eff.
Co-60	No	96.09	1.0	0.27	1.0	0.27

[a]Hard-to-detect contaminant [b]Average beta energy (keV) [N/A indicates alpha emission] [c]Activity fraction

Gross Alpha Mean and Sigma Data

Count Time (min):	1
Sign Test Sigma (cpm/100 cm²):	1.6

Data/Material	Mean (cpm/100 cm²)	Std. Dev. (cpm/100 cm²)	MDC (dpm/100 cm²)
SU	1.4	1.6	31

Gross Beta Mean and Sigma Data

Count Time (min):	1
Sign Test Sigma (cpm/100 cm²):	83

Data/Material	Mean (cpm/100 cm²)	Std. Dev. (cpm/100 cm²)	MDC (dpm/100 cm²)
SU	261	83	230

Report Created 10/05/2010 1520 (*COMPASS v1.1.0*)

BUILDING SURFACE SURVEY PLAN

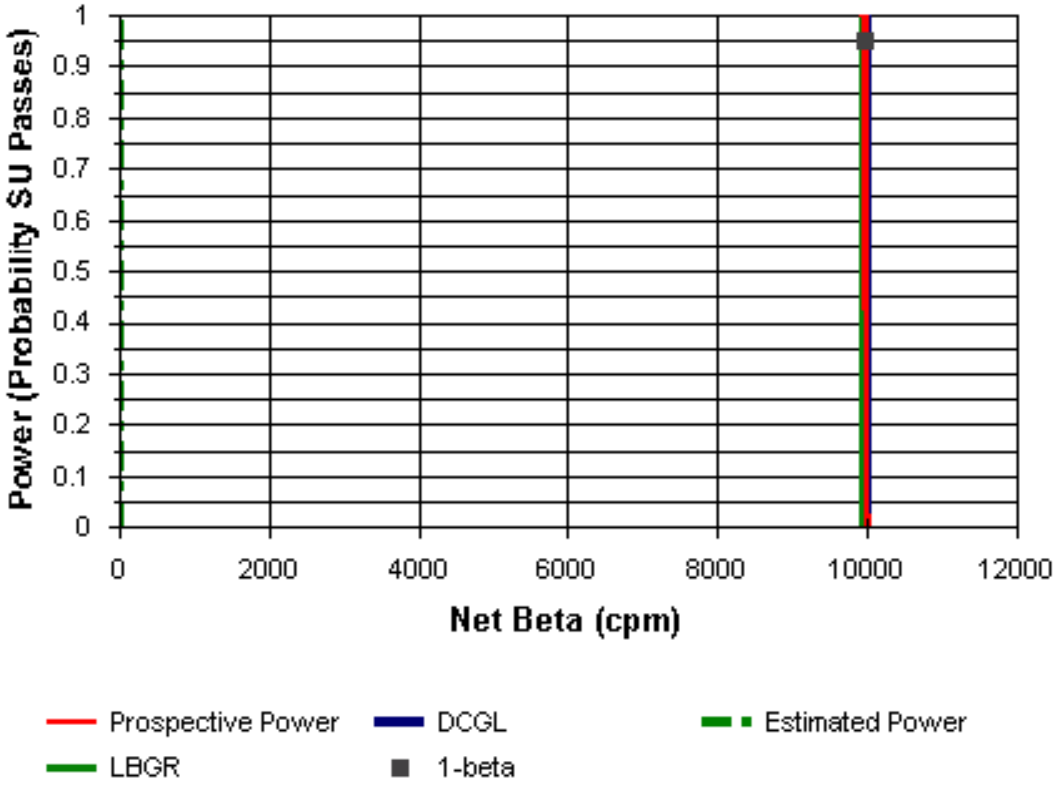
Survey Plan Summary

Site Name:	LBNL Old Town Buildings
Planner(s):	ERG/ProRadCon
Survey Unit Name:	Building 52A Tritium
Comments:	Area is for floor footprint only

Statistical Design Details

Area (m²):	48	Classification:	3
Selected Test:	Sign	Estimated Sigma (cpm/100 cm²):	19
DCGL (cpm/100 cm²):	10,000	Sample Size (N):	**14**
LBGR (cpm/100 cm²):	9,950	Estimated Conc. (cpm/100 cm²):	6.0
Alpha:	0.050	Estimated Power:	1.0
Beta:	0.050		

Prospective Power Curve



Gross Beta Efficiency Data

Instrument Description:	Off-site Analytical Laboratory
Physical Detector Area (cm²):	100
DCGLw (dpm/100 cm²):	10,000
Total Efficiency:	1.0
DCGLw (cpm/100 cm²):	10,000

Contaminant	HTDC[a]	Energy[b]	Fract[c]	Inst. Eff.	Surf. Eff.	Total Eff.
H-3	No	5.69	1.0	1.0	1.0	1.0

[a]Hard-to-detect contaminant [b]Average beta energy (keV) [N/A indicates alpha emission] [c]Activity fraction

Gross Beta Mean and Sigma Data

Count Time (min):	1
Sign Test Sigma (cpm/100 cm²):	19

Data/Material	Mean (cpm/100 cm²)	Std. Dev. (cpm/100 cm²)	MDC (dpm/100 cm²)
SU	6.0	19	14

Report Created 10/05/2010 1523 (*COMPASS v1.1.0*)

APPENDIX B

PHOTOGRAPHS

B5PC02

B5PC03

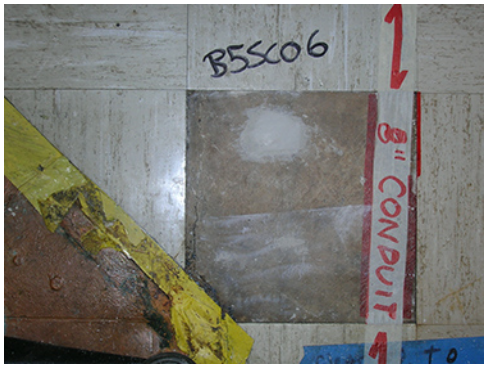
B5SC01

B5SC02

B5SC03

B5SC04

B5SC05



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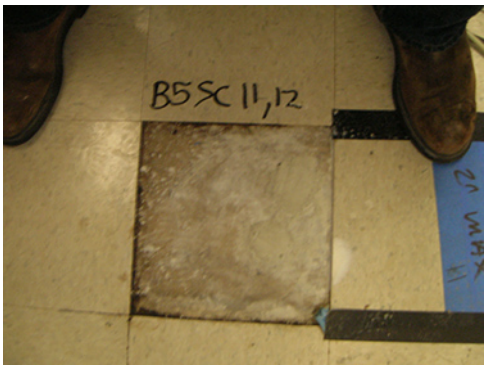
B5SC07

B5SC08

B5SC09

B5SC10



B5SC11, SC12

B5SC13

B5SC14

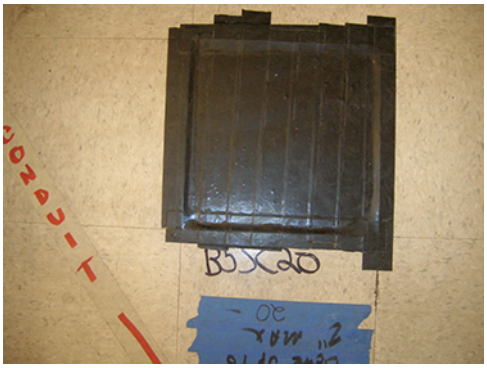
B5SC15

B5SC16

B5SC17

B5SC18

B5SC19



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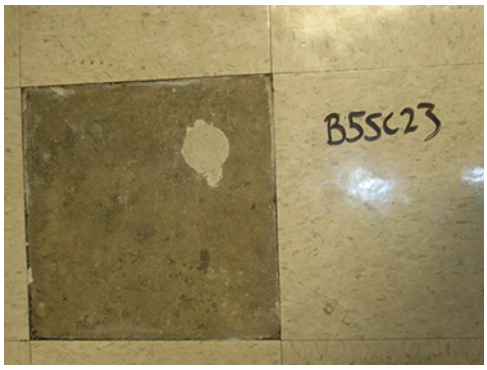
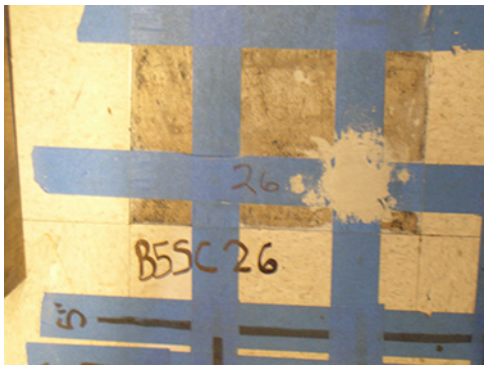
B5SC21, SC22



B5SC23

B5SC24

B5SC25



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B5SC27

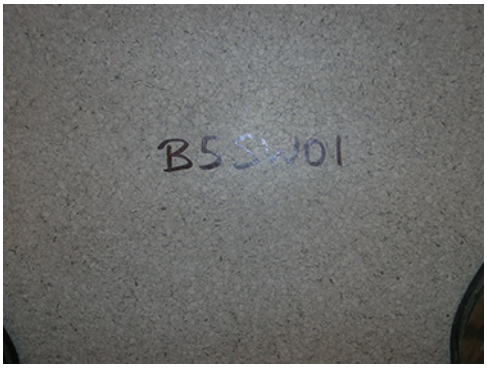
B5SE01

B5SE04 no. 2

B5SE04

B5SG02

B5SSW06



B5SW01

B5SW02,CK01, PC01

B5SW03

B5SW04

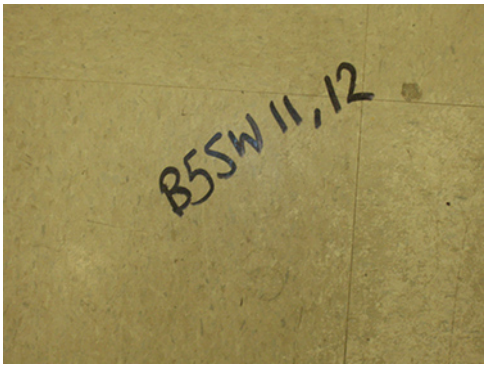
B5SW05

B5SW07

B5SW08

B5SW09

B5SW10



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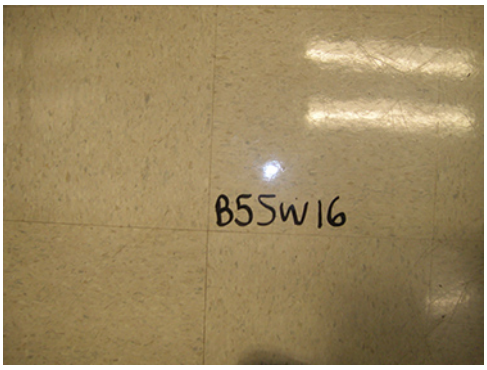
B5SW13

B5SW14

B5SW15



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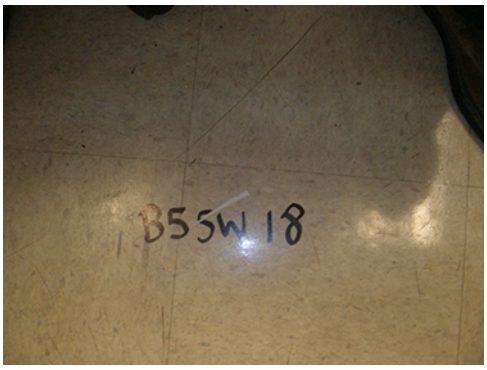

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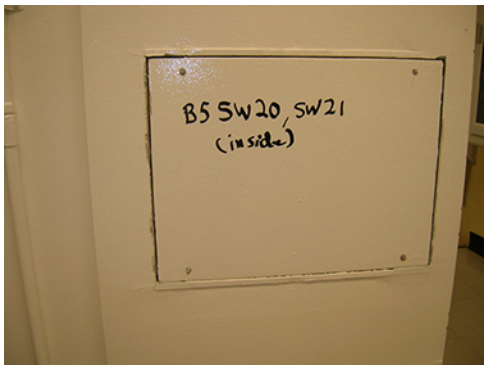

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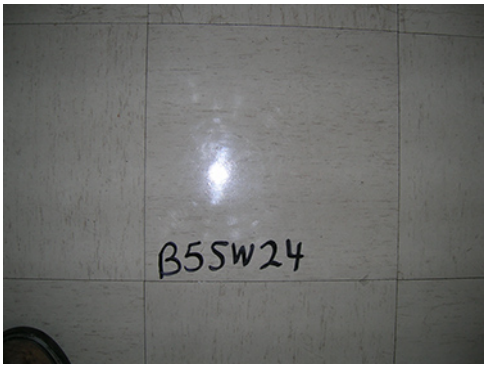
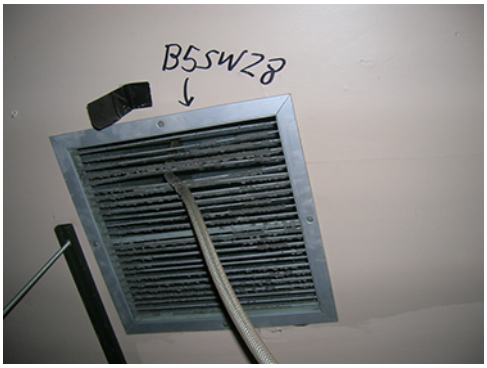


B5SW24

B5SW25

B5SW26



B5SW28

B5SW32

B5WW01

B5WW05

B5WW09,SW30

B5WW10, WW11

B5WW12

B14PC01

B14PC02

B14SC01

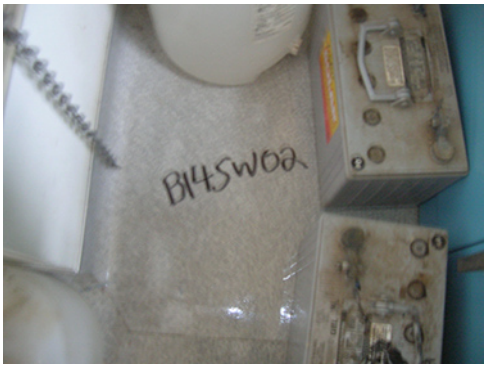
B14SC02

B14SC03

B14SC04

B14SC07

B14SW01



B14SW02

B14SW03

B14SW04, SW05

B14SW04,SW05

B14SW06

B14SW07

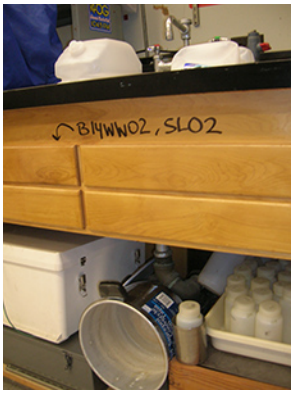
B14Sw08

B14SW09

B14SW10, SW11

B14SW12

B14WW01, SL01



B14WW02, SL02

B14WW03

B14WW04, SL04

B25ACK02

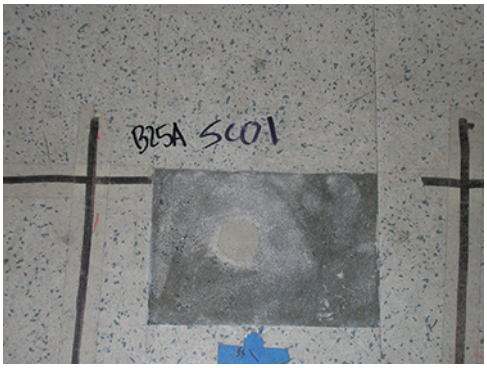
B25AEW01

B25ALH01

B25APC01

B25APC02, CK01

B25APC03



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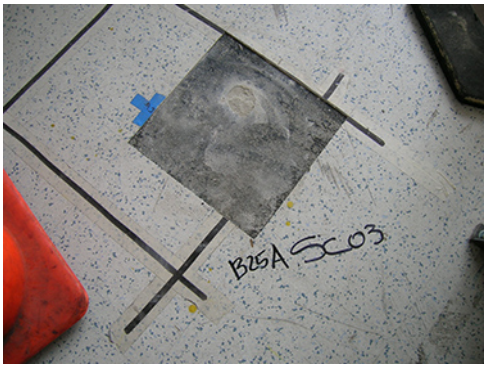

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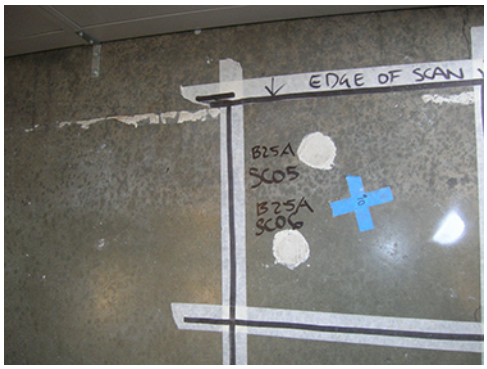

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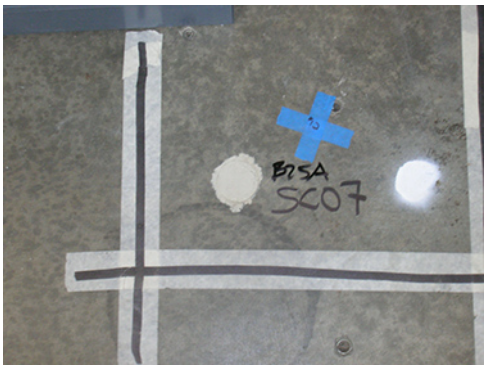

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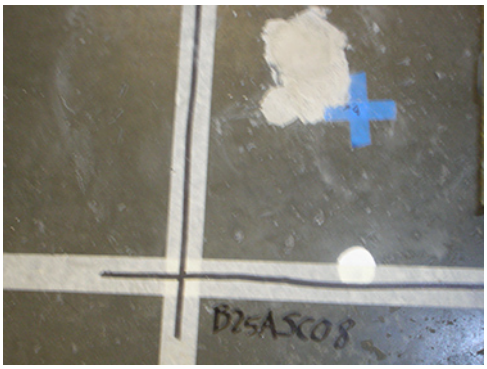

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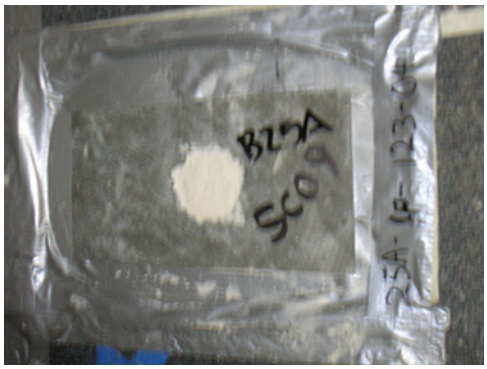
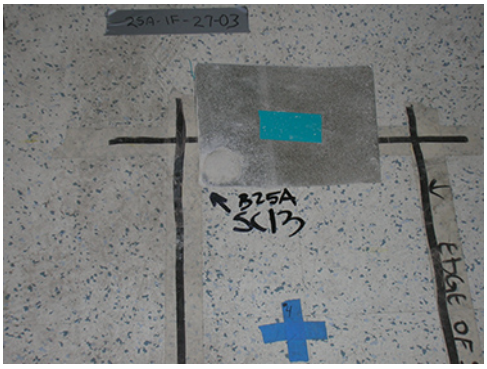


B25ASC09

B25ASC10

B25ASC11

B25ASC12



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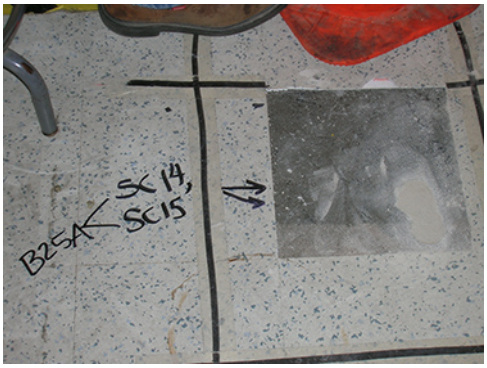

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B25ASW01

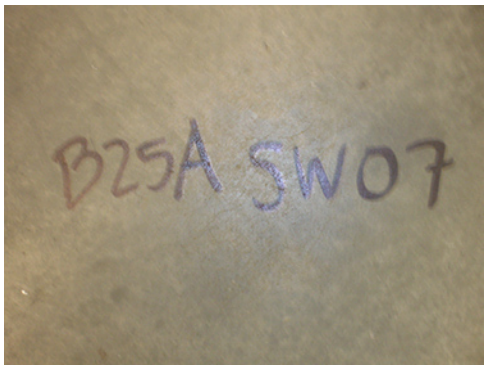
B25ASW02

B25ASW03

B25ASW04

B25ASW05

B25ASW06



B25ASW07

B25ASW08

B25ASW09

B25ASW10, SW11

B25ASW12

B25ASW13

B25ASW14

B25ASW15, SW16

B25ASW17

B25ASW18, SW19

B25ASW20

B25ASW21

B25ASW22

B25ASW23

B25ASW24

B25ASW25

B25ASW26

B25ASW27

B25ASW28

B40PC01

B40SC01

B40SE01

B40SE02

B40SW01

B40SW03

B40SW04,CK01

B40SW05

B41PC01

B41SC01

B41SW01, SW02

B41SW03

B41SW04,CK01

B41SW05

B41WW01, SL01

B41WW02, SL02

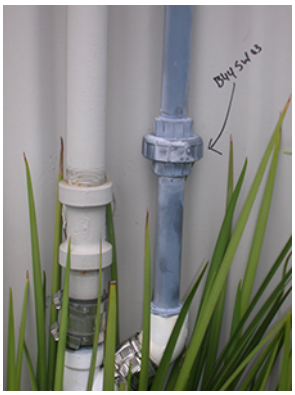
B44CK01

B44PC01,PC02

B44SC01

B44SW01

B44SW02



B44SW03

B44SW04

B44WW01

B44AEW01

B44APC03

B44ASW05

B44ASW06

B44ASW07

B44BEW02

B44BPC04

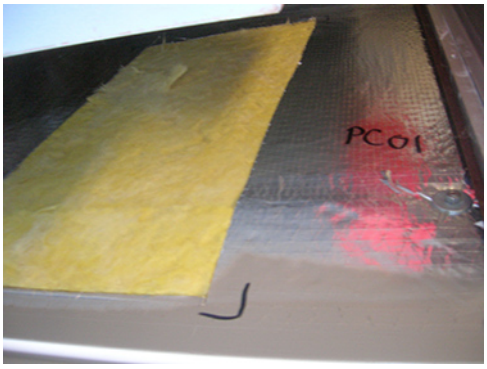
B44BSW08

B44BSW09, SW10

B52CK01

B52CK03

B52EW01

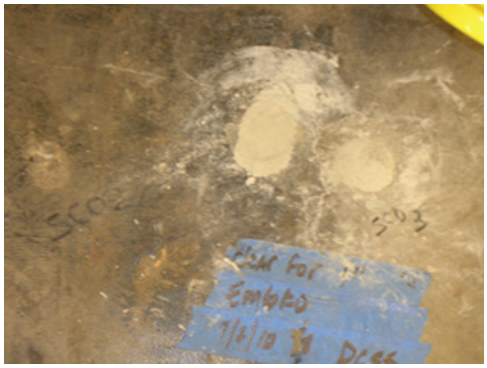


B52PC01

B52PC02

B52PC03

B52SC01



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B52SC05

B52SC06

B52SC07

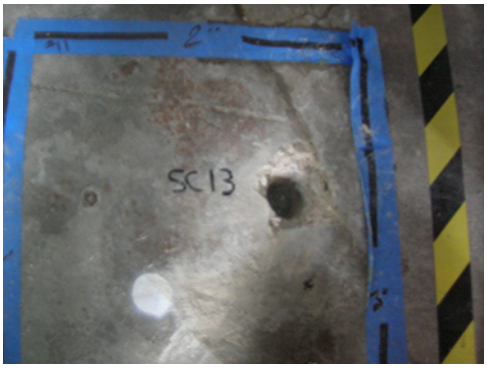
B52SC08

B52SC09

B52SC10

B52SC11

B52SC12



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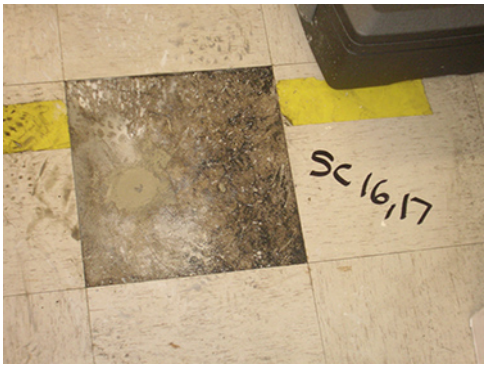
B52SC14

B52SC15



B52SC16, SC17

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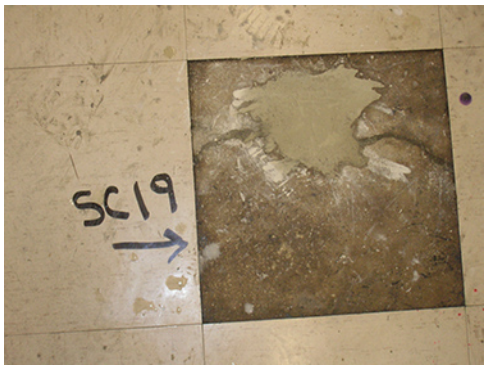

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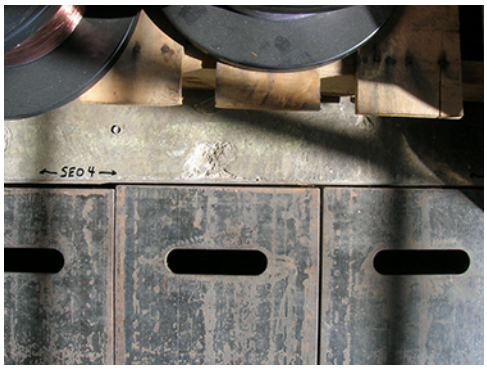
B52SC20

B52SE03



B52SE04

B52SE05

B52SE07

B52SE08

B52SE10

B52SE11

B52SE12

B52SE13

B52SW03

B52SW04

B52SW05

B52SW06

B52SW07

B52SW08

B52SW09,CK02

B52SW09

B52SW10

B52SW11, SW12

B52SW14

B52SW15

B52SW16, SW17

B52SW18

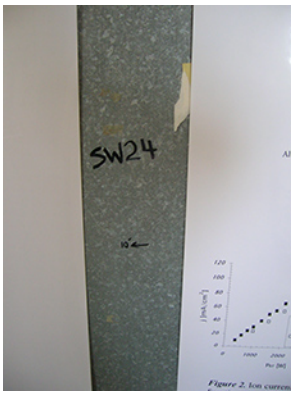
B52SW19

B52SW20

B52SW21

B52SW22

B52SW23



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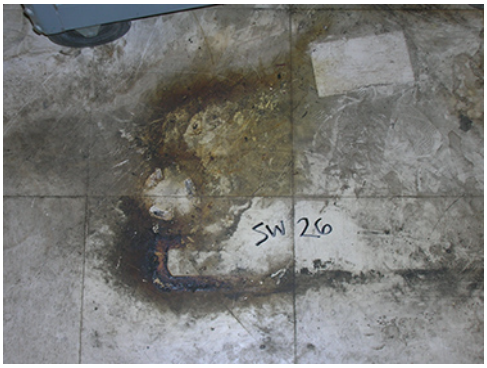

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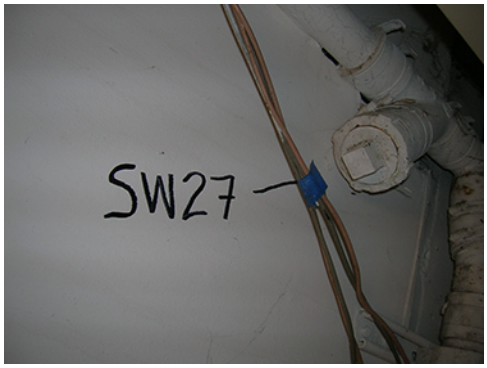
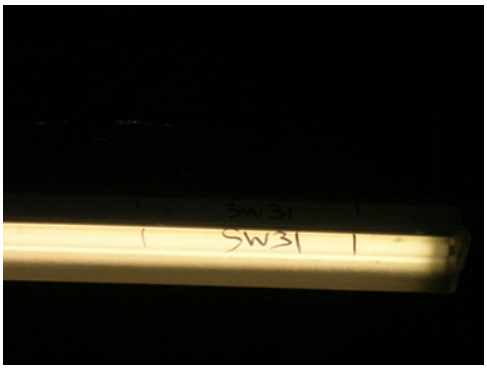


B52SW27

B52SW28

B52SW29

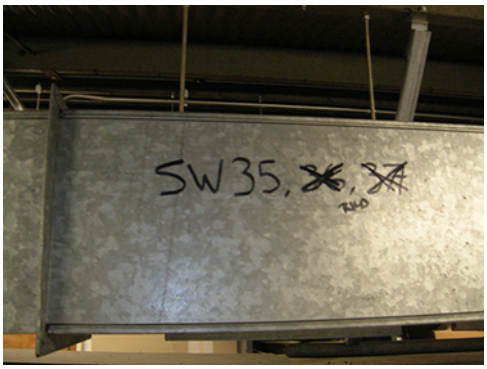
B52SW30



B52SW31

B52SW32

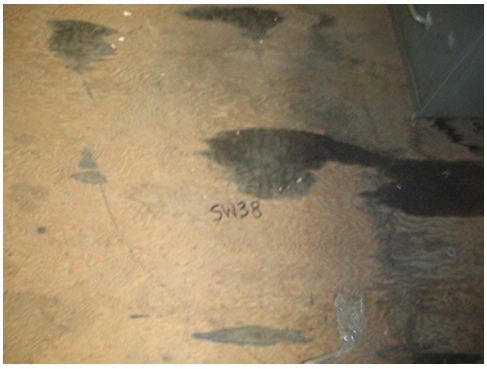
B52SW33, SW34



B52SW35

B52SW36

B52SW37



B52SW38

B52SW39, SW40

B52SW123

B52WW01, SL01, WW02, SL02

B52WW03, SL03

B52WW04, SL04

B52ASE01

B52ASE02

B52ASW01

B52ASW02

APPENDIX C

ASBESTOS AND LEAD PRE-DEMOLITION SURVEY REPORTS FOR BUILDINGS 5, 14, 25A, 40, 41, 44, 44A, 44B, 52, 52A AND GARDENER SHED

A Creative Joint Venture For Better Environmental Solutions

Lawrence Berkeley National Laboratory
Building 5
One Cyclotron Road
Berkeley, CA 94744

KELLCO-MACS Job #1004-17

NESHAP Compliant Pre-Demolition
Asbestos Metals in Paint Inspection Report

for

Weiss Associates
5801 Christie Avenue
Suite 600
Emeryville, CA 94608

August 25, 2010

3137 Diablo Avenue • Hayward, CA 94545-2701• (510) 786-9751 • fax (510) 786-9625
http://www.kellcomacs.com email: mailbox3137@kellcomacs.com

- Transite panels
- TSI
- Transite flue pipes
- Exterior wall elastomer coating
- Pressure valve black mastic patch
- Roof penetration mastic
- Miscellaneous ACM debris
- Floor paper felt

Designation of material as asbestos containing should be applied to all homogenous material of the type analyzed and found to contain asbestos.

About the Inspection

The inspection performed was both visual and tactile. Samples were taken of suspect materials located at the interior and exterior of the survey area.

The inspection was limited to those materials readily discerned in a reasonable inspection by a competent inspector. Materials that are hidden within walls, behind structures, in vertical shafts or in areas that make them not readily available to our inspector were not sampled. If future work uncovers any non-sampled materials, these should be submitted for asbestos and/or lead paint analysis.

The following numbering convention was used for this inspection:

LETTER	STANDS FOR	EXAMPLE	MEANING
XX	Building DESIGNATION based on information provided on drawings provided to us prior to inspection	B5	Lawrence Berkeley National Laboratory - Building 5
Y & *Optional Z*	EITHER building SYSTEM (W: wall; F: Flooring; C: Ceiling; T: TSI; M: Misc) OR Further designation of sample location as Unit # within building	AM	Asbestos Miscellaneous
		SN	Tile/ Mastic Sample
		AW	Asbestos Wall Sample
		SC	Concrete Sample
		AC	Asbestos Ceiling Sample
		AR	Asbestos Roofing Sample

LETTER	STANDS FOR	EXAMPLE	MEANING
xx	Sample number and layer	01	First Sample, First Layer
		01a	First Sample, Second Layer
		01b	First Sample, Third Layer

- ***Asbestos Findings***

Asbestos samples were analyzed in the KELLCO-MACS laboratory, by Polarized Light Microscopy, the EPA's recommended method. Copies of the full laboratory reports are attached.

Photographs of sampled materials are included. Sample locations are noted on the attached not-to-scale drawing.

The determination of a material to be Asbestos Containing Material (ACM) was made either by direct sampling or by homogeneity with at least one positive sample of the same material.

Materials that tested **positive** for asbestos are:

Lab Sample #	Field Sample #	Field Description	Asbestos %
L207283-2	B5-SN01a	South end of hallway by exit - white with black specks - 12x12 Floor Tile & Mastic	5% Chrysotile
L207283-3	B5-SN02	South End Of Hallway By Exit - Beige With Specks - 12x12 Floor Tile & Mastic	2% Chrysotile
L207283-8	B5-SN05	Room 136, West End By Door Frame - Beige With Specks - 12x12 Floor Tile & Mastic	2% Chrysotile
L207283-9	B5-SN05a	Room 136, West End By Door Frame - Beige With Specks - 12x12 Floor Tile & Mastic	5% Chrysotile
L207283-11	B5-SN06a	Room 121, East Wall About a Feet North Of Entryway - Off White W / Grey Specks	3% Chrysotile
L207283-13	B5-SN07a	Room 121, About 2 ft South Of North Wall - Grey with specks - (replacement)	4% Chrysotile
L207283-15	B5-SN08a	Room 121, About 2 ft From East Wall (Central) - Light Beige - (Replacement)	3% Chrysotile
L207283-18	B5-SN10	Room 132, North Wall 5-IF-131-29 - Beige With Specks - 12x12 Floor Tile & Mastic	2% Chrysotile
L207283-19	B5-SN10a	Room 132, North Wall 5-IF-131-29 - Beige With Specks - 12x12 Floor Tile & Mastic	5% Chrysotile
L207283-32	B5-SN18	Entryway Of West Exit - Beige With Specks - 12x12 Floor Tile & Mastic	5% Chrysotile
L207283-33	B5-SN18a	Entryway Of West Exit - Beige With Specks - 12x12 Floor Tile & Mastic	5% Chrysotile

Lab Sample #	Field Sample #	Field Description	Asbestos %
L207283-37	B5-AW21	Room 105, Between Equipment Cage And North Wall - Wall Texture	< 1% Chrysotile
L207283-38	B5-AW21a	Room 105, Between Equipment Cage And North Wall - Drywall Joint Compound	2% Chrysotile
L207283-44	B5-SN24a	West Entryway Of 100 - White With Specks - 12x12 Floor Tile & Mastic	3% Chrysotile
L207283-48	B5-SN26a	Room 100, Central Hallway - Grey with Specks - (Replacement) 12x12 Floor Tile & Mastic	4% Chrysotile
L207283-52	B5-SN28a	Room 100, Under Stairway 4 ft From North Wall - Green - 12x12 Floor Tile & Mastic	3% Chrysotile
L207283-53	B5-SN29	150A, West Wall, NE End - Light Brown With Light Streaks - 12x12 Floor Tile & Mastic	2% Chrysotile
L207283-54	B5-SN29a	150A, West Wall, NE End - Light Brown With Light Streaks - 12x12 Floor Tile & Mastic	5% Chrysotile
L207283-57	B5-SN31	200, North Wall By Central Concrete Column - Light Brown With Light Streaks - 12x12 Floor Tile & Mastic	2% Chrysotile
L207283-61	B5-SN32A	200, South End, SE Corner - Light Brown With Light Streaks - 12x12 Floor Tile & Mastic	2% Chrysotile
L207283-63	B5-SN33	200, North End, NE Corner By East Exit - Light Brown With Light Streaks - 12x12 Floor Tile & Mastic	2% Chrysotile
L207283-64	B5-SN33a	200, North End, NE Corner By East Exit - Light Brown With Light Streaks - 12x12 Floor Tile & Mastic	< 1% Chrysotile
L207283-65	B5-SN34	Room 100, 11 ft East From West Exit - Medium Brown With Streaks - 12x12 Floor Tile & Mastic	5% Chrysotile
L207283-66	B5-SN34a	Room 100, 11 ft East From West Exit - Medium Brown With Streaks - 12x12 Floor Tile & Mastic	5% Chrysotile
L207283-67	B5-SN35	Room 100, NE Corner 5 Ft From East Wall - Medium Brown With Streaks - 12x12 Floor Tile & Mastic	< 1% Chrysotile
L207283-68	B5-SN35a	Room 100, NE Corner 5 Ft From East Wall - Medium Brown With Streaks - 12x12 Floor Tile & Mastic	4% Chrysotile
L207283-69	B5-SN36	Room 100, North Central Wall Under Stairway - Medium Brown With Streaks - 12x12 Floor Tile & Mastic	5% Chrysotile

Lab Sample #	Field Sample #	Field Description	Asbestos %
L207283-70	B5-SN36a	Room 100, North Central Wall Under Stairway - Medium Brown With Streaks - 12x12 Floor Tile & Mastic	6% Chrysotile
L207283-75	B5-AW39	Room 100, North Central Wall Under Electrical Panels - Wall Texture	2% Chrysotile
L207283-76	B5-AW39a	Room 10, North Central Wall Under Electrical Panels - Drywall Joint Compound	2% Chrysotile
L207283-77	B5-AM40	Room 100, North Wall About 8 Ft From West Wall - Black Baseboard Mastic	5% Chrysotile
L207283-79	B5-AW41	Exterior West Wall Of 150 - Transite Panel	16% Chrysotile
L207283-84	B5-SN44	120, South End Under Sink - Peach - 12x12 Floor Tile & Mastic	< 1% Chrysotile
L207283-86	B5-SN45	120, NW Corner - 12x12 Floor Tile & Mastic	< 1% Chrysotile
L207283-99	B5-AW55a	Exterior North Wall Corner Of 100 - Stucco On Concrete	< 1% Chrysotile
L207283-105	B5-SN59	Room 112, East Corner By Doorway To 116A	2% Chrysotile
L207283-106	B5-SN59a	Room 112, East Corner By Doorway To 116A	4% Chrysotile
L207283-127	B5-AM73	South Exterior End Of Bldg, Bottom Of Pressure Valve - Black - Patch	12% Chrysotile
L207283-136	B5-AM78	Base Of Blower Bl 13 05 - Penetration Mastic	10% Chrysotile
L207283-137	B5-AM79	By Base Of Electrical Conduit By BL 13 05 - Penetration Mastic	3% Chrysotile
L207283-145	B5-AM82	Room 116A, 3 Ft East Of Entrance - Floor Paper Felt	6% Chrysotile
L207283-148	B5-AI83	Attic, Pipe Elbow Marked #30 - Pipe Elbow Mudded Joint	2% Chrysotile, 15% Amosite
L207283-152	B5-AI85	Attic, Pipe Insulation Marked #35 - Pipe Insulation	49% Chrysotile
L207283-154	B5-AR87	Attic, South End - Roofing Debris	8% Chrysotile
L207283-157	B5-AM90	Attic, Misc Paper Debris By BL.2.5 - Paper	49% Chrysotile
L207283-159	B5-AI89	Attic, South End - Pipe Elbow Mudded Joint	7% Chrysotile, 9% Amosite
L207283-163	B5-SN93	Room 102, By 1st Floor Vent - 12x12 Floor Tile & Mastic	2% Chrysotile
L207283-164	B5-SN93a	Room 102, By 1st Floor Vent - 12x12 Floor Tile & Mastic	5% Chrysotile

Samples with less than 10% asbestos can be submitted for further analysis by the Point Count method. If the Point Count method determines that the material contains less than 1% asbestos, these materials can be disposed of as non-hazardous asbestos containing construction waste.

Tested materials that were **none detected** for asbestos are:

Lab Sample #	Field Sample #	Field Description
L207283-1	B5-SN01	South end of hallway by exit - white with black specks - 12x12 Floor Tile & Mastic
L207283-4	B5-SN02a	South End Of Hallway By Exit - Beige With Specks - 12x12 Floor Tile & Mastic
L207283-5	B5-SN03	Hallway By Door Outside Of Room 126 - White With Black Specks - 12x12 Floor Tile & Mastic
L207283-6	B5-SN03a	Hallway By Door Outside Of Room 126 - White With Black Specks - 12x12 Floor Tile & Mastic
L207283-7	B5-AM04	Hallway West Wall Outside Of Room 125 - Brown - Baseboard & Brown Mastic
L207283-10	B5-SN06	Room 121, East Wall About a Feet North Of Entryway - Off White W / Grey Specks
L207283-12	B5-SN07	Room 121, About 2 ft South Of North Wall - Grey with specks - (replacement)
L207283-14	B5-SN08	Room 121, About 2 ft From East Wall (Central) - Light Beige - (Replacement)
L207283-16	B5-AW09	Room 121, NE Lower Wall Corner - Wall Texture
L207283-17	B5-AW09a	Room 121, NE Lower Wall Corner - Drywall Joint Compound
L207283-20	B5-AM11	Room 132, West Wall By Doorway - Brown - Baseboard & Brown Mastic
L207283-21	B5-AM11a	Room 132, West Wall By Doorway - Brown - Baseboard & Brown Mastic
L207283-22	B5-AM12	Women's Restroom (126) NW Wall By Doorway - Grey - Baseboard & Brown Mastic
L207283-23	B5-AM12a	Women's Restroom (126) NW Wall By Doorway - Grey - Baseboard & Brown Mastic
L207283-24	B5-SN13	Room 126, 2nd Stall by Commode - Off White With Grey Specks - 12x12 Floor Tile & Mastic
L207283-25	B5-SN13a	Room 126, 2nd Stall by Commode - Off White With Grey Specks - 12x12 Floor Tile & Mastic
L207283-26	B5-AM14	Room 122 (Utility Room) North Corner Of Floor - Maroon - Vinyl Floor Sheeting & Mastic Known ACM
L207283-27	B5-AM14a	Room 122 (Utility Room) North Corner Of Floor - Maroon - Vinyl Floor Sheeting & Mastic Known ACM
L207283-28	B5-SC15	Room 122, NE Corner Outside Of 122A - Concrete Floor
L207283-29	B5-AW16	Room 122A, West Corner Lower Wall - Wall Texture
L207283-30	B5-AW16a	Room 122A, West Corner Lower Wall - Drywall Joint Compound
L207283-31	B5-AW17	Room 122, West Wall, NW End - Wall Texture
L207283-34	B5-AW19	Room 105, West Central Wall - Paint / Coating

Lab Sample #	Field Sample #	Field Description
L207283-35	B5-AM20	Room 105, West Central Wall - Brown - Baseboard & Brown Mastic
L207283-36	B5-AM20a	Room 105, West Central Wall - Brown - Baseboard & Brown Mastic
L207283-39	B5-AM22	Room 118, West Wall By Entryway - Grey - Baseboard & Yellow Glue
L207283-40	B5-AM22a	Room 118, West Wall By Entryway - Grey - Baseboard & Yellow Glue
L207283-41	B5-AM23	Room 122, South End By Doorway - Maroon - Vinyl Floor Sheeting & Mastic
L207283-42	B5-AM23a	Room 122, South End By Doorway - Maroon - Vinyl Floor Sheeting & Mastic
L207283-43	B5-SN24	West Entryway Of 100 - White With Specks - 12x12 Floor Tile & Mastic
L207283-45	B5-AM25	West Entryway Of 100 - Black - Baseboard & Mastic
L207283-46	B5-AM25a	West Entryway Of 100 - Black - Baseboard & Mastic
L207283-47	B5-SN26	Room 100, Central Hallway - Grey with Specks - (Replacement) 12x12 Floor Tile & Mastic
L207283-49	B5-SN27	Room 100, 11 Ft East From East Exit - Light Brown With Heavy Streaks - 12x12 Floor Tile & Mastic
L207283-50	B5-SN27a	Room 100, 11 Ft East From East Exit - Light Brown With Heavy Streaks - 12x12 Floor Tile & Mastic
L207283-51	B5-SN28	Room 100, Under Stairway 4 ft From North Wall - Green - 12x12 Floor Tile & Mastic
L207283-55	B5-AM30	150, East Entrance, Inside Doorway - Grey - Vinyl Floor Sheeting & Mastic
L207283-56	B5-AM30a	150, East Entrance, Inside Doorway - Grey - Vinyl Floor Sheeting & Mastic
L207283-58	B5-SN31a	200, North Wall By Central Concrete Column - Light Brown With Light Streaks - 12x12 Floor Tile & Mastic
L207283-59	B5-SN32	200, South End, SE Corner - Light Brown With Light Streaks - 12x12 Floor Tile & Mastic
L207283-60	B5-SN32a	200, South End, SE Corner - Light Brown With Light Streaks - 12x12 Floor Tile & Mastic
L207283-62	B5-SN32Aa	200, South End, SE Corner - Light Brown With Light Streaks - 12x12 Floor Tile & Mastic
L207283-71	B5-AM37	150 A, 2 Ft North Of West Entry - Grey - Vinyl Floor Sheeting & Mastic
L207283-72	B5-AM37a	150 A, 2 Ft North Of West Entry - Grey - Vinyl Floor Sheeting & Mastic
L207283-73	B5-AM38	150 A, About 3 Ft From West Corner - Grey - Vinyl Floor Sheeting & Mastic

Lab Sample #	Field Sample #	Field Description
L207283-74	B5-AM38a	150 A, About 3 Ft From West Corner - Grey - Vinyl Floor Sheeting & Mastic
L207283-78	B5-AM40a	Room 100, North Wall About 8 Ft From West Wall - Black Baseboard Mastic
L207283-80	B5-AW42	Exterior West Wall Of 105 - Stucco On Concrete
L207283-81	B5-AW42a	Exterior West Wall Of 105 - Stucco On Concrete
L207283-82	B5-AW43	Exterior SW Corner Of 135 - Stucco On Concrete
L207283-83	B5-AW43a	Exterior SW Corner Of 135 - Stucco On Concrete
L207283-85	B5-SN44a	120, South End Under Sink - Peach - 12x12 Floor Tile & Mastic
L207283-87	B5-SN45a	120, NW Corner - 12x12 Floor Tile & Mastic
L207283-88	B5-AC46	Room 101, Above Doorway - 2x4 Suspended Ceiling Tile
L207283-89	B5-AM47	Area 197, West Window - Window Putty
L207283-90	B5-AM48	Area 197, NW Corner Adjacent To Room 150 - Wall Texture
L207283-91	B5-AW48a	Area 197, NW Corner Adjacent To Room 150 - Drywall Joint Compound
L207283-92	B5-AM49	150A, East Window - Window Putty
L207283-93	B5-AI50	Air Intake Duct, AH-1 AC / 2 / 05 - Duct Insulation Jacket
L207283-94	B5-AI51	AH-1, AC / 2 / 05, Suction Connector - Pipe Wrap
L207283-95	B5-AI52	AH-1, AC / 2 / 05, Liquid Connector - Pipe Wrap
L207283-96	B5-AI53	AH-1, AC / 2 / 05, Liquid Connector Pipe - Pipe Insulation
L207283-97	B5-AM54	AH-1, AC / 2 / 05 Between Unit & Duct - Duct Sealant
L207283-98	B5-AW55	Exterior North Wall Corner Of 100 - Stucco On Concrete
L207283-100	B5-AW55b	Exterior North Wall Corner Of 100 - Stucco On Concrete
L207283-101	B5-AM56	Between 150A & 100, Section North Wall - Orange - Foam-Like Sealant
L207283-102	B5-SC57	Exterior NE Floor Of Mezzanine East exit - Concrete Floor
L207283-103	B5-SC58	Exterior Entryway Toward 100 West - Concrete Floor
L207283-104	B5-SC58a	Exterior Entryway Toward 100 West - Concrete Floor
L207283-107	B5-AW60	Room 112, West Central Lower Wall - Wall Texture
L207283-108	B5-AC61	Hallway Ceiling Outside Of Room 112 - Wall Texture
L207283-109	B5-AC61a	Hallway Ceiling Outside Of Room 112 - Drywall Joint Compound
L207283-110	B5-AC62	Room 126, NE Corner - 12x12 Row-Holed Ceiling Tile & Brown Mastic
L207283-111	B5-AC62a	Room 126, NE Corner - 12x12 Row-Holed Ceiling Tile & Brown Mastic
L207283-112	B5-AC63	Room 132, West End Above Doorway - 12x12 Row-Holed Ceiling Tile & Brown Mastic
L207283-113	B5-AC63a	Room 132, West End Above Doorway - 12x12 Row-Holed Ceiling Tile & Brown Mastic
L207283-114	B5-AC64	Room 132, South Central End Of Ceiling - 12x12 Random Holed Ceiling Tile & Mastic

Lab Sample #	Field Sample #	Field Description
L207283-115	B5-AC64a	Room 132, South Central End Of Ceiling - 12x12 Random Holed Ceiling Tile & Mastic
L207283-116	B5-AC65	Room 132, NE Corner Of Ceiling - 12x12 Row-Holed Ceiling Tile & Brown Mastic
L207283-117	B5-AC65a	Room 132, NE Corner Of Ceiling - 12x12 Row-Holed Ceiling Tile & Brown Mastic
L207283-118	B5-AC66	Hallway ceiling Outside Of Room 126 - Wall Texture
L207283-119	B5-AC66a	Hallway ceiling Outside Of Room 126 - Drywall Joint Compound
L207283-120	B5-AC67	Room 150, 3 Ft From East Entrance - Ceiling Batt Insulation
L207283-121	B5-AC67a	Room 150, 3 Ft From East Entrance - Ceiling Batt Insulation
L207283-122	B5-AC68	Room 150, 3 Ft From East Entrance - 2x4 Suspended Drywall
L207283-123	B5-AW69	Room 102, South Lower Wall 2 Ft From Entrance - Block Wall Mortar
L207283-124	B5-AW70	Room 102, south Wall SE Corner - Block Wall Mortar
L207283-125	B5-AM71	Room 112, Exhaust Ventilation On North Wall - White - Duct Joint Tape
L207283-126	B5-AM72	Room 122A, Unit GH 2 5 - Expansion Joint
L207283-128	B5-AR74	East End Of Bldg - Rolled Roof & Felt
L207283-129	B5-AR74a	East End Of Bldg - Rolled Roof & Felt
L207283-130	B5-AR74b	East End Of Bldg - Rolled Roof & Felt
L207283-131	B5-AR75	East End Of Metal Roof Awning - Rolled Roof & Felt
L207283-132	B5-AR75a	East End Of Metal Roof Awning - Rolled Roof & Felt
L207283-133	B5-AR75b	East End Of Metal Roof Awning - Rolled Roof & Felt
L207283-134	B5-AR76	Gable Roof, South End - Roofing Shingle & Felt
L207283-135	B5-AM77	Exterior South Window Of Mezzanine Floor - Window Putty
L207283-138	B5-AR80	Porch Roof Over East Exit Of Mezzanine - Roofing Shingle & Felt
L207283-139	B5-AR80a	Porch Roof Over East Exit Of Mezzanine - Roofing Shingle & Felt
L207283-140	B5-AR80b	Porch Roof Over East Exit Of Mezzanine - Roofing Shingle & Felt
L207283-141	B5-AR81	North End Over Room 150 B Latch-On Ladder - Roofing Shingle & Felt
L207283-142	B5-AR81a	North End Over Room 150 B Latch-On Ladder - Roofing Shingle & Felt
L207283-143	B5-AR81b	North End Over Room 150 B Latch-On Ladder - Roofing Shingle & Felt
L207283-144	B5-AR81c	North End Over Room 150 B Latch-On Ladder - Roofing Shingle & Felt
L207283-146	B5-AM82a	Room 116A, 3 Ft East Of Entrance - Floor Paper Felt
L207283-147	B5-AR79	SW End Of Bldg - Rolled Roof & Felt

Lab Sample #	Field Sample #	Field Description
L207283-149	B5-AR84	Attic, North End - Roofing Debris
L207283-150	B5-AR84a	Attic, North End - Roofing Debris
L207283-151	B5-AR84b	Attic, North End - Roofing Debris
L207283-153	B5-AI86	Attic, Fork-Shape Exhaust Duct (BL 13 05) - Duct Joint Tape
L207283-155	B5-AR87a	Attic, South End - Roofing Debris
L207283-156	B5-AR87b	Attic, South End - Roofing Debris
L207283-158	B5-AR88	Attic, West End - Roofing Debris
L207283-160	B5-AM91	Attic, South End - Misc Debris Material
L207283-161	B5-AC92	Mezzanine Floor, Center Of Room - Yellow - Insulation
L207283-162	B5-AC92a	Mezzanine Floor, Center Of Room - 2x4 Suspended Ceiling Tile
L207578-1	B5-AM94	Bldg 5, Panel 343 A2A25A / Wire Cloth
L207578-2	B5-AM95	Bldg 5, Panel 343A26A / Wire Cloth
L207578-3	B5-AM96	Bldg 5, Panel 343A26A / Wire Wrap Tape
L207578-4	B5-AM97	Bldg 5, Panel 343A2A / Wire Cloth
L207578-5	B5-AM98	Bldg 5, Panel 343A2A / Explosion Proof Tape
L207578-6	B5-AM99	Bldg 5, Panel 343A2C / Wire Cloth

- ***Metals in Paint Findings***

Seven (7) paint samples were collected and submitted for Heavy Metals (CAM 17) analysis to Macs Laboratory, Inc.

Heavy Metals (CAM 17) were analyzed using an ICP/MS, Extraction Method SW3050B TTLC and EPA 6010B/3050 method. This method is **not** for the purpose of profiling any waste streams from this project. Profiling of the waste streams (TCLP & STLC) will be the responsibility of the contractor performing the work. The results of the profiling of the waste streams can vary dramatically depending on the means and methods utilized by the contractor during the demolition of the buildings. Care needs to be taken to ensure that all OSHA and EPA rules are abided by. The EPA rules are typically contained within title 22 and the OSHA rules are typically contained within title 8. Please find the following list as guidance; furthermore, it is not intended to be all encompassing but as a starting point for review in regulatory compliance.

Lab Sample #	Field Sample	Field Description
207291-1	B5-PC1	Room 105/ Off white paint chip composite
207291-2	B5-PC2	Room 102/ Yellow, white paint chip composite
207291-3	B5-PC3	Room 100/ Paint chip composite
207291-4	B5-PC4	Room 150/ Paint chip off wood
207291-5	B5-PC5	Room 101/Paint chip off concrete
207291-6	B5-PC6	Exterior door frame/ Paint chip off composite
207291-7	B5-PC7	Room 102/ Paint chip off composite

Building 5

	Lab Sample Number:	207291 -1	207291 -2	207291 -3	207291 -4	207291 -5
	Client Sample Number:	B5-PC1	B5-PC2	B5-PC3	B5-PC4	B5-PC5
	Matrix:	Bulk	Bulk	Bulk	Bulk	Bulk
	Extraction Type:	Acid	Acid	Acid	Acid	Acid
	Units:	mg/kg (PPM)	mg/kg (PPM)	mg/kg (PPM)	mg/kg (PPM)	mg/kg (PPM)
Sb	Antimony	2.86	10.22	71.26	16.94	2.57
As	Arsenic	<0.01	<0.01	79.06	13.74	<0.01
Ba	Barium	109.36	29.50	2,351.32	397.76	720.02
Be	Beryllium	2.32	0.54	6.99	0.35	1.29
Cd	Cadmium	4.52	6.26	72.78	7.94	5.87
Cr	Chromium	139.60	7,155.98	7,126.30	67.62	58.52
Co	Cobalt	54.43	66.42	662.67	30.32	14.47
Cu	Copper	16.61	8.43	870.10	7.50	8.25
Pb	Lead	1,415.30	72,607.26	40,887.29	1,271.04	1,221.11
Hg	Mercury	245.54	<0.01	3,601.52	332.06	601.68
Mo	Molybdenum	93.02	162.65	1,251.40	256.31	124.67
Ni	Nickel	42.44	6.92	877.30	29.22	38.76
Se	Selenium	229.05	285.48	3,048.36	879.02	282.16
Ag	Silver	<0.01	4.18	155.96	<0.01	<0.01
Tl	Thallium	9.34	35.49	129.58	29.19	10.01
V	Vanadium	12.93	17.51	218.98	26.14	18.90
Zn	Zinc	577.71	688.33	13,013.59	1,456.58	553.57

	Lab Sample Number:	207291 -6	207291 -7
	Client Sample Number:	B5-PC6	B5-PC7
	Matrix:	Bulk	Bulk
	Extraction Type:	Acid	Acid
	Units:	mg/kg (PPM)	mg/kg (PPM)
Sb	Antimony	20.22	32.08
As	Arsenic	47.33	27.26
Ba	Barium	994.80	2,189.70
Be	Beryllium	1.81	3.01
Cd	Cadmium	83.66	39.43
Cr	Chromium	406.84	1,675.28
Co	Cobalt	54.18	321.64
Cu	Copper	58.23	58.55
Pb	Lead	67,414.56	9,915.34
Hg	Mercury	661.22	473.96
Mo	Molybdenum	227.04	254.34
Ni	Nickel	51.44	20.98
Se	Selenium	437.82	752.62
Ag	Silver	<0.01	2.78
Tl	Thallium	30.71	62.22
V	Vanadium	22.04	57.34
Zn	Zinc	7,763.74	6,065.43

Regulatory Requirements

The Environmental Protection Agency (EPA) defines Asbestos Containing Material as any material that contains greater than 1% asbestos. Materials containing greater than 1% asbestos must be removed prior to demolition or renovation if they will be disturbed.

Friable asbestos containing material is any material that can be crushed or pulverized by hand pressure when dry, or materials that can be rendered to a crumbled, pulverized, or powdered state when dry by crushing, sanding, sawing, shot blasting, or through demolition or renovation activities.

As stated by NESHAP regulations, any material that contains less than 10% asbestos using the visual estimation method can be point counted with gravimetric reduction. The Point Counting method is a much more accurate analytical method for determining the percent of asbestos in a particular material. If the Point Count method determines that the material contains less than 1% asbestos, the material being analyzed can be disposed of as non-hazardous asbestos containing construction waste.

Removal or disturbance of material with any detectable amount of asbestos must be handled in accordance with OSHA regulations. Cal-OSHA registration is required if the material contains more than .1% asbestos ($1/10^{th}$ of a percent). If there is more than 100 feet (linear or square) of an asbestos containing material that will be abated or disturbed, a California State registered and licensed asbestos abatement contractor must perform the work. If there is less than 100 feet, the work does not require a licensed asbestos abatement contractor, but must still conform to Cal-OSHA regulations.

Title 8 OSHA

General Industry Safety Orders deal with exposure limits for personnel working in or around surfaces that contain heavy metals.

Element	Chapter	Group	Article	Section
Antimony (Sb)	7	16	107	5155
Arsenic (As)	7	16	110	5214
Barium (Ba)	7	16	107	5155
Beryllium (Be)	7	16	107	5155
Cadmium (Cd)	7	16	110	5206
Chromium (Cr)	7	16	110	5206
Cobalt (Co)	7	16	110	5155
Copper (Cu)	7	16	110	5155
Lead (Pb)	7	16	109	5198
Mercury (Hg)	7	16	110	5155
Molybdenum (Mo)	7	16	110	5155
Nickel (Ni)	7	16	110	5155
Selenium (Se)	7	16	110	5155
Silver (Ag)	7	16	110	5155

Element	Chapter	Group	Article	Section
Thallium (Ti)	7	16	110	5155
Vanadium (V)	7	16	110	5155
Zinc (Zn)	7	16	107	5155

Title 22- Hazardous Waste

Title 22 describes the characterization of hazardous waste as described in chapter 11, article 1, section 66261.1. Under the EPA's Resource Conservation and Recovery Act (RCRA), a national program and inventory system about handling hazardous waste, describes the minimum requirements in order to be in compliance with the Federal and/or State regulations.

Comment Regarding All Asbestos Containing Materials:

Asbestos containing materials in good condition do not necessarily need to be removed unless they will be disturbed; they should however be respected.

Employees, contract workers and others should be advised not to drill, saw, scrape or otherwise disturb this material without taking precautionary measures appropriate to asbestos containing material.

Asbestos containing material should be removed prior to the renovation and must be removed prior to demolition.

Areas Needing Immediate Corrective Action

Asbestos (in any condition) should be removed prior to renovation and must be removed prior to demolition of the survey site.

Analytical Procedures

- ***POLARIZED LIGHT MICROSCOPY (PLM)***

  Bulk samples were analyzed in accordance with U.S. EPA "Test Method for Determination of Asbestos in Bulk Building Materials, 1993," with inclusion of area percent estimates of the sample components. The use of the McCrone Color Dispersion Staining Technique supplements the analysis when considered useful by the analyst. The samples are prepared with refractive immersion oil and are examined under Polarized Light Microscopy (PLM). The accuracy of the visual estimate method is 1%.

  As per the standard "...The accuracy in the determination of the presence or absence of asbestos of greater than 1 area percent asbestos is greater than 99%." ASTM Committee D22.05, 1/18/88, Standard *Method of Testing for Asbestos Containing Materials by Polarized Light Microscopy*. If the sample matrix is reduced to minimize non-asbestos components, the detection limit can be mathematically enhanced, based on the amount of material remaining

after matrix reduction. This method is called gravimetric reduction. This method involves ashing and chemical dissolution of the sample.

- ***POINT COUNTING***

  The Point Counting method is a much more accurate analytical method for determining the percent of asbestos in a particular material. KELLCO-MACS uses a muffle furnace to ash the sample and remove organic compounds. Hydrochloric acid is used to dissolve some of the non-asbestos minerals. Under this method a minimum of 125 points are counted from each of 8 different slide preparations of the same sample (total of 1000 points min.) If the **Point Count Method** determines that the material contains less than 1% asbestos, the material being analyzed can be treated as non-hazardous asbestos containing construction waste**. Note: ONLY the Point Count Method can be used for this determination.**

- ***CAM 17 TESTING***

  CAM 17 Metals were tested by Macs Lab, Inc. using ICP-MS, Extraction Method SW3050B and Analytical Method 6010B/3050.

KELLCO-MACS Qualifications

KELLCO-MACS is a joint venture offering hazardous materials and AIHA laboratory analyses. Our credentials include:

- The KELLCO-MACS asbestos inspector is licensed with the State of California Department of Occupational Safety and Health (CAL-OSHA).

- The KELLCO-MACS lead inspector is licensed by the California Department of Public Health (CDPH)

- The laboratory accreditations include:

  - **NVLAP PLM** for Asbestos: NIST National Voluntary Laboratory Accreditation Program certificate of accreditation for bulk **asbestos** analysis by polarized light microscopy (Accreditation #101948-1).
  - **AIHA** Accreditation for **Industrial Hygiene** Analytical Laboratory for PCM, and AA for lead (Accreditation #101786).
  - **AIHA Analyst Proficiency (NIOSH PAT)** (Accreditation # 11172)
  - **AIHA ELLAP** Accreditation for Lead: Accreditation for the **Environmental Lead** Laboratory recognized by the EPA as meeting the requirements of the National Lead Laboratory Accreditation Program established under Title X (Lab ID #11109).
  - **ELAP PLM** for Asbestos: California Department of Health Services, Environmental Laboratory Accreditation Program, certificate for bulk asbestos analysis (Certificate #2027)
  - **USDA Soil** permit #39484

The following supporting documents are attached to this report:

- Laboratory analytical reports
- Photographs of sample locations
- Floor plan or sketch showing sample locations

Please call KELLCO if there are any questions and/or clarifications regarding this report. We look forward to working with you in the future.

Sincerely,

KELLCO-MACS

Tim C. Cannard CAC #94-1395, CDPH Lead #764
Senior Project Manager

Asbestos Definitions and Classifications

ACM	(Asbestos Containing Material) - Material containing more than 1% asbestos. ACM must be disposed as hazardous waste. Note: Federal OSHA and Cal-OSHA control materials containing any amount of asbestos.
ACBM	(Asbestos Containing Building Material) – AHERA/ASHARA term for material containing more than 1% asbestos in or on interior structural members or other structural components. Exceptions: Covered walkways, porticos and exterior HVAC TSI.
ACCM	(Asbestos Containing Construction Material) – California term for a manufactured construction material containing greater than .1% (one tenth of one percent) asbestos.
PACM	(Presumed Asbestos Containing Material) OSHA considers all TSI and surfacing materials installed prior to1980 to be ACM unless proven otherwise.
Friable	Asbestos Containing Material that can be crumbled pulverized or reduced to powder by hand pressure when dry.
NOA	Naturally Occurring Asbestos. CARB defines as having >.25% by point counting.

Categories of Asbestos Used BY EPA AHERA/ASHARA and OSHA/Cal-OSHA

TSI	(Thermal System Insulation) - "Thermal system insulation (TSI)" means ACM applied to pipes, fittings, boilers, breeching, tanks, ducts or other structural components to prevent heat loss or gain. "Thermal system insulation ACM" is thermal system insulation which contains more than 1% asbestos.
SURFACING (usually mixed on site at time of application)	"Surfacing material" means material that is sprayed, troweled-on or otherwise applied to surfaces (such as acoustical plaster on ceilings and fireproofing materials on structural members, or other materials on surfaces for acoustical, fireproofing, and other purposes). "Surfacing ACM" means surfacing material which contains more than 1% asbestos. NOTE: OSHA/Cal-OSHA do not classify taping mud, floor tile mastic, stucco, leveling compound, and hard wall plasters or wall texturing as surfacing.
MISC.	All other ACM, including classify taping mud, floor tile mastic, stucco, leveling compound, and hard wall plasters or wall texturing as surfacing.

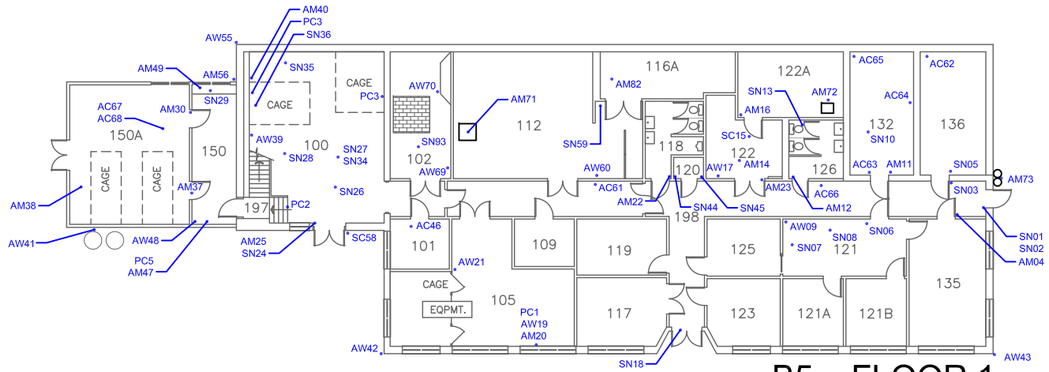
NESHAPS Categories for Asbestos (used by Air Quality Management Districts)

Category I	Cat I Non-friable Asbestos Containing Material refers to asbestos containing packing, gaskets, resilient floor covering, Galbestos, and asphalt roofing products containing more than 1% asbestos.
Category II	Cat II Non-friable Asbestos-Containing Material is any material that is not Cat I that contains greater than 1% asbestos.
RACM	"Regulated Asbestos-Containing Material." – Friable asbestos material (ACM) or a Category I non-friable ACM that has become friable OR a 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 reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations. RACM should be removed prior to renovation or demolition.

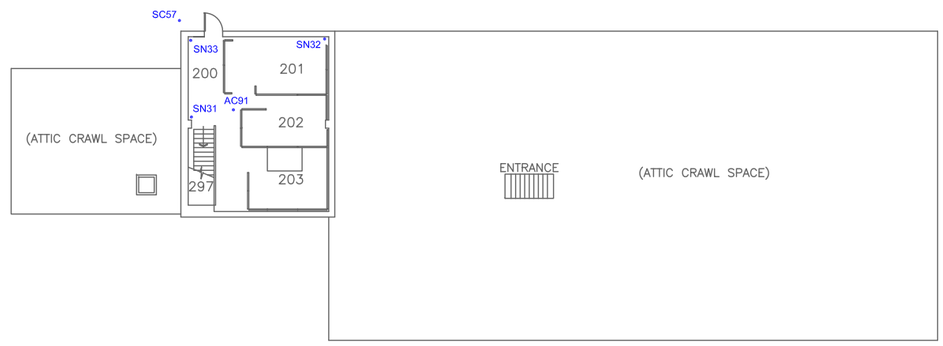
Characterization of Asbestos Containing Materials

Material	Estimated Quantity	TSI	Surfacing	Misc	RACM	Cat I	Cat II
All floor tile, baseboard mastic and floor paper felt	~ 5,600 sq. ft.			X		X	
Wall texture, drywall and joint compound	~25,000 sq. ft.		X		X		
Transite panels	~600 sq. ft.			X			X
TSI and mudded pipe elbow	~ 400 linear feet	X			X		
2 Transite flue pipes	~ 35 sq. ft.			X			X
Exterior wall elastomer coating	~ 4,000 sq. ft.		X		X		
Pressure valve black mastic patch	~ 5 sq. ft.			X			X
Roof penetration mastic	~ 60 sq. ft.			X			X
Attic/ Miscellaneous ACM debris	~4,300 sq. ft.	X			X		

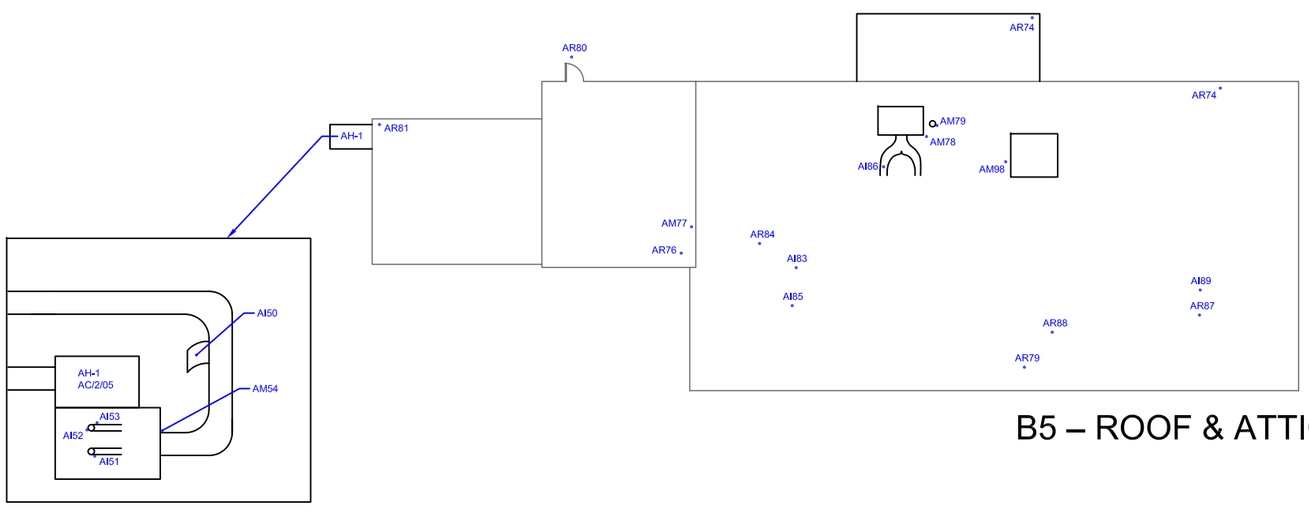
Please note: The attic is contaminated with various ACM debris, including roofing and TSI material.



B5 – FLOOR 1



B5 – FLOOR 2



B5 – ROOF & ATTIC

ABBREVIATIONS

AC	Asbestos ceiling sample
AM	Asbestos miscellaneous
AR	Asbestos roofing sample
AW	Asbestos wall sample
CK	Caulk sample
PC	Paint sample
SC	Concrete sample
SN	Tile/mastic sample

NOTE:

All sample locations are approximate

0 25' 50'

SCALE: 1" = 25'

A Creative Joint Venture For Better Environmental Solutions

NESAHP Compliant Pre-Demolition Asbestos and Metals in Paint Inspection Report

Date:	August 25, 2010
KELLCO-MACS Job #:	1004-17
Client:	Ms. Agata Sulczynski Weiss Associates 5801 Christie Avenue Suite 600 Emeryville, CA 94608
Location:	Lawrence Berkeley National Laboratory Building 5 One Cyclotron Road Berkeley, CA 94744
Date of Inspection:	August 10, 11 and 19, 2010
Inspectors:	Siew Yee Lee CAC # 09-4546, CDPH Lead # 19509
Description of the Inspected Area:	This is an asbestos and metals in paint inspection on building 5 at the University of California, Berkeley campus in Berkeley, CA.

Background

This is a NESHAP compliant pre-demolition asbestos and metals inspection report for Building 5 located in at LBNL in Berkeley, CA.

Synopsis

Asbestos was found in the following materials:

- All floor tile and mastic
- Base board mastic
- Wall texture, drywall and joint compound

MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Method: EPA-600/M4-82-020

KELLCO Services
3137 Diablo Ave

Hayward CA 94545

Person to contact: Tim Cannard
Contact phone: 510-786-9751
FAX phone: 510-786-9625
Sampled by: Siew Yee Lee
Sampled on: August 10, 2010
Analyzed on: August 23, 2010 at: 17:15
Corresponding invoice number: 207283

Analyst: HCB (signature)

Laboratory manager: (signature)

Job Number: 1004-17

Job Description: LBNL - One Cyclotron Road, Bldg 5, Berkeley, CA 94744

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L207283-1	B5-SN01 South end of hallway by exit - white with black specks - 12x12 Floor Tile & Mastic	**N.D.**	< 1% Cellulose	Off-white tile. Balance of sample is unspecified non-fibrous material.
L207283-2	B5-SN01a South end of hallway by exit - white with black specks - 12x12 Floor Tile & Mastic	**Yes**	5% Chrysotile* 4% Cellulose	Black tar. Balance of sample is organic binders.
L207283-3	B5-SN02 South End Of Hallway By Exit - Beige With Specks - 12x12 Floor Tile & Mastic	**Yes**	2% Chrysotile* < 1% Cellulose	Off-white tile. Balance of sample is unspecified non-fibrous material.
L207283-4	B5-SN02a South End Of Hallway By Exit - Beige With Specks - 12x12 Floor Tile & Mastic	**N.D.**	1% Cellulose	Yellow adhesive. Balance of sample is organic binders.
L207283-5	B5-SN03 Hallway By Door Outside Of Room 126 - White With Black Specks - 12x12 Floor Tile & Mastic	**N.D.**	No Fibers	Off-white tile. Balance of sample is unspecified non-fibrous material.

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Hayward, CA 94545-2701

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Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L207283-6	B5-SN03a Hallway By Door Outside Of Room 126 - White With Black Specks - 12x12 Floor Tile & Mastic	**N.D.**	2%Cellulose	Yellow adhesive tar. Balance of sample is organic binders.
L207283-7	B5-AM04 Hallway West Wall Outside Of Room 125 - Brown - Baseboard & Brown Mastic	**N.D.**	2%Wollastonite < 1%Cellulose	Brown adhesive. Balance of sample is organic binders.
L207283-8	B5-SN05 Room 136, West End By Door Frame - Beige With Specks - 12x12 Floor Tile & Mastic	**Yes**	2%Chrysotile* < 1%Cellulose	Off-white tile. Balance of sample is unspecified non-fibrous material.
L207283-9	B5-SN05a Room 136, West End By Door Frame - Beige With Specks - 12x12 Floor Tile & Mastic	**Yes**	5%Chrysotile* 3%Cellulose	Black tar. Balance of sample is organic binders.
L207283-10	B5-SN06 Room 121, East Wall About a Feet North Of Entryway - Off White W / Grey Specks	**N.D.**	< 1%Cellulose	Off-white tile. Balance of sample is unspecified non-fibrous material.
L207283-11	B5-SN06a Room 121, East Wall About a Feet North Of Entryway - Off White W / Grey Specks	**Yes**	3%Chrysotile* 5%Cellulose	Black tar. Balance of sample is organic binders.
L207283-12	B5-SN07 Room 121, About 2 ft South Of North Wall - Grey with specks - (replacement)	**N.D.**	< 1%Cellulose	Gray tile. Balance of sample is unspecified non-fibrous material.
L207283-13	B5-SN07a Room 121, About 2 ft South Of North Wall - Grey with specks - (replacement)	**Yes**	4%Chrysotile* 4%Cellulose	Black adhesive tar. Balance of sample is organic binders.
L207283-14	B5-SN08 Room 121, About 2 ft From East Wall (Central) - Light Beige - (Replacement)	**N.D.**	No Fibers	Off-white tile. Balance of sample is unspecified non-fibrous material.

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510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L207283-15	B5-SN08a Room 121, About 2 ft From East Wall (Central) - Light Beige - (Replacement)	**Yes**	3%Chrysotile* 4%Cellulose	Black tar. Balance of sample is organic binders.
L207283-16	B5-AW09 Room 121, NE Lower Wall Corner - Wall Texture	**N.D.**	1%Cellulose	Off-white compound texture. Balance of sample is unspecified non-fibrous material.
L207283-17	B5-AW09a Room 121, NE Lower Wall Corner - Drywall Joint Compound	**N.D.**	21%Cellulose 2%Fiberglass	Off-white joint compound plaster. Balance of sample is unspecified non-fibrous material.
L207283-18	B5-SN10 Room 132, North Wall 5-IF-131-29 - Beige With Specks - 12x12 Floor Tile & Mastic	**Yes**	2%Chrysotile* < 1%Cellulose	Off-white tile. Balance of sample is unspecified non-fibrous material.
L207283-19	B5-SN10a Room 132, North Wall 5-IF-131-29 - Beige With Specks - 12x12 Floor Tile & Mastic	**Yes**	5%Chrysotile* 3%Cellulose	Black tar. Balance of sample is organic binders.
L207283-20	B5-AM11 Room 132, West Wall By Doorway - Brown - Baseboard & Brown Mastic	**N.D.**	No Fibers	Brown vinyl. Balance of sample is unspecified non-fibrous material.
L207283-21	B5-AM11a Room 132, West Wall By Doorway - Brown - Baseboard & Brown Mastic	**N.D.**	1%Cellulose	Brown adhesive. Balance of sample is organic binders.
L207283-22	B5-AM12 Women's Restroom (126) NW Wall By Doorway - Grey - Baseboard & Brown Mastic	**N.D.**	No Fibers	Gray vinyl. Balance of sample is unspecified non-fibrous material.
L207283-23	B5-AM12a Women's Restroom (126) NW Wall By Doorway - Grey - Baseboard & Brown Mastic	**N.D.**	1%Cellulose	Yellow/brown adhesive. Balance of sample is organic binders.

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Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L207283-24	B5-SN13 Room 126, 2nd Stall by Commote - Off White With Grey Specks - 12x12 Floor Tile & Mastic	**N.D.**	< 1%Cellulose	Off-white tile. Balance of sample is unspecified non-fibrous material.
L207283-25	B5-SN13a Room 126, 2nd Stall by Commote - Off White With Grey Specks - 12x12 Floor Tile & Mastic	**N.D.**	1%Cellulose	Yellow adhesive. Balance of sample is organic binders.
L207283-26	B5-AM14 Room 122 (Utility Room) North Corner Of FLoor - Maroon - Vinyl Floor Sheeting & Mastic Known ACM	**N.D.**	42%Cellulose 2%Synthetic	Red linoleum. Balance of sample is organic binders and unspecified non-fibrous material.
L207283-27	B5-AM14a Room 122 (Utility Room) North Corner Of FLoor - Maroon - Vinyl Floor Sheeting & Mastic Known ACM	**N.D.**	1%Cellulose	Brown adhesive. Balance of sample is organic binders.
L207283-28	B5-SC15 Room 122, NE Corner Outside Of 122A - Concrete Floor	**N.D.**	No Fibers	Gray concrete. Balance of sample is silicate and cementitious.
L207283-29	B5-AW16 Room 122A, West Corner Lower Wall - Wall Texture	**N.D.**	1%Cellulose	Off-white compound texture. Balance of sample is unspecified non-fibrous material.
L207283-30	B5-AW16a Room 122A, West Corner Lower Wall - Drywall Joint Compound	**N.D.**	22%Cellulose 2%Fiberglass	Off-white joint compound plaster. Balance of sample is unspecified non-fibrous material.
L207283-31	B5-AW17 Room 122, West Wall, NW End - Wall Texture	**N.D.**	1%Cellulose	Off-white compound texture. Balance of sample is unspecified non-fibrous material.
L207283-32	B5-SN18 Entryway Of West Exit - Beige With Specks - 12x12 Floor Tile & Mastic	**Yes**	5%Chrysotile* < 1%Cellulose	Off-white tile. Balance of sample is unspecified non-fibrous material.

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Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L207283-33	B5-SN18a Entryway Of West Exit - Beige With Specks - 12x12 Floor Tile & Mastic	**Yes**	5%Chrysotile* 4%Cellulose	Black tar. Balance of sample is organic binders.
L207283-34	B5-AW19 Room 105, West Central Wall - Paint / Coating	**N.D.**	< 1%Cellulose	Off-white coating paint. Balance of sample is unspecified non-fibrous material.
L207283-35	B5-AM20 Room 105, West Central Wall - Brown - Baseboard & Brown Mastic	**N.D.**	No Fibers	Brown vinyl. Balance of sample is unspecified non-fibrous material.
L207283-36	B5-AM20a Room 105, West Central Wall - Brown - Baseboard & Brown Mastic	**N.D.**	No Fibers	Brown adhesive. Balance of sample is organic binders.
L207283-37	B5-AW21 Room 105, Between Equipment Cage And North Wall - Wall Texture	**Yes**	< 1%Chrysotile* 1%Cellulose	Off-white compound texture. Balance of sample is unspecified non-fibrous material.
L207283-38	B5-AW21a Room 105, Between Equipment Cage And North Wall - Drywall Joint Compound	**Yes**	2%Chrysotile* 22%Cellulose	Off-white joint compound plaster. Balance of sample is unspecified non-fibrous material.
L207283-39	B5-AM22 Room 118, West Wall By Entryway - Grey - Baseboard & Yellow Glue	**N.D.**	No Fibers	Gray vinyl. Balance of sample is unspecified non-fibrous material.
L207283-40	B5-AM22a Room 118, West Wall By Entryway - Grey - Baseboard & Yellow Glue	**N.D.**	1%Cellulose	Yellow adhesive. Balance of sample is organic binders.
L207283-41	B5-AM23 Room 122, South End By Doorway - Maroon - Vinyl Floor Sheeting & Mastic	**N.D.**	41%Cellulose 2%Synthetic	Red linoleum fibrous tar. Balance of sample is organic binders and unspecified non-fibrous material.

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MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L207283-42	B5-AM23a Room 122, South End By Doorway - Maroon - Vinyl Floor Sheeting & Mastic	**N.D.**	1%Cellulose	Brown adhesive. Balance of sample is organic binders.
L207283-43	B5-SN24 West Entrway Of 100 - White With Specks - 12x12 Floor Tile & Mastic	**N.D.**	< 1%Cellulose	Off-white tile. Balance of sample is unspecified non-fibrous material.
L207283-44	B5-SN24a West Entrway Of 100 - White With Specks - 12x12 Floor Tile & Mastic	**Yes**	3%Chrysotile* 3%Cellulose	Yellow adhesive tar. Balance of sample is organic binders.
L207283-45	B5-AM25 West Entrway Of 100 - Black - Baseboard & Mastic	**N.D.**	No Fibers	Black vinyl. Balance of sample is unspecified non-fibrous material.
L207283-46	B5-AM25a West Entrway Of 100 - Black - Baseboard & Mastic	**N.D.**	< 1%Cellulose	Brown adhesive. Balance of sample is organic binders.
L207283-47	B5-SN26 Room 100, Central Hallway - Grey with Specks - (Replacement) 12x12 Floor Tile & Mastic	**N.D.**	< 1%Cellulose	Off-white tile. Balance of sample is unspecified non-fibrous material.
L207283-48	B5-SN26a Room 100, Central Hallway - Grey with Specks - (Replacement) 12x12 Floor Tile & Mastic	**Yes**	4%Chrysotile* 4%Cellulose	Black adhesive tar. Balance of sample is organic binders.
L207283-49	B5-SN27 Room 100, 11 Ft East From East Exit - Light Brown With Heavy Streaks - 12x12 Floor Tile & Mastic	**N.D.**	< 1%Cellulose	Off-white tile. Balance of sample is unspecified non-fibrous material.
L207283-50	B5-SN27a Room 100, 11 Ft East From East Exit - Light Brown With Heavy Streaks - 12x12 Floor Tile & Mastic	**N.D.**	1%Cellulose	Beige adhesive. Balance of sample is organic binders.

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MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L207283-51	B5-SN28 Room 100, Under Stairway 4 ft From North Wall - Green - 12x12 Floor Tile & Mastic	**N.D.**	No Fibers	Off-white tile. Balance of sample is unspecified non-fibrous material.
L207283-52	B5-SN28a Room 100, Under Stairway 4 ft From North Wall - Green - 12x12 Floor Tile & Mastic	**Yes**	3%Chrysotile* 5%Cellulose	Black tar. Balance of sample is organic binders.
L207283-53	B5-SN29 150A, West Wall, NE End - Light Brown With Light Streaks - 12x12 Floor Tile & Mastic	**Yes**	2%Chrysotile* < 1%Cellulose	Off-white tile. Balance of sample is unspecified non-fibrous material.
L207283-54	B5-SN29a 150A, West Wall, NE End - Light Brown With Light Streaks - 12x12 Floor Tile & Mastic	**Yes**	5%Chrysotile* 4%Cellulose	Black tar. Balance of sample is organic binders.
L207283-55	B5-AM30 150, East Entrance, Inside Doorway - Grey - Vinyl Floor Sheeting & Mastic	**N.D.**	< 1%Cellulose	Off-white tile vinyl. Balance of sample is unspecified non-fibrous material.
L207283-56	B5-AM30a 150, East Entrance, Inside Doorway - Grey - Vinyl Floor Sheeting & Mastic	**N.D.**	1%Cellulose < 1%Polyethylene	Yellow adhesive. Balance of sample is organic binders.
L207283-57	B5-SN31 200, North Wall By Central Concrte Column - Light Brown With Light Streaks - 12x12 Floor Tile & Mastic	**Yes**	2%Chrysotile* < 1%Cellulose	Off-white tile. Balance of sample is unspecified non-fibrous material.
L207283-58	B5-SN31a 200, North Wall By Central Concrte Column - Light Brown With Light Streaks - 12x12 Floor Tile & Mastic	**N.D.**	1%Cellulose	Yellow adhesive. Balance of sample is organic binders.
L207283-59	B5-SN32 200, South End, SE Corner - Light Brown With Light Streaks - 12x12 Floor Tile & Mastic	**N.D.**	41%Cellulose 2%Synthetic	Red linoleum fibrous tar. Balance of sample is organic binders and unspecified non-fibrous material.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

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L207283-60	B5-SN32a 200, South End, SE Corner - Light Brown With Light Streaks - 12x12 Floor Tile & Mastic	**N.D.**	2%Cellulose	Beige adhesive. Balance of sample is organic binders.
L207283-61	B5-SN32A 200, South End, SE Corner - Light Brown With Light Streaks - 12x12 Floor Tile & Mastic	**Yes**	2%Chrysotile* < 1%Cellulose	Off-white tile. Balance of sample is unspecified non-fibrous material.
L207283-62	B5-SN32Aa 200, South End, SE Corner - Light Brown With Light Streaks - 12x12 Floor Tile & Mastic	**N.D.**	2%Cellulose	Yellow adhesive. Balance of sample is organic binders.
L207283-63	B5-SN33 200, North End, NE Corner By East Exit - Light Brown With Light Streaks - 12x12 Floor Tile & Mastic	**Yes**	2%Chrysotile* < 1%Cellulose	Off-white tile. Balance of sample is unspecified non-fibrous material.
L207283-64	B5-SN33a 200, North End, NE Corner By East Exit - Light Brown With Light Streaks - 12x12 Floor Tile & Mastic	**Yes**	< 1%Chrysotile* 4%Cellulose	Black adhesive tar. Balance of sample is organic binders.
L207283-65	B5-SN34 Room 100, 11 ft East From West Exit - Medium Brown With Streaks - 12x12 Floor Tile & Mastic	**Yes**	5%Chrysotile* < 1%Cellulose	Off-white tile. Balance of sample is unspecified non-fibrous material.
L207283-66	B5-SN34a Room 100, 11 ft East From West Exit - Medium Brown With Streaks - 12x12 Floor Tile & Mastic	**Yes**	5%Chrysotile* 4%Cellulose	Black tar. Balance of sample is organic binders.
L207283-67	B5-SN35 Room 100, NE Corner 5 Ft FroM East Wall - Medium Brown With Streaks - 12x12 Floor Tile & Mastic	**Yes**	< 1%Chrysotile* < 1%Cellulose	Off-white tile. Balance of sample is unspecified non-fibrous material.
L207283-68	B5-SN35a Room 100, NE Corner 5 Ft FroM East Wall - Medium Brown With Streaks - 12x12 Floor Tile & Mastic	**Yes**	4%Chrysotile* 5%Cellulose	Black tar. Balance of sample is organic binders.

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L207283-69	B5-SN36 Room 100, North Central Wall Under Stairway - Medium Brown With Streaks 12x12 Floor Tile & Mastic	**Yes**	5%Chrysotile* < 1%Cellulose	Off-white tile. Balance of sample is unspecified non-fibrous material.
L207283-70	B5-SN36a Room 100, North Central Wall Under Stairway - Medium Brown With Streaks 12x12 Floor Tile & Mastic	**Yes**	6%Chrysotile* 3%Cellulose	Black tar. Balance of sample is organic binders.
L207283-71	B5-AM37 150 A, 2 Ft North Of West Entry - Grey - Vinyl Floor Sheeting & Mastic	**N.D.**	No Fibers	Off-white/black tile vinyl. Balance of sample is unspecified non-fibrous material.
L207283-72	B5-AM37a 150 A, 2 Ft North Of West Entry - Grey - Vinyl Floor Sheeting & Mastic	**N.D.**	< 1%Cellulose	Black adhesive. Balance of sample is organic binders and unspecified non-fibrous material.
L207283-73	B5-AM38 150 A, About 3 Ft From West Corner - Grey - Vinyl Floor Sheeting & Mastic	**N.D.**	No Fibers	Off-white/black tile vinyl. Balance of sample is unspecified non-fibrous material.
L207283-74	B5-AM38a 150 A, About 3 Ft From West Corner - Grey - Vinyl Floor Sheeting & Mastic	**N.D.**	< 1%Cellulose	Black adhesive. Balance of sample is organic binders and unspecified non-fibrous material.
L207283-75	B5-AW39 Room 100, North Central Wall Under Electrical Panels - Wall Texture	**Yes**	2%Chrysotile* 1%Cellulose	Off-white compound texture. Balance of sample is unspecified non-fibrous material.
L207283-76	B5-AW39a Room 10, North Central Wall Under Electrical Panels - Drywall Joint Compound	**Yes**	2%Chrysotile* 22%Cellulose	Off-white joint compound plaster. Balance of sample is unspecified non-fibrous material.
L207283-77	B5-AM40 Room 100, North Wall About 8 Ft From West Wall - Black Baseboard Mastic	**Yes**	5%Chrysotile* 4%Cellulose	Black tar. Balance of sample is organic binders.

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L207283-78	B5-AM40a Room 100, North Wall About 8 Ft From West Wall - Black Baseboard Mastic	**N.D.**	1%Cellulose	Brown adhesive. Balance of sample is organic binders.
L207283-79	B5-AW41 Exterior West Wall Of 150 - Transite Panel	**Yes**	16%Chrysotile*	Gray transite. Balance of sample is cementitious.
L207283-80	B5-AW42 Exterior West Wall Of 105 - Stucco On Concrete	**N.D.**	No Fibers	Beige/gray stucco. Balance of sample is silicate and cementitious.
L207283-81	B5-AW42a Exterior West Wall Of 105 - Stucco On Concrete	**N.D.**	< 1%Cellulose	Beige/gray skim coat. Balance of sample is unspecified non-fibrous material.
L207283-82	B5-AW43 Exterior SW Corner Of 135 - Stucco On Concrete	**N.D.**	< 1%Cellulose	Beige/gray stucco. Balance of sample is silicate and cementitious.
L207283-83	B5-AW43a Exterior SW Corner Of 135 - Stucco On Concrete	**N.D.**	< 1%Cellulose	Beige/gray skim coat. Balance of sample is unspecified non-fibrous material.
L207283-84	B5-SN44 120, South End Under Sink - Peach - 12x12 Floor Tile & Mastic	**Yes**	< 1%Chrysotile* 1%Cellulose	Tan tile. Balance of sample is unspecified non-fibrous material.
L207283-85	B5-SN44a 120, South End Under Sink - Peach - 12x12 Floor Tile & Mastic	**N.D.**	1%Cellulose	Beige adhesive. Balance of sample is organic binders.
L207283-86	B5-SN45 120, NW Corner - 12x12 Floor Tile & Mastic	**Yes**	< 1%Chrysotile* < 1%Cellulose	Tan tile. Balance of sample is unspecified non-fibrous material.

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L207283-87	B5-SN45a 120, NW Corner - 12x12 Floor Tile & Mastic	**N.D.**	1%Cellulose	Beige adhesive. Balance of sample is organic binders.
L207283-88	B5-AC46 Room 101, Above Doorway - 2x4 Suspended Ceiling Tile	**N.D.**	34%Cellulose 33%Mineral Wool 1%Polyethylene	Tan ceiling tile. Balance of sample is perlite and unspecified non-fibrous material.
L207283-89	B5-AM47 Area 197, West Window - Window Putty	**N.D.**	< 1%Cellulose	Off-white putty. Balance of sample is unspecified non-fibrous material.
L207283-90	B5-AM48 Area 197, NW Corner Adjacent To Room 150 - Wall Texture	**N.D.**	1%Cellulose	Off-white compound texture. Balance of sample is unspecified non-fibrous material.
L207283-91	B5-AW48a Area 197, NW Corner Adjacent To Room 150 - Drywall Joint Compound	**N.D.**	21%Cellulose 2%Fiberglass	Off-white joint compound plaster. Balance of sample is unspecified non-fibrous material.
L207283-92	B5-AM49 150A, East Window - Window Putty	**N.D.**	< 1%Cellulose	Off-white putty. Balance of sample is unspecified non-fibrous material.
L207283-93	B5-AI50 Air Intake Duct, AH-1 AC / 2 / 05 - Duct Insulation Jacket	**N.D.**	50%Cellulose 4%Fiberglass	Off-white/silver wrap insulation. Balance of sample is unspecified non-fibrous material.
L207283-94	B5-AI51 AH-1, AC / 2 / 05, Suction Connector - Pipe Wrap	**N.D.**	15%Cellulose	Black tar. Balance of sample is organic binders and unspecified non-fibrous material.
L207283-95	B5-AI52 AH-1, AC / 2 / 05, Liquid Connector - Pipe Wrap	**N.D.**	15%Cellulose	Black tar. Balance of sample is organic binders and unspecified non-fibrous material.

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L207283-96	B5-AI53 AH-1, AC / 2 / 05, Liquid Connector Pipe - Pipe Insulation	**N.D.**	< 1%Cellulose	Black sponge. Balance of sample is organic binders and unspecified non-fibrous material.
L207283-97	B5-AM54 AH-1, AC / 2 / 05 Between Unit & Duct - Duct Sealant	**N.D.**	< 1%Cellulose	Off-white sealant. Balance of sample is unspecified non-fibrous material.
L207283-98	B5-AW55 Exterior North Wall Corner Of 100 - Stucco On Concrete	**N.D.**	No Fibers	Gray stucco. Balance of sample is silicate and cementitious.
L207283-99	B5-AW55a Exterior North Wall Corner Of 100 - Stucco On Concrete	**Yes**	< 1%Chrysotile* 5%Cellulose	Black tar. Balance of sample is organic binders.
L207283-100	B5-AW55b Exterior North Wall Corner Of 100 - Stucco On Concrete	**N.D.**	No Fibers	Gray paint. Balance of sample is polymer and unspecified non-fibrous material.
L207283-101	B5-AM56 Between 150A & 100, Section North Wall - Orange - Foam-Like Sealant	**N.D.**	No Fibers	Yellow foam. Balance of sample is unspecified non-fibrous material.
L207283-102	B5-SC57 Exterior NE Floor Of Mezzanine East exit - Concrete Floor	**N.D.**	No Fibers	Gray concrete. Balance of sample is silicate and cementitious.
L207283-103	B5-SC58 Exterior Entryway Toward 100 West - Concrete Floor	**N.D.**	No Fibers	Gray concrete. Balance of sample is silicate and cementitious.
L207283-104	B5-SC58a Exterior Entryway Toward 100 West - Concrete Floor	**N.D.**	3%Cellulose	Black tar. Balance of sample is organic binders.

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L207283-105	B5-SN59 Room 112, East Cornr By Doorway To 116A	**Yes**	2%Chrysotile* < 1%Cellulose	Off-white tile. Balance of sample is unspecified non-fibrous material.
L207283-106	B5-SN59a Room 112, East Cornr By Doorway To 116A	**Yes**	4%Chrysotile* 3%Cellulose	Black tar. Balance of sample is organic binders.
L207283-107	B5-AW60 Room 112, West Central Lower Wall - Wall Texture	**N.D.**	1%Cellulose	Off-white compound texture. Balance of sample is unspecified non-fibrous material.
L207283-108	B5-AC61 Hallway Ceiling Outside Of Room 112 - Wall Texture	**N.D.**	< 1%Cellulose	Off-white compound texture. Balance of sample is unspecified non-fibrous material.
L207283-109	B5-AC61a Hallway Ceiling Outside Of Room 112 - Drywall Joint Compound	**N.D.**	22%Cellulose	Off-white joint compound plaster. Balance of sample is unspecified non-fibrous material.
L207283-110	B5-AC62 Room 126, NE Corner - 12x12 Row-Holed Ceiling Tile & Brown Mastic	**N.D.**	92%Cellulose	Brown ceiling tile. Balance of sample is unspecified non-fibrous material.
L207283-111	B5-AC62a Room 126, NE Corner - 12x12 Row-Holed Ceiling Tile & Brown Mastic	**N.D.**	< 1%Cellulose	Brown adhesive. Balance of sample is organic binders.
L207283-112	B5-AC63 Room 132, West End Above Doorway - 12x12 Row-Holed Ceiling Tile & Brown Mastic	**N.D.**	90%Cellulose	Brown ceiling tile. Balance of sample is unspecified non-fibrous material.
L207283-113	B5-AC63a Room 132, West End Above Doorway - 12x12 Row-Holed Ceiling Tile & Brown Mastic	**N.D.**	1%Cellulose	Brown adhesive. Balance of sample is organic binders.

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L207283-114	B5-AC64 Room 132, South Central End Of Ceiling - 12x12 Random Holed Ceiling Tile & Mastic	**N.D.**	91%Cellulose	Brown ceiling tile. Balance of sample is unspecified non-fibrous material.
L207283-115	B5-AC64a Room 132, South Central End Of Ceiling - 12x12 Random Holed Ceiling Tile & Mastic	**N.D.**	< 1%Cellulose	Brown adhesive. Balance of sample is organic binders.
L207283-116	B5-AC65 Room 132, NE Corner Of Ceiling - 12x12 Row-Holed Ceiling Tile & Brown Mastic	**N.D.**	90%Cellulose	Brown ceiling tile. Balance of sample is unspecified non-fibrous material.
L207283-117	B5-AC65a Room 132, NE Corner Of Ceiling - 12x12 Row-Holed Ceiling Tile & Brown Mastic	**N.D.**	1%Cellulose	Brown adhesive. Balance of sample is organic binders.
L207283-118	B5-AC66 Hallway ceiling Outside Of Room 126 - Wall Texture	**N.D.**	1%Cellulose	Off-white compound texture. Balance of sample is unspecified non-fibrous material.
L207283-119	B5-AC66a Hallway ceiling Outside Of Room 126 - Drywall Joint Compound	**N.D.**	22%Cellulose	Off-white joint compound plaster. Balance of sample is unspecified non-fibrous material.
L207283-120	B5-AC67 Room 150, 3 Ft From East Entrance - Ceiling Batt Insulation	**N.D.**	55%Cellulose	Silver tar paper. Balance of sample is organic binders and unspecified non-fibrous material.
L207283-121	B5-AC67a Room 150, 3 Ft From East Entrance - Ceiling Batt Insulation	**N.D.**	89%Mineral Wool 2%Cellulose 2%Fiberglass	Yellow fibrous insulation. Balance of sample is unspecified non-fibrous material.
L207283-122	B5-AC68 Room 150, 3 Ft From East Entrance - 2x4 Suspended Drywall	**N.D.**	21%Cellulose	Off-white joint compound plaster. Balance of sample is unspecified non-fibrous material.

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L207283-123	B5-AW69 Room 102, South Lower Wall 2 Ft From Entrance - Block Wall Mortar	**N.D.**	< 1% Cellulose	Gray mortar. Balance of sample is silicate and cementitious.
L207283-124	B5-AW70 Room 102, south Wall SE Corner - Block Wall Mortar	**N.D.**	No Fibers	Gray mortar. Balance of sample is silicate and cementitious.
L207283-125	B5-AM71 Room 112, Exhaust Rentilation On North Wall - White - Duct Joint Tape	**N.D.**	12% Cellulose	Off-white duct joint tape. Balance of sample is unspecified non-fibrous material.
L207283-126	B5-AM72 Room 122A, Unit GH 2 5 - Expanision Joint	**N.D.**	19% Fiberglass < 1% Cellulose	Black expansion joint. Balance of sample is unspecified non-fibrous material.
L207283-127	B5-AM73 South Exterior End Of Bldg, Bottom Of Pressure Vavle - Black - Patch	**Yes**	12% Chrysotile* 4% Cellulose 4% Fiberglass	Black fibrous tar. Balance of sample is organic binders and unspecified non-fibrous material.
L207283-128	B5-AR74 East End Of Bldg - Rolled Roof & Felt	**N.D.**	17% Fiberglass 3% Cellulose	Black roofing aggregate. Balance of sample is silicate and organic binders.
L207283-129	B5-AR74a East End Of Bldg - Rolled Roof & Felt	**N.D.**	16% Fiberglass 3% Cellulose < 1% Polyethylene	Black roofing aggregate. Balance of sample is silicate and organic binders.
L207283-130	B5-AR74b East End Of Bldg - Rolled Roof & Felt	**N.D.**	39% Cellulose 1% Synthetic < 1% Polyethylene	Black roofing felt. Balance of sample is silicate and organic binders.
L207283-131	B5-AR75 East End Of Metal Roof Awning - Rolled Roof & Felt	**N.D.**	17% Fiberglass 2% Cellulose	Black roofing aggregate. Balance of sample is silicate and organic binders.

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NVLAP Lab Code 101948-0

MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L207283-132	B5-AR75a East End Of Metal Roof Awning - Rolled Roof & Felt	**N.D.**	18% Fiberglass 2% Cellulose	Black roofing aggregate. Balance of sample is silicate and organic binders.
L207283-133	B5-AR75b East End Of Metal Roof Awning - Rolled Roof & Felt	**N.D.**	40% Cellulose 1% Synthetic < 1% Polyethylene	Black roofing felt. Balance of sample is silicate and organic binders.
L207283-134	B5-AR76 Gable Roof, South End - Roofing Shingle & Felt	**N.D.**	15% Cellulose < 1% Polyethylene	Black roofing aggregate. Balance of sample is silicate and organic binders.
L207283-135	B5-AM77 Exterior South Window Of Mezzanine Floor - Window Putty	**N.D.**	< 1% Cellulose	Off-white putty. Balance of sample is unspecified non-fibrous material.
L207283-136	B5-AM78 Base Of Blower Bl 13 05 - Penetration Mastic	**Yes**	10% Chrysotile* 3% Cellulose	Black roofing mastic. Balance of sample is organic binders.
L207283-137	B5-AM79 By Base Of Electrical Conduit By BL 13 05 - Penetration Mastic	**Yes**	3% Chrysotile* 8% Cellulose	Black roofing mastic. Balance of sample is organic binders.
L207283-138	B5-AR80 Porch Roof Over East Exit Of Mezzanine - Roofing Shingle & Felt	**N.D.**	17% Fiberglass 2% Cellulose	Black roofing aggregate. Balance of sample is silicate and organic binders.
L207283-139	B5-AR80a Porch Roof Over East Exit Of Mezzanine - Roofing Shingle & Felt	**N.D.**	17% Fiberglass 2% Cellulose	Black roofing aggregate. Balance of sample is silicate and organic binders.
L207283-140	B5-AR80b Porch Roof Over East Exit Of Mezzanine - Roofing Shingle & Felt	**N.D.**	39% Cellulose 1% Synthetic < 1% Polyethylene	Black roofing felt. Balance of sample is silicate and organic binders.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

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MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L207283-141	B5-AR81 North End OVer Room 150 B Latch-On Ladder - Roofing Shingle & Felt	**N.D.**	17% Fiberglass 2% Cellulose	Black roofing aggregate. Balance of sample is silicate and organic binders.
L207283-142	B5-AR81a North End OVer Room 150 B Latch-On Ladder - Roofing Shingle & Felt	**N.D.**	17% Fiberglass 1% Cellulose	Black roofing aggregate. Balance of sample is silicate and organic binders.
L207283-143	B5-AR81b North End OVer Room 150 B Latch-On Ladder - Roofing Shingle & Felt	**N.D.**	17% Fiberglass 1% Cellulose < 1% Polyethylene	Black roofing aggregate. Balance of sample is silicate and organic binders.
L207283-144	B5-AR81c North End OVer Room 150 B Latch-On Ladder - Roofing Shingle & Felt	**N.D.**	40% Cellulose 1% Synthetic < 1% Polyethylene	Black roofing felt. Balance of sample is silicate and organic binders.
L207283-145	B5-AM82 Room 116A, 3 Ft East Of Entrance - Floor Paper Felt	**Yes**	6% Chrysotile* 2% Cellulose < 1% Fiberglass	Black roofing vinyl. Balance of sample is organic binders and unspecified non-fibrous material.
L207283-146	B5-AM82a Room 116A, 3 Ft East Of Entrance - Floor Paper Felt	**N.D.**	< 1% Cellulose	Off-white roofing vinyl. Balance of sample is unspecified non-fibrous material.
L207283-147	B5-AR79 SW End Of Bldg - Rolled Roof & Felt	**N.D.**	18% Fiberglass 2% Cellulose	Black roofing aggregate. Balance of sample is silicate and organic binders.
L207283-148	B5-AI83 Attic, Pipe Elbow Marked #30 - Pipe Elbow Mudded Joint	**Yes**	15% Amosite* 2% Chrysotile* 1% Cellulose	Off-white fibrous powder insulation. Balance of sample is unspecified non-fibrous material.
L207283-149	B5-AR84 Attic, North End - Roofing Debris	**N.D.**	19% Cellulose < 1% Polyethylene	Black roofing aggregate. Balance of sample is silicate and organic binders.

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NVLAP®
NVLAP Lab Code 101948-0

MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L207283-150	B5-AR84a Attic, North End - Roofing Debris	**N.D.**	22% Cellulose < 1% Polyethylene < 1% Synthetic	Black roofing. Balance of sample is silicate and organic binders.
L207283-151	B5-AR84b Attic, North End - Roofing Debris	**N.D.**	39% Cellulose 1% Synthetic < 1% Polyethylene	Black roofing felt. Balance of sample is silicate and organic binders.
L207283-152	B5-AI85 Attic, Pipe Insulation Marked #35 - Pipe Insulation	**Yes**	49% Chrysotile* 15% Cellulose 1% Fiberglass	Off-white fibrous paper insulation. Balance of sample is unspecified non-fibrous material.
L207283-153	B5-AI86 Attic, Fork-Shape Exhaust Duct (BL 13 05) - Duct Joint Tape	**N.D.**	24% Cellulose	Off-white duct joint tape. Balance of sample is unspecified non-fibrous material.
L207283-154	B5-AR87 Attic, South End - Roofing Debris	**Yes**	8% Chrysotile* 3% Cellulose	Black roofing. Balance of sample is organic binders.
L207283-155	B5-AR87a Attic, South End - Roofing Debris	**N.D.**	37% Cellulose < 1% Synthetic < 1% Polyethylene	Black roofing felt. Balance of sample is silicate and organic binders.
L207283-156	B5-AR87b Attic, South End - Roofing Debris	**N.D.**	38% Cellulose 1% Synthetic < 1% Polyethylene	Black roofing felt. Balance of sample is organic binders.
L207283-157	B5-AM90 Attic, Misc Paper Debris By BL.2.5 - Paper	**Yes**	49% Chrysotile* 15% Cellulose 1% Fiberglass	Off-white fibrous paper insulation. Balance of sample is unspecified non-fibrous material.
L207283-158	B5-AR88 Attic, West End - Roofing Debris	**N.D.**	2% Cellulose	Black roofing. Balance of sample is organic binders.

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MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L207283-159	B5-AI89 Attic, South End - Pipe Elbow Mudded Joint	**Yes**	9% Amosite* 7% Chrysotile* 2% Cellulose	Off-white fibrous powder insulation. Balance of sample is unspecified non-fibrous material.
L207283-160	B5-AM91 Attic, South End - Misc Debris Material	**N.D.**	59% Fiberglass 2% Cellulose	Brown fibrous woven tar material. Balance of sample is organic binders and unspecified non-fibrous material.
L207283-161	B5-AC92 Mezzanine Floor, Center Of Room - Yellow - Insulation	**N.D.**	91% Mineral Wool 2% Cellulose	Yellow fibrous insulation. Balance of sample is unspecified non-fibrous material.
L207283-162	B5-AC92a Mezzanine Floor, Center Of Room - 2x4 Suspended Ceiling Tile	**N.D.**	35% Cellulose 34% Mineral Wool 1% Polyethylene	Off-white ceiling tile. Balance of sample is perlite and unspecified non-fibrous material.
L207283-163	B5-SN93 Room 102, By 1st Floor Vent - 12x12 Floor Tile & Mastic	**Yes**	2% Chrysotile* < 1% Cellulose	Off-white tile. Balance of sample is unspecified non-fibrous material.
L207283-164	B5-SN93a Room 102, By 1st Floor Vent - 12x12 Floor Tile & Mastic	**Yes**	5% Chrysotile* 4% Cellulose	Black tar. Balance of sample is silicate and organic binders.

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MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

QA Report

Method: EPA-600/M

KELLCO Services
3137 Diablo Ave

Hayward CA 94545

Laboratory manager: _____
(signature)

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
Blank sample		**N.D.**	No fibers	
		PC*		
L207283-155	B5-AR87a Attic, South End - Roofing Debris	**N.D.**	40% Cellulose < 1% Synthetic < 1% Polyethylene	Black roofing felt. Balance of sample is silicate and organic binders.

End of report.

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CLIENT	JOBSITE
Weiss Associates 5801 Christie Avenue 600 Emeryville CA 94608	Lawrence Berkeley National Laboratory One Cyclotron Road Bldg 5 Berkeley CA 94744

KELLCO-MACS JOB#: **1004-17** LAB LOGIN # L207283

COLLECTED BY: Siew Yee Lee

COLLECTED DATE 8/10 & 8/11/2010

TURN AROUND TIME: 4 8 (24) 48 5-DAY

RESULTS NEEDED BY

CIRCLE TYPE OF BULK ANALYSIS

(PLM) LEAD PAINT LEAD WIPE NON VIABLE MOLD VIABLE MOLD eCOLI OTHER

SAMPLES REC'D _____ ANALYZE TO FIRST POSITIVE YES NO

REPORT RESULTS TO PROJECT MANAGER: Tim Cannard

NOTES & COMMENTS:

CHAIN OF CUSTODY & SAMPLE SUBMITAL FORM

PAGE 1 OF ____

KELLCO-MACS JOB#: **1004-17**
Lawrence Berkeley National Laboratory

FIELD NUMBER	LOCATION (bldg, rm#, area)	COLOR	MATERIAL of SUBSTRATE (ft w/ size, mastic, etc. etc.)	NOTES: Like condition, damage, quantity, inside what, beneath what, direction in building (N,S,E,W) etc.
B5 - SN01	South ~~hallway~~ end of hallway by exit	White with black specks	12X12 floor tile & mastic	
- SN02		Beige with specks		
- SN03	Hallway by door outside of Room 136	White with black specks		
- AM04	~~West hallway wall~~ Hallway West wall outside of Room 135	Brown	Baseboard & Brown mastic	
- SN05	Room 136, west end by door in frame	Beige with specks	12X12 floor tile & mastic	
- SN06	Room 121, east wall about a feet north of entryway	Off white w/ grey specks		
- SN07	Room 121, about 2 ft South of north wall	Grey with specks	(replacement)	
- SN08	Room 121, about 2 ft from east wall (central)	Light Beige	(replacement)	
- AW09	Room 121, NE lower wall corner		Wall texture	
- AW9a			drywall joint compound	

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
[illegible]	8/12/2010	0940	Danielle Nichols	8/12/10	8:00

L207283

CHAIN OF CUSTODY & SAMPLE SUBMITAL FORM PAGE 2 OF ____

KELLCO-MACS JOB#: 1004-17
Lawrence Berkeley National Laboratory

FIELD NUMBER	LOCATION (bldg, rm#, area)	COLOR	MATERIAL or SUBSTRATE (ft w/ size, mastic, tjc, etc.)	NOTES: Like condition, damage, quantity, inside what, beneath what? direction in building (N,S,E,W) etc.)
B5-SN10	Room 132, North wall, ~~East~~ By S-IF-131-29	Beige with specks	12X12 floor tile & mastic.	
-AM11	~~North~~ Room 132, west wall By doorway	Brown	Baseboard & Brown mastic	
-AM12	Women's Restroom (126) NW wall by doorway	Grey.		
-SN13	Room 126, 2nd stall by commote.	~~Gr~~ off white with grey specks	12X12 floor tile & mastic	
-AM14	Room 122 (Utility Room) north corner of floor	Maroon	vinyl floor sheeting & mastic	Known ACM.
-SC15	Room 122, NE corner outside of 122A		Concrete floor	
-AW16	Room 122A, ~~North~~ West corner lower wall		wall texture	
-AW16a			drywall joint compound.	
B5 -AW17	Room 122, West wall, NW end		wall texture.	
-SN18	~~East of~~ Entryway of West exit	Beige with specks	12X12 floor tile & mastic.	
-AW19	Room 105, west central wall		paint/coating	
-AM20	~~Ro~~	Brown	Baseboard & Brown mastic	
-AW21	Room 105, Between equipment cage and north wall		wall texture	
-AW21a			drywall joint compound	
-AM22	Room 118, West wall By entryway.	Grey	Baseboard & yellow glue	
-AM23	Room 122, South end By doorway	Maroon	vinyl floor sheeting & mastic	
-SN24	West entryway of 100	White with ~~black~~ specks	12X12 floor tile & mastic	
-AM25		Black	Baseboard & mastic	

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
[illegible]	8/12/2010	940	Danielle Nichols	8/12/10	8:00

L207283

CHAIN OF CUSTODY & SAMPLE SUBMITAL FORM PAGE 3 OF ____

KELLCO-MACS JOB#: **1004-17**
Lawrence Berkeley National Laboratory

FIELD NUMBER	LOCATION (bldg, rm#, area)	COLOR	MATERIAL or SUBSTRATE (ft w/ size, mastic, tjc, etc)	NOTES: Like condition, damage, quantity, inside what, beneath what? direction in building (N,S,E,W) etc)
B5-SN26	Room 100, Hallway central	Grey with specks	(replacement) 12X12 floor tile & mastic	
-SN27	Room 100, 11 ft east from west exit	light Brown with heavy streaks	12X12 floor tile & Mastic	
-SN28	Room 100, under stairway ~~north~~ 4 ft from north wall	Green	12X12 floor tile & mastic	
-SN29	150A, West ~~end~~ wall, NE end	light Brown with light streaks	12X12 floor tile & mastic	
-AM30	150, East entrance, ~~Eg~~ inside doorway	Grey	vinyl floor sheeting & Mastic	
-SN 31	200, North wall By central concrete column	light Brown with light streaks	12X12 floor tile & mastic	
-SN 32	200, south end, SE corner			
-SN33	200, North end, NE corner ~~By~~ east exit.			
B5 -SN34	Room 100, 11 ft east from west exit	medium Brown with streaks		
-SN35	Room 100, NE corner 5 ft from east wall			
-SN36	Room 100, ~~used~~ North wall under stairway, central			
-AM37	150A, ~~west~~ 2 ft North of west entry	Grey	vinyl floor sheeting & mastic	
-AM38	150A, about 3 ft from west corner			
-AW39	Room 100, ~~ed~~ North central wall under electrical	panels	wall texture	
-AW39a			drywall joint compound.	
-AM40	Room 100, North wall, about ~~ea~~ 8 ft from west wall		Black Baseboard mastic.	
-AW41	Exterior West wall of 150		transite panel.	
-AW42	Exterior West wall of 105		~~ede~~ Stucco on concrete	

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
[illegible]	8/12/2010	0940	Danielle Nichols	8/12/10	8:00

L207283

CHAIN OF CUSTODY & SAMPLE SUBMITAL FORM PAGE 4 OF ____

KELLCO-MACS JOB#: **1004-17**
Lawrence Berkeley National Laboratory

FIELD NUMBER	LOCATION (bldg, rm#, area)	COLOR	MATERIAL or SUBSTRATE (ft w/ size, mastic, etc, etc.)	NOTES: Like condition, damage, quantity, inside what, beneath what? direction in building (N,S,E,W, etc.)
B5- AW43	Exterior SW corner of 135		Stucco on concrete.	
- SN44	120, south end under sink	~~Beige~~ Peach	~~Room~~ 1 12x12 floor tile & mastic	
- SN45	120, NW corner		|	
- AC46	Room 101, above doorway		2x4 suspended ceiling tile	
- AM47	Area ~~150~~ 197, west window		window putty	
- AW48	Area 197, NW corner adjacent to Room 150		wall texture	
- AW48a	|		drywall joint compound	
B5 - AM49	150A, east window		window putty.	
- AI50	Air intake duct, AH-1 ~~external Air exchan~~ AC/2/05		duct insulation jacket	
- AI51	AH-1, AC/2/05 suction connector		pipe wrap.	
- AI52	AH-1, AC/2/05, Liquid connector		|	
- AI53	~~AH-1~~ AH-1, AC/2/05 Liquid connector pipe		pipe insulation	
- AM54	AH-1, AC/2/05 Between unit & duct		Duct sealant	
- AW55	Exterior north wall corner of 100		Stucco on concrete.	
- AM56	Between 150A & 100, exterior North wall	orange ~~yellow~~	foam-like sealant	
- SC 57	Exterior NE floor of Mezzanine east exit.		concrete floor.	
- SC 58	Exterior entryway toward 100 ~~or~~ West		Concrete floor.	
- SN 59	Room 112, East corner by doorway to ~~112~~ 116A			

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
[illegible]	8/12/2010	0980	Danielle Nichols	8/12/10	8:00

L207283

CHAIN OF CUSTODY & SAMPLE SUBMITAL FORM PAGE 5 OF ____

KELLCO-MACS JOB#: **1004-17**
Lawrence Berkeley National Laboratory

FIELD NUMBER	LOCATION (bldg, rm#, area)	COLOR	MATERIAL or SUBSTRATE (ft w/ size, mastic, etc, etc)	NOTES (like condition, damage, quantity, inside what, beneath what? direction in building (N S E W) etc)
B5-AW60	Room 112, West central wall lower		wall texture.	
-AC61	Hallway ceiling outside of Room 112		wall texture	
-AC61a	|		drywall joint compound	
-AC62	Room 136, NE corner		12X12 row-holed ceiling tile & brown mastic.	
-AC63	Room 132, West end above doorway		|	|
-AC64	Room 132, South central end of ceiling		12X12 random holed ceiling tile & mastic	
-AC65	Room 132, NE corner of ceiling		12X12 row-holed ceiling tile & brown mastic.	
-AC66	Hallway ceiling outside of Room 126		wall texture	
B5 -AC66a	|		drywall joint compound.	
-AC67	Room 150, ~~east entra~~ 3 ft from east entrance		ceiling batt insulation.	
-AC68	|		2X4 suspended drywall	
-AW69	Room 102, South wall lower ≈ 2 ft from entrance		Block wall mortar	
-AW70	Room 102, South wall, SE corner		|	
-AM71	Room 112, exhaust ventilation on north wall	white.	duct joint tape	
-AM72	Room 122A, Unit GH 2 5		expansion joint.	
-AM73	South exterior end of Bldg, bottom of pressure valve	Black.	patch	
-AR74	East end of Bldg		Rolled roof & felt.	
-AR75	East end of Metal Awning roof		|	

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
[illegible]	8/12/2010	0940	Danielle Nichols	8/12/10	8:00

L207283

CHAIN OF CUSTODY & SAMPLE SUBMITAL FORM PAGE 6 OF ____

KELLCO-MACS JOB#: **1004-17**
Lawrence Berkeley National Laboratory

FIELD NUMBER	LOCATION (bldg rm#, area)	COLOR	MATERIAL or SUBSTRATE (ft w/ size, mastic, etc, etc!)	NOTES: Like condition, damage, quantity, inside what, beneath what? direction in building (N,S,E,W) etc.)
B5 - AR76	Gabled roof, south end		roofing shingle & felt	
- AM77	Exterior south window of Mezzanine floor.		window putty	
- AM78	Base of Blower BL13 05		penetration mastic	
- AM79	~~Elect~~ By base of electrical conduit by BL 13 05			
- AR80	~~East~~ Porch roof over east exit of mezzanine		roofing shingle & felt	
- AR81	North end over Room 150 By latch-on ladder.			
- AM82	Room 116A, 3 ft east of entrance		floor paper felt	
* - AR79	SW end of Bldg.		Rolled roof & felt.	
B5 - AI83	Attic, pipe elbow marked #30		pipe elbow mudded joint	
- AR84	Attic, north end		roofing debris	
- AI85	Attic, pipe insulation marked #35		pipe insulation	
- AI86.	Attic, ~~exhaust~~ fork-shape exhaust duct (BL 13 05)		duct joint tape	
- AR87	Attic, south end		roofing debris	
* - AM90	Attic, Misc paper debris By BL. 2. 5		paper	
- AR88	Attic, west end		roofing debris.	
- AI89	Attic, south end		pipe elbow mudded joint	
- AM91	Attic, south end		misc debris material	
- AC92	Mezzanine floor, center of Room	yellow	Insulation	
- AC92A			2X4 suspended ceiling tile	

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
[illegible]	8/12/2010	0900	Danielle Nichols	8/12/10	8:00

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CHAIN OF CUSTODY & SAMPLE SUBMITAL FORM

PAGE 7 OF ____

KELLCO-MACS JOB#: **1004-17**
Lawrence Berkeley National Laboratory

FIELD NUMBER	LOCATION (bldg, rm#, area)	COLOR	MATERIAL or SUBSTRATE (f, w/ size, mastic, tic, etc.)	NOTES: Like condition, damage, quantity, inside what, beneath what?, direction in building (N,S,E,W) etc.)
B5-SN93	Room 102, By 1st floor vent		12x12 floor tile & mastic	

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
[illegible]	8/12/2010	0900	Danielle Nichols	8/12/10	8:00

MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Method: EPA-600/M4-82-020

KELLCO Services
3137 Diablo Ave

Hayward CA 94545

Person to contact:
Contact phone: 510-786-9751
FAX phone: 510-786-9625
Sampled by: Siew Yee Lee
Sampled on: August 19, 2010
Analyzed on: August 19, 2010 at: 11:46
Corresponding invoice number: 207578

Analyst: HCB (signature)

Laboratory manager: (signature)

Job Number: 1004-17

Job Description: LBNL - Bldg 5, Berkeley, CA

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L207578-1	B5-AM94 Bldg 5, Panel 343 A2A25A / Wire Cloth	**N.D.**	22% Cellulose 2% Synthetic	Black wire cloth. Balance of sample is organic binders and unspecified non-fibrous material.
L207578-2	B5-AM95 Bldg 5, Panel 343A26A / Wire Cloth	**N.D.**	22% Cellulose 2% Synthetic	Black wire cloth. Balance of sample is organic binders and unspecified non-fibrous material.
L207578-3	B5-AM96 Bldg 5, Panel 343A26A / Wire Wrap Tape	**N.D.**	37% Cellulose 3% Synthetic	Black wire cloth. Balance of sample is organic binders and unspecified non-fibrous material.
L207578-4	B5-AM97 Bldg 5, Panel 343A2A / Wire Cloth	**N.D.**	23% Cellulose 2% Synthetic	Black wire cloth. Balance of sample is organic binders and unspecified non-fibrous material.
L207578-5	B5-AM98 Bldg 5, Panel 343A2A / Explosion Proof Tape	**N.D.**	37% Cellulose 2% Synthetic	Black wire cloth. Balance of sample is organic binders and unspecified non-fibrous material.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

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NVLAP Lab Code 101948-0

MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L207578-6	B5-AM99 Bldg 5, Panel 343A2C / Wire Cloth	**N.D.**	23% Cellulose 2% Synthetic	Black wire cloth. Balance of sample is organic binders and unspecified non-fibrous material.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

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NVLAP Lab Code 101948-0

MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

QA Report

Method: EPA-600/M

KELLCO Services
3137 Diablo Ave

Hayward CA 94545

Laboratory manager: _____
(signature)

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
Blank sample		**N.D.**	No fibers	
		PC*		

End of report.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

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MACS Lab Incorporated

Material Analysis and Characterization Service

L207578

Analytical and Environmental Services

Chain of Custody Record

To Be Used For All Types Of Analysis

Rush

MACS Lab # _____

Customer Code

BILLED TO		PROJECT INFORMATION		
Name: Kelco-MACS.		Sampled By: Steve Yedee	Date: 8/19/2010.	
Address:		Project Name: LBNL	Job #: 1004-17	
City:		Site Address: Bldg 5		
State:	Zip:	City, State, Zip: Berkeley, CA		
Phone No:		Site Contact:		
Fax No:		Phone No:	Fax No:	
Cell No:		Comments:		
Email:		Samples Preserved: Yes / No	Received Cold: Yes / No	

ANALYSIS REQUIRED

Required Turn Around Time: 4 Hour X; 8 Hour; 24 Hour; 2 Days/48 Hour; 3 Days/72 Hour; 5+ Days/120 Hour

DISPOSAL: ☐ Customer ☐ MACS ☐ OTHER (Explain)

Sample #	Sample Description / Type of Work	TIME ON	TIME OFF	TOTAL TIME	FLOW RATES START	FLOW RATES STOP	PCM Asbestos Air - NIOSH 7400	PLM Asbestos Bulk - 40 CFR 763	Lead (Wipes, Air, Paint, Soil)	TEM (Air/Bulk) - AHERA/Yamate Level II	Mold - Viable / Non Viable Air / Bulk	Metals (TCLP, CAM17, STLC)		Comments / Area Social Security #
B5-AM94	Bldg 5, Panel 343A2A25A / wire cloth							X						
-AM95	, panel 343A26A / wire cloth							X						
-AM96	, panel 343A26A / wire wrap tape							X						
-AM97	, panel 343A2A / wire cloth							X						
-AM98	, panel 343A2A / explosion proof tape							X						
-AM99	, panel 343A2C / wire cloth													

Relinquished By: [signature] *Date:* 8/19/2010 *Time:* 1043 *Accepted By:* Danielle Nichols *Date:* 8/19/10 *Time:* 10:45

TEM asbestos in water analysis requires 2 one-liter bottles shipped @ 4°C in dark containers for each sample.

LEAD USEPA 7420, Air NIOSH 7082, Soil EPA 7000/7420, Wipes NIOSH 9100 Water AIHA (method 3113B EPA 200.9)

Units Water - 1ug/l = 1 ppb Paint - 1% = 10,000 ppm

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Analytical and Environmental Services
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CAM-17 Bulk Materials Analysis Report - Method: EPA 6010B/3050

KELLCO Services
3137 Diablo Avenue
Hayward, CA 94545

Contact: Tim Cannard
Phone: (510) 786-9751
Email: mailbox3137@kellcomacs.com
Job #: 1004-17

Laboratory Number: 207291
Sampled By: Siew Yee Lee
Sampled On: August 10, 2010
Submitted On: August 12, 2010
Analyzed On: August 27, 2010
Reported On: August 31, 2010
SOP: CAM17
Sample Type: Bulk

Job Description: LBNL - One Cyclotron Road, Bld 5, Berkeley, CA 94744

	Lab Sample Number:	207291 -1	207291 -2	207291 -3	207291 -4	207291 -5
	Client Sample Number:	B5-PC1	B5-Pc2	B5-PC3	B5-PC4	B5-PC5
	Matrix:	Bulk	Bulk	Bulk	Bulk	Bulk
	Extraction Type:	Acid	Acid	Acid	Acid	Acid
	Units:	mg/kg (PPM)	mg/kg (PPM)	mg/kg (PPM)	mg/kg (PPM)	mg/kg (PPM)
Sb	Antimony	2.86	10.22	71.26	16.94	2.57
As	Arsenic	<0.01	<0.01	79.06	13.74	<0.01
Ba	Barium	109.36	29.50	2,351.32	397.76	720.02
Be	Beryllium	2.32	0.54	6.99	0.35	1.29
Cd	Cadmium	4.52	6.26	72.78	7.94	5.87
Cr	Chromium	139.60	7,155.98	7,126.30	67.62	58.52
Co	Cobalt	54.43	66.42	662.67	30.32	14.47
Cu	Copper	16.61	8.43	870.10	7.50	8.25
Pb	Lead	1,415.30	72,607.26	40,887.29	1,271.04	1,221.11
Hg	Mercury	245.54	<0.01	3,601.52	332.06	601.68
Mo	Molybdenum	93.02	162.65	1,251.40	256.31	124.67
Ni	Nickel	42.44	6.92	877.30	29.22	38.76
Se	Selenium	229.05	285.48	3,048.36	879.02	282.16
Ag	Silver	<0.01	4.18	155.96	<0.01	<0.01
Tl	Thallium	9.34	35.49	129.58	29.19	10.01
V	Vanadium	12.93	17.51	218.98	26.14	18.90
Zn	Zinc	577.71	688.33	13,013.59	1,456.58	553.57

Analyst: JR (Signature)

Laboratory Manager: TD (Signature)

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Analytical and Environmental Services
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(510) 786-9751 * (510) 786-9625 Fax * www.macslab.com

CAM-17 Bulk Materials Analysis Report - Method: EPA 6010B/3050

KELLCO Services
3137 Diablo Avenue
Hayward, CA 94545

Contact: Tim Cannard
Phone: (510) 786-9751
Email: mailbox3137@kellcomacs.com
Job #: 1004-17

Laboratory Number: 207291
Sampled By: Siew Yee Lee
Sampled On: August 10, 2010
Submitted On: August 12, 2010
Analyzed On: August 27, 2010
Reported On: August 31, 2010
SOP: CAM17
Sample Type: Bulk

Job Description: LBNL - One Cyclotron Road, Bld 5, Berkeley, CA 94744

	Lab Sample Number:	207291 -6	207291 -7			
	Client Sample Number:	B5-Pc6	B5-Pc7			
	Matrix:	Bulk	Bulk			
	Extraction Type:	Acid	Acid			
	Units:	mg/kg (PPM)	mg/kg (PPM)			
Sb	Antimony	20.22	32.08			
As	Arsenic	47.33	27.26			
Ba	Barium	994.80	2,189.70			
Be	Beryllium	1.81	3.01			
Cd	Cadmium	83.66	39.43			
Cr	Chromium	406.84	1,675.28			
Co	Cobalt	54.18	321.64			
Cu	Copper	58.23	58.55			
Pb	Lead	67,414.56	9,915.34			
Hg	Mercury	661.22	473.96			
Mo	Molybdenum	227.04	254.34			
Ni	Nickel	51.44	20.98			
Se	Selenium	437.82	752.62			
Ag	Silver	<0.01	2.78			
Tl	Thallium	30.71	62.22			
V	Vanadium	22.04	57.34			
Zn	Zinc	7,763.74	6,065.43			

Analyst: JR
(Signature)

Laboratory Manager: TD
(Signature)

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CLIENT	JOBSITE
Weiss Associates 5801 Christie Avenue 600 Emeryville CA 94608	Lawrence Berkeley National Laboratory One Cyclotron Road Bldg 5 Berkeley CA 94744

KELLCO-MACS JOB#: **1004-17** LAB LOGIN # I20729 1

COLLECTED BY: Siew Yee Lee

COLLECTED DATE 8/10/2010

TURN AROUND TIME: 4 8 (24) 48 5-DAY

RESULTS NEEDED BY

CIRCLE TYPE OF BULK ANALYSIS

PLM (LEAD PAINT) LEAD WIPE NON VIABLE MOLD VIABLE MOLD eCOLI OTHER CAM 17 ~~Pb~~

SAMPLES REC'D _____ ANALYZE TO FIRST POSITIVE YES NO

REPORT RESULTS TO PROJECT MANAGER: Tim Cannard

NOTES & COMMENTS:

CHAIN OF CUSTODY & SAMPLE SUBMITAL FORM PAGE____ OF ____

KELLCO-MACS JOB#: **1004-17**
Lawrence Berkeley National Laboratory

FIELD NUMBER	LOCATION (bldg, rm, area)	COLOR	MATERIAL or SUBSTRATE (ft w/ size, mastic, tic, etc.)	NOTES: Like condition, damage, quantity, inside what, beneath what? direction in building (N S E W) etc.)
B5-PC1	Room 105, West wall	off white	paint chip off concrete wall	0.6134 gm
-PC2	Room 102, wood door frame & wooden stairway	yellow & white	paint chip composite.	0.1135 gm
-PC3	Room 100, wood wall panels & drywall		" " "	0.1251 gm
-PC4	Room 150, ~~window~~ window sill & skirt		" " off wood.	0.5228 gm
-PC5	Room 101. concrete wall		" " off concrete.	0.3211 gm
-PC6	Exterior door frame, window frame & concrete window skirt		" " composite.	0.6730 gm
-PC7	Room 102, north & ~~west~~ east walls	Peach & Beige	" " "	0.6969 gm

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
[illegible]	8/12/10	0942	Danielle Nichols	8/12/10	3:00

PHOTOGRAPHS

Photographs containing no sample identification number are included for reference of the general sample locations.

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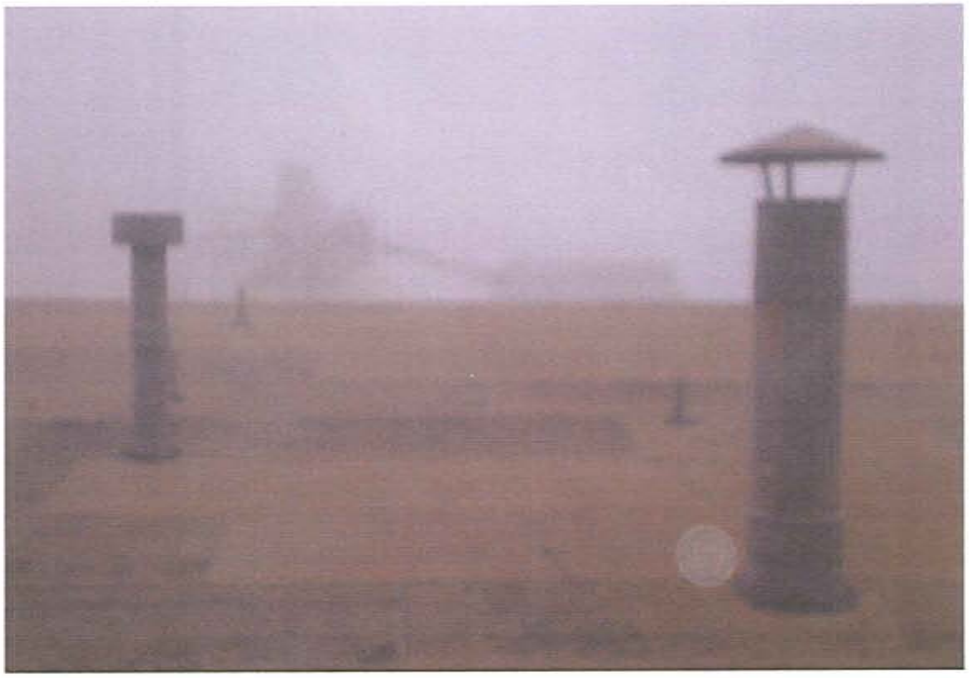
http://www.kellcomacs.com email: mailbox3137@kellcomacs.com

5



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B5-SN01

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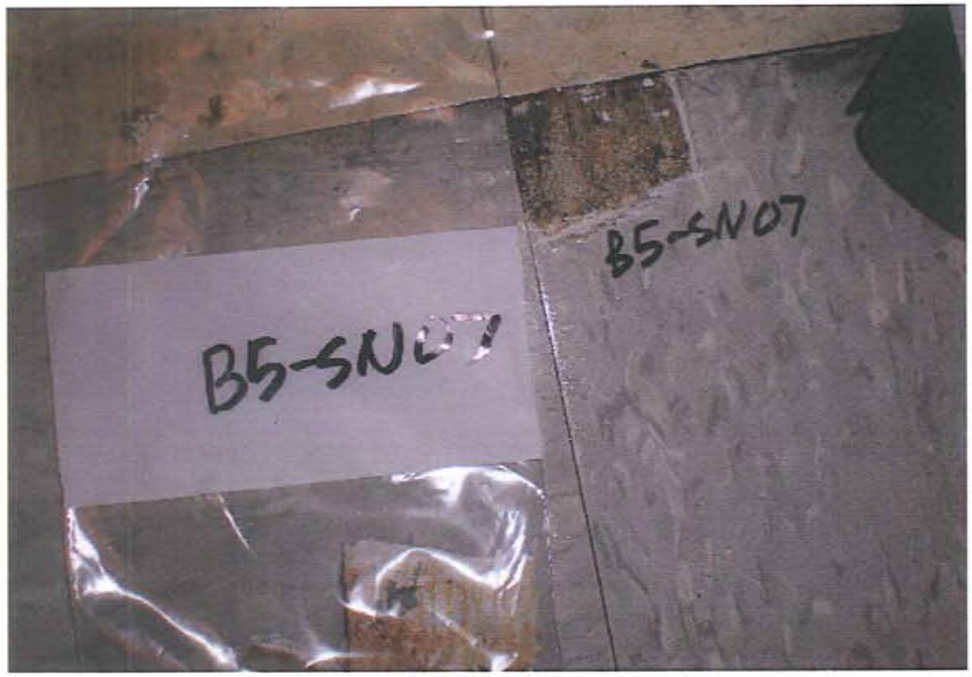
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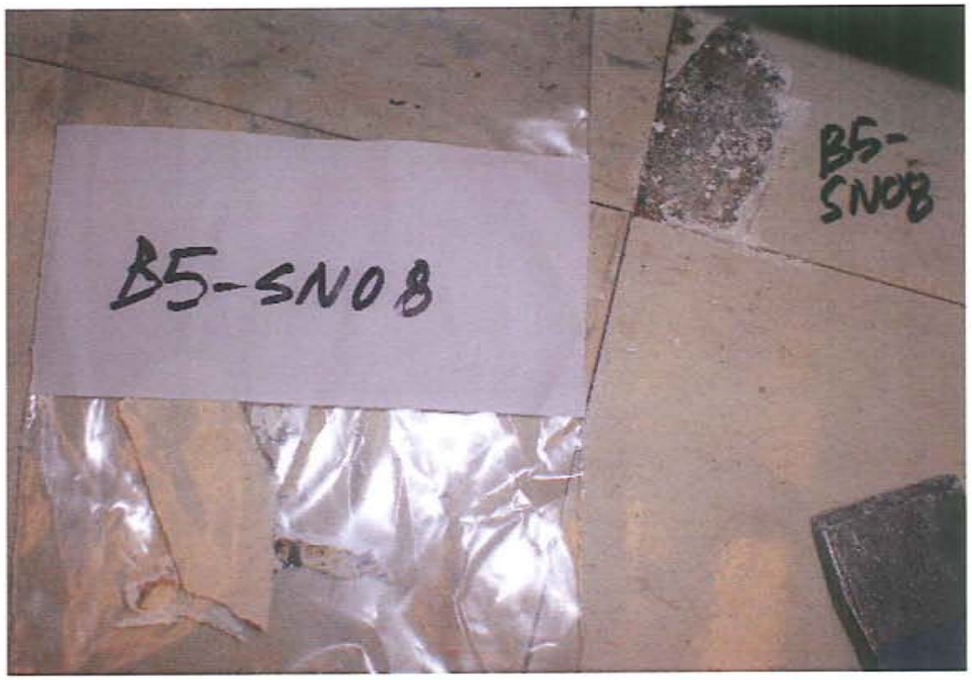
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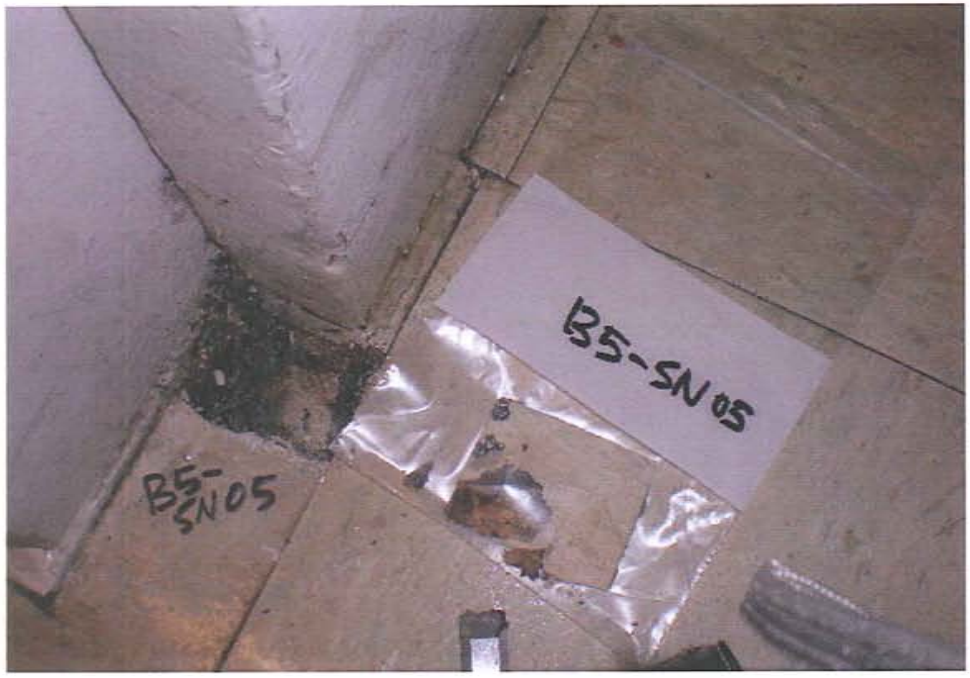
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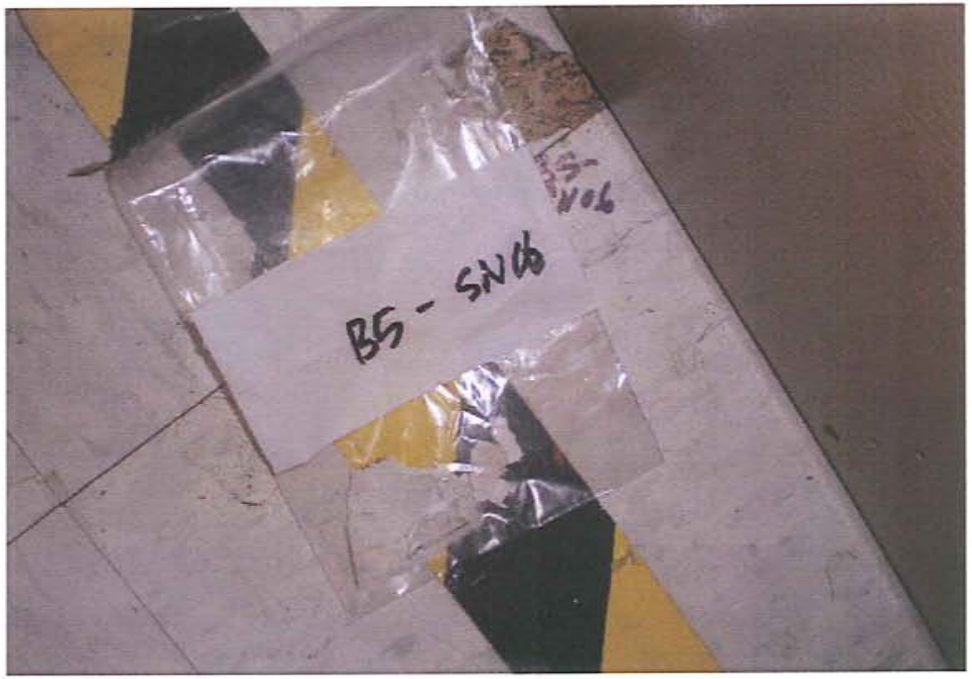
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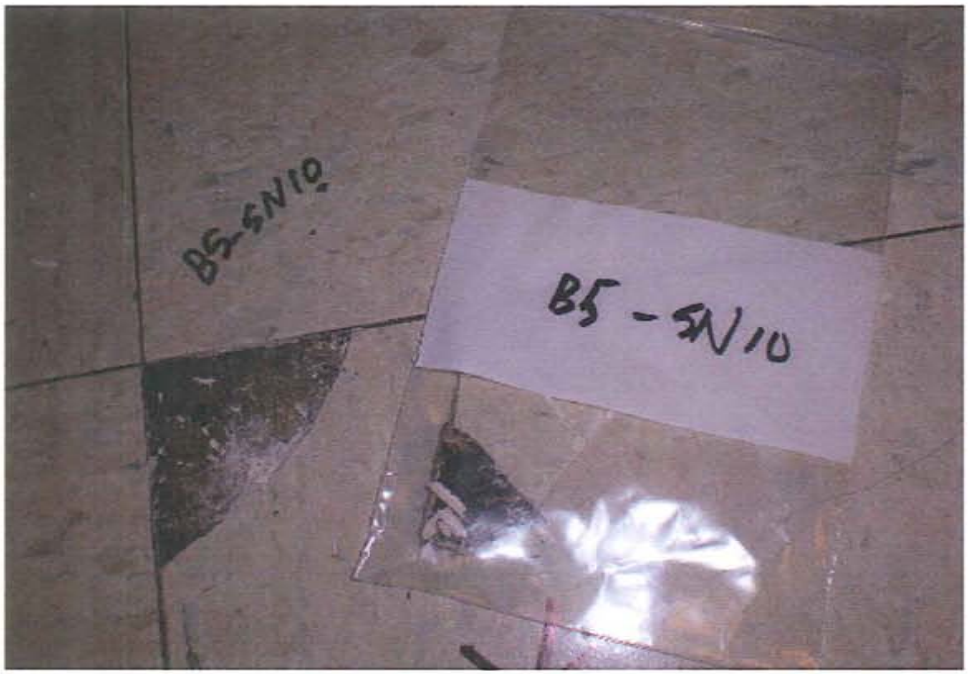
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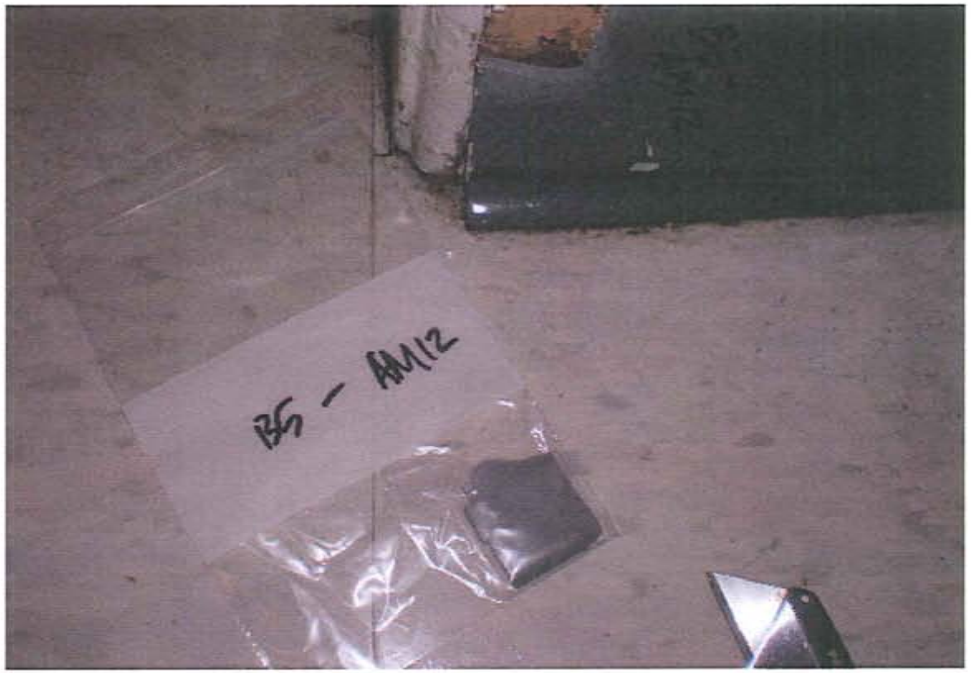
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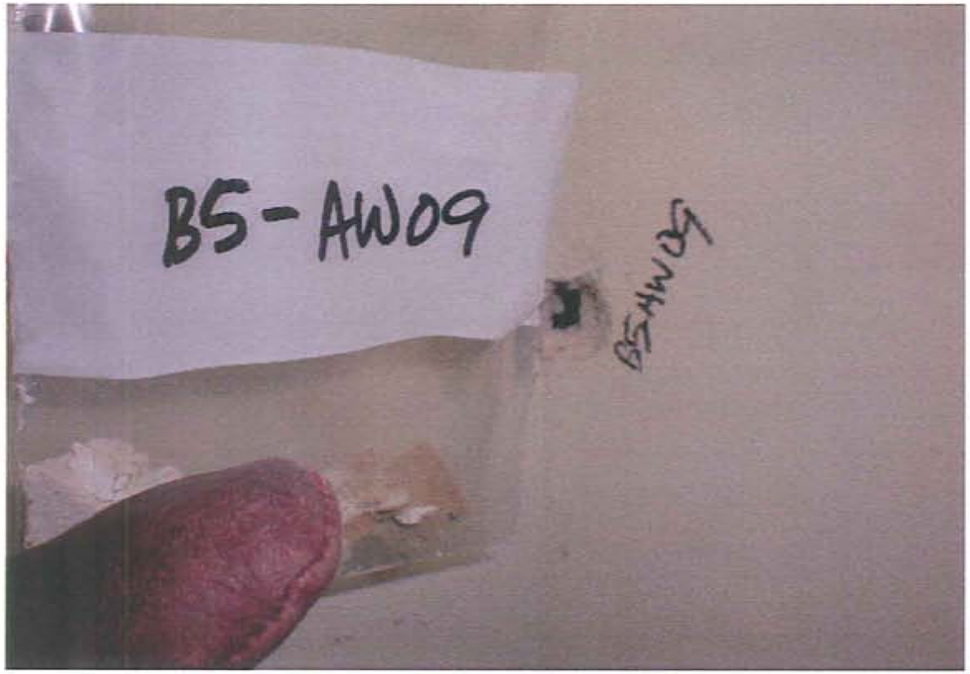
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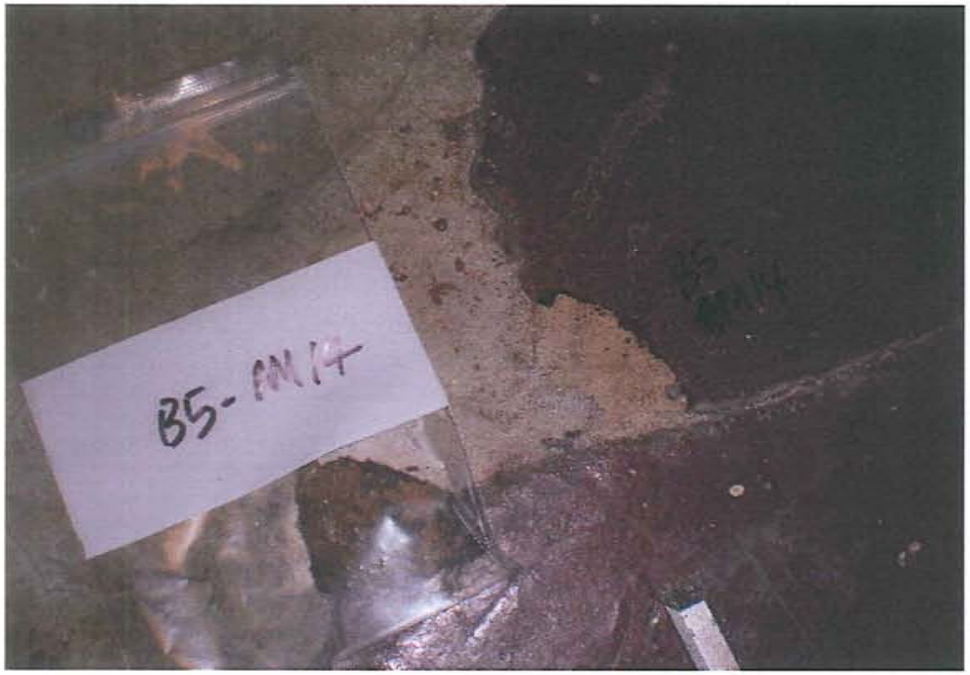
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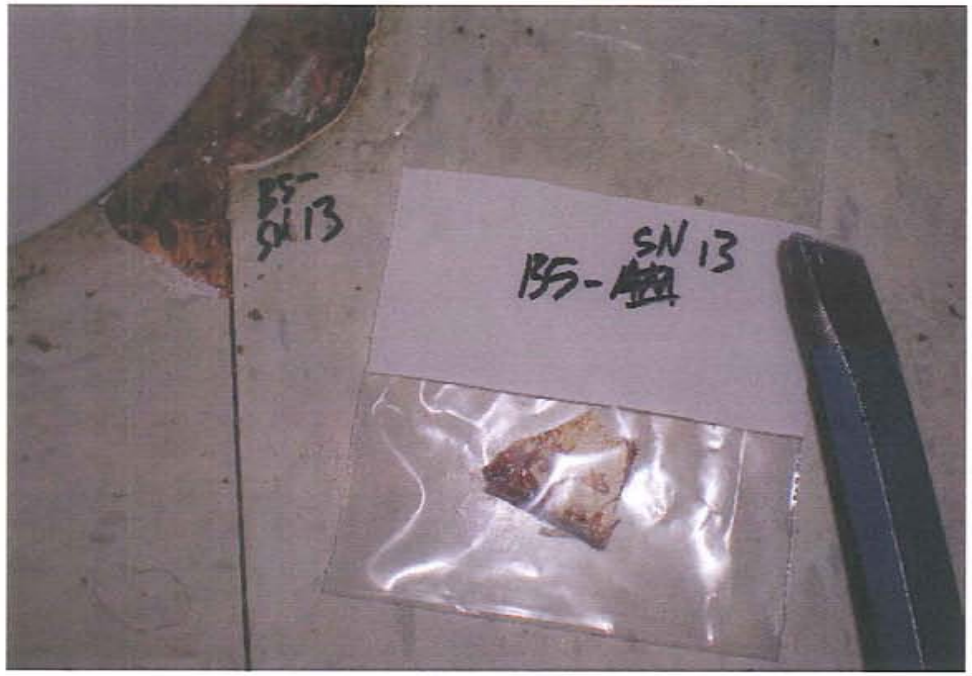
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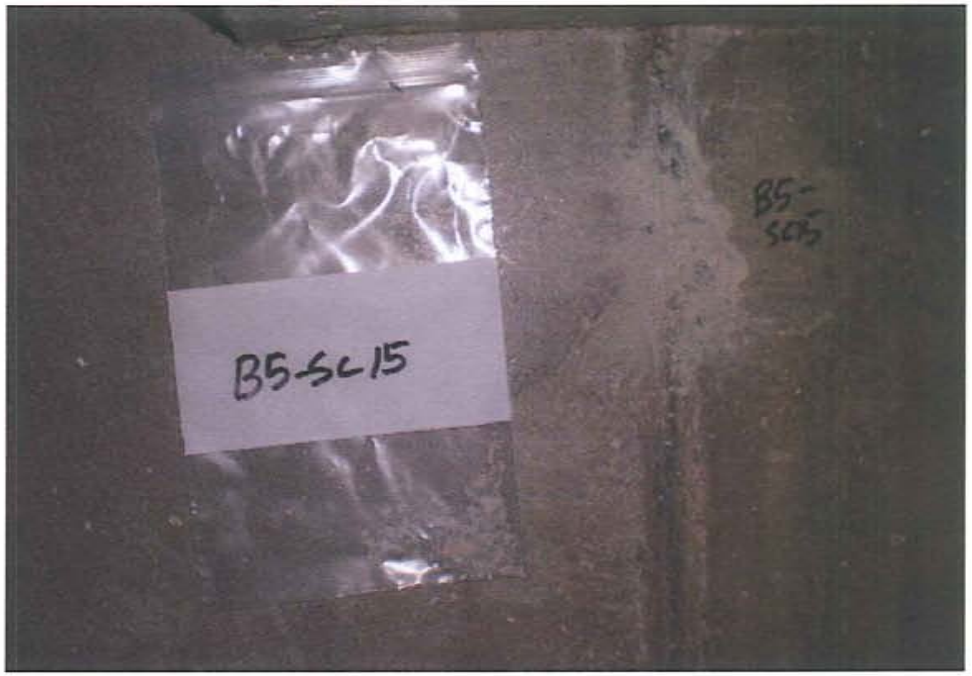
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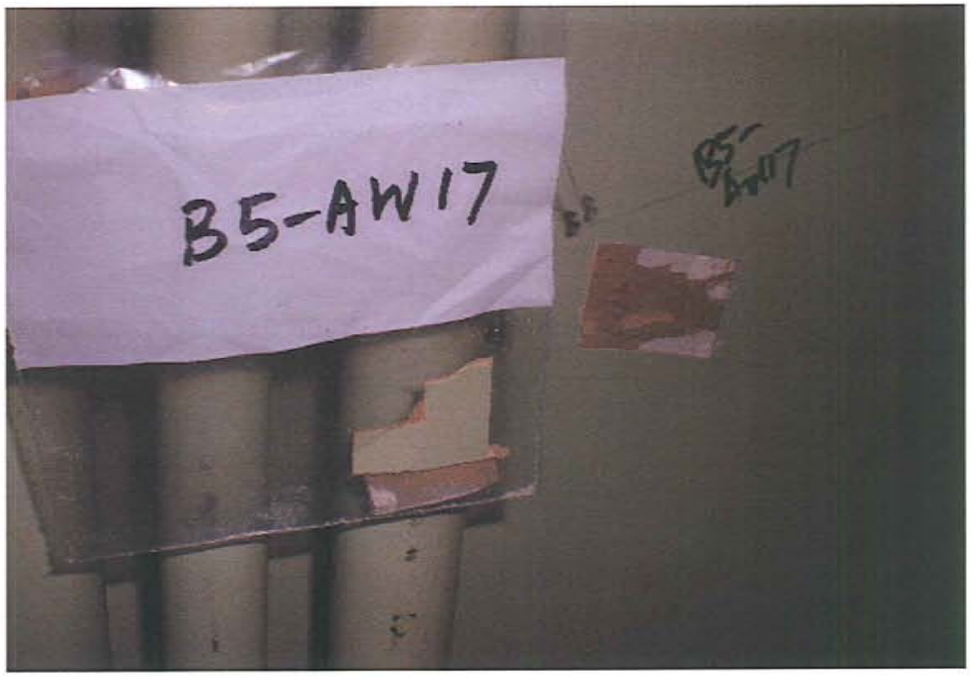
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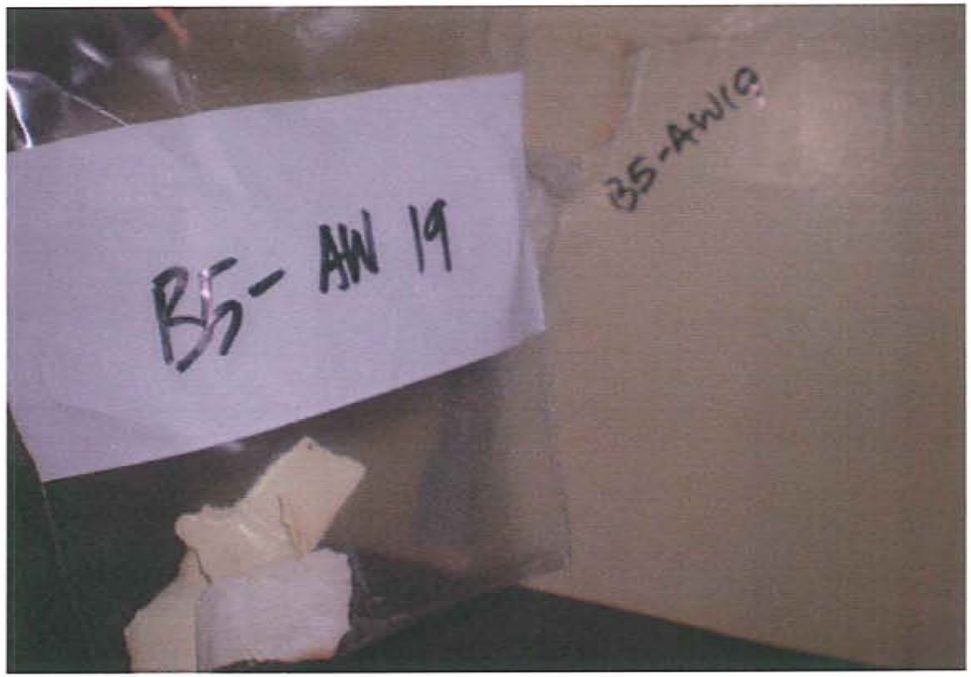
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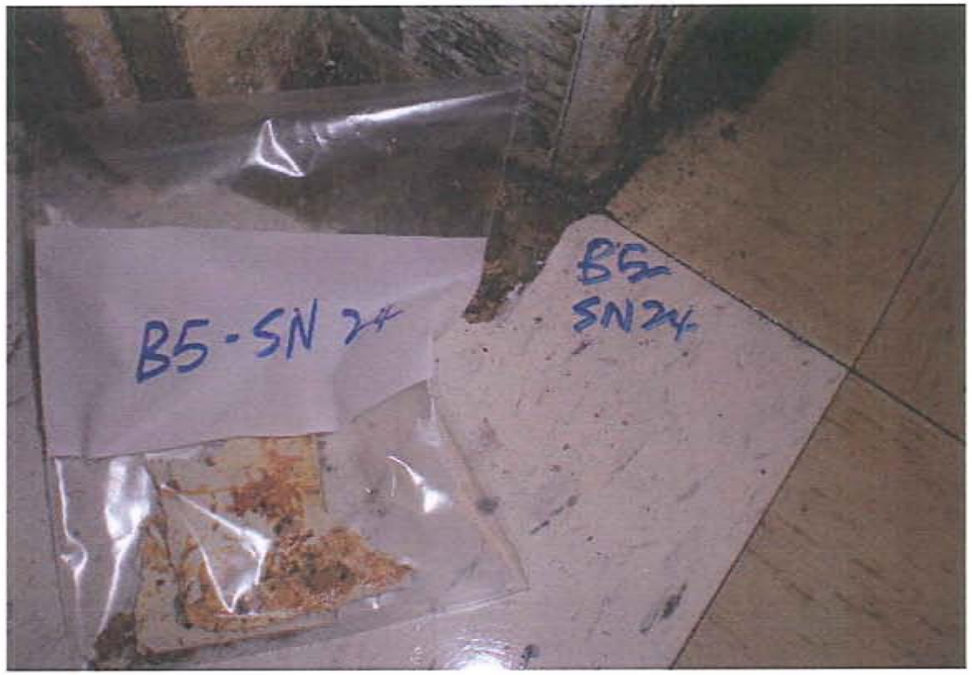
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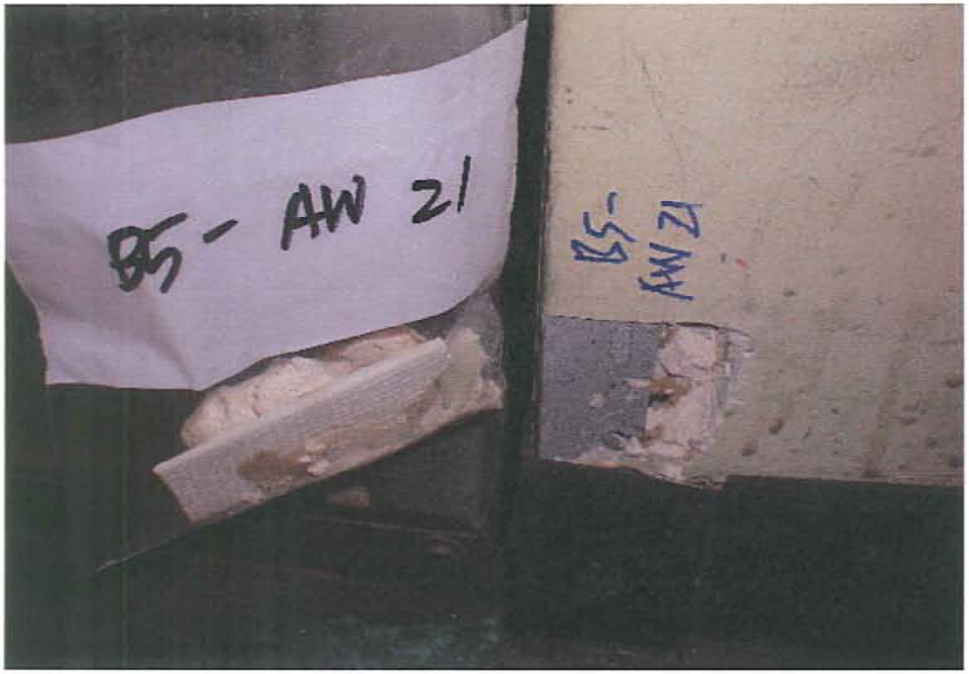
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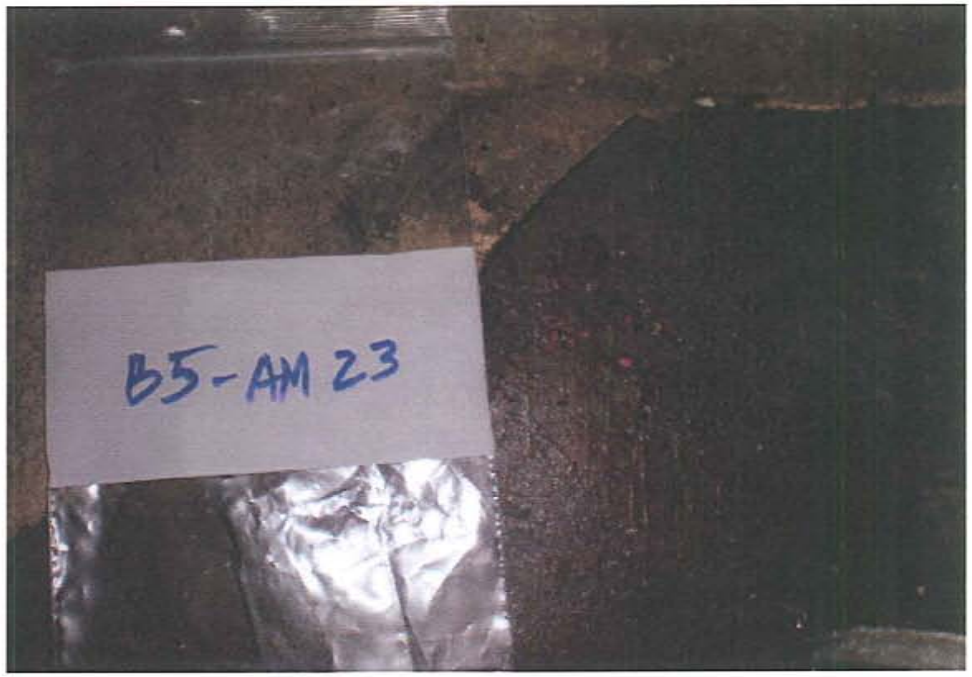
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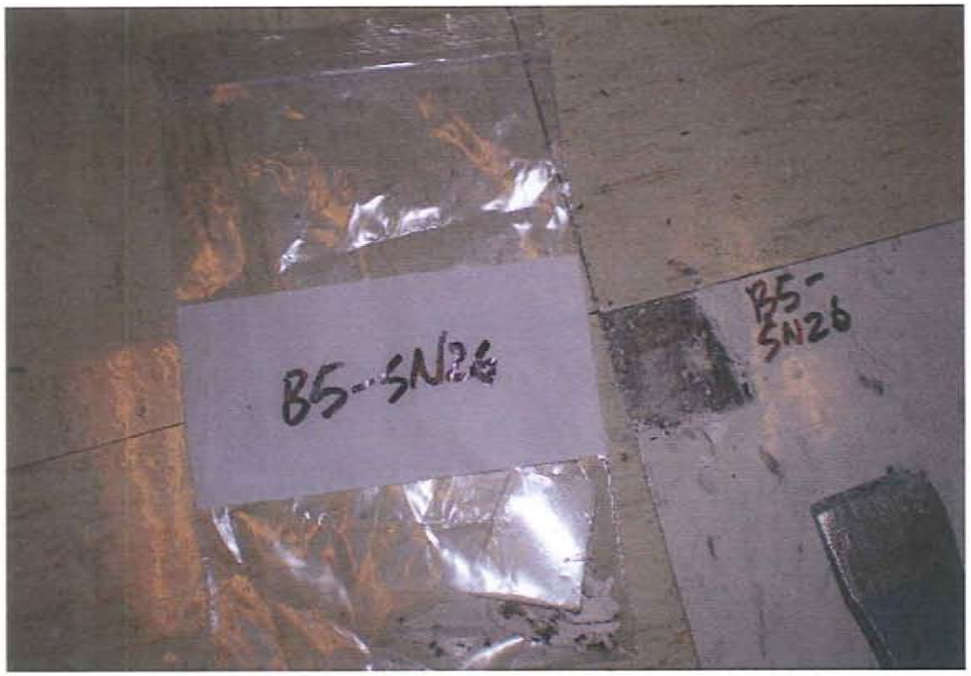
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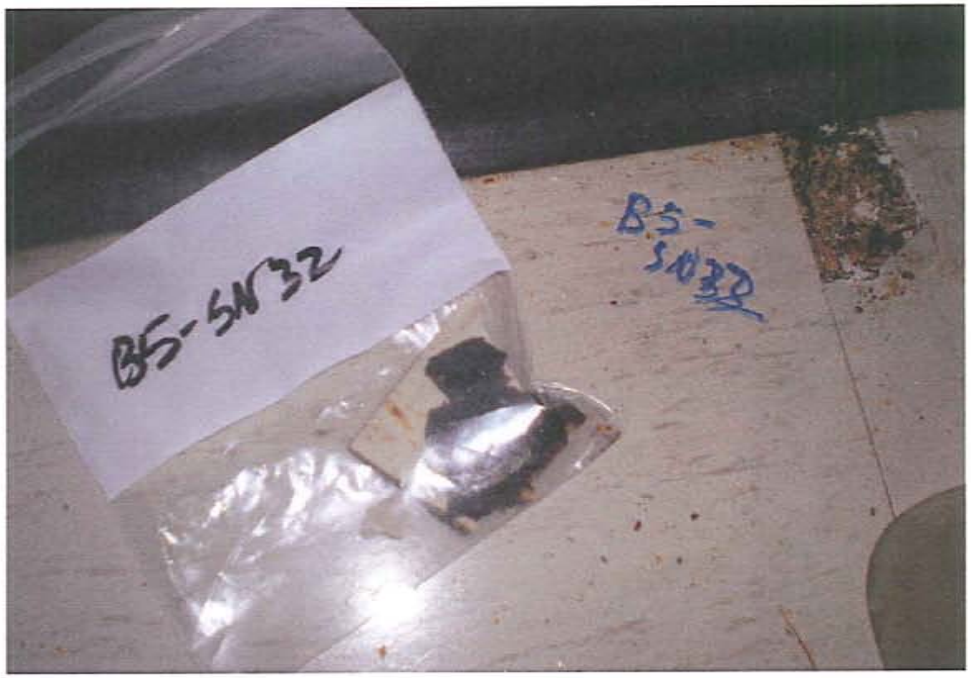
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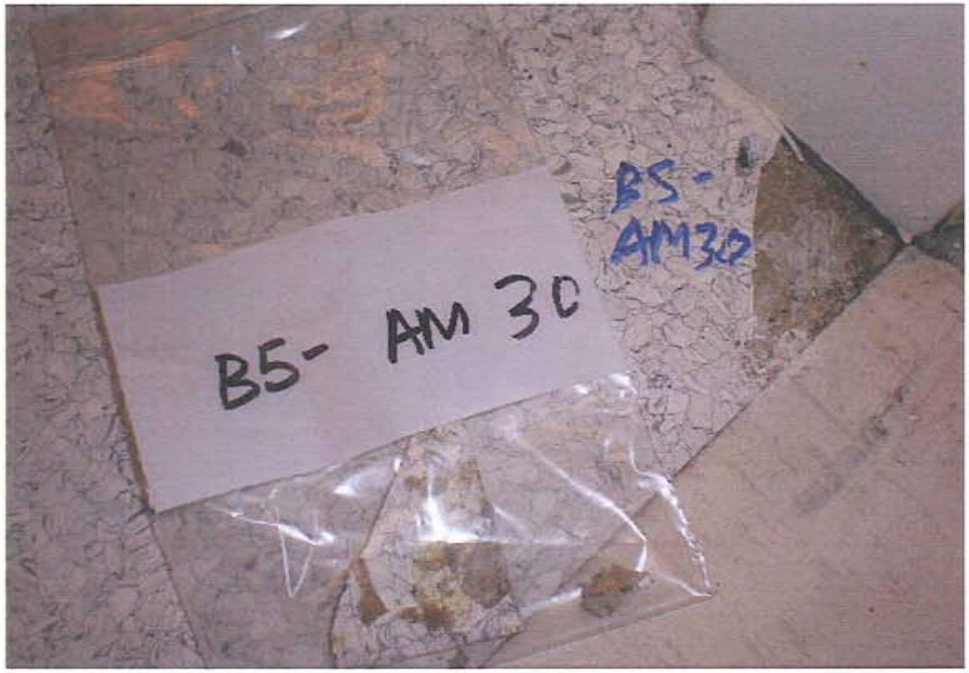
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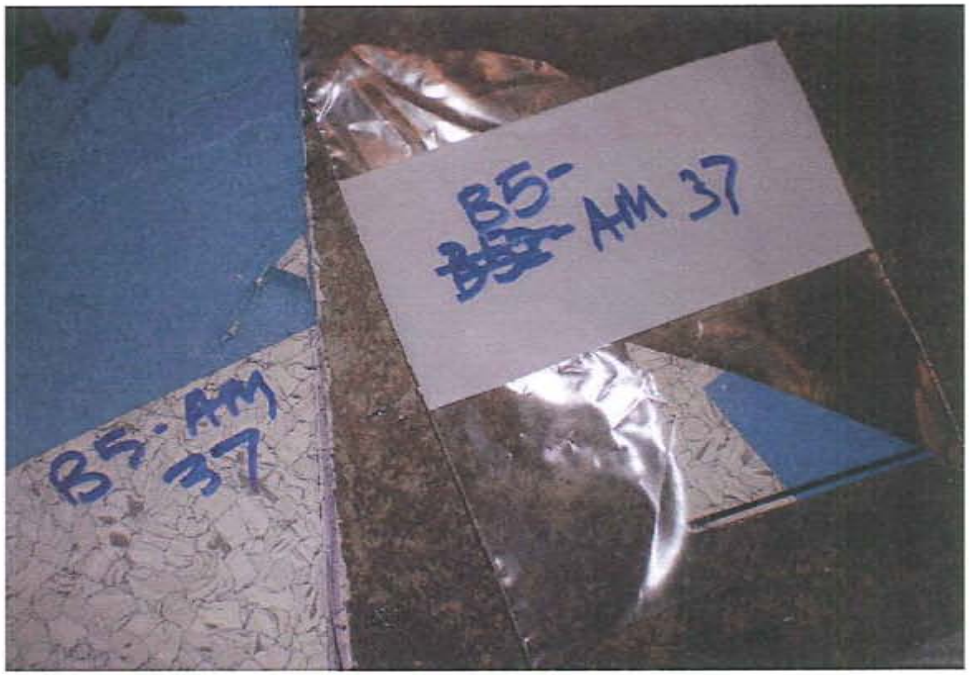
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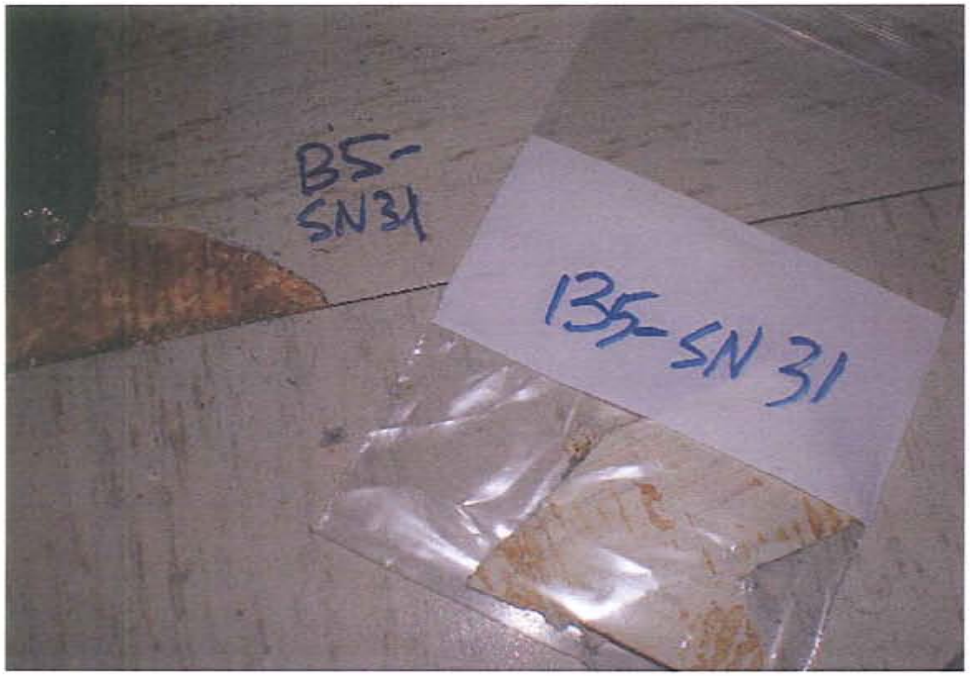
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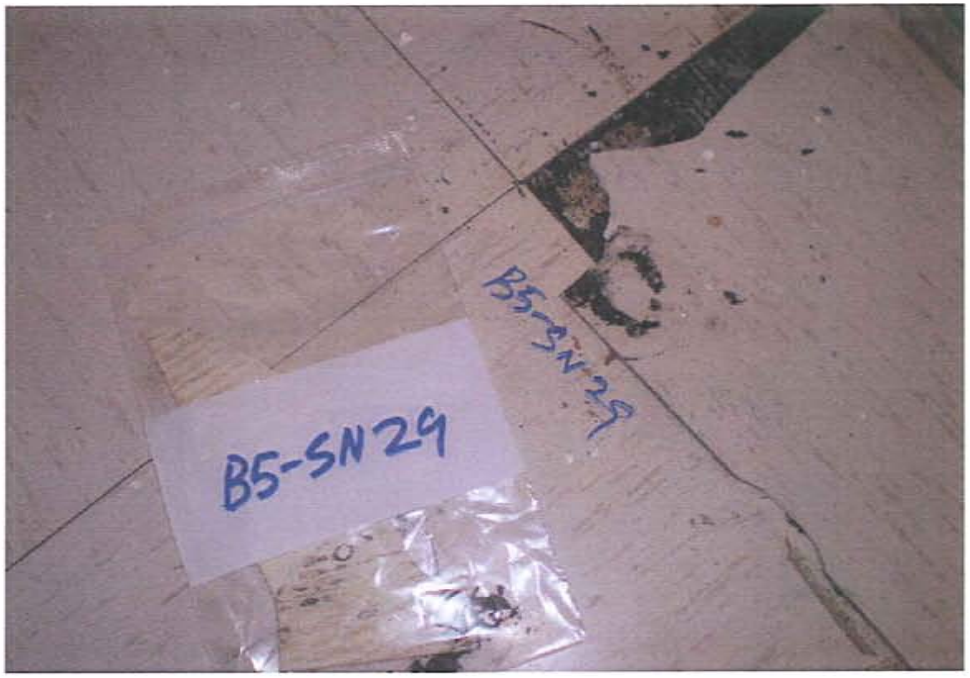
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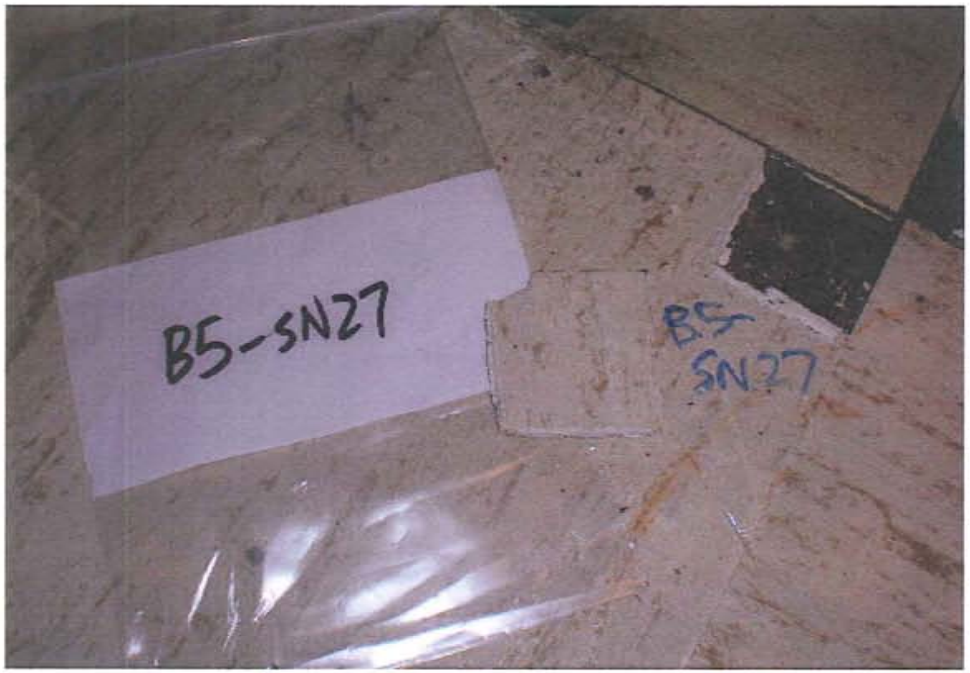
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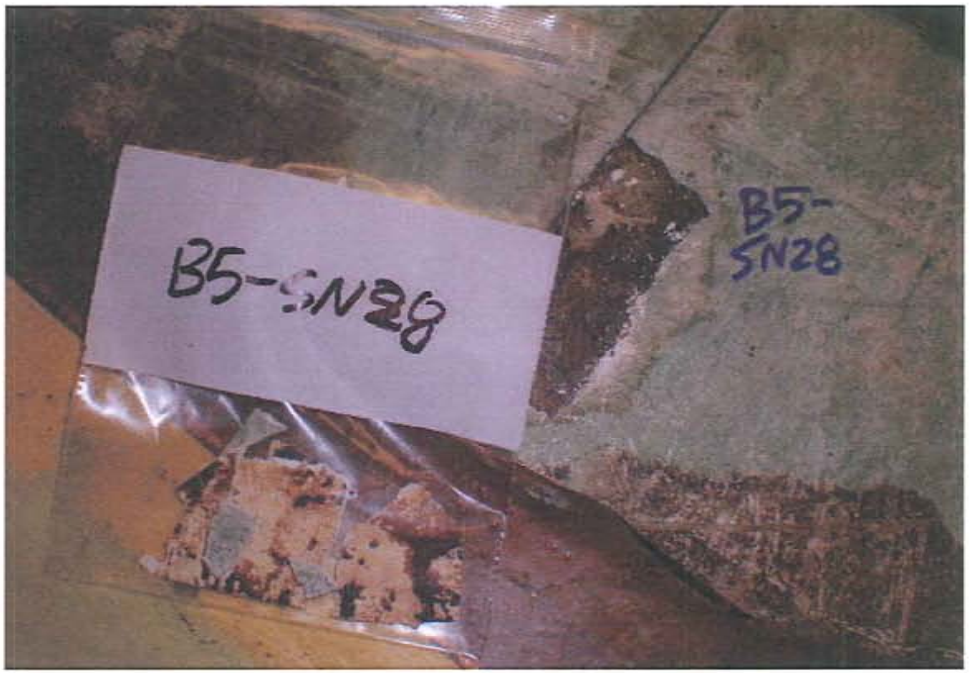
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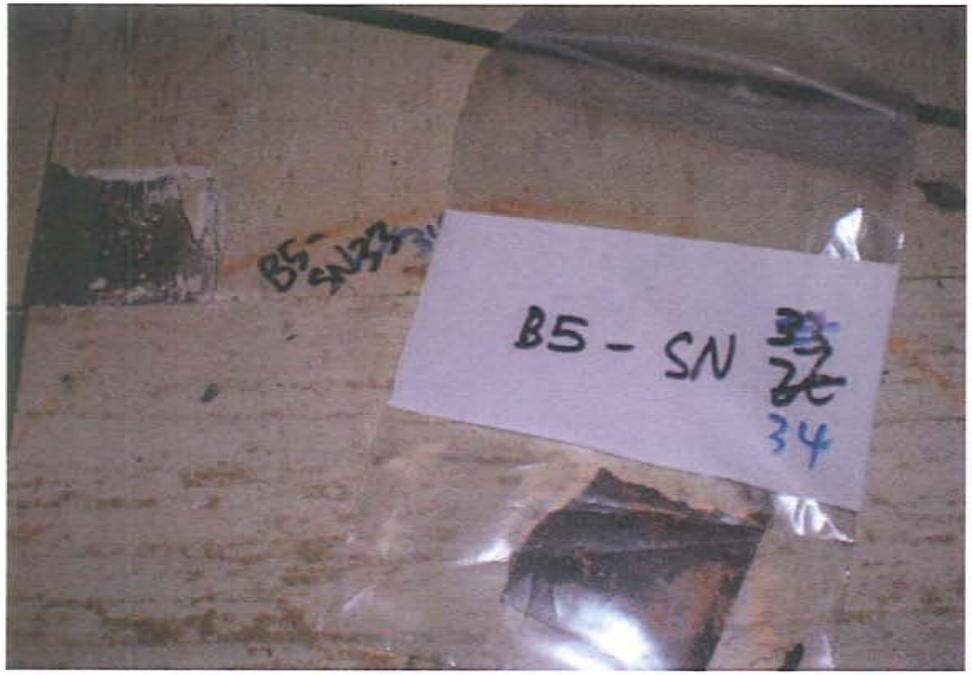
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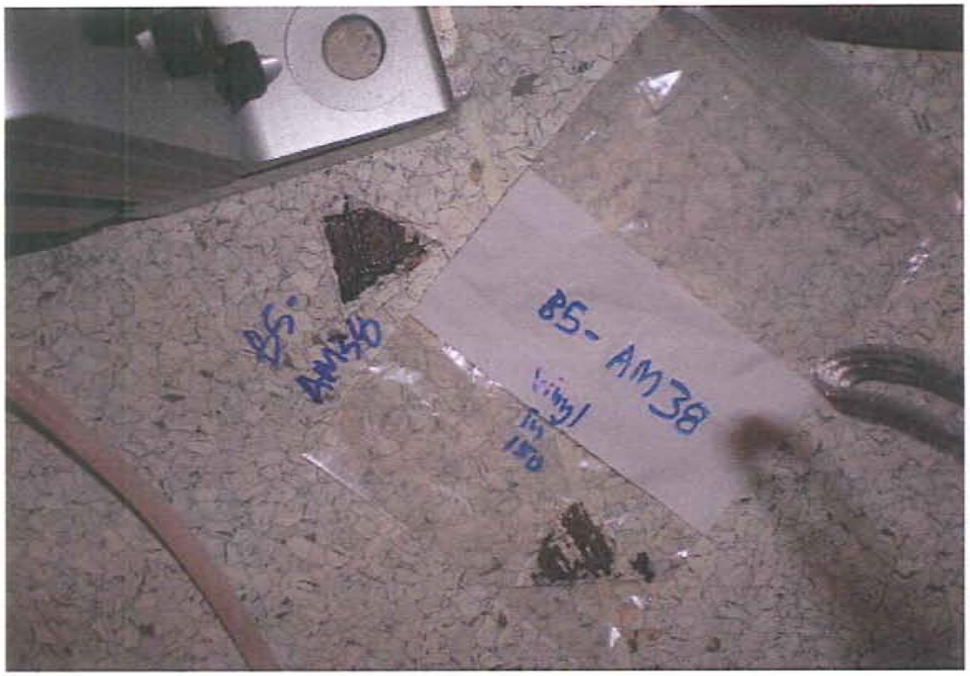
B5-SN28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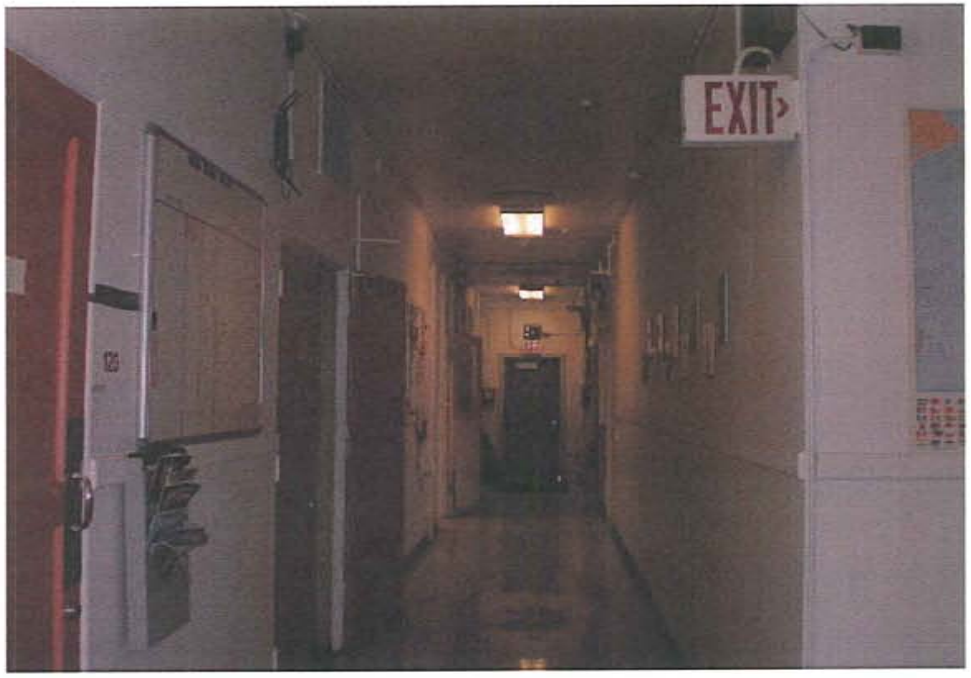
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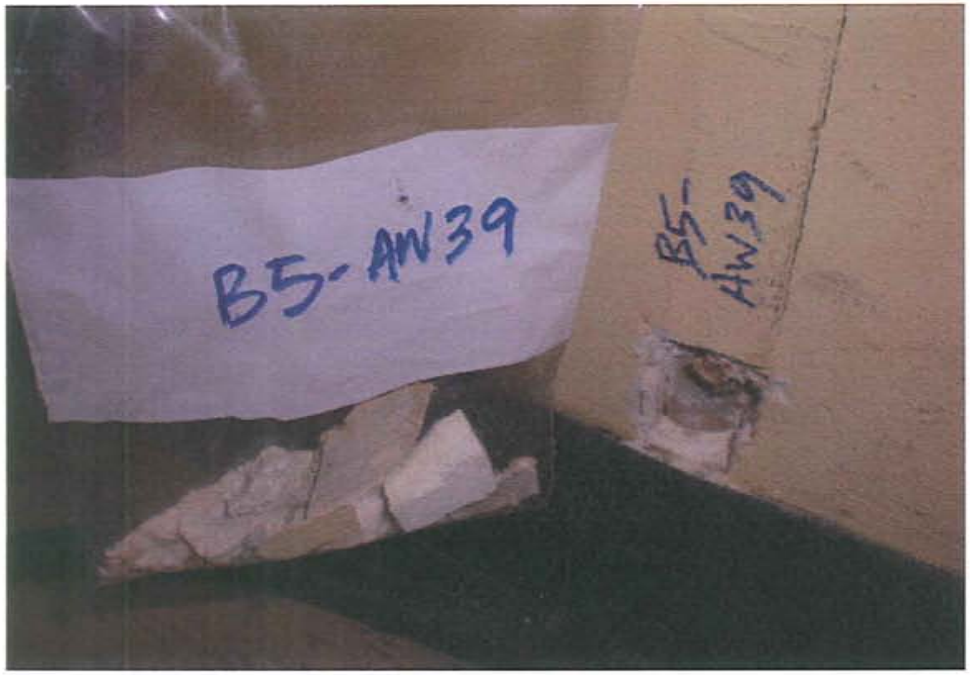
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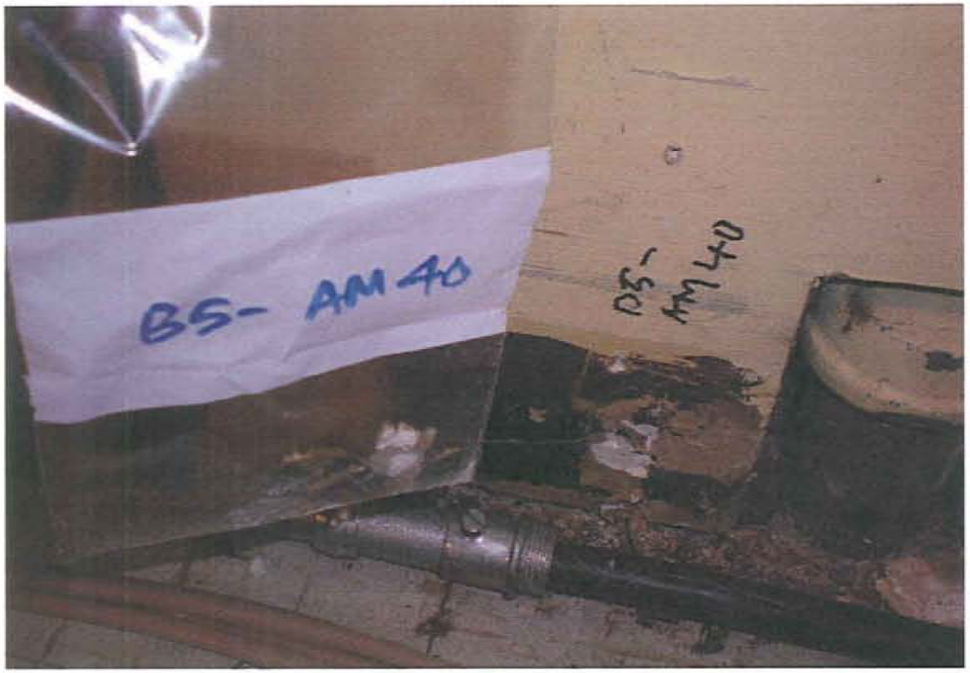
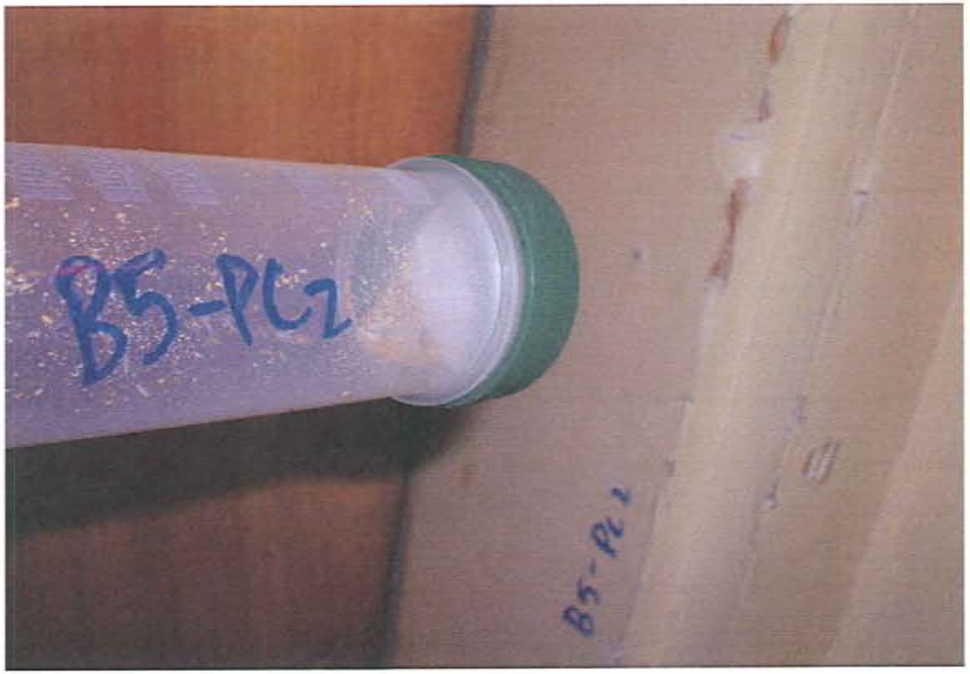

BS- AM 40
BS-
AM 40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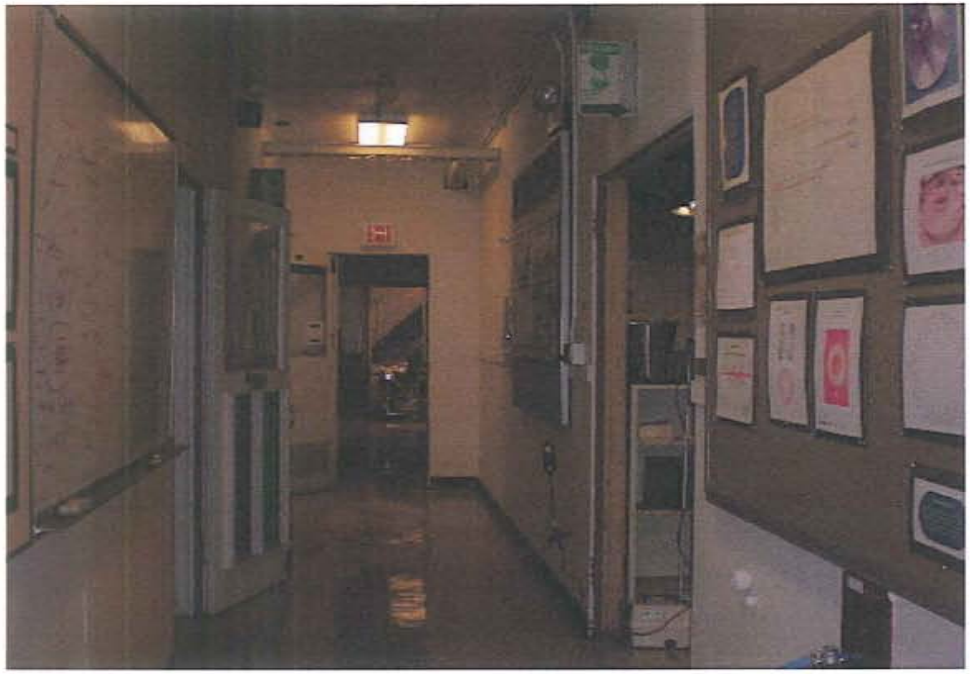
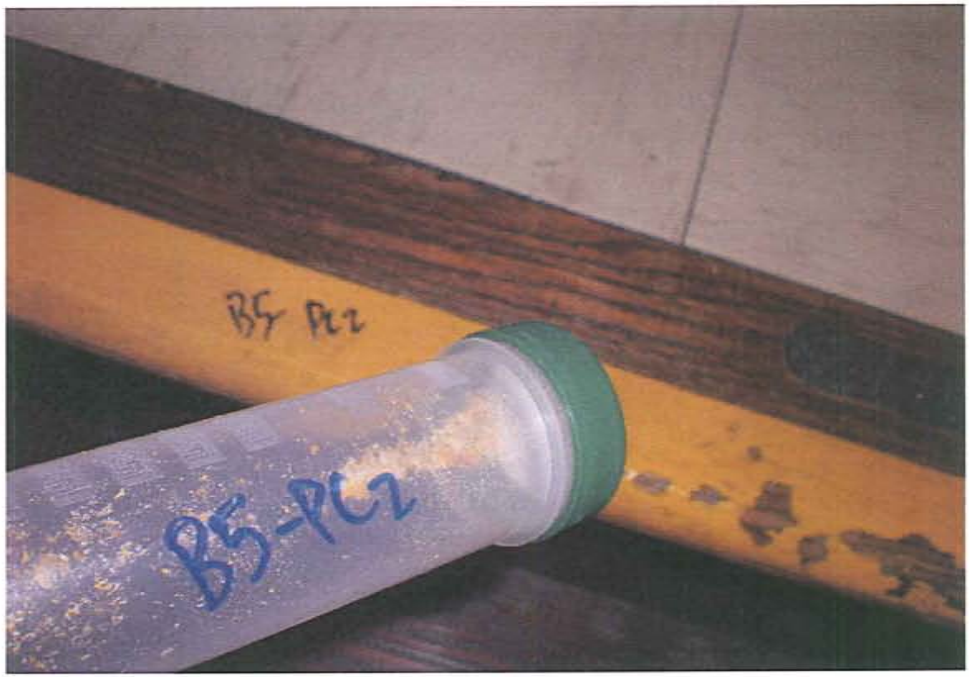
BS-PC2

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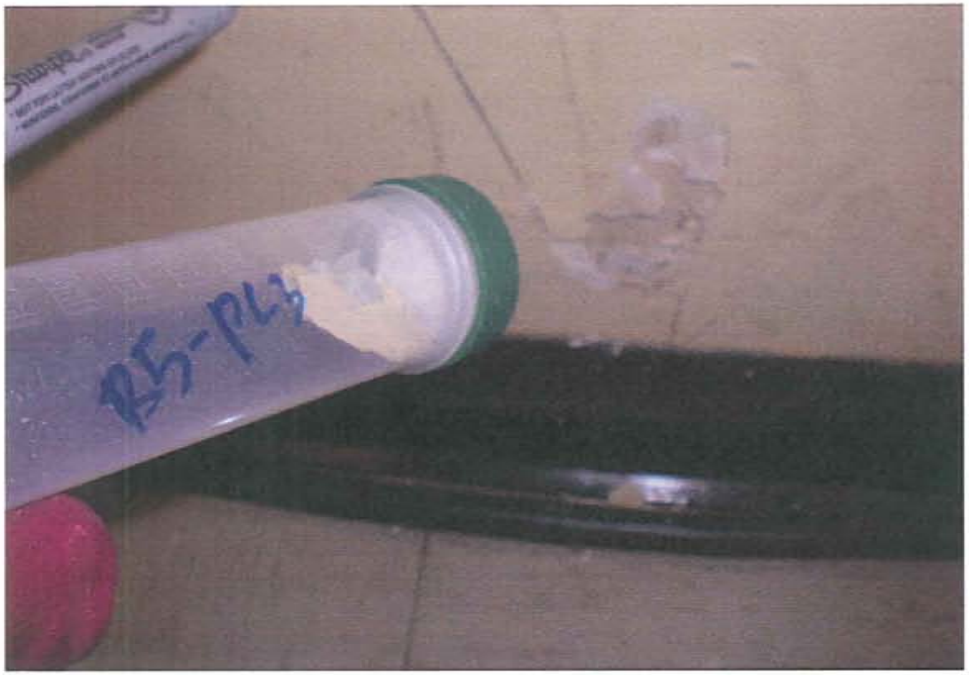
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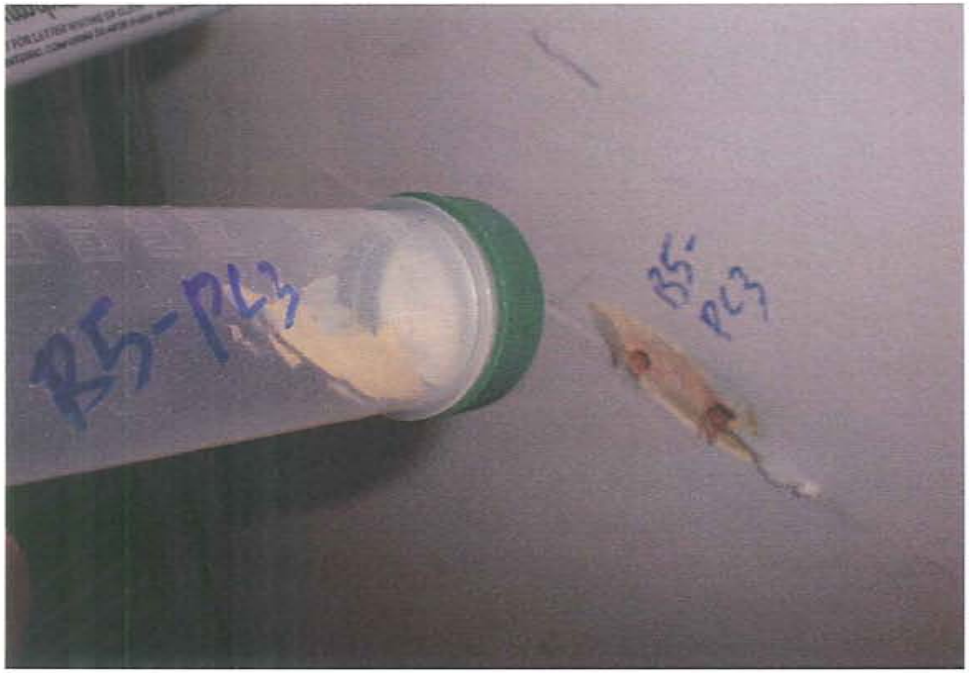
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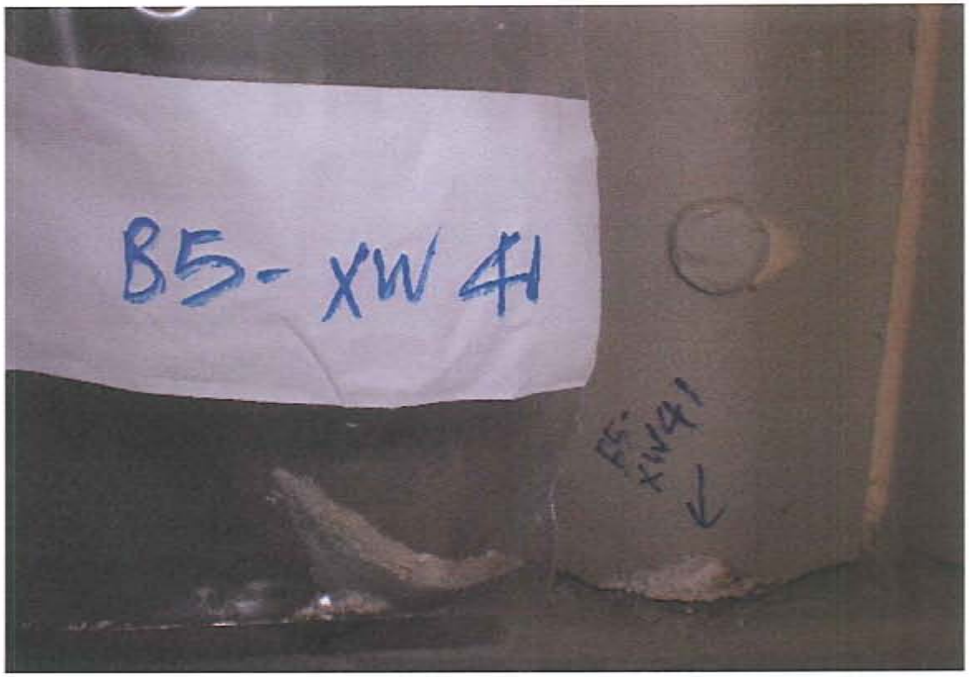
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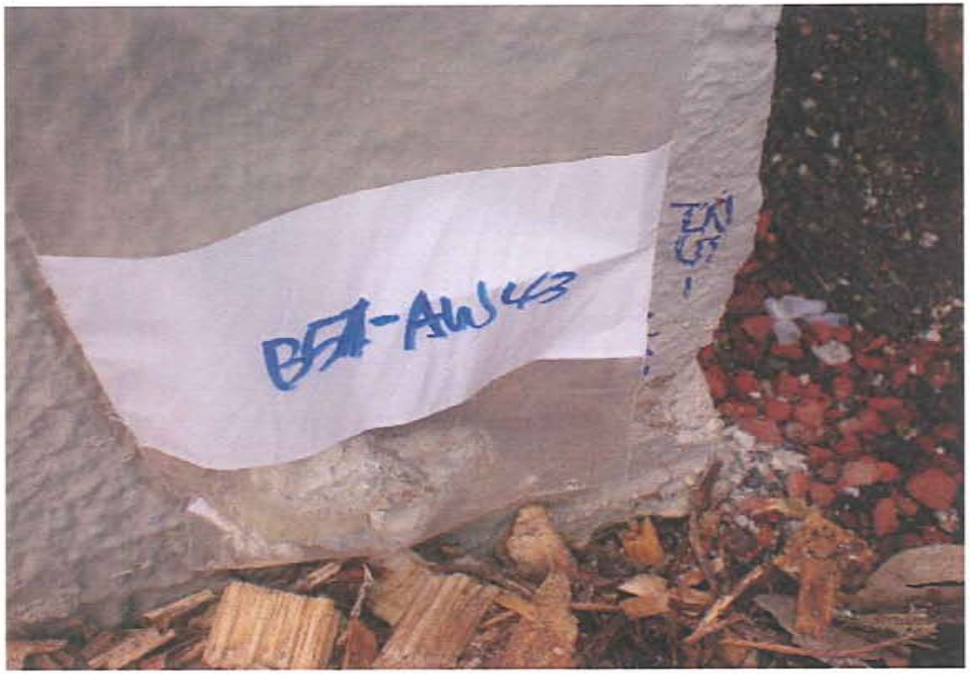
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B5-SN
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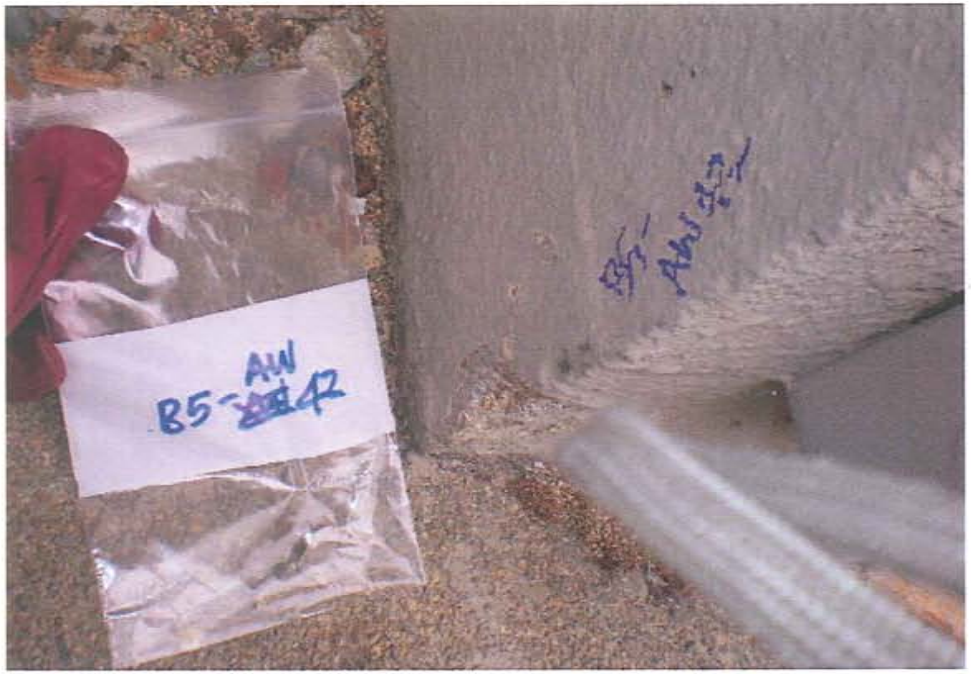
17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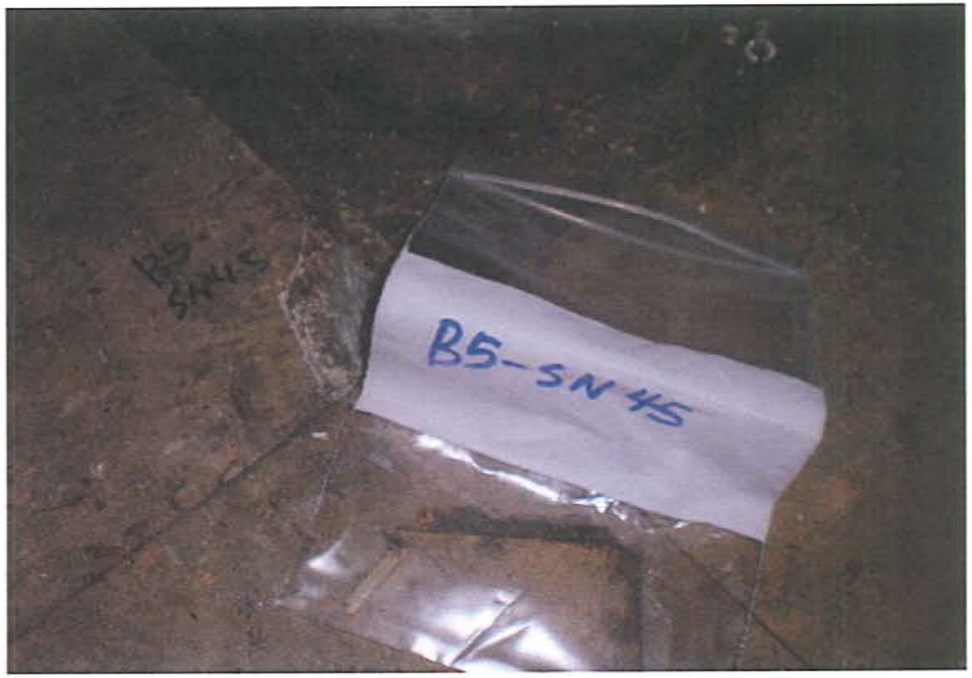
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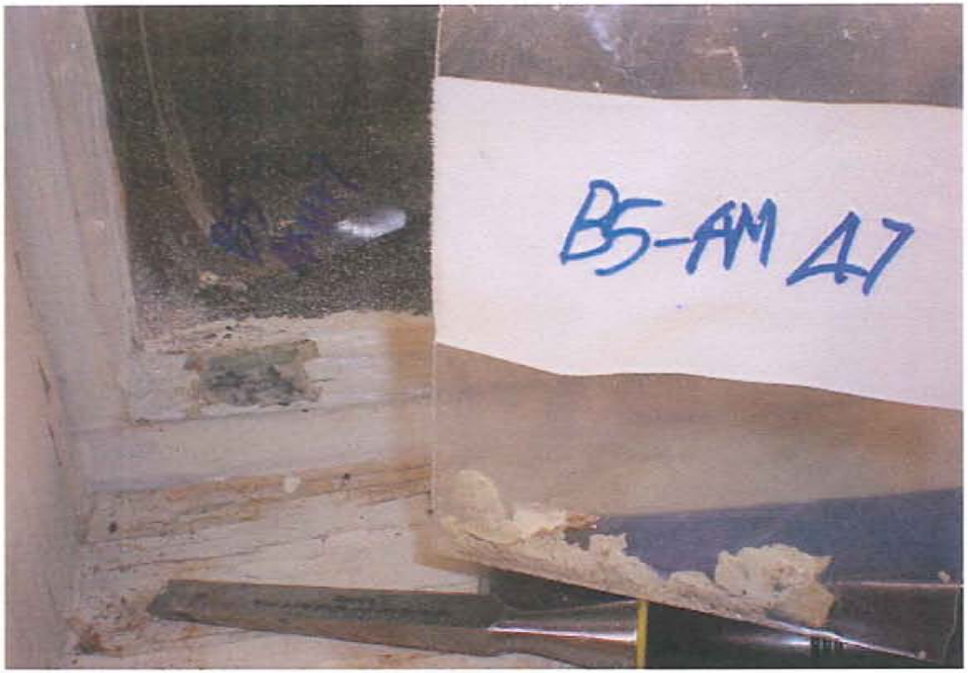
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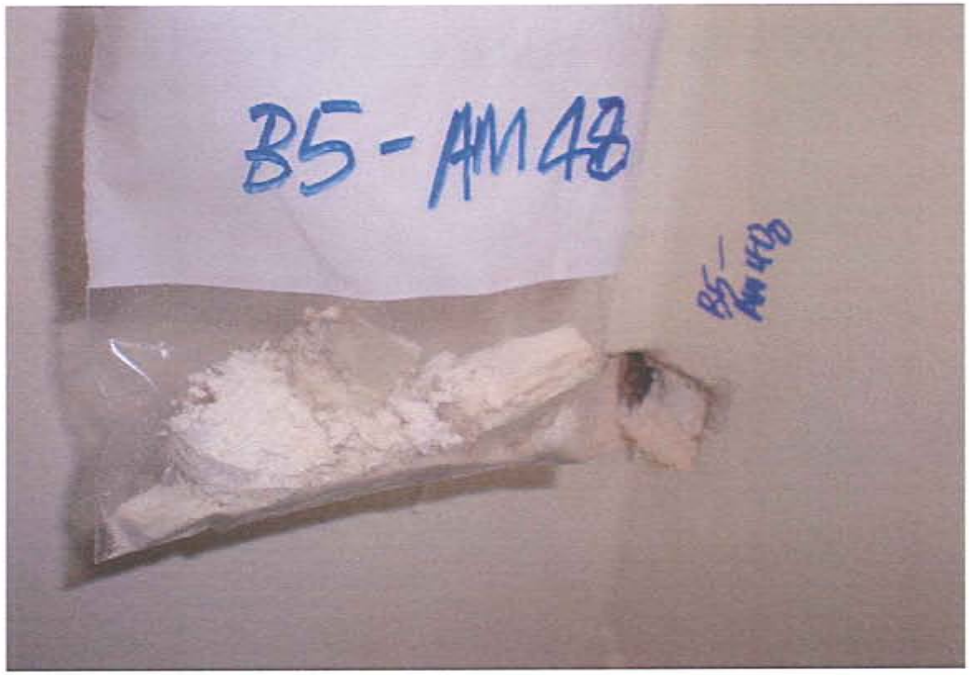
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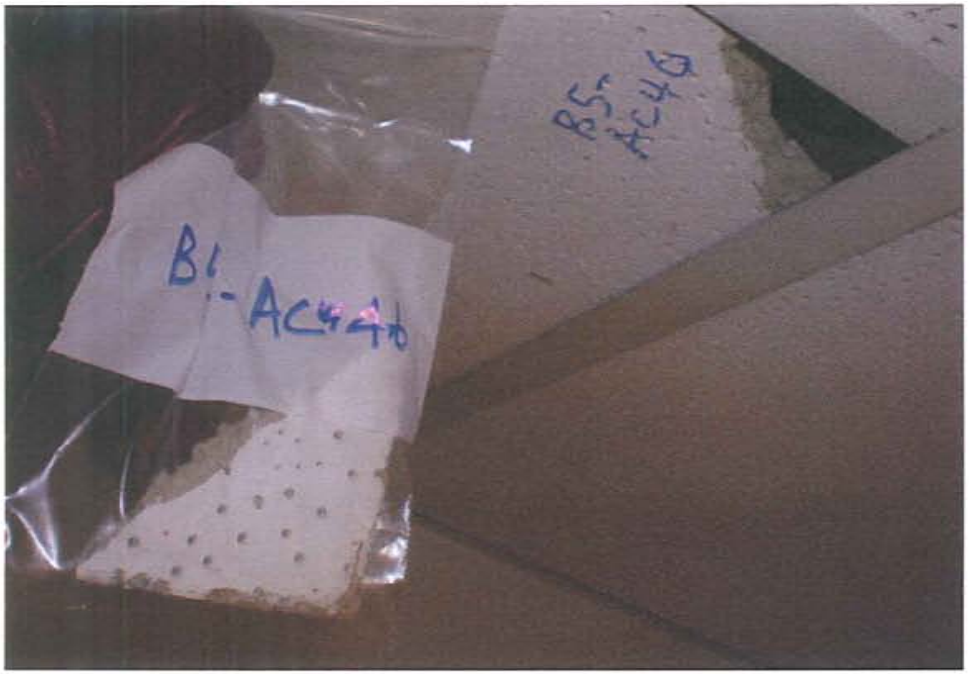
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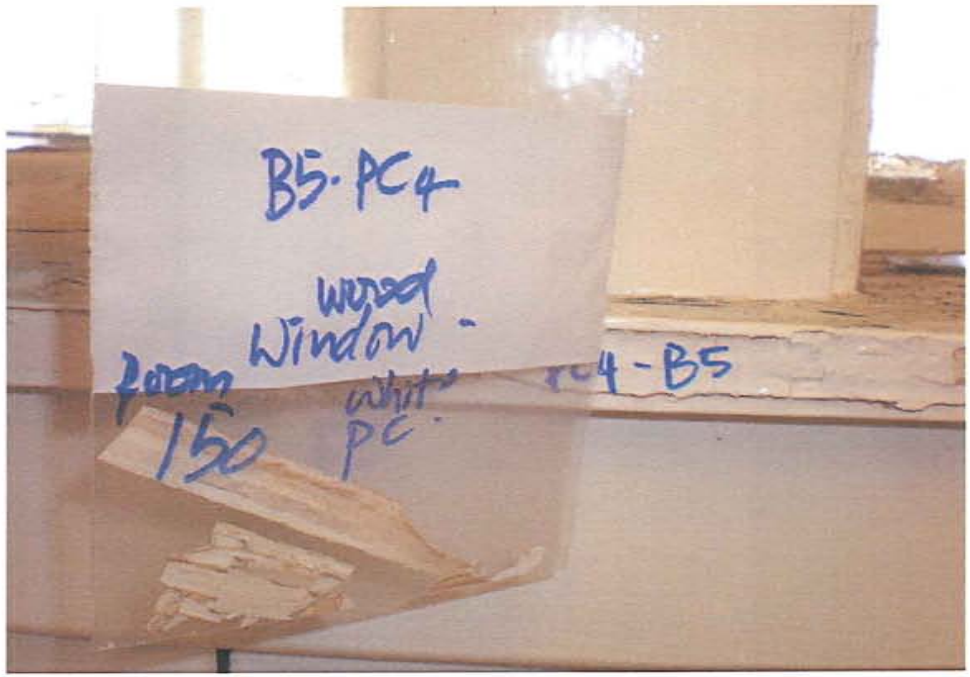
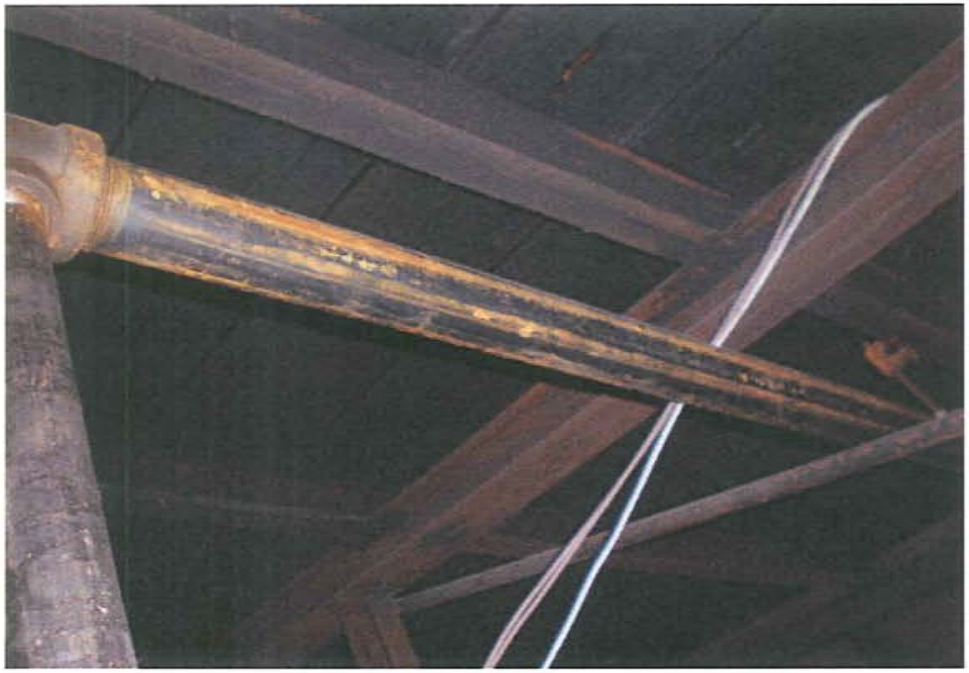
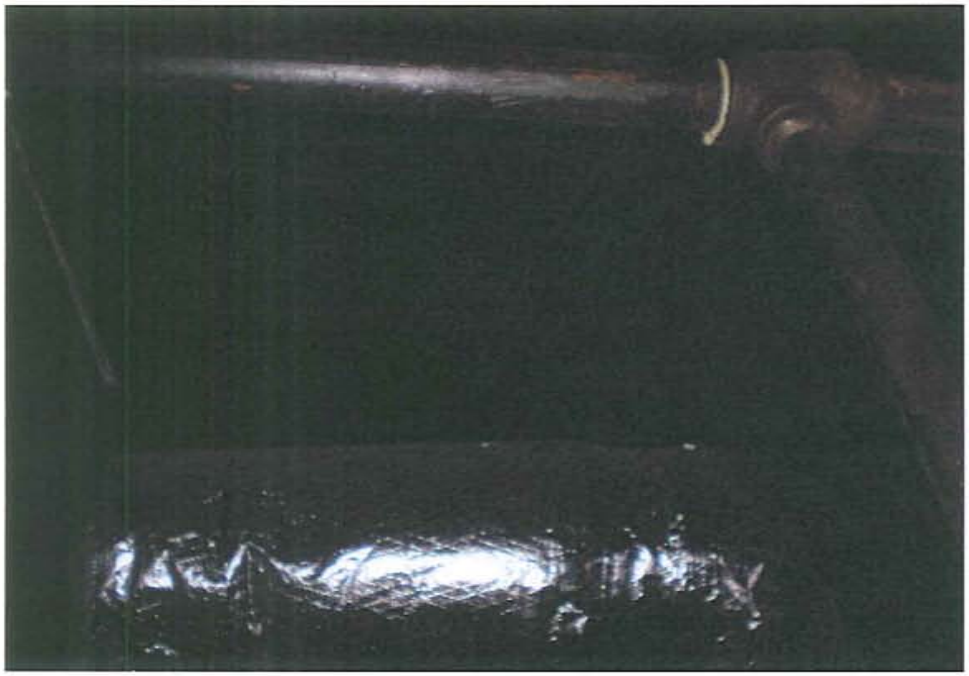

B5. PC4
wood
Window -
white
PC
Room
150
PC4 - B5





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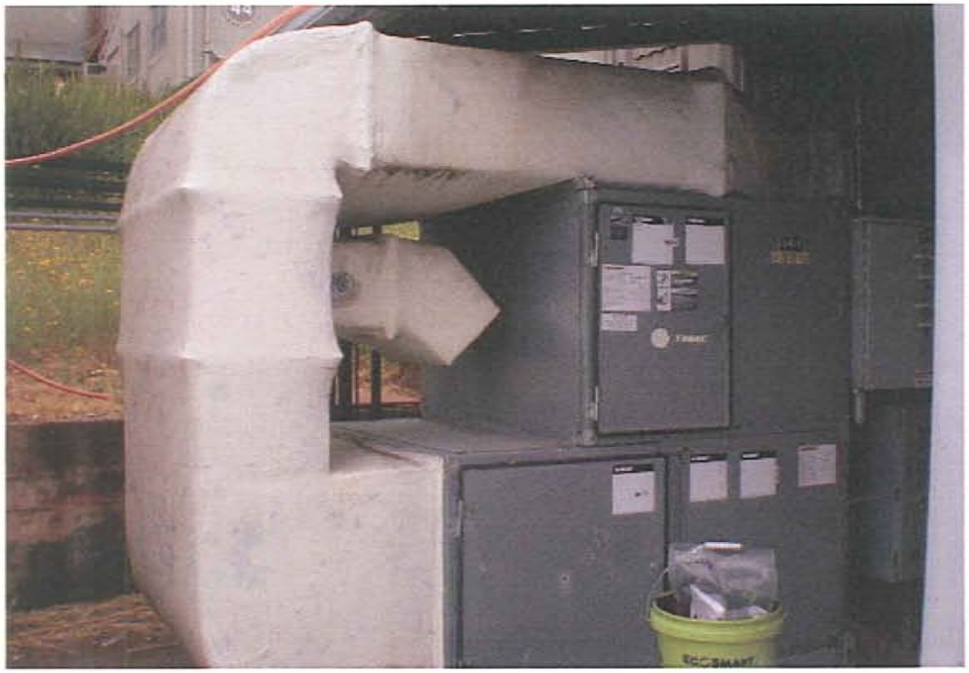

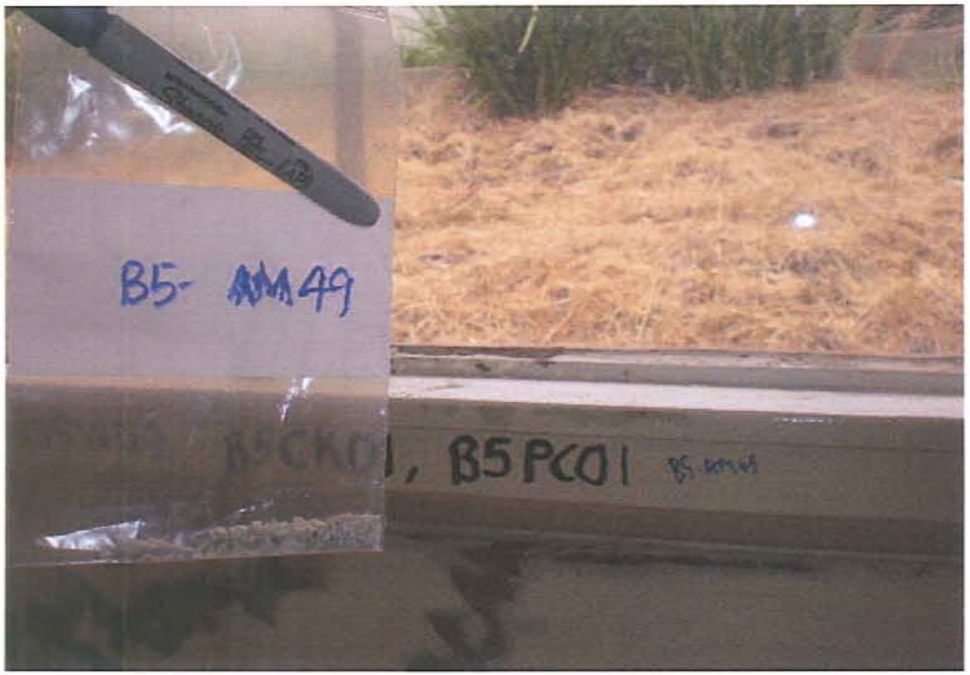
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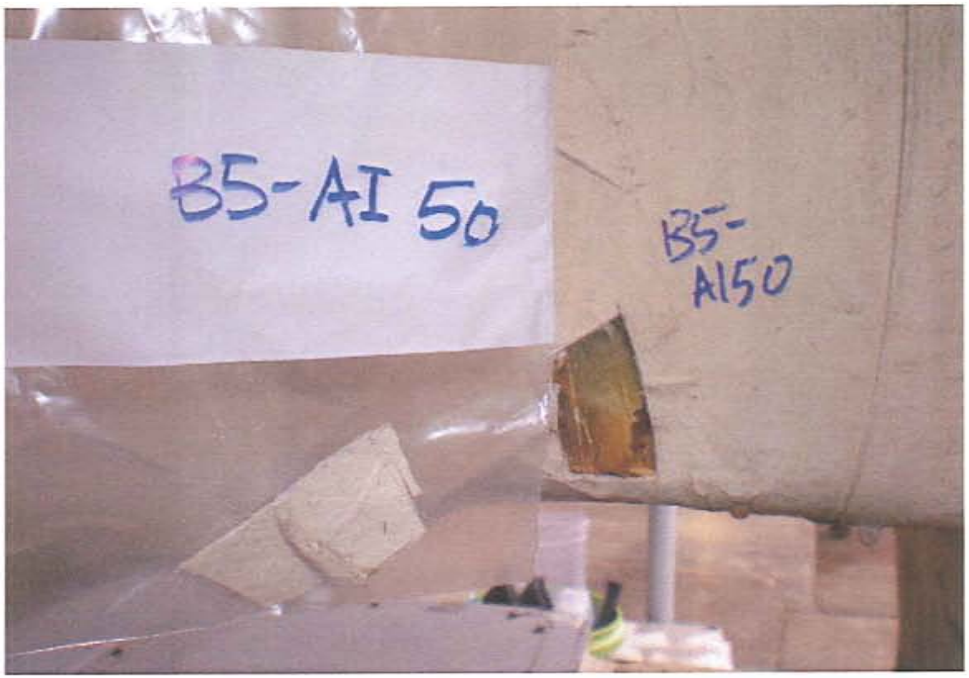
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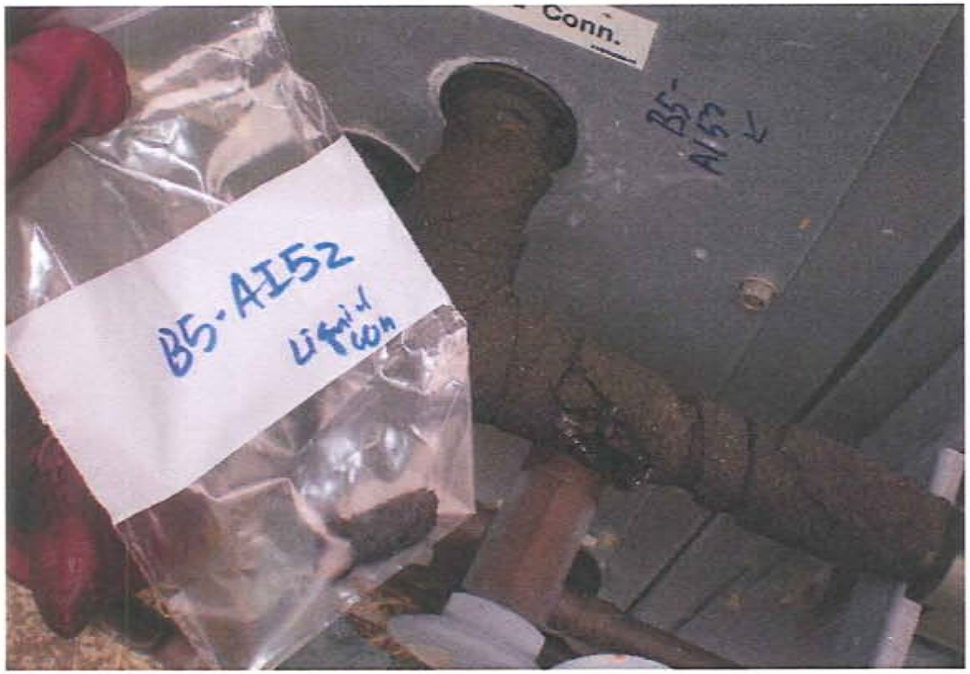
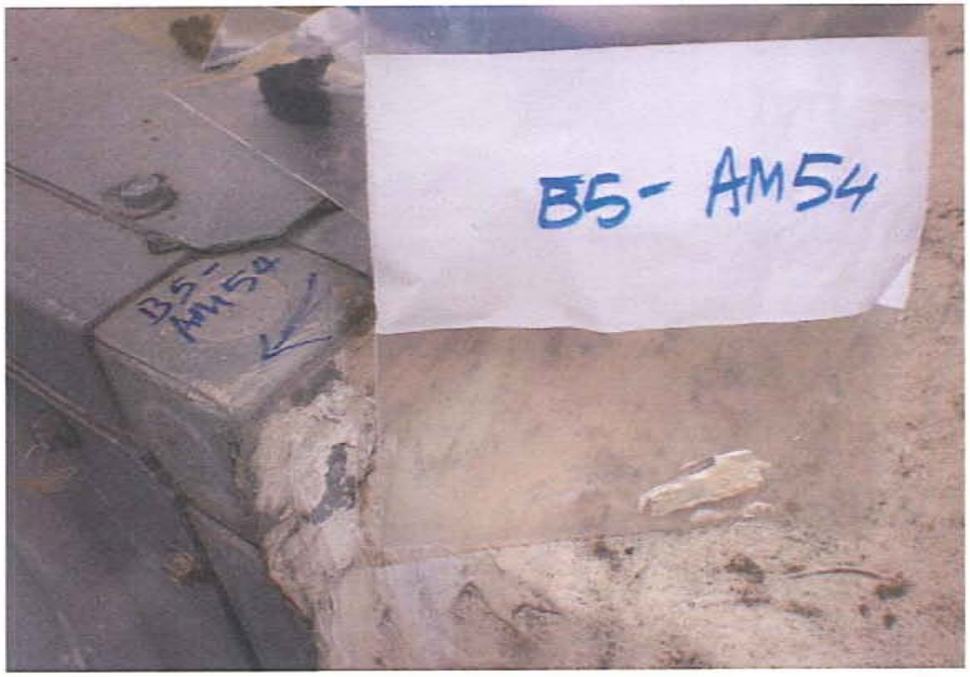
B5-
AI50


Conn.
B5-AI52
B5-AI5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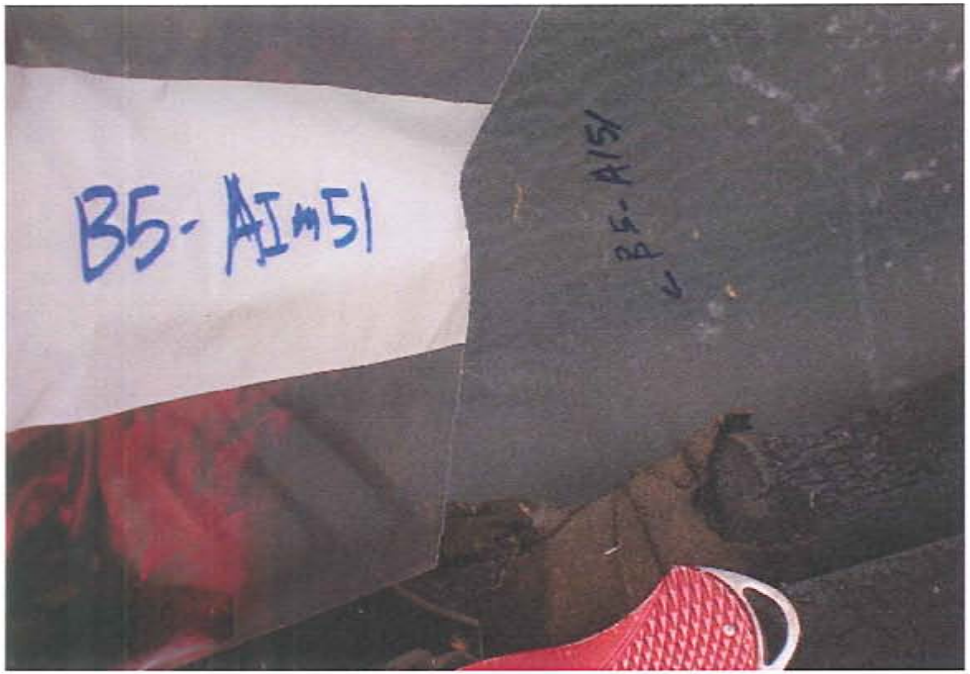
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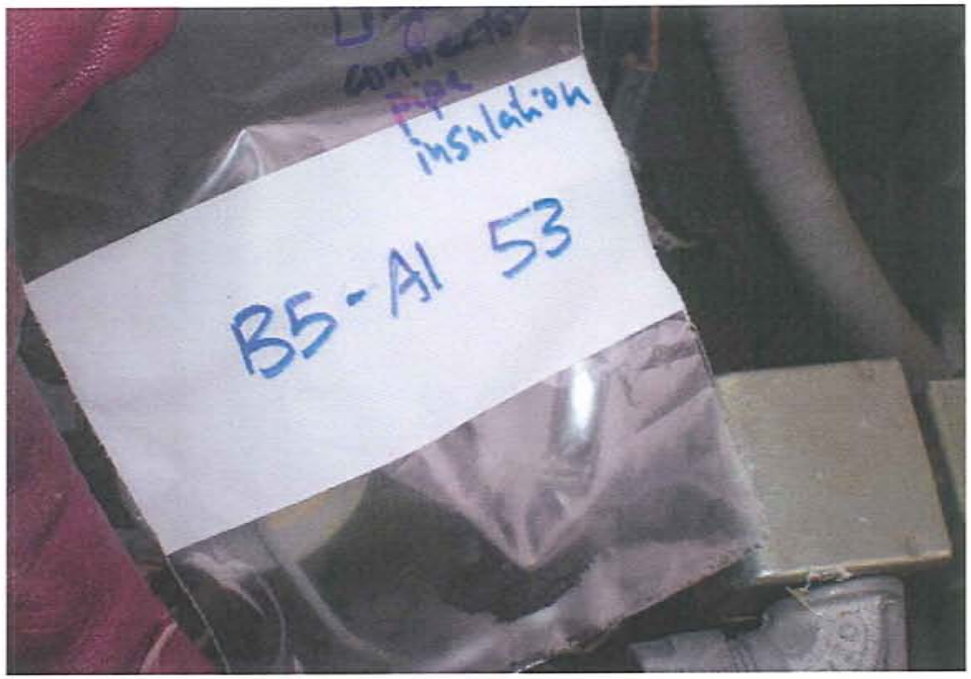
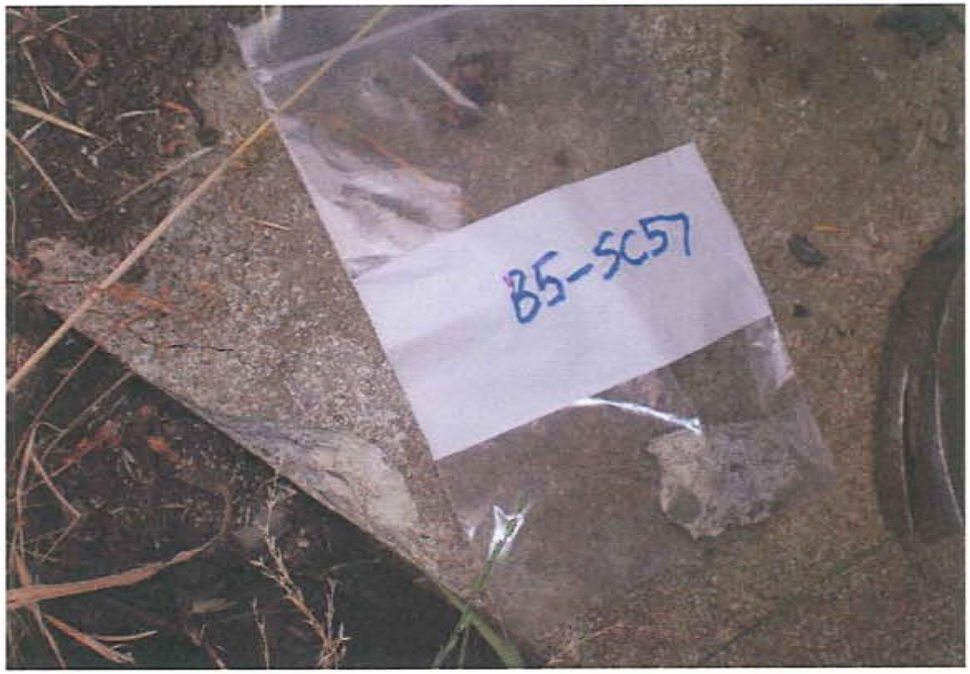

insulation
B5- AI 53

B5-AM55
Concrete wall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B5-AM56
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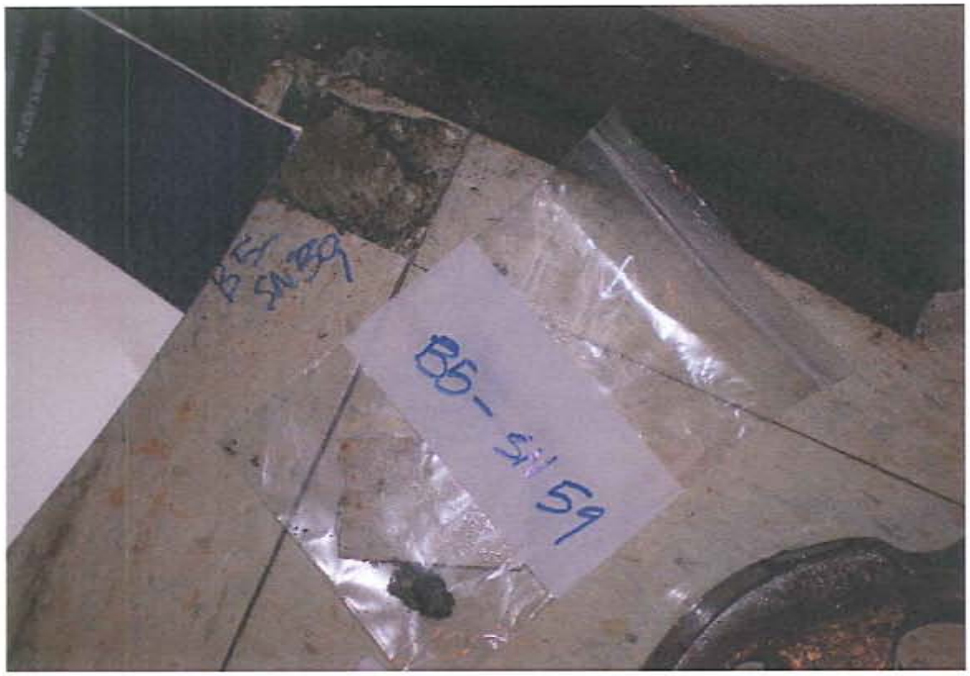
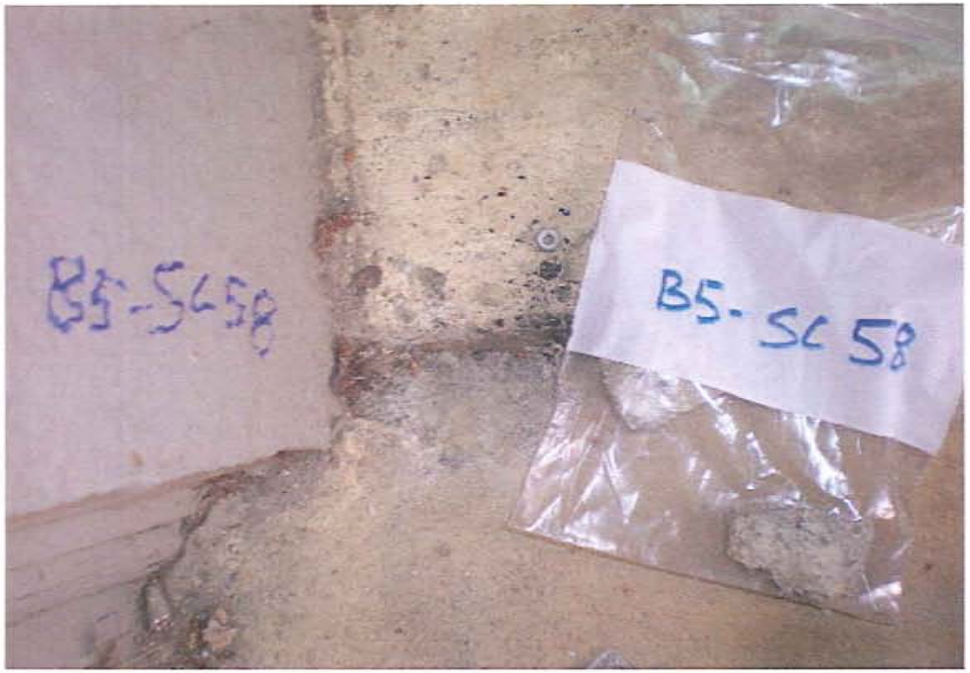

B5- SN 59

B5- AW60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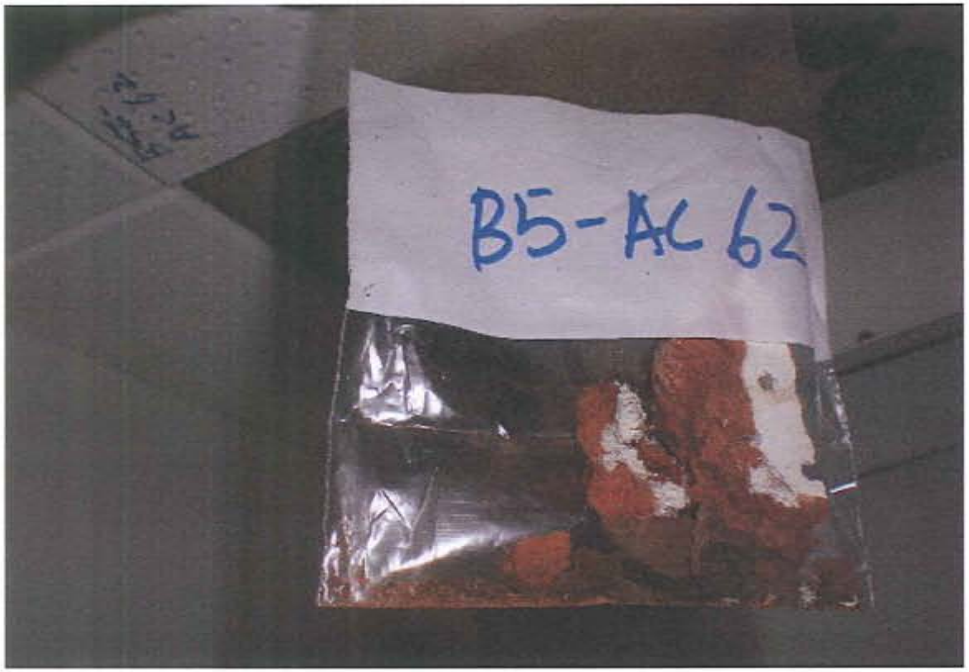
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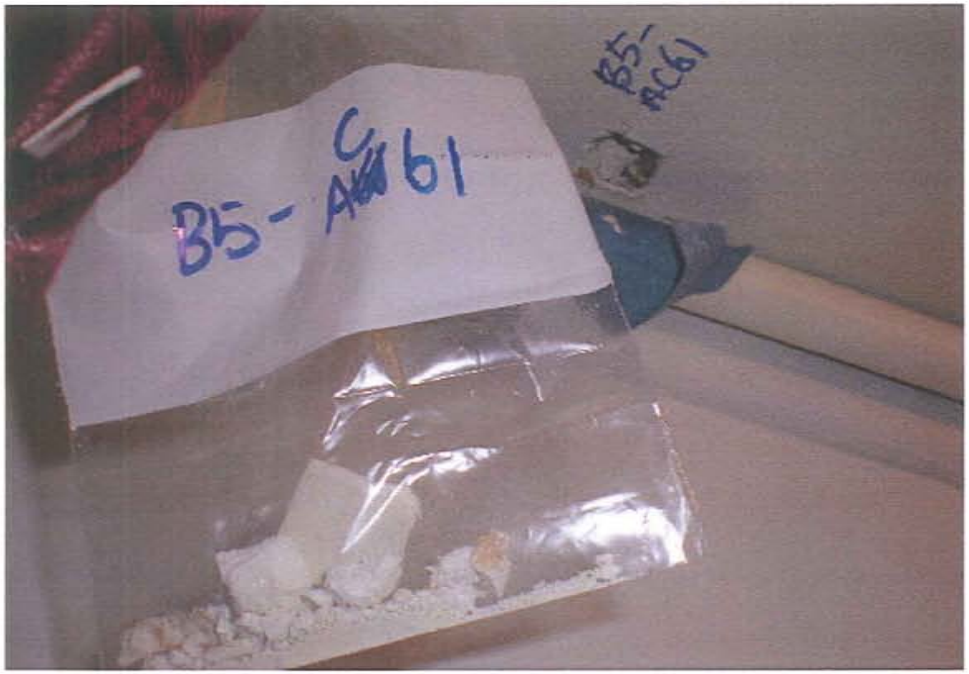
B5-AC 64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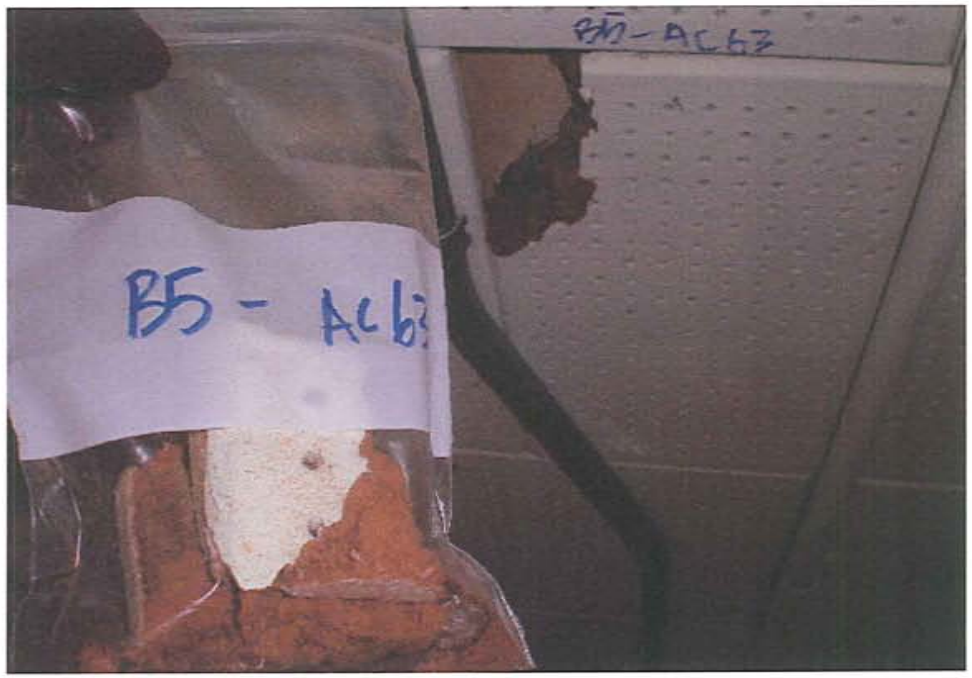
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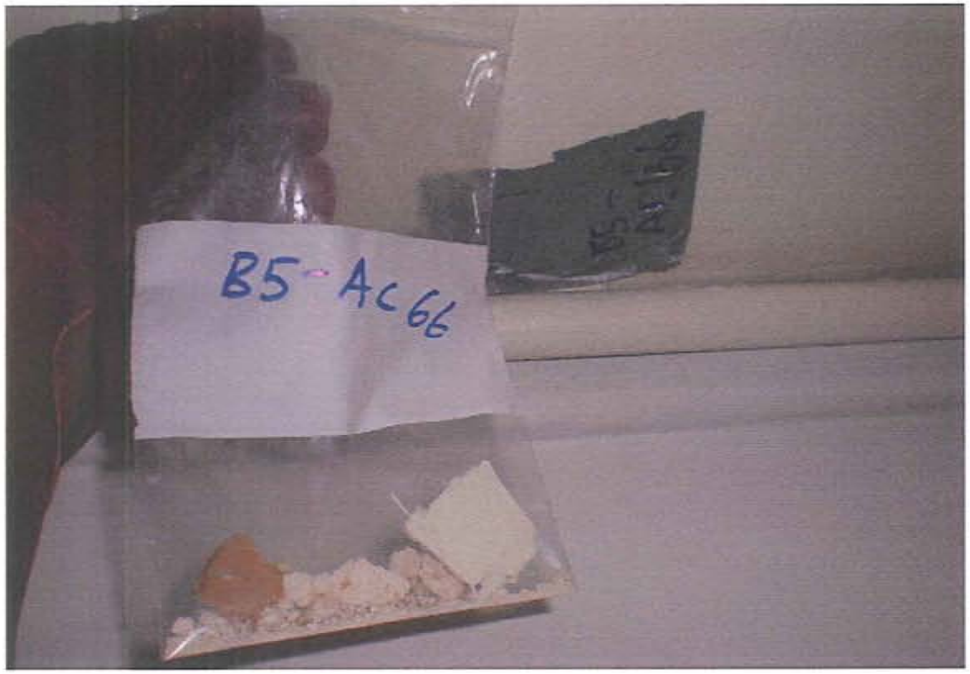
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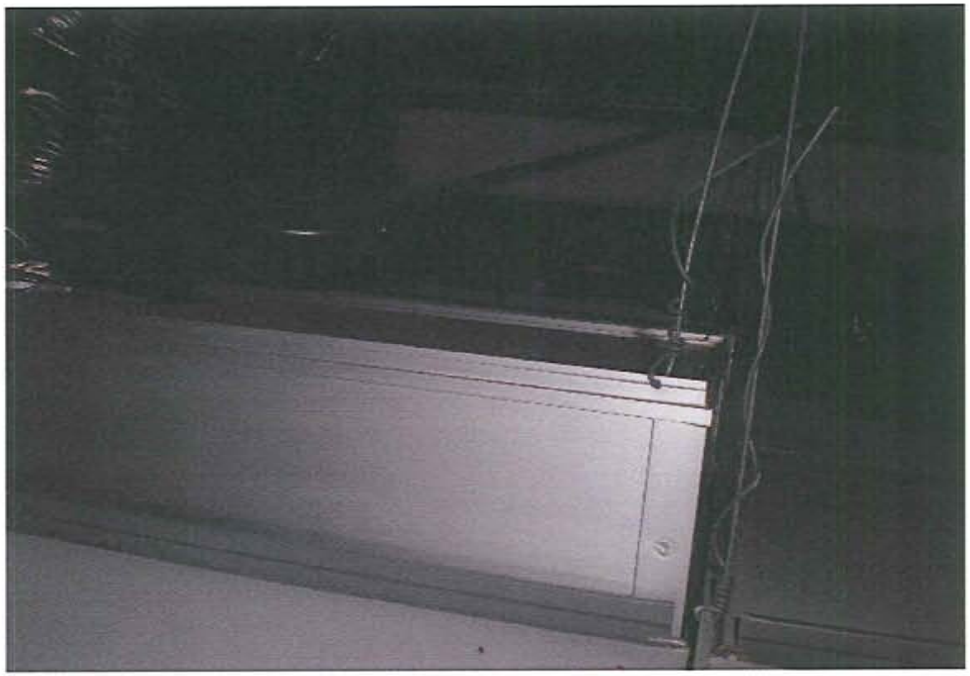

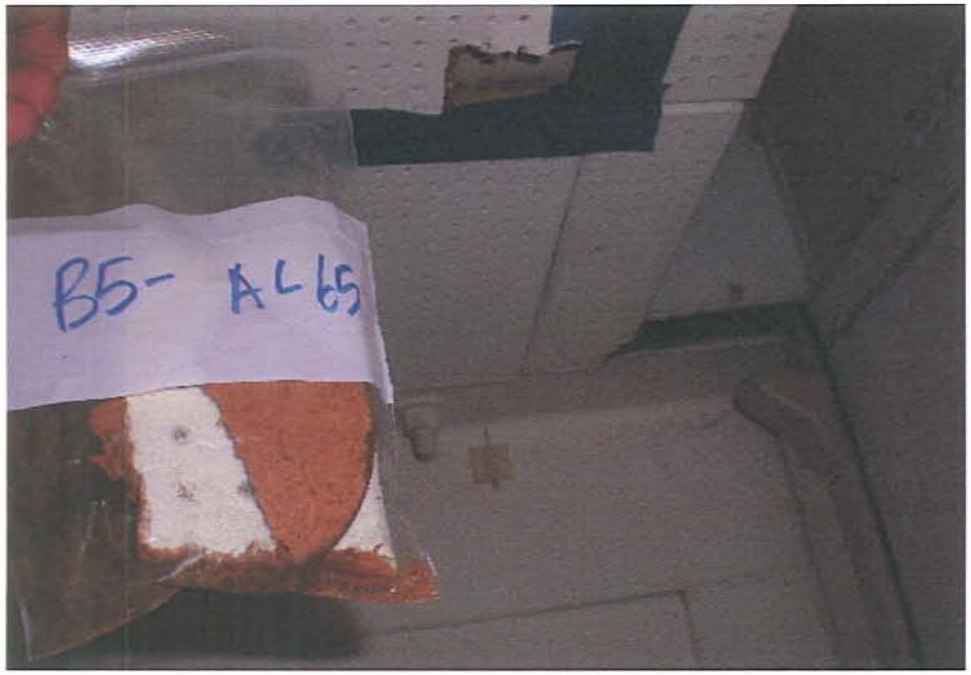
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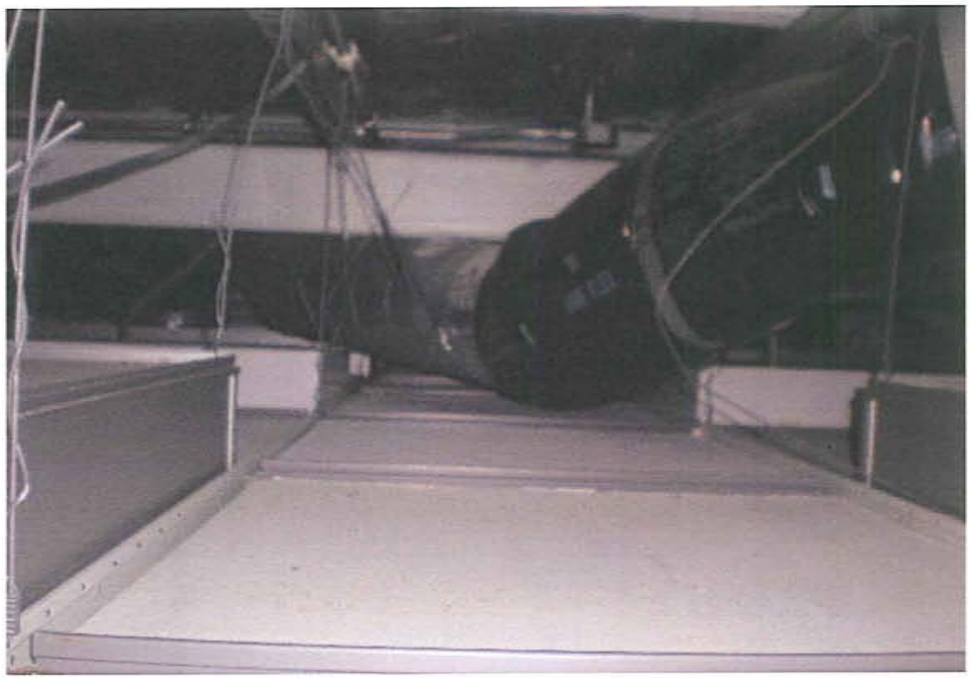

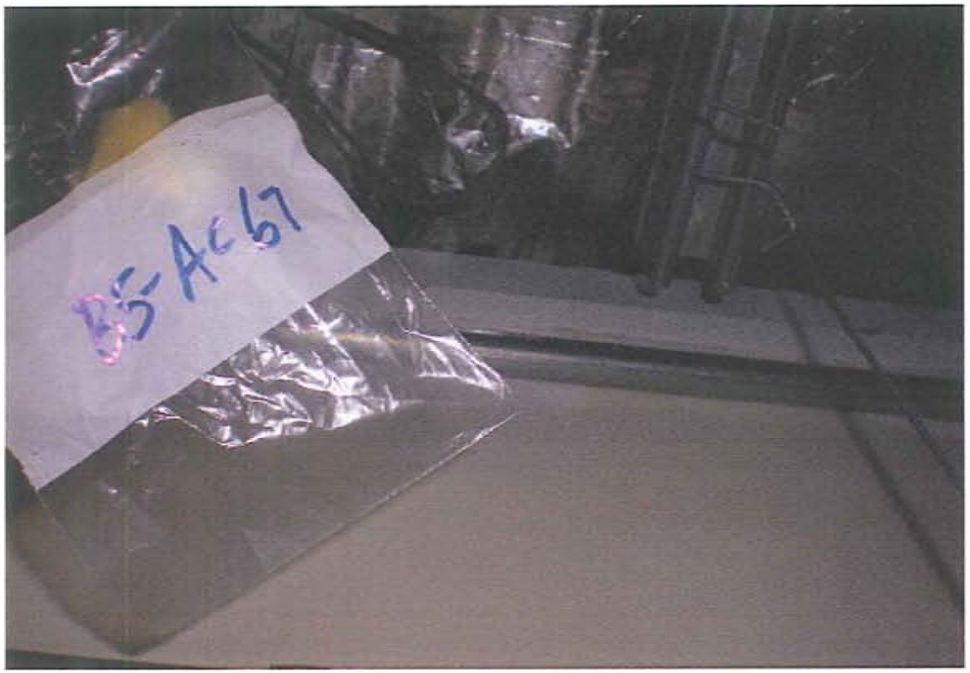
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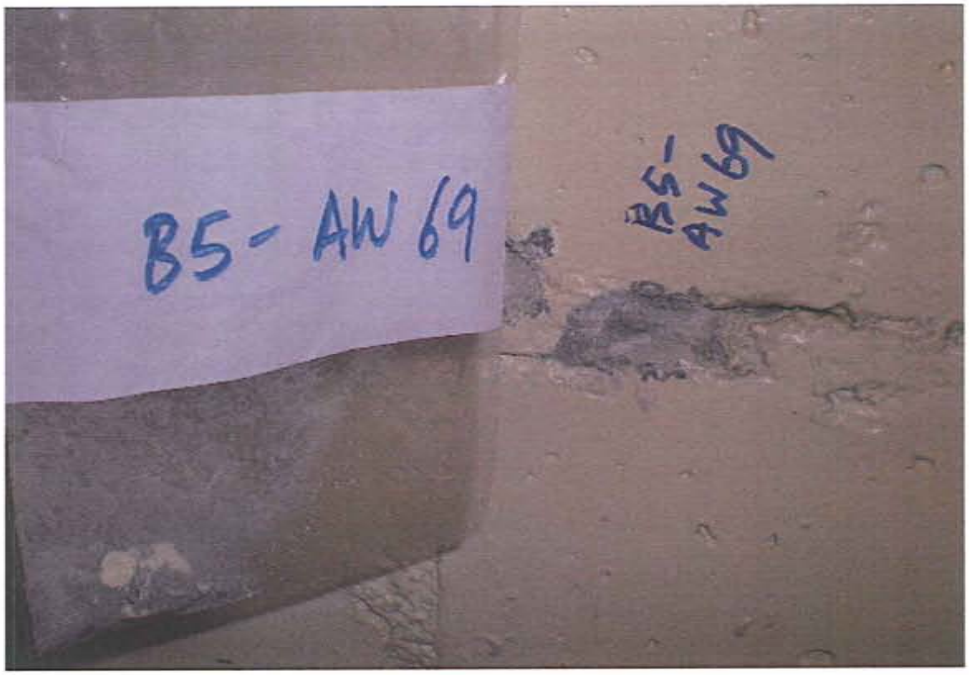
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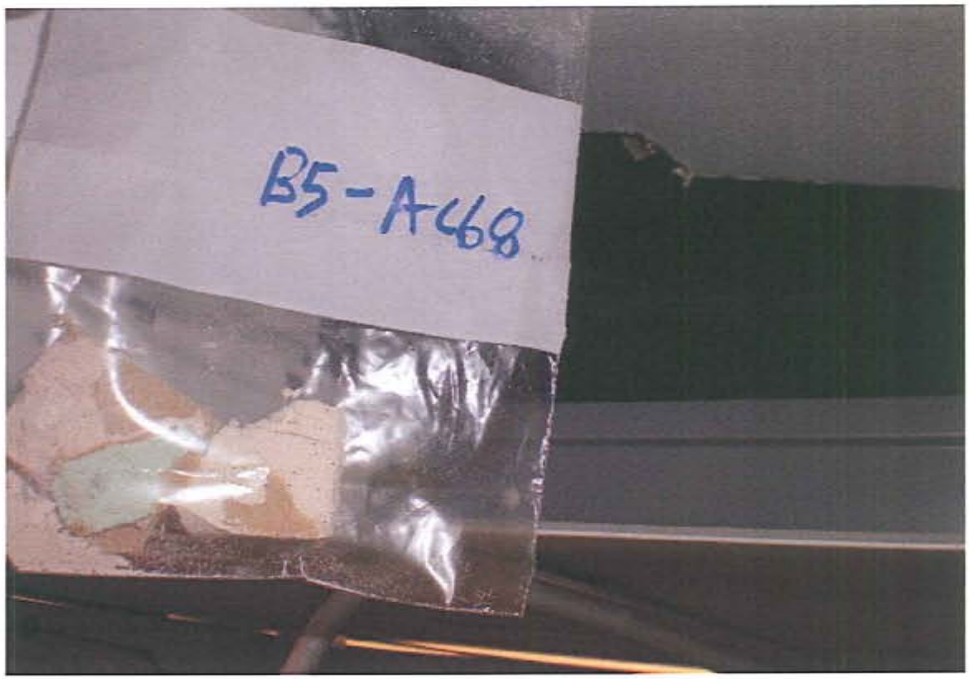
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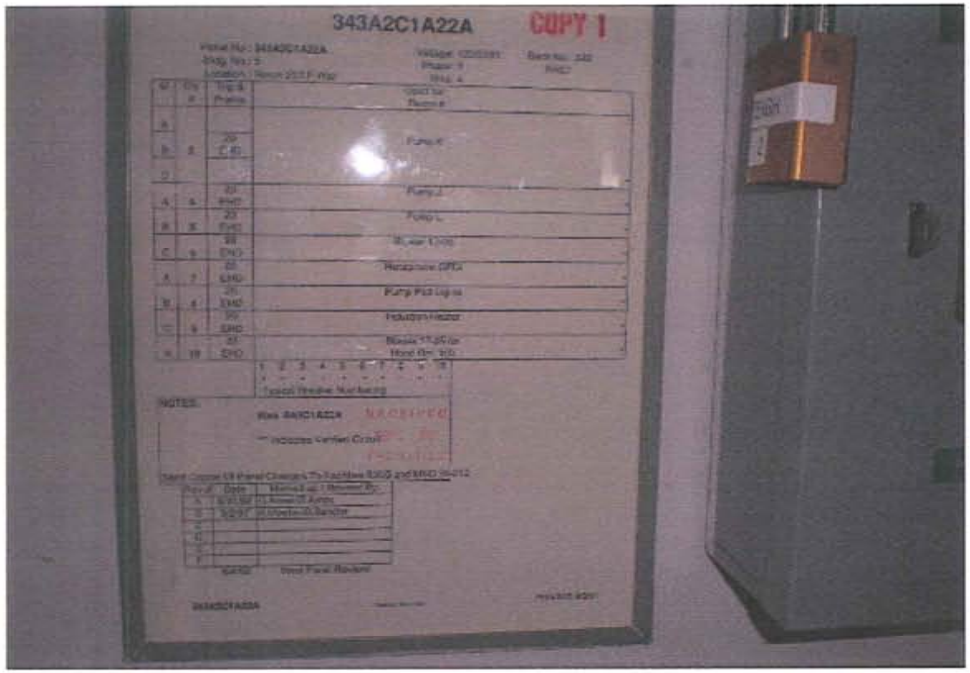
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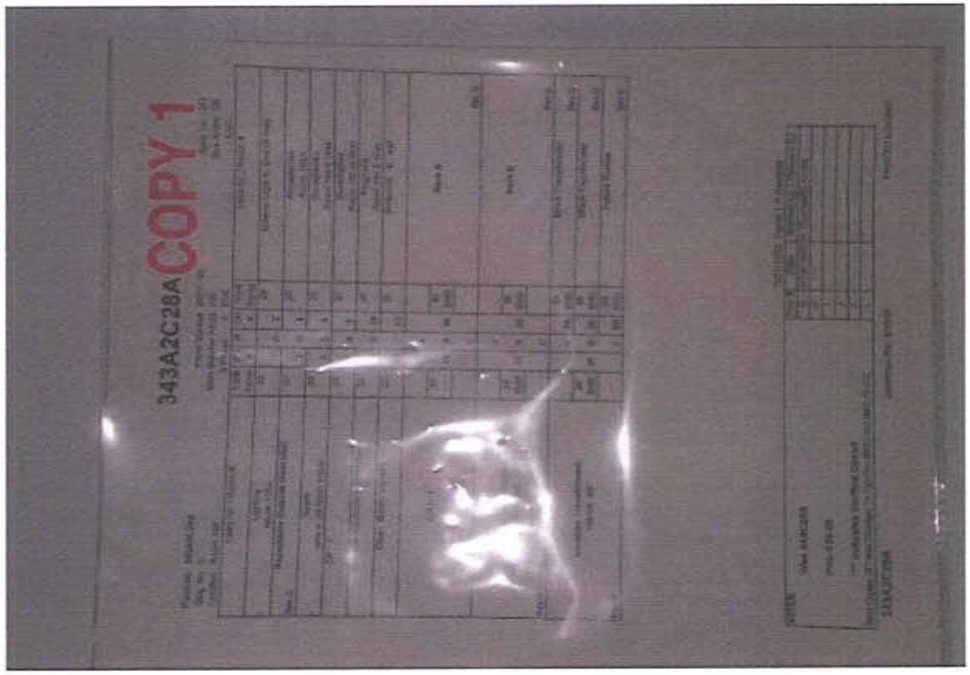
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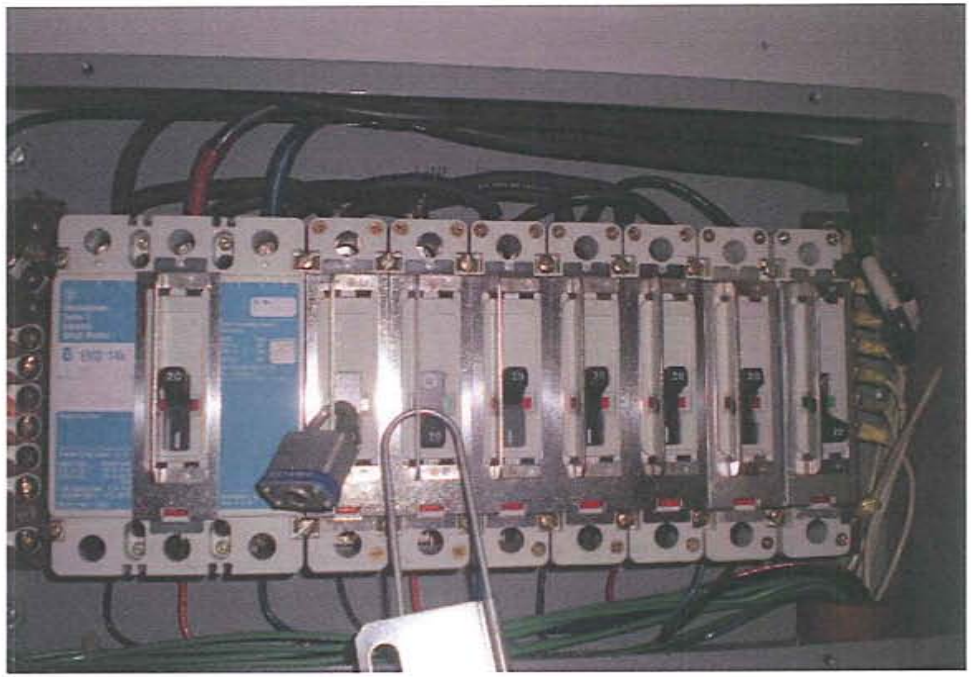
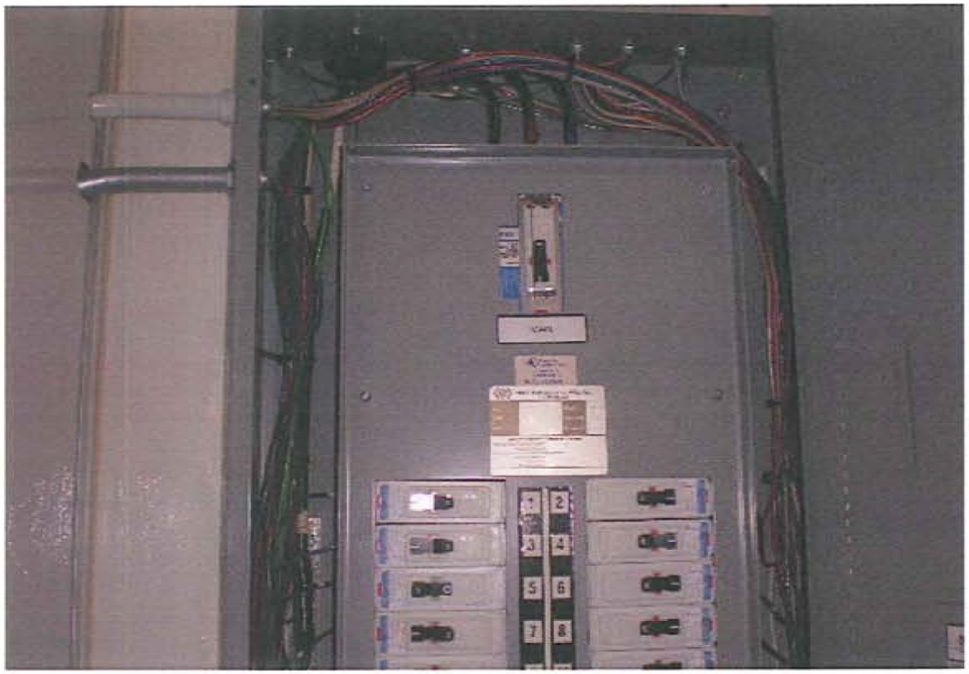
WARNING
NOTICE





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480V 3 PHASE 3 WIRE
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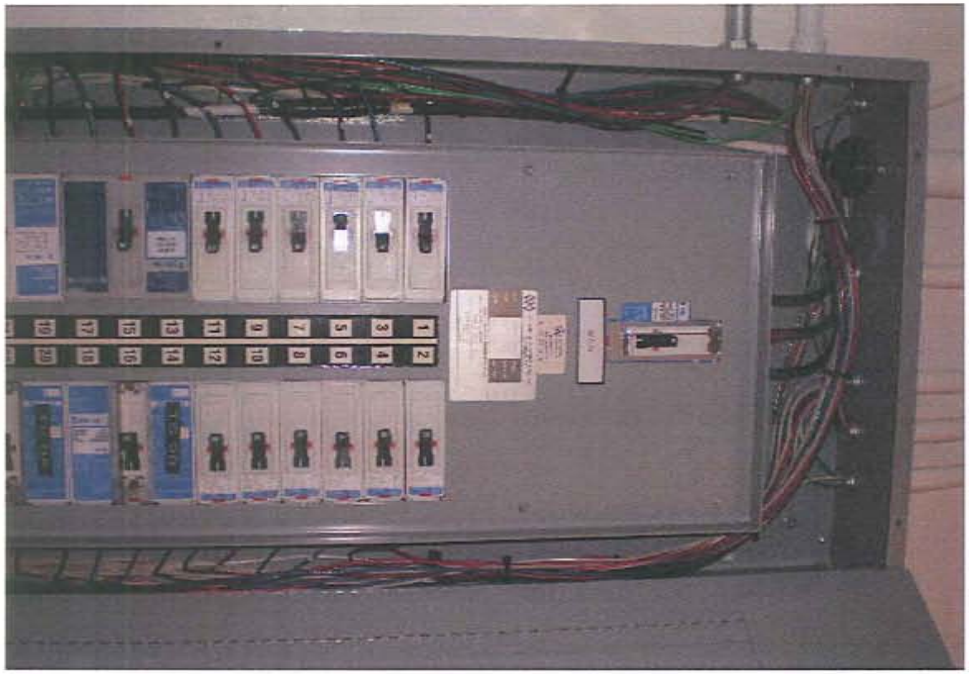
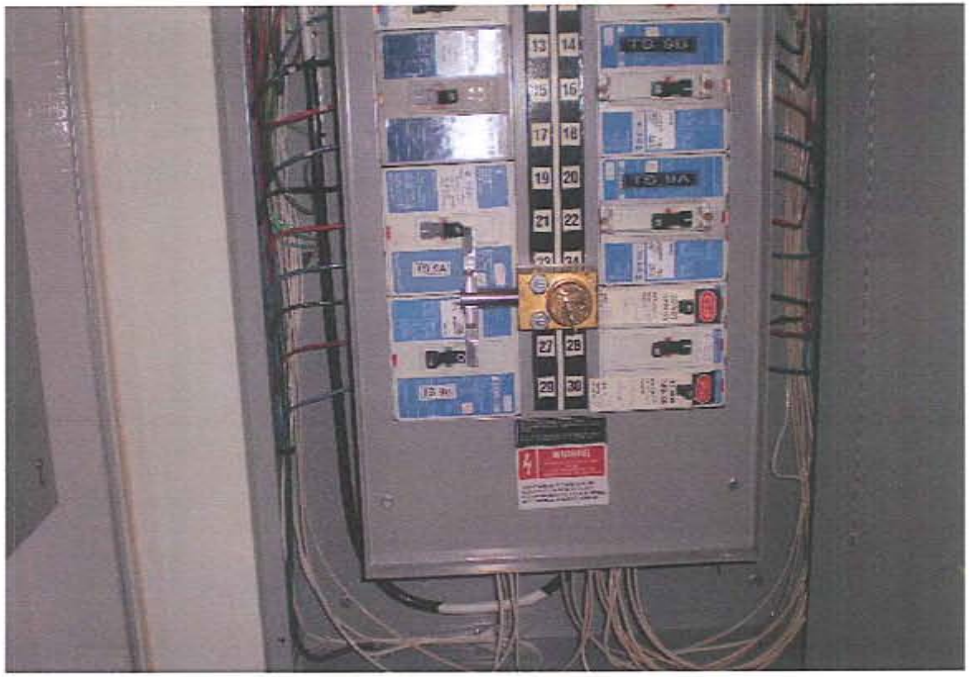
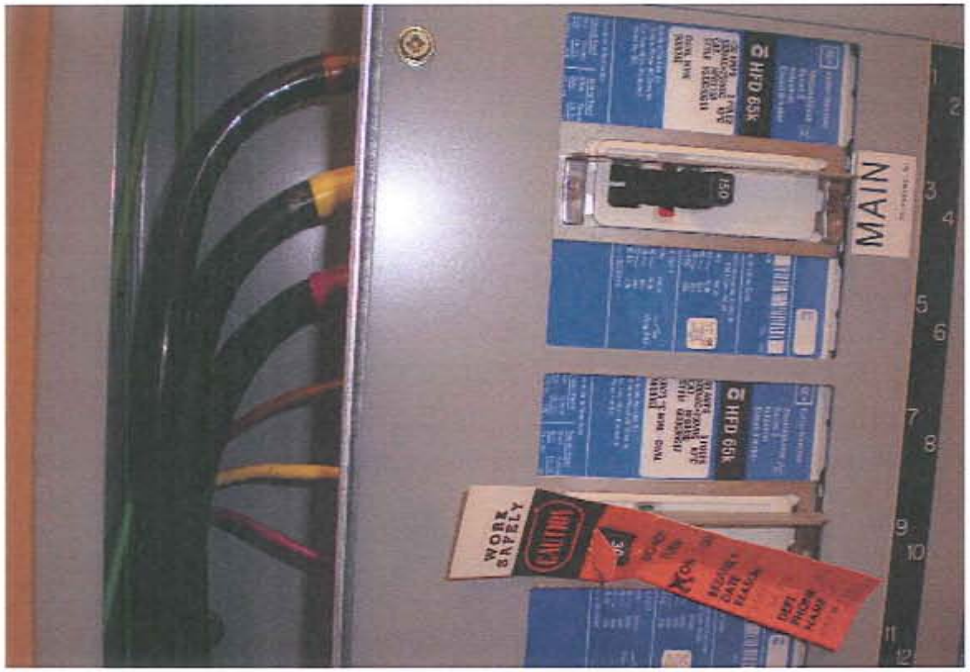
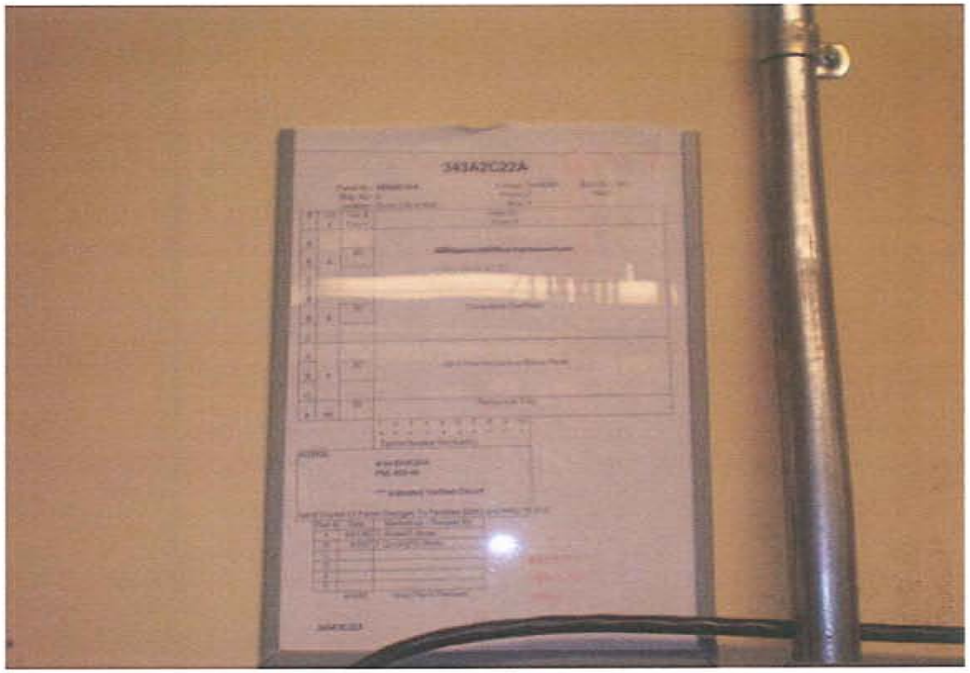





MAIN
HFD 65k
HFD 65k
150
WORK SAFELY
CAUTION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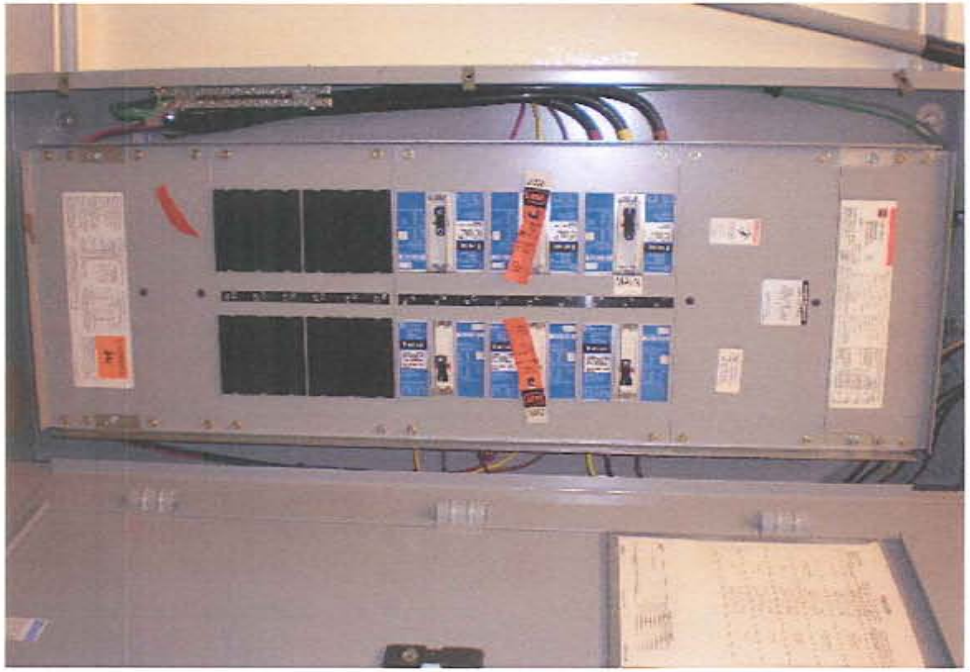

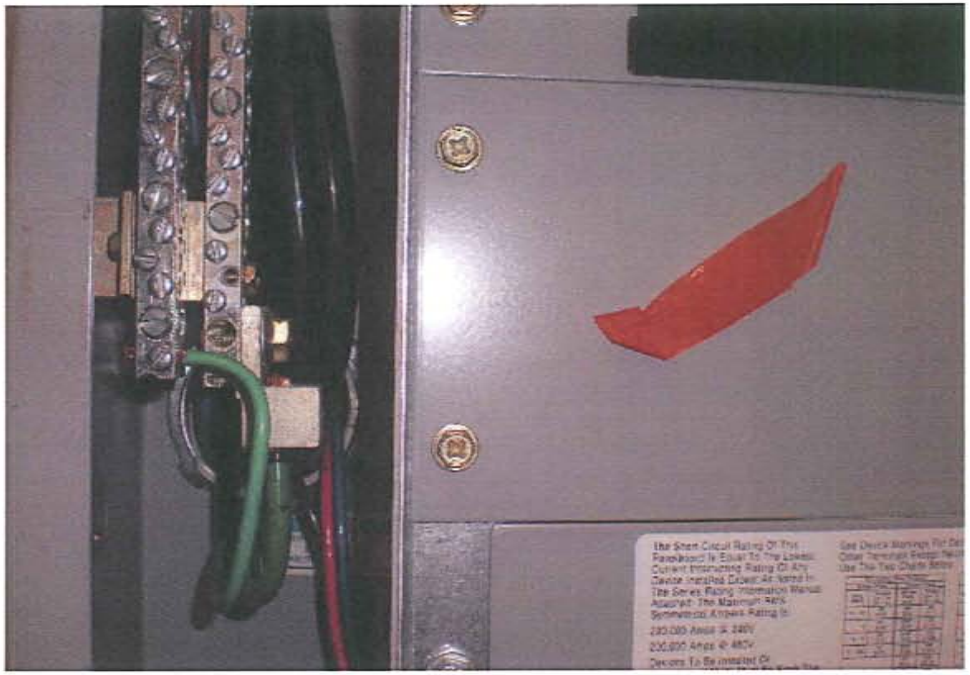

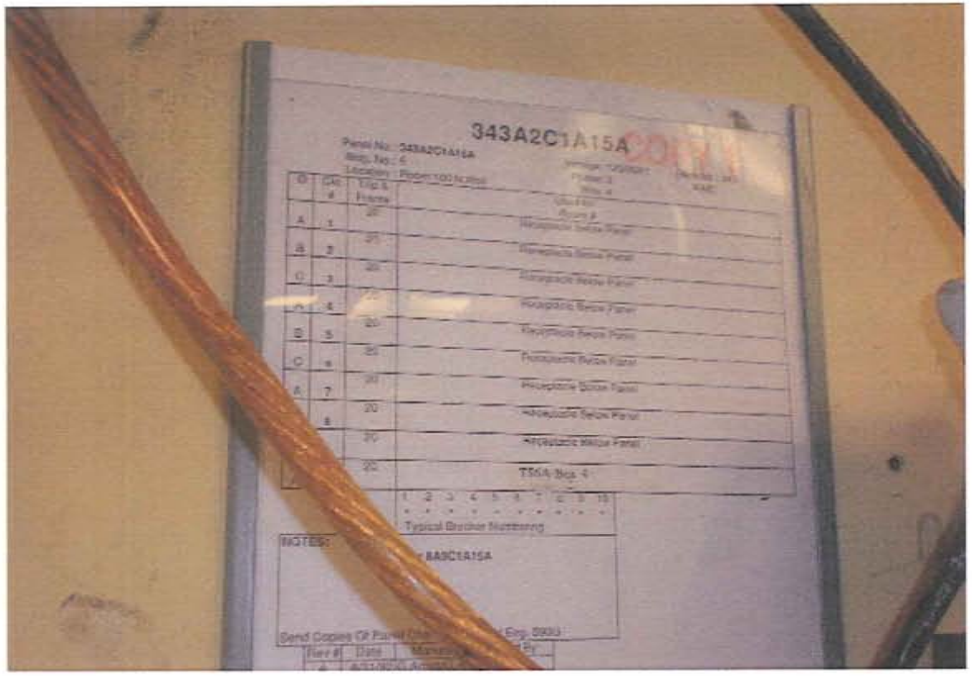
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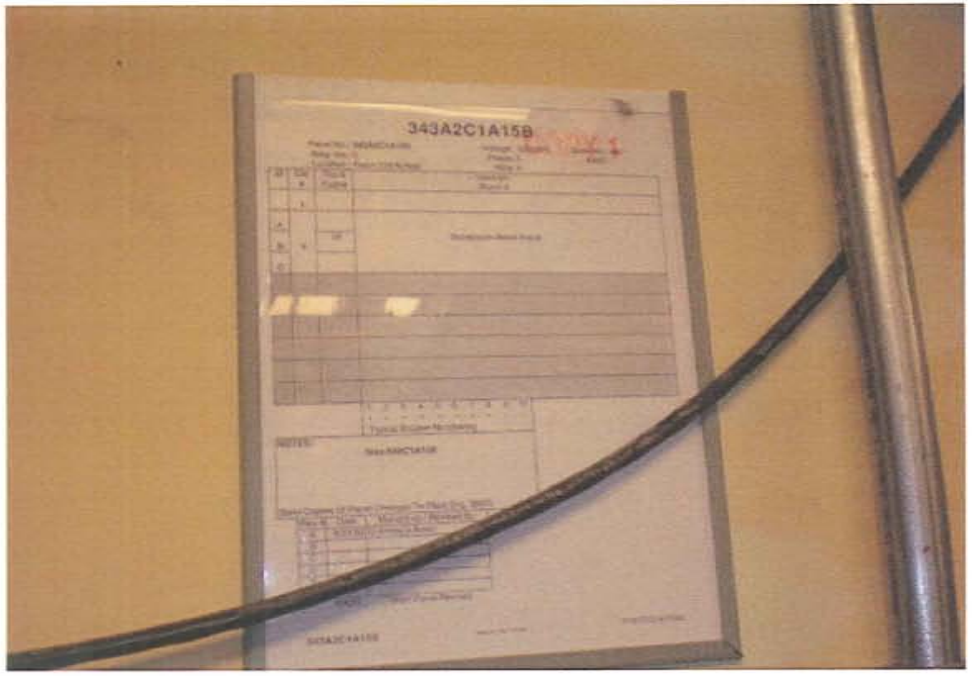
Typical Breaker Numbering

LINE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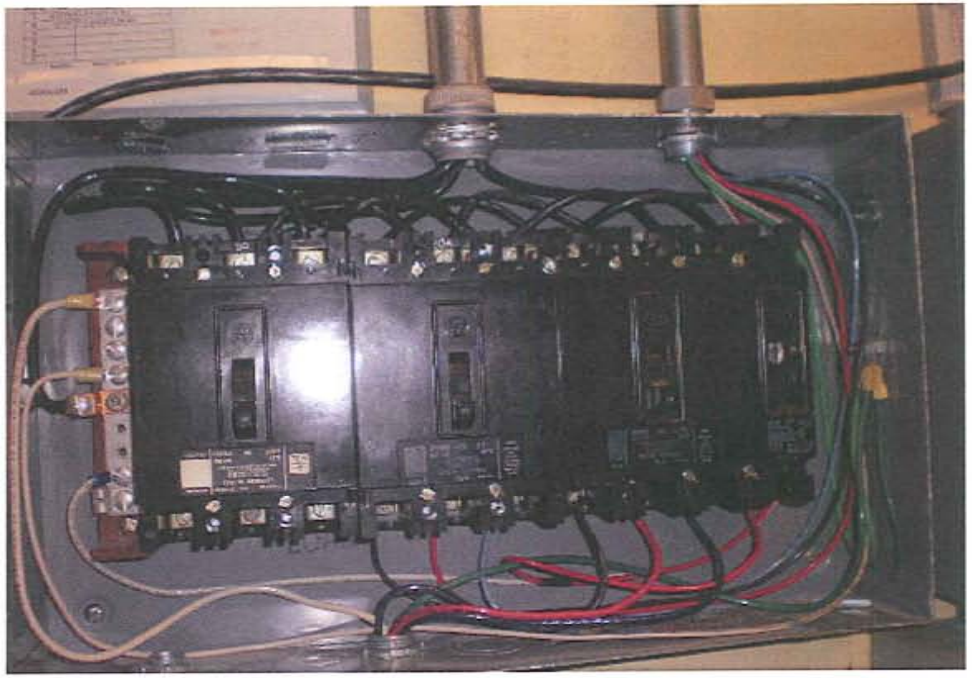
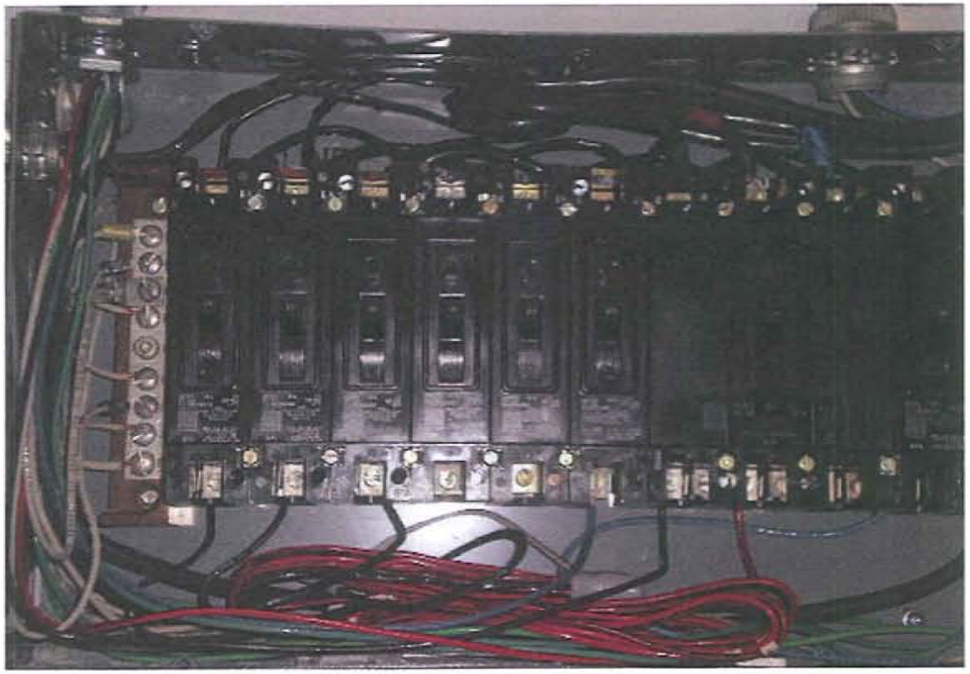
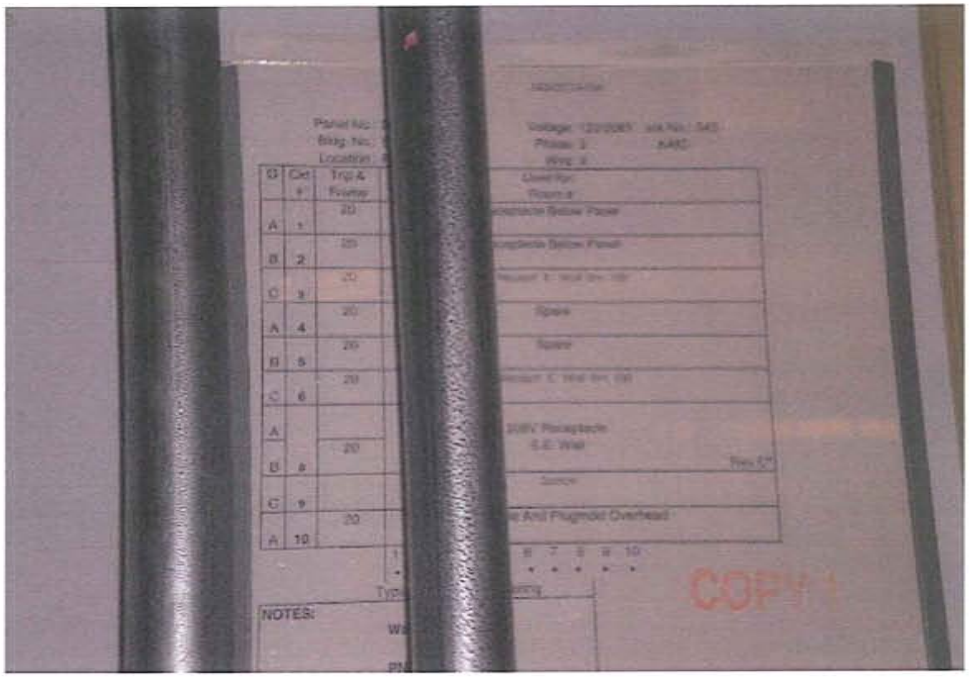


NOTICE
AREA IN FRONT OF THIS
PANEL MUST BE KEPT CLEAR
THREE (3) FOOT
MINIMUM AISLE WIDTH
PNL-021-5
343A2C1A16A
A PHASE BLACK
B PHASE RED
C PHASE BLUE
NEUTRAL WHITE
WARNING



LOAD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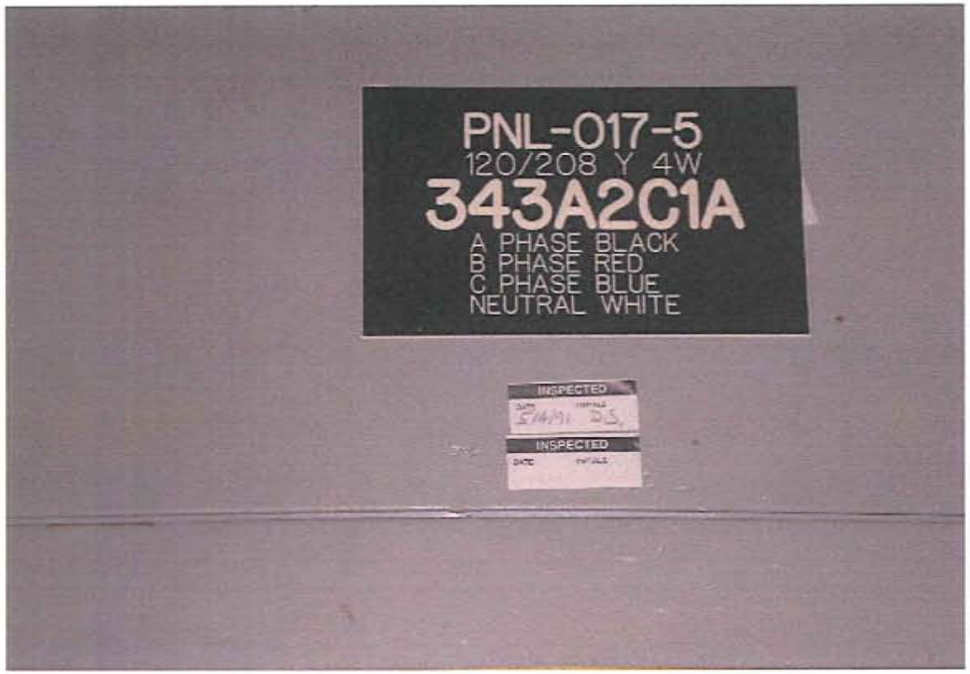
COPY


PNL-017-5
120/208 Y 4W
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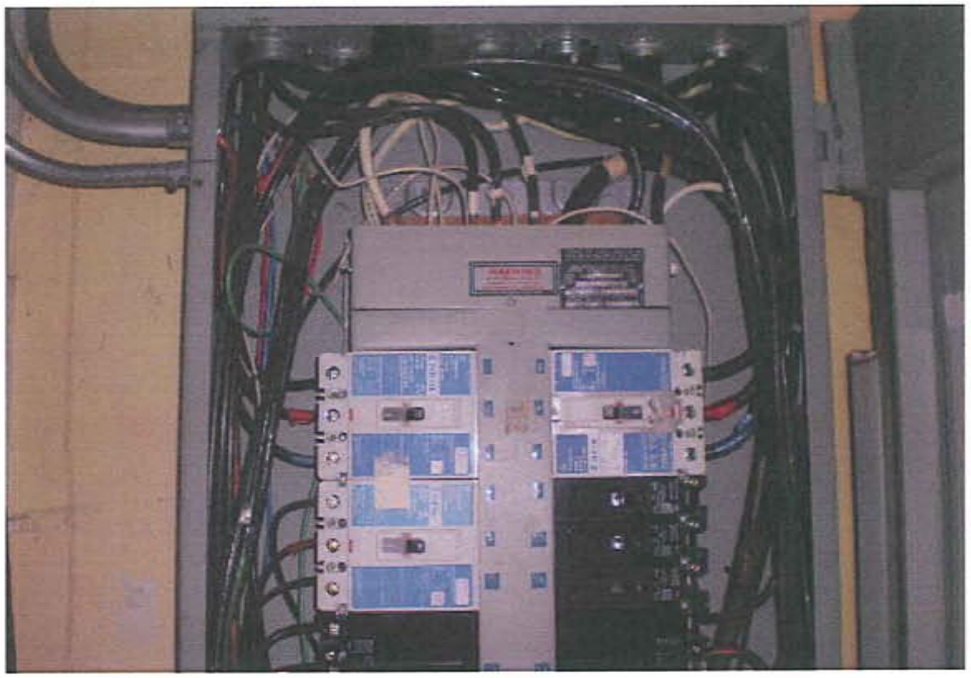
A PHASE BLACK
B PHASE RED
C PHASE BLUE
NEUTRAL WHITE
INSPECTED
INSPECTED



PNL-016-5
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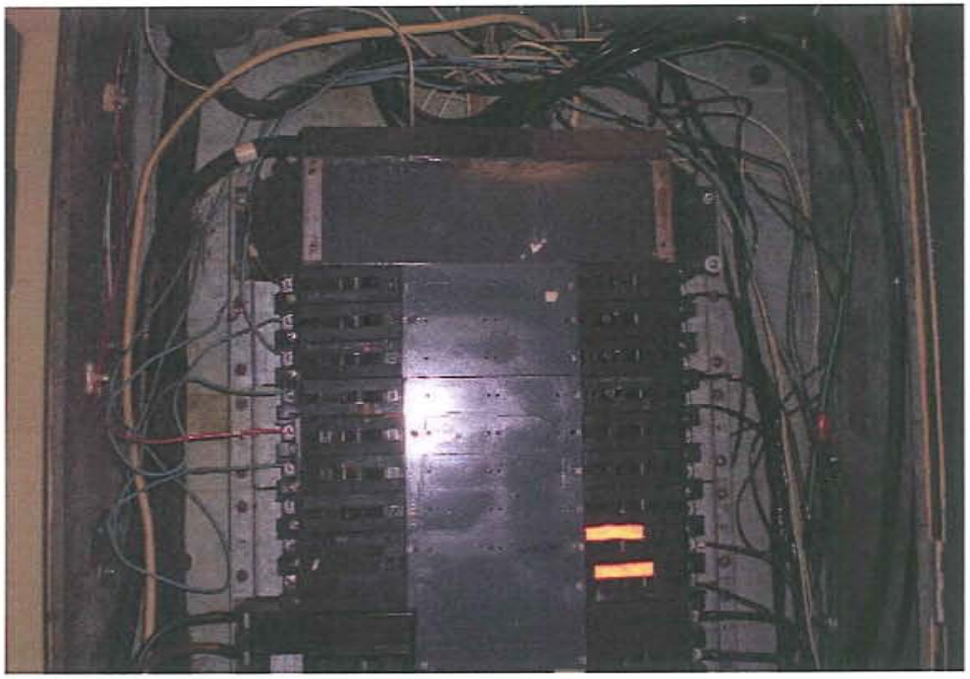
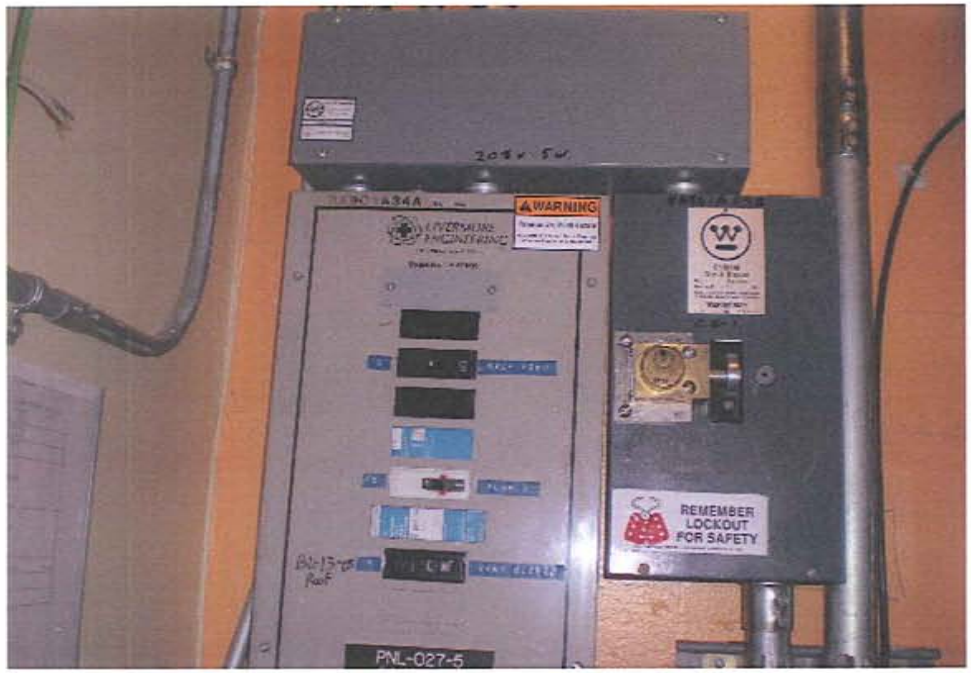
NOTICE
AREA IN FRONT
OF THIS PANEL

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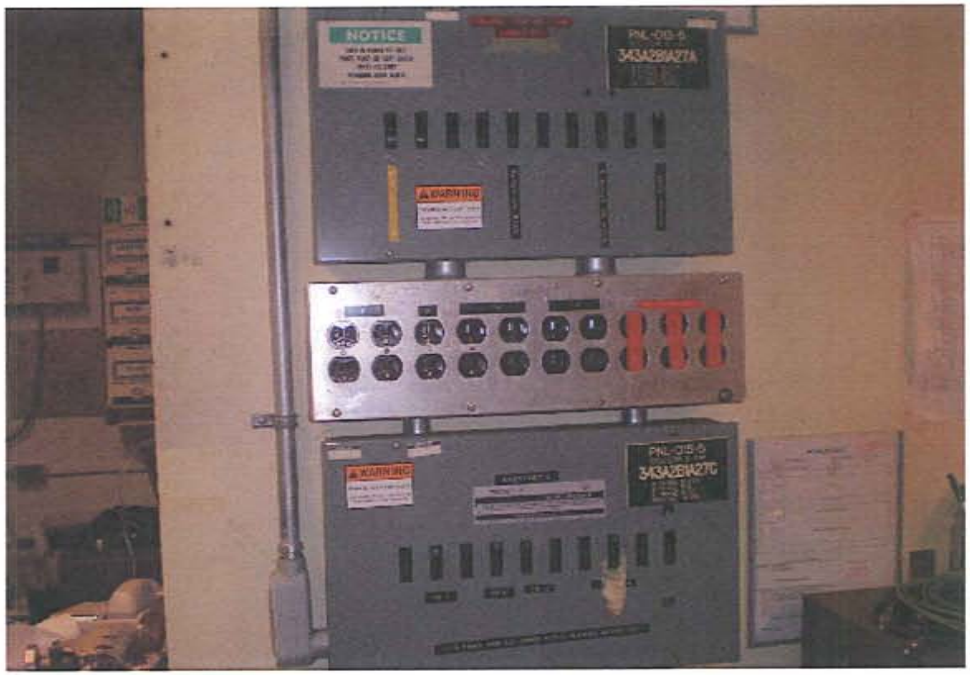
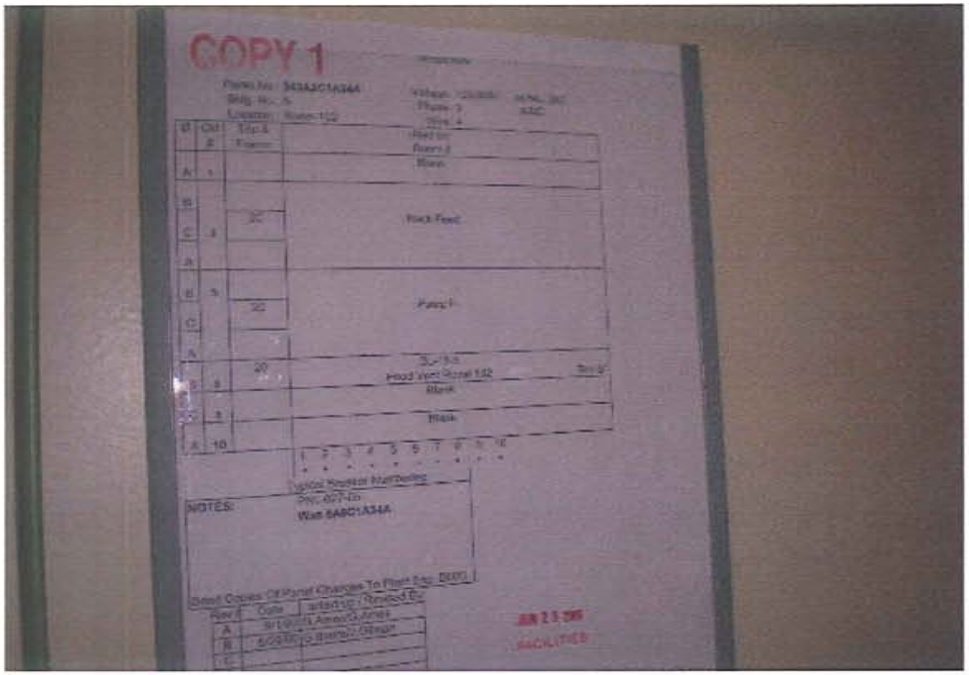
REMEMBER
LOCKOUT
FOR SAFETY
PNL-027-5


NOTICE
WARNING
WARNING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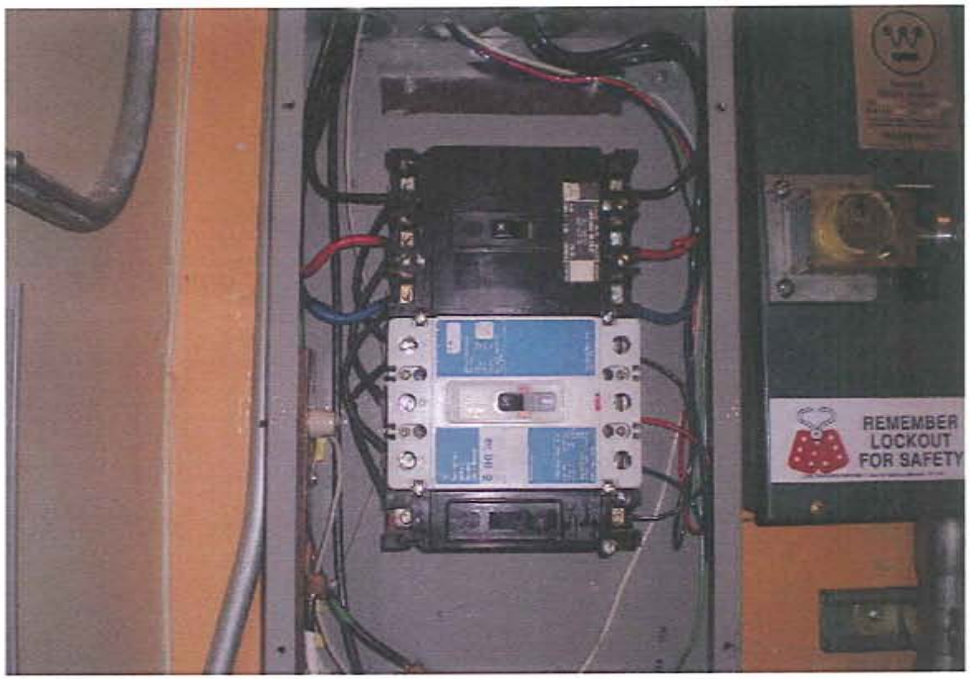
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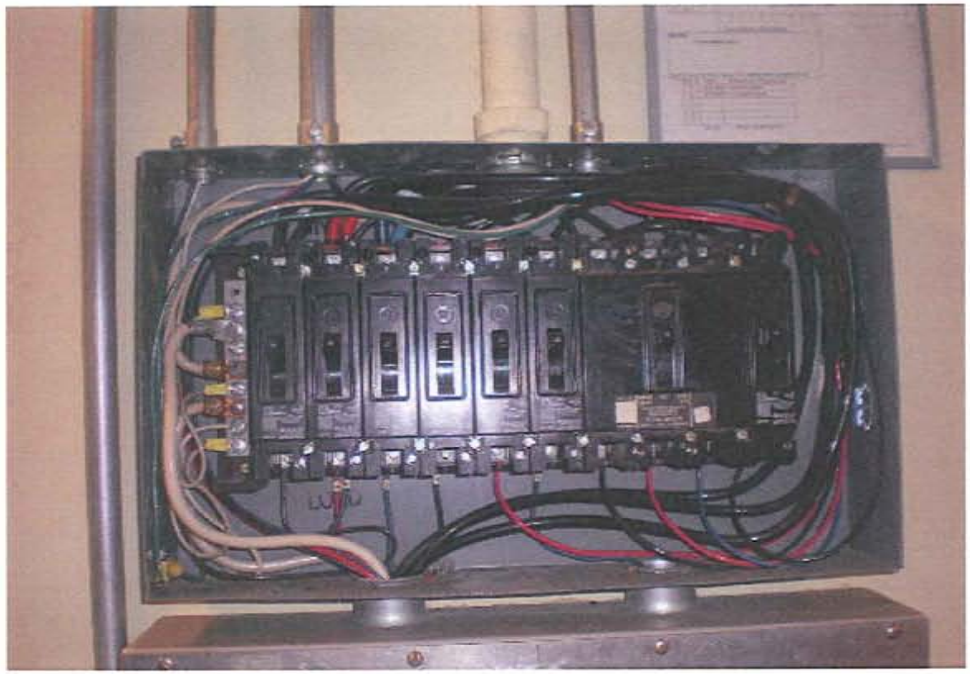
LOCKOUT
FOR SAFETY



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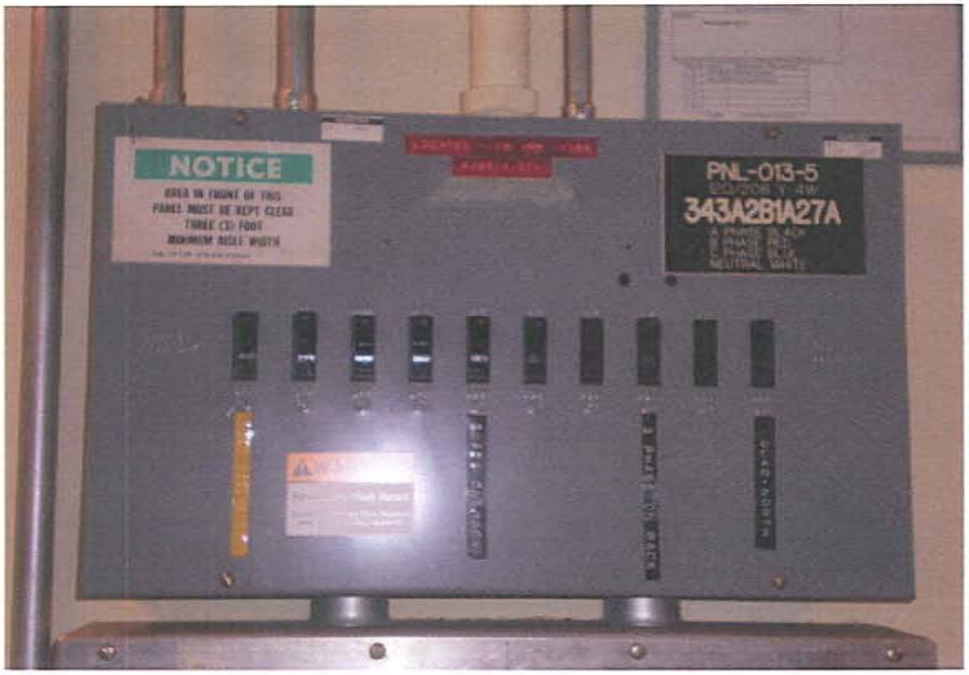
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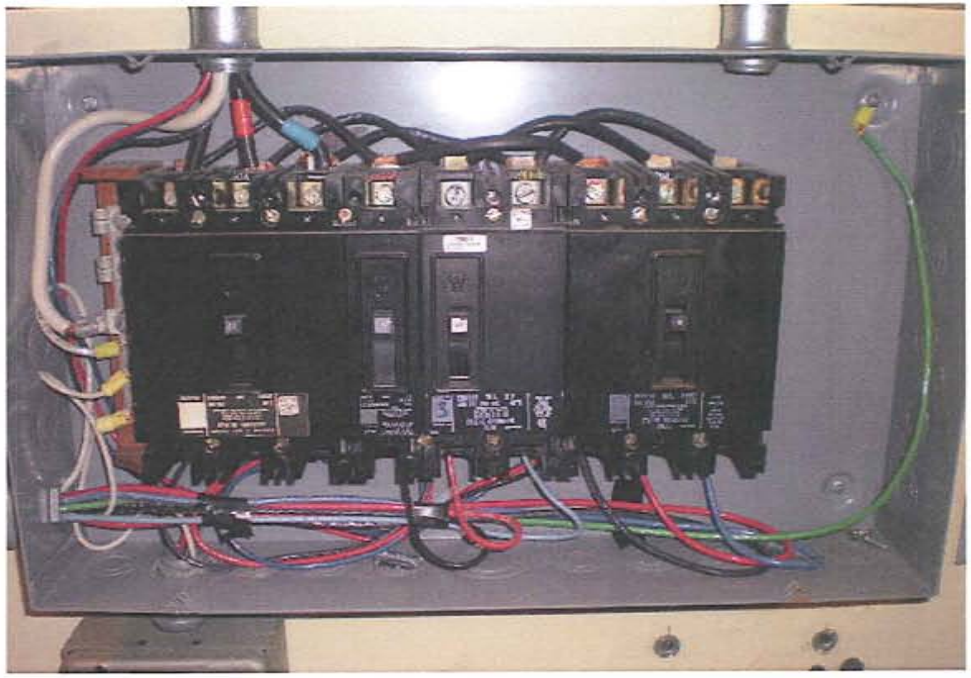

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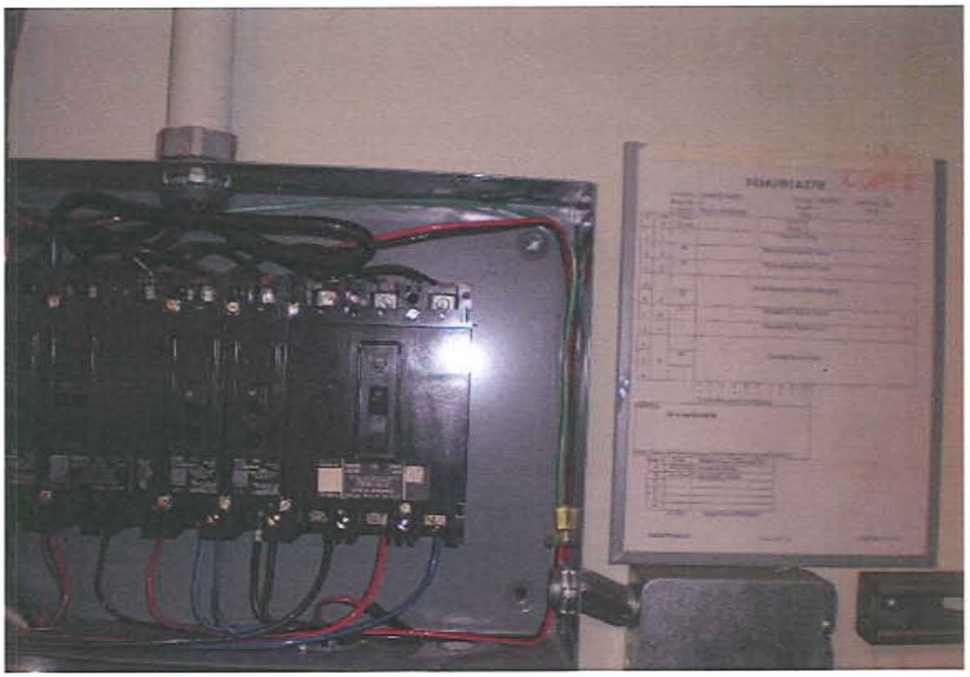

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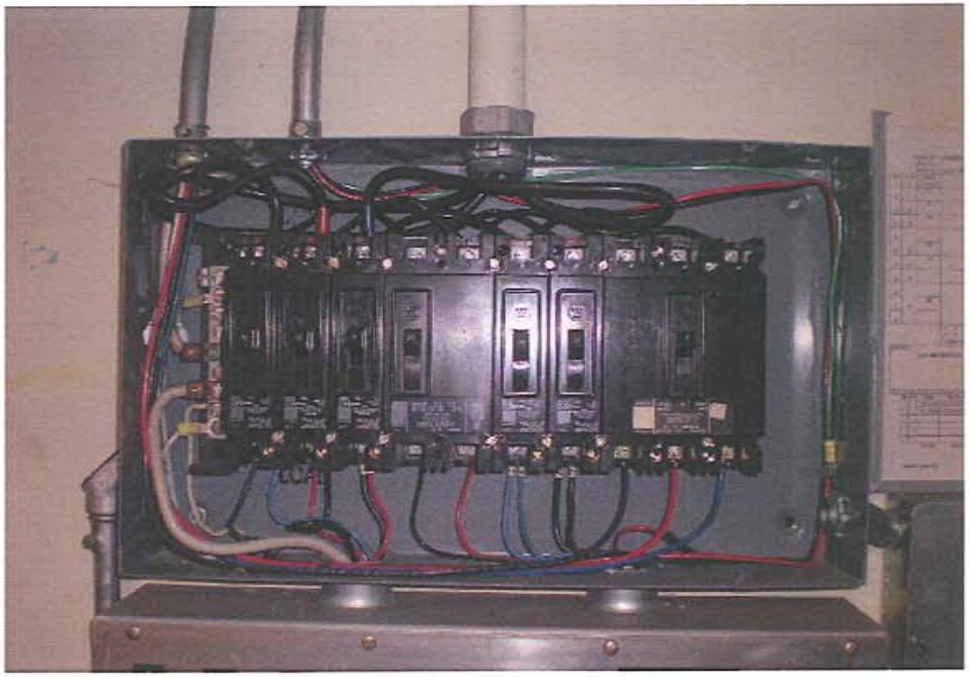
COPY 1



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Potential Arc Flash Hazard
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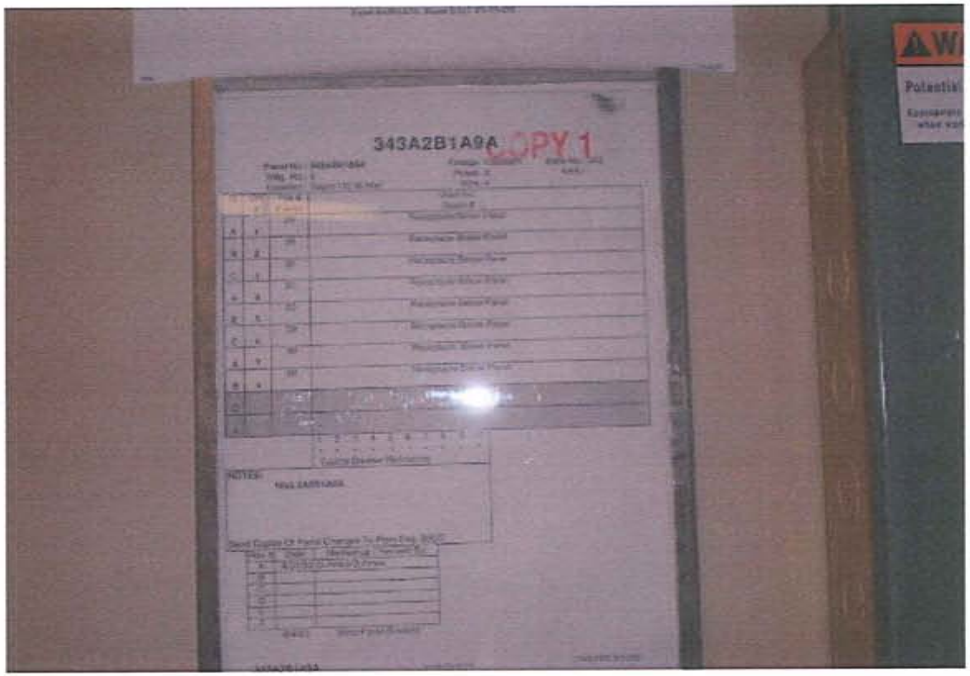
NOTICE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WARNING
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PNL-01-5
343A2B1A15A
NOTICE
WARNING
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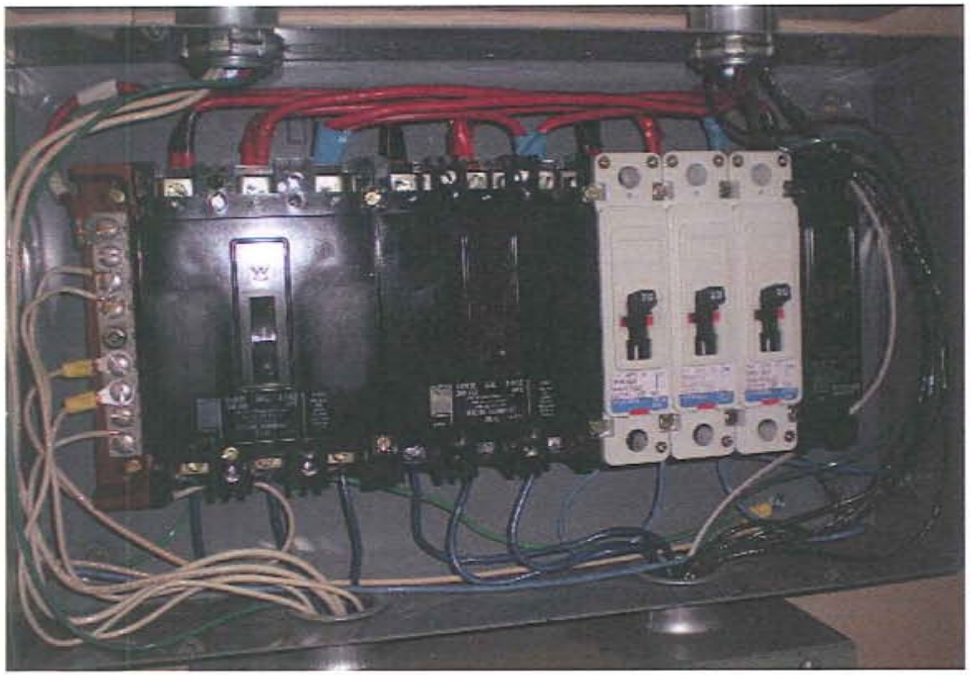
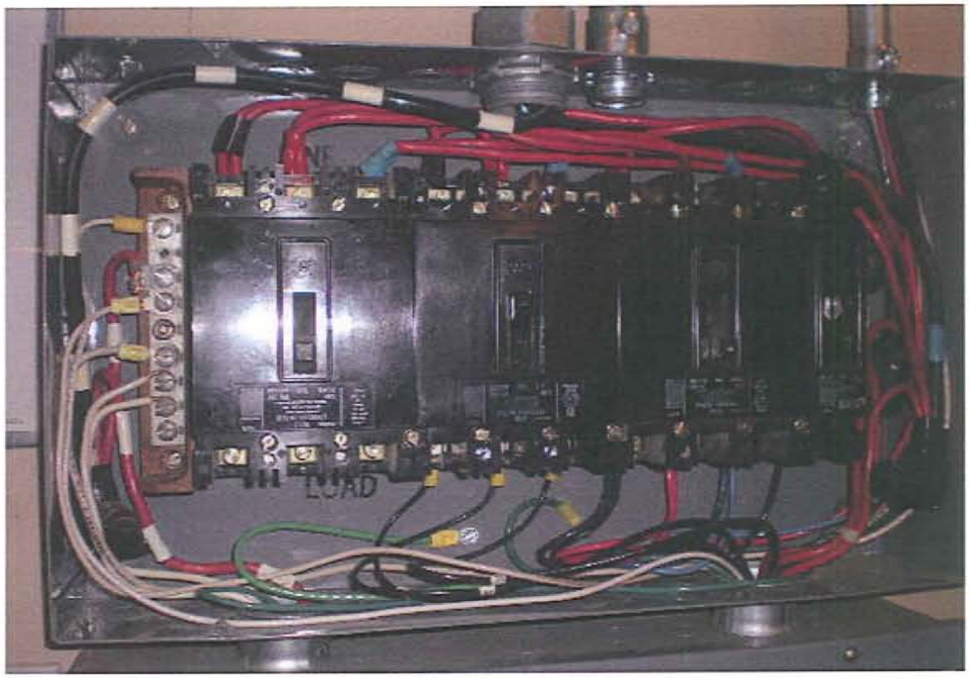
PNL-01-5
343A2B1A15B

343A2B1A15B
WARNING
Potential Arc Flash Hazard
8A9B1A15
NOTICE



WARNING
Potential Arc Flash Hazard
8A9B1A9A
PNL-009-5
120/208 Y 4W
343A2B1A9A
A PHASE BLACK
B PHASE RED
C PHASE BLUE
NEUTRAL WHITE
NOTICE
AREA IN FRONT OF THIS
PANEL MUST BE KEPT CLEAR
THREE (3) FOOT
MINIMUM AISLE WIDTH


LOAD

PNL-005-5
120/208 Y 4W
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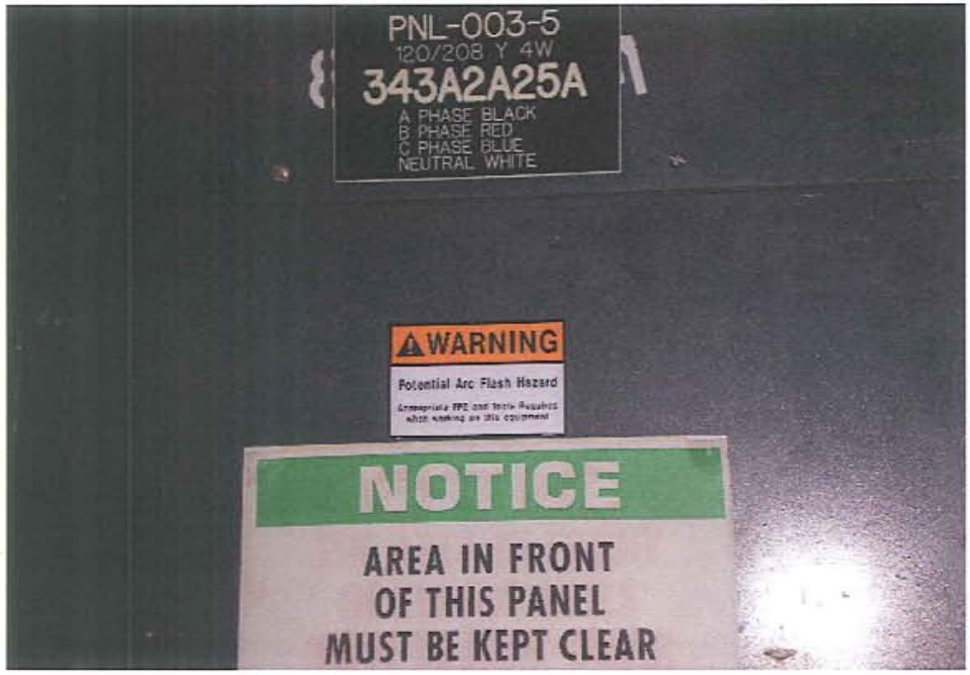
A PHASE BLACK
B PHASE RED
C PHASE BLUE
NEUTRAL WHITE
AREA IN FRONT OF THIS
PANEL MUST BE KEPT CLEAR
THREE (3) FOOT
MINIMUM AISLE WIDTH
Title 29 CFR 1910.309 (OSHA)
INSPECTED
LTS


PNL-003-5
120/208 Y 4W
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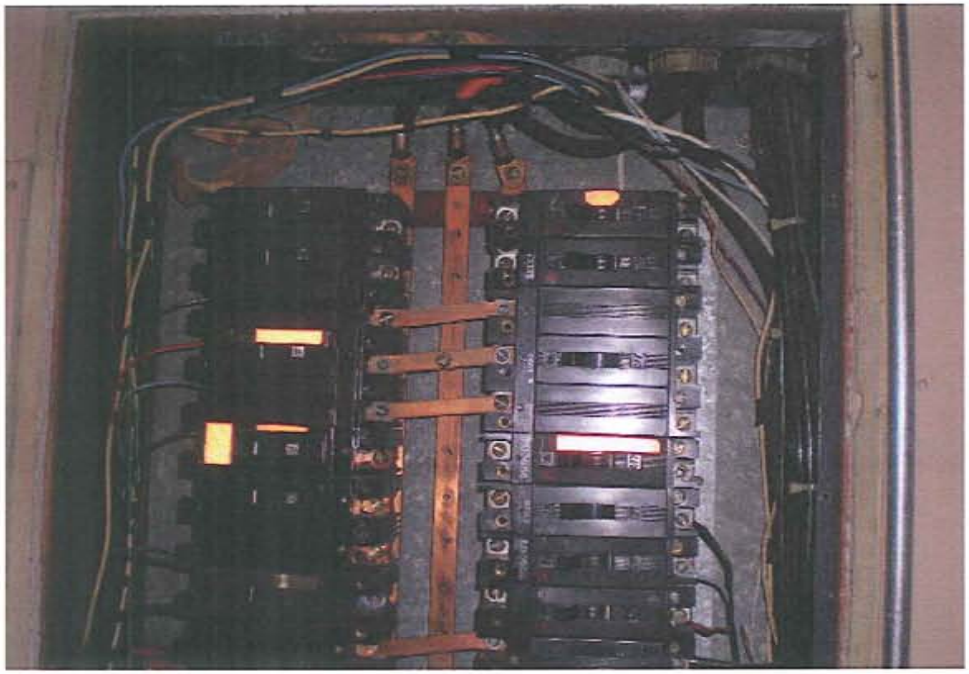
A PHASE BLACK
B PHASE RED
C PHASE BLUE
NEUTRAL WHITE
WARNING
Potential Arc Flash Hazard
NOTICE
AREA IN FRONT
OF THIS PANEL
MUST BE KEPT CLEAR

PNL-010-5
120/208 Y 4W
343A2B1A10A
A PHASE BLACK
B PHASE RED
C PHASE BLUE
NEUTRAL WHITE
TO RESET—THROW HANDLE TO EXTREME "OFF" POSITION THEN THROW "ON"
CAT. NO.
STYLE NO.
HEAVY DUTY INDUSTRIAL TYPE
WESTINGHOUSE ELECTRIC CORPORATION
MADE IN U.S.A.
CB1
CB2
CB3
CB4
CB5
CB6
CB7
Flash Hazard



PNL-008-5
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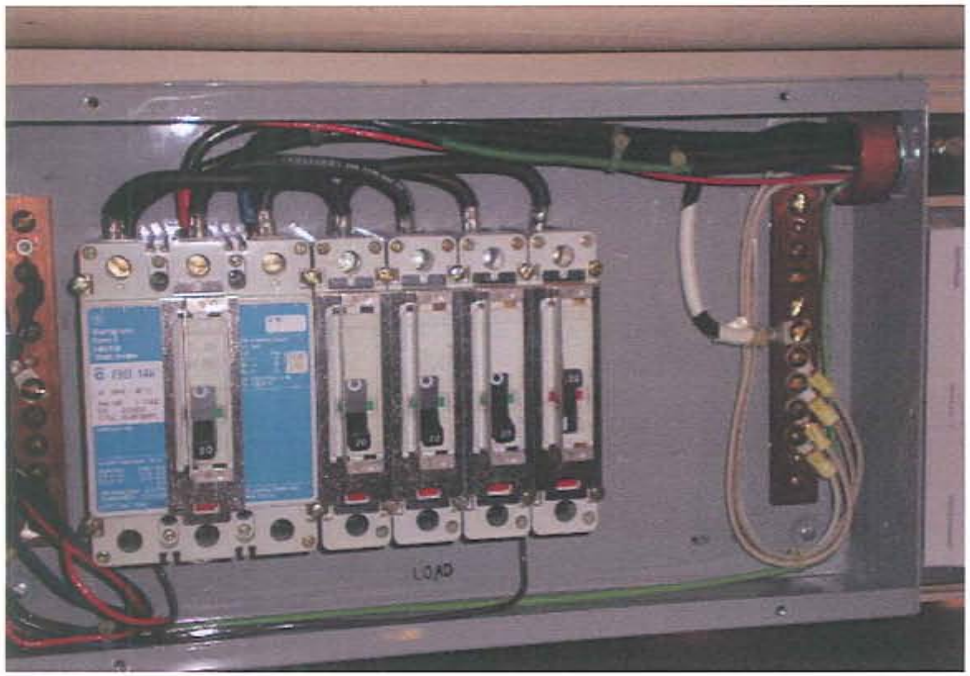
NOTICE
WARNING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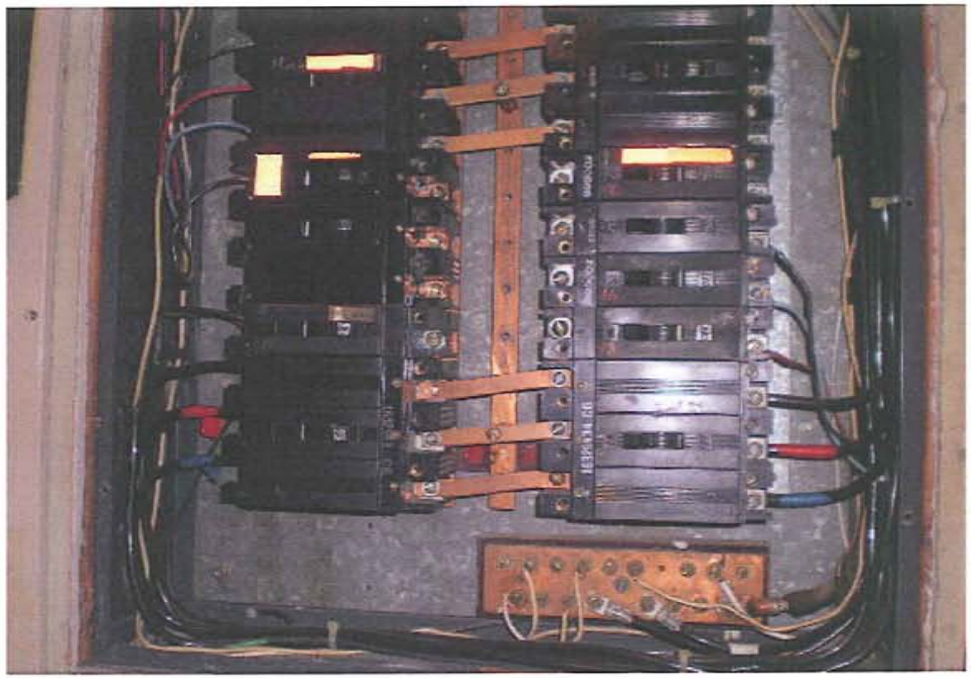

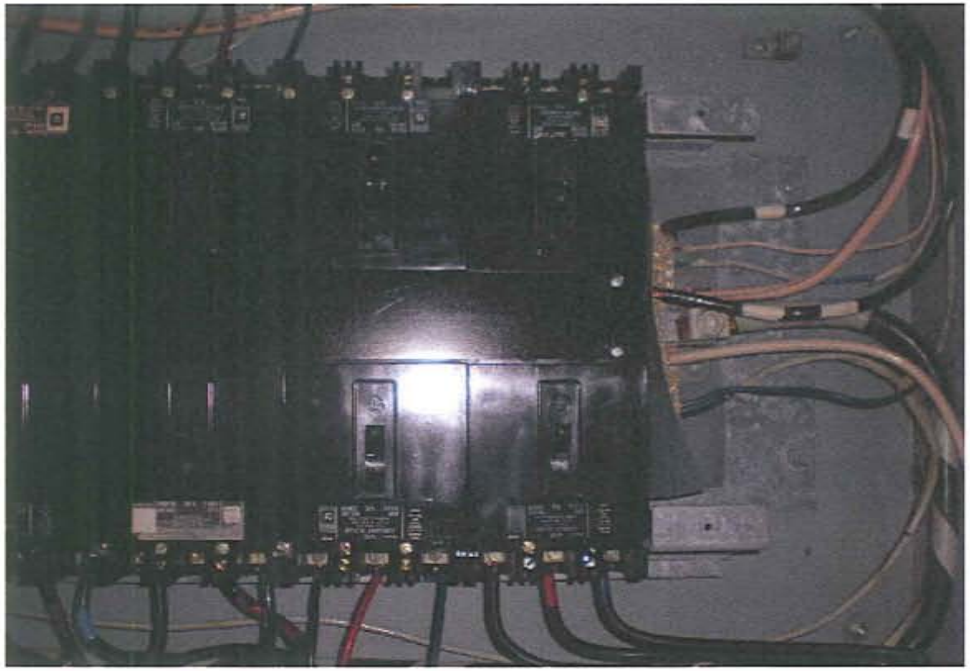

PNL-006-5
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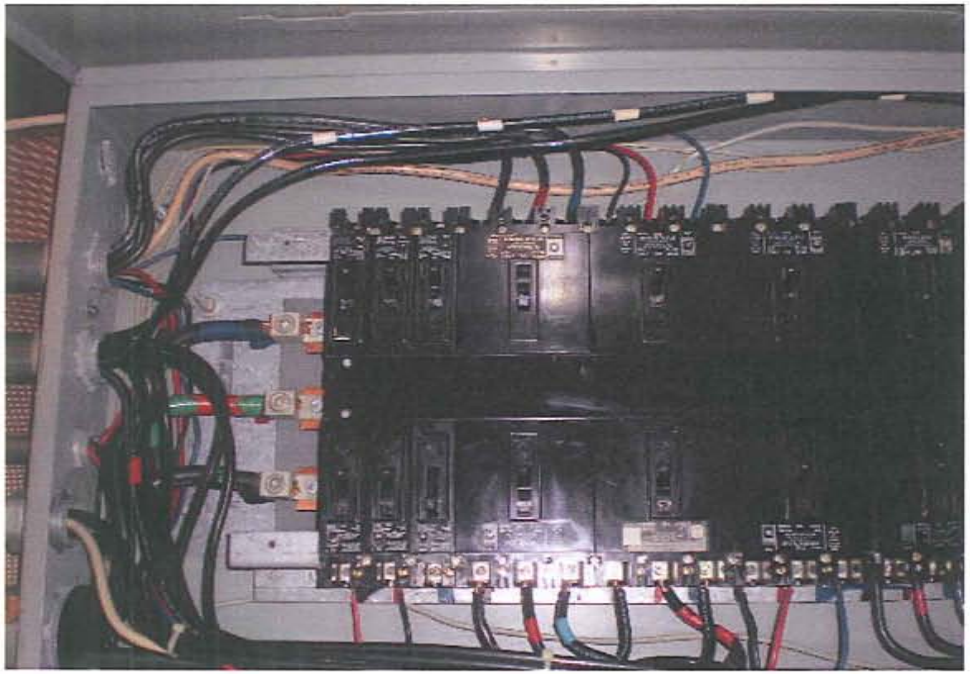
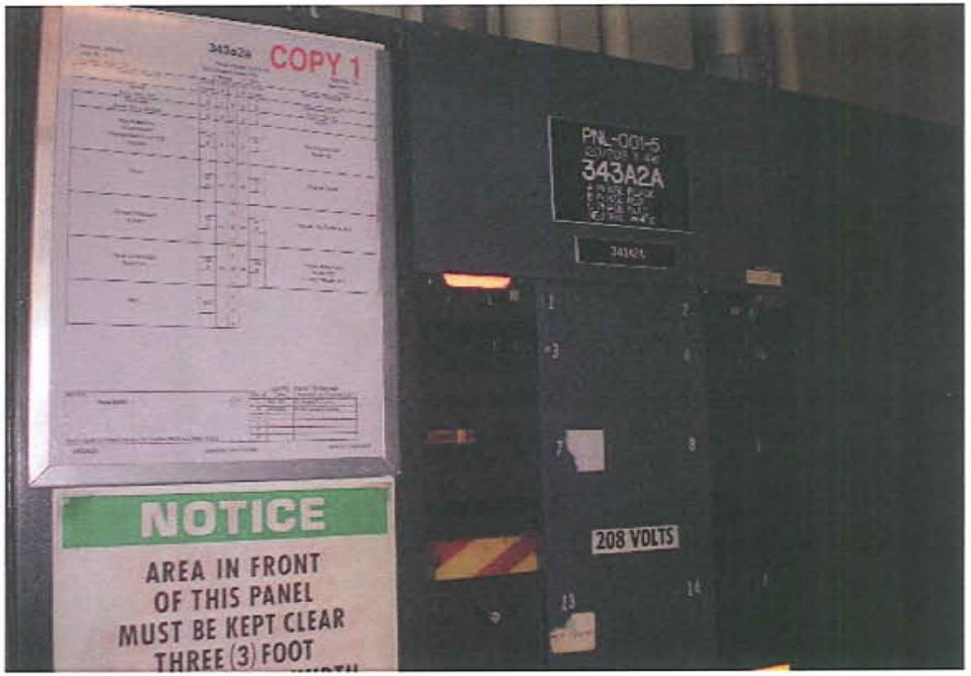
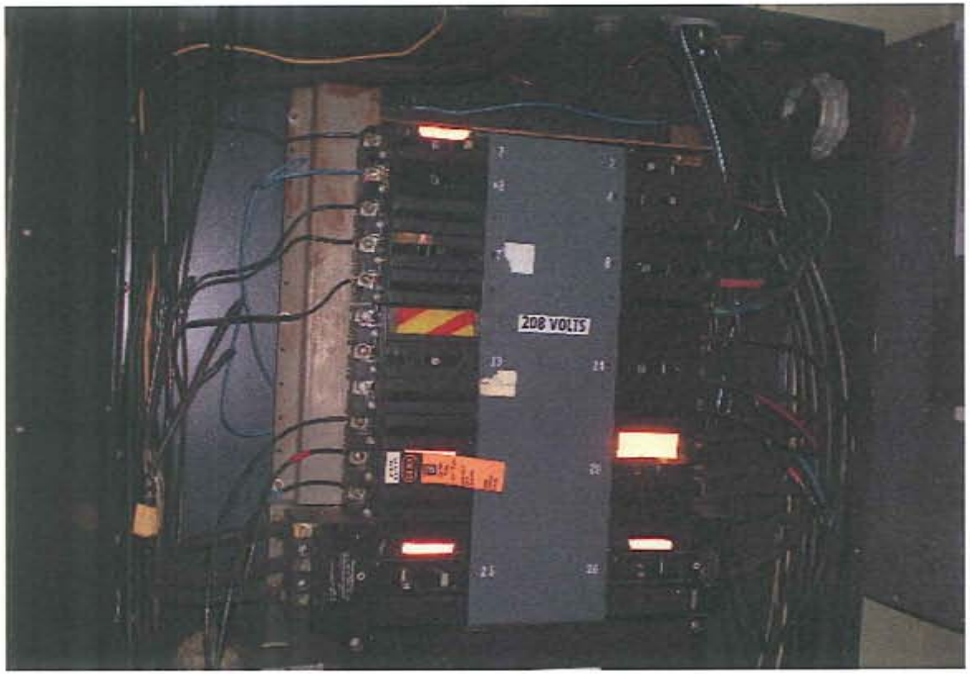
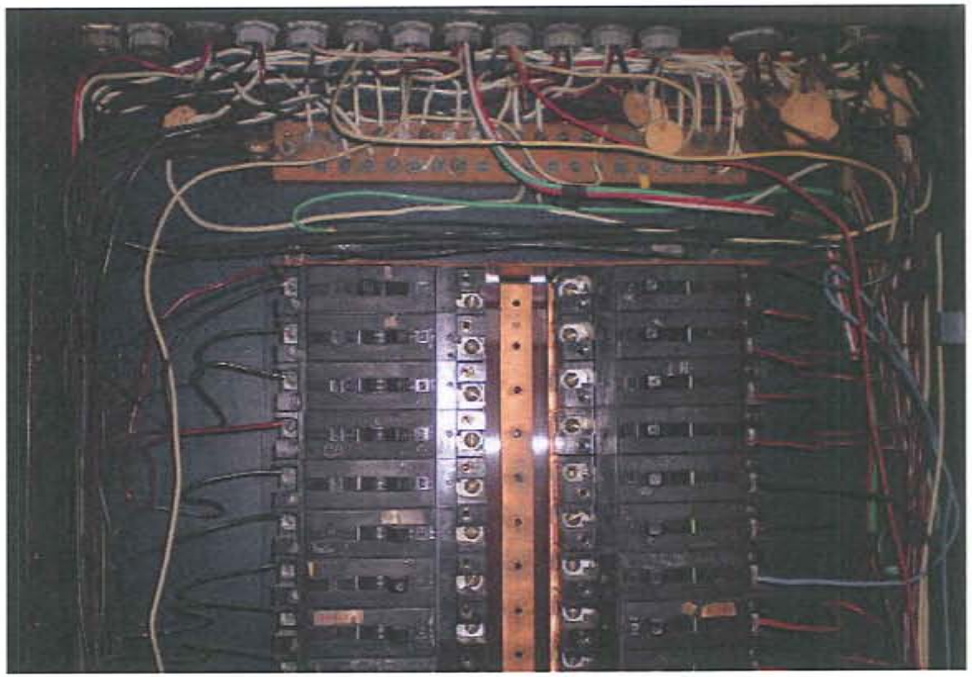
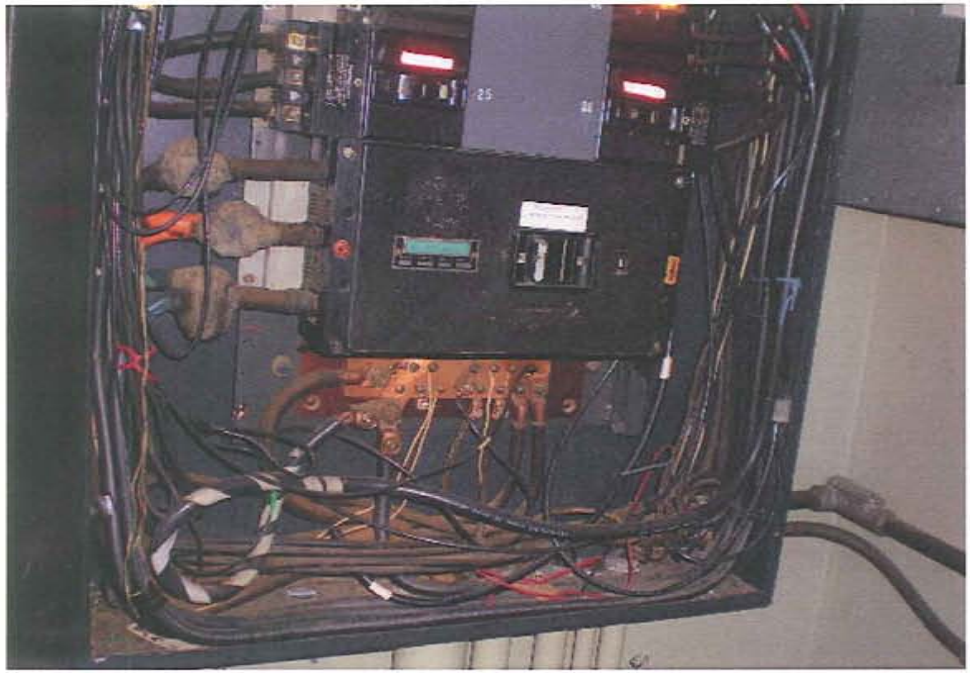
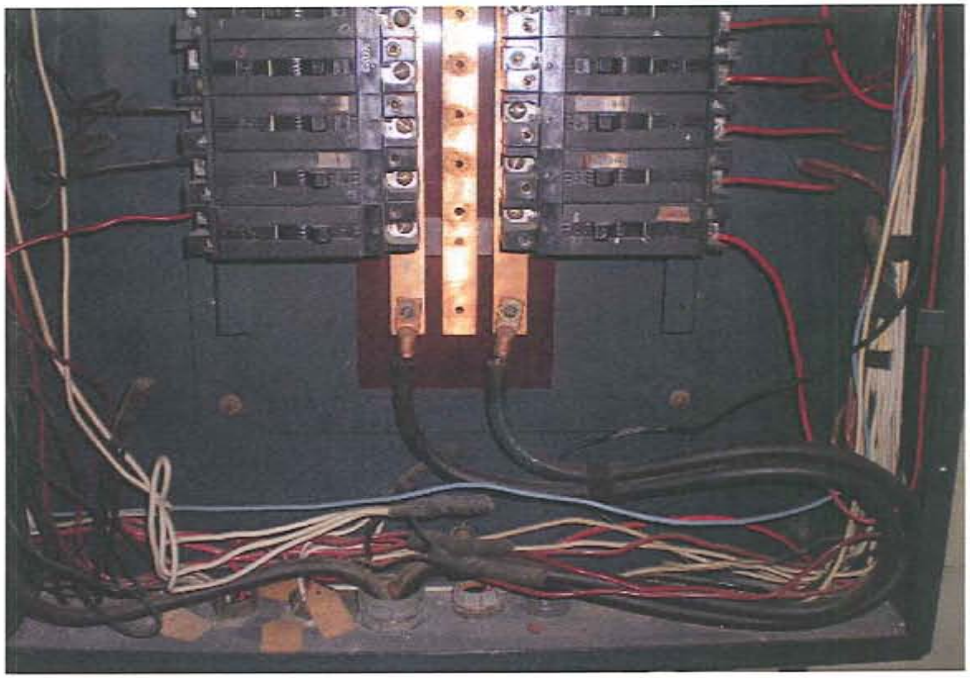



COPY 1
PNL-001-5
343A2A
NOTICE
AREA IN FRONT
OF THIS PANEL
MUST BE KEPT CLEAR
THREE (3) FOOT
208 VOLTS

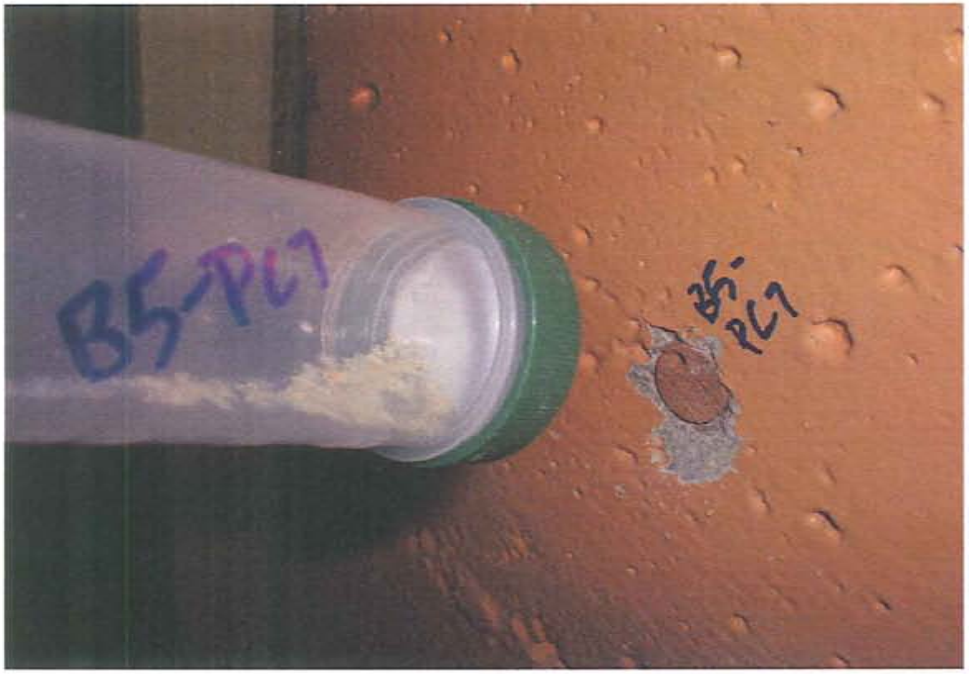

208 VOLTS







B5-AW70
B5-AW70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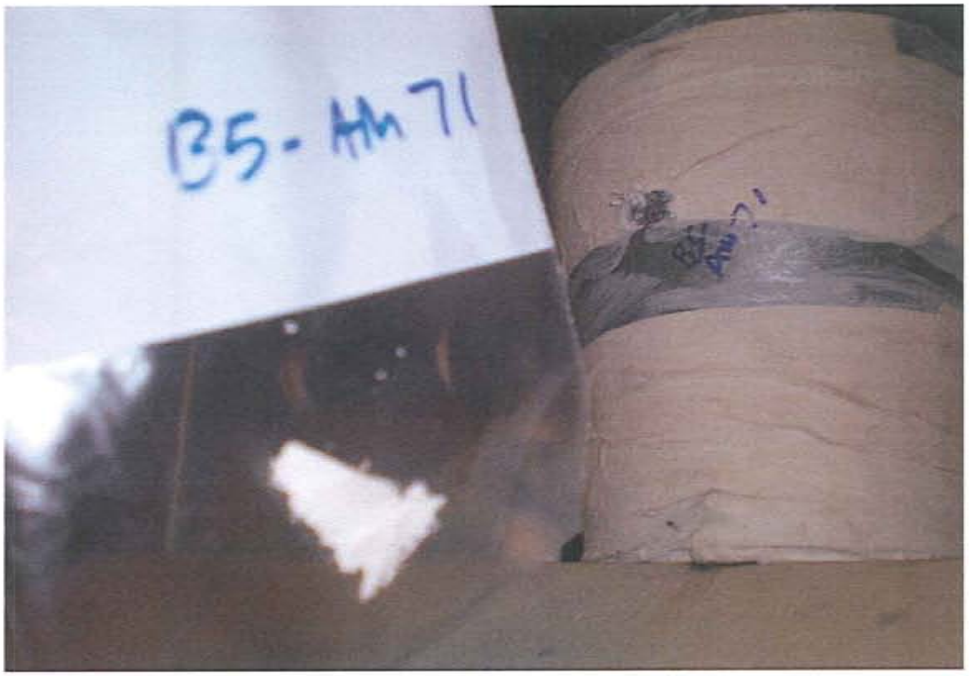
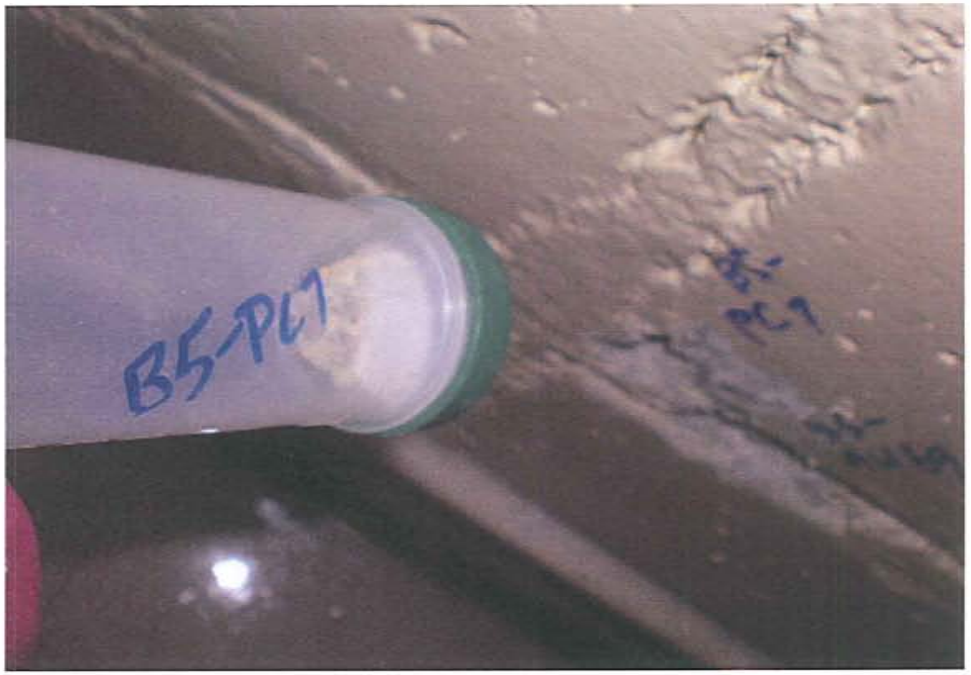
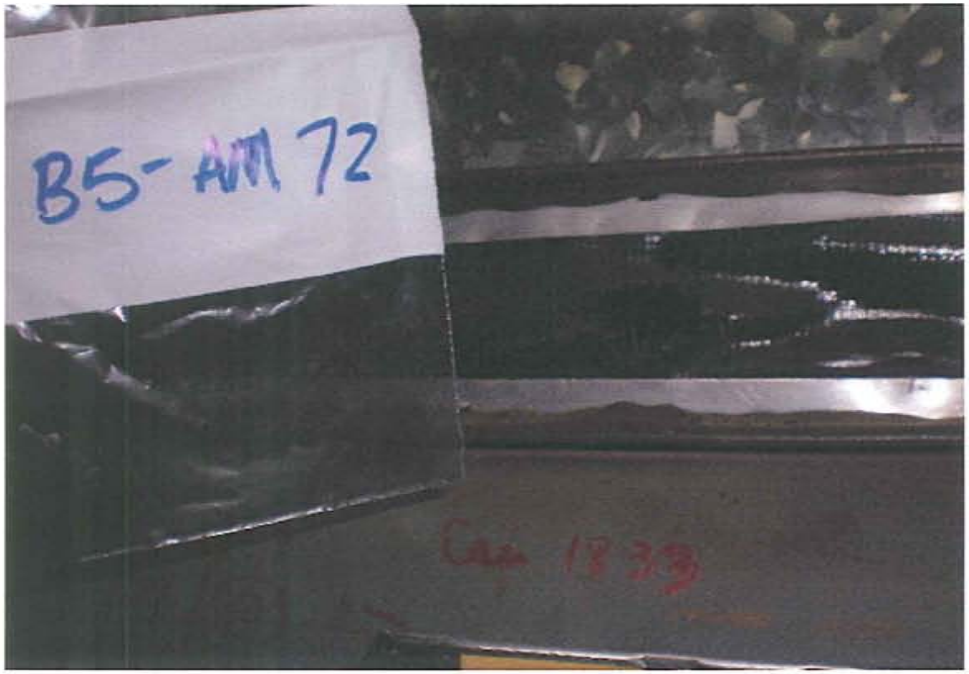
B5-PC7


B5-AM71

R102 Pit opening
B5SG02


B5-PC7
B5-PC7

B5- AM 72
GH 25

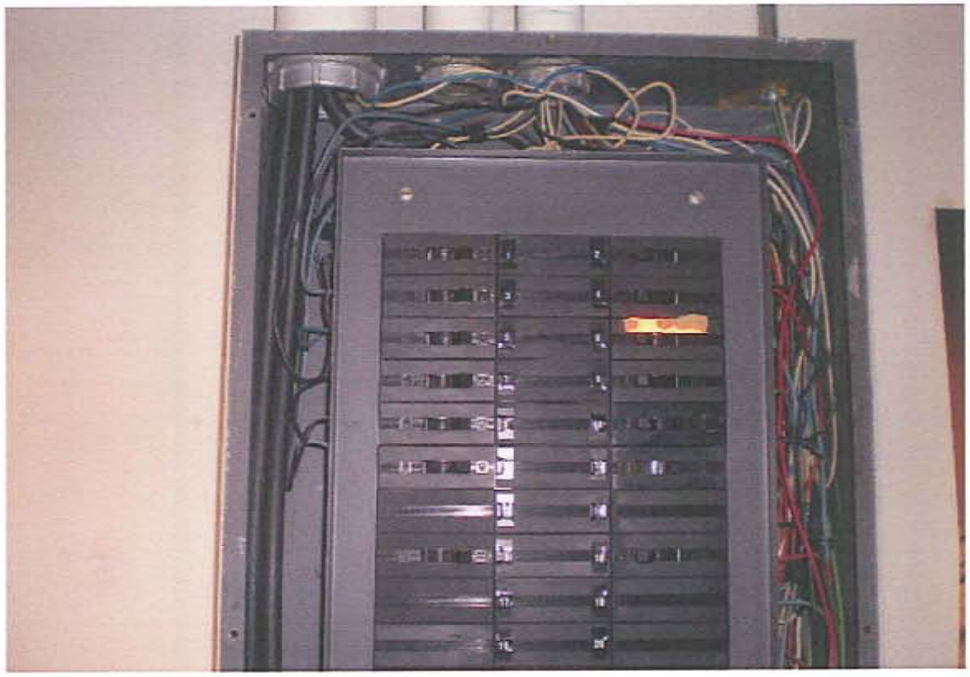

B5- AM 72

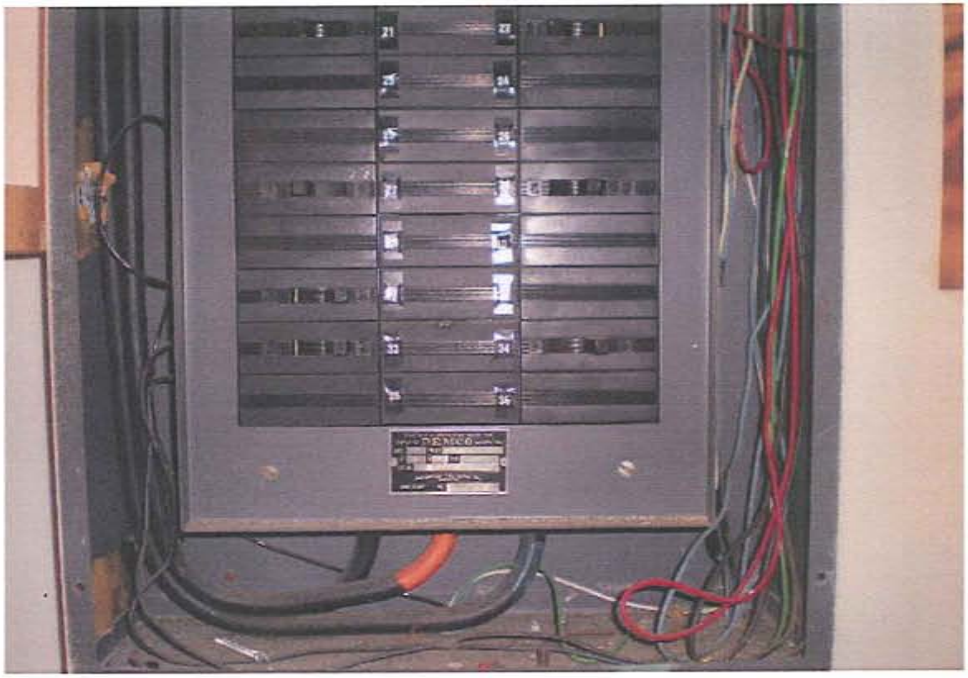
B5 - AR74
B5-AR74

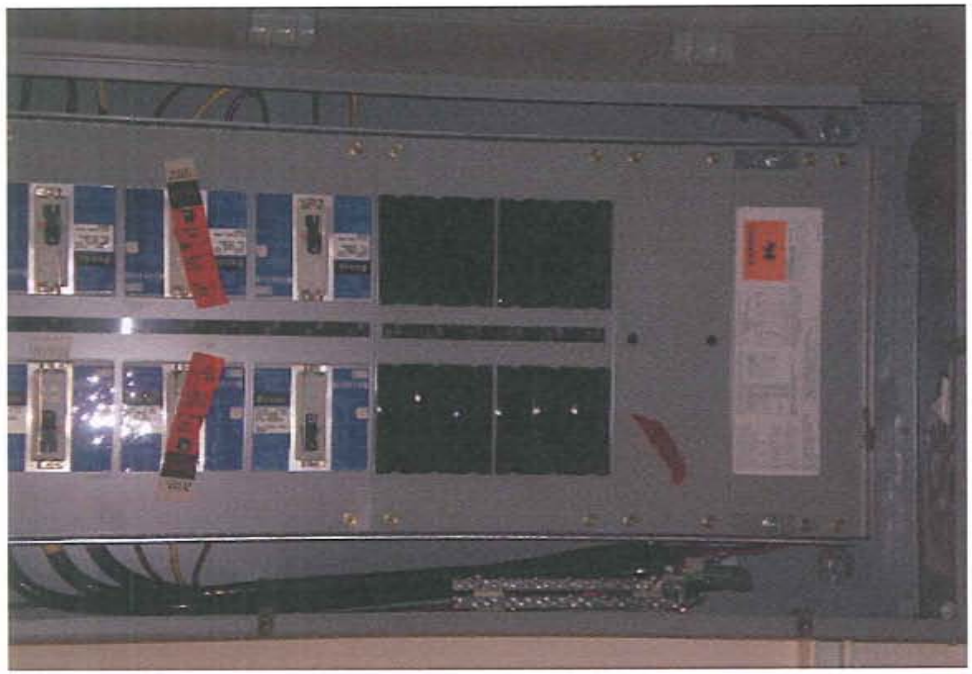
B5-AM73
B5-AM73

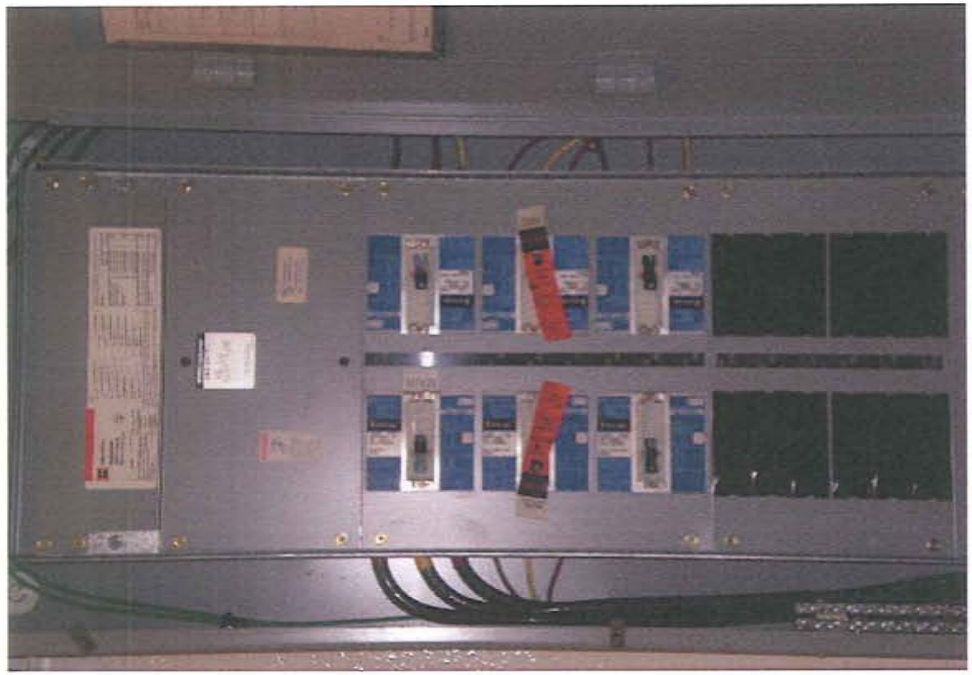
B5 - AR75
B5 AR75

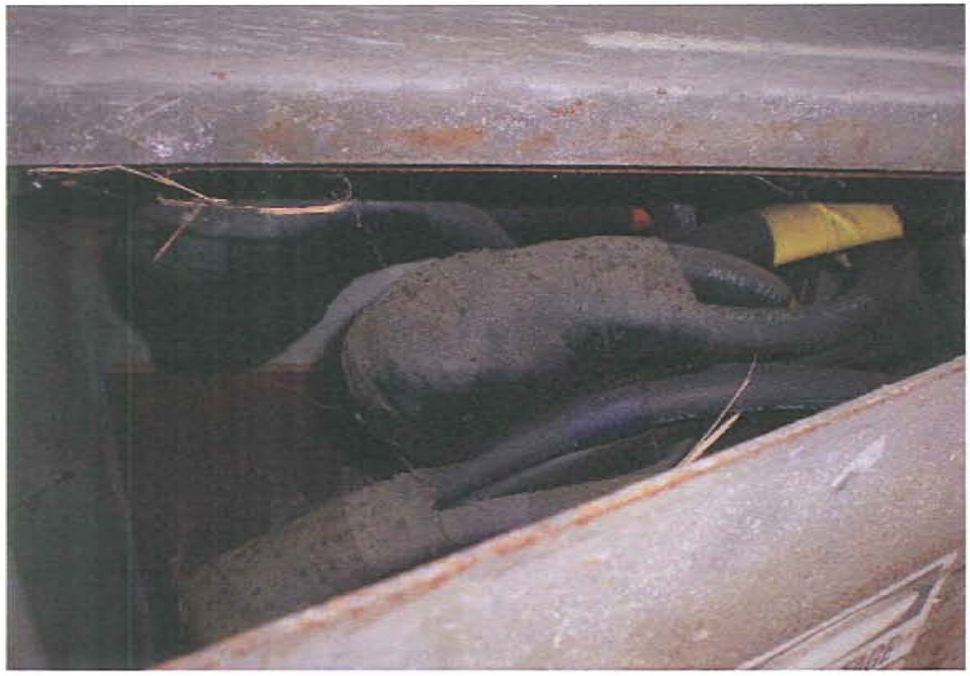
8A9A8A
PNL-002-5
343A2A8A
WARNING
NOTICE
AREA IN FRONT
OF THIS PANEL
MUST BE KEPT CLEAR
THREE (3) FOOT
MINIMUM AISLE WIDTH
TITLE 29 CFR 1910.310 (OSHA)











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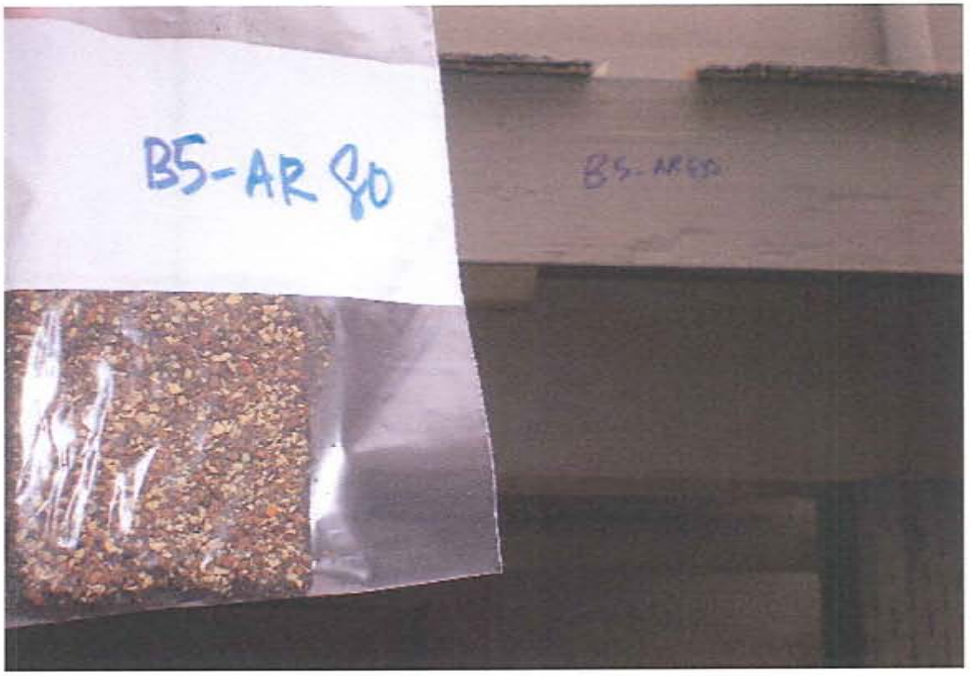
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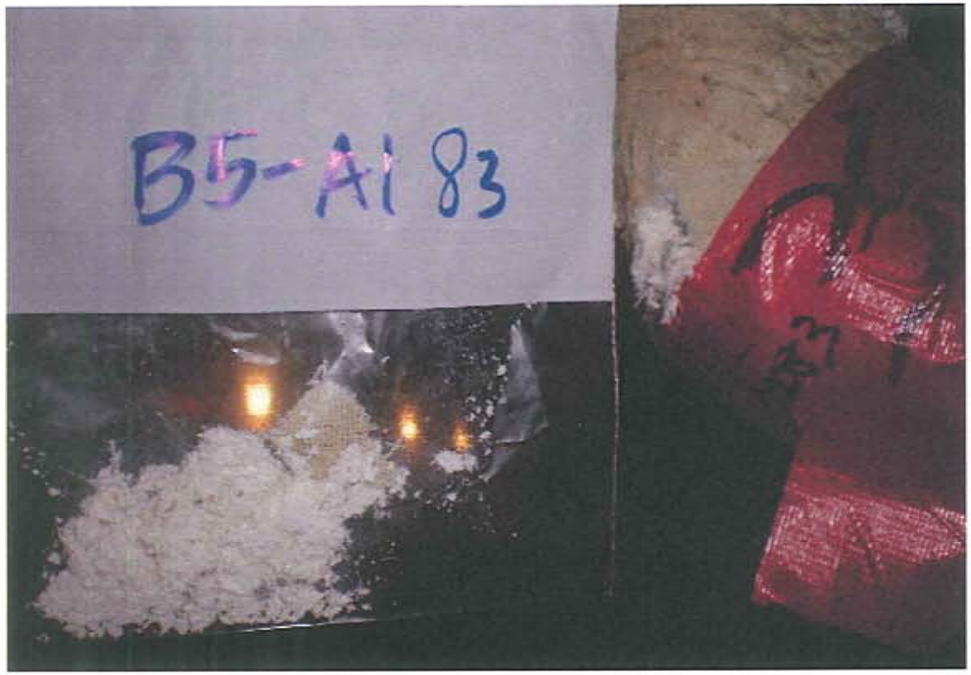
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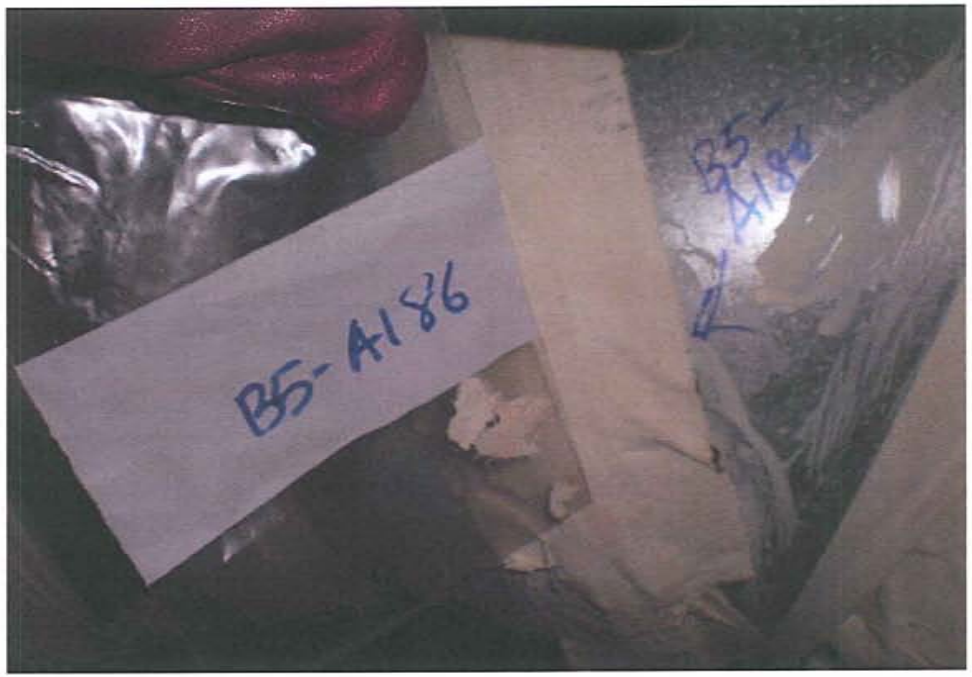
B5-AM82
B5-AM82

AR84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B5-A185

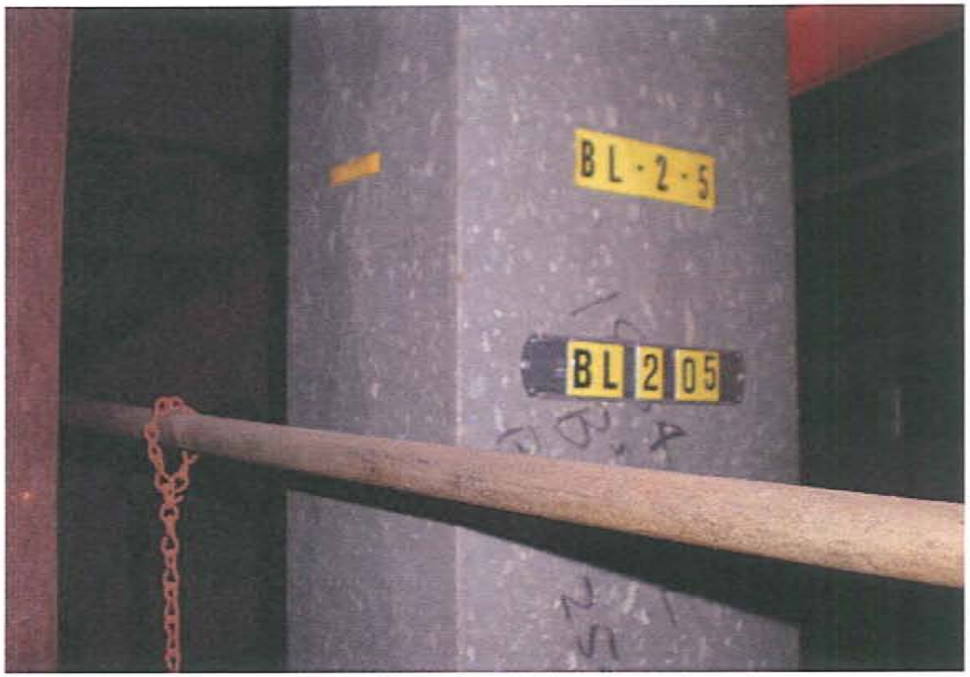
BOSCH

B5-AR87

B5EW01

B5EW01

BS-A-MSP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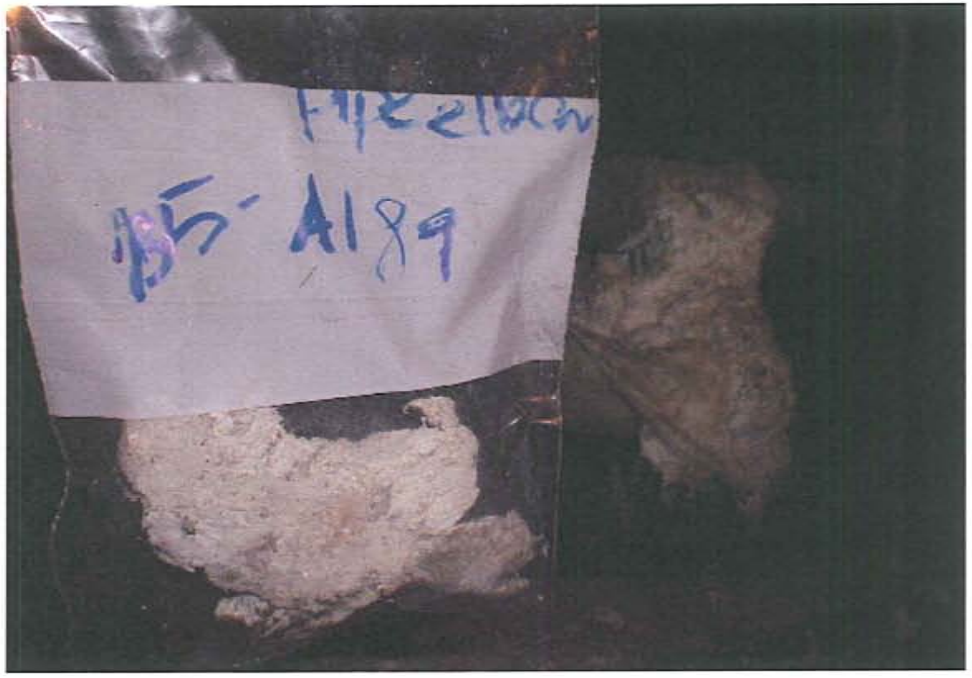
BL 2 05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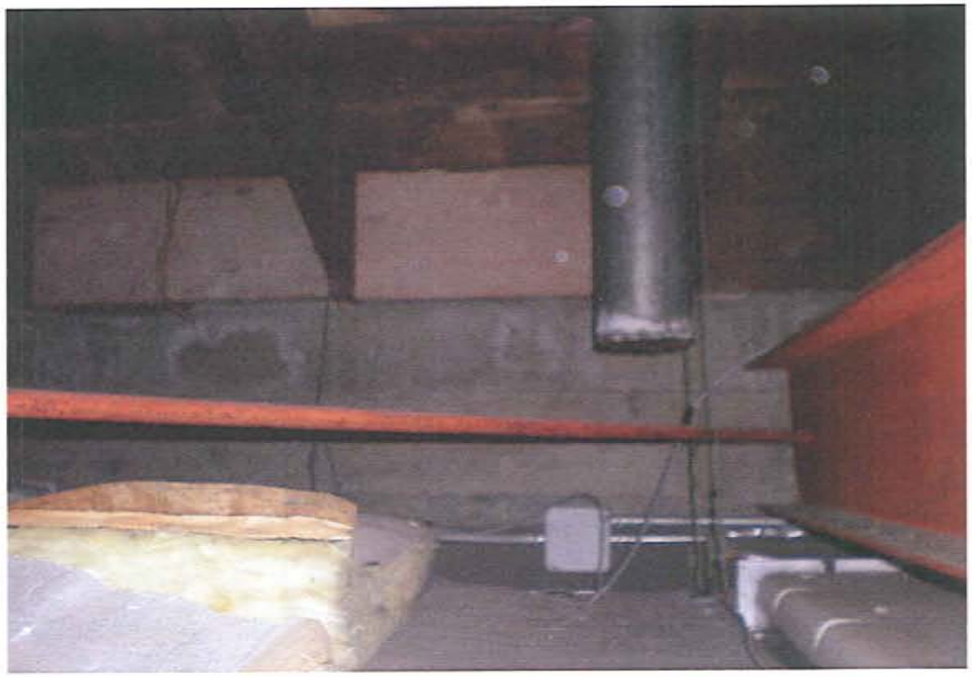
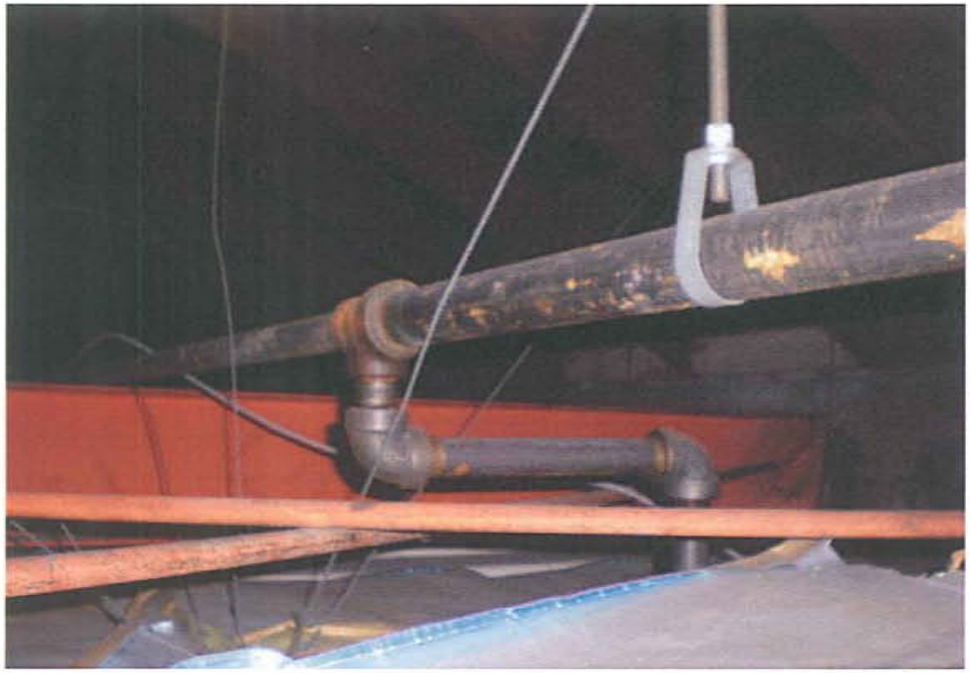
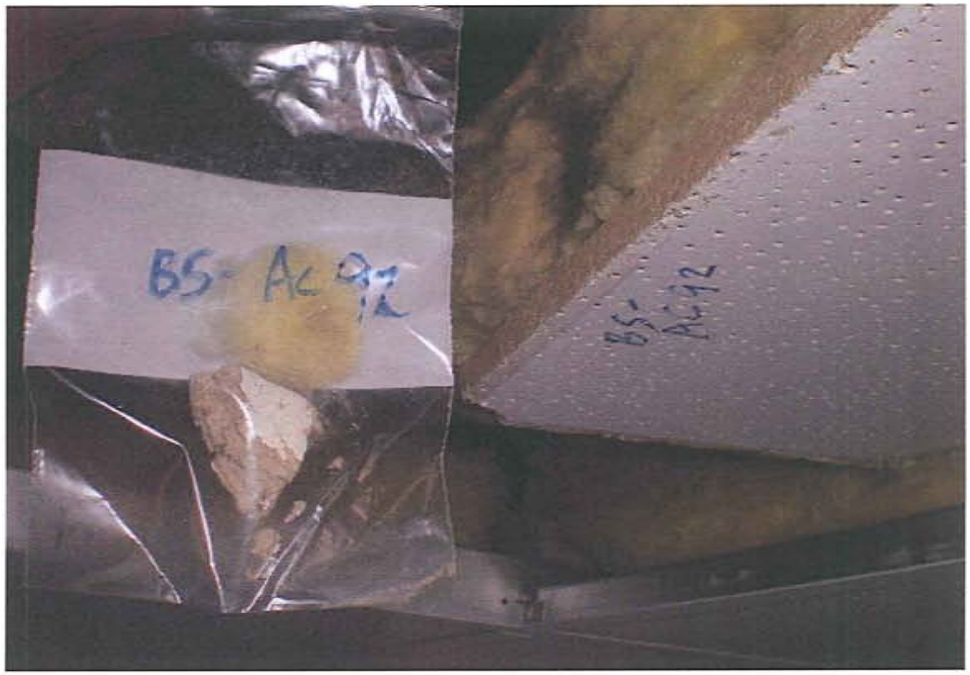





BS- AC 92
BS-
AC92

A Creative Joint Venture For Better Environmental Solutions

Lawrence Berkeley National Laboratory
Building 14
One Cyclotron Road
Berkeley, CA 94744

KELLCO-MACS Job #1004-17

NESHAP Compliant Pre-Demolition
Asbestos and Metals in Paint Inspection Report

for

Weiss Associates
5801 Christie Avenue
Suite 600
Emeryville, CA 94608

January 4, 2011
REVISED

3137 Diablo Avenue • Hayward, CA 94545-2701• (510) 786-9751 • fax (510) 786-9625
http://www.kellcomacs.com email: mailbox3137@kellcomacs.com

A Creative Joint Venture For Better Environmental Solutions

NESHAP Compliant Pre-Demolition
Asbestos and Metals in Paint Inspection Report

Date:	January 4, 2011 - REVISED
KELLCO-MACS Job #:	1004-17
Client:	Ms. Agata Sulczynski Weiss Associates 5801 Christie Avenue Suite 600 Emeryville, CA 94608
Location:	Lawrence Berkeley National Laboratory Building 14 One Cyclotron Road Berkeley, CA 94744
Date of Inspection:	July 21, 22, 23 & August 4, 2010
Inspectors:	Siew Yee Lee CAC # 09-4546, CDPH Lead # 19509
Description of the Inspected Area:	This is an asbestos and Heavy Metals inspection on building 14, a single story building with offices at the University of California, Berkeley campus in Berkeley, CA. The exterior walls contain stucco on a raised concrete foundation. The roofing consists of shingles and flooring with multi-color floor tile and linoleum. The paint on the exterior of the building appears to be in poor condition, with chipping and peeling evident in various locations. Please note, paint samples in this location where analyzed for heavy metals.

Background

This is a NESHAP compliant pre-demolition asbestos and metals inspection report for Building 14 located at LBNL in Berkeley, CA.

LETTER	STANDS FOR	EXAMPLE	MEANING
		01a 01b	First Sample, Second Layer First Sample, Third Layer

- ***Asbestos Findings***

Asbestos samples were analyzed in the KELLCO-MACS laboratory, by Polarized Light Microscopy, the EPA's recommended method. Copies of the full laboratory reports are attached.

Photographs of sampled materials are included. Sample locations are noted on the attached not-to-scale drawing.

The determination of a material to be Asbestos Containing Material (ACM) was made either by direct sampling or by homogeneity with at least one positive sample of the same material.

Materials that tested **positive** for asbestos are:

Lab Sample #	Field Sample #	Field Description	Asbestos %
L206486-2	B14-SN01a	Between 108 And 108A / Mastic (Green)	< 1% Chrysotile
L206486-4	B14-SN02	Area 108 / 12x12 Floor Tile (Blue)	2% Chrysotile
L206486-5	B14-SN02a	Area 108 / Mastic (Blue)	2% Chrysotile
L206486-7	B14-SN03	South End Of Area 120C / 9x9 Floor Tile (Green)	7% Chrysotile
L206486-8	B14-SN03a	South End Of Area 120C / Mastic (Green)	3% Chrysotile
L206486-12	B14-SNO6	Area 198, By Doorway To 137 / 9x9 Floor Tile (Marble Green)	8% Chrysotile
L206486-13	B14-SNO6a	Area 198, By Doorway To 137 / Mastic (Marble Green)	< 1% Chrysotile
L206486-14	B14-SNO7	Room 138, NE Corner By Sink / 9x9 Floor Tile (Dark Green)	7% Chrysotile
L206486-15	B14-SNO7a	Room 138, NE Corner By Sink / Mastic (Dark Green)	< 1% Chrysotile
L206486-16	B14-SNO8	Room 136, SW End / 9x9 Floor Tile (Marble Green)	8% Chrysotile
L206486-17	B14-SNO8a	Room 136, SW End / Mastic (Marble Green)	< 1% Chrysotile
L206486-18	B14-AW09	Room 136, NE Corner / Wall Texture	< 1% Chrysotile
L206486-19	B14-AW9a	Room 136, NE Corner / Drywall Joint Compound	< 1% Chrysotile
L206486-28	B14-SN14	Area 118, NE End By Work Station / 9x9 Floor Tile (Marble Green)	7% Chrysotile
L206486-29	B14-SN14a	Area 118, NE End By Work Station / Mastic (Marble Green)	< 1% Chrysotile
L206486-30	B14-AW15	Area 134, NW Corner / Wall Texture	< 1% Chrysotile

Lab Sample #	Field Sample #	Field Description	Asbestos %
L206486-31	B14-AW15a	Area 134, NW Corner / Drywall Joint Compound	2% Chrysotile
L206486-34	B14-AW17	South End Of 120C, SE Corner / Wall Texture	< 1% Chrysotile
L206486-35	B14-AW17a	South End Of 120C, SE Corner / Drywall Joint Compound	< 1% Chrysotile
L206486-36	B14-SN18	Room 118, Toward West Exit / 9x9 Floor Tile (Beige)	2% Chrysotile
L206486-37	B14-SN18a	Room 118, Toward West Exit / 9x9 Floor Tile And Mastic (Beige)	< 1% Chrysotile
L206486-42	B14-SN21	Room 104C, SW Corner Behind Doorway / 9x9 Floor Tile Mastic (Green)	8% Chrysotile
L206486-43	B14-SN21a	Room 104C, SW Corner Behind Doorway / 9x9 Floor Tile Mastic (Green)	< 1% Chrysotile
L206486-48	B14-SN24	South End Of Room 104 / 9x9 Floor Tile And Mastic (Marble Green)	7% Chrysotile
L206486-51	B14-SN26	Room 104A, East Corner By Doorway Under Carpet / Floor Tile (Beige)	< 1% Chrysotile
L206486-57	B14-AM30	West Exit, Exterior Of Door Frame / Sealant	2% Chrysotile
L206486-66	B14-SN39	SE Corner Of Room 104A, Under Carpet / Floor Tile (Beige)	< 1% Chrysotile
L206486-67	B14-SN39a	SE Corner Of Room 104A, Under Carpet / Mastic (Beige)	< 1% Chrysotile
L206486-78	B14-CK49	Above South Door Of 102 / Transite Panel	14% Chrysotile
L206486-90	B14-AW56	Room 137, West Wall / Wall Texture	< 1% Chrysotile
L206486-91	B14-SN57	Hallway In 198 / 9x9 Floor Tile (Dark Green)	7% Chrysotile
L206486-92	B14-SN57a	Hallway In 198 / Mastic (Dark Green)	< 1% Chrysotile
L206486-93	B14-SN58	Women's Restroom (136) / 9x9 Floor Tile (Dark Green)	7% Chrysotile
L206486-94	B14-SN58a	Women's Restroom (136) / Mastic (Dark Green)	< 1% Chrysotile
L206486-101	B14-AR62	East Vent On Roof / Penetration Mastic	7% Chrysotile
L206486-102	B14-AR63	Base Of Transite Pipe SW Of Roof / Penetration Mastic	8% Chrysotile

Samples with less than 10% asbestos can be submitted for further analysis by the Point Count method. If the Point Count method determines that the material contains less than 1% asbestos, these materials can be disposed of as non-hazardous asbestos containing construction waste.

Materials for which the analytical results show **no detection** of asbestos are:

Lab Sample #	Field Sample #	Field Description

Lab Sample #	Field Sample #	Field Description
L206480-1	B14-AMO1	Bldg 14, Stripping Material Behind Vent Register
L206486-1	B14-SN01	Between 108 And 108A / 12x12 Floor Tile (Green)
L206486-3	B14-SN01b	Between 108 And 108A /Mastic (Green)
L206486-6	B14-SN02b	Area 108 / Mastic (Blue)
L206486-9	B14-AM04	West End Of 120C, Under Table / Floor Leveling Compound (White)
L206486-10	B14-SNO5	By West Exit Of 120C / 12x12 Floor Tile
L206486-11	B14-SNO5a	By West Exit Of 120C / Yellow Glue
L206486-20	B14-SN10	Hallway Between 124A And 124C, By Doorway / 9x9 Floor Tile (Green)
L206486-21	B14-SN10a	Hallway Between 124A And 124C, By Doorway / Mastic (Green)
L206486-22	B14-AM11	Outside Of Doorway Of 134A / Vinyl Floor Sheeting (Grey Mosaic)
L206486-23	B14-AM11a	Outside Of Doorway Of 134A / Mastic (Grey Mosaic)
L206486-24	B14-AM11b	Outside Of Doorway Of 134A / Mastic (Grey Mosaic)
L206486-25	B14-AM12	Open Floor Space North Of 134A, NE Corner / Vinyl Floor Sheeting (Grey Mosaic)
L206486-26	B14-AM13	Open Floor Space North 134A, NE Corner / Baseboard (Black)
L206486-27	B14-AM13a	Open Floor Space North 134A, NE Corner / Mastic (Black)
L206486-32	B14-AM16	Area 134, West Wall Behind South Doorway / Mastic (Black)
L206486-33	B14-AM16a	Area 134, West Wall Behind South Doorway / Mastic (Black)
L206486-38	B14-AM19	Cubicle 114 E, South Wall / Baseboard (Black)
L206486-39	B14-AM19a	Cubicle 114 E, South Wall / Mastic (Black)
L206486-40	B14-AW20	Cubicle 114 E, SE Corner / Wall Texture
L206486-41	B14-AW20a	Cubicle 114 E, SE Corner / Drywall Joint Compound
L206486-44	B14-AW22	Room 104C, SW Corner Behind Doorway / Wall Texture
L206486-45	B14-AW22a	Room 104C, SW Corner Behind Doorway / Drywall Joint Compound
L206486-46	B14-SN23	South End Of Room 104 / 12x12 Floor Tile (Green)
L206486-47	B14-SN23a	South End Of Room 104 / Mastic (Green)
L206486-49	B14-SN24a	South End Of Room 104 / Mastic (Marble Green)
L206486-50	B14-AW25	Exterior South SW Corner Of Room 102 / Stucco
L206486-52	B14-SN26a	Room 104A, East Corner By Doorway Under Carpet / Mastic (Beige)
L206486-53	B14-AM26	Exterior West Wall Of Room 106 / Wall Patch (Grey)
L206486-54	B14-AM27	Exterior West Wall Of Room 106, Below Door Threshold / Wall Mastic (Black)
L206486-55	B14-AW28	Exterior West Wall Of Room 106 / Stucco
L206486-56	B14-SC29	Exterior West Wall Of Room 106 / Concrete
L206486-58	B14-AW31	Exterior Wall Of West Exit / Stucco
L206486-59	B14-SC32	Exterior Lower Wall Of South Of West Exit / Concrete
L206486-60	B14-SC33	Exterior Lower Wall Of South Exit Of Room 102 / Concrete

Lab Sample #	Field Sample #	Field Description
L206486-61	B14-AW34	Exterior SE Corner Of Room 104B / Stucco
L206486-62	B14-AW35	Exterior E Wall Of Room 114D / Stucco
L206486-63	B14-CK36	Exterior Window Of Room 114D / Window Caulking
L206486-64	B14-CK37	Exterior Window Of Room 134A / Window Caulking
L206486-65	B14-AW38	NE Corner Of Room 102 / Wall Texture And Drywall Joint Compound
L206486-68	B14-AR40	Attic / Roofing Debris (Black)
L206486-69	B14-AR41	Attic / Roofing Debris (Black)
L206486-70	B14-AR42	Attic / Roofing Debris (Black)
L206486-71	B14-AM43	Attic / Vinyl Floor Sheet (Grey Mosaic)
L206486-72	B14-AS44	Attic, Air Blower Unit, Duct Joint Tape
L206486-73	B14-AS44a	Attic, Air Blower Unit, Duct Joint Tape
L206486-74	B14-AC45	Room 108, By Latch-On Stairway To Attic / Ceiling Sound Board
L206486-75	B14-AC46	Hallway Ceiling By West Exit (Near 120C) / Ceiling Sound Board
L206486-76	B14-AC47	Area 104 Ceiling / Ceiling Sound Board
L206486-77	B14-CK48	Exterior South Window Of 104 / Window Caulking
L206486-79	B14-SN50	Cubicle 114E, SW Corner Under Carpet / Floor Tile Glue (Beige)
L206486-80	B14-SN50a	Cubicle 114E, SW Corner Under Carpet / Floor Tile Glue (Beige)
L206486-81	B14-SN51	Cubicle 114E, SE Corner Under Carpet / Floor Tile (Beige)
L206486-82	B14-SN51a	Cubicle 114E, SE Corner Under Carpet / Glue (Beige)
L206486-83	B14-SN52	Cubicle 114D, NE Corner Under Carpet / Floor Tile (Beige)
L206486-84	B14-SN52a	Cubicle 114D, NE Corner Under Carpet / Glue (Beige)
L206486-85	B14-AW53	Room 120B, SW Corner Behind Doorway / Wall Texture
L206486-86	B14-AW53a	Room 120B, SW Corner Behind Doorway / Wall Drywall Joint Compound
L206486-87	B14-AW54	Room 120A, East Wall / Wall Texture
L206486-88	B14-AM55	Room 137, West Corner by Door / Vinyl Floor Sheeting (Grey Mosaic)
L206486-89	B14-AM55a	Room 137, West Corner by Door / Vinyl Floor Sheeting (Grey Mosaic)
L206486-95	B14-AW59	North Wall In 104 / 12x12 Tile
L206486-96	B14-AW59a	North Wall In 104 / Brown Mastic
L206486-97	B14-AW59b	North Wall In 104 / 12x12 Tile And Brown Mastic
L206486-98	B14-AR60	NE Vent On Roof / Penetration Mastic
L206486-99	B14-AR61	SW Corner Of Roof / Roofing Shingles
L206486-100	B14-AR61a	SW Corner Of Roof / Felt
L206486-103	B14-AR64	SE Corner Of Roof / Roofing Shingles
L206486-104	B14-AR65	West End Of Roof / Felt
L206486-105	B14-AM66	Building 14, Electrical Panel 343A3A / Wire Tape Wrap

Lab Sample #	Field Sample #	Field Description
L206486-106	B14-CK39	South Exit Exterior Door Frame / Frame Caulking
L206954-1	B14-AM001	Panel 343A3A27A / black cloth wire
L206954-2	B14-AM002	Panel 343A3A27A25A / black cloth wire

- ***Metals in Paint Findings***

Four paint samples were collected and submitted for Heavy Metals (CAM17) analysis to Macs Lab, Inc.

These samples were analyzed using an ICP/MS, Extraction Method SW3050B TTLC and EPA 6010B/3050 method. This method is **not** for the purpose of profiling any waste streams from this project. Profiling of the waste streams (TCLP & STLC) will be the responsibility of the contractor performing the work. The results of the profiling of the waste streams can vary dramatically depending on the means and methods utilized by the contractor during the demolition of the buildings. Care needs to be taken to ensure that all OSHA and EPA rules are abided by. The EPA rules are typically contained within title 22 and the OSHA rules are typically contained within title 8. Please find the following list as guidance; furthermore, it is not intended to be all encompassing but as a starting point for review in regulatory compliance.

Lab Sample #	Field Sample	Field Description
206541-1	B14-PC1	Paint Chip Composite Off Wood/ Exterior Windows & Doors
206541-2	B14-PC2	Paint Chip Composite Off Concrete/ Exterior Walls
206541-3	B14-PC3	Paint Chip Composite/ Interior Building
206541-4	B14-PC4	Paint Chip Composite/ Interior Building

Building 14:

	Lab Sample Number:	206541 -1	206541 -2	206541 -3	206541 -4
	Client Sample Number:	B14-PC1	B14-PC2	B14-PC3	B14-PC4
	Matrix:	Bulk	Bulk	Bulk	Bulk
	Extraction Type:	Acid	Acid	Acid	Acid
	Units:	mg/kg (PPM)	mg/kg (PPM)	mg/kg (PPM)	mg/kg (PPM)
Sb	Antimony	468.26	135.45	505.57	65.18
As	Arsenic	46.08	102.61	74.70	<0.01
Ba	Barium	23,007.88	6,384.76	10,598.65	8,787.20
Be	Beryllium	1.60	3.12	1.27	2.01
Cd	Cadmium	135.62	24.14	132.78	27.57
Cr	Chromium	5,315.24	2,392.39	18,605.81	798.36
Co	Cobalt	1,040.28	310.65	879.87	293.86
Cu	Copper	277.36	315.26	248.61	126.97
Pb	Lead	576,182.14	17,263.39	411,694.51	11,082.59
Hg	Mercury	110.75	27.04	30.81	40.51
Mo	Molybdenum	155.19	45.61	135.06	27.23
Ni	Nickel	77.80	145.06	51.05	215.63
Se	Selenium	6,652.80	6,358.43	5,346.06	3,542.41
Ag	Silver	15.50	28.80	21.14	10.79
Tl	Thallium	342.60	110.77	261.34	85.45
V	Vanadium	87.78	241.15	65.35	89.17
Zn	Zinc	47,373.03	3,892.98	41,149.56	4,159.23

Regulatory Requirements

The Environmental Protection Agency (EPA) defines Asbestos Containing Material as any material that contains greater than 1% asbestos. Materials containing greater than 1% asbestos must be removed prior to demolition or renovation if they will be disturbed.

Friable asbestos containing material is any material that can be crushed or pulverized by hand pressure when dry, or materials that can be rendered to a crumbled, pulverized, or powdered state when dry by crushing, sanding, sawing, shot blasting, or through demolition or renovation activities.

As stated by NESHAP regulations, any material that contains less than 10% asbestos using the visual estimation method can be point counted with gravimetric reduction. The Point Counting method is a much more accurate analytical method for determining the percent of asbestos in a particular material. If the Point Count method determines that the material contains less than 1% asbestos, the material being analyzed can be disposed of as a non-hazardous asbestos containing construction waste.

Removal or disturbance of material with any detectable amount of asbestos must be handled in accordance with OSHA regulations. Cal-OSHA registration is required if the material contains more than .1% asbestos ($1/10^{th}$ of a percent). If there is more than 100 feet (linear or square) of an asbestos containing material that will be abated or disturbed, a California State registered and licensed asbestos abatement contractor must perform the work. If there is less than 100 feet, the work does not require a licensed asbestos abatement contractor, but must still conform to Cal-OSHA regulations.

Removal or disturbance of any amount of lead paint requires adherence to the Cal-OSHA and CDPH regulations, including proper training and certification for workers and supervisors

The OSHA lead (1532) regulations require that a Negative Initial Determination for lead exposure be made with paint that contains greater than 0.06% (600 ppm) of lead. Paint with less than 0.06% lead should still be treated within the OSHA guidelines, but with reasonable work practices should not generate OSHA action levels of lead exposure.

Building components with intact lead paint and no other hazardous materials can be disposed of as non-hazardous construction waste. Paint chips and debris must be disposed of as lead containing hazardous waste.

Title 8 OSHA

General Industry Safety Orders deal with exposure limits for personnel working in or around surfaces that contain heavy metals.

Element	Chapter	Group	Article	Section
Antimony (Sb)	7	16	107	5155
Arsenic (As)	7	16	110	5214
Barium (Ba)	7	16	107	5155
Beryllium (Be)	7	16	107	5155

Element	Chapter	Group	Article	Section
Cadmium (Cd)	7	16	110	5206
Chromium (Cr)	7	16	110	5206
Cobalt (Co)	7	16	110	5155
Copper (Cu)	7	16	110	5155
Lead (Pb)	7	16	109	5198
Mercury (Hg)	7	16	110	5155
Molybdenum (Mo)	7	16	110	5155
Nickel (Ni)	7	16	110	5155
Selenium (Se)	7	16	110	5155
Silver (Ag)	7	16	110	5155
Thallium (Ti)	7	16	110	5155
Vanadium (V)	7	16	110	5155
Zinc (Zn)	7	16	107	5155

Title 22- Hazardous Waste

Title 22 describes the characterization of hazardous waste as described in chapter 11, article 1, section 66261.1. Under the EPA's Resource Conservation and Recovery Act (RCRA), a national program and inventory system about handling hazardous waste, describes the minimum requirements in order to be in compliance with the Federal and/or State regulations.

Comment Regarding All Asbestos Containing Materials:

Asbestos containing materials in good condition do not necessarily need to be removed unless they will be disturbed; they should however be respected.

Employees, contract workers and others should be advised not to drill, saw, scrape or otherwise disturb this material without taking precautionary measures appropriate to asbestos containing material.

Asbestos containing material should be removed prior to the renovation and must be removed prior to demolition.

Comment Regarding All Lead Containing Materials:

Lead is a known health hazard. Lead containing materials in good condition do not necessarily need to be removed if they are not disturbed; they should however be respected.

Painted surfaces that contain lead should be made known to contractors who may disturb them during their work. OSHA guidelines for workers in contact with lead paint apply if ANY detectable lead is found.

Anyone coming in contact with leaded paint should be advised not to disturb it without taking precautionary measures appropriate to avoid lead contamination or lead exposure.

Areas Needing Immediate Corrective Action

Asbestos (in any condition) and chipping and peeling lead paint should be removed prior to renovation and must be removed prior to demolition of the survey site.

Analytical Procedures

- ***POLARIZED LIGHT MICROSCOPY (PLM)***

  Bulk samples were analyzed in accordance with U.S. EPA "Test Method for Determination of Asbestos in Bulk Building Materials, 1993," with inclusion of area percent estimates of the sample components. The use of the McCrone Color Dispersion Staining Technique supplements the analysis when considered useful by the analyst. The samples are prepared with refractive immersion oil and are examined under Polarized Light Microscopy (PLM). The accuracy of the visual estimate method is 1%.

  As per the standard "...The accuracy in the determination of the presence or absence of asbestos of greater than 1 area percent asbestos is greater than 99%." ASTM Committee D22.05, 1/18/88, Standard *Method of Testing for Asbestos Containing Materials by Polarized Light Microscopy*. If the sample matrix is reduced to minimize non-asbestos components, the detection limit can be mathematically enhanced, based on the amount of material remaining after matrix reduction. This method is called gravimetric reduction. This method involves ashing and chemical dissolution of the sample.

- ***POINT COUNTING***

  The Point Counting method is a much more accurate analytical method for determining the percent of asbestos in a particular material. KELLCO-MACS uses a muffle furnace to ash the sample and remove organic compounds. Hydrochloric acid is used to dissolve some of the non-asbestos minerals. Under this method a minimum of 125 points are counted from each of 8 different slide preparations of the same sample (total of 1000 points min.) If the **Point Count Method** determines that the material contains less than 1% asbestos, the material being analyzed can be treated as non-hazardous asbestos containing construction waste**. Note: ONLY the Point Count Method can be used for this determination.**

- ***ATOMIC ABSORPTION FOR LEAD***

  Paint samples were collected for atomic absorption (AA) analysis. The detection limit for each sample depends upon many factors including the sensitivity of the instrument and the sample size. In the KELLCO-MACS laboratory utilizing flame AA, the detection limit is normally .01% or 100 parts per million (ppm).

- ***CAM 17 TESTING***
  CAM 17 Metals were tested by Macs Lab, Inc. using ICP-MS, Extraction Method SW3050B and Analytical Method 6010B/3050.

KELLCO-MACS Qualifications

KELLCO-MACS is a joint venture offering hazardous materials and AIHA laboratory analyses. Our credentials include:

- The KELLCO-MACS asbestos inspector is licensed with the State of California Department of Occupational Safety and Health (CAL-OSHA).

- The KELLCO-MACS lead inspector is licensed by the California Department of Public Health (CDPH)

- The laboratory accreditations include:

  - **NVLAP PLM** for Asbestos: NIST National Voluntary Laboratory Accreditation Program certificate of accreditation for bulk **asbestos** analysis by polarized light microscopy (Accreditation #101948-1).
  - **AIHA** Accreditation for **Industrial Hygiene** Analytical Laboratory for PCM, and AA for lead (Accreditation #101786).
  - **AIHA Analyst Proficiency (NIOSH PAT)** (Accreditation # 11172)
  - **AIHA ELLAP** Accreditation for Lead: Accreditation for the **Environmental Lead** Laboratory recognized by the EPA as meeting the requirements of the National Lead Laboratory Accreditation Program established under Title X (Lab ID #11109).
  - **ELAP PLM** for Asbestos: California Department of Health Services, Environmental Laboratory Accreditation Program, certificate for bulk asbestos analysis (Certificate #2027)
  - **USDA Soil** permit #39484

The following supporting documents are attached to this report:

- Laboratory analytical reports
- Photographs of sample locations
- Floor plan or sketch showing sample locations

Please call KELLCO if there are any questions and/or clarifications regarding this report. We look forward to working with you in the future.

Synopsis

Asbestos was found in the following materials:

- Transite Flue Pipe
- 12 x 12 floor tile and black mastic
- 9x9 floor tile and black mastic
- Wall texture, drywall and joint compound
- Door Frame Sealant
- Transite panel
- Roof penetration mastic

Upon visual inspection, there appears to be loose roofing debris throughout the attic area. The fume hood is assumed to contain asbestos

Designation of material as asbestos containing should be applied to homogenous material of the type analyzed and found to contain asbestos.

The paint on the exterior of the building appears to be in poor condition, with chipping and peeling evident in various locations. Please note, paint samples in this location where analyzed for heavy metals.

About the Inspection

The inspection performed was both visual and tactile. Samples were taken of suspect materials located at the interior and exterior of the survey area.

Areas that make them not readily available to our inspector were not sampled. If future work uncovers any non-sampled materials, these should be submitted for asbestos and/or lead paint analysis.

The following numbering convention was used for this inspection:

LETTER	STANDS FOR	EXAMPLE	MEANING
XX	Building DESIGNATION based on information provided on drawings provided to us prior to inspection	B14	Building 14
Y & *Optional Z*	EITHER building SYSTEM (W: wall; F: Flooring; C: Ceiling; T: TSI; M: Misc) OR Further designation of sample location as Unit # within building	SN AW AM	Tile/ Mastic Samples Asbestos Ceiling Samples Asbestos Miscellaneous
xx	Sample number and layer	01	First Sample, First Layer

Sincerely,

KELLCO-MACS

Tim C. Cannard CAC #94-1395, CDPH Lead #764
Senior Project Manager

Asbestos Definitions and Classifications

ACM	(Asbestos Containing Material) - Material containing more than 1% asbestos. ACM must be disposed as hazardous waste. Note: Federal OSHA and Cal-OSHA control materials containing any amount of asbestos.
ACBM	(Asbestos Containing Building Material) – AHERA/ASHARA term for material containing more than 1% asbestos in or on interior structural members or other structural components. Exceptions: Covered walkways, porticos and exterior HVAC TSI.
ACCM	(Asbestos Containing Construction Material) – California term for a manufactured construction material containing greater than .1% (one tenth of one percent) asbestos.
PACM	(Presumed Asbestos Containing Material) OSHA considers all TSI and surfacing materials installed prior to1980 to be ACM unless proven otherwise.
Friable	Asbestos Containing Material that can be crumbled pulverized or reduced to powder by hand pressure when dry.
NOA	Naturally Occurring Asbestos. CARB defines as having >.25% by point counting.

Categories of Asbestos Used BY EPA AHERA/ASHARA and OSHA/Cal-OSHA

TSI	(Thermal System Insulation) - "Thermal system insulation (TSI)" means ACM applied to pipes, fittings, boilers, breeching, tanks, ducts or other structural components to prevent heat loss or gain. "Thermal system insulation ACM" is thermal system insulation which contains more than 1% asbestos.
SURFACING (usually mixed on site at time of application)	"Surfacing material" means material that is sprayed, troweled-on or otherwise applied to surfaces (such as acoustical plaster on ceilings and fireproofing materials on structural members, or other materials on surfaces for acoustical, fireproofing, and other purposes). "Surfacing ACM" means surfacing material which contains more than 1% asbestos. NOTE: OSHA/Cal-OSHA do not classify taping mud, floor tile mastic, stucco, leveling compound, and hard wall plasters or wall texturing as surfacing.
MISC.	All other ACM, including classify taping mud, floor tile mastic, stucco, leveling compound, and hard wall plasters or wall texturing as surfacing.

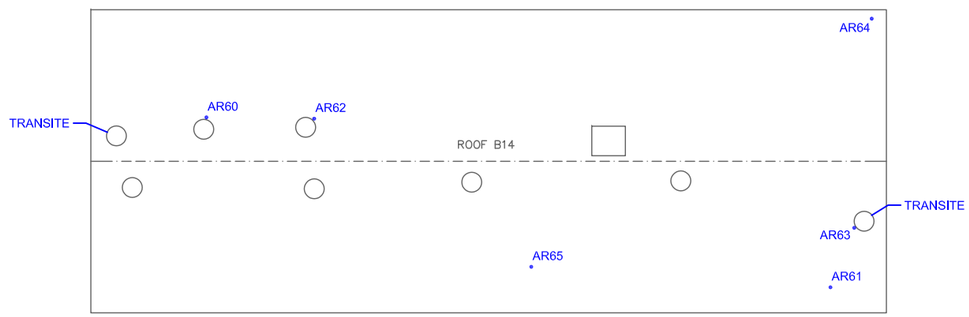
NESHAPS Categories for Asbestos (used by Air Quality Management Districts)

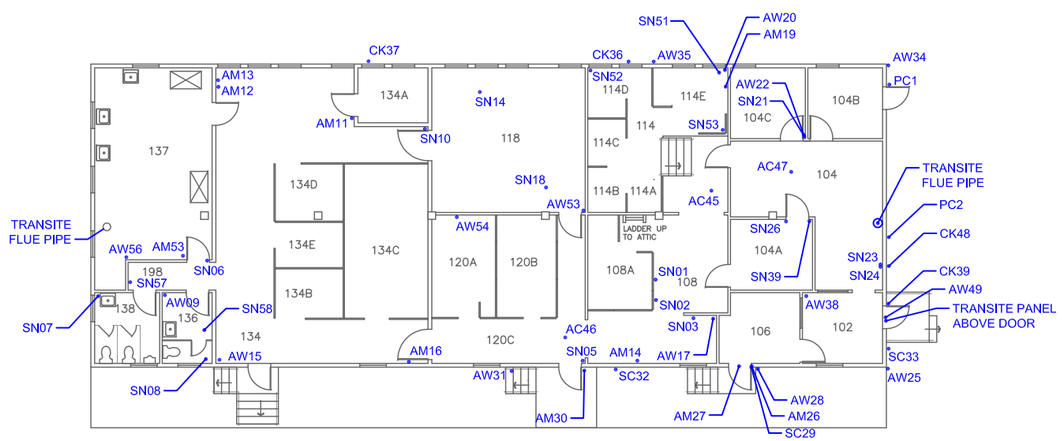
Category I	Cat I Non-friable Asbestos Containing Material refers to asbestos containing packing, gaskets, resilient floor covering, Galbestos, and asphalt roofing products containing more than 1% asbestos.
Category II	Cat II Non-friable Asbestos-Containing Material is any material that is not Cat I that contains greater than 1% asbestos.
RACM	"Regulated Asbestos-Containing Material." – Friable asbestos material (ACM) or a Category I non-friable ACM that has become friable OR a 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 reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations. RACM should be removed prior to renovation or demolition.

Characterization of Asbestos Containing Materials

Material	Estimated Quantity	TSI	Surfacing	Misc	RACM	Cat I	Cat II
All 9 x 9 and 12 x 12 Floor Tile and Mastic	~4,730 sq. ft.			X		X	
Wall Texture, Drywall and Joint Compound	~25,000 sq. ft.		X		X		
Transite Panel	~ 10 sq. ft.			X		X	
Transite Flue Pipes	~20 ft			X		X	
Roof Patch/ Penetration Mastic	~ 30 sq. ft.			X		X	
Door Frame Sealant	~20 sq. ft.			X			X

Please note: Multiple layers of flooring material exist; sq/ft information provided only accounts for a single layer of floor tile and mastic.





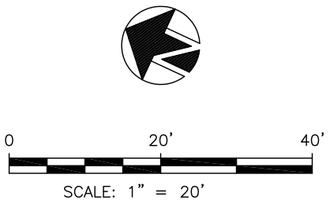
B14

ABBREVIATIONS

AC	Asbestos ceiling sample
AM	Asbestos miscellaneous
AR	Asbestos roofing sample
AW	Asbestos wall sample
CK	Caulk sample
PC	Paint sample
SC	Concrete sample
SN	Tile/mastic sample

NOTE:

All sample locations are approximate



L:\LBNL.178\Old Town Demolition\Sample Location Maps\Kellco Maps\SLM_Kellco_B14.dwg

MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Method: EPA-600/M4-82-020

KELLCO Services
3137 Diablo Ave

Hayward CA 94545

Person to contact: Tim Cannard
Contact phone: 510-786-9751
FAX phone: 510-786-9625
Sampled by: Siew Yee
Sampled on: July 22, 2010
Analyzed on: July 22, 2010 at: 17:19
Corresponding invoice number: 206480

Analyst: HCB (signature)

Laboratory manager: (signature)

Job Number: 1004-17

Job Description: Lawrence Berkeley National Lab - Bldg 14 & 25A, Berkeley, CA

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206480-1	B14-AMO1 Bldg 14, Stripping Matieral Behind Vent Register	**N.D.**	< 1%Cellulose	Black/off-white plaster. Balance of sample is unspecified non-fibrous material.
L206480-2	B25A-SNO1 Bldg 25, White 12x12 Floor Tile And Mastic	**N.D.**	No Fibers	Off-white/black tile. Balance of sample is unspecified non-fibrous material.
L206480-3	B25A-SNO1a Bldg 25, White 12x12 Floor Tile' Mastic	**N.D.**	< 1%Cellulose	Black adhesive. Balance of sample is unspecified non-fibrous material.
L206480-4	B25A-SNO2 Bldg 25, 12x12 Blue Dot Floor Tile & Mastic	**N.D.**	No Fibers	Off-white/black tile. Balance of sample is unspecified non-fibrous material.
L206480-5	B25A-SNO2a Bldg 25, 12x12 Blue Dot Floor Tile' Mastic	**N.D.**	< 1%Cellulose	Black adhesive. Balance of sample is unspecified non-fibrous material.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

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MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

QA Report

Method: EPA-600/M

KELLCO Services
3137 Diablo Ave

Hayward CA 94545

Laboratory manager: _____ (signature)

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
Blank sample		**N.D.**	No fibers	
		PC*		

End of report.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

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MACS Lab Incorporated

Material Analysis and Characterization Service

Analytical and Environmental Services

Chain of Custody Record

To Be Used For All Types Of Analysis

MACS Lab # ~~L204206~~

Customer Code L206480

BILLED TO		PROJECT INFORMATION		
Name: Kello-MACS		Sampled By: Siew Yee Lee	Date: 7/22/2010	
Address:		Project Name: LBNL.	Job #: 1004-17	
City:		Site Address: Cyclotron Rd		
State:	Zip:	City, State, Zip: Berkeley,		
Phone No:		Site Contact:		
Fax No:		Phone No:	Fax No:	
Cell No:		Comments:		
Email:		Samples Preserved: Yes / No	Received Cold: Yes / No	

ANALYSIS REQUIRED

Required Turn Around Time: 4 Hour X; 8 Hour; 24 Hour; 2 Days/48 Hour; 3 Days/72 Hour; 5+ Days/120 Hour

DISPOSAL: ☐ Customer ☐ MACS ☐ OTHER (Explain)

Sample #	Sample Description / Type of Work	TIME ON	TIME OFF	TOTAL TIME	FLOW RATES START	FLOW RATES STOP	PCM Asbestos Air - NIOSH 7400	PLM Asbestos Bulk - 40 CFR 763	Lead (Wipes, Air, Paint, Soil)	TEM (Air/Bulk) - AHERA/Yamate Level II	Mold - Viable / Non Viable Air / Bulk	Metals (TCLP, CAM17, STLC)		Comments /Area Social Security #
B14-AM01	Bldg 14, ~~we when~~ stripping material behind vent register							X						
B25A-SN01	Bldg 25, white 12x12 floortile & mastic							X						
B25-SN02	Bldg 25, 12x12 Blue dot floor tile & mastic							X						

Relinquished By: [signature] *Date:* 7/22/2010 *Time:* 1704 *Accepted By:* Danielle Nichols *Date:* 7/22/10 *Time:* 5:00

TEM asbestos in water analysis requires 2 one-liter bottles shipped @ 4°C in dark containers for each sample.

LEAD USEPA 7420, Air NIOSH 7082, Soil EPA 7000/7420, Wipes NIOSH 9100 Water AIHA (method 3113B EPA 200.9)

Units Water - 1ug/l = 1 ppb Paint - 1% = 10,000 ppm

3137 Diablo Avenue • Hayward, CA 94545-2701• (510) 786-9751 • fax (510) 786-9625 • http://www.macslab.com • email: info@macslab.com

MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Method: EPA-600/M4-82-020

KELLCO Services
3137 Diablo Ave

Hayward CA 94545

Person to contact: Tim Cannard
Contact phone: 510-786-9751
FAX phone: 510-786-9625
Sampled by: Siew Yee Lee
Sampled on: July 9, 2010
Analyzed on: August 2, 2010 at: 14:13
Corresponding invoice number: 206486

Analyst: HCB
HCB (signature)

Laboratory manager: _____ (signature)

Job Number: 1004-17

Job Description: Lawrence Berkeley Naitonal Lab, Bldg 14A, Berkeley, CA

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206486-1	B14-SN01 Between 108 And 108A / 12x12 Floor Tile And Mastic (Green)	**N.D.**	< 1%Cellulose	Green tile. Balance of sample is unspecified non-fibrous material.
L206486-2	B14-SN01a Between 108 And 108A / 12x12 Floor Tile And Mastic (Green)	**Yes**	< 1%Chrysotile* 4%Cellulose	Black tar adhesive. Balance of sample is organic binders.
L206486-3	B14-SN01b Between 108 And 108A / 12x12 Floor Tile And Mastic (Green)	**N.D.**	1%Cellulose	Off-white leveling compound. Balance of sample is unspecified non-fibrous material.
L206486-4	B14-SN02 Area 108 / 12x12 Floor Tile And Mastic (Blue)	**Yes**	2%Chrysotile* < 1%Cellulose	Blue tile. Balance of sample is unspecified non-fibrous material.
L206486-5	B14-SN02a Area 108 / 12x12 Floor Tile And Mastic (Blue)	**Yes**	2%Chrysotile* 4%Cellulose	Black tar adhesive. Balance of sample is organic binders.

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Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206486-6	B14-SN02b Area 108 / 12x12 Floor Tile And Mastic (Blue)	**N.D.**	< 1%Cellulose	Off-white leveling compound. Balance of sample is unspecified non-fibrous material.
L206486-7	B14-SN03 South End Of Area 120C / 9x9 Floor Tile And Mastic (Green)	**Yes**	7%Chrysotile* < 1%Cellulose	Green tile. Balance of sample is unspecified non-fibrous material.
L206486-8	B14-SN03a South End Of Area 120C / 9x9 Floor Tile And Mastic (Green)	**Yes**	3%Chrysotile* 4%Cellulose	Black tar. Balance of sample is organic binders.
L206486-9	B14-AM04 West End Of 120C, Under Table / Floor Leveling Compound (White)	**N.D.**	< 1%Cellulose	Off-white leveling compound. Balance of sample is unspecified non-fibrous material.
L206486-10	B14-SNO5 By West Exit Of 120C / 12x12 Floor Tile And Yellow Glue	**N.D.**	< 1%Cellulose	Green tile. Balance of sample is unspecified non-fibrous material.
L206486-11	B14-SNO5a By West Exit Of 120C / 12x12 Floor Tile And Yellow Glue	**N.D.**	1%Cellulose	Yellow adhesive. Balance of sample is organic binders.
L206486-12	B14-SNO6 Area 198, By Doorway To 137 / 9x9 Floor Tile And Mastic (Marble Green)	**Yes**	8%Chrysotile* < 1%Cellulose	Green tile. Balance of sample is unspecified non-fibrous material.
L206486-13	B14-SNO6a Area 198, By Doorway To 137 / 9x9 Floor Tile And Mastic (Marble Green)	**Yes**	< 1%Chrysotile* 4%Cellulose	Black tar. Balance of sample is organic binders.
L206486-14	B14-SNO7 Room 138, NE Corner By Sink / 9x9 Floor Tile ANd Mastic (Dark Green)	**Yes**	7%Chrysotile* < 1%Cellulose	Green tile. Balance of sample is unspecified non-fibrous material.

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3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206486-15	B14-SNO7a Room 138, NE Corner By Sink / 9x9 Floor Tile ANd Mastic (Dark Green)	**Yes**	< 1% Chrysotile* 5% Cellulose	Black tar. Balance of sample is organic binders.
L206486-16	B14-SNO8 Room 136, SW End / 9x9 Floor Tile And Mastic (Marble Green)	**Yes**	8% Chrysotile* < 1% Cellulose	Green tile. Balance of sample is unspecified non-fibrous material.
L206486-17	B14-SNO8a Room 136, SW End / 9x9 Floor Tile And Mastic (Marble Green)	**Yes**	< 1% Chrysotile* 3% Cellulose	Black tar. Balance of sample is organic binders.
L206486-18	B14-AW09 Room 136, NE Corner / Wall Texture	**Yes**	< 1% Chrysotile* 1% Cellulose	Off-white compound texture. Balance of sample is unspecified non-fibrous material.
L206486-19	B14-AW9a Room 136, NE Corner / Drywall Joint Compound	**Yes**	< 1% Chrysotile* 22% Cellulose	Off-white joint compound plaster. Balance of sample is unspecified non-fibrous material.
L206486-20	B14-SN10 Hallway Between 124A And 124C, By Doorway / 9x9 Floor Tile And Mastic (Green)	**N.D.**	< 1% Cellulose	Green tile. Balance of sample is unspecified non-fibrous material.
L206486-21	B14-SN10a Hallway Between 124A And 124C, By Doorway / 9x9 Floor Tile And Mastic (Green)	**N.D.**	1% Cellulose	Yellow adhesive. Balance of sample is organic binders.
L206486-22	B14-AM11 Outside Of Doorway Of 134A / Vinyl Floor Sheeting And Mastic (Grey Mosaic)	**N.D.**	20% Cellulose 6% Synthetic 4% Fiberglass	Off-white linoleum. Balance of sample is polymer and unspecified non-fibrous material.
L206486-23	B14-AM11a Outside Of Doorway Of 134A / Vinyl Floor Sheeting And Mastic (Grey Mosaic)	**N.D.**	4% Cellulose < 1% Polyethylene	Black tar. Balance of sample is organic binders.

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Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206486-24	B14-AM11b Outside Of Doorway Of 134A / Vinyl Floor Sheeting And Mastic (Grey Mastic)	**N.D.**	1%Cellulose	Off-white leveling compound. Balance of sample is unspecified non-fibrous material.
L206486-25	B14-AM12 Open Floor Space North Of 134A, NE Corner / Vinyl Floor Sheeting And Mastic (Grey Mastic)	**N.D.**	20%Cellulose 4%Fiberglass 4%Synthetic	Off-white linoleum. Balance of sample is polymer and unspecified non-fibrous material.
L206486-26	B14-AM13 Open Floor Space North 134A, NE Corner / Baseboard And Mastic (Black)	**N.D.**	No Fibers	Black vinyl. Balance of sample is unspecified non-fibrous material.
L206486-27	B14-AM13a Open Floor Space North 134A, NE Corner / Baseboard And Mastic (Black)	**N.D.**	1%Cellulose	Yellow adhesive. Balance of sample is organic binders.
L206486-28	B14-SN14 Area 118, NE End By Work Station / 9x9 Floor Tile And Mastic (Marble Green)	**Yes**	7%Chrysotile* < 1%Cellulose	Green tile. Balance of sample is unspecified non-fibrous material.
L206486-29	B14-SN14a Area 118, NE End By Work Station / 9x9 Floor Tile And Mastic (Marble Green)	**Yes**	< 1%Chrysotile* 4%Cellulose	Black tar. Balance of sample is organic binders.
L206486-30	B14-AW15 Area 134, NW Corner / Wall Texture	**Yes**	< 1%Chrysotile* 1%Cellulose	Off-white compound texture. Balance of sample is unspecified non-fibrous material.
L206486-31	B14-AW15a Area 134, NW Corner / Drywall Joint Compound	**Yes**	2%Chrysotile* 22%Cellulose	Off-white joint compound plaster. Balance of sample is unspecified non-fibrous material.
L206486-32	B14-AM16 Area 134, West Wall Behind South Doorway / Baseboard And Mastic (Black)	**N.D.**	No Fibers	Black vinyl. Balance of sample is unspecified non-fibrous material.

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Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206486-33	B14-AM16a Area 134, West Wall Behind South Doorway / Baseboard And Mastic (Black)	**N.D.**	2% Wollastonite < 1% Cellulose	Brown adhesive. Balance of sample is organic binders.
L206486-34	B14-AW17 South End Of 120C, SE Corner / Wall Texture	**Yes**	< 1% Chrysotile* 1% Cellulose	Off-white compound texture. Balance of sample is unspecified non-fibrous material.
L206486-35	B14-AW17a South End Of 120C, SE Corner / Drywall Joint Compound	**Yes**	< 1% Chrysotile* 22% Cellulose	Off-white joint compound plaster. Balance of sample is unspecified non-fibrous material.
L206486-36	B14-SN18 Room 118, Toward West Exit / 9x9 Floor Tile And Mastic (Beige)	**Yes**	2% Chrysotile* < 1% Cellulose	Off-white tile. Balance of sample is unspecified non-fibrous material.
L206486-37	B14-SN18a Room 118, Toward West Exit / 9x9 Floor Tile And Mastic (Beige)	**Yes**	< 1% Chrysotile* 5% Cellulose	Black tar. Balance of sample is organic binders.
L206486-38	B14-AM19 Cubicle 114 E, South Wall / Baseboard And Mastic (Black)	**N.D.**	No Fibers	Brown vinyl. Balance of sample is unspecified non-fibrous material.
L206486-39	B14-AM19a Cubicle 114 E, South Wall / Baseboard And Mastic (Black)	**N.D.**	2% Wollastonite < 1% Cellulose	Brown adhesive. Balance of sample is organic binders.
L206486-40	B14-AW20 Cubicle 114 E, SE Corner / Wall Texture	**N.D.**	1% Cellulose	Off-white compound texture. Balance of sample is unspecified non-fibrous material.
L206486-41	B14-AW20a Cubicle 114 E, SE Corner / Drywall Joint Compound	**N.D.**	23% Cellulose	Off-white joint compound plaster. Balance of sample is unspecified non-fibrous material.

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Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206486-42	B14-SN21 Room 104C, SW Corner Behidn Doorway / 9x9 Floor Tile Mastic (Green)	**Yes**	8%Chrysotile* < 1%Cellulose	Green tile. Balance of sample is unspecified non-fibrous material.
L206486-43	B14-SN21a Room 104C, SW Corner Behidn Doorway / 9x9 Floor Tile Mastic (Green)	**Yes**	< 1%Chrysotile* 4%Cellulose	Black tar. Balance of sample is organic binders.
L206486-44	B14-AW22 Room 104C, SW Corner Behind Doorway / Wall Texture	**N.D.**	1%Cellulose	Off-white compound texture. Balance of sample is unspecified non-fibrous material.
L206486-45	B14-AW22a Room 104C, SW Corner Behidn Doorway / Drywall Joint Compound	**N.D.**	23%Cellulose	Off-white joint compound plaster. Balance of sample is unspecified non-fibrous material.
L206486-46	B14-SN23 South End Of Room 104 / 12x12 Floor Tile And Mastic (Green)	**N.D.**	< 1%Cellulose	Green tile. Balance of sample is unspecified non-fibrous material.
L206486-47	B14-SN23a South End Of Room 104 / 12x12 Floor Tile And Mastic (Green)	**N.D.**	4%Cellulose	Black tar. Balance of sample is organic binders.
L206486-48	B14-SN24 South End Of Room 104 / 9x9 Floor Tile And Mastic (Marble Green)	**Yes**	7%Chrysotile* < 1%Cellulose	Green tile. Balance of sample is unspecified non-fibrous material.
L206486-49	B14-SN24a South End Of Room 104 / 9x9 Floor Tile And Mastic (Marble Green)	**N.D.**	4%Cellulose < 1%Polyethylene	Black tar. Balance of sample is organic binders.
L206486-50	B14-AW25 Exterior South SW Corner Of Room 102 / Stucco	**N.D.**	< 1%Cellulose	Gray stucco. Balance of sample is silicate and cementitious.

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Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206486-51	B14-SN26 Room 104A, East Corner By Doorway Under Carpet / Floor Tile And Mastic (Beige)	**Yes**	< 1% Chrysotile* < 1% Cellulose	Beige tile. Balance of sample is unspecified non-fibrous material.
L206486-52	B14-SN26a Room 104A, East Corner By Doorway Under Carpet / Floor Tile And Mastic (Beige)	**N.D.**	4% Cellulose < 1% Polyethylene	Black tar. Balance of sample is organic binders.
L206486-53	B14-AM26 Exterior West Wall Of Room 106 / Wall Patch (Grey)	**N.D.**	< 1% Cellulose	Gray/beige stucco. Balance of sample is silicate and cementitious.
L206486-54	B14-AM27 Exterior West Wall Of Room 106, Below Door Threshold / Wall Mastic (Black)	**N.D.**	< 1% Polyethylene < 1% Cellulose	Black adhesive. Balance of sample is organic binders and unspecified non-fibrous material.
L206486-55	B14-AW28 Extrior West Wall Of Room 106 / Stucco	**N.D.**	No Fibers	Gray stucco. Balance of sample is silicate and cementitious.
L206486-56	B14-SC29 Exterior West Wall Of Room 106 / Concrete	**N.D.**	No Fibers	Gray concrete. Balance of sample is silicate and cementitious.
L206486-57	B14-AM30 West Exit, Exterior Of Door Frame / Sealant	**Yes**	2% Chrysotile* < 1% Cellulose	Off-white sealant. Balance of sample is unspecified non-fibrous material.
L206486-58	B14-AW31 Exterior Wall Of West Exit / Stucco	**N.D.**	< 1% Cellulose	Gray stucco. Balance of sample is silicate and cementitious.
L206486-59	B14-SC32 Exterior Lower Wall Of South Of West Exit / Concrete	**N.D.**	No Fibers	Gray concrete. Balance of sample is silicate and cementitious.

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Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206486-60	B14-SC33 Exterior Lower Wall Of South Exit Of Room 102 / Concrete	**N.D.**	No Fibers	Gray concrete. Balance of sample is silicate and cementitious.
L206486-61	B14-AW34 Exterior SE Corner Of Room 104B / Stucco	**N.D.**	No Fibers	Gray stucco. Balance of sample is silicate and cementitious.
L206486-62	B14-AW35 Exterior E Wall Of Room 114D / Stucco	**N.D.**	< 1%Cellulose	Gray stucco. Balance of sample is silicate and cementitious.
L206486-63	B14-CK36 Exterior Window Of Room 114D / Window Caulking	**N.D.**	< 1%Cellulose	Off-white caulk. Balance of sample is unspecified non-fibrous material.
L206486-64	B14-CK37 Exterior Window Of Room 134A / Window Caulking	**N.D.**	< 1%Cellulose	Off-white caulk. Balance of sample is unspecified non-fibrous material.
L206486-65	B14-AW38 NE Corner Of Room 102 / Wall Texture And Drywall Joint Compound	**N.D.**	1%Cellulose	Off-white compound texture. Balance of sample is unspecified non-fibrous material.
L206486-66	B14-SN39 SE Corner Of Room 104A, Under Carpet / Floor Tile And Mastic (Beige)	**Yes**	< 1%Chrysotile* 22%Cellulose	Beige tile. Balance of sample is unspecified non-fibrous material.
L206486-67	B14-SN39a SE Corner Of Room 104A, Under Carpet / Floor Tile And Mastic (Beige)	**Yes**	< 1%Chrysotile* 4%Cellulose	Black tar adhesive. Balance of sample is organic binders.
L206486-68	B14-AR40 Attic / Roofing Debris (Black)	**N.D.**	21%Cellulose < 1%Polyethylene	Black roofing. Balance of sample is organic binders.

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NVLAP®
NVLAP Lab Code 101948-0

MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206486-69	B14-AR41 Attic / Roofing Debris (Black)	**N.D.**	20% Cellulose < 1% Synthetic	Black roofing. Balance of sample is organic binders.
L206486-70	B14-AR42 Attic / Roofing Debris (Black)	**N.D.**	20% Cellulose < 1% Polyethylene < 1% Synthetic	Black roofing. Balance of sample is organic binders.
L206486-71	B14-AM43 Attic / Vinyl Floor Sheet (Grey Mosaic)	**N.D.**	19% Cellulose 9% Synthetic 3% Fiberglass	Gray linoleum. Balance of sample is polymer and unspecified non-fibrous material.
L206486-72	B14-AS44 Attic, Air Blower Unit, Duct Joint Tape	**N.D.**	88% Fiberglass 1% Cellulose	Brown duct tape. Balance of sample is unspecified non-fibrous material.
L206486-73	B14-AS44a Attic, Air Blower Unit, Duct Joint Tape	**N.D.**	12% Fiberglass < 1% Cellulose	Black vinyl. Balance of sample is unspecified non-fibrous material.
L206486-74	B14-AC45 Room 108, By Latch-On Stairway To Attic / Ceiling Sound Board	**N.D.**	91% Cellulose	Tan ceiling fiber board. Balance of sample is unspecified non-fibrous material.
L206486-75	B14-AC46 Hallway Ceiling By West Exit (Near 120C) / Ceiling Sound Board	**N.D.**	91% Cellulose	Tan ceiling fiber board. Balance of sample is unspecified non-fibrous material.
L206486-76	B14-AC47 Area 104 Ceiling / Ceiling Sound Board	**N.D.**	91% Cellulose	Tan ceiling fiber board. Balance of sample is unspecified non-fibrous material.
L206486-77	B14-CK48 Exterior South Window Of 104 / Window Caulking	**N.D.**	< 1% Cellulose	Beige caulk. Balance of sample is unspecified non-fibrous material.

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510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206486-78	B14-CK49 Above South Door Of 102 / Transite Panel	**Yes**	14%Chrysotile* < 1%Cellulose	Gray transite. Balance of sample is cementitious.
L206486-79	B14-SN50 Cubicle 114E, SW Corner Under Carpet / Floor Tile Glue (Beige)	**N.D.**	< 1%Cellulose	Off-white tile. Balance of sample is unspecified non-fibrous material.
L206486-80	B14-SN50a Cubicle 114E, SW Corner Under Carpet / Floor Tile Glue (Beige)	**N.D.**	1%Cellulose	Yellow adhesive. Balance of sample is organic binders.
L206486-81	B14-SN51 Cubicle 114E, SE Corner Under Carpet / Floor Tile And Glue (Beige)	**N.D.**	< 1%Cellulose	Off-white tile. Balance of sample is unspecified non-fibrous material.
L206486-82	B14-SN51a Cubicle 114E, SE Corner Under Carpet / Floor Tile And Glue (Beige)	**N.D.**	1%Cellulose	Yellow adhesive. Balance of sample is organic binders.
L206486-83	B14-SN52 Cubicle 114D, NE Corner Under Carpet / Floor Tile And Glue (Beige)	**N.D.**	< 1%Cellulose	Off-white tile. Balance of sample is unspecified non-fibrous material.
L206486-84	B14-SN52a Cubicle 114D, NE Corner Under Carpet / Floor Tile And Glue (Beige)	**N.D.**	< 1%Cellulose < 1%Polyethylene	Yellow adhesive. Balance of sample is organic binders.
L206486-85	B14-AW53 Room 120B, SW Corner Behind Doorway / Wall Texture And Drywall Joint Compound	**N.D.**	< 1%Cellulose	Off-white compound texture. Balance of sample is unspecified non-fibrous material.
L206486-86	B14-AW53a Room 120B, SW Corner Behind Doorway / Wall Texture And Drywall Joint Compound	**N.D.**	22%Cellulose	Off-white joint compound plaster. Balance of sample is unspecified non-fibrous material.

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MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206486-87	B14-AW54 Room 120A, East Wall / Wall Texture	**N.D.**	< 1% Cellulose	Off-white compound texture. Balance of sample is unspecified non-fibrous material.
L206486-88	B14-AM55 Room 137, West Corner by Door / Vinyl Floor Sheeting (Grey Mosaic)	**N.D.**	18% Cellulose 10% Synthetic 4% Fiberglass	Gray linoleum. Balance of sample is polymer and unspecified non-fibrous material.
L206486-89	B14-AM55a Room 137, West Corner by Door / Vinyl Floor Sheeting (Grey Mosaic)	**N.D.**	1% Cellulose < 1% Synthetic	Off-white adhesive. Balance of sample is organic binders.
L206486-90	B14-AW56 Room 137, West Wall / Wall Texture	**Yes**	< 1% Chrysotile* 1% Cellulose	Off-white compound texture. Balance of sample is unspecified non-fibrous material.
L206486-91	B14-SN57 Hallway In 198 / 9x9 Floor Tile And Mastic (Dark Green)	**Yes**	7% Chrysotile* < 1% Cellulose	Green tile. Balance of sample is unspecified non-fibrous material.
L206486-92	B14-SN57a Hallway In 198 / 9x9 Floor Tile And Mastic (Dark Green)	**Yes**	< 1% Chrysotile* 4% Cellulose	Black tar. Balance of sample is organic binders.
L206486-93	B14-SN58 Women's Restroom (136) / 9x9 Floor Tile And Msatic (Dark Green)	**Yes**	7% Chrysotile* < 1% Cellulose	Green tile. Balance of sample is unspecified non-fibrous material.
L206486-94	B14-SN58a Women's Restroom (136) / 9x9 Floor Tile And Msatic (Dark Green)	**Yes**	< 1% Chrysotile* 4% Cellulose	Black tar. Balance of sample is organic binders.
L206486-95	B14-AW59 North Wall In 104 / 12x12 Tile And Brown Mastic	**N.D.**	70% Mineral Wool 8% Cellulose < 1% Polyethylene	Off-white ceiling tile. Balance of sample is unspecified non-fibrous material.

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MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206486-96	B14-AW59a North Wall In 104 / 12x12 Tile And Brown Mastic	**N.D.**	< 1%Cellulose	Brown adhesive. Balance of sample is organic binders.
L206486-97	B14-AW59b North Wall In 104 / 12x12 Tile And Brown Mastic	**N.D.**	78%Cellulose 2%Synthetic	Off-white wall seam paper. Balance of sample is unspecified non-fibrous material.
L206486-98	B14-AR60 NE Vent On Roof / Penetration Mastic	**N.D.**	< 1%Cellulose	Gray caulk tar. Balance of sample is organic binders and unspecified non-fibrous material.
L206486-99	B14-AR61 SW Corner Of Roof / Roofing Shingles & Felt	**N.D.**	19%Fiberglass 1%Cellulose	Black roofing aggregate. Balance of sample is silicate and organic binders.
L206486-100	B14-AR61a SW Corner Of Roof / Roofing Shingles & Felt	**N.D.**	41%Cellulose 1%Synthetic	Black felt. Balance of sample is organic binders.
L206486-101	B14-AR62 East Vent On Roof / Penetration Mastic	**Yes**	7%Chrysotile* 2%Cellulose	Black/gray roofing mastic. Balance of sample is silicate and organic binders.
L206486-102	B14-AR63 Base Of Transite Pipe SW Of Roof / Penetration Mastic	**Yes**	8%Chrysotile* 3%Cellulose	Black roofing mastic. Balance of sample is silicate and organic binders.
L206486-103	B14-AR64 SE Corner Of Roof / Roofing Shingles & Felt	**N.D.**	19%Fiberglass 1%Cellulose	Black roofing aggregate. Balance of sample is silicate and organic binders.
L206486-104	B14-AR65 West End Of Roof / Roofing Shingles & Felt	**N.D.**	18%Fiberglass 1%Cellulose < 1%Polyethylene	Black roofing aggregate. Balance of sample is silicate and organic binders.

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MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206486-105	B14-AM66 Building 14, Electrical Panel 343A3A / Wire Tape Wrap	**N.D.**	47%Cellulose	Black wrap tar. Balance of sample is organic binders and unspecified non-fibrous material.
L206486-106	B14-CK39 South Exit Exterior Door Frame / Frame Caulking	**N.D.**	< 1%Cellulose < 1%Polyethylene	Off-white caulk. Balance of sample is unspecified non-fibrous material.

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MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

QA Report

Method: EPA-600/M

KELLCO Services
3137 Diablo Ave

Hayward CA 94545

Laboratory manager: _____ (signature)

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
Blank sample		**N.D.**	No fibers	
		PC*		
L206486-82	B14-SN51a Cubicle 114E, SE Corner Under Carpet / Floor Tile And Glue (Beige)	**N.D.**	1%Cellulose	Yellow adhesive. Balance of sample is organic binders.

End of report.

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L206486

KELLCO-MACS

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Chain of Custody Record

For Bulk PLM Sample Collection Only

PROJECT INFORMATION

BILLED TO		
Name: Kellco - MACS	Sampled By: Siew Yee Lee	Date Sampled: 7/9 & 7/16/2010
Address: 3137 Diablo Avenue	Project Manager: Tim Cannard	Job #: 1004-17
City: Hayward	Project Name: Lawrence Berkeley National Lab	
State: Ca Zip: 94545	Site Address: Bldg 14A,	
Phone No: (510) 786-9751	City, State, Zip: Berkeley, Ca	
Fax No: (510) 786-9625	Site Contact:	
Cell No:	Phone No:	Fax No:
Email:	Samples Preserved: Yes / No	Analyze to First Positive: Yes / No

ANALYSIS REQUIRED

	Sample #	Sample Location / Sample Description (Color)	PLM (Bulk) - 40 CFR - Chap. 1, Part 763, Subpart F, Appendix A, Section 1	(F)riable / (N)on Friable	Condition: (G)ood / (F)air / (P)oor	Length (Feet)	Width (Feet)	Height (Feet)	Quantity
1004-17— 1	B14-SN01	Between 108 and 108A / 12x12 floor tile and mastic (green)	X						
1004-17— 2	B14-SN02	Area 108 / 12x12 floor tile and mastic (blue)	X						
1004-17— 3	B14-SN03	South end of Area 120C / 9x9 floor tile and mastic (green)	X						
1004-17— 4	B14-AM04	west end of 120C, under table / floor leveling compound (white)	X						
1004-17— 5	B14-SN05	By west exit or 120C / 12x12 floor tile and yellow glue	X						
1004-17— 6	B14-SN06	Area 198, by doorway to 137 / 9x9 floor tile and mastic (marble green)	X						
1004-17— 7	B14-SN07	Room 138, NE corner by sink / 9x9 floor tile and mastic (dark green)	X						
1004-17— 8	B14-SN08	Room 136, SW end / 9x9 floor tile and mastic (marble green)	X						
1004-17— 9	B14-AW09	Room 136, NE corner / Wall texture	X						
1004-17— 10	B14-AW9a	Room 136, NE corner / Drywall joint compound	X						

Required Turn Around Time
4 Hour ___
8 Hour ___
24 Hour XX
2 Days/48 Hour ___
3 Days/72 Hour ___
5+ Days/120 Hour ___

DISPOSAL
☐ Customer
☒ Laboratory
☐ OTHER (Explain)

Relinquished By: [signature] *Date:* 7/23/2010 *Time:* 0725

Accepted By: Danielle Nichols *Date:* 7/23/10 *Time:* 8:35

Lab Report Number(s):

Delivery Type: *Drop Off* *FedEx* *Mail* *Other*

WB - Wallboard JC - Joint Compound WT - Wall Texture WBT - Wallboard Tape FT - Floor Tile FTM - Floor Tile Mastic BBM - Baseboard Mastic
RSF - Resilient Sheet Flooring CT - Ceiling Tile SAAM - Spray-Applied Acoustical Material R - Roof TSI - Thermal System Insulation EL - Elbow

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http://www.kellcomacs.com email: mailbox3137@kellcomacs.com

L206486

KELLCO-MACS

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Chain of Custody Record

For Bulk PLM Sample Collection Only

BILLED TO	PROJECT INFORMATION	
Name: Kellco - MACS	Sampled By: Siew Yee Lee	Date Sampled: 7/9 & 7/16/2010
Address: 3137 Diablo Avenue	Project Manager: Tim Cannard	Job #: 1004-17
City: Hayward	Project Name: Lawrence Berkeley National Lab	
State: Ca Zip: 94545	Site Address: Bldg 14A,	
Phone No: (510) 786-9751	City, State, Zip: Berkeley, Ca	
Fax No: (510) 786-9625	Site Contact:	
Cell No:	Phone No:	Fax No:
Email:	Samples Preserved: Yes / No	Analyze to First Positive: Yes / No

ANALYSIS REQUIRED

Required Turn Around Time: 4 Hour ___ 8 Hour ___ 24 Hour XX 2 Days/48 Hour ___ 3 Days/72 Hour ___ 5+ Days/120 Hour ___

DISPOSAL: ☐ Customer ☒ Laboratory ☐ OTHER (Explain)

	Sample #	Sample Location / Sample Description (Color)	PLM (Bulk) - 40 CFR - Chap. 1, Part 763,	(F)riable / (N)on Friable	Condition: (G)ood / (F)air / (P)oor	Length (Feet)	Width (Feet)	Height (Feet)	Quantity
1004-17— 11	B14-SN10	Hallway between 134A and 134C, by doorway /9x9 Floor tile and mastic (green)	X						
1004-17— 12	B14-AM11	Outside of doorway of 134A / Vinyl floor sheeting and mastic (grey mosaic)	X						
1004-17— 13	B14-AM12	Open floor space north of 134A, NE corner / Vinyl floor sheeting and mastic (grey m	X						
1004-17— 14	B14-AM13	Open floor space north of 134A, NE corner / Baseboard and mastic (black)	X						
1004-17— 15	B14-SN14	Area 118, NE end by workstation, 9x9 Floor tile and mastic (marble green)	X						
1004-17— 16	B14-AW15	Area 134, NW corner / Wall texture	X						
1004-17— 17	B14-AW15a	Area 134, NW corner /Drywall joint compound	X						
1004-17— 18	B14-AM16	Area 134, west wall behind south doorway/ Baseboard and mastic (black)	X						
1004-17— 19	B14-AW17	South end of 120C, SE corner / Wall texture	X						
1004-17— 20	B14-AW17a	South end of 120C, SE corner /Drywall joint compound	X						

Relinquished By: [illegible] *Date:* 7/23/10 *Time:* 0725

Accepted By: D. Nichols *Date:* 7/23/10 *Time:* 8:35

Lab Report Number(s):

Delivery Type: *Drop Off* *FedEx* *Mail* *Other*

WB - Wallboard JC - Joint Compound WT - Wall Texture WBT - Wallboard Tape FT - Floor Tile FTM - Floor Tile Mastic BBM - Baseboard Mastic
RSF - Resilient Sheet Flooring CT - Ceiling Tile SAAM - Spray-Applied Acoustical Material R - Roof TSI - Thermal System Insulation EL - Elbow

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KELLCO-MACS

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Chain of Custody Record

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BILLED TO	PROJECT INFORMATION	
Name: Kellco - MACS	Sampled By: Siew Yee Lee	Date Sampled: 7/9 & 7/16/2010
Address: 3137 Diablo Avenue	Project Manager: Tim Cannard	Job #: 1004-17
City: Hayward	Project Name: Lawrence Berkeley National Lab	
State: Ca Zip: 94545	Site Address: Bldg 14A,	
Phone No: (510) 786-9751	City, State, Zip: Berkeley, Ca	
Fax No: (510) 786-9625	Site Contact:	
Cell No:	Phone No:	Fax No:
Email:	Samples Preserved: Yes / No	Analyze to First Positive: Yes / No

ANALYSIS REQUIRED

Required Turn Around Time: 4 Hour ___ 8 Hour ___ 24 Hour XX 2 Days/48 Hour ___ 3 Days/72 Hour ___ 5+ Days/120 Hour ___

DISPOSAL: ☐ Customer ☒ Laboratory ☐ OTHER (Explain)

	Sample #	Sample Location / Sample Description (Color)	PLM (Bulk) - 40 CFR - Chap. 1, Part 763,	(F)riable / (N)on Friable	Condition: (G)ood / (F)air / (P)oor	Length (Feet)	Width (Feet)	Height (Feet)	Quantity
1004-17— 21	B14-SN18	Room 118, toward west exit / 9x9 Floor Tile and mastic (Beige)	X						
1004-17— 22	B14-AM19	Cubicle 114 E , south wall / Baseboard and mastic (black)	X						
1004-17— 23	B14-AW20	Cubicle 114 E , SE corner / Wall texture	X						
1004-17— 24	B14-AW20a	Cubicle 114 E , SE corner /Drywall joint compound	X						
1004-17— 25	B14-SN21	Room 104C, SW corner behind doorway/ 9x9 Floor Tile and mastic (Green)	X						
1004-17— 26	B14-AW22	Room 104C, SW corner behind doorway/ Wall texture	X						
1004-17— 27	B14-AW22a	Room 104C, SW corner behind doorway/ Drywall joint compound	X						
1004-17— 28	B14-SN23	South end of Room 104/ 12x12 floor tile and mastic (green)	X						
1004-17— 29	B14-SN24	South end of Room 104/9x9 floor tile and mastic (marble green)	X						
1004-17— 30	B14-AW25	Exterior South SW corner of Room 102/Stucco	X						

Relinquished By: [signature] *Date:* 7/23/10 *Time:* 0725 *Accepted By:* D. Nichols *Date:* 7/23/10 *Time:* 8:35

Lab Report Number(s): *Delivery Type:* *Drop Off* *FedEx* *Mail* *Other*

WB - Wallboard JC - Joint Compound WT - Wall Texture WBT - Wallboard Tape FT - Floor Tile FTM - Floor Tile Mastic BBM - Baseboard Mastic
RSF - Resilient Sheet Flooring CT - Ceiling Tile SAAM - Spray-Applied Acoustical Material R - Roof TSI - Thermal System Insulation EL - Elbow

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L206486

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BILLED TO	PROJECT INFORMATION	
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City: Hayward	Project Name: Lawrence Berkeley National Lab	
State: Ca Zip: 94545	Site Address: Bldg 14	
Phone No: (510) 786-9751	City, State, Zip: Berkeley CA	
Fax No: (510) 786-9625	Site Contact:	
Cell No:	Phone No:	Fax No:
Email:	Samples Preserved: Yes / No	Analyze to First Positive: Yes / No

ANALYSIS REQUIRED

Required Turn Around Time: 4 Hour ___ 8 Hour ___ 24 Hour XX 2 Days/48 Hour ___ 3 Days/72 Hour ___ 5+ Days/120 Hour ___

DISPOSAL: [ ] Customer [X] Laboratory [ ] OTHER (Explain)

	Sample #	Sample Location / Sample Description (Color)	PLM (Bulk) - 40 CFR - Chap. 1, Part 763,	(F)riable / (N)on Friable	Condition: (G)ood / (F)air / (P)oor	Length (Feet)	Width (Feet)	Height (Feet)	Quantity
1004-17— 31	B14-SN26	Room 104A, east corner by doorway under carpet/ floor tile and mastic (Beige)	X						
1004-17— 32	B14-AM26	Exterior west wall of Room 106/ wall patch (grey)	X						
1004-17— 33	B14-AM27	Exterior west wall of Room 106, below door threshold/ wall mastic (black)	X						
1004-17— 34	B14-AW28	Exterior west wall of Room 106/ stucco	X						
1004-17— 35	B14-SC29	Exterior west wall of Room 106/ concrete	X						
1004-17— 36	B14-AM30	West exit, exterior of door frame / sealant	X						
1004-17— 37	B14-AW31	Exterior wall of West exit / stucco	X						
1004-17— 38	B14-SC32	Exterior lower wall of south of west exit / concrete	X						
1004-17— 39	B14-SC33	~~No sample~~ Exterior Lower wall of south exit of Room 102/concrete.	X						
1004-17— 40	B14-AW34	Exterior SE corner of Room 104B / stucco	X						

Relinquished By: [signature] *Date:* 7/23/10 *Time:* 0725.	*Accepted By:* D. Nichols *Date:* 7/23/10 *Time:* 8:35
Lab Report Number(s):	*Delivery Type:* *Drop Off* *FedEx* *Mail* *Other*

WB - Wallboard JC - Joint Compound WT - Wall Texture WBT - Wallboard Tape FT - Floor Tile FTM - Floor Tile Mastic BBM - Baseboard Mastic
RSF - Resilient Sheet Flooring CT - Ceiling Tile SAAM - Spray-Applied Acoustical Material R - Roof TSI - Thermal System Insulation EL - Elbow

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http://www.kellcomacs.com email: mailbox3137@kellcomacs.com

L206486

KELLCO-MACS

A Creative Joint Venture For Better Environmental Solutions

Chain of Custody Record

For Bulk PLM Sample Collection Only

BILLED TO	PROJECT INFORMATION	
Name: Kellco - MACS	Sampled By: Siew Yee Lee	Date Sampled: 7/9 & 7/16/2010
Address: 3137 Diablo Avenue	Project Manager: Tim Cannard	Job #: 1004-17
City: Hayward	Project Name: Lawrence Berkeley National Lab	
State: Ca Zip: 94545	Site Address: Bldg 14	
Phone No: (510) 786-9751	City, State, Zip: Berkeley CA	
Fax No: (510) 786-9625	Site Contact:	
Cell No:	Phone No:	Fax No:
Email:	Samples Preserved: Yes / No	Analyze to First Positive: Yes / No

ANALYSIS REQUIRED

Required Turn Around Time: 4 Hour ___ 8 Hour ___ 24 Hour XX 2 Days/48 Hour ___ 3 Days/72 Hour ___ 5+ Days/120 Hour ___

DISPOSAL: ☐ Customer ☒ Laboratory ☐ OTHER (Explain)

	Sample #	Sample Location / Sample Description (Color)	PLM (Bulk) - 40 CFR - Chap. 1, Part 763,	(F)riable / (N)on Friable	Condition: (G)ood / (F)air / (P)oor	Length (Feet)	Width (Feet)	Height (Feet)	Quantity
1004-17— 41	B14-AW35	Exterior E wall of Room 114D / stucco	X						
1004-17— 42	B14-CK36	Exterior window of Room 114D / window caulking	X						
1004-17— 43	B14-CK37	Exterior window of Room 134A / window caulking	X						
1004-17— 44	B14-AW38	NE corner of Room 102/ wall texture and drywall joint compound	X						
1004-17— 45	B14-SN39	SE corner of Room 104A, under carpet / floor tile and mastic (beige)	X						
1004-17— 46	B14-AR40	Attic / Roofing debris (black)	X						
1004-17— 47	B14-AR41	Attic / Roofing debris (black)	X						
1004-17— 48	B14-AR42	Attic / Roofing debris (black)	X						
1004-17— 49	B14-AM43	Attic / vinyl floor sheet (grey mosaic)	X						
1004-17— 50	B14-AS44	Attic, air blower unit / duct joint tape	X						

Relinquished By: [signature] *Date:* 7/23/2010 *Time:* 0725	*Accepted By:* D. Nichols *Date:* 7/23/10 *Time:* 8:35
Lab Report Number(s):	*Delivery Type:* *Drop Off* *FedEx* *Mail* *Other*

WB - Wallboard JC - Joint Compound WT - Wall Texture WBT - Wallboard Tape FT - Floor Tile FTM - Floor Tile Mastic BBM - Baseboard Mastic
RSF - Resilient Sheet Flooring CT - Ceiling Tile SAAM - Spray-Applied Acoustical Material R - Roof TSI - Thermal System Insulation EL - Elbow

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BILLED TO	PROJECT INFORMATION	
Name: Kellco - MACS	Sampled By: Siew Yee Lee	Date Sampled: 7/9 & 7/16/2010
Address: 3137 Diablo Avenue	Project Manager: Tim Cannard	Job #: 1004-17
City: Hayward	Project Name: Lawrence Berkeley National Lab	
State: Ca Zip: 94545	Site Address: Bldg 14	
Phone No: (510) 786-9751	City, State, Zip: Berkeley CA	
Fax No: (510) 786-9625	Site Contact:	
Cell No:	Phone No:	Fax No:
Email:	Samples Preserved: Yes / No	Analyze to First Positive: Yes / No

ANALYSIS REQUIRED

Required Turn Around Time: 4 Hour ___ 8 Hour ___ 24 Hour XX 2 Days/48 Hour ___ 3 Days/72 Hour ___ 5+ Days/120 Hour ___

DISPOSAL: ☐ Customer ☒ Laboratory ☐ OTHER (Explain)

	Sample #	Sample Location / Sample Description (Color)	PLM (Bulk) - 40 CFR - Chap. 1, Part 763,	(F)riable / (N)on Friable	Condition: (G)ood / (F)air / (P)oor	Length (Feet)	Width (Feet)	Height (Feet)	Quantity
1004-17— 51	B14-AC45	Room 108, by latch-on stairway to attic / Ceiling sound board	X						
1004-17— 52	B14-AC46	Hallway ceiling by west exit (near 120C) / Ceiling sound board	X						
1004-17— 53	B14-AC47	Area 104 ceiling / ceiling sound board	X						
1004-17— 54	B14-CK48	Exterior south window of 104 / window caulking	X						
1004-17— 55	B14-CK49	Above south door of 102 / transite panel	X						
1004-17— 56	B14-SN50	Cubicle 114E, SW corner under carpet / floor tile and glue (beige)	X						
1004-17— 57	B14-SN51	Cubicle 114E, SE corner under carpet / floor tile and glue (beige)	X						
1004-17— 58	B14-SN52	Cubicle 114D, NE corner under carpet / floor tile and glue (beige)	X						
1004-17— 59	B14-AW53	Room 120B, SW corner behind doorway / wall texture and drywall joint compound	X						
1004-17— 60	B14-AW54	Room 120A, east wall / wall texture	X						

Relinquished By: [illegible] *Date:* 7/23/10 *Time:* 0725

Accepted By: D. Nichols *Date:* 7/23/10 *Time:* 8:35

Lab Report Number(s):

Delivery Type: *Drop Off* *FedEx* *Mail* *Other*

WB - Wallboard JC - Joint Compound WT - Wall Texture WBT - Wallboard Tape FT - Floor Tile FTM - Floor Tile Mastic BBM - Baseboard Mastic
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Chain of Custody Record

For Bulk PLM Sample Collection Only

BILLED TO	PROJECT INFORMATION	
Name: Kellco - MACS	Sampled By: Siew Yee Lee	Date Sampled: 7/9 & 7/16/2010
Address: 3137 Diablo Avenue	Project Manager: Tim Cannard	Job #: 1004-17
City: Hayward	Project Name: Lawrence Berkeley National Lab	
State: Ca Zip: 94545	Site Address: Bldg 14	
Phone No: (510) 786-9751	City, State, Zip: Berkeley CA	
Fax No: (510) 786-9625	Site Contact:	
Cell No:	Phone No:	Fax No:
Email:	Samples Preserved: Yes / No	Analyze to First Positive: Yes / No

ANALYSIS REQUIRED

Required Turn Around Time: 4 Hour ___ 8 Hour ___ 24 Hour XX 2 Days/48 Hour ___ 3 Days/72 Hour ___ 5+ Days/120 Hour ___

DISPOSAL: ☐ Customer ☒ Laboratory ☐ OTHER (Explain)

Sample #	Type	Sample Location / Sample Description (Color)	PLM (Bulk) - 40 CFR - Chap. 1, Part 763,	(F)riable / (N)on Friable	Condition: (G)ood / (F)air / (P)oor	Length (Feet)	Width (Feet)	Height (Feet)	Quantity
1004-17— 61	B14-AM55	Room 137, west corner by door / vinyl floor sheeting (grey mosaic)	X						
1004-17— 62	B14-AW56	Room 137, west wall / wall texture	X						
1004-17— 63	B14-SN57	Hallway in 198 / 9x9 floor tile and mastic (dark green)	X						
1004-17— 64	B14-SN58	Women's restroom (136) / 9x9 floor tile and mastic (dark green)	X						
1004-17— 65	B14-AW59	North wall in 104 / 12x12 tile and brown mastic	X						
1004-17— 66	B14-AR60	NE vent on roof / penetration mastic	X						
1004-17— 67	B14-AR61	SW corner of roof / Roofing shingles x feet	X						
1004-17— 68	B14-AR62	East vent on roof / penetration mastic	X						
1004-17— 69	B14-AR63	Base of transite pipe SW of Roof / Penetration mastic	X						
1004-17— 70	B14-AR64	SE corner of roof / Roofing shingles x feet.	X						

Relinquished By: [signature] *Date:* 7/23/10 *Time:* 0725

Accepted By: D. Nichols *Date:* 7/23/10 *Time:* 8:35

Lab Report Number(s):

Delivery Type: *Drop Off* *FedEx* *Mail* *Other*

WB - Wallboard JC - Joint Compound WT - Wall Texture WBT - Wallboard Tape FT - Floor Tile FTM - Floor Tile Mastic BBM - Baseboard Mastic
RSF - Resilient Sheet Flooring CT - Ceiling Tile SAAM - Spray-Applied Acoustical Material R - Roof TSI - Thermal System Insulation EL - Elbow

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KELLCO-MACS

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Chain of Custody Record

For Bulk PLM Sample Collection Only

BILLED TO	PROJECT INFORMATION	
Name: Kellco - MACS	Sampled By: Siew Yee Lee	Date Sampled: 7/13/10
Address: 3137 Diablo Avenue	Project Manager: Tim Cannard	Job #: 1004-17
City: Hayward	Project Name: Lawrence Berkeley National Lab	
State: Ca Zip: 94545	Site Address: Bldg 14	
Phone No: (510) 786-9751	City, State, Zip: Berkeley CA	
Fax No: (510) 786-9625	Site Contact:	
Cell No:	Phone No:	Fax No:
Email:	Samples Preserved: Yes / No	Analyze to First Positive: Yes / No

ANALYSIS REQUIRED

	Sample #	Sample Location / Sample Description (Color)	PLM (Bulk) - 40 CFR - Chap. 1, Part 763, Subpart F Appendix A or current EPA method	(F)riable / (N)on Friable	Condition: (G)ood / (F)air / (P)oor	Length (Feet)	Width (Feet)	Height (Feet)	Quantity
1004-17 — 71	B14-AR65	west end of roof / Roofing shingles & felt.	X						
1004-17 — 72	B14-AM66	Bldg 14, electrical panel 343A3A / wire ~~wrap~~ tape wrap.	X						
1004-17 — 73	B14-CK39	South exit ~~door~~ exterior door frame / frame caulking	X						
1004-17 — 74			X						
1004-17 — 75			X						
1004-17 — 76			X						
1004-17 — 77			X						
1004-17 — 78			X						
1004-17 — 79			X						
1004-17 — 80			X						

Required Turn Around Time
4 Hour
8 Hour
24 Hour XX
2 Days/48 Hour
3 Days/72 Hour
5+ Days/120 Hour

DISPOSAL
☐ Customer
☒ Laboratory
☐ OTHER (Explain)

Relinquished By: [signature] *Date:* 7/23/2010 *Time:* 0735

Accepted By: D. Nichols *Date:* 7/23/10 *Time:* 8:35

Lab Report Number(s):

Delivery Type: *Drop Off* *FedEx* *Mail* *Other*

WB - Wallboard JC - Joint Compound WT - Wall Texture WBT - Wallboard Tape FT - Floor Tile FTM - Floor Tile Mastic BBM - Baseboard Mastic
RSF - Resilient Sheet Flooring CT - Ceiling Tile SAAM - Spray-Applied Acoustical Material R - Roof TSI - Thermal System Insulation EL - Elbow

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http://www.kellcomacs.com email: mailbox3137@kellcomacs.com

MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Method: EPA-600/M4-82-020

KELLCO Services
3137 Diablo Ave

Hayward CA 94545

Person to contact: Tim Cannard
Contact phone: 510-786-9751
FAX phone: 510-786-9625
Sampled by: Siew Yee Lee
Sampled on: August 4, 2010
Analyzed on: August 4, 2010 at: 18:09
Corresponding invoice number: 206954

Analyst: HCB (signature)

Laboratory manager: (signature)

Job Number: 1004-17

Job Description: LBNL - Building 14 - Berkeley, CA

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206954-1	B14-AM001 Panel 343A3A27A / black cloth wire	**N.D.**	26% Cellulose 18% Synthetic	Black cloth wire. Balance of sample is unspecified non-fibrous material.
L206954-2	B14-AM002 Panel 343A3A27A25A / black cloth wire	**N.D.**	28% Cellulose 16% Synthetic	Black cloth wire. Balance of sample is unspecified non-fibrous material.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

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NVLAP Lab Code 101948-0

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MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

QA Report

Method: EPA-600/M

KELLCO Services
3137 Diablo Ave

Hayward CA 94545

Laboratory manager: _____ (signature)

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
Blank sample		**N.D.**	No fibers	
		PC*		

End of report.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

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NVLAP®
NVLAP Lab Code 101948-0

MACS Lab Incorporated
Material Analysis and Characterization Service

L206954

Analytical and Environmental Services

Chain of Custody Record

To Be Used For All Types Of Analysis

MACS Lab # _____

Customer Code

BILLED TO		PROJECT INFORMATION	
Name: Kellco-MACS		Sampled By: Siew Yee Lee	Date: 8/4/2010
Address:		Project Name: LBNL	Job #: 1004-17
City:		Site Address: Bldg 14	
State:	Zip:	City, State, Zip: Berkeley, CA	
Phone No:		Site Contact:	
Fax No:		Phone No:	Fax No:
Cell No:		Comments:	
Email:		Samples Preserved: Yes / No	Received Cold: Yes / No

ANALYSIS REQUIRED

Required Turn Around Time: 4 Hour ___ 8 Hour ___ 24 Hour ___ 2 Days/48 Hour ___ 3 Days/72 Hour ___ 5+ Days/120 Hour ___

DISPOSAL: ☐ Customer ☐ MACS ☐ OTHER (Explain)

Sample #	Sample Description / Type of Work	TIME ON	TIME OFF	TOTAL TIME	FLOW RATES START	FLOW RATES STOP	PCM Asbestos Air - NIOSH 7400	PLM Asbestos Bulk - 40 CFR 763	Lead (Wipes, Air, Paint, Soil)	TEM (Air/Bulk) - AHERA/Yamate Level II	Mold - Viable / Non Viable Air / Bulk	Metals (TCLP, CAM17, STLC)		Comments /Area Social Security #
B14-AM001	Panel 343A3A27A / Black cloth wire							X						
B14-AM002	Panel 343A3A27A25A /							X						

Relinquished By: [illegible] *Date:* 8/4/2010 *Time:* 1010 *Accepted By:* D. [illegible] *Date:* 08/04/10 *Time:* 10:10

TEM asbestos in water analysis requires 2 one-liter bottles shipped @ 4°C in dark containers for each sample.

LEAD USEPA 7420, Air NIOSH 7082, Soil EPA 7000/7420, Wipes NIOSH 9100
Water AIHA (method 3113B EPA 200.9)

Units Water - 1ug/l = 1 ppb
Paint - 1% = 10,000 ppm

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Analytical and Environmental Services
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CAM-17 Bulk Materials Analysis Report - Method: EPA 6010B/3050

KELLCO Services
3137 Diablo Avenue
Hayward, CA 94545

Contact: Tim Cannard
Phone: (510) 786-9751
Email: mailbox3137@kellcomacs.com
Job #: 1004-17

Laboratory Number: 206541
Sampled By: Siew Yee Lee
Sampled On: July 21, 2010
Submitted On: July 26, 2010
Analyzed On: August 3, 2010
Reported On: August 4, 2010
SOP: CAM17
Sample Type: Bulk

Job Description: Lawrence Berkeley National Laboratory-Building 14-One Cycloto Road, Berkeley, CA 94744

	Lab Sample Number:	206541 -1	206541 -2	206541 -3	206541 -4	
	Client Sample Number:	B14-PC1	B14-PC2	B14-PC3	B14-PC4	
	Matrix:	Bulk	Bulk	Bulk	Bulk	
	Extraction Type:	Acid	Acid	Acid	Acid	
	Units:	mg/kg (PPM)	mg/kg (PPM)	mg/kg (PPM)	mg/kg (PPM)	
Sb	Antimony	468.26	135.45	505.57	65.18	
As	Arsenic	46.08	102.61	74.70	<0.01	
Ba	Barium	23,007.88	6,384.76	10,598.65	8,787.20	
Be	Beryllium	1.60	3.12	1.27	2.01	
Cd	Cadmium	135.62	24.14	132.78	27.57	
Cr	Chromium	5,315.24	2,392.39	18,605.81	798.36	
Co	Cobalt	1,040.28	310.65	879.87	293.86	
Cu	Copper	277.36	315.26	248.61	126.97	
Pb	Lead	576,182.14	17,263.39	411,694.51	11,082.59	
Hg	Mercury	110.75	27.04	30.81	40.51	
Mo	Molybdenum	155.19	45.61	135.06	27.23	
Ni	Nickel	77.80	145.06	51.05	215.63	
Se	Selenium	6,652.80	6,358.43	5,346.06	3,542.41	
Ag	Silver	15.50	28.80	21.14	10.79	
Tl	Thallium	342.60	110.77	261.34	85.45	
V	Vanadium	87.78	241.15	65.35	89.17	
Zn	Zinc	47,373.03	3,892.98	41,149.56	4,159.23	

Analyst: _____ (Signature)

Laboratory Manager: _____ (Signature)

NOTICE

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CLIENT	JOBSITE
Weiss Associates 5801 Christie Avenue 600 Emeryville CA 94608	Lawrence Berkeley National Laboratory One Cyclotron Road Berkeley CA 94744

KELLCO-MACS JOB#: **1004-17** LAB LOGIN # I206541

COLLECTED BY: Siew Yee Lee

COLLECTED DATE 7/21/2010

TURN AROUND TIME: 4 8 24 48 5-DAY

RESULTS NEEDED BY

CIRCLE TYPE OF BULK ANALYSIS

PLM **LEAD PAINT** **LEAD WIPE** **NON VIABLE MOLD** **VIABLE MOLD** **eCOLI** **OTHER** CAM 17

SAMPLES REC'D _____ ANALYZE TO FIRST POSITIVE YES NO

REPORT RESULTS TO PROJECT MANAGER: Tim Cannard

NOTES & COMMENTS:

CHAIN OF CUSTODY & SAMPLE SUBMITAL FORM PAGE_____ OF _____

KELLCO-MACS JOB#: **1004-17**
Lawrence Berkeley National Laboratory

FIELD NUMBER	LOCATION (bldg, rm, area)	COLOR	MATERIAL or SUBSTRATE (ft w/ size, mastic, tic, etc.)	NOTES: Like condition, damage, quantity, inside what, beneath what? direction in building (N,S,E,W) etc.)
B14 -PC1	exterior of Bldg, window & door		paint chip composite off	wood
-PC2	Exterior of Bldg, walls		" " " off	concrete
-PC3	& Interior walls, various locations		paint chip composite	
-PC4	Interior of bldg, various locations		" " "	

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
[illegible]	7/26/2010	0931	D. Kahle	07/26/10	0931

PHOTOGRAPHS

Photographs containing no sample identification number are included for reference of the general sample locations.

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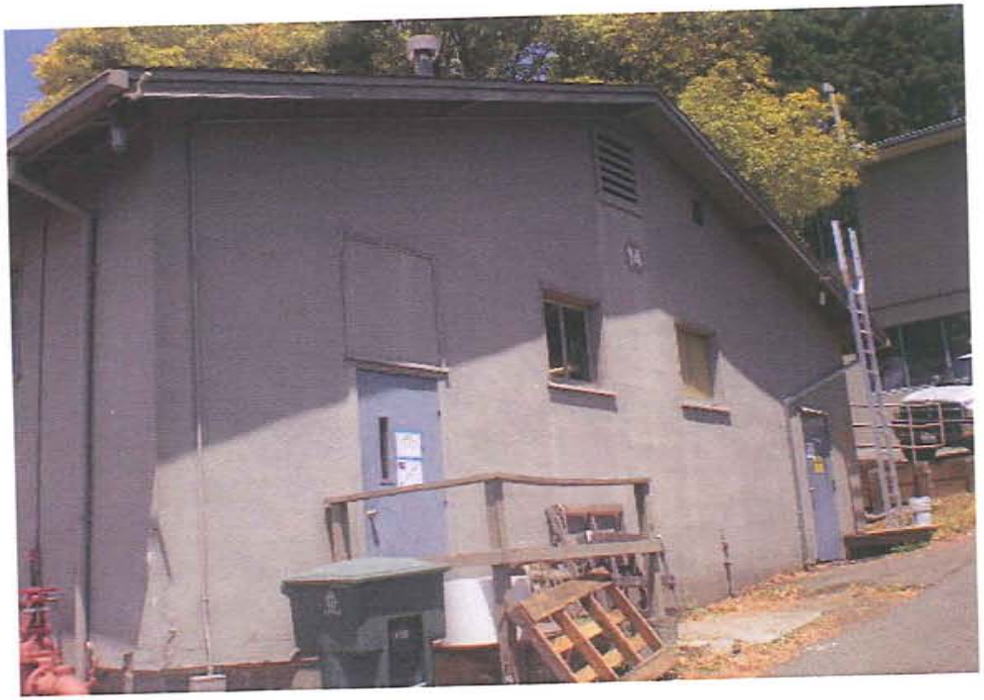
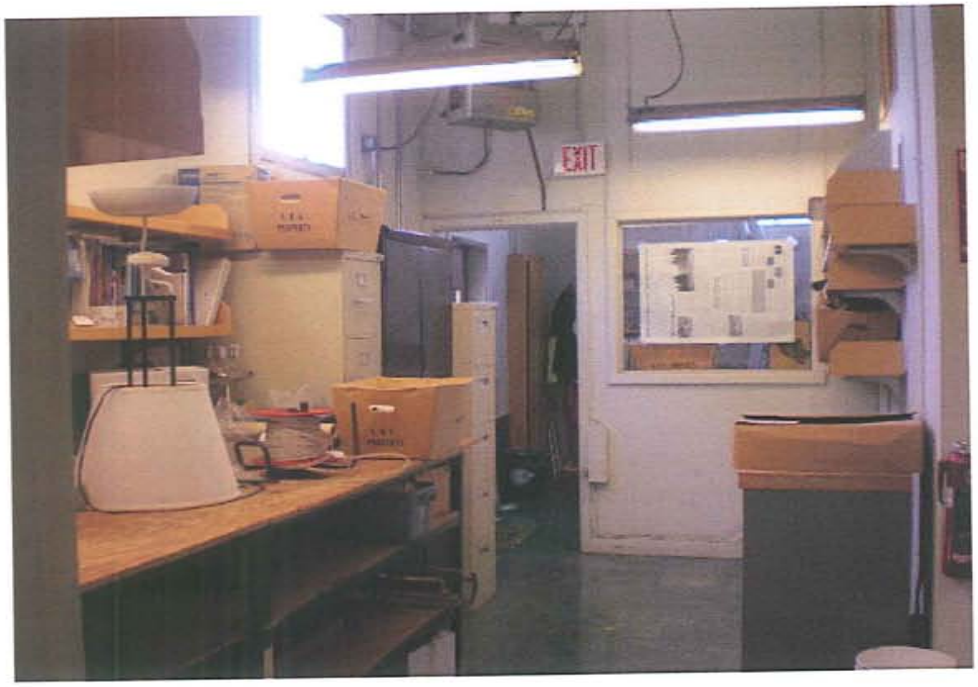
14

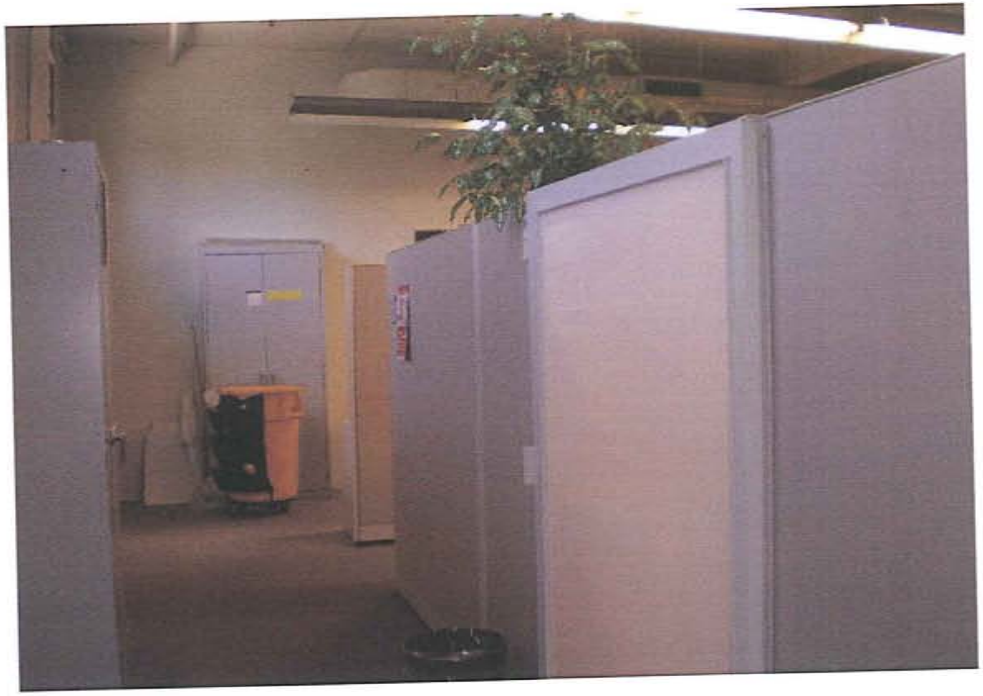
14

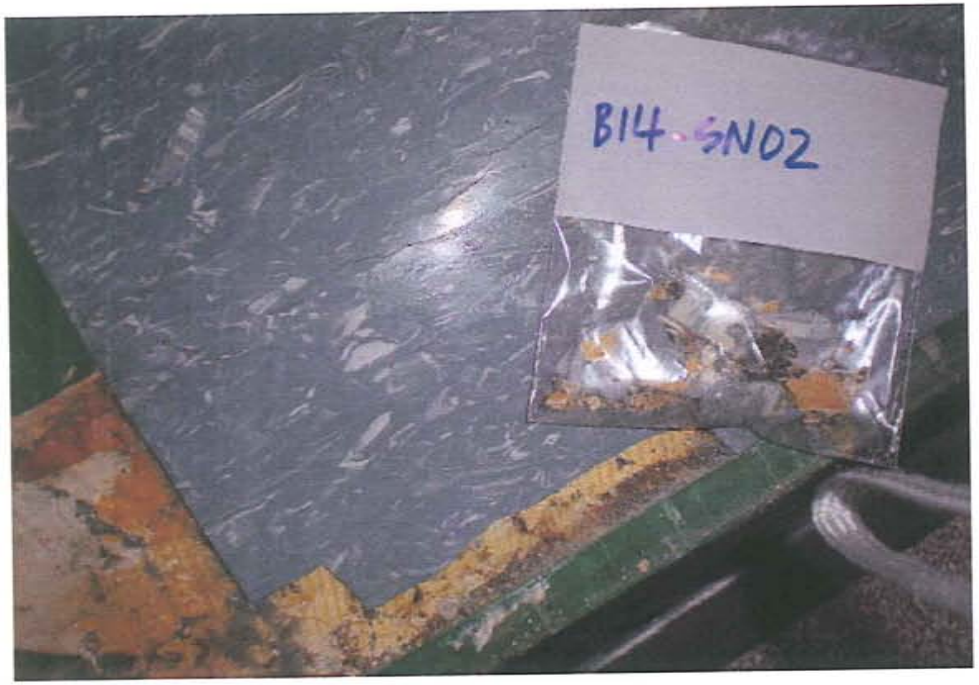
14




EXIT

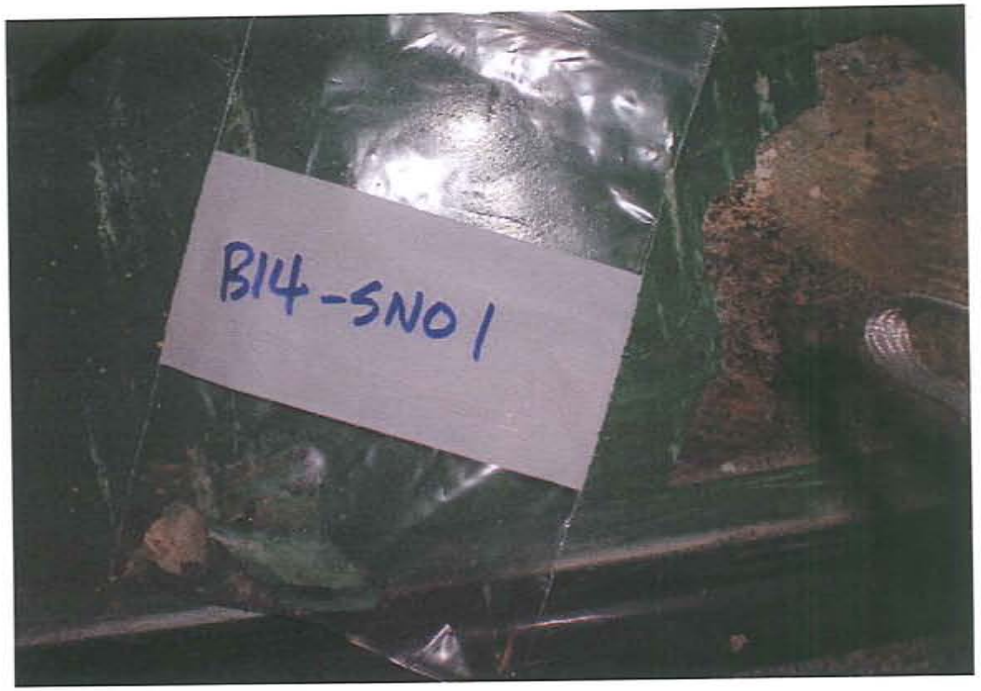
PHONE LIST




B14-SN02

B14-SN3

B/K - AW20

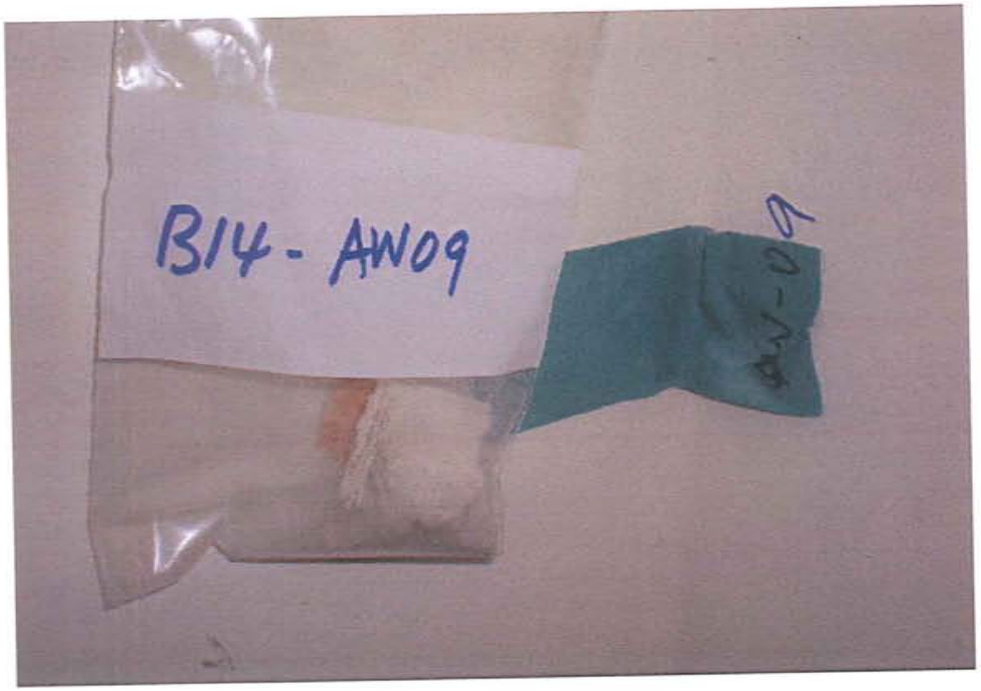

B14-SN01

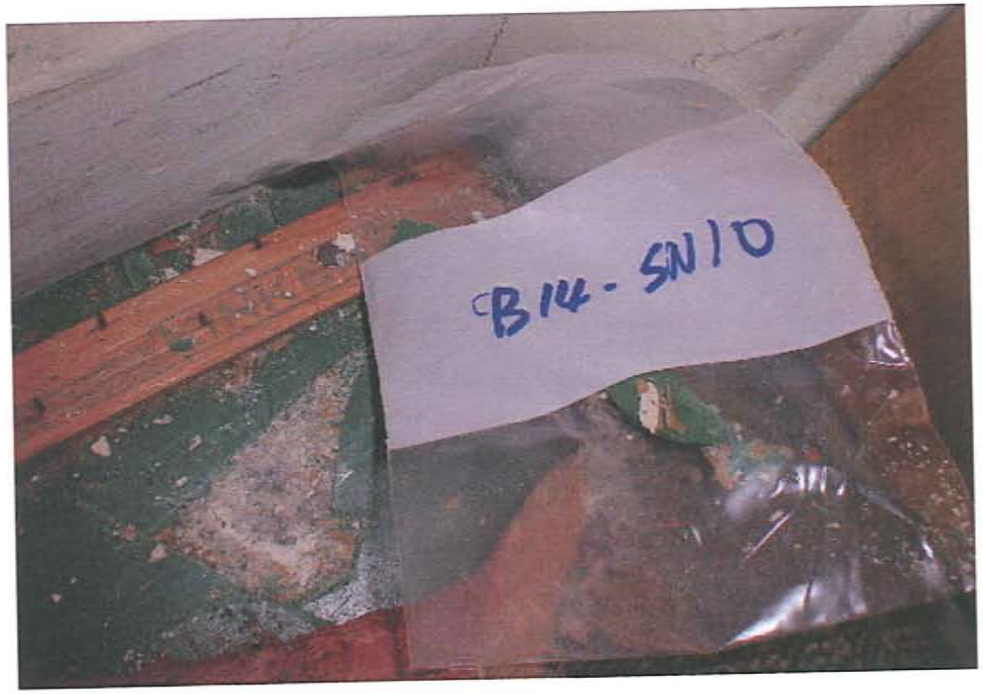
B14-SN 5

B14 - SN 06

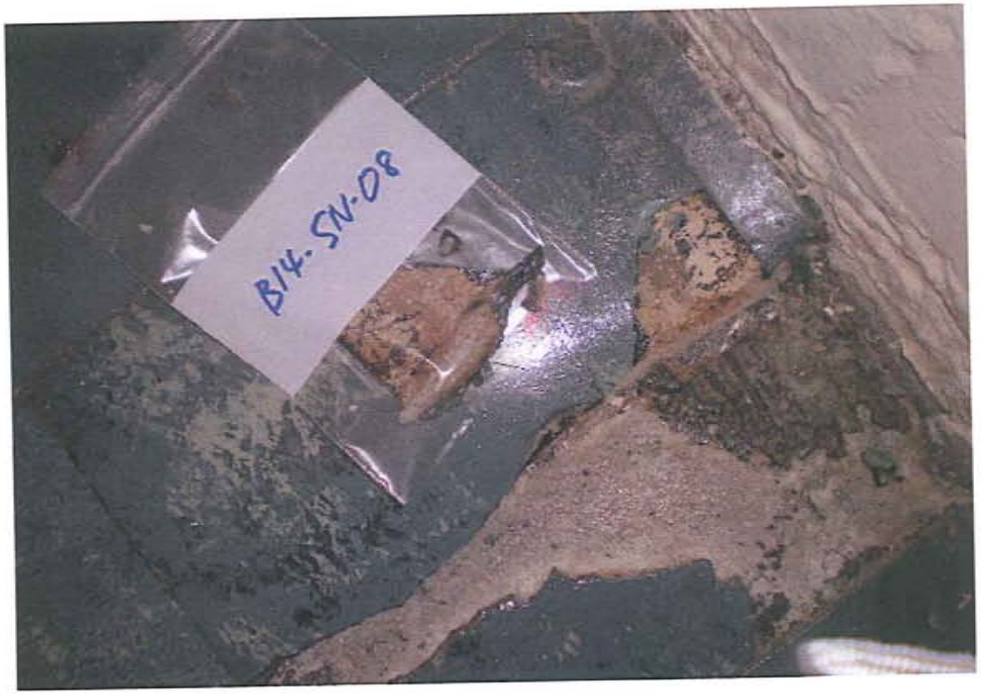
B14-AM 4.

B14 - SN18


B14 - AW09


B14 - SN10

B14 - SN07
B14 - LENS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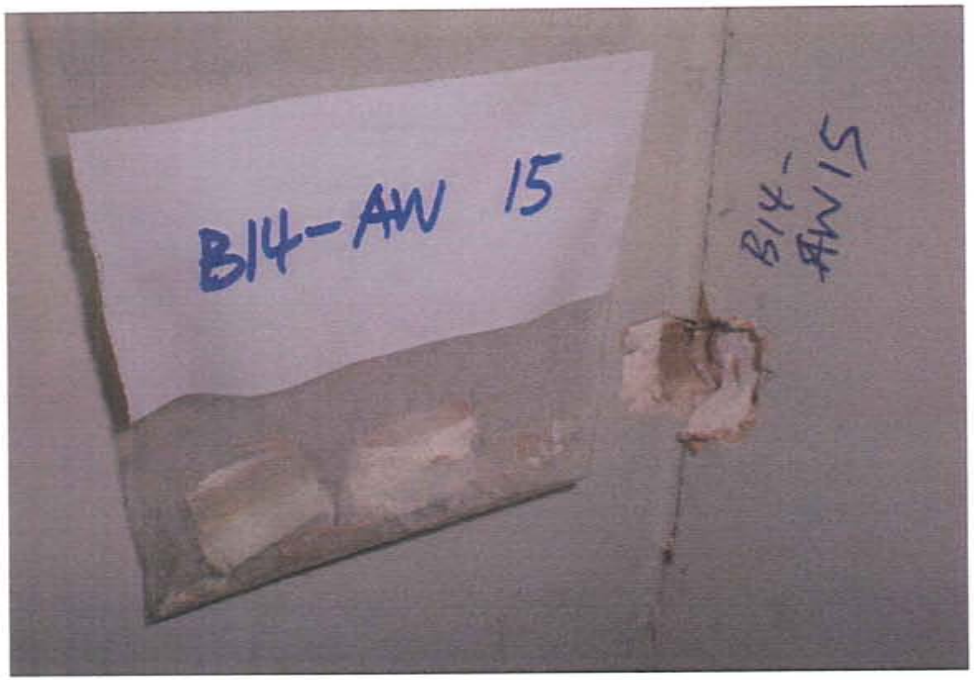
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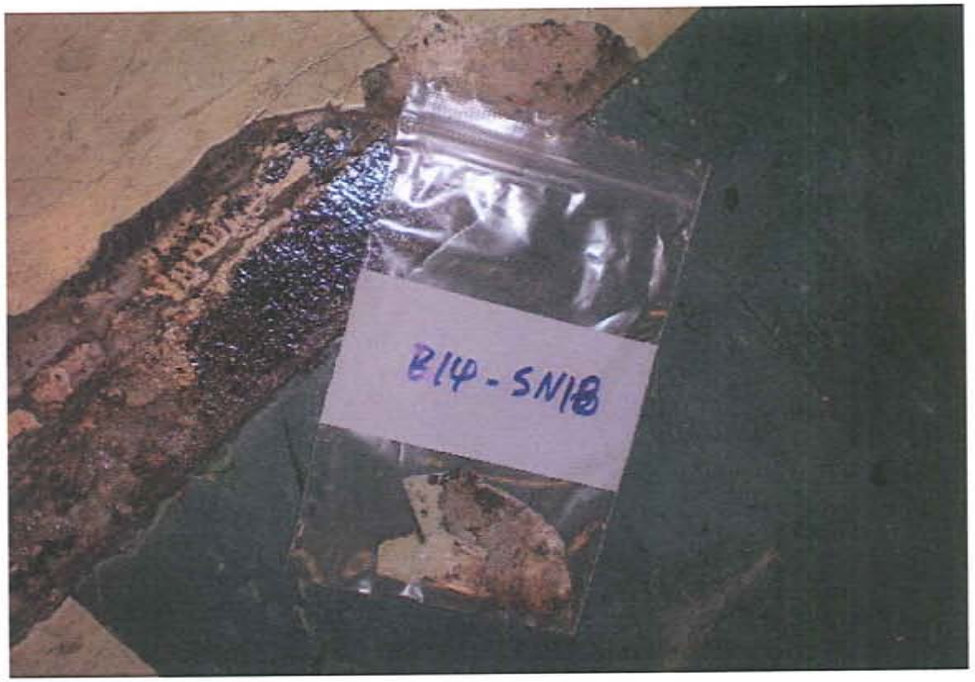
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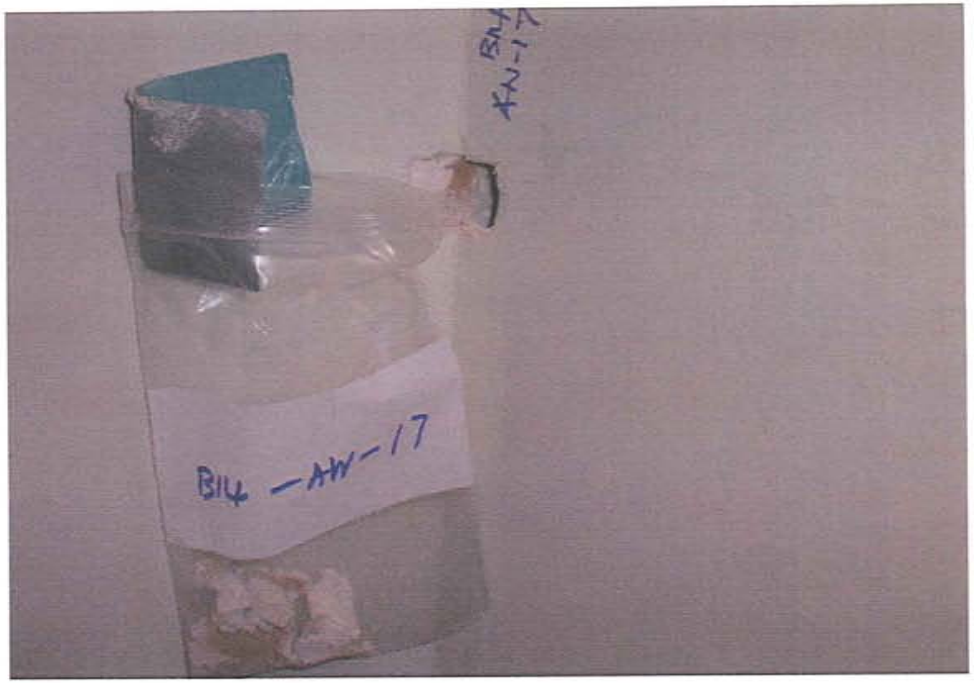
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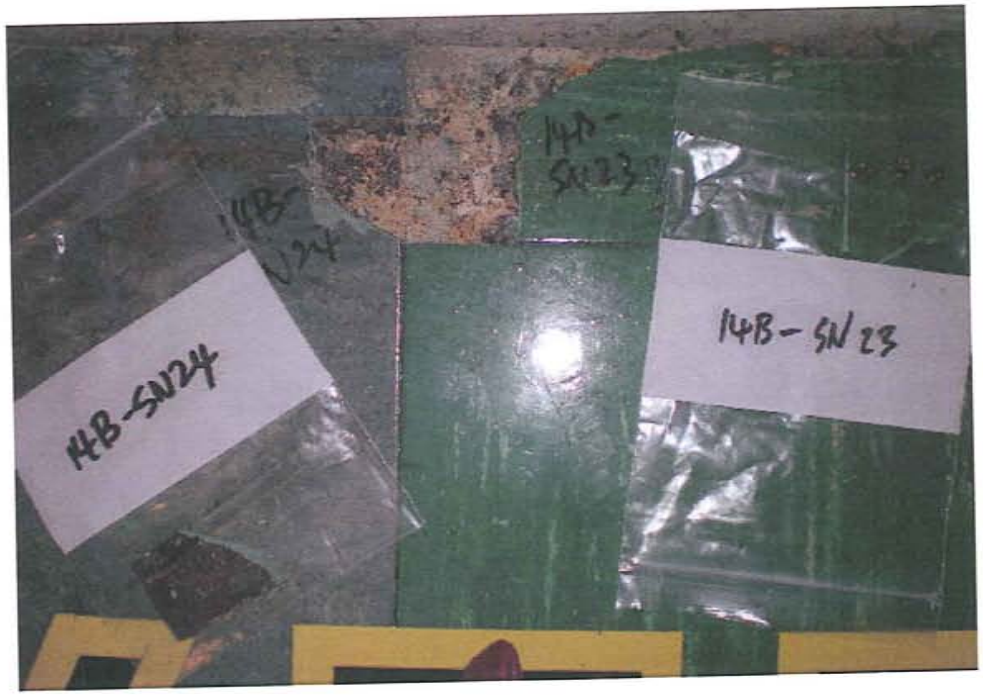
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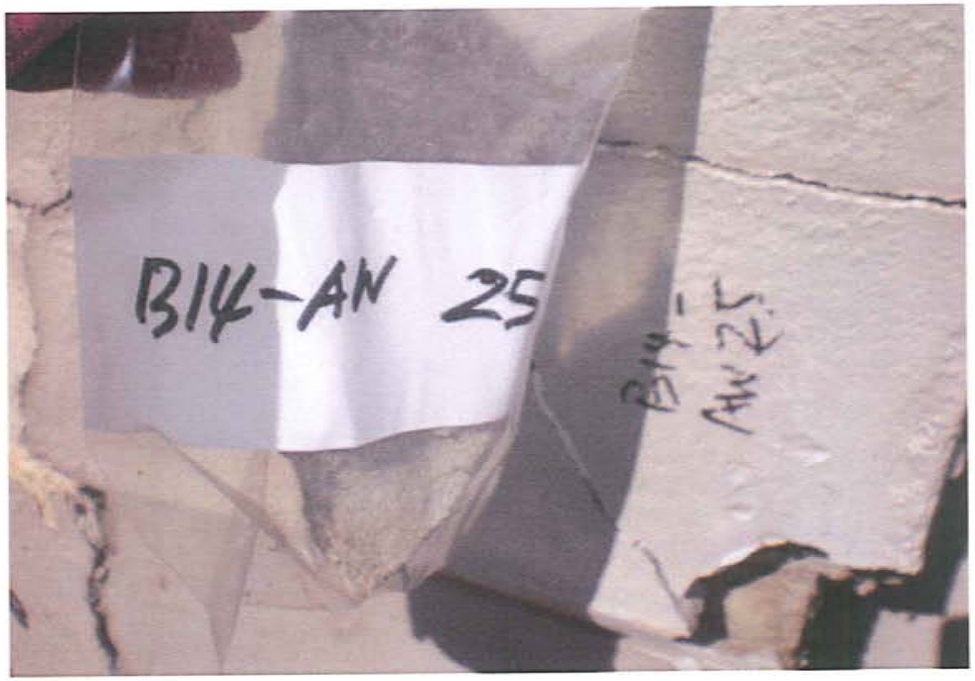
14B-SN23

B14-SN24

B14-AN22

14B-PC1
14B-
PC1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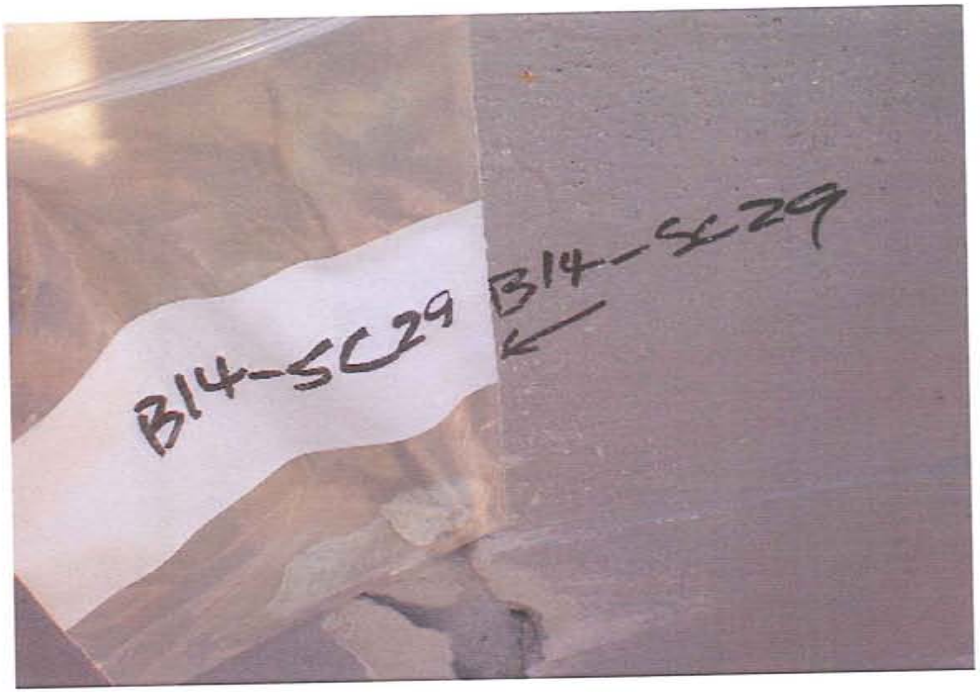
B 14B-PC2

B 14- AM27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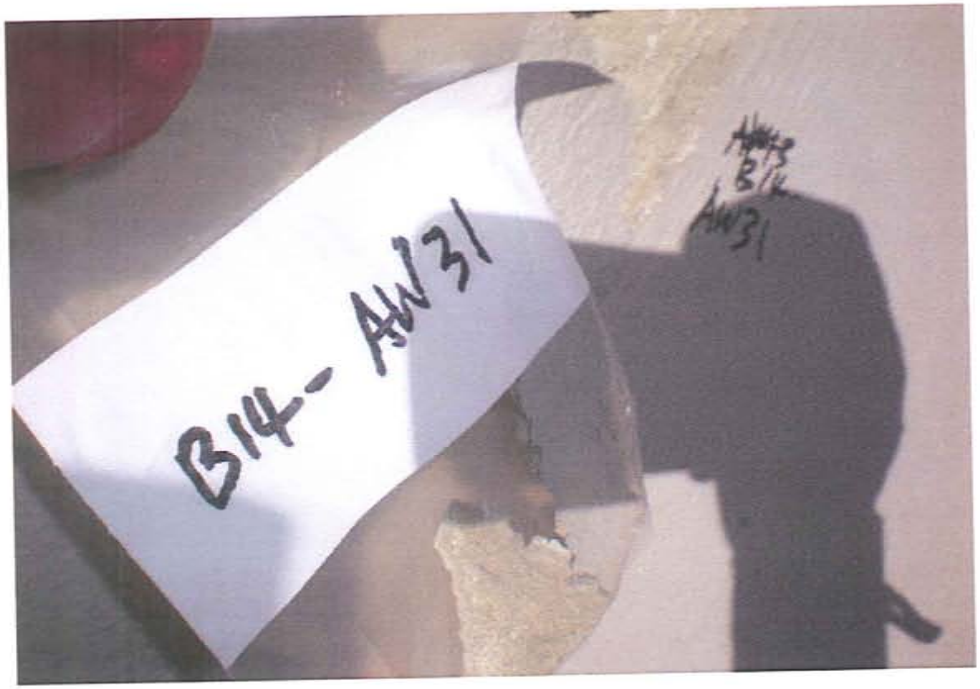
B14-SC29

B14-AM-26
B14
AM28

B14-AW28
B14-
AW28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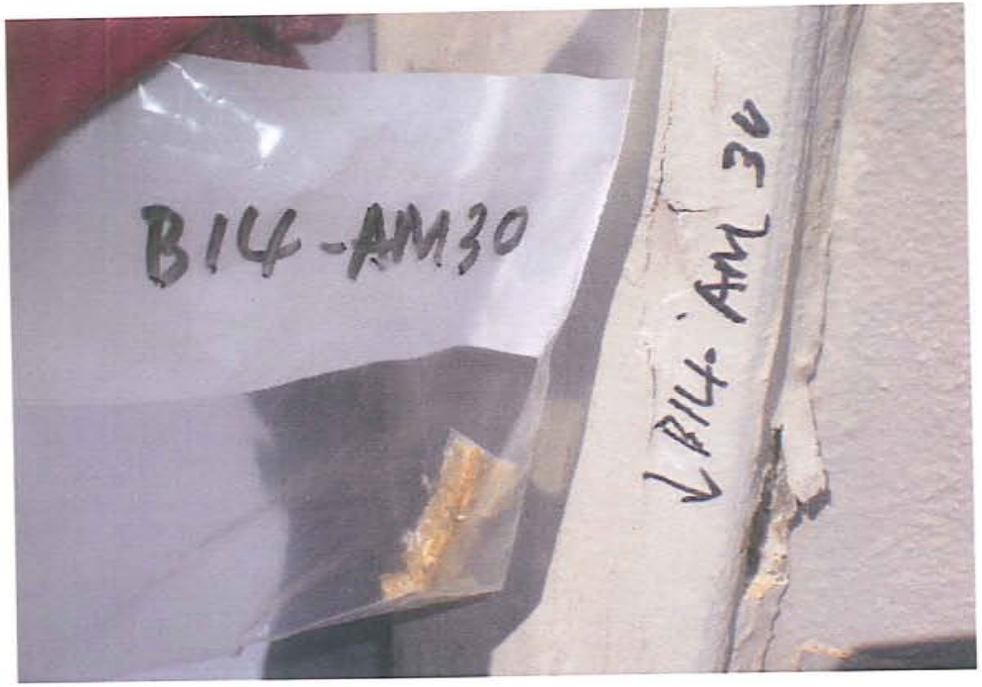
B14 - SC3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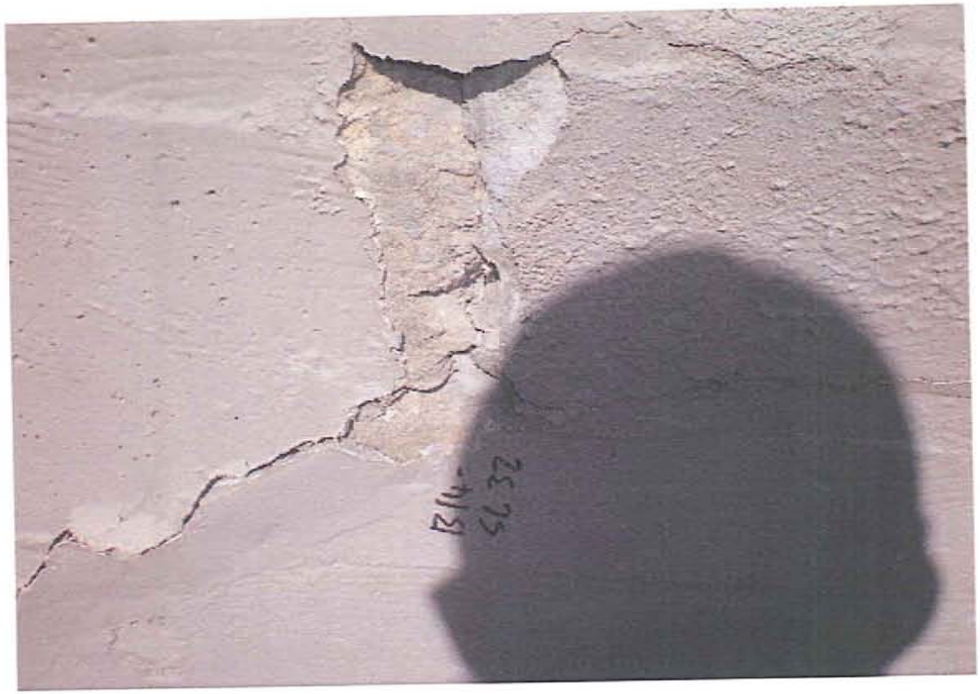
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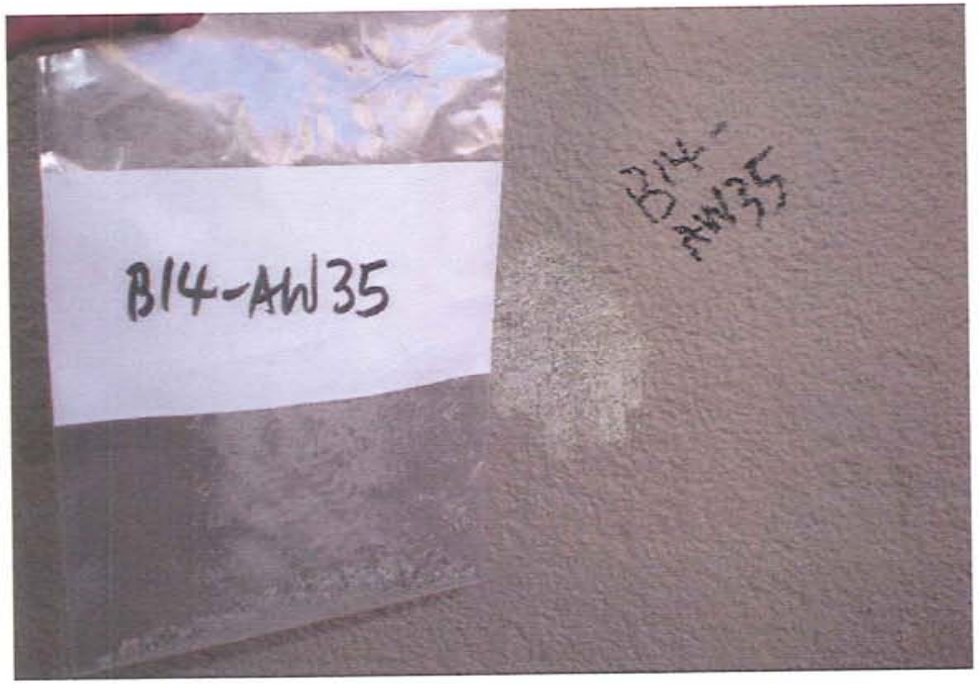
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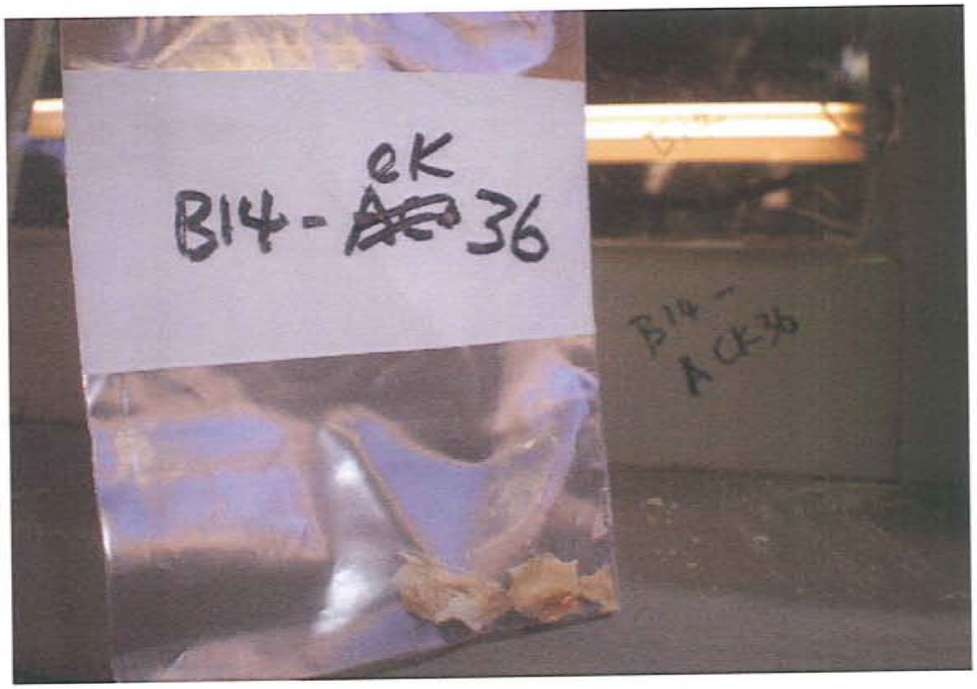
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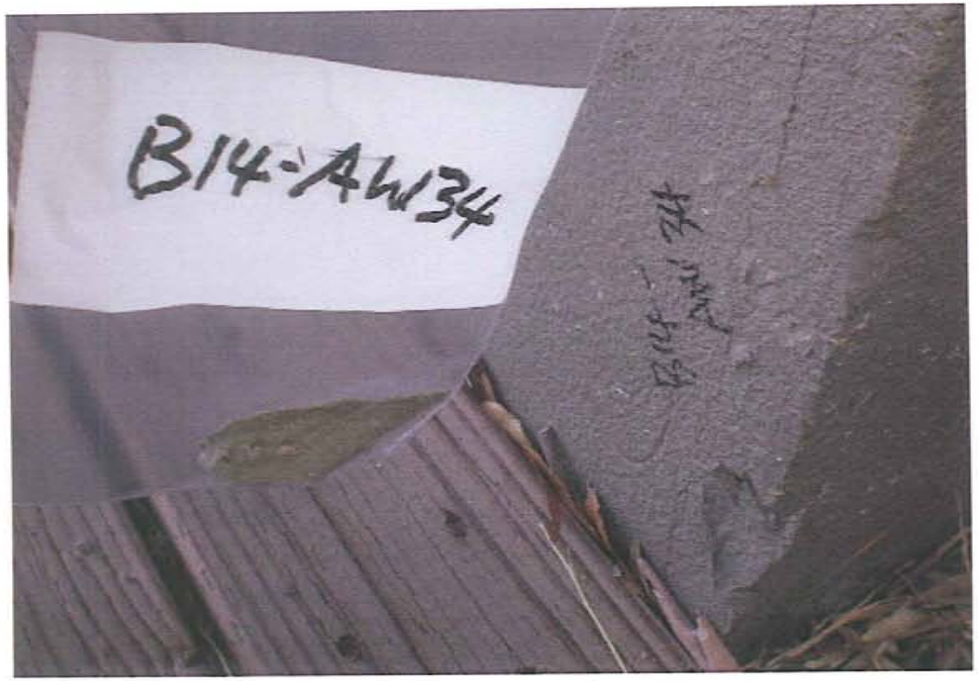
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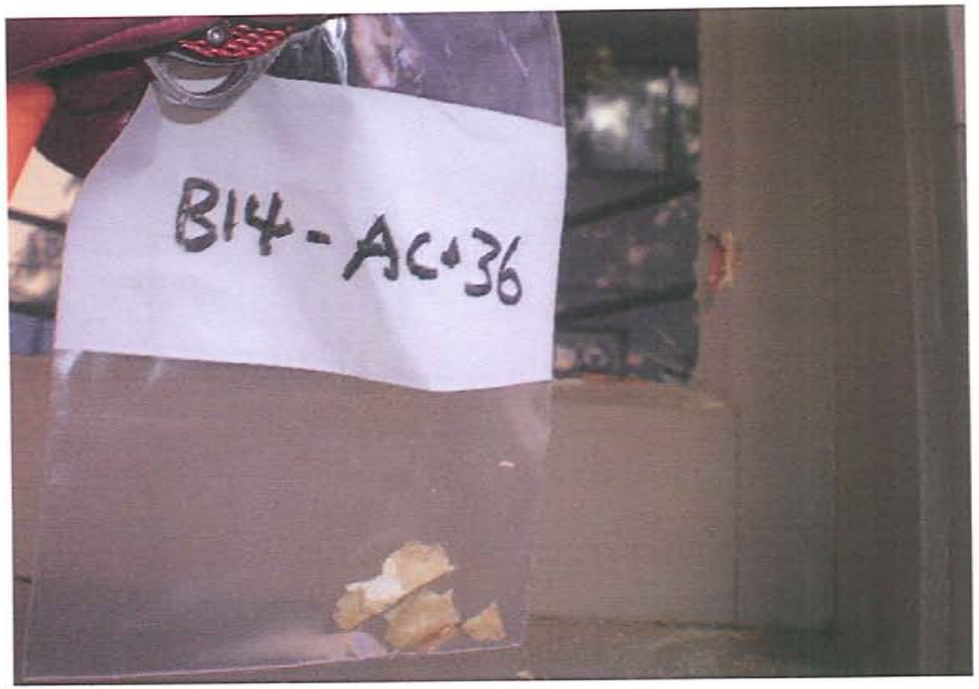
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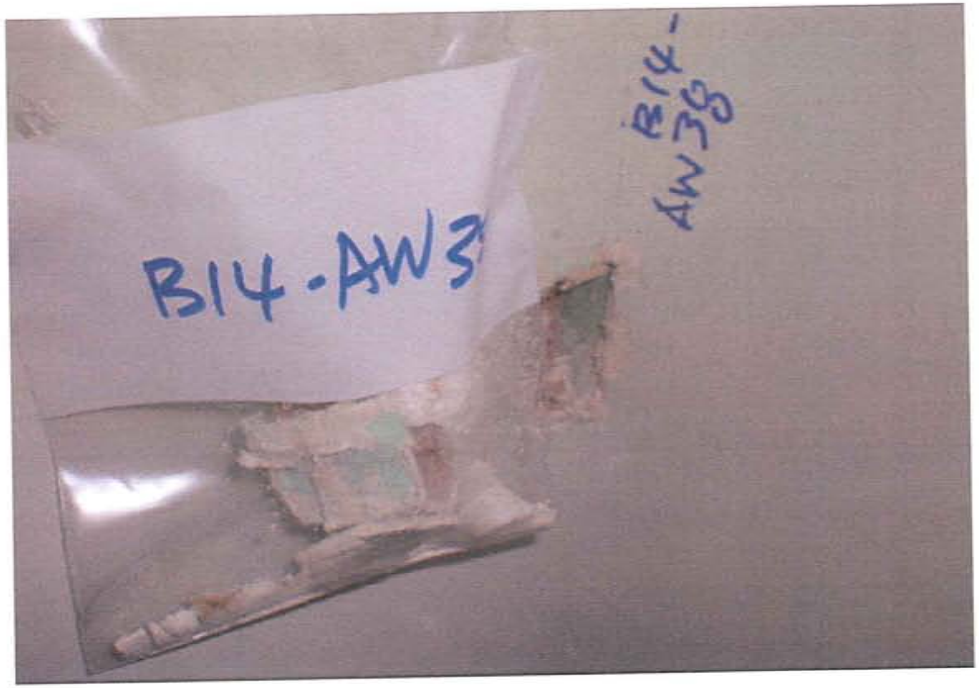
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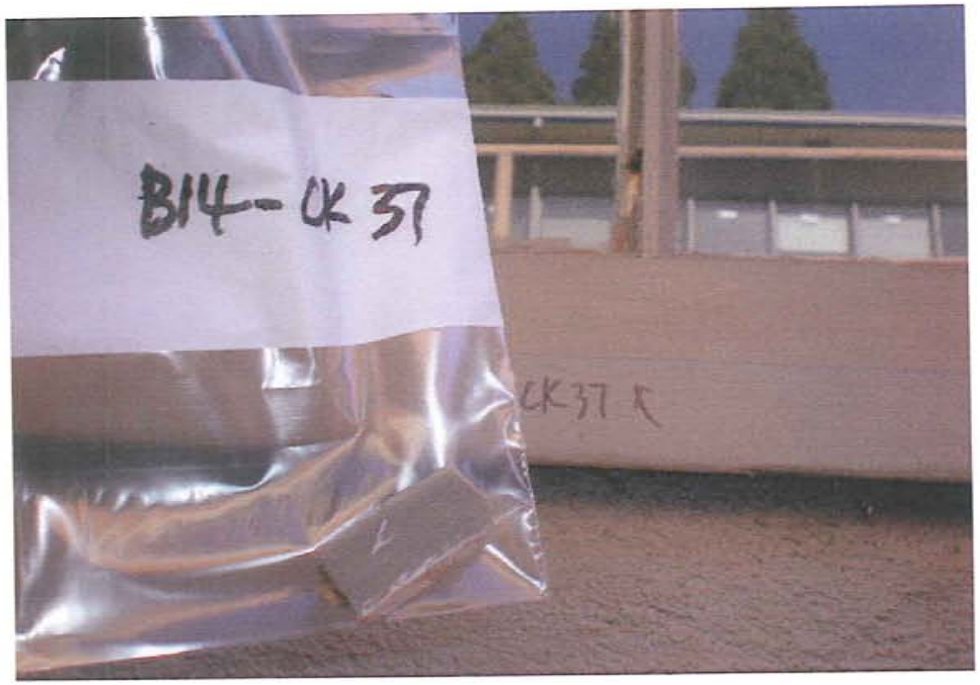
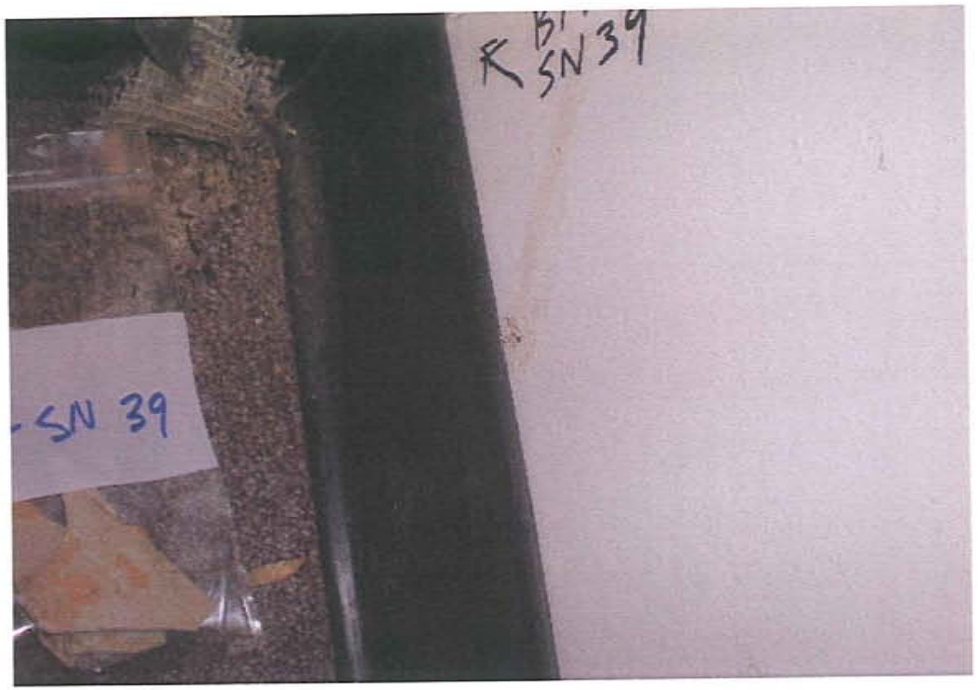
B14-AW38


B14-CK37
CK37

B14-AR 40

CK
B14-AA39
B14-CK39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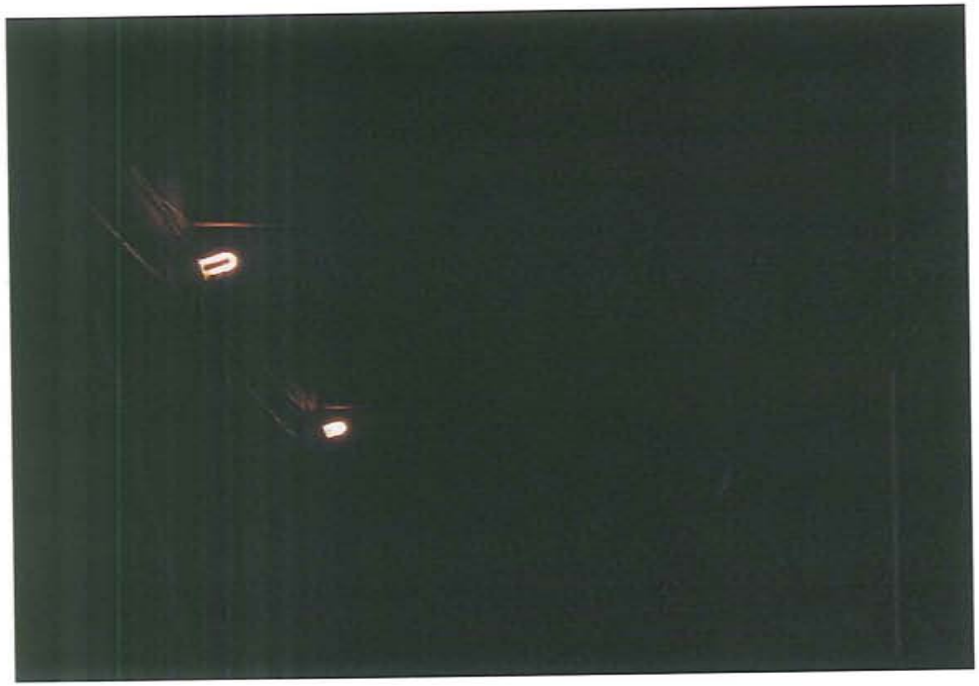

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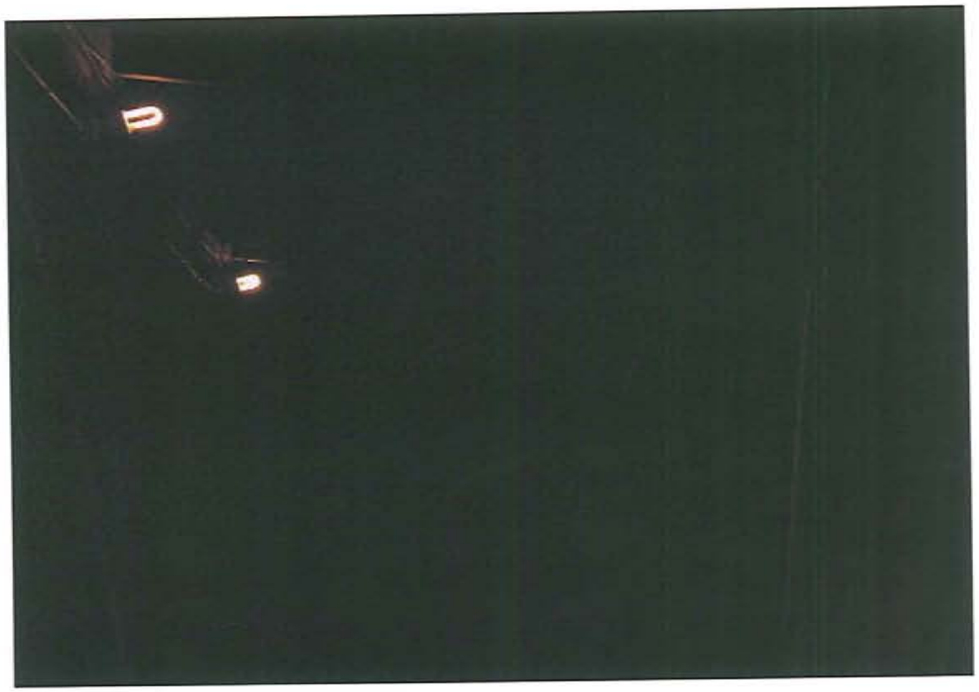
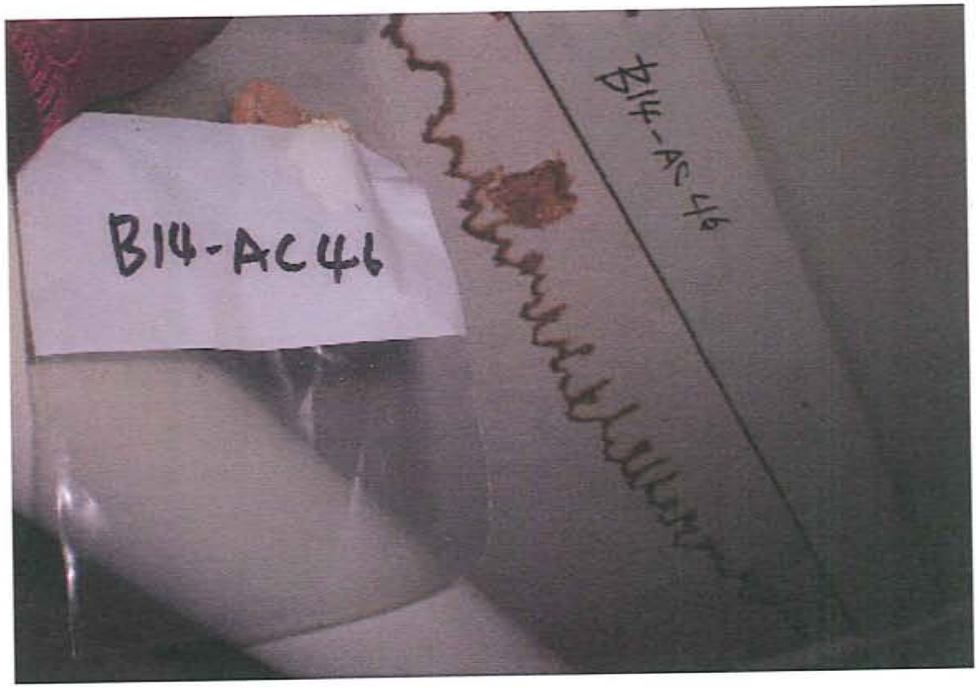


B14-AR 43

B14-AM 42

ALADDIN
BLOWER
GENERAL ELECTRIC
AC MOTOR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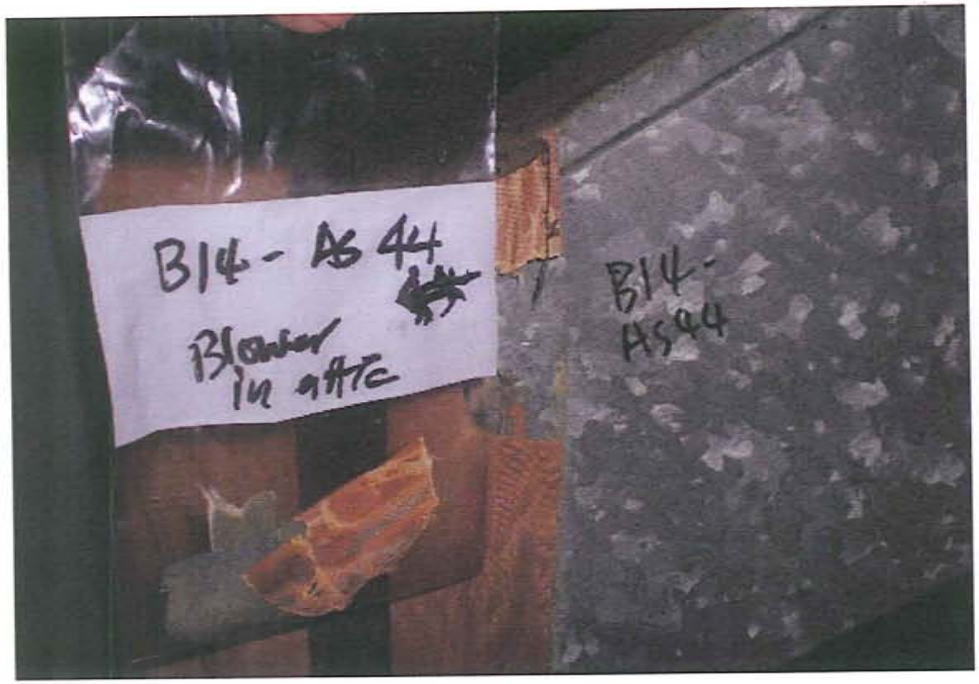
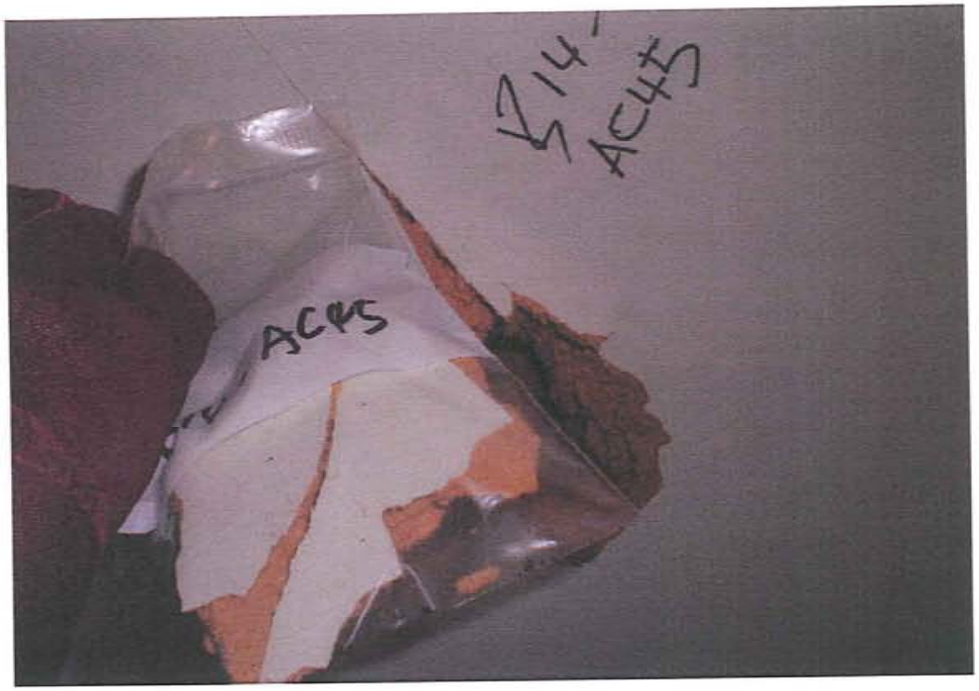

B14-AS44
Blower in attic
B14-AS44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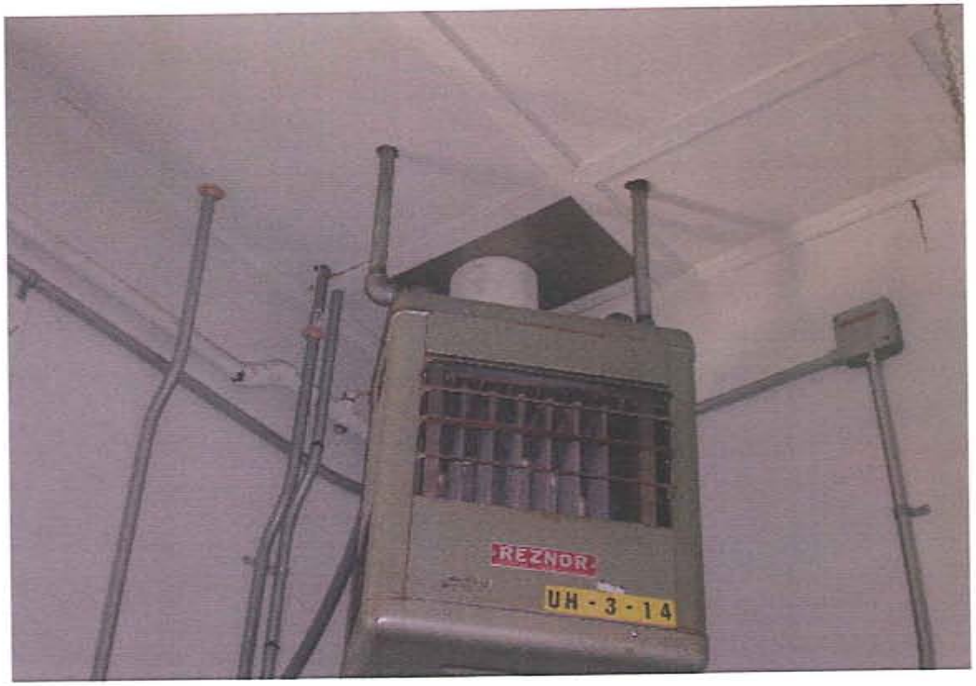
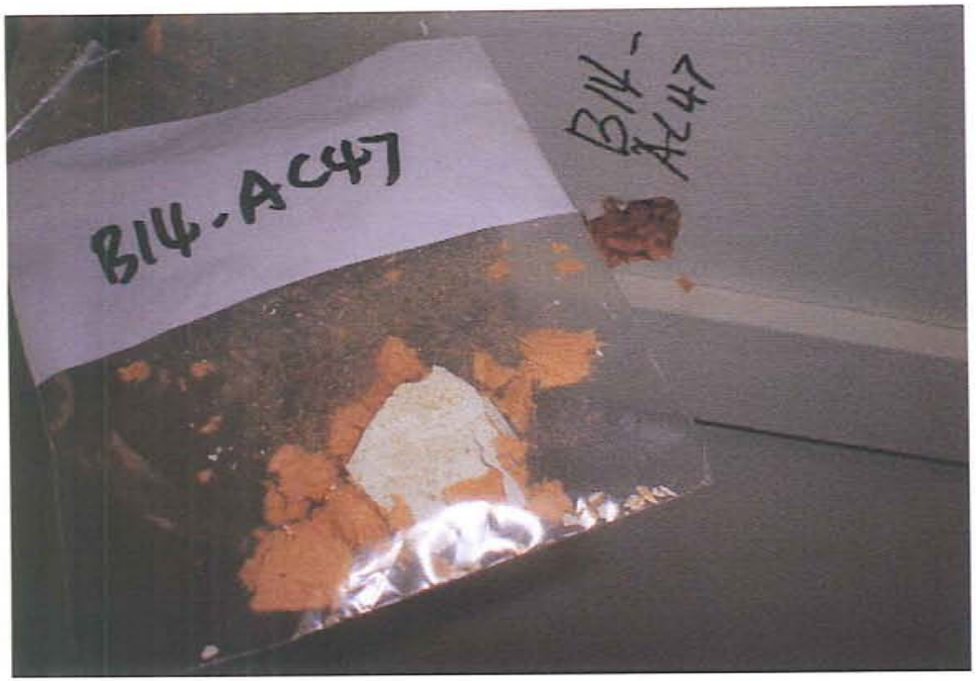
AC45

B14-SK48


REZNOR
UH-3-14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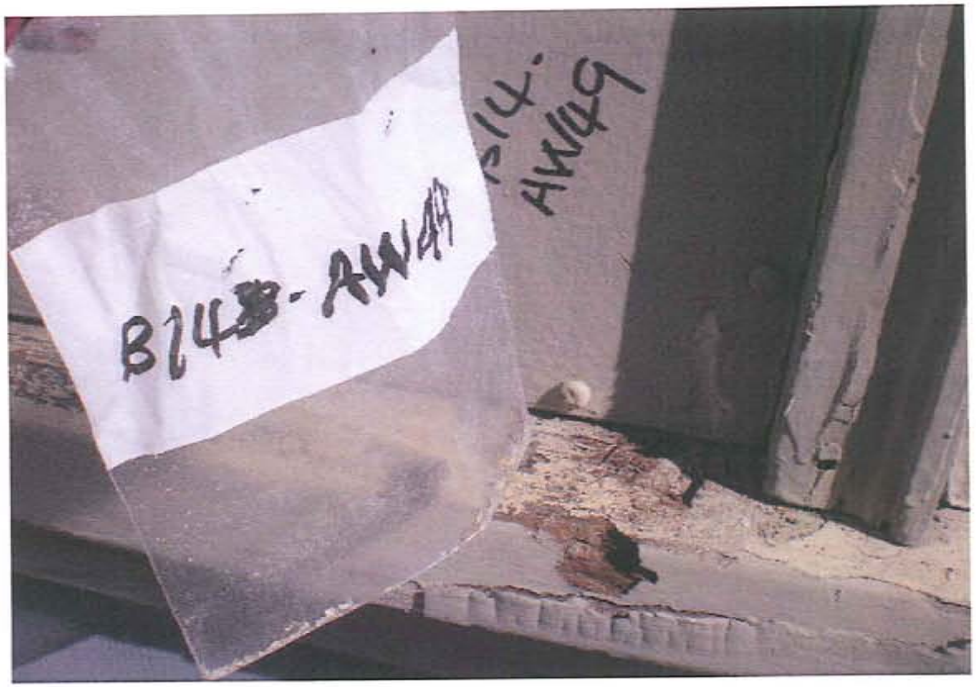
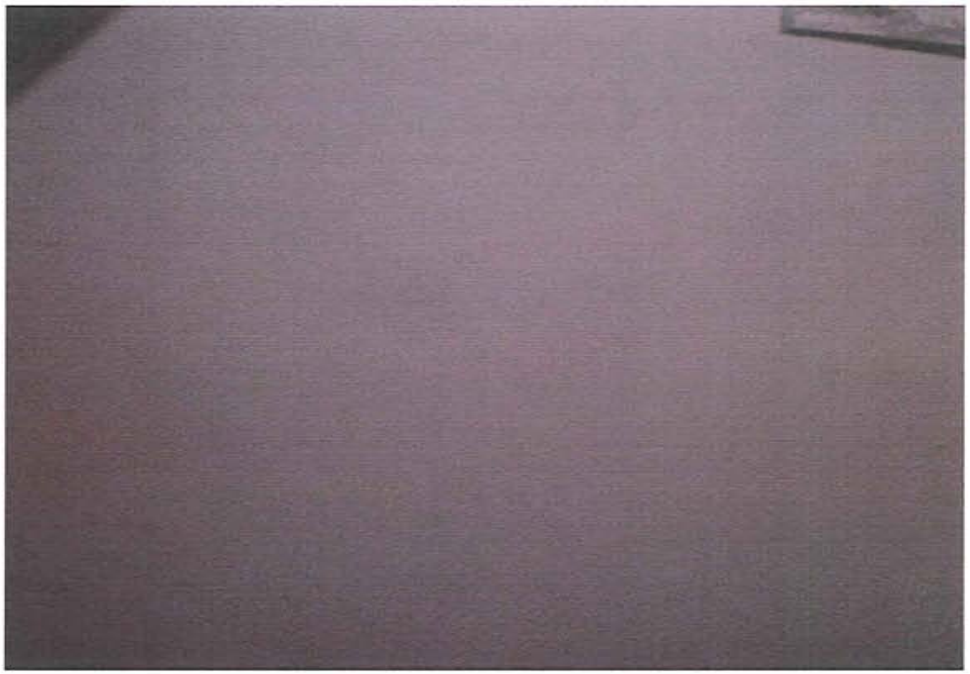
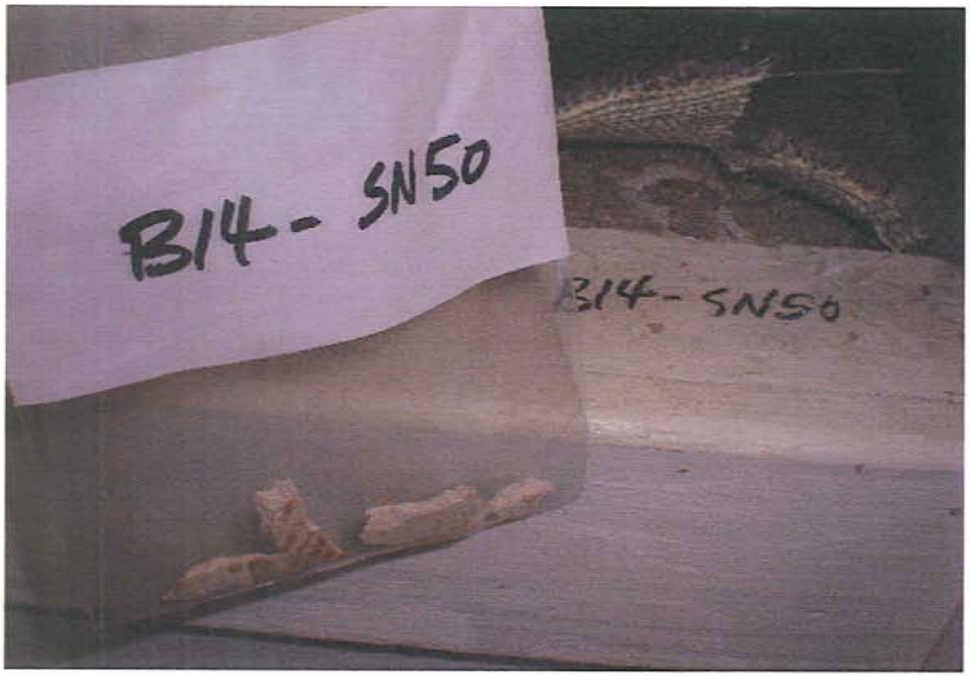

B14-AW49
B14-AW49

B14-SN51
B14 SN51

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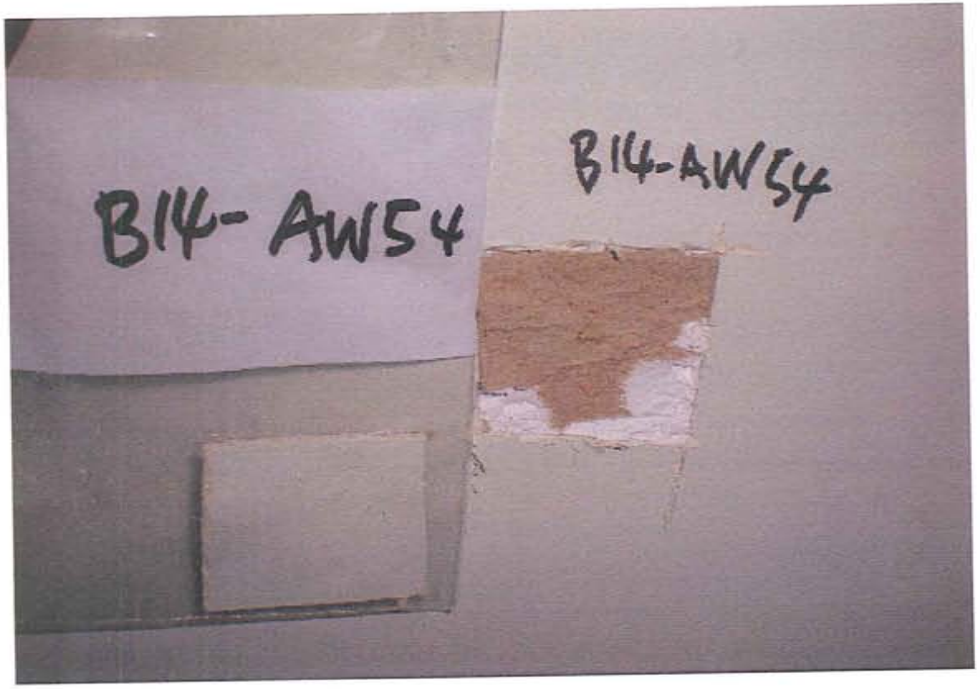
B14-SN50

148-SN52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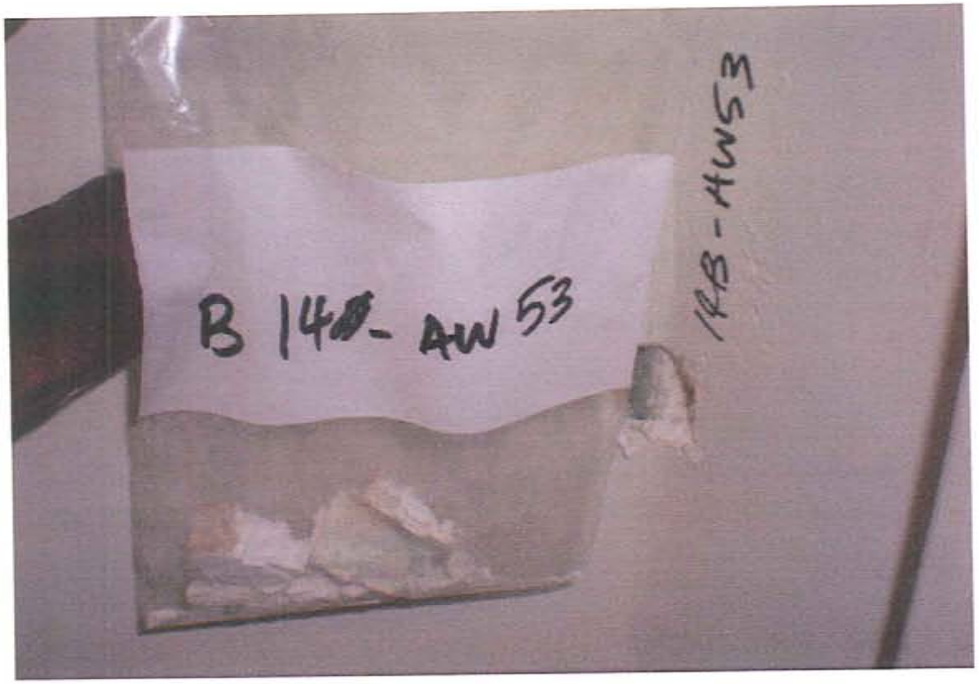
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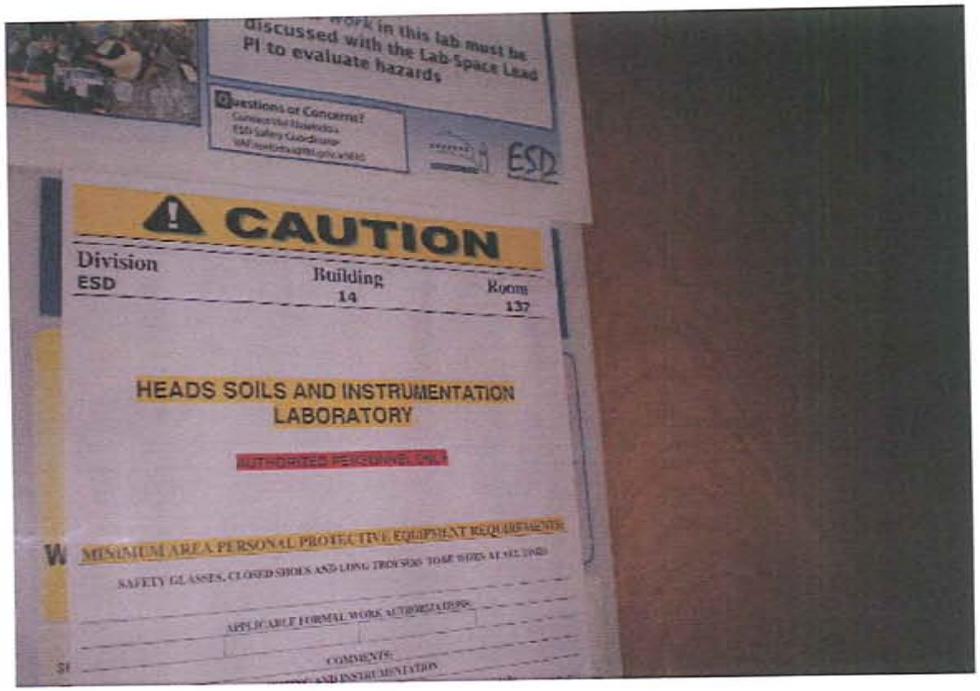
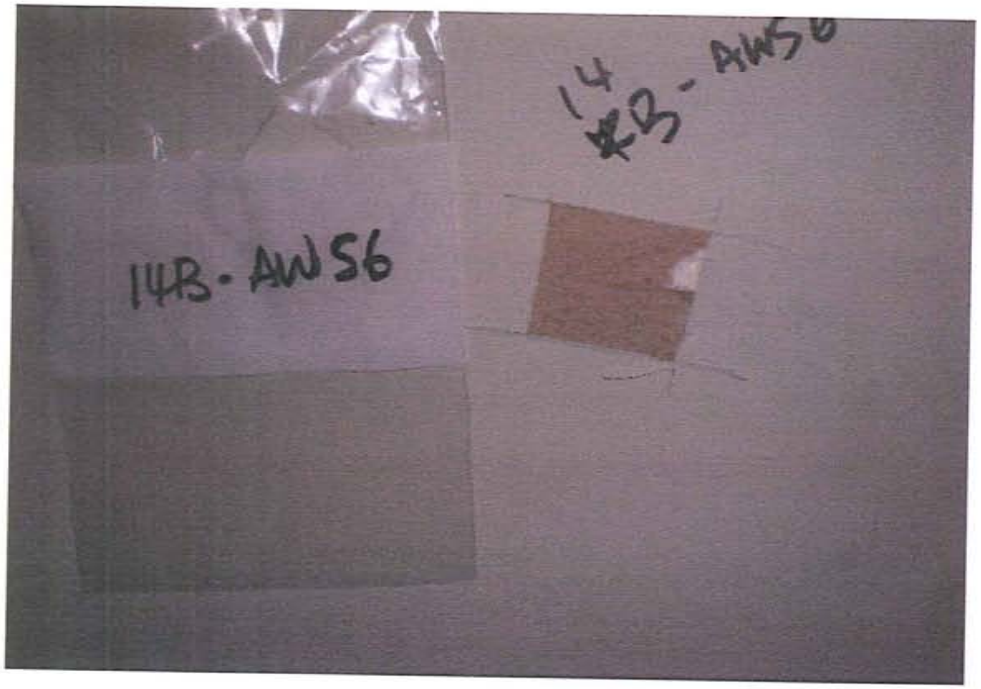
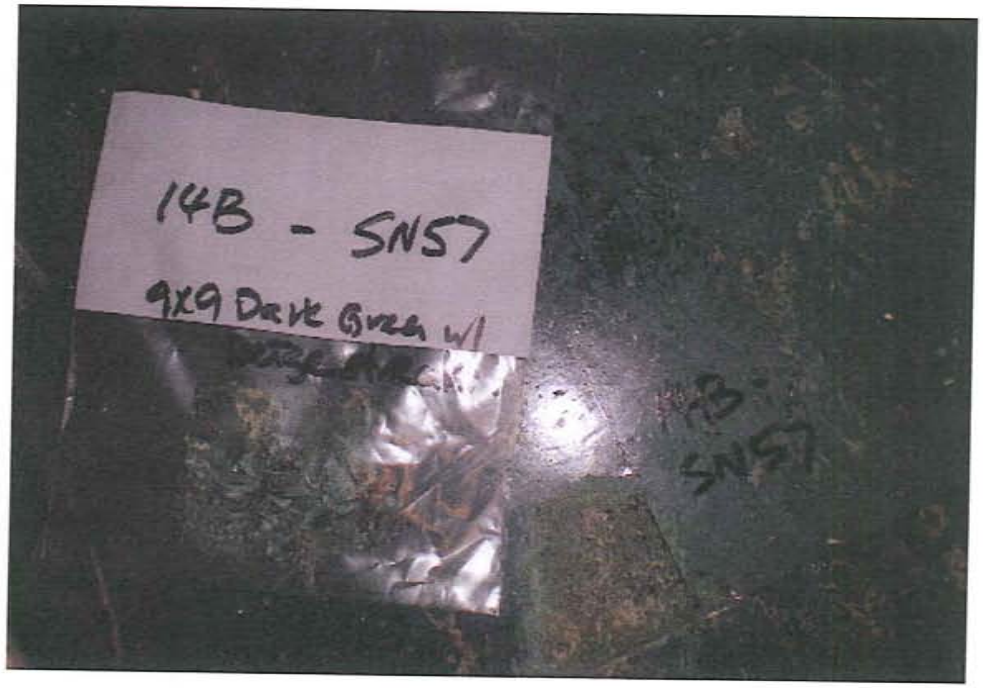
14B-AW53


discussed with the Lab Space Lead
PI to evaluate hazards
Questions or Concerns?
ESD
CAUTION
Division
ESD
Building
14
Room
137
HEADS SOILS AND INSTRUMENTATION
LABORATORY
MINIMUM AREA PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS
SAFETY GLASSES, CLOSED SHOES AND LONG TROUSERS TO BE WORN AT ALL TIMES
APPLICABLE FORMAL WORK AUTHORIZATIONS
COMMENTS


14B - AW56
14 B - AW56

B14 - SN58
9x9 Dark Green w/

14B - AM55
14B - AM 55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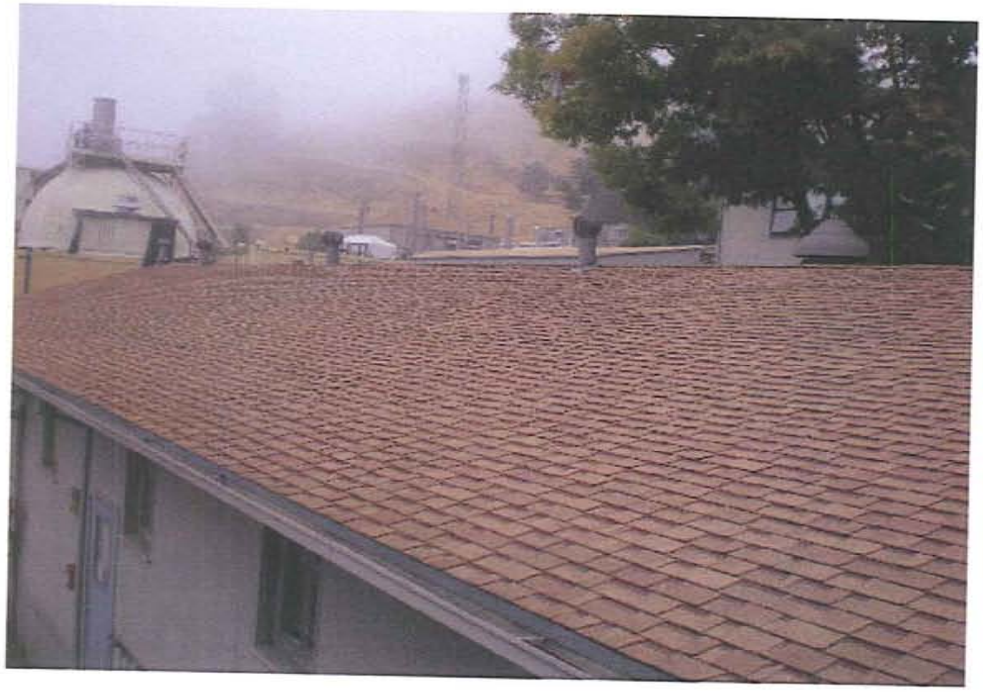
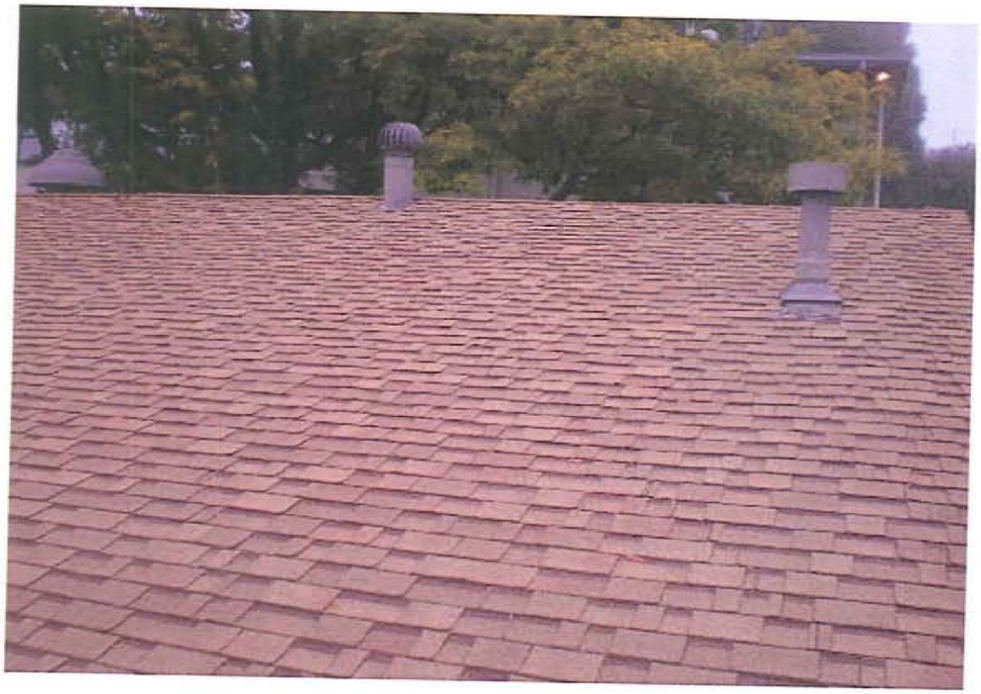
9x9 Dark Green w/
B - SN57

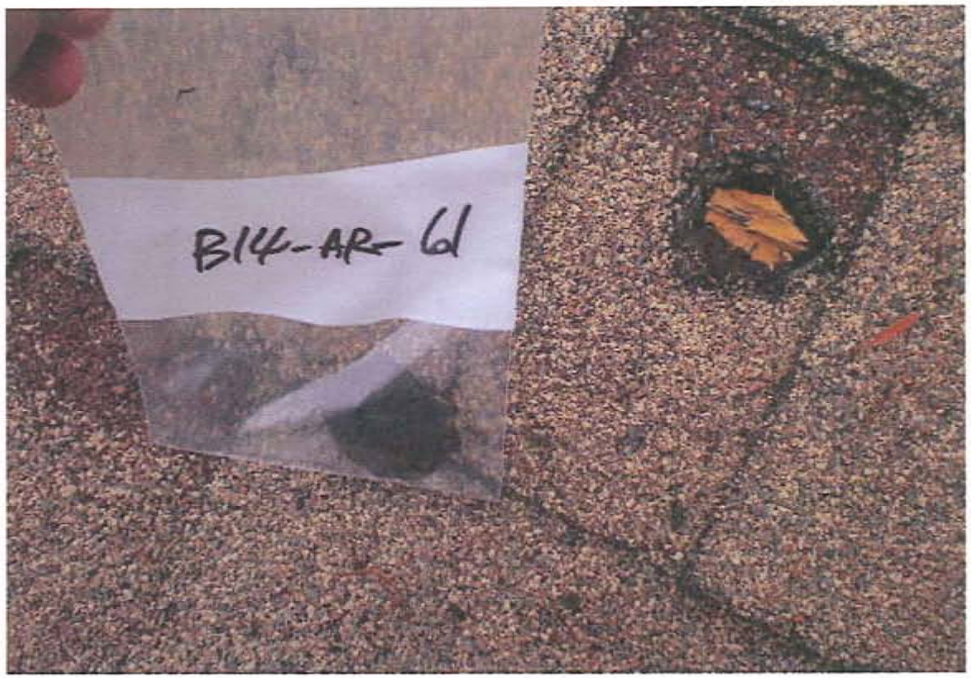




40

B14-AR6

B14
AR65


B14-AR-6

A Creative Joint Venture For Better Environmental Solutions

Lawrence Berkeley National Laboratory
Building 25A
One Cyclotron Road
Berkeley, CA 94744

KELLCO-MACS Job #1004-17

NESHAP Compliant Pre-Demolition
Asbestos and Metals in Paint Inspection Report

for

Weiss Associates
5801 Christie Avenue
Suite 600
Emeryville, CA 94608

August 11, 2010

3137 Diablo Avenue • Hayward, CA 94545-2701• (510) 786-9751 • fax (510) 786-9625
http://www.kellcomacs.com email: mailbox3137@kellcomacs.com

A Creative Joint Venture For Better Environmental Solutions

NESAHP Compliant Pre-Demolition Asbestos and Metals in Paint Inspection Report

Date:	August 11, 2010
KELLCO-MACS Job #:	1004-17
Client:	Ms. Agata Sulczynski Weiss Associates 5801 Christie Avenue Suite 600 Emeryville, CA 94608
Location:	Lawrence Berkeley National Laboratory Building 25A One Cyclotron Road Berkeley, CA 94744
Date of Inspection:	July 13, 2010
Inspectors:	Siew Yee Lee CAC # 09-4546, CDPH Lead # 19509
Description of the Inspected Area:	This is an asbestos and Heavy Metals inspection on building 25A on the University of California, Berkeley campus in Berkeley, CA.

Background

This is a NESHAP compliant pre-demolition asbestos and metals inspection report for Building 25A located in at LBNL in Berkeley, CA.

Synopsis

Asbestos was found in the following materials:

- Wall texture, drywall joint compound
- Thermal system insulation and pipe elbow insulation
- Floor tile and mastic
- Interior metal wall paint/ coating

- Black flooring material
- Vinyl floor sheeting paper backing
- Door frame sealant
- Roof cap sealant

Upon visual inspection of the building, there were multiple locations that were determined to be asbestos containing materials (ACM). The boiler room, men's restroom, hallway between the men's restroom and boiler room, area 119 and area 131 contain thermal system insulation (TSI) pipe lagging and mudded elbow which is considered to be ACM. The east exterior door of aisle 194 and the south exit door of aisle 194 to boiler room contain a fire door which is ACM.

Designation of material as asbestos containing should be applied to all homogenous material of the type analyzed and found to contain asbestos.

About the Inspection

The inspection performed was both visual and tactile. Samples were taken of suspect materials located at the interior and exterior of the survey area.

The inspection was limited to those materials readily discerned in a reasonable inspection by a competent inspector. Materials that are hidden within walls, behind structures, in vertical shafts or in areas that make them not readily available to our inspector were not sampled. If future work uncovers any non-sampled materials, these should be submitted for asbestos and/or lead paint analysis.

The following numbering convention was used for this inspection:

LETTER	STANDS FOR	EXAMPLE	MEANING
XX	Building DESIGNATION based on information provided on drawings provided to us prior to inspection	25A	Building 25A
Y & *Optional Z*	EITHER building SYSTEM (W: wall; F: Flooring; C: Ceiling; T: TSI; M: Misc) OR Further designation of sample location as Unit # within building	SN	Concrete Sample
		AW	Asbestos Wall Sample
		AM	Asbestos Miscellaneous
		TSI	Thermal System Insulation
		AC	Asbestos Ceiling Sample
		CK	Caulk Sample
		AR	Asbestos Roof Sample

LETTER	STANDS FOR	EXAMPLE	MEANING
xx	Sample number and layer	01	First Sample, First Layer
		01a	First Sample, Second Layer
		01b	First Sample, Third Layer

- ***Asbestos Findings***

Asbestos samples were analyzed in the KELLCO-MACS laboratory, by Polarized Light Microscopy, the EPA's recommended method. Copies of the full laboratory reports are attached.

Photographs of sampled materials are included. Sample locations are noted on the attached not-to-scale drawing.

The determination of a material to be Asbestos Containing Material (ACM) was made either by direct sampling or by homogeneity with at least one positive sample of the same material.

Materials that tested **positive** for asbestos are:

Lab Sample #	Field Sample #	Field Description	Asbestos %
L206503-4	25A-AW2a	119A, west wall behind double door to Room 131 / drywall joint compound	< 1% Chrysotile
L206503-28	25A-TSI17	Area 131, north lower wall / mudded pipe elbow	6% Chrysotile
L206503-32	25A-TSI21	Area 119, N wall, heating return pipe / mudded pipe elbow	6% Chrysotile
L206503-45	25A-AM28	Room 112, N corner by doorway / floor mastic	5% Chrysotile
L206503-46	25A-AW29	Exterior NE corner of 104 / wall texture	2% Chrysotile
L206503-47	25A-AW29a	Exterior NE corner of 104 / drywall joint compound	2% Chrysotile
L206503-48	25A-AW30	Area 101, east wall by roll-up door / paint or coating	2% Chrysotile
L206503-57	25A-TSI35	Room 204, heating return pipe behind door / mudded pipe elbow	< 1% Chrysotile, 15% Amosite
L206503-60	25A-SN36b	Room 204, SE corner under carpet / yellow glue	5% Chrysotile
L206503-63	25A-SN37b	Rom 204, south end under carpet / black flooring material	5% Chrysotile
L206503-65	25A-TSI39	Area 101A, toward south wall / mudded pipe elbow	6% Chrysotile
L206503-68	25A-AW42	Area 101C, west wall at 4ft / wall texture	< 1% Chrysotile
L206503-69	25A-AW42a	Area 101C, west wall at 4ft / drywall joint compound	< 1% Chrysotile

Lab Sample #	Field Sample #	Field Description	Asbestos %
L206503-70	25A-AW43	Area 101C, north metal wall / paint or coating	< 1% Chrysotile
L206503-74	25A-SN46a	Room 104, west wall by doorway, under carpet / vinyl floor sheeting paper backing	31% Chrysotile
L206503-77	25A-SN47a	Room 104, NE corner by doorway under carpet / vinyl floor sheeting paper backing	32% Chrysotile
L206503-80	25A-SN48a	Room 104, SE corner by doorway, under carpet / vinyl floor sheeting paper backing	32% Chrysotile
L206503-82	25A-AW49	Boiler room, SE corner behind door / wall texture	< 1% Chrysotile
L206503-83	25A-AW49a	Boiler room, SE corner behind door / drywall joint compound	2% Chrysotile
L206503-84	25A-AW50	Custodial closet, NW corner / wall texture	< 1% Chrysotile
L206503-85	25A-AW50a	Custodial closet, NW corner / drywall joint compound	2% Chrysotile
L206503-89	25A-AM54	South exit of hallway between 101 & 105 / door frame sealant	6% Chrysotile
L206503-92	25A-AM55	East exit of boiler room / door frame sealant	5% Chrysotile
L206503-93	25A-AM56	Room 112, east end under carpet / floor mastic	6% Chrysotile
L206503-104	25A-CK67	Exterior building between roof & wall, southeast corner / sealant	16% Chrysotile
L206503-106	25A-CK69	Roof, west exterior end between roof & wall / sealant	16% Chrysotile
L206503-107	25A-CK70	Exterior west end, roof cap panel / sealant	5% Chrysotile
L206503-111	25A-CK73	Northwest exterior of building, between wall & roof / sealant	15% Chrysotile

Samples with less than 10% asbestos can be submitted for further analysis by the Point Count method. If the Point Count method determines that the material contains less than 1% asbestos, these materials can be disposed of as non-hazardous asbestos containing construction waste.

Materials for which the analytical results show no **detections** of asbestos are:

Lab Sample #	Field Sample #	Field Description
L206503-1	25A-SN01	119A, north corner by door / 12x12 blue dotted floor tile
L206503-2	25A-SN01a	119A, north corner by door / glue
L206503-3	25A-AW02	119A, west wall behind double door to Room 131 / wall texture
L206503-5	25A-AM03	119, west wall by wooden stairway to 218 / black board
L206503-6	25A-AM03a	119, west wall by wooden stairway to 218 / glue
L206503-7	25A-SN04	119A, replacement tile / 12x12 dotted grey tile
L206503-8	25A-SN04a	119A, replacement tile /glue

Lab Sample #	Field Sample #	Field Description
L206503-9	25A-SN05	Room 124, north end behind entryway / 12x12 off white floor tile
L206503-10	25A-SN05a	Room 124, north end behind entryway / 12x12 off white floor tile
L206503-11	25A-AM06	North wall behind 124 & 120 / black baseboard
L206503-12	25A-AM06a	North wall behind 124 & 120 / glue
L206503-13	25A-AM07	Room 124, south window / white window caulking
L206503-14	25A-AW08	South support column between 124 & 120 / wall texture
L206503-15	25A-SN09	South floor between 120 & 124 / 12x12 off white floor tile
L206503-16	25A-SN09a	South floor between 120 & 124 / mastic
L206503-17	25A-SN10	Room 120, NE corner behind door / 12x12 blue dotted floor tile
L206503-18	25A-SN10a	Room 120, NE corner behind door / mastic
L206503-19	25A-AM11	Area 131, north wall / window caulking
L206503-20	25A-TSI12	Under sink, area 131 / pipe insulation
L206503-21	25A-AW13	Exterior SE corner of 131A / wall texture
L206503-22	25A-AM13a	Exterior SE corner of 131A / drywall joint compound
L206503-23	25A-AM14	Exterior SE corner of 131A / black baseboard
L206503-24	25A-AM14a	Exterior SE corner of 131A / mastic
L206503-25	25A-AW15	Area 298, suth wall by latch-on steps / old wall insulation
L206503-26	25A-AW15a	Area 298, south wall by latch-on steps / old wall insulation joint compound
L206503-27	25A-TSI16	Heating return pipe in 218, south wall / pipe insulation
L206503-29	25A-AM18	Area 119, N wall, NE end / window caulking
L206503-30	25A-SC19	Area 119, N lower wall, NE end / concrete
L206503-31	25A-TSI20	Area 119, N wall, heating return pipe / pipe insulation
L206503-33	25A-SN22	Area 119, by doorway to 112 / 12x12 blue dotted floor tile
L206503-34	25A-SN22a	Area 119, by doorway to 112 / mastic
L206503-35	25A-SN23	Room 119B, SW corner / 12x12 grey floor tile
L206503-36	25A-SN23a	Room 119B, SW corner / mastic
L206503-37	25A-AW24	Room 119B, south lower wall / wall texture
L206503-38	25A-SN25	Room 219, SE corner behind door / 12x12 grey floor tile
L206503-39	25A-SN25a	Room 219, SE corner behind door / mastic
L206503-40	25A-SN26	Room 219, NW end under work station / 12x12 grey floor tile
L206503-41	25A-SN26a	Room 219, NW end under work station / mastic
L206503-42	25A-SN27	Room 114, NE corner behind door, under carpet / floor tile
L206503-43	25A-SN27a	Room 114, NE corner behind door, under carpet / mastic
L206503-44	25A-SN27b	Room 114, NE corner behind door, under carpet / mastic
L206503-49	25A-SN31	Room 114, NW end under carpet / floor tile

Lab Sample #	Field Sample #	Field Description
L206503-96	25A-AW59	Exterior north wall of 101 / metal panel paint or coating
L206503-97	25A-AW60	Exterior window north of 131 / window pane sealant
L206503-98	25A-AM61	Exterior window north of 101 / window pane sealant
L206503-99	25A-AM62	Exterior air exchange unit / duct joint compound
L206503-100	25A-AM63	Exterior air exchange unit / duct joint compound
L206503-101	25A-AM64	Exterior air exchange unit / duct joint compound
L206503-102	25A-AM65	Exterior window north of 119 / window pane sealant
L206503-103	25A-AC66	Area 199, east end ceiling / insulation
L206503-105	25A-AR68	Roof, southeast corner / rolled roof, mastic & insulation
L206503-108	25A-CK71	West exterior wall / rivet caulking
L206503-109	25A-AR72	Roof, west end / rolled roof, mastic & insulation
L206503-110	25A-AR72a	Roof, west end / rolled roof, mastic & insulation
L206503-112	25A-AR74	Northwest corner of roof / rolled roof, mastic
L206503-113	25A-AR74a	Northwest corner of roof / rolled roof insulation

- ***Metals in Paint Findings***

Eleven paint samples were collected and submitted for Heavy Metals (CAM 17) analysis to Macs Lab, Inc.

These samples were analyzed using an ICP/MS, Extraction Method SW3050B TTLC and EPA 6010B/3050 method. This method is **not** for the purpose of profiling any waste streams from this project. Profiling of the waste streams (TCLP & STLC) will be the responsibility of the contractor performing the work. The results of the profiling of the waste streams can vary dramatically depending on the means and methods utilized by the contractor during the demolition of the buildings. Care needs to be taken to ensure that all OSHA and EPA rules are abided by. The EPA rules are typically contained within title 22 and the OSHA rules are typically contained within title 8. Please find the following list as guidance; furthermore, it is not intended to be all encompassing but as a starting point for review in regulatory compliance.

Lab Sample #	Field Sample	Field Description
206482-1	25A-PC1	Paint Chip Off Metal/ Area 119A, Roll up Door
206482-2	25A-PC2	Paint Chip Off Wood/ Room 124 Window
206482-3	25A-PC3	Paint Chip Composite Off Wood/ wood stairway
206482-4	25A-PC4	Paint Chip Of Metal / Area 218
206482-5	25A-PC5	Red and Yellow Pain Chip Composite Off Wood/ Area 218, Floor
206482-6	25A-PC6	Paint chip Off Metal/ North Wall between 1010 & 101C
206482-7	25A-PC7	Paint Chip off Concrete/ Broiler Room
206482-8	25A-PC8	Paint Chip Off Metal/ Exterior West Wall of Bldg
206482-9	25A-PC9	Light fixtures above NW entrance
206482-10	25A-PC10	Light Fixture, wipe/ between 119 & 218
206482-11	25A-PC11	Light fixture/ east exit in 131

Building 25A:

	Lab Sample Number:	206482-1	206482-2	206482-3	206482-4	206482-5
	Client Sample Number:	25A-PC1	25A-PC2	25A-PC3	25A-PC4	25A-PC5
	Matrix:	Bulk	Bulk	Bulk	Bulk	Bulk
	Extraction Type:	Acid	Acid	Acid	Acid	Acid
	Units:	mg/kg (PPM)	mg/kg (PPM)	mg/kg (PPM)	mg/kg (PPM)	mg/kg (PPM)
Sb	Antimony	82.07	100.07	747.42	1,046.88	468.73
As	Arsenic	2.34	<0.01	<0.01	98.35	64.43
Ba	Barium	1,661.13	241,928.57	1,587.26	1,733.51	537.56
Be	Beryllium	5.49	0.96	0.98	0.35	1.37
Cd	Cadmium	21.30	212.54	99.02	85.68	80.81
Cr	Chromium	136.53	473.21	81,859.93	87,760.42	49,296.82
Co	Cobalt	1,475.33	1,577.14	1,716.99	2,428.82	522.21
Cu	Copper	210.65	1,232.50	1,478.19	977.43	1,157.11
Pb	Lead	12,776.94	12,460.71	341,676.23	1,346,354.17	220,392.30
Hg	Mercury	10.95	15.32	59.59	40.28	<0.01
Mo	Molybdenum	31.19	44.82	92.08	1,844.62	55.96
Ni	Nickel	92.15	166.18	200.23	377.95	130.64
Se	Selenium	5,687.31	6,392.86	7,192.88	13,220.49	7,479.64
Ag	Silver	2.37	17.96	84.90	7.38	20.41
Tl	Thallium	125.58	113.21	283.81	712.07	206.88
V	Vanadium	108.84	82.86	89.21	50.87	231.31
Zn	Zinc	7,703.93	5,810.71	8,656.72	14,826.39	3,699.11

	Lab Sample Number:	206482 -6	206482 -7	206482 -8
	Client Sample Number:	25A-PC6	25A-PC7	25A-PC8
	Matrix:	Bulk	Bulk	Bulk
	Extraction Type:	Acid	Acid	Acid
	Units:	mg/kg (PPM)	mg/kg (PPM)	mg/kg (PPM)
Sb	Antimony	3,183.00	123.22	190.91
As	Arsenic	<0.01	44.70	<0.01
Ba	Barium	686.46	640.15	252,020.20
Be	Beryllium	0.43	1.61	<0.01
Cd	Cadmium	788.18	25.14	19.53
Cr	Chromium	1,985.59	4,969.22	1,570.88
Co	Cobalt	54.32	73.82	85.19
Cu	Copper	1,733.43	332.62	1,062.63
Pb	Lead	21,498.56	23,816.29	9,230.64
Hg	Mercury	47.55	282.91	1,133.00
Mo	Molybdenum	862.68	40.84	128.45
Ni	Nickel	2,011.53	63.57	855.56
Se	Selenium	10,975.50	5,085.23	9,030.30
Ag	Silver	<0.01	10.23	<0.01
Tl	Thallium	201.59	122.56	112.46
V	Vanadium	48.70	267.28	7.24
Zn	Zinc	317,579.25	2,563.92	46,447.81

	Lab Sample Number:	206482 -9	206482 -10	206482 -11
	Client Sample Number:	25A-01	25A-02	25A-03
	Matrix:	Bulk	Bulk	Bulk
	Extraction Type:	Acid	Acid	Acid
	Units:	mg/kg (PPM)	mg/kg (PPM)	mg/kg (PPM)
Sb	Antimony	108.85	175.80	239.95
As	Arsenic	62.85	68.30	76.10
Ba	Barium	653.50	805.50	1,150.00
Be	Beryllium	0.27	0.34	0.62
Cd	Cadmium	70.50	97.75	121.10
Cr	Chromium	158.40	248.05	304.45
Co	Cobalt	31.45	37.71	46.29
Cu	Copper	1,430.00	1,335.50	1,880.50
Pb	Lead	2,451.00	4,082.00	5,385.00
Hg	Mercury	8.24	3.65	1.13
Mo	Molybdenum	46.91	61.15	83.05
Ni	Nickel	109.00	152.60	185.70
Se	Selenium	3,311.00	3,585.50	4,063.00
Ag	Silver	24.98	31.16	29.85
Tl	Thallium	37.35	42.28	49.01
V	Vanadium	54.50	61.30	83.60
Zn	Zinc	4,309.50	6,060.00	6,505.00

Regulatory Requirements

The Environmental Protection Agency (EPA) defines Asbestos Containing Material as any material that contains greater than 1% asbestos. Materials containing greater than 1% asbestos must be removed prior to demolition or renovation if they will be disturbed.

Friable asbestos containing material is any material that can be crushed or pulverized by hand pressure when dry, or materials that can be rendered to a crumbled, pulverized, or powdered state when dry by crushing, sanding, sawing, shot blasting, or through demolition or renovation activities.

As stated by NESHAP regulations, any material that contains less than 10% asbestos using the visual estimation method can be point counted with gravimetric reduction. The Point Counting method is a much more accurate analytical method for determining the percent of asbestos in a particular material. If the Point Count method determines that the material contains less than 1% asbestos, the material being analyzed can be disposed of as a non-hazardous asbestos containing construction waste.

Removal or disturbance of material with any detectable amount of asbestos must be handled in accordance with OSHA regulations. Cal-OSHA registration is required if the material contains more than .1% asbestos (1/10th of a percent). If there is more than 100 feet (linear or square) of an asbestos containing material that will be abated or disturbed, a California State registered and licensed asbestos abatement contractor must perform the work. If there is less than 100 feet, the work does not require a licensed asbestos abatement contractor, but must still conform to Cal-OSHA regulations.

Title 8 OSHA

General Industry Safety Orders deal with exposure limits for personnel working in or around surfaces that contain heavy metals.

Element	Chapter	Group	Article	Section
Antimony (Sb)	7	16	107	5155
Arsenic (As)	7	16	110	5214
Barium (Ba)	7	16	107	5155
Beryllium (Be)	7	16	107	5155
Cadmium (Cd)	7	16	110	5206
Chromium (Cr)	7	16	110	5206
Cobalt (Co)	7	16	110	5155
Copper (Cu)	7	16	110	5155
Lead (Pb)	7	16	109	5198
Mercury (Hg)	7	16	110	5155
Molybdenum (Mo)	7	16	110	5155
Nickel (Ni)	7	16	110	5155
Selenium (Se)	7	16	110	5155
Silver (Ag)	7	16	110	5155
Thallium (Ti)	7	16	110	5155
Vanadium (V)	7	16	110	5155

Element	Chapter	Group	Article	Section
Zinc (Zn)	7	16	107	5155

Title 22- Hazardous Waste

Title 22 describes the characterization of hazardous waste as described in chapter 11, article 1, section 66261.1. Under the EPA's Resource Conservation and Recovery Act (RCRA), a national program and inventory system about handling hazardous waste, describes the minimum requirements in order to be in compliance with the Federal and/or State regulations.

Comment Regarding All Asbestos Containing Materials:

Asbestos containing materials in good condition do not necessarily need to be removed unless they will be disturbed; they should however be respected.

Employees, contract workers and others should be advised not to drill, saw, scrape or otherwise disturb this material without taking precautionary measures appropriate to asbestos containing material.

Asbestos containing material should be removed prior to the renovation and must be removed prior to demolition.

Areas Needing Immediate Corrective Action

Asbestos (in any condition) should be removed prior to renovation and must be removed prior to demolition of the survey site.

Analytical Procedures

- ***POLARIZED LIGHT MICROSCOPY (PLM)***

  Bulk samples were analyzed in accordance with U.S. EPA "Test Method for Determination of Asbestos in Bulk Building Materials, 1993," with inclusion of area percent estimates of the sample components. The use of the McCrone Color Dispersion Staining Technique supplements the analysis when considered useful by the analyst. The samples are prepared with refractive immersion oil and are examined under Polarized Light Microscopy (PLM). The accuracy of the visual estimate method is 1%.

  As per the standard "...The accuracy in the determination of the presence or absence of asbestos of greater than 1 area percent asbestos is greater than 99%." ASTM Committee D22.05, 1/18/88, Standard *Method of Testing for Asbestos Containing Materials by Polarized Light Microscopy*. If the sample matrix is reduced to minimize non-asbestos components, the detection limit can be mathematically enhanced, based on the amount of material remaining after matrix reduction. This method is called gravimetric reduction. This method involves ashing and chemical dissolution of the sample.

- ***POINT COUNTING***

  The Point Counting method is a much more accurate analytical method for determining the percent of asbestos in a particular material. KELLCO-MACS uses a muffle furnace to ash the sample and remove organic compounds. Hydrochloric acid is used to dissolve some of the non-asbestos minerals. Under this method a minimum of 125 points are counted from each of 8 different slide preparations of the same sample (total of 1000 points min.) If the **Point Count Method** determines that the material contains less than 1% asbestos, the material being analyzed can be treated as non-hazardous asbestos containing construction waste**. Note: ONLY the Point Count Method can be used for this determination.**

- ***CAM 17 TESTING***

  CAM 17 Metals were tested by Macs Lab, Inc. using ICP-MS, Extraction Method SW3050B and Analytical Method 6010B/3050.

KELLCO-MACS Qualifications

KELLCO-MACS is a joint venture offering hazardous materials and AIHA laboratory analyses. Our credentials include:

- The KELLCO-MACS asbestos inspector is licensed with the State of California Department of Occupational Safety and Health (CAL-OSHA).

- The KELLCO-MACS lead inspector is licensed by the California Department of Public Health (CDPH)

- The laboratory accreditations include:

  - **NVLAP PLM** for Asbestos: NIST National Voluntary Laboratory Accreditation Program certificate of accreditation for bulk **asbestos** analysis by polarized light microscopy (Accreditation #101948-1).
  - **AIHA** Accreditation for **Industrial Hygiene** Analytical Laboratory for PCM, and AA for lead (Accreditation #101786).
  - **AIHA Analyst Proficiency (NIOSH PAT)** (Accreditation # 11172)
  - **AIHA ELLAP** Accreditation for Lead: Accreditation for the **Environmental Lead** Laboratory recognized by the EPA as meeting the requirements of the National Lead Laboratory Accreditation Program established under Title X (Lab ID #11109).
  - **ELAP PLM** for Asbestos: California Department of Health Services, Environmental Laboratory Accreditation Program, certificate for bulk asbestos analysis (Certificate #2027)
  - **USDA Soil** permit #39484

The following supporting documents are attached to this report:

- Laboratory analytical reports
- Photographs of sample locations

Lab Sample #	Field Sample #	Field Description
L206503-50	25A-SN31a	Room 114, NW end under carpet / mastic
L206503-51	25A-SN31b	Room 114, NW end under carpet / mastic
L206503-52	25A-AW32	Room 114, north lower wall / wall texture
L206503-53	25A-SN33	Room 204, under carpet NE corner behind door / yellow glue
L206503-54	25A-SN33a	Room 204, under carpet NE corner behind door / yellow glue
L206503-55	25A-AW34	Room 204, NE corner behind door / wall texture
L206503-56	25A-AW34a	Room 204, NE corner behind door / drywall joint compound
L206503-58	25A-SN36	Room 204, SE corner under carpet / black flooring material
L206503-59	25A-SN36a	Room 204, SE corner under carpet / yellow glue
L206503-61	25A-SN37	Rom 204, south end under carpet / black flooring material
L206503-62	25A-SN37a	Rom 204, south end under carpet / yellow glue
L206503-64	25A-AW38	East wall by stairway landing of 204 / wall insulation
L206503-66	25A-SC40	Area 101A, south raised wall / concrete
L206503-67	25A-AM41	Area 101A, south wall / window caulking
L206503-71	25A-SC44	Between 101 & 101C, north raised wall / concrete
L206503-72	25A-AM45	Area 101, north wall / window caulking
L206503-73	25A-SN46	Room 104, west wall by doorway, under carpet / vinyl floor sheeting
L206503-75	25A-SN46b	Room 104, NE corner by doorway under carpet / vinyl floor sheeting yellow glue
L206503-76	25A-SN47	Room 104, NE corner by doorway under carpet / vinyl floor sheeting paper backing
L206503-78	25A-SN47b	Room 104, NE corner by doorway under carpet / vinyl floor sheeting yellow glue
L206503-79	25A-SN48	Room 104, SE corner by doorway, under carpet / vinyl floor sheeting
L206503-81	25A-SN48b	Room 104, SE corner by doorway, under carpet / vinyl floor sheeting yellow glue
L206503-86	25A-AM51	Boiler room, east wall by exit / cinder block mortar
L206503-87	25A-AM52	Boiler room, east wall by exit / cinder block mortar
L206503-88	25A-AM53	South wall of hallway between 101 & 105 / cinder block mortar
L206503-90	25A-AC53	219B / 2x2 suspended ceiling tile
L206503-91	25A-AC54	219B / 2x2 suspended ceiling tile
L206503-94	25A-AW57	Area 218, south wall, SW end / old wall insulation, tape & joint compound
L206503-95	25A-AW58	Area 119, north wall, NE end / metal panel paint or coating

- Floor plan or sketch showing sample locations

Please call KELLCO if there are any questions and/or clarifications regarding this report. We look forward to working with you in the future.

Sincerely,

KELLCO-MACS

Tim C. Cannard CAC #94-1395, CDPH Lead #764
Senior Project Manager

Asbestos Definitions and Classifications

ACM	(Asbestos Containing Material) - Material containing more than 1% asbestos. ACM must be disposed as hazardous waste. Note: Federal OSHA and Cal-OSHA control materials containing any amount of asbestos.
ACBM	(Asbestos Containing Building Material) – AHERA/ASHARA term for material containing more than 1% asbestos in or on interior structural members or other structural components. Exceptions: Covered walkways, porticos and exterior HVAC TSI.
ACCM	(Asbestos Containing Construction Material) – California term for a manufactured construction material containing greater than .1% (one tenth of one percent) asbestos.
PACM	(Presumed Asbestos Containing Material) OSHA considers all TSI and surfacing materials installed prior to1980 to be ACM unless proven otherwise.
Friable	Asbestos Containing Material that can be crumbled pulverized or reduced to powder by hand pressure when dry.
NOA	Naturally Occurring Asbestos. CARB defines as having >.25% by point counting.

Categories of Asbestos Used BY EPA AHERA/ASHARA and OSHA/Cal-OSHA

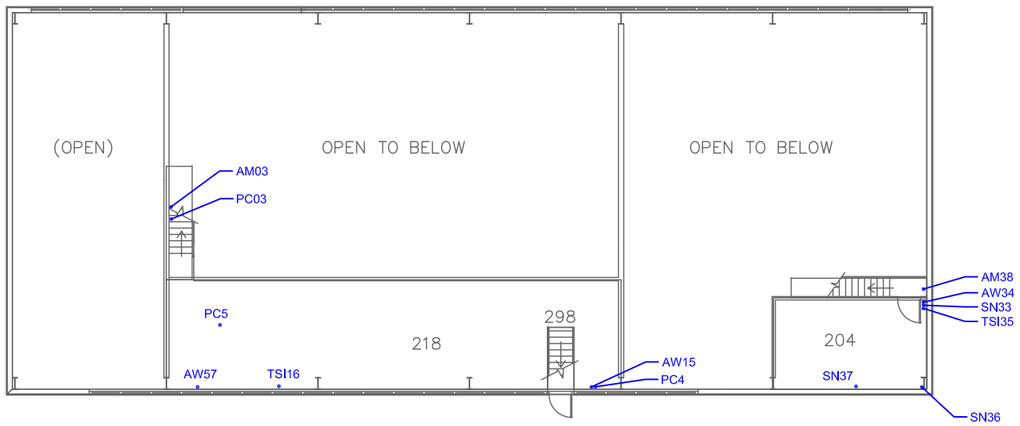
TSI	(Thermal System Insulation) - "Thermal system insulation (TSI)" means ACM applied to pipes, fittings, boilers, breeching, tanks, ducts or other structural components to prevent heat loss or gain. "Thermal system insulation ACM" is thermal system insulation which contains more than 1% asbestos.
SURFACING (usually mixed on site at time of application)	"Surfacing material" means material that is sprayed, troweled-on or otherwise applied to surfaces (such as acoustical plaster on ceilings and fireproofing materials on structural members, or other materials on surfaces for acoustical, fireproofing, and other purposes). "Surfacing ACM" means surfacing material which contains more than 1% asbestos. NOTE: OSHA/Cal-OSHA do not classify taping mud, floor tile mastic, stucco, leveling compound, and hard wall plasters or wall texturing as surfacing.
MISC.	All other ACM, including classify taping mud, floor tile mastic, stucco, leveling compound, and hard wall plasters or wall texturing as surfacing.

NESHAPS Categories for Asbestos (used by Air Quality Management Districts)

Category I	Cat I Non-friable Asbestos Containing Material refers to asbestos containing packing, gaskets, resilient floor covering, Galbestos, and asphalt roofing products containing more than 1% asbestos.
Category II	Cat II Non-friable Asbestos-Containing Material is any material that is not Cat I that contains greater than 1% asbestos.
RACM	"Regulated Asbestos-Containing Material." – Friable asbestos material (ACM) or a Category I non-friable ACM that has become friable OR a 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 reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations. RACM should be removed prior to renovation or demolition.

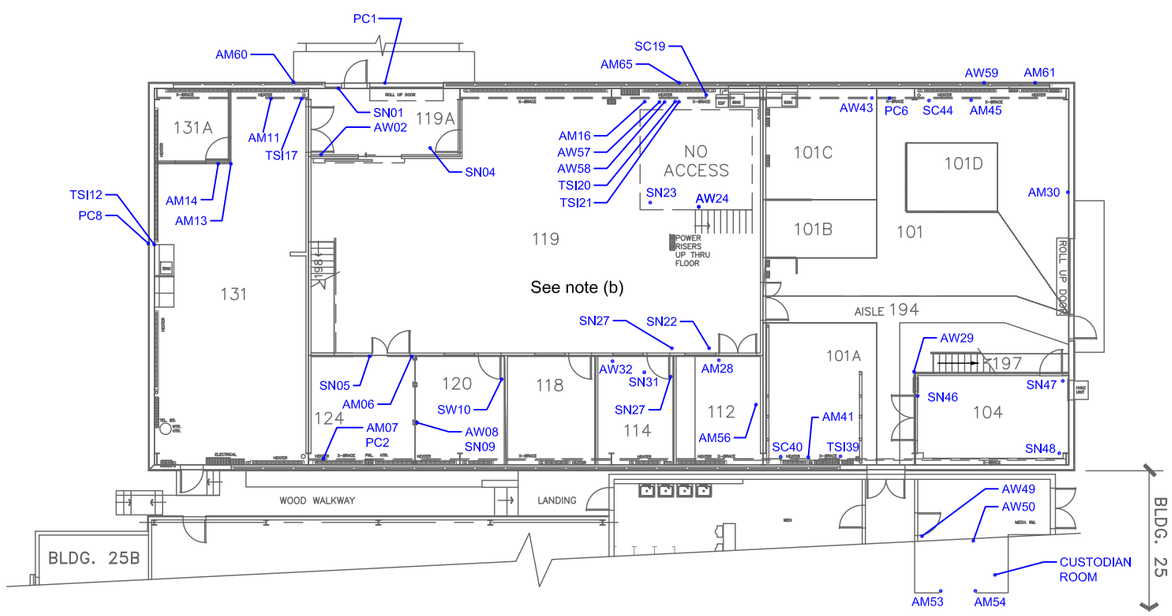
Characterization of Asbestos Containing Materials

Material	Estimated Quantity	TSI	Surfacing	Misc	RACM	Cat I	Cat II
Wall texture, drywall joint compound	~9500 sq. ft.		X		X		
Mudded pipe elbow	20 elbows	X			X		
Thermal System Insulation-(TSI)	~ 150 Linear ft	X			X		
Interior walls paint or coating	~9000 sq. ft.		X		X		
Room 204/ black flooring material & yellow glue	~300 sq. ft.			X		X	
Room 112/ floor mastic	~200 sq. ft.			X		X	
Exterior roof / sealant	~ 30 sq. ft.			X			X
Fire Door	4 doors	X			X		
Room 104/ vinyl floor sheeting and mastic	~300 sq. ft.			X	X		
Door frame/ sealant	5 doors			X			X



B25A – FLOOR 2

ROOF



B25A – FLOOR 1

ABBREVIATIONS

AM	Asbestos miscellaneous
AR	Asbestos roofing sample
AW	Asbestos wall sample
CK	Caulk sample
PC	Paint sample
SC	Concrete sample
SN	Tile/mastic sample
SW	Wipe sample

0 20' 40'

SCALE: 1" = 20'

NOTE:

All sample locations are approximate

L:\LBNL.178\Old Town Demolition\Sample Location Maps\Kellco Maps\SLM_Kellco_B25A.dwg

MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Method: EPA-600/M4-82-020

KELLCO Services
3137 Diablo Ave

Hayward CA 94545

Person to contact: Tim Cannard
Contact phone: 510-786-9751
FAX phone: 510-786-9625
Sampled by: Siew Yee Lee
Sampled on: July 13, 2010
Analyzed on: July 27, 2010 at: 17:30
Corresponding invoice number: 206503

Analyst: HCB (signature)

Laboratory manager: (signature)

Job Number: 1004-17

Job Description: Lawrence Berkeley National Lab - Building 25A, Berkeley, CA

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206503-1	25A-SN01 119A, north corner by door / 12x12 blue dotted floor tile & glue	**N.D.**	No Fibers	Off-white tile vinyl. Balance of sample is unspecified non-fibrous material.
L206503-2	25A-SN01a 119A, north corner by door / 12x12 blue dotted floor tile & glue	**N.D.**	< 1%Cellulose	Black adhesive. Balance of sample is organic binders.
L206503-3	25A-AW02 119A, west wall behind double door to Room 131 / wall texture	**N.D.**	< 1%Cellulose	Off-white compound texture. Balance of sample is unspecified non-fibrous material.
L206503-4	25A-AW2a 119A, west wall behind double door to Room 131 / drywall joint compound	**Yes**	< 1%Chrysotile* 2%Cellulose	Off-white joint compound. Balance of sample is unspecified non-fibrous material.
L206503-5	25A-AM03 119, west wall by wooden stairway to 218 / black board & glue	**N.D.**	No Fibers	Black vinyl. Balance of sample is unspecified non-fibrous material.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

This report shall not be reproduced except in full without written approval of MACS Lab, Inc. This report relates only to the items tested. Samples will be destroyed after one month. Test per 40 Code of Federal Reg. Chap I (1-1-87) Part 763, Subpart F, Appendix A or current EPA method. Percentages are approximate. MACS Lab is an accredited laboratory of the National Voluntary Laboratory Accreditation Program (NVLAP) and is Lab Code 101948-0. No product endorsement by NVLAP or any agency of the U.S. Government may be claimed as a result of this analysis. Calif Dept of Health ELAP #2027. This method is not reliable for analysis of tile or other materials when fiber size is less than 10μ. TEM analysis should be used. Method Detection limit for asbestos is 1% per CA law. See QC page attached to this page for blank and retest data .

NVLAP®
NVLAP Lab Code 101948-0

MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206503-6	25A-AM03a 119, west wall by wooden stairway to 218 / black board & glue	**N.D.**	1%Cellulose	Yellow adhesive. Balance of sample is organic binders.
L206503-7	25A-SN04 119A, replacement tile / 12x12 dotted grey tile & glue	**N.D.**	< 1%Cellulose	Off-white tile. Balance of sample is unspecified non-fibrous material.
L206503-8	25A-SN04a 119A, replacement tile / 12x12 dotted grey tile & glue	**N.D.**	1%Cellulose	Yellow adhesive. Balance of sample is organic binders.
L206503-9	25A-SN05 Room 124, north end behind entryway / 12x12 off white floor tile & glue	**N.D.**	No Fibers	Off-white tile. Balance of sample is unspecified non-fibrous material.
L206503-10	25A-SN05a Room 124, north end behind entryway / 12x12 off white floor tile & glue	**N.D.**	1%Cellulose	Off-white adhesive. Balance of sample is organic binders.
L206503-11	25A-AM06 North wall behind 124 & 120 / black baseboard & glue	**N.D.**	No Fibers	Black vinyl. Balance of sample is unspecified non-fibrous material.
L206503-12	25A-AM06a North wall behind 124 & 120 / black baseboard & glue	**N.D.**	< 1%Cellulose	White adhesive. Balance of sample is organic binders.
L206503-13	25A-AM07 Room 124, south window / white window caulking	**N.D.**	< 1%Cellulose	White caulk. Balance of sample is unspecified non-fibrous material.
L206503-14	25A-AW08 South support column between 124 & 120 / wall texture	**N.D.**	< 1%Cellulose	Off-white compound texture. Balance of sample is unspecified non-fibrous material.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

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510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206503-15	25A-SN09 South floor between 120 & 124 / 12x12 off white floor tile & mastic	**N.D.**	< 1%Cellulose	Off-white tile. Balance of sample is unspecified non-fibrous material.
L206503-16	25A-SN09a South floor between 120 & 124 / 12x12 off white floor tile & mastic	**N.D.**	1%Cellulose	Yellow adhesive. Balance of sample is organic binders.
L206503-17	25A-SN10 Room 120, NE corner behind door / 12x12 blue dotted floor tile & mastic	**N.D.**	No Fibers	Off-white tile vinyl. Balance of sample is unspecified non-fibrous material.
L206503-18	25A-SN10a Room 120, NE corner behind door / 12x12 blue dotted floor tile & mastic	**N.D.**	1%Cellulose	Black adhesive. Balance of sample is organic binders.
L206503-19	25A-AM11 Area 131, north wall / window caulking	**N.D.**	< 1%Cellulose	Off-white caulk. Balance of sample is unspecified non-fibrous material.
L206503-20	25A-TSI12 Under sink, area 131 / pipe insulation	**N.D.**	66%Mineral Wool 17%Cellulose	Off-white/yellow fibrous wrap insulation. Balance of sample is unspecified non-fibrous material.
L206503-21	25A-AW13 Exterior SE corner of 131A / wall texture	**N.D.**	< 1%Cellulose	Off-white compound texture. Balance of sample is unspecified non-fibrous material.
L206503-22	25A-AM13a Exterior SE corner of 131A / drywall joint compound	**N.D.**	22%Cellulose 3%Fiberglass	Off-white joint compound plaster. Balance of sample is unspecified non-fibrous material.
L206503-23	25A-AM14 Exterior SE corner of 131A / black baseboard & mastic	**N.D.**	No Fibers	Black vinyl. Balance of sample is unspecified non-fibrous material.

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L206503-24	25A-AM14a Exterior SE corner of 131A / black baseboard & mastic	**N.D.**	1%Cellulose	Off-whitew adhesive. Balance of sample is organic binders.
L206503-25	25A-AW15 Area 298, suth wall by latch-on steps / old wall insulation	**N.D.**	89%Mineral Wool 2%Cellulose	Brown fibrous insulation. Balance of sample is unspecified non-fibrous material.
L206503-26	25A-AW15a Area 298, south wall by latch-on steps / old wall insulation joint compound	**N.D.**	16%Fiberglass 1%Cellulose	Off-white wrap joint compound. Balance of sample is unspecified non-fibrous material.
L206503-27	25A-TSI16 Heating return pipe in 218, south wall / pipe insulation	**N.D.**	63%Mineral Wool 18%Cellulose	Off-white/beige fibrous wrap insulation. Balance of sample is unspecified non-fibrous material.
L206503-28	25A-TSI17 Area 131, north lower wall / mudded pipe elbow	**Yes**	6%Chrysotile* 40%Mineral Wool 11%Cellulose	Off-white fibrous powder insulation. Balance of sample is unspecified non-fibrous material.
L206503-29	25A-AM18 Area 119, N wall, NE end / window caulking	**N.D.**	< 1%Cellulose	Off-white caulk. Balance of sample is unspecified non-fibrous material.
L206503-30	25A-SC19 Area 119, N lower wall, NE end / concrete	**N.D.**	No Fibers	Gray concrete. Balance of sample is silicate and cementitious.
L206503-31	25A-TSI20 Area 119, N wall, heating return pipe / pipe insulation	**N.D.**	64%Mineral Wool 16%Cellulose	Beige fibrous wrap insulation. Balance of sample is unspecified non-fibrous material.
L206503-32	25A-TSI21 Area 119, N wall, heating return pipe / mudded pipe elbow	**Yes**	6%Chrysotile* 44%Mineral Wool 14%Cellulose	Off-white fibrous powder insulation. Balance of sample is unspecified non-fibrous material.

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L206503-33	25A-SN22 Area 119, by doorway to 112 / 12x12 blue dotted floor tile & mastic	**N.D.**	No Fibers	Off-white tile vinyl. Balance of sample is unspecified non-fibrous material.
L206503-34	25A-SN22a Area 119, by doorway to 112 / 12x12 blue dotted floor tile & mastic	**N.D.**	< 1%Cellulose	Black adhesive. Balance of sample is organic binders.
L206503-35	25A-SN23 Room 119B, SW corner / 12x12 grey floor tile & mastic	**N.D.**	< 1%Cellulose	Off-white/gray tile. Balance of sample is unspecified non-fibrous material.
L206503-36	25A-SN23a Room 119B, SW corner / 12x12 grey floor tile & mastic	**N.D.**	2%Cellulose	Black tar. Balance of sample is organic binders.
L206503-37	25A-AW24 Room 119B, south lower wall / wall texture	**N.D.**	< 1%Cellulose	Off-white compound texture. Balance of sample is unspecified non-fibrous material.
L206503-38	25A-SN25 Room 219, SE corner behind door / 12x12 grey floor tile & mastic	**N.D.**	No Fibers	Off-white/gray tile. Balance of sample is unspecified non-fibrous material.
L206503-39	25A-SN25a Room 219, SE corner behind door / 12x12 grey floor tile & mastic	**N.D.**	3%Cellulose	Black tar. Balance of sample is organic binders.
L206503-40	25A-SN26 Room 219, NW end under work station / 12x12 grey floor tile & mastic	**N.D.**	< 1%Cellulose	Off-white/gray tile. Balance of sample is unspecified non-fibrous material.
L206503-41	25A-SN26a Room 219, NW end under work station / 12x12 grey floor tile & mastic	**N.D.**	3%Cellulose	Yellow adhesive. Balance of sample is organic binders.

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L206503-42	25A-SN27 Room 114, NE corner behind door, under carpet / floor tile & mastic	**N.D.**	No Fibers	Off-white tile vinyl. Balance of sample is unspecified non-fibrous material.
L206503-43	25A-SN27a Room 114, NE corner behind door, under carpet / floor tile & mastic	**N.D.**	1%Cellulose	Black adhesive. Balance of sample is organic binders.
L206503-44	25A-SN27b Room 114, NE corner behind door, under carpet / floor tile & mastic	**N.D.**	1%Cellulose	Yellow adhesive. Balance of sample is organic binders.
L206503-45	25A-AM28 Room 112, N corner by doorway / floor mastic	**Yes**	5%Chrysotile* 4%Cellulose	Black/brown adhesive tar. Balance of sample is organic binders.
L206503-46	25A-AW29 Exterior NE corner of 104 / wall texture	**Yes**	2%Chrysotile* 1%Cellulose	Off-white compound texture. Balance of sample is unspecified non-fibrous material.
L206503-47	25A-AW29a Exterior NE corner of 104 / drywall joint compound	**Yes**	2%Chrysotile* 21%Cellulose	Off-white joint compound plaster. Balance of sample is unspecified non-fibrous material.
L206503-48	25A-AW30 Area 101, east wall by roll-up door / paint or coating	**Yes**	2%Chrysotile* < 1%Cellulose	Gray coating/paint. Balance of sample is unspecified non-fibrous material.
L206503-49	25A-SN31 Room 114, NW end under carpet / floor tile & mastic	**N.D.**	No Fibers	Off-white tile vinyl. Balance of sample is unspecified non-fibrous material.
L206503-50	25A-SN31a Room 114, NW end under carpet / floor tile & mastic	**N.D.**	1%Cellulose	Black adhesive. Balance of sample is organic binders.

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L206503-51	25A-SN31b Room 114, NW end under carpet / floor tile & mastic	**N.D.**	1% Cellulose	Yellow adhesive. Balance of sample is organic binders.
L206503-52	25A-AW32 Room 114, north lower wall / wall texture	**N.D.**	< 1% Cellulose	Off-white compound texture. Balance of sample is unspecified non-fibrous material.
L206503-53	25A-SN33 Room 204, under carpet NE corner behind door / black flooring material & yellow glue	**N.D.**	36% Cellulose 2% Synthetic	Black tile fibrous tar. Balance of sample is organic binders and unspecified non-fibrous material.
L206503-54	25A-SN33a Room 204, under carpet NE corner behind door / black flooring material & yellow glue	**N.D.**	1% Cellulose	Yellow adhesive. Balance of sample is organic binders.
L206503-55	25A-AW34 Room 204, NE corner behind door / wall texture	**N.D.**	< 1% Cellulose	Off-white compound texture. Balance of sample is unspecified non-fibrous material.
L206503-56	25A-AW34a Room 204, NE corner behind door / drywall joint compound	**N.D.**	22% Cellulose	Off-white joint compound plaster. Balance of sample is unspecified non-fibrous material.
L206503-57	25A-TSI35 Room 204, heating return pipe behind door / mudded pipe elbow	**Yes**	15% Amosite* < 1% Chrysotile* 4% Mineral Wool	Off-white fibrous powder insulation. Balance of sample is unspecified non-fibrous material.
L206503-58	25A-SN36 Room 204, SE corner under carpet / black flooring material & yellow glue	**N.D.**	34% Cellulose 2% Synthetic 1% Polyethylene	Black tile fibrous tar. Balance of sample is organic binders and unspecified non-fibrous material.
L206503-59	25A-SN36a Room 204, SE corner under carpet / black flooring material & yellow glue	**N.D.**	1% Cellulose	Yellow adhesive. Balance of sample is organic binders.

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L206503-60	25A-SN36b Room 204, SE corner under carpet / black flooring material & yellow glue	**Yes**	5% Chrysotile* 3% Cellulose	Black tar. Balance of sample is organic binders.
L206503-61	25A-SN37 Rom 204, south end under carpet / black flooring material & yellow glue	**N.D.**	34% Cellulose 2% Synthetic 1% Polyethylene	Black tile fibrous tar. Balance of sample is organic binders and unspecified non-fibrous material.
L206503-62	25A-SN37a Rom 204, south end under carpet / black flooring material & yellow glue	**N.D.**	1% Cellulose	Yellow adhesive. Balance of sample is organic binders.
L206503-63	25A-SN37b Rom 204, south end under carpet / black flooring material & yellow glue	**Yes**	5% Chrysotile* 3% Cellulose	Black tar. Balance of sample is organic binders.
L206503-64	25A-AW38 East wall by stairway landing of 204 / wall insulation	**N.D.**	94% Mineral Wool 2% Cellulose	Beige fibrous insulation. Balance of sample is unspecified non-fibrous material.
L206503-65	25A-TSI39 Area 101A, toward south wall / mudded pipe elbow	**Yes**	6% Chrysotile* 39% Mineral Wool 5% Cellulose	Off-white fibrous powder insulation. Balance of sample is unspecified non-fibrous material.
L206503-66	25A-SC40 Area 101A, south raised wall / concrete	**N.D.**	No Fibers	Gray concrete. Balance of sample is silicate and cementitious.
L206503-67	25A-AM41 Area 101A, south wall / window caulking	**N.D.**	No Fibers	Off-white caulk. Balance of sample is unspecified non-fibrous material.
L206503-68	25A-AW42 Area 101C, west wall at 4ft / wall texture	**Yes**	< 1% Chrysotile* 1% Cellulose	Off-white compound texture. Balance of sample is unspecified non-fibrous material.

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L206503-69	25A-AW42a Area 101C, west wall at 4ft / drywall joint compound	**Yes**	< 1%Chrysotile* 22%Cellulose	Off-white joint compound plaster. Balance of sample is unspecified non-fibrous material.
L206503-70	25A-AW43 Area 101C, north metal wall / paint or coating	**Yes**	< 1%Chrysotile* < 1%Cellulose	Gray coating/paint. Balance of sample is unspecified non-fibrous material.
L206503-71	25A-SC44 Between 101 & 101C, north raised wall / concrete	**N.D.**	No Fibers	Gray concrete. Balance of sample is silicate and cementitious.
L206503-72	25A-AM45 Area 101, north wall / window caulking	**N.D.**	< 1%Cellulose	Off-white caulk. Balance of sample is unspecified non-fibrous material.
L206503-73	25A-SN46 Room 104, west wall by doorway, under carpet / vinyl floor sheeting	**N.D.**	No Fibers	Off-white linoleum. Balance of sample is polymer and unspecified non-fibrous material.
L206503-74	25A-SN46a Room 104, west wall by doorway, under carpet / vinyl floor sheeting paper backing	**Yes**	31%Chrysotile* 12%Cellulose	Off-white linoleum backing. Balance of sample is unspecified non-fibrous material.
L206503-75	25A-SN46b Room 104, NE corner by doorway under carpet / vinyl floor sheeting yellow glue	**N.D.**	1%Cellulose	Yellow adhesive. Balance of sample is organic binders.
L206503-76	25A-SN47 Room 104, NE corner by doorway under carpet / vinyl floor sheeting paper backing	**N.D.**	No Fibers	Off-white linoleum. Balance of sample is polymer and unspecified non-fibrous material.
L206503-77	25A-SN47a Room 104, NE corner by doorway under carpet / vinyl floor sheeting paper backing	**Yes**	32%Chrysotile* 11%Cellulose	Off-white linoleum backing. Balance of sample is unspecified non-fibrous material.

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L206503-78	25A-SN47b Room 104, NE corner by doorway under carpet / vinyl floor sheeting yellow glue	**N.D.**	1%Cellulose	Yellow adhesive. Balance of sample is organic binders.
L206503-79	25A-SN48 Room 104, SE corner by doorway, under carpet / vinyl floor sheeting	**N.D.**	No Fibers	Off-white linoleum. Balance of sample is polymer and unspecified non-fibrous material.
L206503-80	25A-SN48a Room 104, SE corner by doorway, under carpet / vinyl floor sheeting paper backing	**Yes**	32%Chrysotile* 13%Cellulose	Off-white linoleum backing. Balance of sample is unspecified non-fibrous material.
L206503-81	25A-SN48b Room 104, SE corner by doorway, under carpet / vinyl floor sheeting yellow glue	**N.D.**	1%Cellulose	Yellow adhesive. Balance of sample is organic binders.
L206503-82	25A-AW49 Boiler room, SE corner behind door / wall texture	**Yes**	< 1%Chrysotile* 1%Cellulose	Off-white compound texture. Balance of sample is unspecified non-fibrous material.
L206503-83	25A-AW49a Boiler room, SE corner behind door / drywall joint compound	**Yes**	2%Chrysotile* 22%Cellulose	Off-white joint compound plaster. Balance of sample is unspecified non-fibrous material.
L206503-84	25A-AW50 Custodial closet, NW corner / wall texture	**Yes**	< 1%Chrysotile* 1%Cellulose	Off-white compound texture. Balance of sample is unspecified non-fibrous material.
L206503-85	25A-AW50a Custodial closet, NW corner / drywall joint compound	**Yes**	2%Chrysotile* 21%Cellulose	Off-white joint compound plaster. Balance of sample is unspecified non-fibrous material.
L206503-86	25A-AM51 Boiler room, east wall by exit / cinder block mortar	**N.D.**	< 1%Cellulose	Gray mortar. Balance of sample is silicate and cementitious.

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L206503-87	25A-AM52 Boiler room, east wall by exit / cinder block mortar	**N.D.**	No Fibers	Gray mortar. Balance of sample is silicate and cementitious.
L206503-88	25A-AM53 South wall of hallway between 101 & 105 / cinder block mortar	**N.D.**	< 1% Cellulose	Gray mortar. Balance of sample is silicate and cementitious.
L206503-89	25A-AM54 South exit of hallway between 101 & 105 / door frame sealant	**Yes**	6% Chrysotile* 5% Cellulose	Off-white sealant. Balance of sample is unspecified non-fibrous material.
L206503-90	25A-AC53 219B / 2x2 suspended ceiling tile	**N.D.**	35% Mineral Wool 34% Cellulose 1% Polyethylene	Tan ceiling tile. Balance of sample is perlite and unspecified non-fibrous material.
L206503-91	25A-AC54 219B / 2x2 suspended ceiling tile	**N.D.**	35% Cellulose 34% Mineral Wool 1% Polyethylene	Tan ceiling tile. Balance of sample is perlite and unspecified non-fibrous material.
L206503-92	25A-AM55 East exit of boiler room / door frame sealant	**Yes**	5% Chrysotile* 4% Cellulose	Off-white sealant. Balance of sample is unspecified non-fibrous material.
L206503-93	25A-AM56 Room 112, east end under carpet / floor mastic	**Yes**	6% Chrysotile* 4% Cellulose	Black adhesive tar. Balance of sample is organic binders.
L206503-94	25A-AW57 Area 218, south wall, SW end / old wall insulation, tape & joint compound	**N.D.**	60% Mineral Wool 15% Fiberglass 1% Cellulose	Beige fibrous wrap insulation. Balance of sample is unspecified non-fibrous material.
L206503-95	25A-AW58 Area 119, north wall, NE end / metal panel paint or coating	**N.D.**	8% Cellulose 8% Mineral Wool	Gray coating/paint. Balance of sample is unspecified non-fibrous material.

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L206503-96	25A-AW59 Exterior north wall of 101 / metal panel paint or coating	**N.D.**	2% Cellulose	Gray coating/paint. Balance of sample is unspecified non-fibrous material.
L206503-97	25A-AW60 Exterior window north of 131 / window pane sealant	**N.D.**	11% Cellulose 1% Polyethylene	Black sealant. Balance of sample is unspecified non-fibrous material.
L206503-98	25A-AM61 Exterior window north of 101 / window pane sealant	**N.D.**	< 1% Cellulose	Off-white sealant. Balance of sample is unspecified non-fibrous material.
L206503-99	25A-AM62 Exterior air exchange unit / duct joint compound	**N.D.**	1% Cellulose < 1% Polyethylene	Gray duct compound caulk. Balance of sample is unspecified non-fibrous material.
L206503-100	25A-AM63 Exterior air exchange unit / duct joint compound	**N.D.**	16% Cellulose 1% Polyethylene	Gray duct compound caulk. Balance of sample is unspecified non-fibrous material.
L206503-101	25A-AM64 Exterior air exchange unit / duct joint compound	**N.D.**	1% Cellulose	Gray duct compound caulk. Balance of sample is unspecified non-fibrous material.
L206503-102	25A-AM65 Exterior window north of 119 / window pane sealant	**N.D.**	No Fibers	Gray sealant. Balance of sample is unspecified non-fibrous material.
L206503-103	25A-AC66 Area 199, east end ceiling / insulation	**N.D.**	No Fibers	Pink fibrous insulation. Balance of sample is unspecified non-fibrous material.
L206503-104	25A-CK67 Exterior building between roof & wall, southeast corner / sealant	**Yes**	16% Chrysotile* 5% Cellulose	Off-white sealant. Balance of sample is unspecified non-fibrous material.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

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MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206503-105	25A-AR68 Roof, southeast corner / rolled roof, mastic & insulation	**N.D.**	10% Fiberglass 5% Cellulose	Black roofing aggregate. Balance of sample is silicate and organic binders.
L206503-106	25A-CK69 Roof, west exterior end between roof & wall / sealant	**Yes**	16% Chrysotile* 5% Cellulose	Off-white sealant. Balance of sample is unspecified non-fibrous material.3
L206503-107	25A-CK70 Exterior west end, roof cap panel / sealant	**Yes**	5% Chrysotile* 2% Cellulose	Off-white sealant. Balance of sample is unspecified non-fibrous material.
L206503-108	25A-CK71 West exterior wall / rivet caulking	**N.D.**	< 1% Cellulose	Gray caulk. Balance of sample is unspecified non-fibrous material.
L206503-109	25A-AR72 Roof, west end / rolled roof, mastic & insulation	**N.D.**	10% Fiberglass 1% Cellulose	Black roofing aggregate. Balance of sample is silicate and organic binders.
L206503-110	25A-AR72a Roof, west end / rolled roof, mastic & insulation	**N.D.**	73% Cellulose 1% Mineral Wool	Brown fibrous insulation. Balance of sample is perlite and unspecified non-fibrous material.
L206503-111	25A-CK73 Northwest exterior of building, between wall & roof / sealant	**Yes**	15% Chrysotile* 3% Cellulose	Off-white/gray sealant. Balance of sample is unspecified non-fibrous material.
L206503-112	25A-AR74 Northwest corner of roof / rolled roof, mastic & insulation	**N.D.**	11% Fiberglass 2% Cellulose	Black roofing aggregate. Balance of sample is silicate and organic binders.
L206503-113	25A-AR74a Northwest corner of roof / rolled roof, mastic & insulation	**N.D.**	77% Cellulose	Brown fibrous insulation. Balance of sample is perlite and unspecified non-fibrous material.

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MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

QA Report

Method: EPA-600/M

KELLCO Services
3137 Diablo Ave

Hayward CA 94545

Laboratory manager: _____
(signature)

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
Blank sample		**N.D.**	No fibers	
		PC*		
L206503-2	25A-SN01a 119A, north corner by door / 12x12 blue dotted floor tile & glue	**N.D.**	1%Cellulose	Black adhesive. Balance of sample is organic binders.
L206503-14	25A-AW08 South support column between 124 & 120 / wall texture	**N.D.**	< 1%Cellulose	Off-white compound texture. Balance of sample is unspecified non-fibrous material.
L206503-19	25A-AM11 Area 131, north wall / window caulking	**N.D.**	< 1%Cellulose	Off-white caulk. Balance of sample is unspecified non-fibrous material.
L206503-23	25A-AM14 Exterior SE corner of 131A / black baseboard & mastic	**N.D.**	No Fibers	Black vinyl. Balance of sample is unspecified non-fibrous material.

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MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

QA Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
Blank sample		**N.D.** PC*	No fibers	
L206503-38	25A-SN25 Room 219, SE corner behind door / 12x12 grey floor tile & mastic	**N.D.**	< 1% Cellulose	Off-white/gray tile. Balance of sample is unspecified non-fibrous material.
L206503-42	25A-SN27 Room 114, NE corner behind door, under carpet / floor tile & mastic	**N.D.**	No Fibers	Off-white tile vinyl. Balance of sample is unspecified non-fibrous material.
L206503-70	25A-AW43 Area 101C, north metal wall / paint or coating	**Yes**	< 1% Chrysotile* < 1% Cellulose	Gray coating/paint. Balance of sample is unspecified non-fibrous material.
L206503-73	25A-SN46 Room 104, west wall by doorway, under carpet / vinyl floor sheeting	**N.D.**	No Fibers	Off-white linoleum. Balance of sample is polymer and unspecified non-fibrous material.
L206503-83	25A-AW49a Boiler room, SE corner behind door / drywall joint compound	**Yes**	2% Chrysotile* 2% Cellulose	Off-white joint compound. Balance of sample is unspecified non-fibrous material.
L206503-89	25A-AM54 South exit of hallway between 101 & 105 / door frame sealant	**Yes**	5% Chrysotile* 3% Cellulose	Off-white sealant. Balance of sample is unspecified non-fibrous material.
L206503-90	25A-AC53 219B / 2x2 suspended ceiling tile	**N.D.**	35% Cellulose 35% Mineral Wool 1% Polyethylene	Off-white ceiling tile. Balance of sample is unspecified non-fibrous material.

End of report.

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Chain of Custody Record

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Page ____ of ____

BILLED TO	PROJECT INFORMATION	
Name: Kellco - MACS	Sampled By: Siew Yee Lee	Date Sampled: 7/13/10
Address: 3137 Diablo Avenue	Project Manager: Tim Cannard	Job #: 1004-17
City: Hayward	Project Name: Lawrence Berkeley National Lab	
State: Ca Zip: 94545	Site Address: Bldg 25A,	
Phone No: (510) 786-9751	City, State, Zip: Berkely, Ca	
Fax No: (510) 786-9625	Site Contact:	
Cell No:	Phone No:	Fax No:
Email:	Samples Preserved: Yes / No	Analyze to First Positive: Yes / No

ANALYSIS REQUIRED

Required Turn Around Time: 4 Hour ____ 8 Hour ____ 24 Hour XX 2 Days/48 Hour ____ 3 Days/72 Hour ____ 5+ Days/120 Hour ____

DISPOSAL: ☐ Customer ☒ Laboratory ☐ OTHER (Explain)

	Sample #	Sample Location / Sample Description (Color)	PLM (Bulk) - 40 CFR - Chap. 1, Part 763, Subpart F Appendix A or current EPA method	(F)riable / (N)on Friable	Condition: (G)ood / (F)air / (P)oor	Length (Feet)	Width (Feet)	Height (Feet)	Quantity
1004-17 — 1	25A - SN01	119A, north corner by door/ 12x12 blue dotted floor tile and glue	X						
1004-17 — 2	25A-AW02	119A, west wall behind double door to room 131 / wall texture	X						
1004-17 — 3	25A-AW2a	119A, west wall behind double door to room 131 / drywall joint compound	X						
1004-17 — 4	25A-AM03	119, west wall by wooden stairway to 218 / black board and glue	X						
1004-17 — 5	25A-SN04	119A, replacement tile / 12x12 dotted grey tile and glue	X						
1004-17 — 6	25A-SN05	Room 124, northend behind entryway / 12x12 off white floor tile and glue	X						
1004-17 — 7	25A-AM06	North wall behind 124 and 120 / black baseboard and glue	X						
1004-17 — 8	25A-AM07	Room 124, south window / white window caulking	X						
1004-17 — 9	25A-AW08	south support column between 124 and 120 / wall texture	X						
1004-17 — 10	25A-SN09	south floor between 120 and 124 / 12x12 off white floor tile and mastic	X						

Relinquished By: [signature]	*Date:* 7/21/2010 *Time:* 0730	*Accepted By:* D. Kahler	*Date:* 07/21/10 *Time:* 0730
Lab Report Number(s):		*Delivery Type:* (Drop Off) FedEx Mail Other	

WB - Wallboard JC - Joint Compound WT - Wall Texture WBT - Wallboard Tape FT - Floor Tile FTM - Floor Tile Mastic BBM - Baseboard Mastic
RSF - Resilient Sheet Flooring CT - Ceiling Tile SAAM - Spray-Applied Acoustical Material R - Roof TSI - Thermal System Insulation EL - Elbow

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Name: Kellco - MACS	Sampled By: Siew Yee Lee	Date Sampled: 7/13/10
Address: 3137 Diablo Avenue	Project Manager: Tim Cannard	Job #: 1004-17
City: Hayward	Project Name: Lawrence Berkeley National Lab	
State: Ca Zip: 94545	Site Address: Bldg 25A,	
Phone No: (510) 786-9751	City, State, Zip: Berkely, Ca	
Fax No: (510) 786-9625	Site Contact:	
Cell No:	Phone No:	Fax No:
Email:	Samples Preserved: Yes / No	Analyze to First Positive: Yes / No

ANALYSIS REQUIRED

Required Turn Around Time: 4 Hour ____ 8 Hour ____ 24 Hour XX 2 Days/48 Hour ____ 3 Days/72 Hour ____ 5+ Days/120 Hour ____

DISPOSAL: ☐ Customer ☒ Laboratory ☐ OTHER (Explain)

	Sample #	Sample Location / Sample Description (Color)	PLM (Bulk) - 40 CFR - Chap. 1, Part 763, Subpart F Appendix A or current EPA method	(F)riable / (N)on Friable	Condition: (G)ood / (F)air / (P)oor	Length (Feet)	Width (Feet)	Height (Feet)	Quantity
1004-17 — 11	25A-SN10	Room 120, NE corner behind door / 12x12 blue dotted floor tile and mastic	X						
1004-17 — 12	25A-AM11	Area 131, north wall / window caulking	X						
1004-17 — 13	25A-TSI12	Under sink, Area 131 / pipe insulation	X						
1004-17 — 14	25A-AW13	Exterior SE corner of 131A/ wall texture	X						
1004-17 — 15	25A-AM13a	Exterior SE corner of 131A/ drywall joint compound	X						
1004-17 — 16	25A-AM14	Exterior SE corner of 131A/ black baseboard and mastic	X						
1004-17 — 17	25A-AW15	Area 298, south wall by latch-on steps / old wall insulation	X						
1004-17 — 18	25A-AW15a	Area 298, south wall by latch-on steps / old wall insulation joint compound	X						
1004-17 — 19	25A-TSI16	Heating return pipe in 218, south wall/ pipe insulation	X						
1004-17 — 20	25A-TSI17	Area 131, north lower wall / mudded pipe elbow	X						

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Accepted By: [signature] *Date:* 07/21/10 *Time:* 0730

Lab Report Number(s):

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Address: 3137 Diablo Avenue	Project Manager: Tim Cannard	Job #: 1004-17
City: Hayward	Project Name: Lawrence Berkeley National Lab	
State: Ca Zip: 94545	Site Address: Bldg 25A,	
Phone No: (510) 786-9751	City, State, Zip: Berkely, Ca	
Fax No: (510) 786-9625	Site Contact:	
Cell No:	Phone No:	Fax No:
Email:	Samples Preserved: Yes / No	Analyze to First Positive: Yes / No

ANALYSIS REQUIRED

Required Turn Around Time
- 4 Hour ____
- 8 Hour ____
- 24 Hour XX
- 2 Days/48 Hour ____
- 3 Days/72 Hour ____
- 5+ Days/120 Hour ____

DISPOSAL
- ☐ Customer
- ☒ Laboratory
- ☐ OTHER (Explain)

	Sample #	Sample Location / Sample Description (Color)	PLM (Bulk) - 40 CFR - Chap. 1, Part 763, Subpart F Appendix A or current EPA method	(F)riable / (N)on Friable	Condition: (G)ood / (F)air / (P)oor	Length (Feet)	Width (Feet)	Height (Feet)	Quantity
1004-17 — 21	25A-AM18	Area 119, N wall, NE end / window caulking	X						
1004-17 — 22	25A-SC19	Area 119, N lower wall, NE end / concrete	X						
1004-17 — 23	25A-TSI20	Area 119, N. wall, heating return pipe / pipe insulation	X						
1004-17 — 24	25A-TSI21	Area 119, N. wall, heating return pipe / mudded pipe elbow	X						
1004-17 — 25	25A-SN22	Area 119, by doorway to 112 / 12x12 blue dotted floor tile and mastic	X						
1004-17 — 26	25A-SN23	Room 119B, SW corner / 12x12 grey floor tile and mastic	X						
1004-17 — 27	25A-AW24	Room 119B, South lower wall / wall texture	X						
1004-17 — 28	25A-SN25	Room 219, SE corner behind door / 12x12 grey floor tile and mastic	X						
1004-17 — 29	25A-SN26	Room 219, NW end under work station / 12x12 grey floor tile and mastic	X						
1004-17 — 30	25A-SN27	Room 114, NE corner behind door, under carpet / floor tile and mastic	X						

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Lab Report Number(s):	*Delivery Type:* (Drop Off) FedEx Mail Other

WB - Wallboard JC - Joint Compound WT - Wall Texture WBT - Wallboard Tape FT - Floor Tile FTM - Floor Tile Mastic BBM - Baseboard Mastic
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City: Hayward	Project Name: Lawrence Berkeley National Lab	
State: Ca Zip: 94545	Site Address: Bldg 25A,	
Phone No: (510) 786-9751	City, State, Zip: Berkely, Ca	
Fax No: (510) 786-9625	Site Contact:	
Cell No:	Phone No:	Fax No:
Email:	Samples Preserved: Yes / No	Analyze to First Positive: Yes / No

ANALYSIS REQUIRED

Required Turn Around Time
- 4 Hour ____
- 8 Hour ____
- 24 Hour XX
- 2 Days/48 Hour ____
- 3 Days/72 Hour ____
- 5+ Days/120 Hour ____

DISPOSAL
- ☐ Customer
- ☒ Laboratory
- ☐ OTHER (Explain)

	Sample #	Sample Location / Sample Description (Color)	PLM (Bulk) - 40 CFR - Chap. 1, Part 763, Subpart F Appendix A or current EPA method	(F)riable / (N)on Friable	Condition: (G)ood / (F)air / (P)oor	Length (Feet)	Width (Feet)	Height (Feet)	Quantity
1004-17 — 31	25A-AM28	Room 112, N corner by doorway / floor mastic	X						
1004-17 — 32	25A-AW29	Exterior NE corner of 104 / wall texture	X						
1004-17 — 33	25A-AW29a	Exterior NE corner of 104 / drywall joint compound	X						
1004-17 — 34	25A-AW30	Area 101, East wall by roll-up door / paint or coating	X						
1004-17 — 35	25A-SN31	Room 114, NW end under carpet / floor tile and mastic	X						
1004-17 — 36	25A-AW32	Room 114, North lower wall / wall texture	X						
1004-17 — 37	25A-SN33	Room 204, under carpet NE corner behind door/ black flooring material and yellow glue	X						
1004-17 — 38	25A-AW34	Room 204, NE corner behind door / wall texture	X						
1004-17 — 39	25A-AW34a	Room 204, NE corner behind door / drywall joint compound	X						
1004-17 — 40	25A-TSI35	Room 204, heating return pipe behind door / mudded pipe elbow	X						

Relinquished By:	*Date:* 7/21/2010 *Time:* 0730	*Accepted By:* D. Kr	*Date:* 07/21/10 *Time:* 0730
Lab Report Number(s):		*Delivery Type:* (Drop Off) FedEx Mail Other	

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City: Hayward	Project Name: Lawrence Berkeley National Lab	
State: Ca Zip: 94545	Site Address: Bldg 25A,	
Phone No: (510) 786-9751	City, State, Zip: Berkely, Ca	
Fax No: (510) 786-9625	Site Contact:	
Cell No:	Phone No:	Fax No:
Email:	Samples Preserved: Yes / No	Analyze to First Positive: Yes / No

ANALYSIS REQUIRED

Required Turn Around Time: 4 Hour ____ 8 Hour ____ 24 Hour XX 2 Days/48 Hour ____ 3 Days/72 Hour ____ 5+ Days/120 Hour ____

DISPOSAL: ☐ Customer ☒ Laboratory ☐ OTHER (Explain)

	Sample #	Sample Location / Sample Description (Color)	PLM (Bulk) - 40 CFR - Chap. 1, Part 763, Subpart F Appendix A or current EPA method	(F)riable / (N)on Friable	Condition: (G)ood / (F)air / (P)oor	Length (Feet)	Width (Feet)	Height (Feet)	Quantity
1004-17 — 41	25A-SN36	Room 204, SE corner under carpet/ black flooring material and yellow glue	X						
1004-17 — 42	25A-SN37	Room 204, south end under carpet/ black flooring material and yellow glue	X						
1004-17 — 43	25A-AW38	East wall by stairway landing of 204 / wall insulation	X						
1004-17 — 44	25A-TSI39	Area 101A, toward south wall / mudded pipe elbow	X						
1004-17 — 45	25A-SC40	Area 101A, south raised wall / concrete	X						
1004-17 — 46	25A-AM41	Area 101A, south wall / window caulking	X						
1004-17 — 47	25A-AW42	Area 101C, west wall at 4ft / wall texture	X						
1004-17 — 48	25A-AW42a	Area 101C, west wall at 4ft / drywall joint compound	X						
1004-17 — 49	25A-AW43	Area 101C, north metal wall / paint or coating	X						
1004-17 — 50	25A-SC44	Between 101 and 101C, north raised wall / concrete	X						

Relinquished By: [signature] *Date:* 7/21/2010 *Time:* 0730	*Accepted By:* D. Kahle *Date:* 07/21/10 *Time:* 0730
Lab Report Number(s):	*Delivery Type:* (Drop Off) FedEx Mail Other

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City: Hayward	Project Name: Lawrence Berkeley National Lab	
State: Ca Zip: 94545	Site Address: Bldg 25A,	
Phone No: (510) 786-9751	City, State, Zip: Berkely, Ca	
Fax No: (510) 786-9625	Site Contact:	
Cell No:	Phone No:	Fax No:
Email:	Samples Preserved: Yes / No	Analyze to First Positive: Yes / No

ANALYSIS REQUIRED

Required Turn Around Time: 4 Hour ____ 8 Hour ____ 24 Hour XX 2 Days/48 Hour ____ 3 Days/72 Hour ____ 5+ Days/120 Hour ____

DISPOSAL: ☐ Customer ☒ Laboratory ☐ OTHER (Explain)

	Sample #	Sample Location / Sample Description (Color)	PLM (Bulk) - 40 CFR - Chap. 1, Part 763, Subpart F Appendix A or current EPA method	(F)riable / (N)on Friable	Condition: (G)ood / (F)air / (P)oor	Length (Feet)	Width (Feet)	Height (Feet)	Quantity
1004-17 — 51	25A-AM45	Area 101, north wall / window caulking	X						
1004-17 — 52	25A-SN46	Room 104, west wall by doorway, under carpet/ vinyl floor sheeting	X						
1004-17 — 53	25A-SN46a	Room 104, west wall by doorway, under carpet/ vinyl floor sheeting paper backing	X						
1004-17 — 54	25A-SN46b	Room 104, west wall by doorway, under carpet/ vinyl floor sheeting yellow glue	X						
1004-17 — 55	25A-SN47	Room 104, NE corner by doorway, under carpet / vinyl floor sheeting	X						
1004-17 — 56	25A-SN47a	Room 104, NE corner by doorway, under carpet /vinyl floor sheeting paper backing	X						
1004-17 — 57	25A-SN47b	Room 104, NE corner by doorway, under carpet / vinyl floor sheeting yellow glue	X						
1004-17 — 58	25A-SN48	Room 104, SE corner by doorway, under carpet / vinyl floor sheeting	X						
1004-17 — 59	25A-SN48a	Room 104, SE corner by doorway, under carpet /vinyl floor sheeting paper backing	X						
1004-17 — 60	25A-SN48b	Room 104, SE corner by doorway, under carpet / vinyl floor sheeting yellow glue	X						

Relinquished By: [illegible]	*Date:* 7/21/2010 *Time:* 0730	*Accepted By:* [illegible]	*Date:* 07/21/10 *Time:* 0730
Lab Report Number(s):		*Delivery Type:* Drop Off	FedEx Mail Other

WB - Wallboard JC - Joint Compound WT - Wall Texture WBT - Wallboard Tape FT - Floor Tile FTM - Floor Tile Mastic BBM - Baseboard Mastic
RSF - Resilient Sheet Flooring CT - Ceiling Tile SAAM - Spray-Applied Acoustical Material R - Roof TSI - Thermal System Insulation EL - Elbow

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L206503

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Page ____ of ____

BILLED TO	PROJECT INFORMATION	
Name: Kellco - MACS	Sampled By: Siew Yee Lee	Date Sampled: 7/13/10
Address: 3137 Diablo Avenue	Project Manager: Tim Cannard	Job #: 1004-17
City: Hayward	Project Name: Lawrence Berkeley National Lab	
State: Ca Zip: 94545	Site Address: Bldg 25A,	
Phone No: (510) 786-9751	City, State, Zip: Berkely, Ca	
Fax No: (510) 786-9625	Site Contact:	
Cell No:	Phone No:	Fax No:
Email:	Samples Preserved: Yes / No	Analyze to First Positive: Yes / No

ANALYSIS REQUIRED

Required Turn Around Time: 4 Hour ____; 8 Hour ____; 24 Hour XX; 2 Days/48 Hour ____; 3 Days/72 Hour ____; 5+ Days/120 Hour ____

DISPOSAL: ☐ Customer ☒ Laboratory ☐ OTHER (Explain)

	Sample #	Sample Location / Sample Description (Color)	PLM (Bulk) - 40 CFR - Chap. 1, Part 763, Subpart F Appendix A or current EPA method	(F)riable / (N)on Friable	Condition: (G)ood / (F)air / (P)oor	Length (Feet)	Width (Feet)	Height (Feet)	Quantity
1004-17 — 61	25A-AW49	Boiler Room , SE corner behind door / wall texture	X						
1004-17 — 62	25A-AW49A	Boiler Room , SE corner behind door / drywall joint compound	X						
1004-17 — 63	25A-AW50	Custodial closet, NW corner / wall texture	X						
1004-17 — 64	25A-AW50a	Custodial closet, NW corner / drywall joint compound	X						
1004-17 — 65	25A-AM51	Boiler Room, East wall by exit / cinder block mortar	X						
1004-17 — 66	25A-AM52	Boiler Room, East wall by exit / cinder block mortar	X						
1004-17 — 67	25A-AM53	South wall of hallway between 101 and 105 / cinder block mortar	X						
1004-17 — 68	25A-AM54	South exit of hallway between 101 and 105 / door frame sealant	X						
1004-17 — 69	25A-AC53	219B / 2x2 suspended ceiling tile	X						
1004-17 — 70	25A-AC54	219B / 2x2 suspended ceiling tile	X						

Relinquished By: [illegible] *Date:* 7/21/2010 *Time:* 0730 *Accepted By:* D. [illegible] *Date:* 07/21/10 *Time:* 0730

Lab Report Number(s): *Delivery Type:* Drop Off FedEx Mail Other

WB - Wallboard JC - Joint Compound WT - Wall Texture WBT - Wallboard Tape FT - Floor Tile FTM - Floor Tile Mastic BBM - Baseboard Mastic
RSF - Resilient Sheet Flooring CT - Ceiling Tile SAAM - Spray-Applied Acoustical Material R - Roof TSI - Thermal System Insulation EL - Elbow

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Page ____ of ____

BILLED TO	PROJECT INFORMATION	
Name: Kellco - MACS	Sampled By: Siew Yee Lee	Date Sampled: 7/13/10
Address: 3137 Diablo Avenue	Project Manager: Tim Cannard	Job #: 1004-17
City: Hayward	Project Name: Lawrence Berkeley National Lab	
State: Ca Zip: 94545	Site Address: Bldg 25A,	
Phone No: (510) 786-9751	City, State, Zip: Berkely, Ca	
Fax No: (510) 786-9625	Site Contact:	
Cell No:	Phone No:	Fax No:
Email:	Samples Preserved: Yes / No	Analyze to First Positive: Yes / No

ANALYSIS REQUIRED

Required Turn Around Time: 4 Hour ____ 8 Hour ____ 24 Hour XX 2 Days/48 Hour ____ 3 Days/72 Hour ____ 5+ Days/120 Hour ____

DISPOSAL: ☐ Customer ☒ Laboratory ☐ OTHER (Explain)

	Sample #	Sample Location / Sample Description (Color)	PLM (Bulk) - 40 CFR - Chap. 1, Part 763, Subpart F Appendix A or current EPA method	(F)riable / (N)on Friable	Condition: (G)ood / (F)air / (P)oor	Length (Feet)	Width (Feet)	Height (Feet)	Quantity
1004-17 — 71	25A-AM55	East exit of Boiler Room / door frame sealant	X						
1004-17 — 72	25A-AM56	Room 112, east end under carpet / floor mastic	X						
1004-17 — 73	25A-AW57	Area 218, , south wall, SW end / old wall insulation, tape and joint compound	X						
1004-17 — 74	25A-AW58	Area 119, north wall, NE end / metal panel paint or coating	X						
1004-17 — 75	25A-AW59	Exterior north wall of 101 / metal panel paint or coating	X						
1004-17 — 76	25A-AW60	Exterior window north of 131 / window pane sealant	X						
1004-17 — 77	25A-AM61	Exterior window north of 101 / window pane sealant	X						
1004-17 — 78	25A-AM62	Exterior Air Exchange Unit/ duct joint compound	X						
1004-17 — 79	25A-AM63	Exterior Air Exchange Unit/ duct joint compound	X						
1004-17 — 80	25A-AM64	Exterior Air Exchange Unit/ duct joint compound	X						

Relinquished By: [signature] *Date:* 7/21/2010 *Time:* 0730

Accepted By: [signature] *Date:* 07/21/10 *Time:* 07:30

Lab Report Number(s):

Delivery Type: Drop Off FedEx Mail Other

WB - Wallboard JC - Joint Compound WT - Wall Texture WBT - Wallboard Tape FT - Floor Tile FTM - Floor Tile Mastic BBM - Baseboard Mastic
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Page ____ of ____

BILLED TO	PROJECT INFORMATION	
Name: Kellco - MACS	Sampled By: Siew Yee Lee	Date Sampled: 7/13/10
Address: 3137 Diablo Avenue	Project Manager: Tim Cannard	Job #: 1004-17
City: Hayward	Project Name: Lawrence Berkeley National Lab	
State: Ca Zip: 94545	Site Address: Bldg 25A,	
Phone No: (510) 786-9751	City, State, Zip: Berkely, Ca	
Fax No: (510) 786-9625	Site Contact:	
Cell No:	Phone No:	Fax No:
Email:	Samples Preserved: Yes / No	Analyze to First Positive: Yes / No

ANALYSIS REQUIRED

Required Turn Around Time: 4 Hour ____ 8 Hour ____ 24 Hour XX 2 Days/48 Hour ____ 3 Days/72 Hour ____ 5+ Days/120 Hour ____

DISPOSAL: ☐ Customer ☒ Laboratory ☐ OTHER (Explain)

	Sample #	Sample Location / Sample Description (Color)	PLM (Bulk) - 40 CFR - Chap. I, Part 763, Subpart F Appendix A or current EPA method	(F)riable / (N)on Friable	Condition: (G)ood / (F)air / (P)oor	Length (Feet)	Width (Feet)	Height (Feet)	Quantity
1004-17—81	25A-AM65	Exterior window north of 119 / window pane sealant	X						
1004-17—82	25A-AC66	Area 119, east end ceiling / insulation	X						
1004-17—83	25A-CK67	Exterior ~~wall~~ Bldg, Between roof & wall, SE corner / Sealant	X						
1004-17—84	25A-AR68	~~Ext~~ Roof, SE corner / Rolled roof, mastic & insulation	X						
1004-17—85	25A-CK69	Roof, West end of ~~roof~~ exterior Between roof & wall / sealant	X						
1004-17—86	25A-CK70	Exterior West end, roof cap panel / sealant	X						
1004-17—87	25A-CK71	West exterior wall / rivet caulking	X						
1004-17—88	25A-AR72	~~Ext~~ Roof, West end / Rolled roof, mastic & insulation	X						
1004-17—89	25A-CK73	NW exterior ~~wall~~ of Bldg, between wall & roof / sealant	X						
1004-17—90	25A-AR74	NW corner of roof / Rolled roof, mastic & insulation	X						

Relinquished By: [signature] *Date:* 7/21/2010 *Time:* 0730	*Accepted By:* [signature] *Date:* 07/21/10 *Time:* 0730
Lab Report Number(s):	*Delivery Type:* (Drop Off) FedEx Mail Other

WB - Wallboard JC - Joint Compound WT - Wall Texture WBT - Wallboard Tape FT - Floor Tile FTM - Floor Tile Mastic BBM - Baseboard Mastic
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BILLED TO	PROJECT INFORMATION	
Name: Kellco - MACS	Sampled By: Siew Yee Lee	Date Sampled: 7/13/10
Address: 3137 Diablo Avenue	Project Manager: Tim Cannard	Job #: 1004-17
City: Hayward	Project Name: Lawrence Berkeley National Lab	
State: Ca Zip: 94545	Site Address: Bldg 25A,	
Phone No: (510) 786-9751	City, State, Zip: Berkely, Ca	
Fax No: (510) 786-9625	Site Contact:	
Cell No:	Phone No:	Fax No:
Email:	Samples Preserved: Yes / No	Analyze to First Positive: Yes / No

ANALYSIS REQUIRED

Required Turn Around Time: 4 Hour ____ 8 Hour ____ 24 Hour XX 2 Days/48 Hour ____ 3 Days/72 Hour ____ 5+ Days/120 Hour ____

DISPOSAL: ☐ Customer ☒ Laboratory ☐ OTHER (Explain)

	Sample #	Sample Location / Sample Description (Color)	PLM (Bulk) - 40 CFR - Chap. 1, Part 763, Subpart F Appendix A or current EPA method	(F)riable / (N)on Friable	Condition: (G)ood / (F)air / (P)oor	Length (Feet)	Width (Feet)	Height (Feet)	Quantity
1004-17 — 41	25A-SN36	Room 204, SE corner under carpet/ black flooring material and yellow glue	X						
1004-17 — 42	25A-SN37	Room 204, south end under carpet/ black flooring material and yellow glue	X						
1004-17 — 43	25A-AW38	East wall by stairway landing of 204 / wall insulation	X						
1004-17 — 44	25A-TSI39	Area 101A, toward south wall / mudded pipe elbow	X						
1004-17 — 45	25A-SC40	Area 101A, south raised wall / concrete	X						
1004-17 — 46	25A-AM41	Area 101A, south wall / window caulking	X						
1004-17 — 47	25A-AW42	Area 101C, west wall at 4ft / wall texture	X						
1004-17 — 48	25A-AW42a	Area 101C, west wall at 4ft / drywall joint compound	X						
1004-17 — 49	25A-AW43	Area 101C, north metal wall / paint or coating	X						
1004-17 — 50	25A-SC44	Between 101 and 101C, north raised wall / concrete	X						

Relinquished By: [illegible] *Date:* 7/21/2010 *Time:* 0730 *Accepted By:* *Date:* *Time:*

Lab Report Number(s): *Delivery Type:* *Drop Off* *FedEx* *Mail* *Other*

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BILLED TO	PROJECT INFORMATION	
Name: Kellco - MACS	Sampled By: Siew Yee Lee	Date Sampled: 7/13/10
Address: 3137 Diablo Avenue	Project Manager: Tim Cannard	Job #: 1004-17
City: Hayward	Project Name: Lawrence Berkeley National Lab	
State: Ca Zip: 94545	Site Address: Bldg 25A,	
Phone No: (510) 786-9751	City, State, Zip: Berkely, Ca	
Fax No: (510) 786-9625	Site Contact:	
Cell No:	Phone No:	Fax No:
Email:	Samples Preserved: Yes / No	Analyze to First Positive: Yes / No

ANALYSIS REQUIRED

Required Turn Around Time: 4 Hour ____ 8 Hour ____ 24 Hour XX 2 Days/48 Hour ____ 3 Days/72 Hour ____ 5+ Days/120 Hour ____

DISPOSAL: ☐ Customer ☒ Laboratory ☐ OTHER (Explain)

	Sample #	Sample Location / Sample Description (Color)	PLM (Bulk) - 40 CFR - Chap. 1, Part 763, Subpart F Appendix A or current EPA method	(F)riable / (N)on Friable	Condition: (G)ood / (F)air / (P)oor	Length (Feet)	Width (Feet)	Height (Feet)	Quantity
1004-17 — 21	25A-AM18	Area 119, N wall, NE end / window caulking	X						
1004-17 — 22	25A-SC19	Area 119, N lower wall, NE end / concrete	X						
1004-17 — 23	25A-TSI20	Area 119, N. wall, heating return pipe / pipe insulation	X						
1004-17 — 24	25A-TSI21	Area 119, N. wall, heating return pipe / mudded pipe elbow	X						
1004-17 — 25	25A-SN22	Area 119, by doorway to 112 / 12x12 blue dotted floor tile and mastic	X						
1004-17 — 26	25A-SN23	Room 119B, SW corner / 12x12 grey floor tile and mastic	X						
1004-17 — 27	25A-AW24	Room 119B, South lower wall / wall texture	X						
1004-17 — 28	25A-SN25	Room 219, SE corner behind door / 12x12 grey floor tile and mastic	X						
1004-17 — 29	25A-SN26	Room 219, NW end under work station / 12x12 grey floor tile and mastic	X						
1004-17 — 30	25A-SN27	Room 114, NE corner behind door, under carpet / floor tile and mastic	X						

Relinquished By: [illegible] *Date:* 7/21/2010 *Time:* 0730 *Accepted By:* *Date:* *Time:*

Lab Report Number(s): *Delivery Type:* *Drop Off* *FedEx* *Mail* *Other*

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BILLED TO	
Name: Kellco - MACS	
Address: 3137 Diablo Avenue	
City: Hayward	
State: Ca Zip: 94545	
Phone No: (510) 786-9751	
Fax No: (510) 786-9625	
Cell No:	
Email:	

PROJECT INFORMATION

Sampled By: Siew Yee Lee	Date Sampled: 7/13/10	
Project Manager: Tim Cannard	Job #: 1004-17	
Project Name: Lawrence Berkeley National Lab		
Site Address: Bldg 25A,		
City, State, Zip: Berkely, Ca		
Site Contact:		
Phone No:	Fax No:	
Samples Preserved: Yes / No	Analyze to First Positive: Yes / No	

ANALYSIS REQUIRED

Required Turn Around Time: 4 Hour ____ 8 Hour ____ 24 Hour XX 2 Days/48 Hour ____ 3 Days/72 Hour ____ 5+ Days/120 Hour ____

DISPOSAL: ☐ Customer ☒ Laboratory ☐ OTHER (Explain)

	Sample #	Sample Location / Sample Description (Color)	PLM (Bulk) - 40 CFR - Chap. 1, Part 763, Subpart F Appendix A or current EPA method	(F)riable / (N)on Friable	Condition: (G)ood / (F)air / (P)oor	Length (Feet)	Width (Feet)	Height (Feet)	Quantity
1004-17 — 61	25A-AW49	Boiler Room , SE corner behind door / wall texture	X						
1004-17 — 62	25A-AW49A	Boiler Room , SE corner behind door / drywall joint compound	X						
1004-17 — 63	25A-AW50	Custodial closet, NW corner / wall texture	X						
1004-17 — 64	25A-AW50a	Custodial closet, NW corner / drywall joint compound	X						
1004-17 — 65	25A-AM51	Boiler Room, East wall by exit / cinder block mortar	X						
1004-17 — 66	25A-AM52	Boiler Room, East wall by exit / cinder block mortar	X						
1004-17 — 67	25A-AM53	South wall of hallway between 101 and 105 / cinder block mortar	X						
1004-17 — 68	25A-AM54	South exit of hallway between 101 and 105 / door frame sealant	X						
1004-17 — 69	25A-AC53	219B / 2x2 suspended ceiling tile	X						
1004-17 — 70	25A-AC54	219B / 2x2 suspended ceiling tile	X						

Relinquished By: [signature] *Date:* 7/21/2010 *Time:* 0730

Accepted By: *Date:* *Time:*

Lab Report Number(s):

Delivery Type: *Drop Off* *FedEx* *Mail* *Other*

WB - Wallboard JC - Joint Compound WT - Wall Texture WBT - Wallboard Tape FT - Floor Tile FTM - Floor Tile Mastic BBM - Baseboard Mastic
RSF - Resilient Sheet Flooring CT - Ceiling Tile SAAM - Spray-Applied Acoustical Material R - Roof TSI - Thermal System Insulation EL - Elbow

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MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Method: EPA-600/M4-82-020

KELLCO Services
3137 Diablo Ave

Hayward CA 94545

Person to contact: Tim Cannard
Contact phone: 510-786-9751
FAX phone: 510-786-9625
Sampled by: Siew Yee
Sampled on: July 22, 2010
Analyzed on: July 22, 2010 at: 17:19
Corresponding invoice number: 206480

Analyst: HCB (signature)

Laboratory manager: (signature)

Job Number: 1004-17

Job Description: Lawrence Berkeley National Lab - Bldg 14 & 25A, Berkeley, CA

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206480-1	B14-AMO1 Bldg 14, Stripping Matieral Behind Vent Register	**N.D.**	< 1%Cellulose	Black/off-white plaster. Balance of sample is unspecified non-fibrous material.
L206480-2	B25A-SNO1 Bldg 25, White 12x12 Floor Tile And Mastic	**N.D.**	No Fibers	Off-white/black tile. Balance of sample is unspecified non-fibrous material.
L206480-3	B25A-SNO1a Bldg 25, White 12x12 Floor Tile' Mastic	**N.D.**	< 1%Cellulose	Black adhesive. Balance of sample is unspecified non-fibrous material.
L206480-4	B25A-SNO2 Bldg 25, 12x12 Blue Dot Floor Tile & Mastic	**N.D.**	No Fibers	Off-white/black tile. Balance of sample is unspecified non-fibrous material.
L206480-5	B25A-SNO2a Bldg 25, 12x12 Blue Dot Floor Tile' Mastic	**N.D.**	< 1%Cellulose	Black adhesive. Balance of sample is unspecified non-fibrous material.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

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NVLAP® NVLAP Lab Code 101948-0

MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

QA Report

Method: EPA-600/M

KELLCO Services
3137 Diablo Ave

Hayward CA 94545

Laboratory manager: _____ (signature)

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
Blank sample		**N.D.**	No fibers	
		PC*		

End of report.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

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NVLAP®
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MACS Lab Incorporated

Material Analysis and Characterization Service

Analytical and Environmental Services

Chain of Custody Record

To Be Used For All Types Of Analysis

MACS Lab # ~~L204206~~

Customer Code L206480

BILLED TO		PROJECT INFORMATION		
Name: Kello-MACS		Sampled By: Siew Yee Lee	Date: 7/22/2010	
Address:		Project Name: LBNL.	Job #: 1004-17	
City:		Site Address: Cyclotron Rd		
State:	Zip:	City, State, Zip: Berkeley,		
Phone No:		Site Contact:		
Fax No:		Phone No:	Fax No:	
Cell No:		Comments:		
Email:		Samples Preserved: Yes / No	Received Cold: Yes / No	

ANALYSIS REQUIRED

Required Turn Around Time: 4 Hour X; 8 Hour; 24 Hour; 2 Days/48 Hour; 3 Days/72 Hour; 5+ Days/120 Hour

DISPOSAL: ☐ Customer ☐ MACS ☐ OTHER (Explain)

Sample #	Sample Description / Type of Work	TIME ON	TIME OFF	TOTAL TIME	FLOW RATES START	FLOW RATES STOP	PCM Asbestos Air - NIOSH 7400	PLM Asbestos Bulk - 40 CFR 763	Lead (Wipes, Air, Paint, Soil)	TEM (Air/Bulk) - AHERA/Yamate Level II	Mold - Viable / Non Viable Air / Bulk	Metals (TCLP, CAM17, STLC)		Comments /Area Social Security #
B14-AM01	Bldg 14, ~~we when~~ stripping material behind vent register							X						
B25A-SN01	Bldg 25, white 12x12 floortile & mastic							X						
B25-SN02	Bldg 25, 12x12 Blue dot floor tile & mastic							X						

Relinquished By: [signature] *Date:* 7/22/2010 *Time:* 1704 *Accepted By:* Danielle Nichols *Date:* 7/22/10 *Time:* 5:00

TEM asbestos in water analysis requires 2 one-liter bottles shipped @ 4°C in dark containers for each sample.

LEAD USEPA 7420, Air NIOSH 7082, Soil EPA 7000/7420, Wipes NIOSH 9100 Water AIHA (method 3113B EPA 200.9)

Units Water - 1ug/l = 1 ppb Paint - 1% = 10,000 ppm

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CAM-17 Bulk Materials Analysis Report - Method: EPA 6010B/3050

KELLCO Services
3137 Diablo Avenue
Hayward, CA 94545

Contact: Tim Cannard
Phone: (510) 786-9751
Email: mailbox3137@kellcomacs.com
Job #: 1004-17

Laboratory Number: 206482
Sampled By: Siew Yee Lee
Sampled On: July 13, 2010
Submitted On: July 21, 2010
Analyzed On: August 3, 2010
Reported On: August 5, 2010
SOP: CAM17
Sample Type: Bulk

Job Description: Lawrence Berkeley National Laboratory-Building 25A, Berkeley, CA

	Lab Sample Number:	206482 -1	206482 -2	206482 -3	206482 -4	206482 -5
	Client Sample Number:	25A-PC1	25A-PC2	25A-PC3	25A-PC4	25A-PC5
	Matrix:	Bulk	Bulk	Bulk	Bulk	Bulk
	Extraction Type:	Acid	Acid	Acid	Acid	Acid
	Units:	mg/kg (PPM)	mg/kg (PPM)	mg/kg (PPM)	mg/kg (PPM)	mg/kg (PPM)
Sb	Antimony	82.07	100.07	747.42	1,046.88	468.73
As	Arsenic	2.34	<0.01	<0.01	98.35	64.43
Ba	Barium	1,661.13	241,928.57	1,587.26	1,733.51	537.56
Be	Beryllium	5.49	0.96	0.98	0.35	1.37
Cd	Cadmium	21.30	212.54	99.02	85.68	80.81
Cr	Chromium	136.53	473.21	81,859.93	87,760.42	49,296.82
Co	Cobalt	1,475.33	1,577.14	1,716.99	2,428.82	522.21
Cu	Copper	210.65	1,232.50	1,478.19	977.43	1,157.11
Pb	Lead	12,776.94	12,460.71	341,676.23	1,346,354.17	220,392.30
Hg	Mercury	10.95	15.32	59.59	40.28	<0.01
Mo	Molybdenum	31.19	44.82	92.08	1,844.62	55.96
Ni	Nickel	92.15	166.18	200.23	377.95	130.64
Se	Selenium	5,687.31	6,392.86	7,192.88	13,220.49	7,479.64
Ag	Silver	2.37	17.96	84.90	7.38	20.41
Tl	Thallium	125.58	113.21	283.81	712.07	206.88
V	Vanadium	108.84	82.86	89.21	50.87	231.31
Zn	Zinc	7,703.93	5,810.71	8,656.72	14,826.39	3,699.11

Analyst: _____ (Signature)

Laboratory Manager: _____ (Signature)

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(510) 786-9751 * (510) 786-9625 Fax * www.macslab.com

CAM-17 Bulk Materials Analysis Report - Method: EPA 6010B/3050

KELLCO Services
3137 Diablo Avenue
Hayward, CA 94545

Contact: Tim Cannard
Phone: (510) 786-9751
Email: mailbox3137@kellcomacs.com
Job #: 1004-17

Laboratory Number: 206482
Sampled By: Siew Yee Lee
Sampled On: July 13, 2010
Submitted On: July 21, 2010
Analyzed On: August 3, 2010
Reported On: August 5, 2010
SOP: CAM17
Sample Type: Bulk

Job Description: Lawrence Berkeley National Laboratory-Building 25A, Berkeley, CA

	Lab Sample Number:	206482 -6	206482 -7	206482 -8		
	Client Sample Number:	25A-PC6	25A-PC7	25A-PC8		
	Matrix:	Bulk	Bulk	Bulk		
	Extraction Type:	Acid	Acid	Acid		
	Units:	mg/kg (PPM)	mg/kg (PPM)	mg/kg (PPM)		
Sb	Antimony	3,183.00	123.22	190.91		
As	Arsenic	<0.01	44.70	<0.01		
Ba	Barium	686.46	640.15	252,020.20		
Be	Beryllium	0.43	1.61	<0.01		
Cd	Cadmium	788.18	25.14	19.53		
Cr	Chromium	1,985.59	4,969.22	1,570.88		
Co	Cobalt	54.32	73.82	85.19		
Cu	Copper	1,733.43	332.62	1,062.63		
Pb	Lead	21,498.56	23,816.29	9,230.64		
Hg	Mercury	47.55	282.91	1,133.00		
Mo	Molybdenum	862.68	40.84	128.45		
Ni	Nickel	2,011.53	63.57	855.56		
Se	Selenium	10,975.50	5,085.23	9,030.30		
Ag	Silver	<0.01	10.23	<0.01		
Tl	Thallium	201.59	122.56	112.46		
V	Vanadium	48.70	267.28	7.24		
Zn	Zinc	317,579.25	2,563.92	46,447.81		

Analyst: _____ (Signature)

Laboratory Manager: _____ (Signature)

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CAM-17 Bulk Materials Analysis Report - Method: EPA 6010B/3050

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Hayward, CA 94545

Contact: Tim Cannard
Phone: (510) 786-9751
Email: mailbox3137@kellcomacs.com
Job #: 1004-17

Laboratory Number: 206482
Sampled By: Siew Yee Lee
Sampled On: July 13, 2010
Submitted On: July 21, 2010
Analyzed On: August 3, 2010
Reported On: August 5, 2010
SOP: CAM17
Sample Type: Bulk

Job Description: Lawrence Berkeley National Laboratory-Building 25A, Berkeley, CA

	Lab Sample Number:	206482 -9	206482 -10	206482 -11		
	Client Sample Number:	25A-01	25A-02	25A-03		
	Matrix:	Bulk	Bulk	Bulk		
	Extraction Type:	Acid	Acid	Acid		
	Units:	mg/kg (PPM)	mg/kg (PPM)	mg/kg (PPM)		
Sb	Antimony	108.85	175.80	239.95		
As	Arsenic	62.85	68.30	76.10		
Ba	Barium	653.50	805.50	1,150.00		
Be	Beryllium	0.27	0.34	0.62		
Cd	Cadmium	70.50	97.75	121.10		
Cr	Chromium	158.40	248.05	304.45		
Co	Cobalt	31.45	37.71	46.29		
Cu	Copper	1,430.00	1,335.50	1,880.50		
Pb	Lead	2,451.00	4,082.00	5,385.00		
Hg	Mercury	8.24	3.65	1.13		
Mo	Molybdenum	46.91	61.15	83.05		
Ni	Nickel	109.00	152.60	185.70		
Se	Selenium	3,311.00	3,585.50	4,063.00		
Ag	Silver	24.98	31.16	29.85		
Tl	Thallium	37.35	42.28	49.01		
V	Vanadium	54.50	61.30	83.60		
Zn	Zinc	4,309.50	6,060.00	6,505.00		

Analyst: _____ (Signature)

Laboratory Manager: _____ (Signature)

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PHOTOGRAPHS

Photographs containing no sample identification number are included for reference of the general sample locations.

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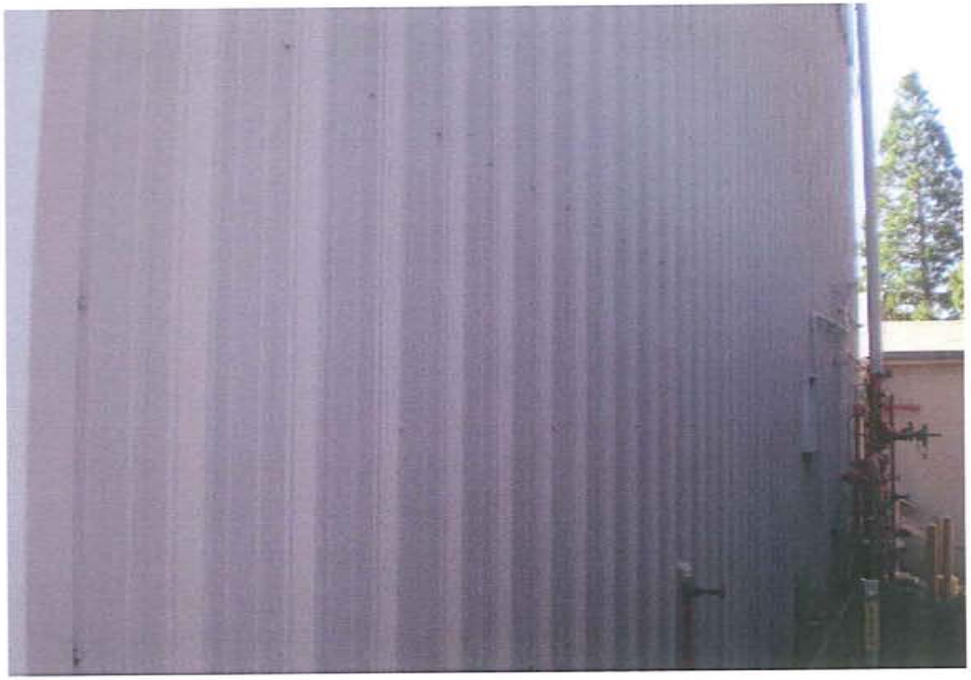
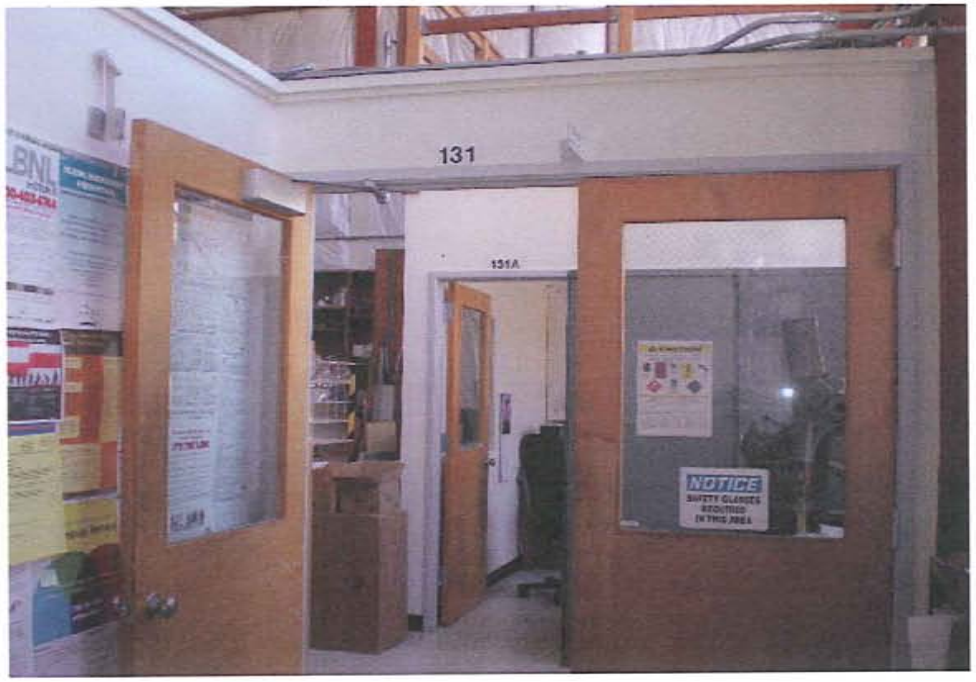
25A

25A

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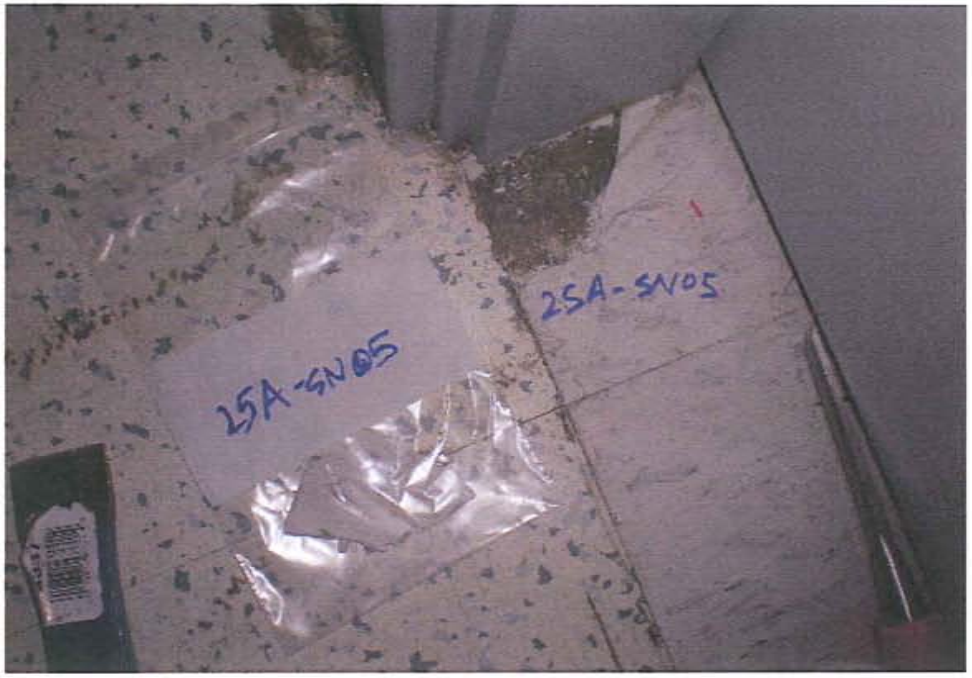
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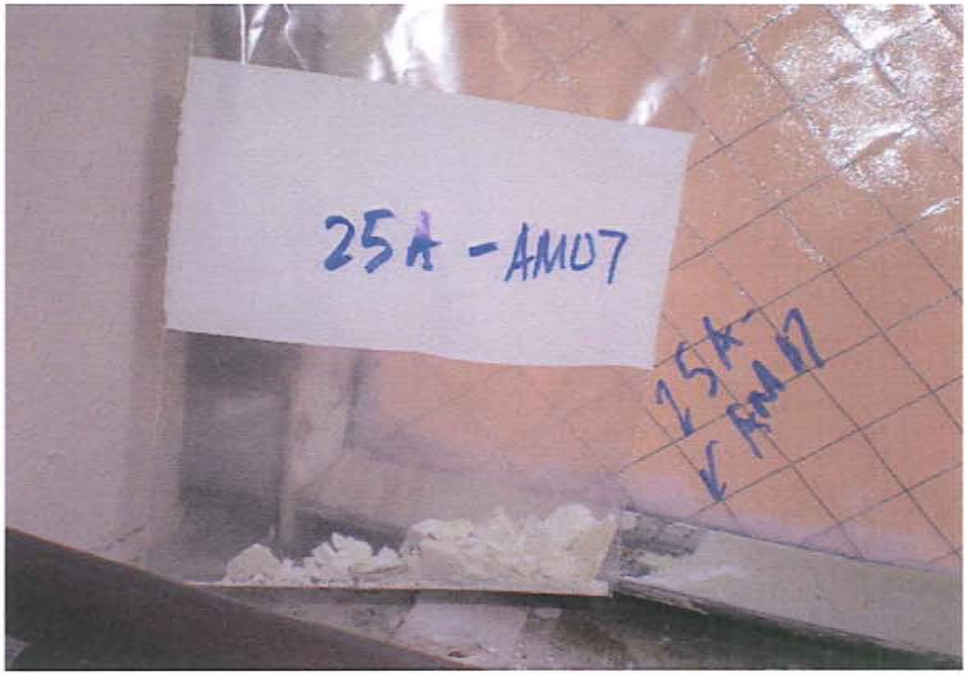
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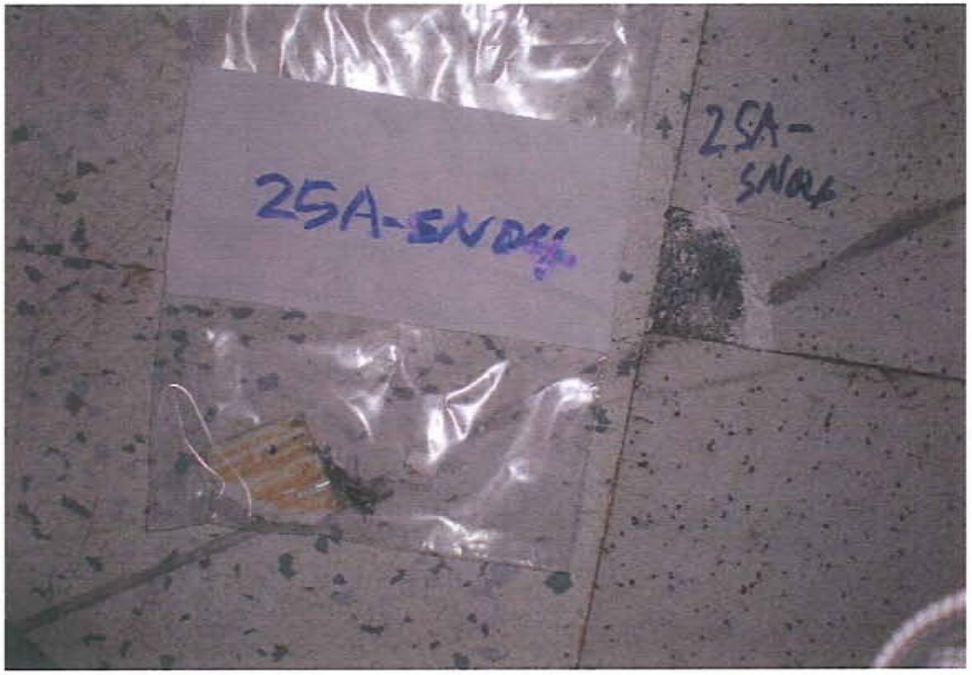
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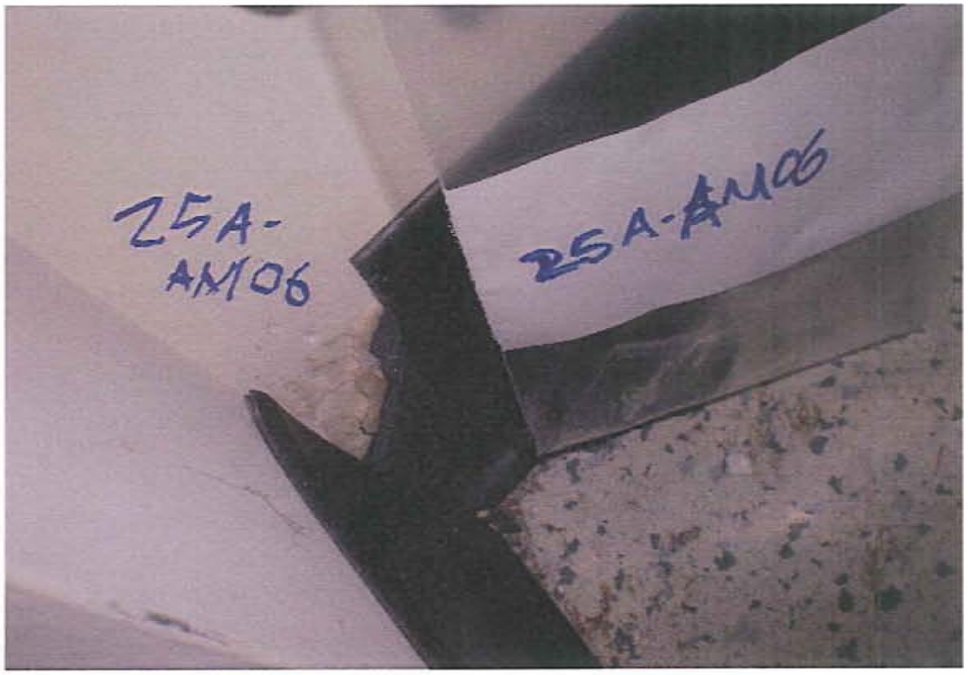
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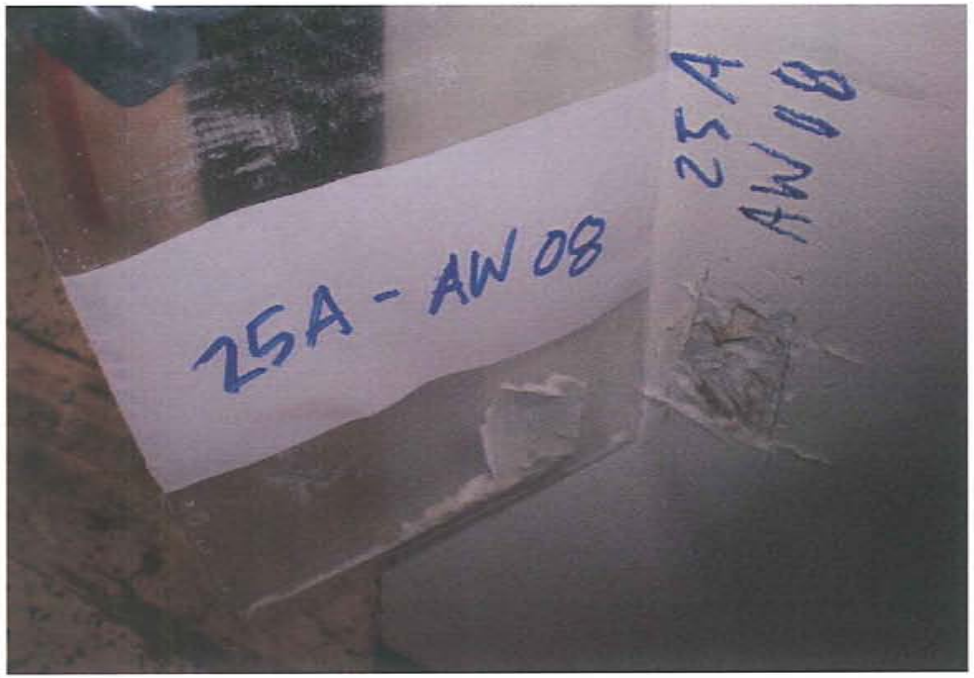
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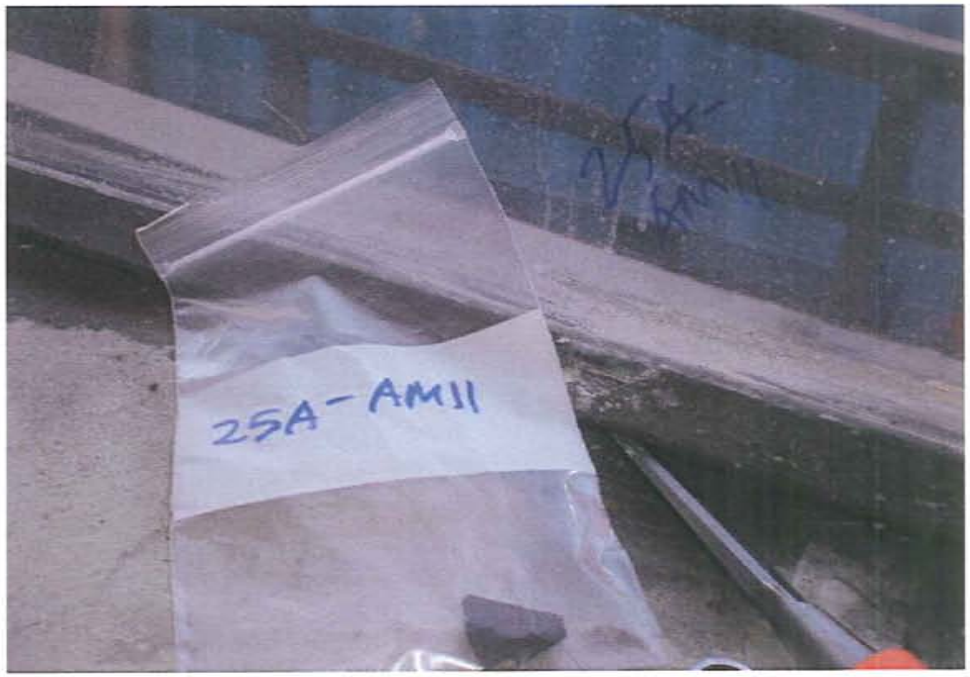
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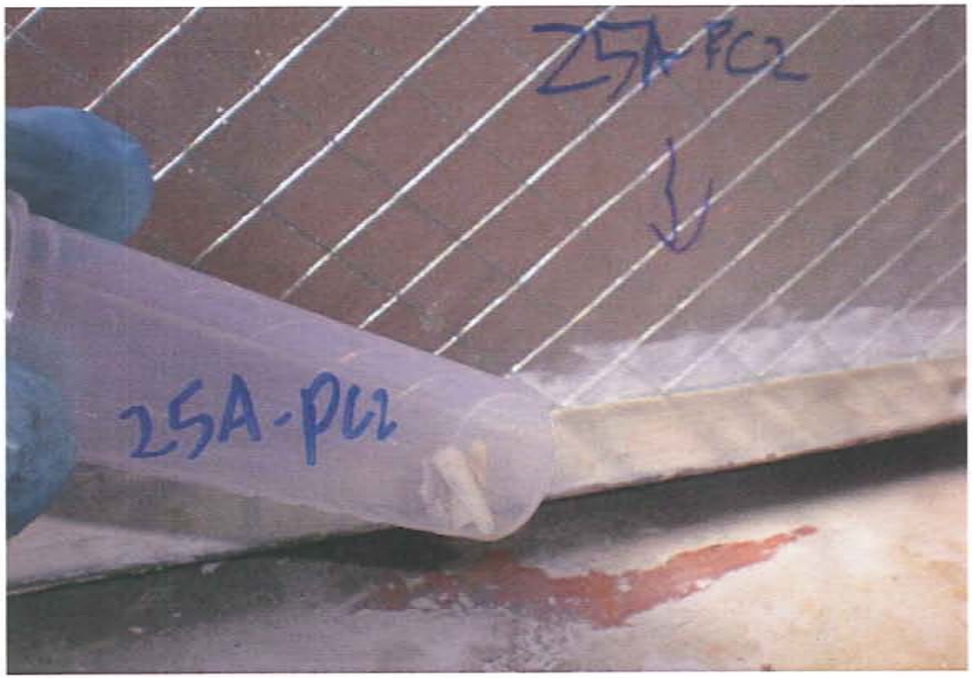
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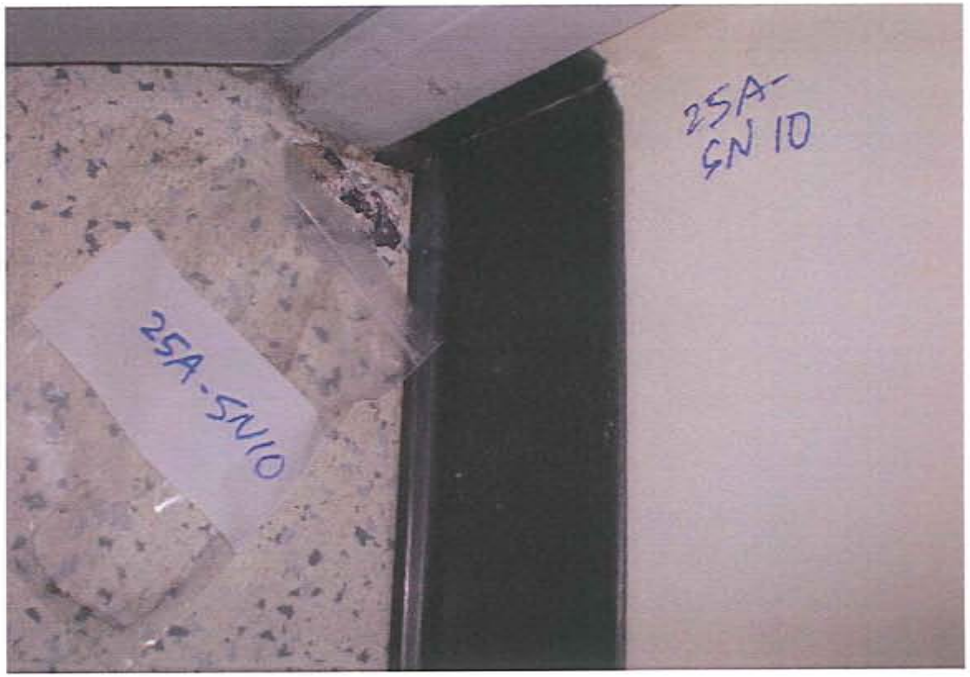
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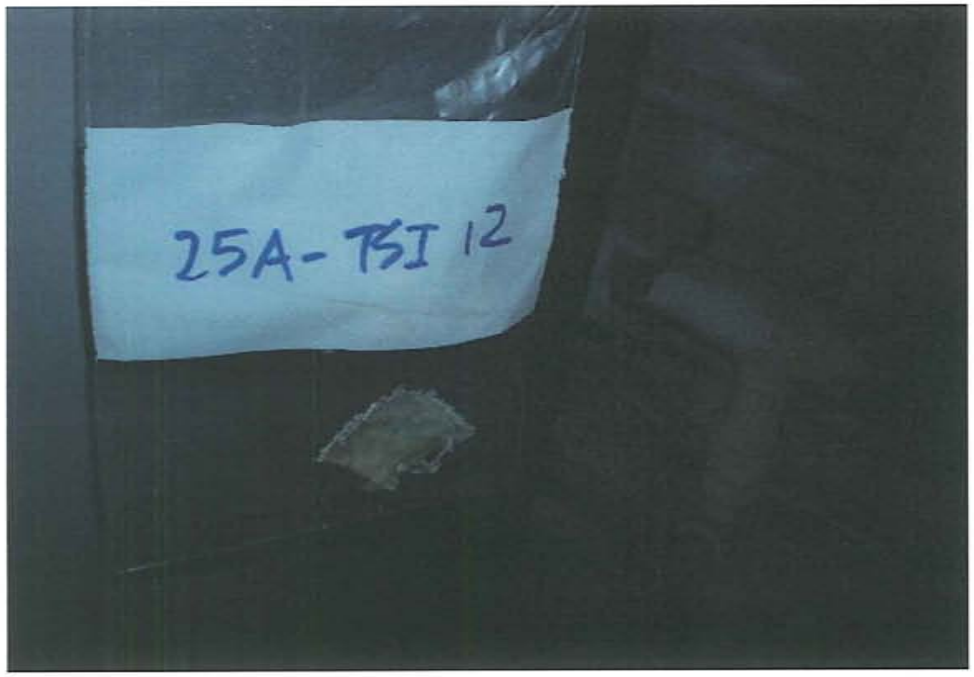
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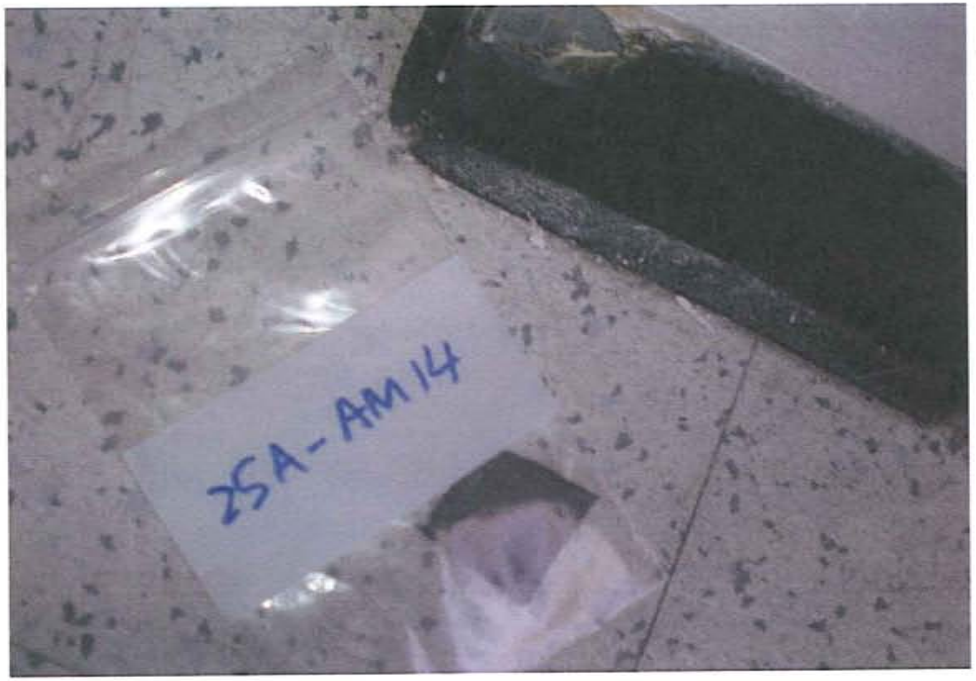
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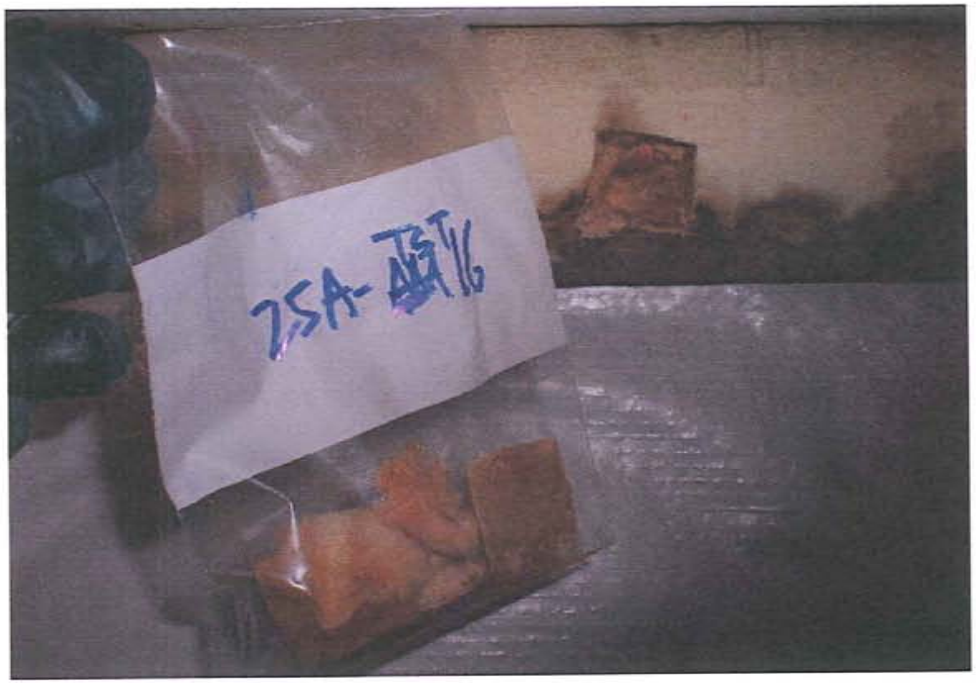
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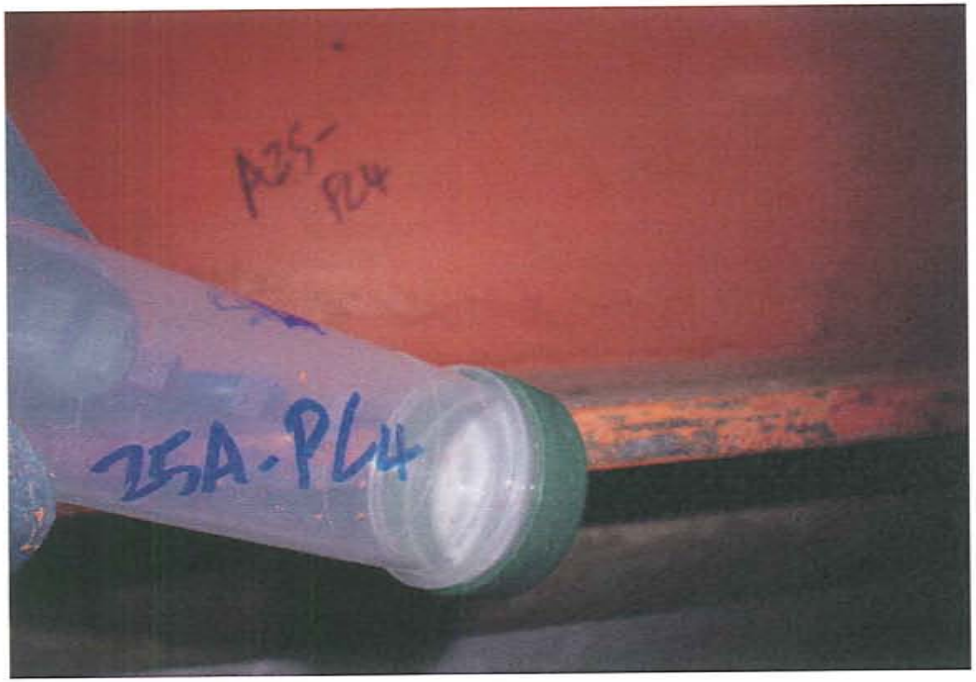
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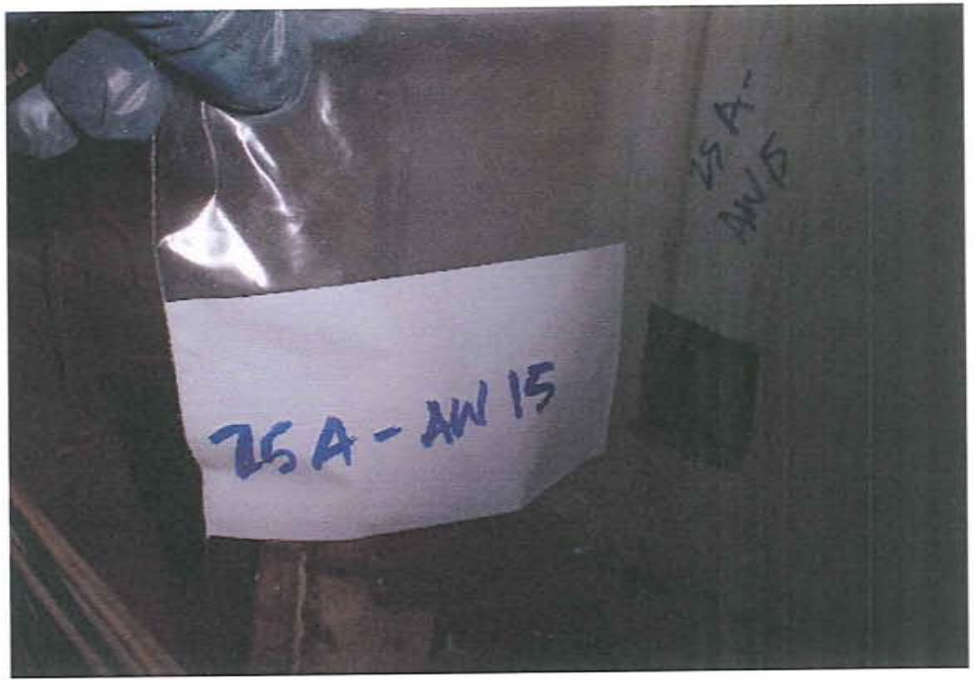
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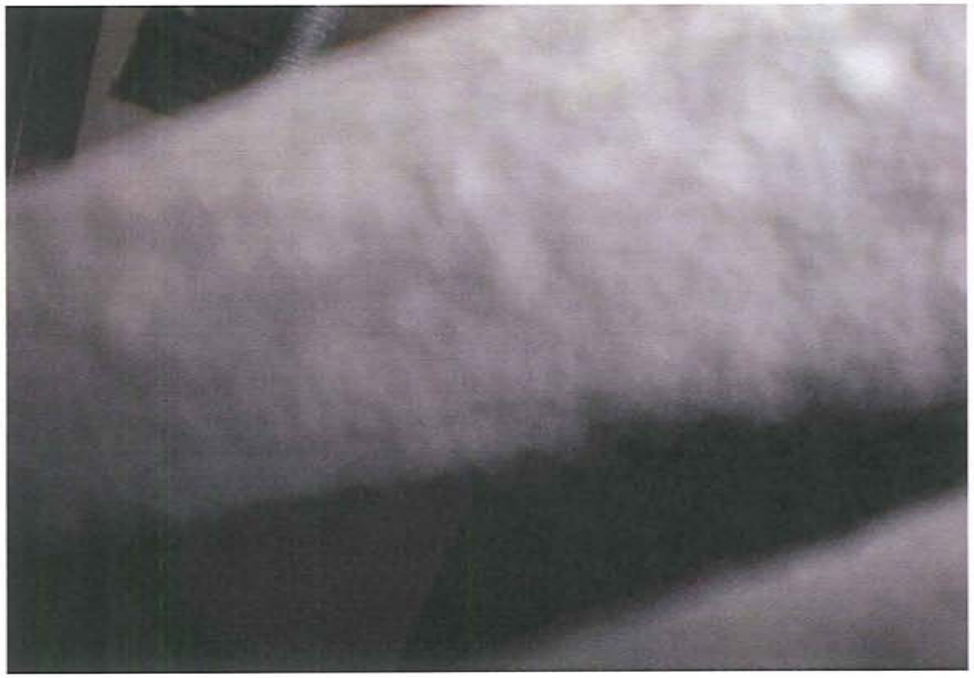

CAUTION
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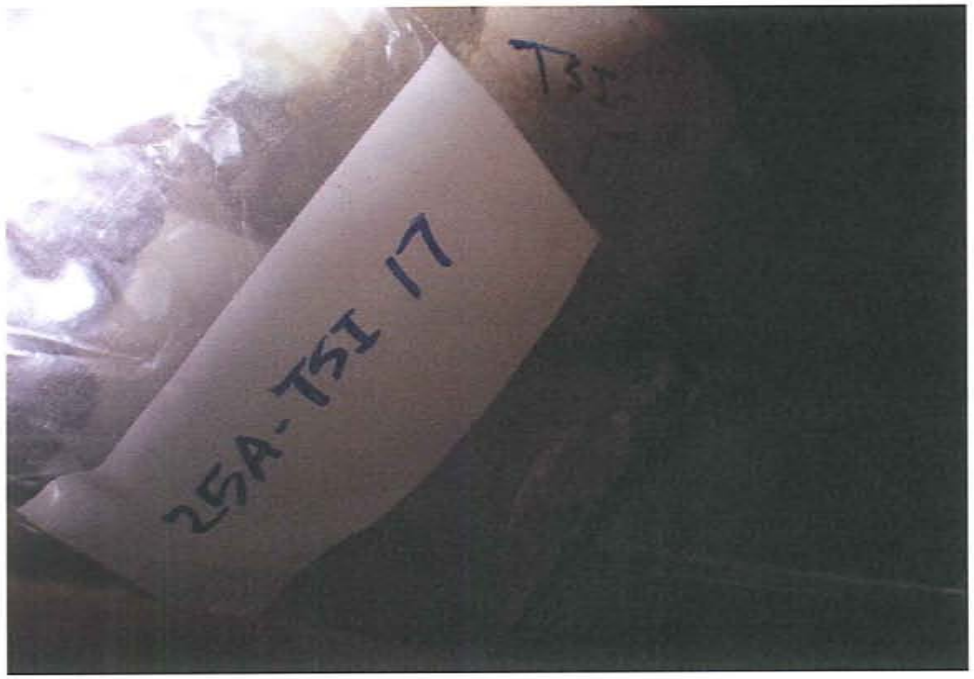
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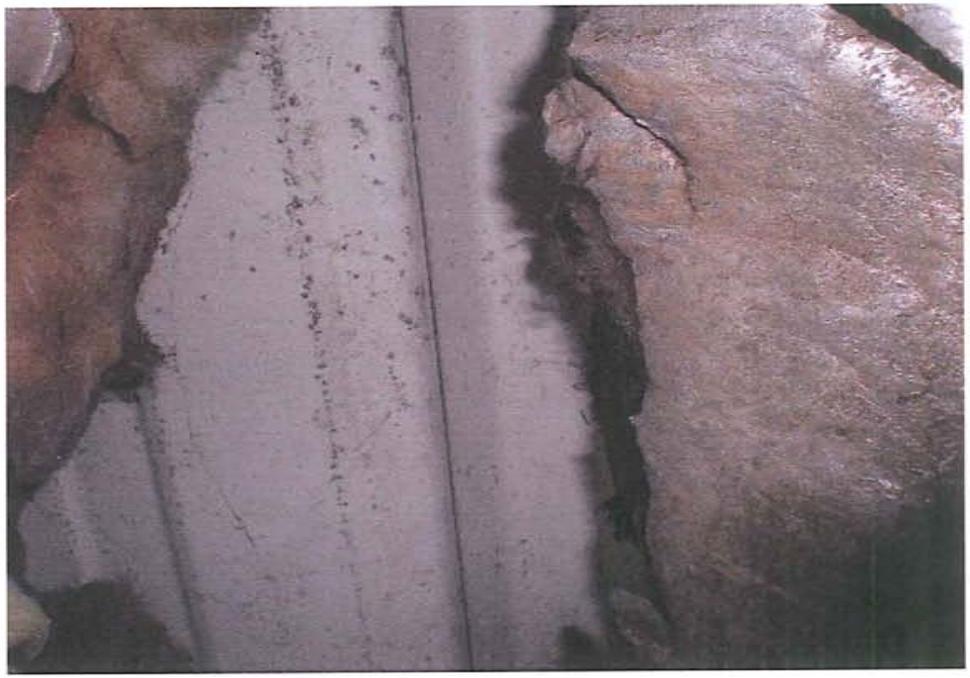

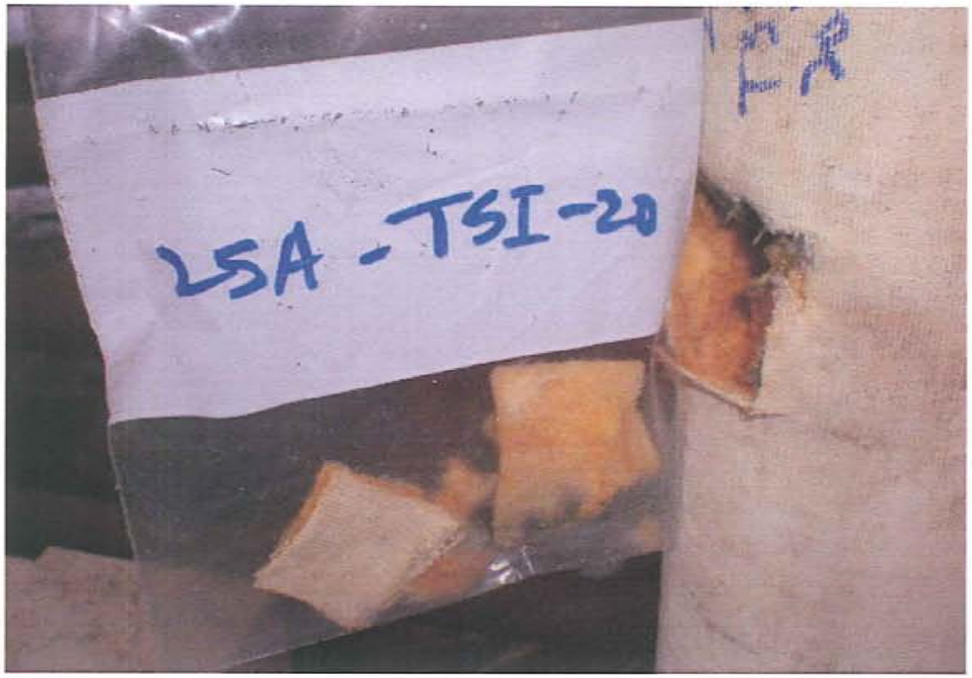
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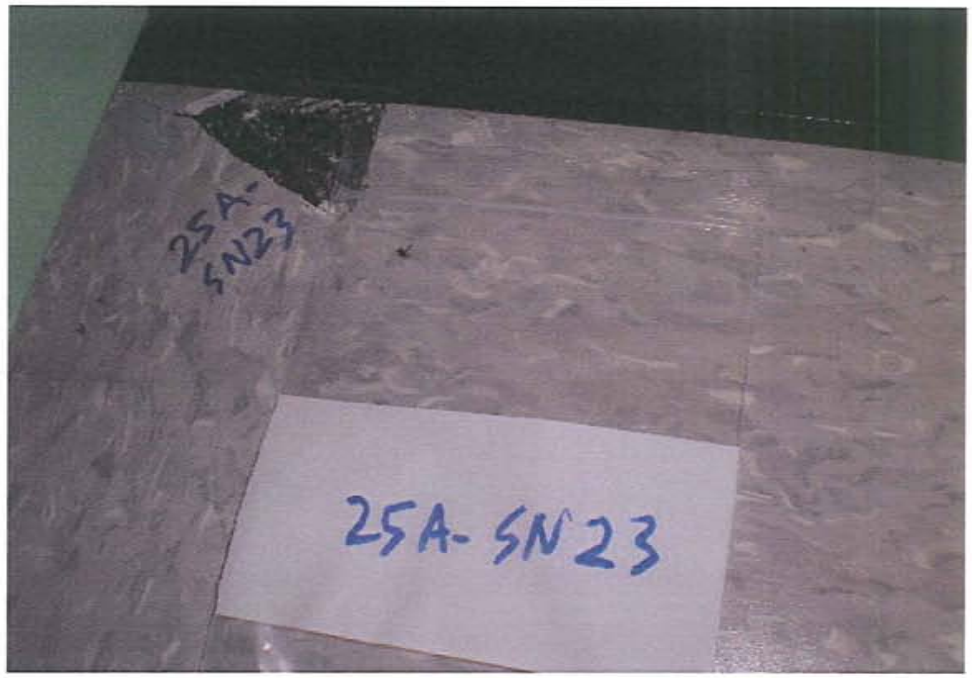
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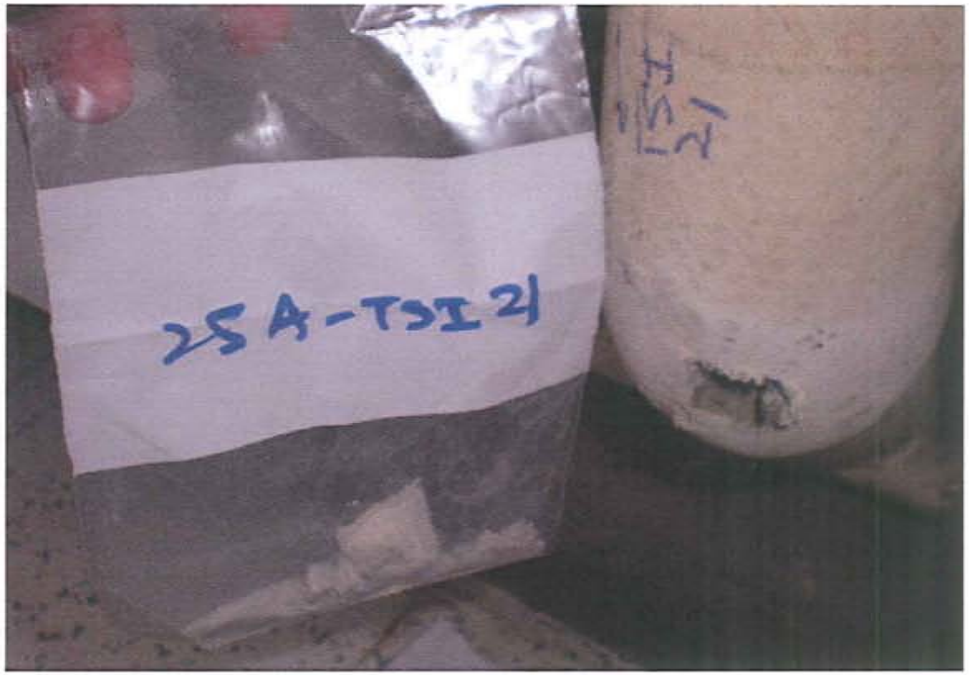
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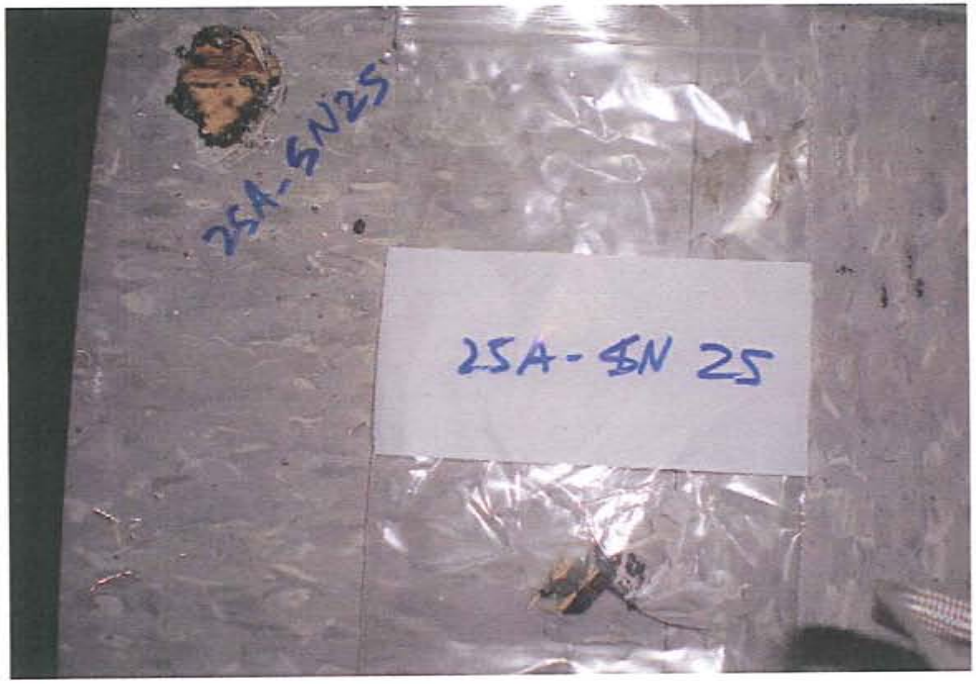
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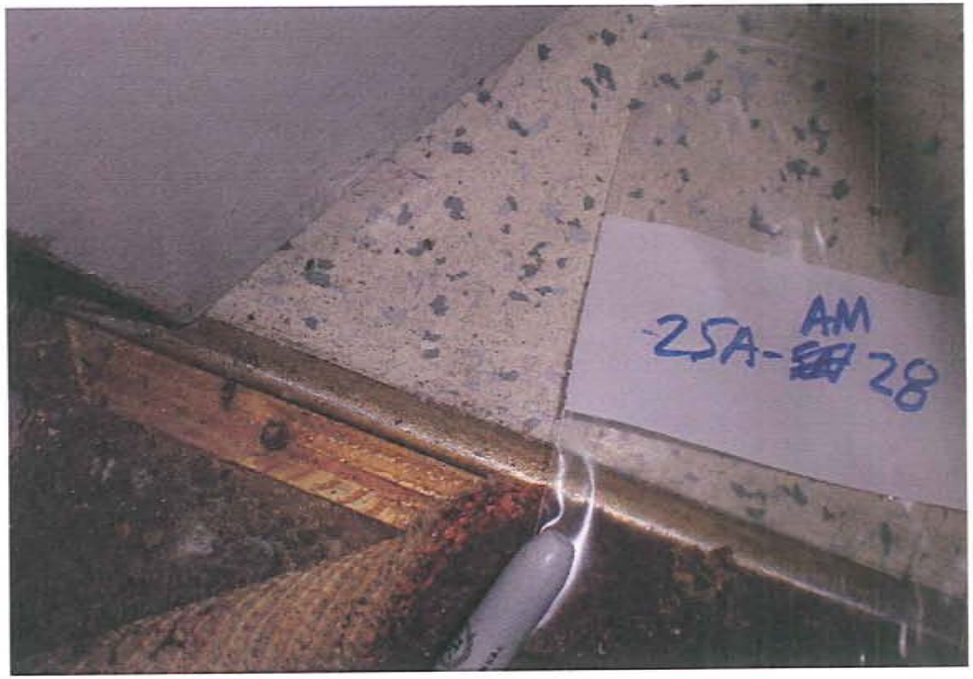
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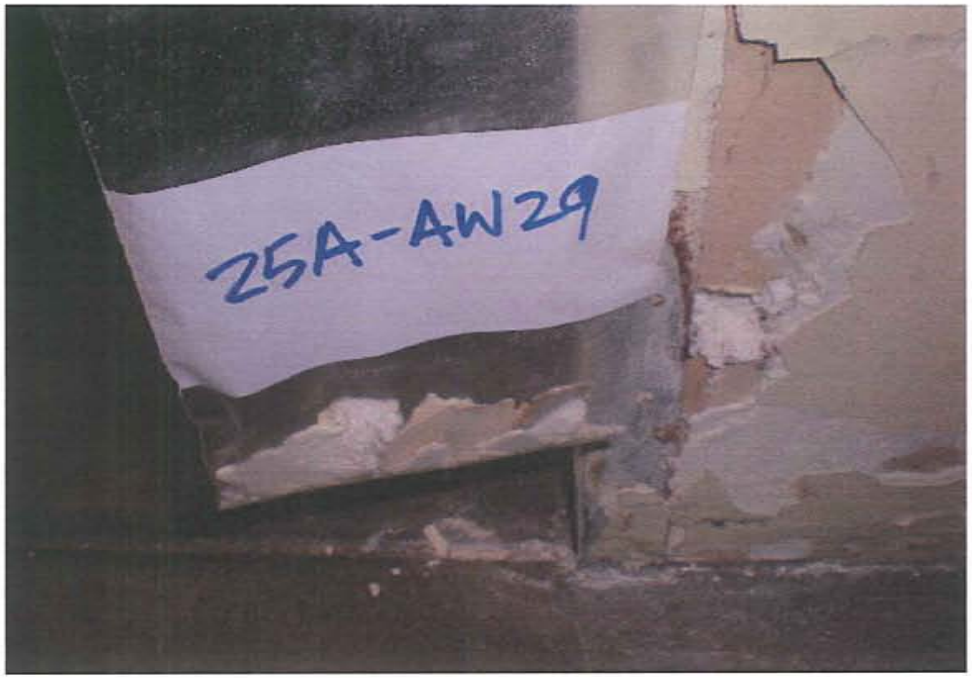
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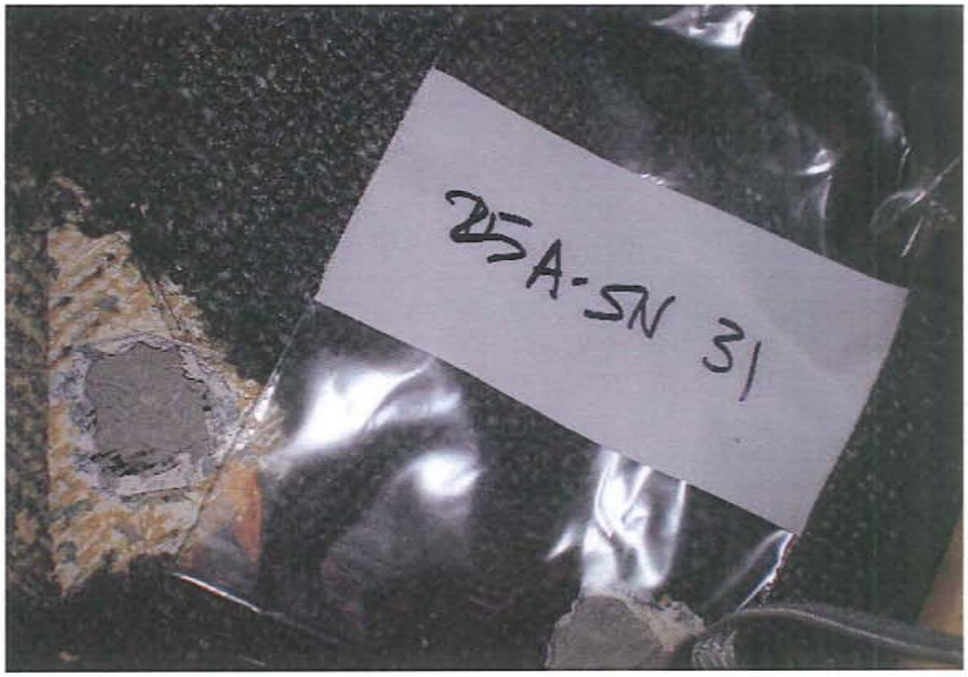
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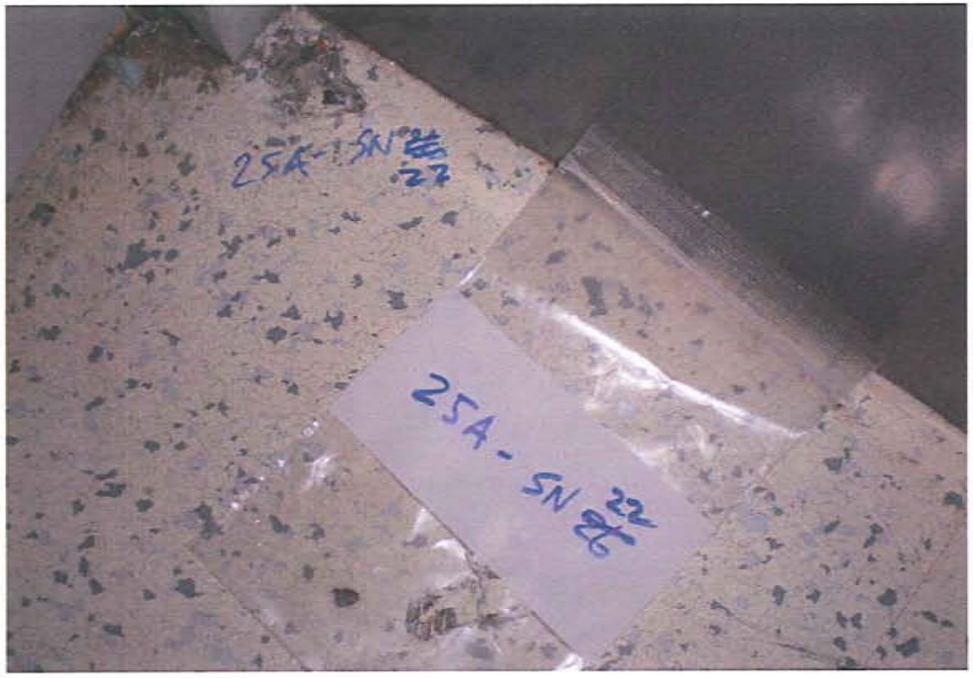
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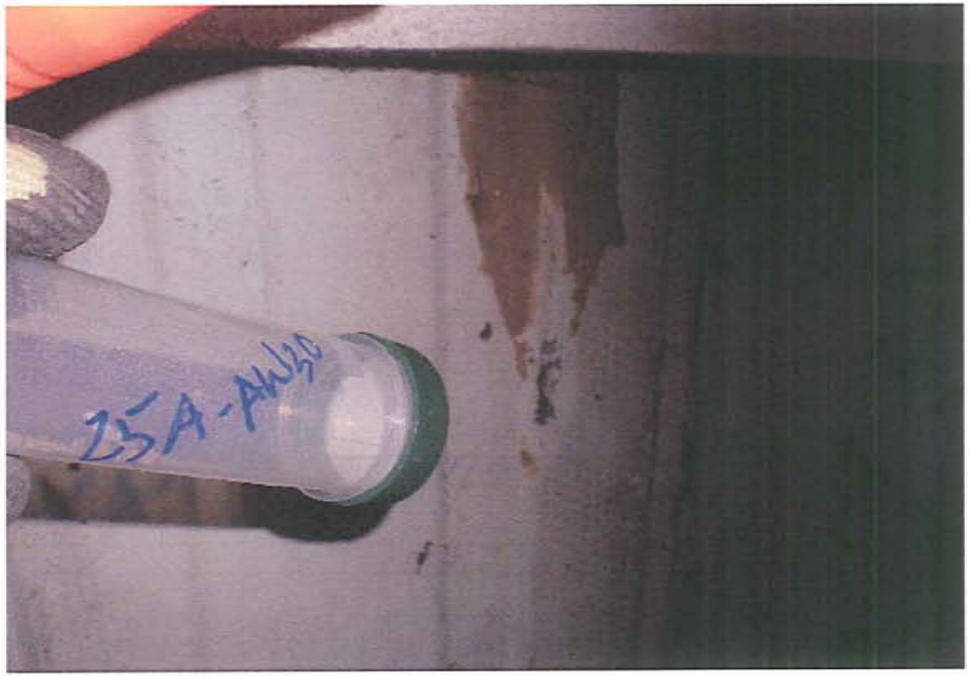
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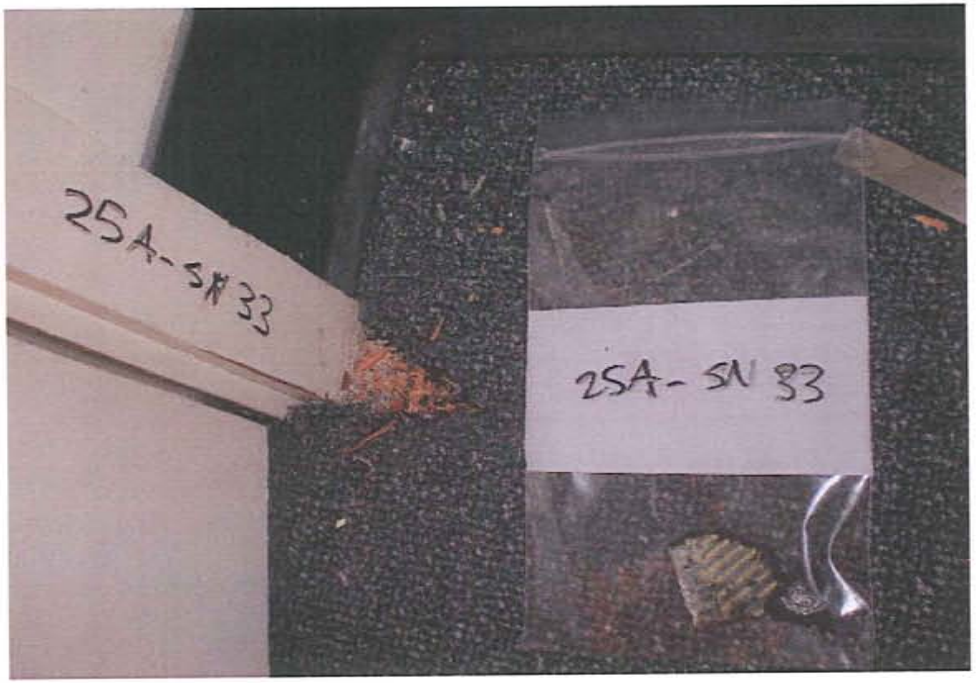
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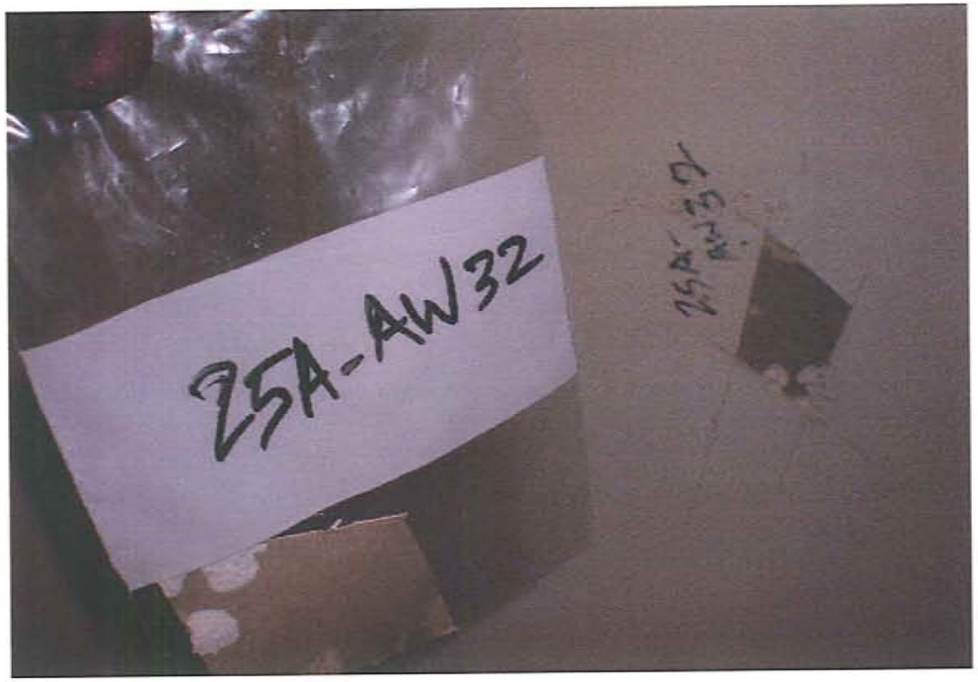
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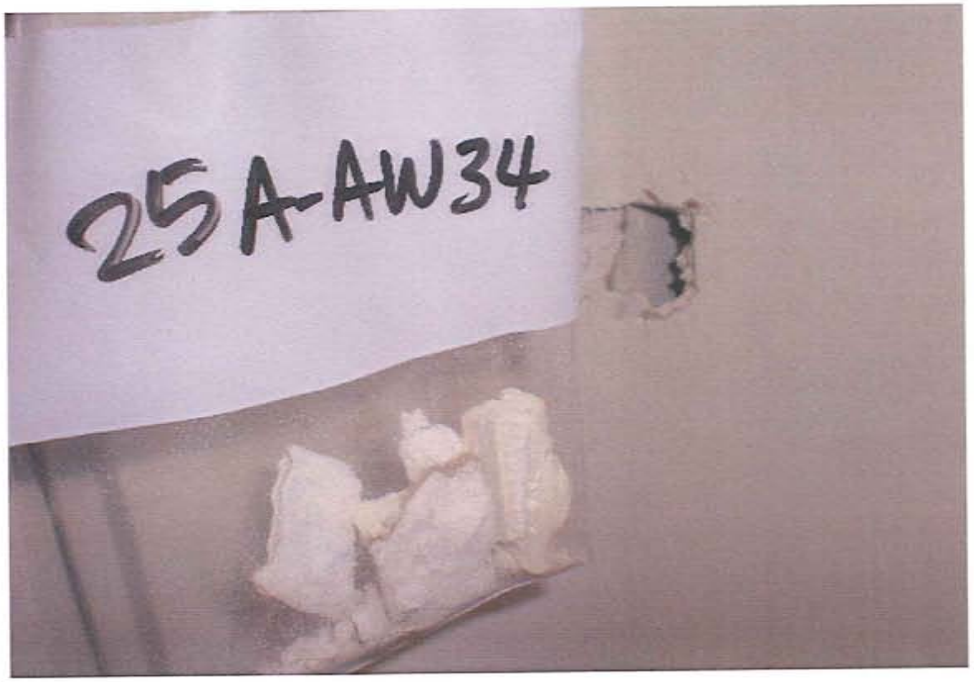
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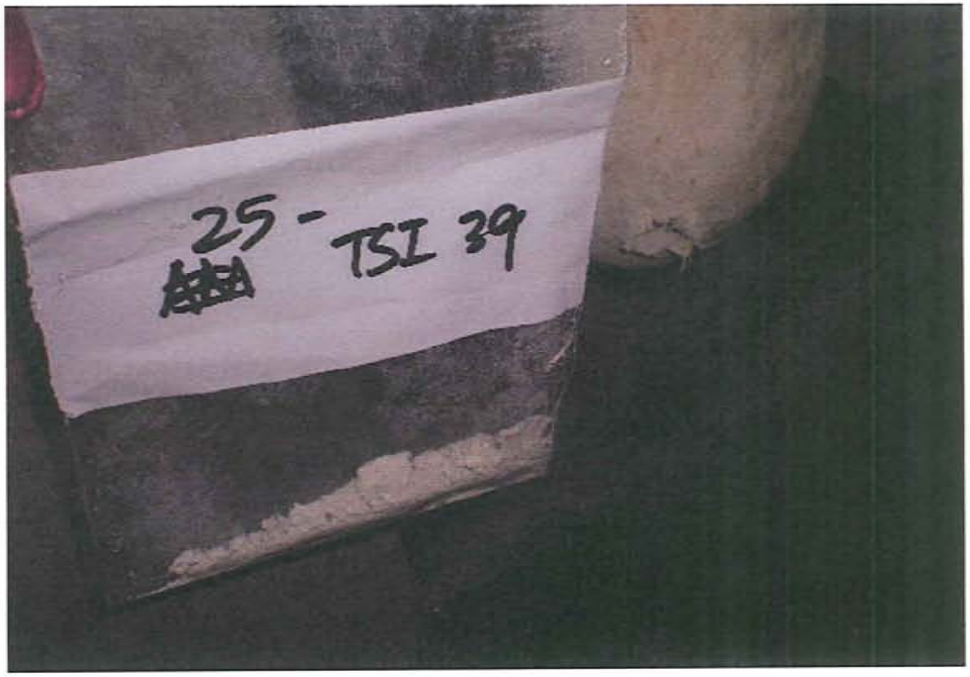
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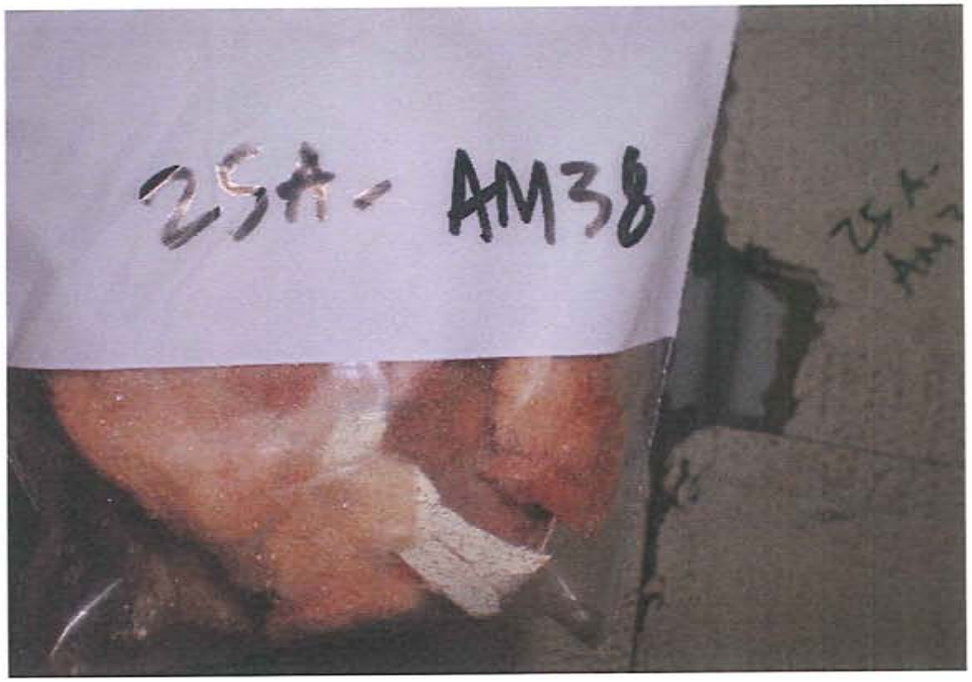
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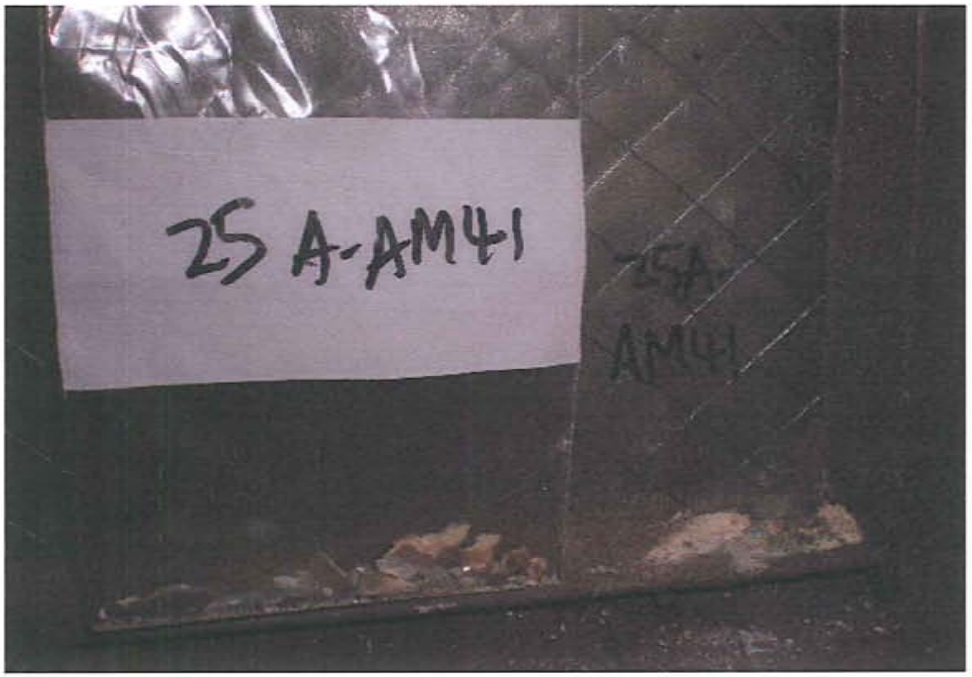
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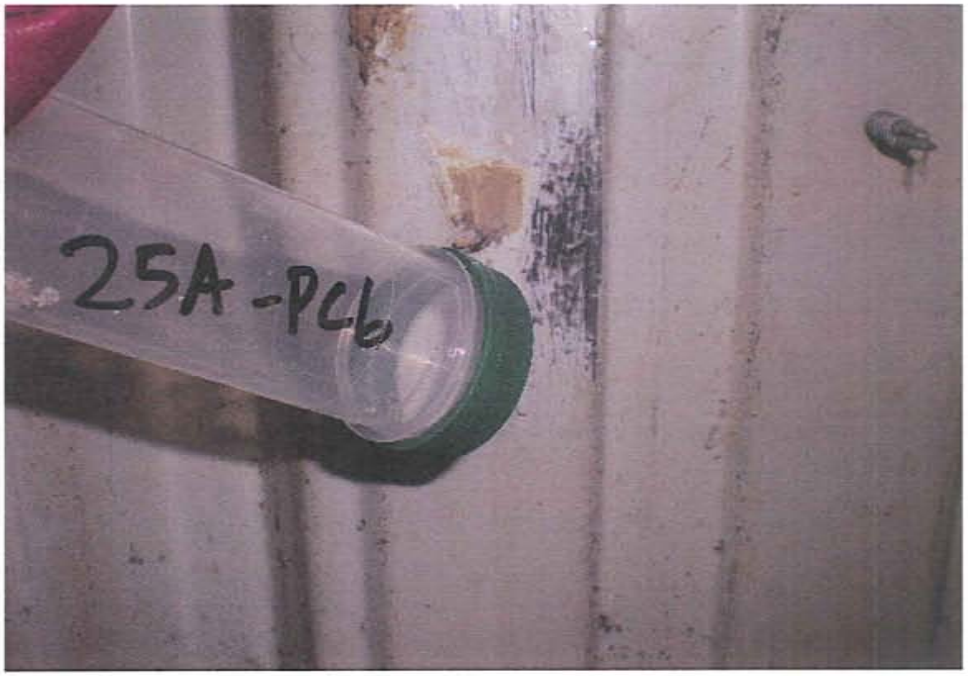
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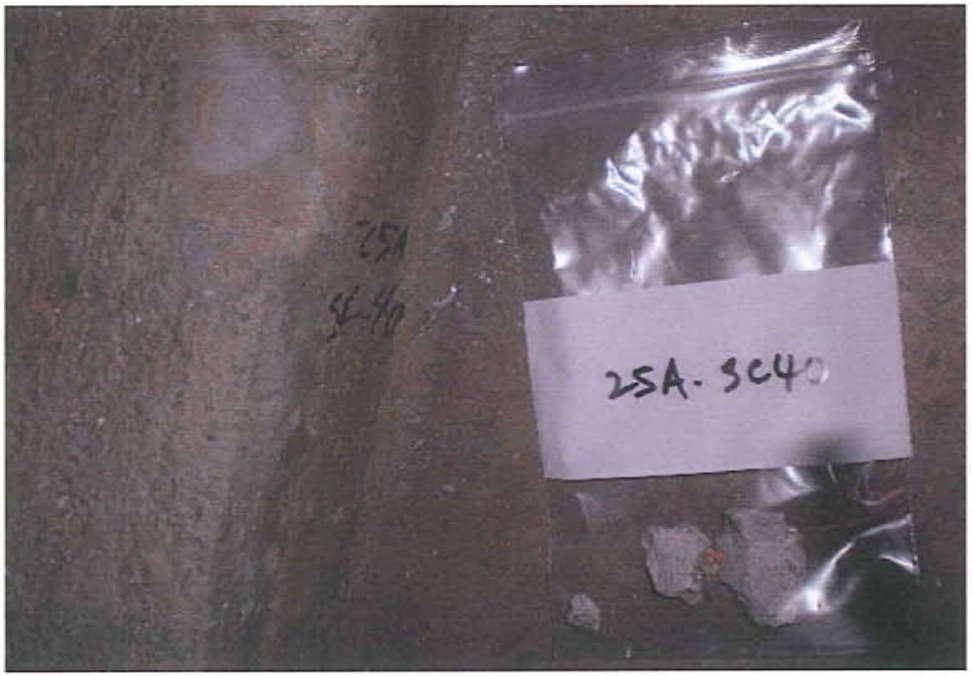
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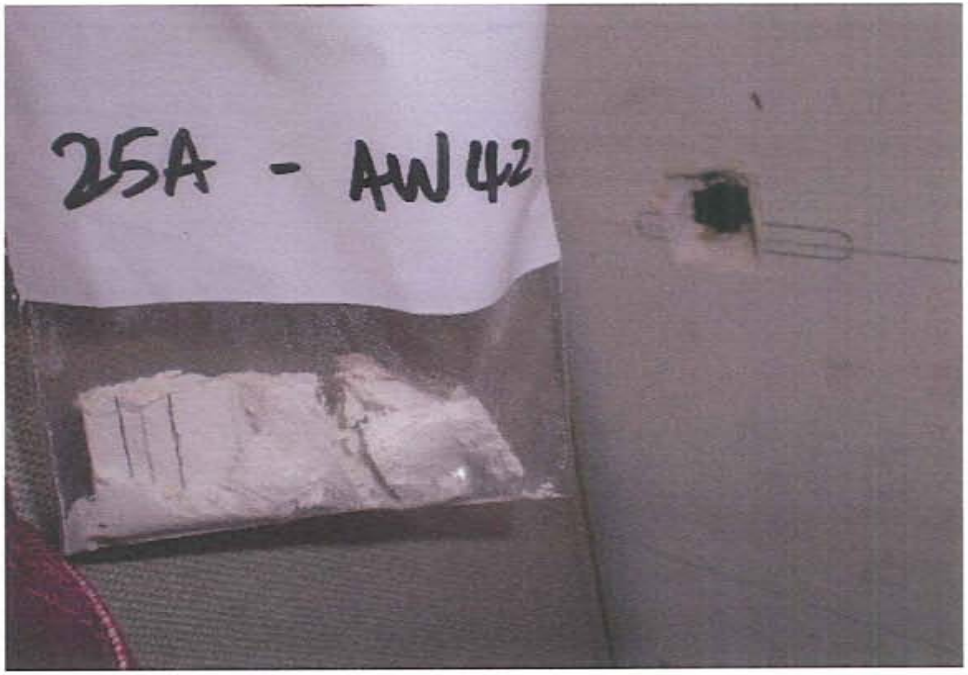
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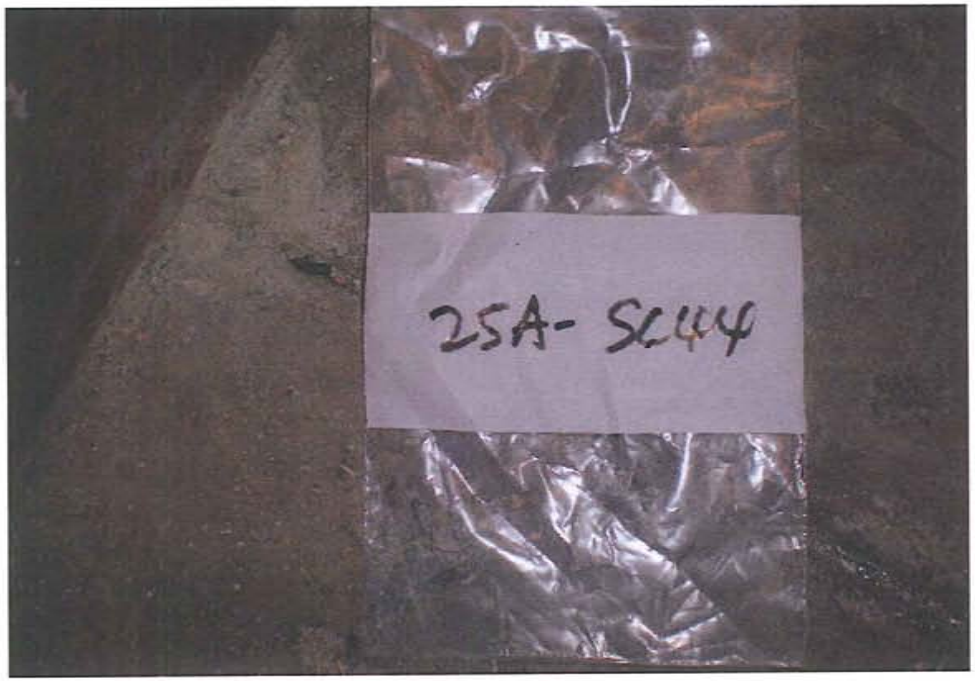
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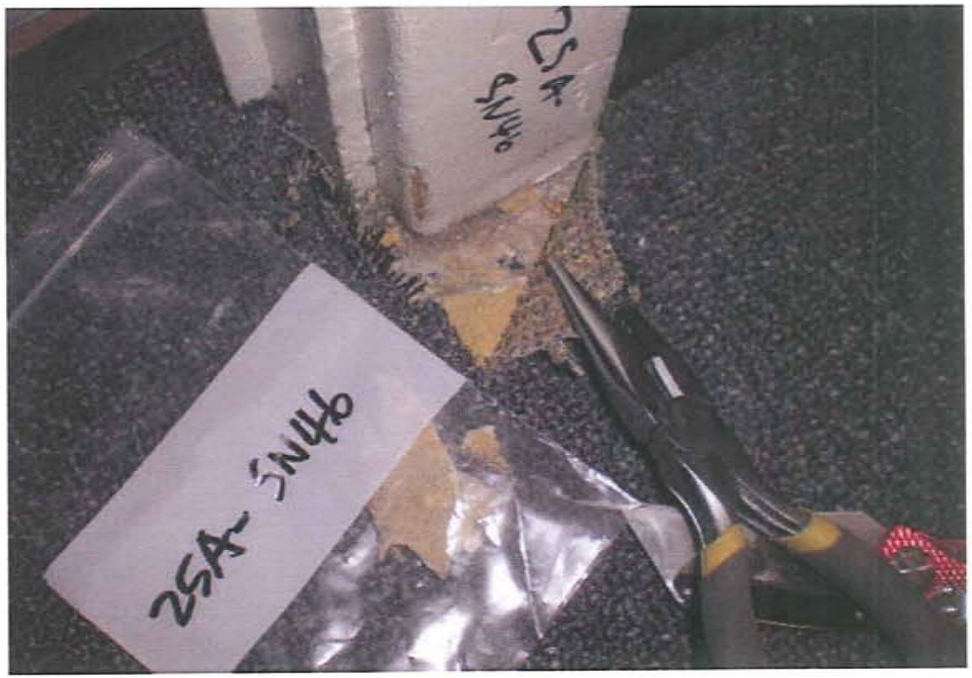
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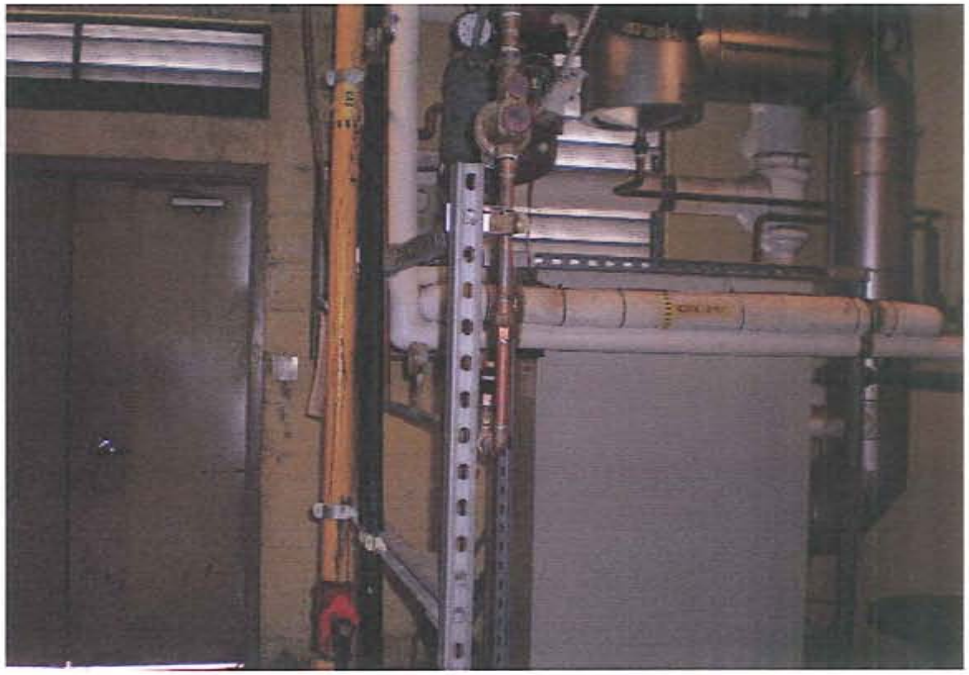

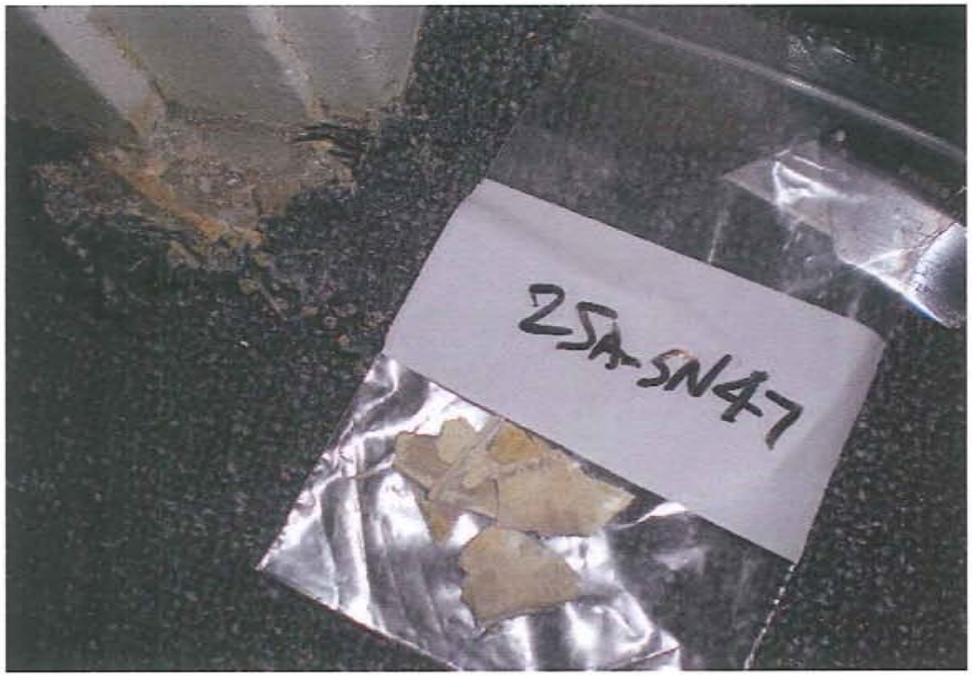
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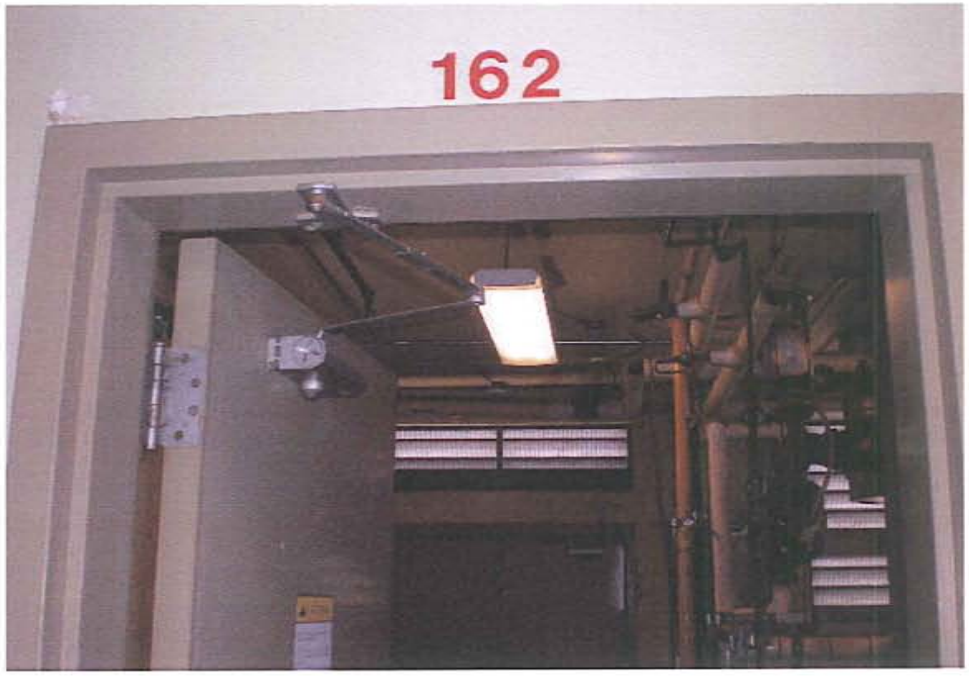
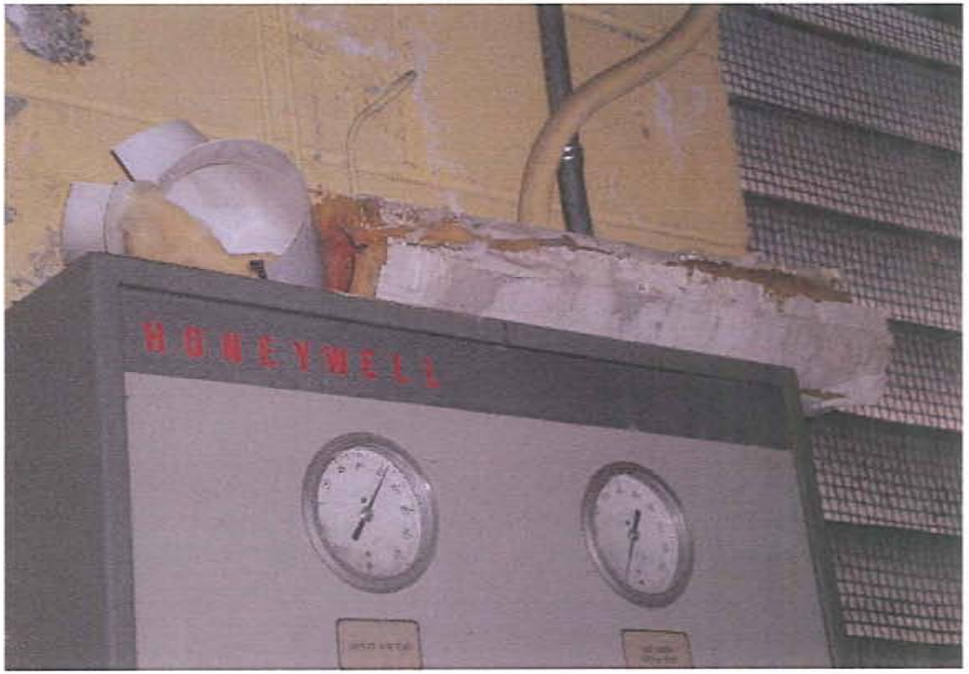

162

DANGER
DANGER
DOM. HOT WTR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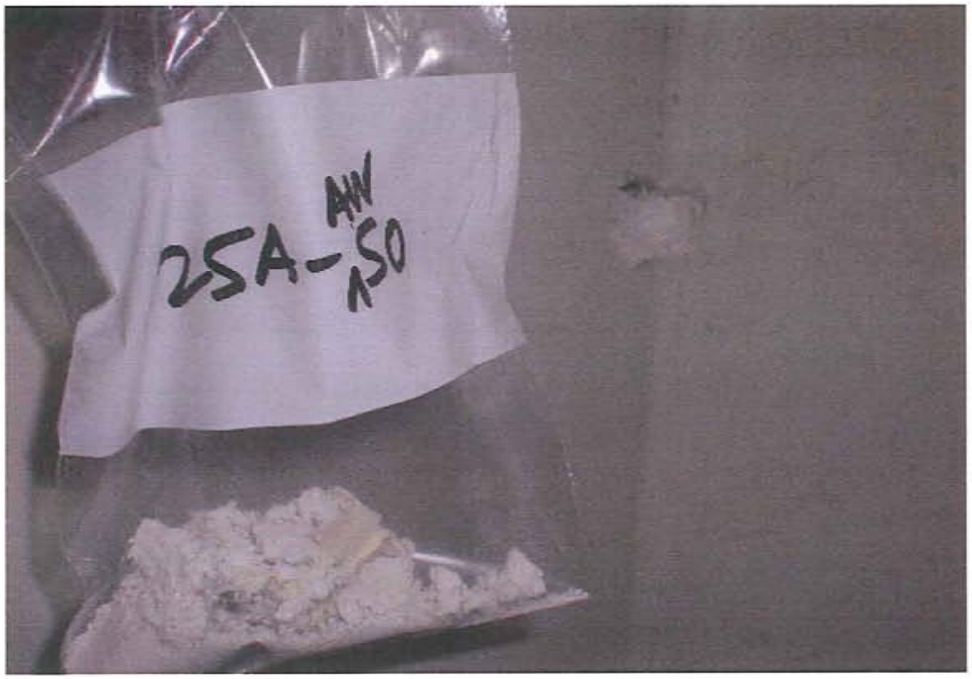
HEATING SUPPLY
HEATING RETURN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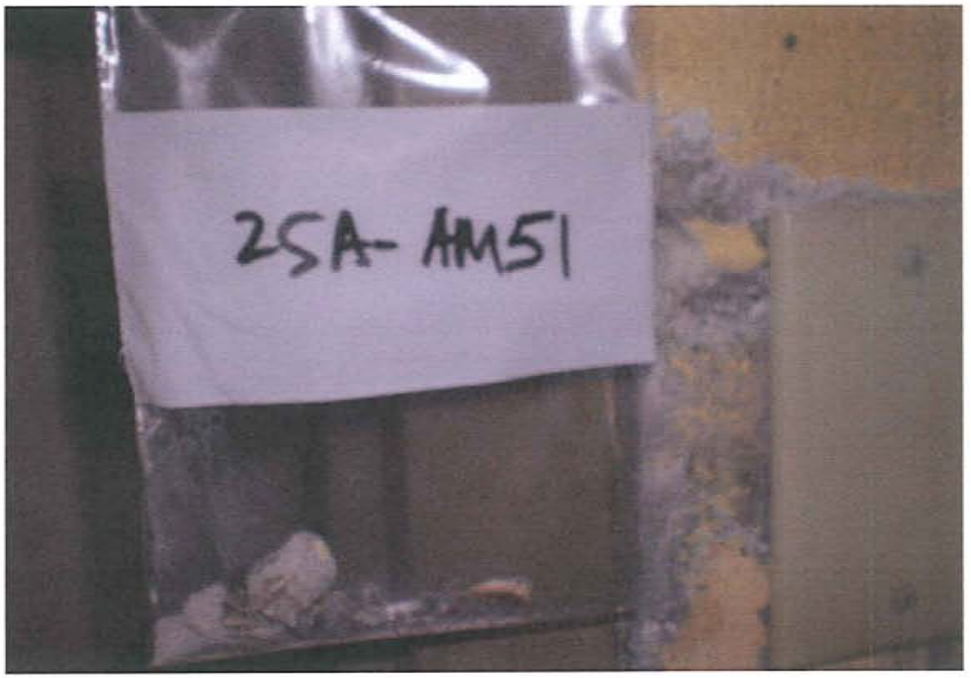
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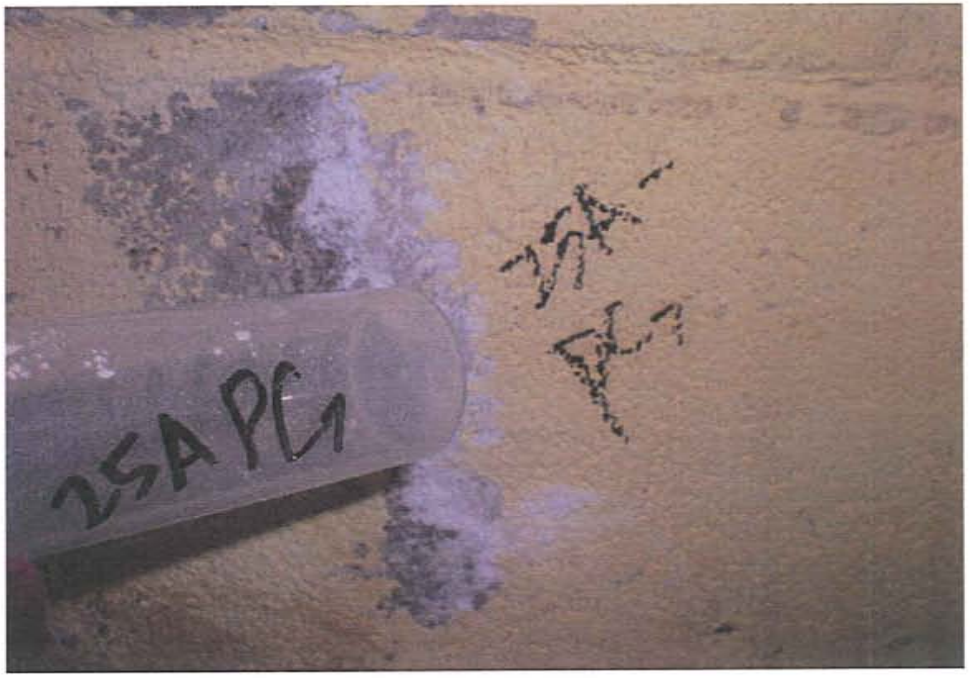
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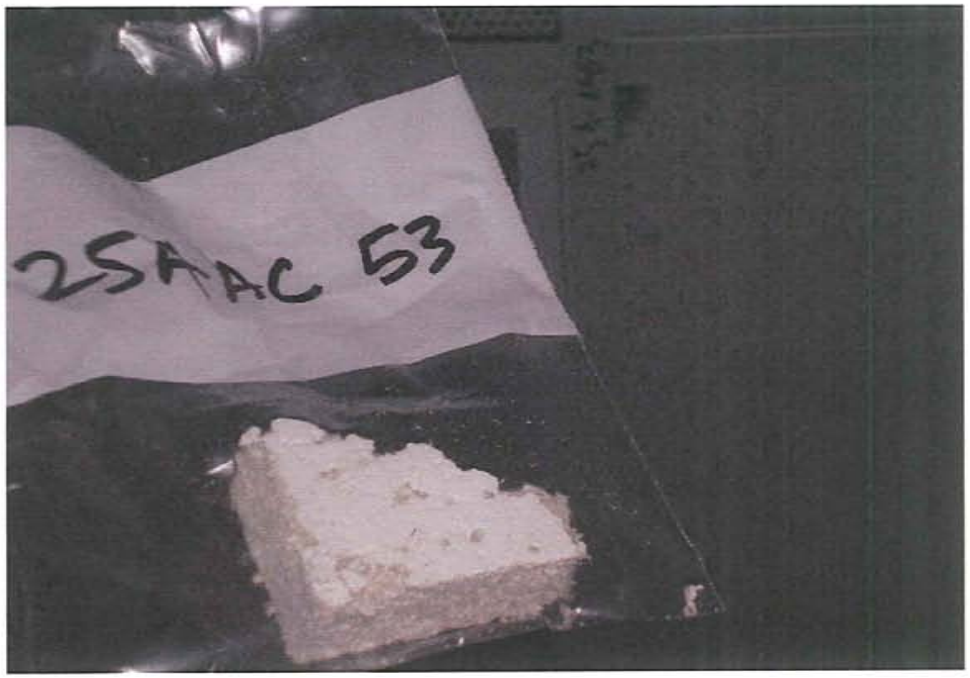
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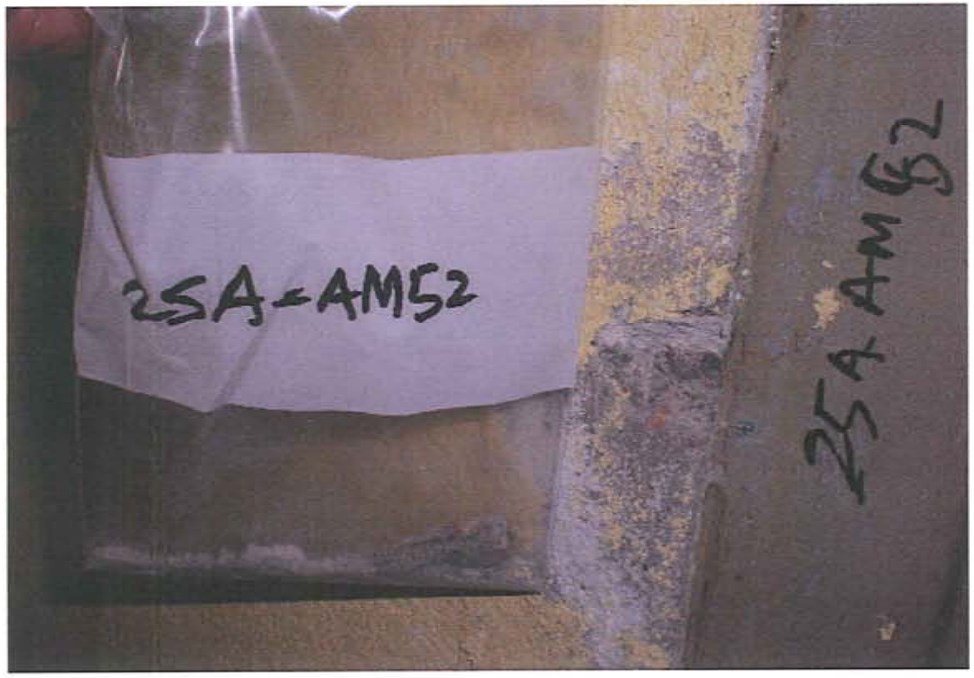
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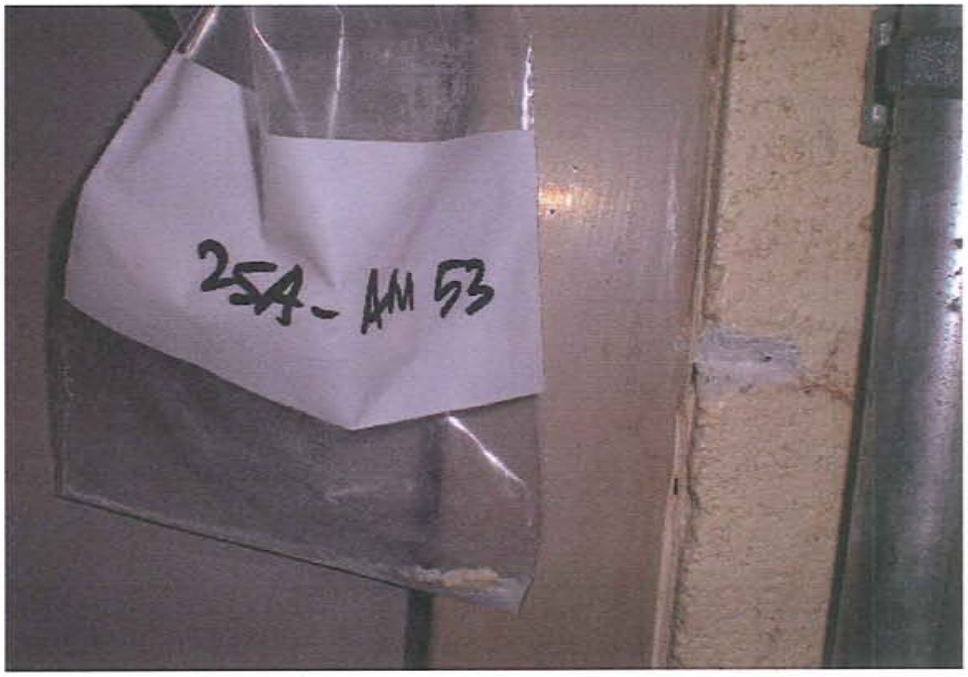
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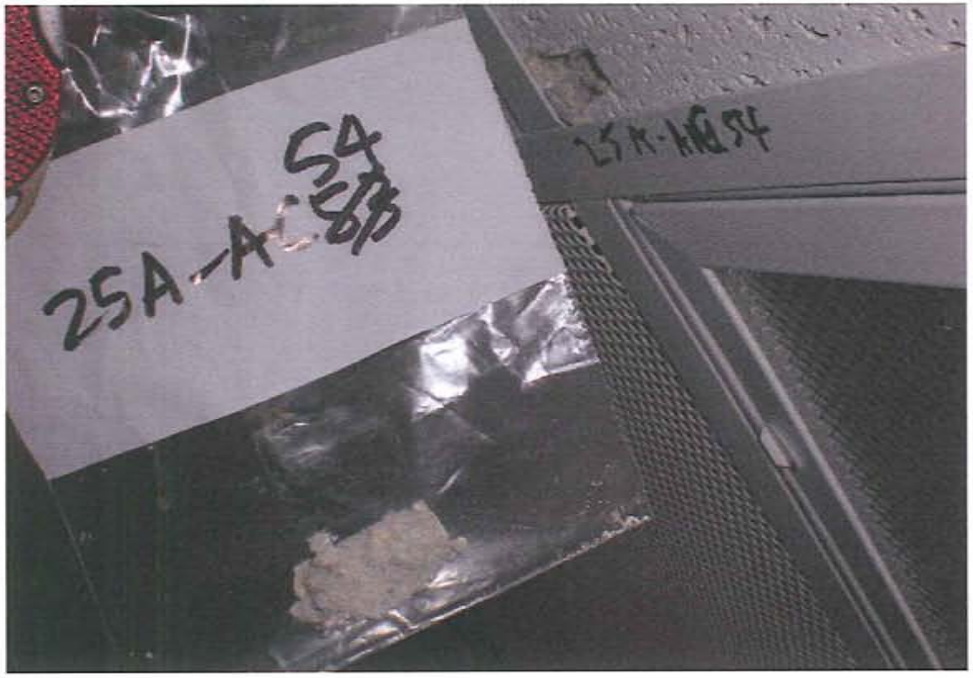
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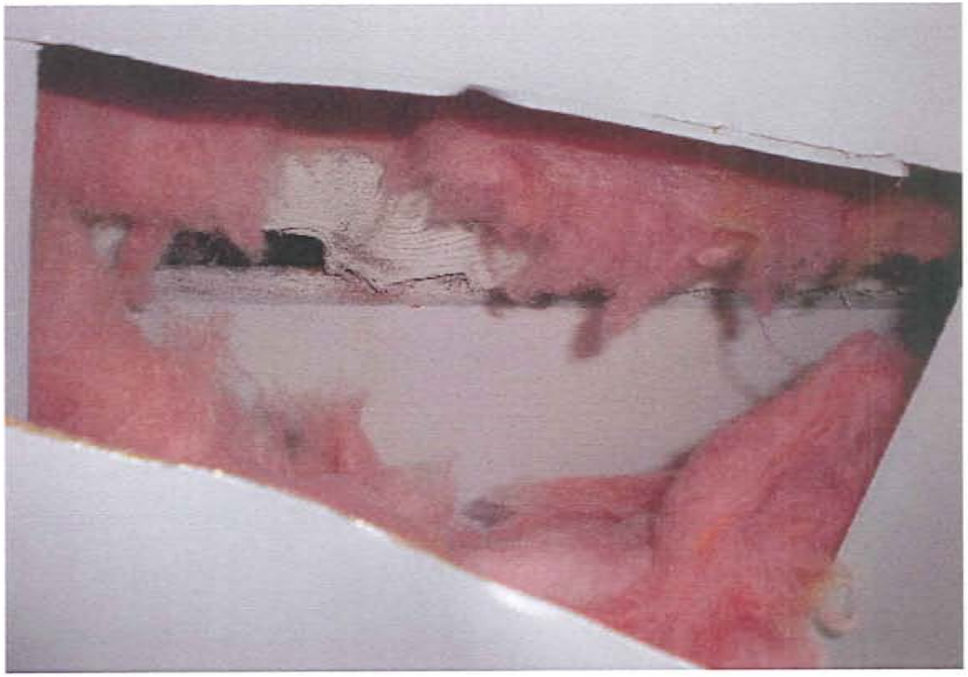

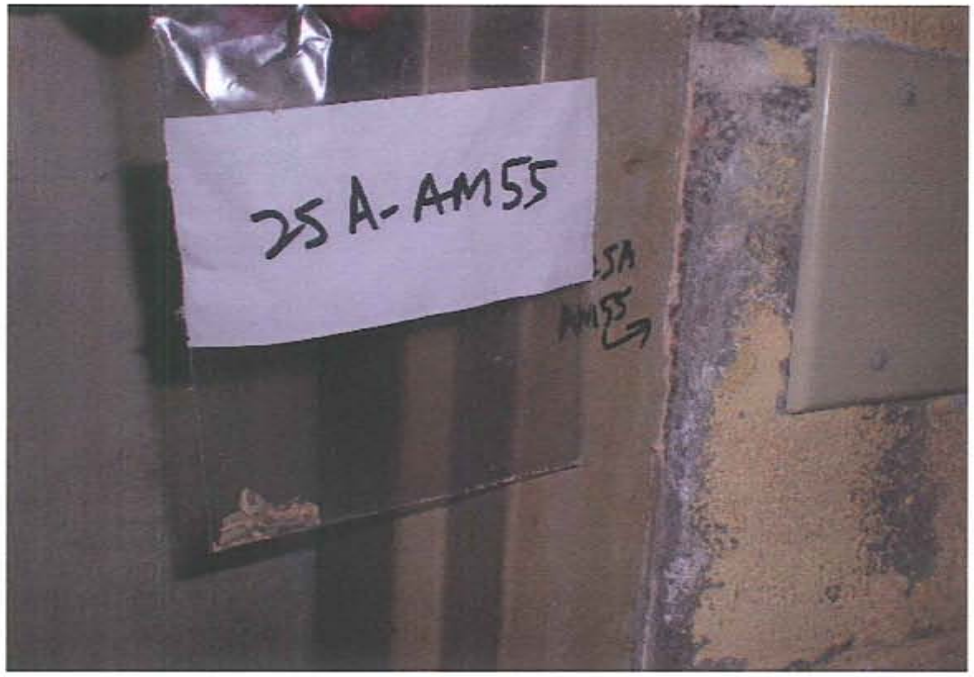
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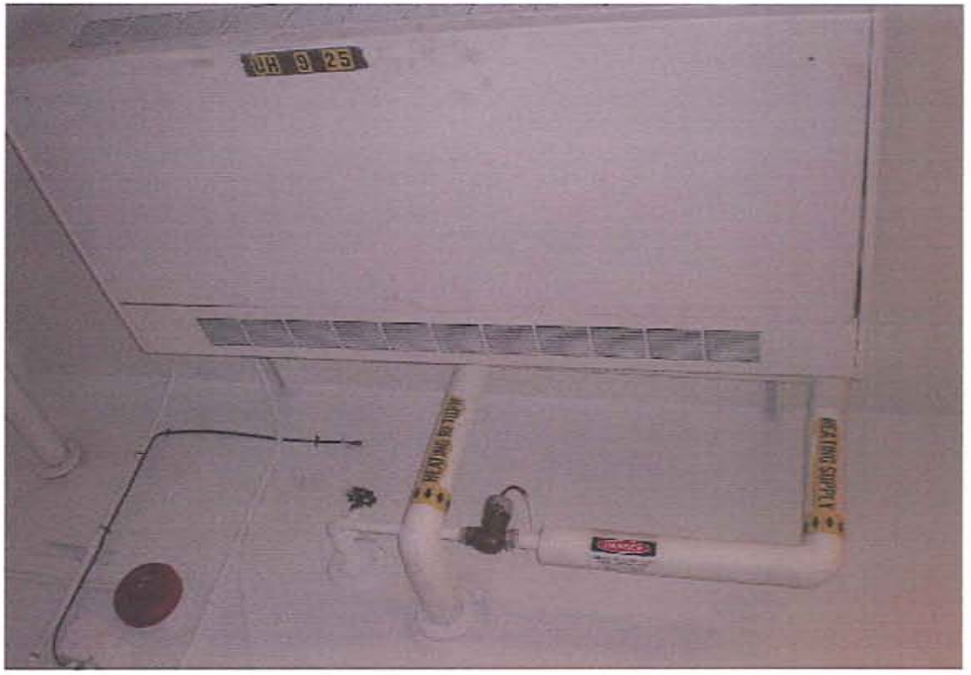
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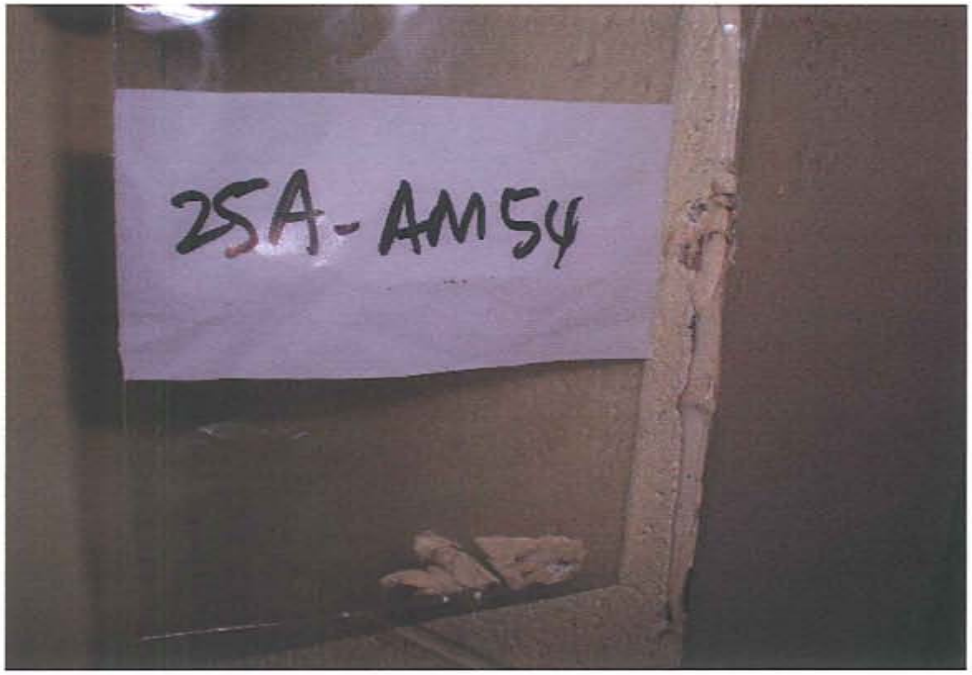
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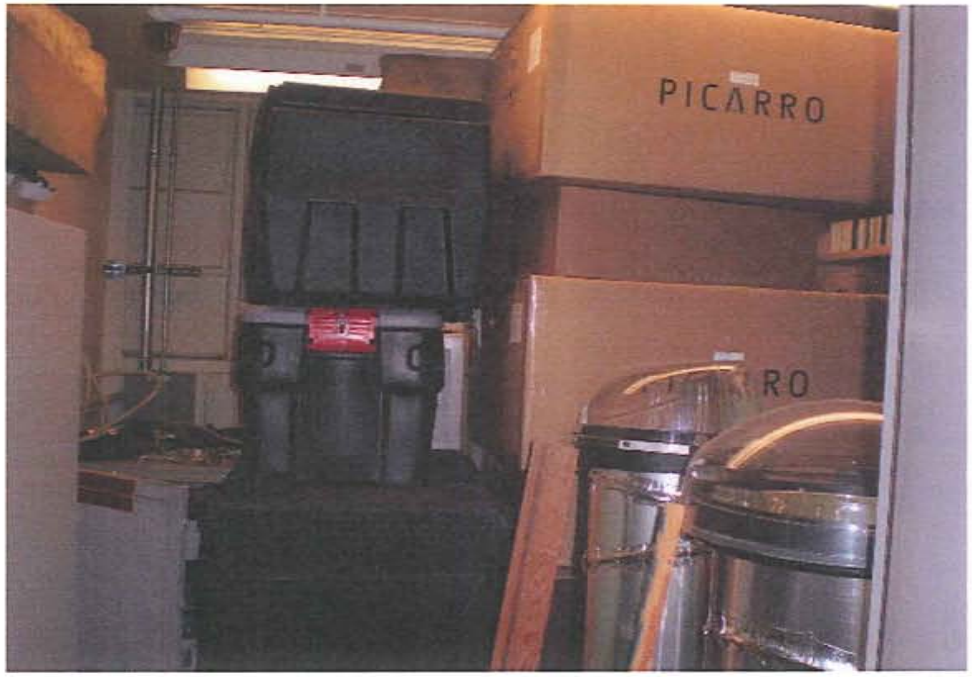
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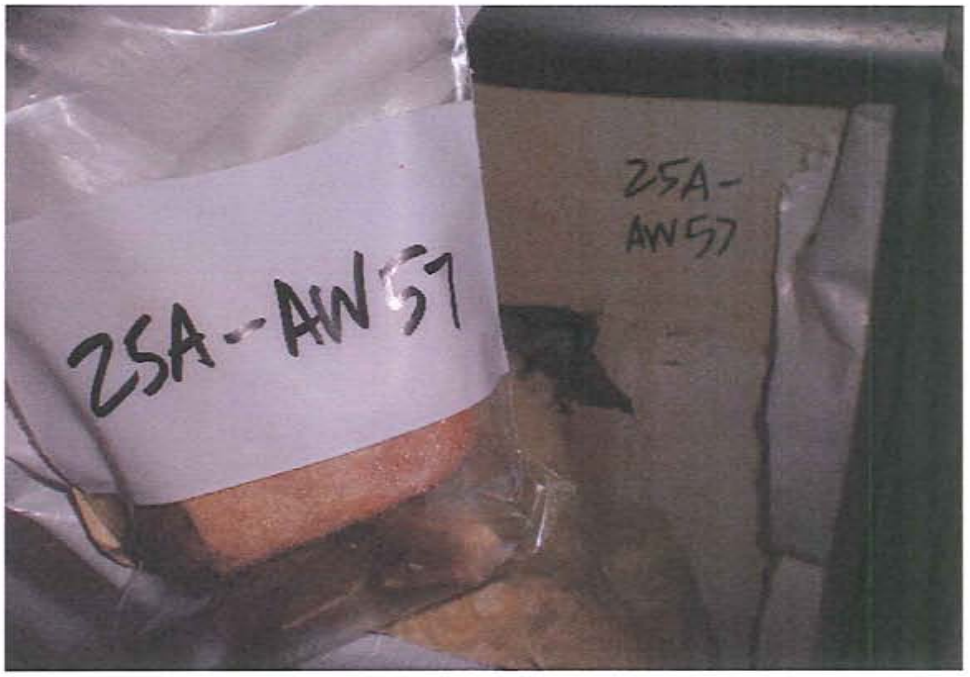
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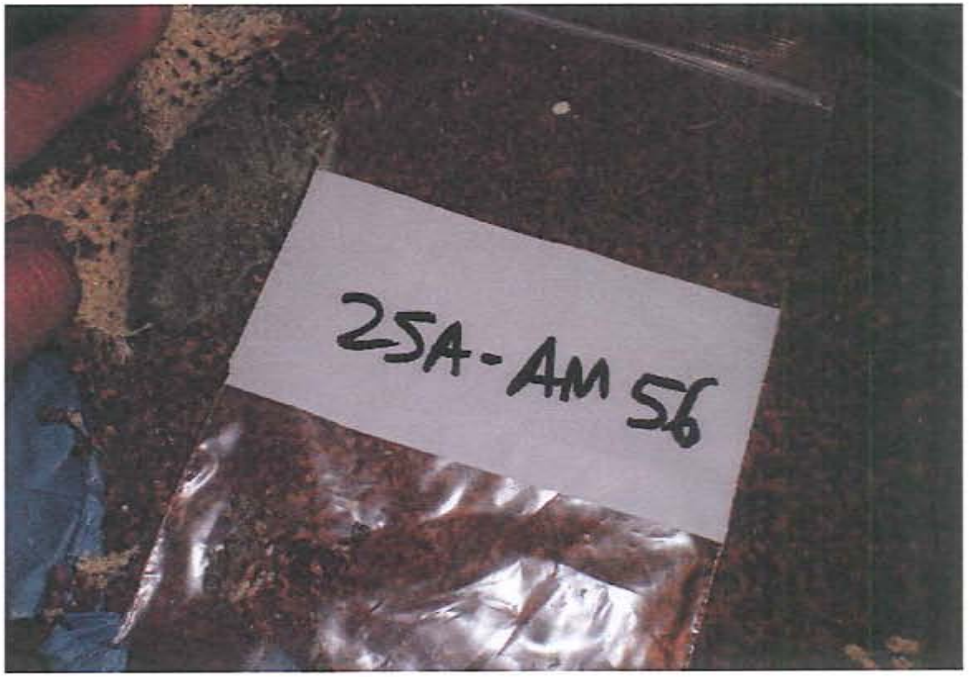
25A-
AW57

DANGER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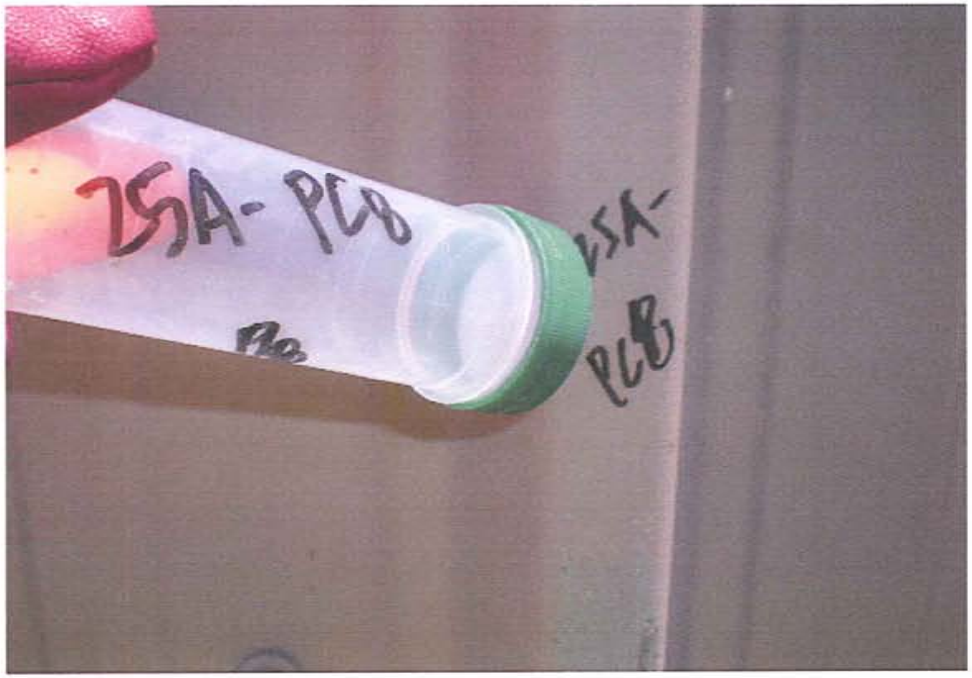
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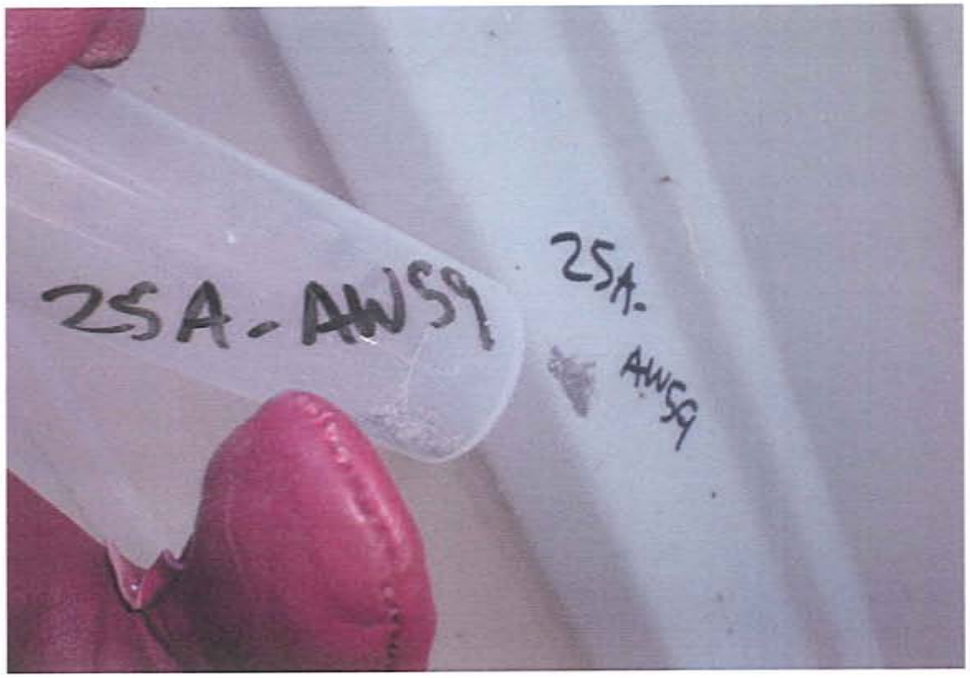
25A- AM61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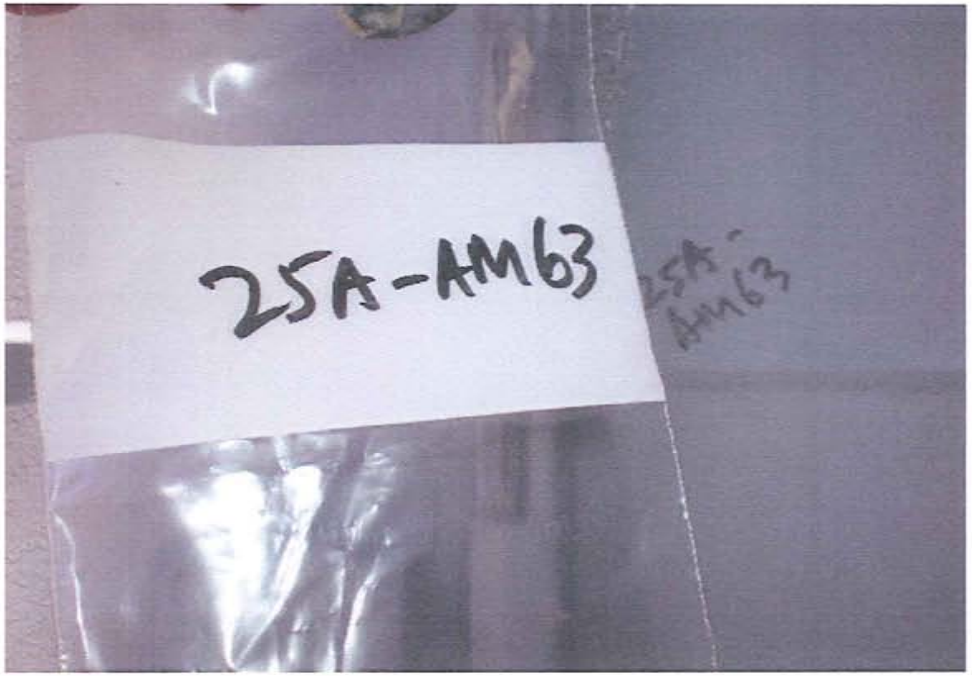
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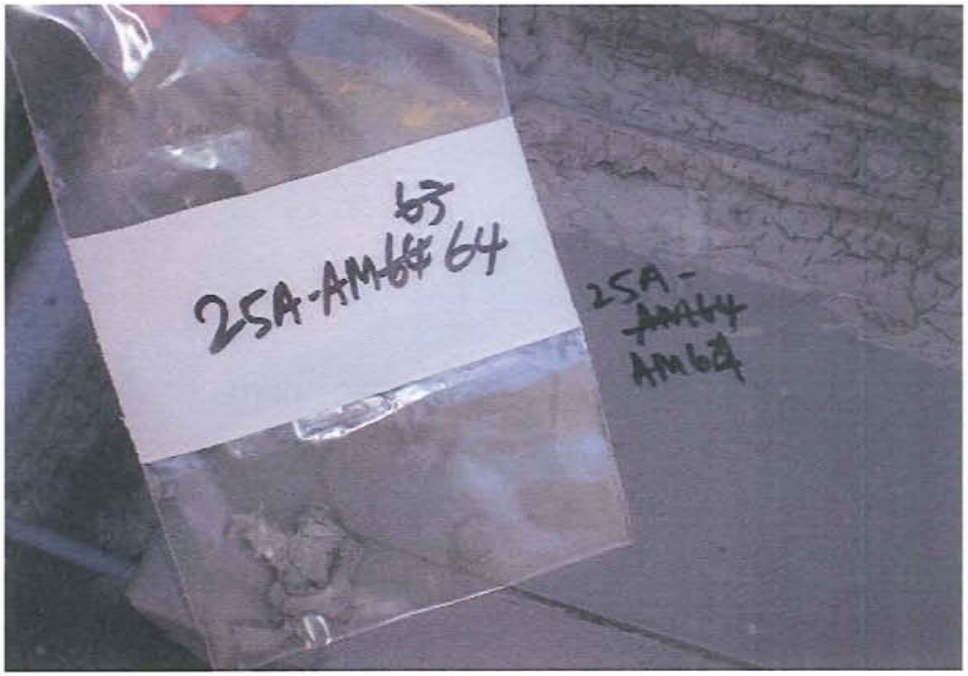
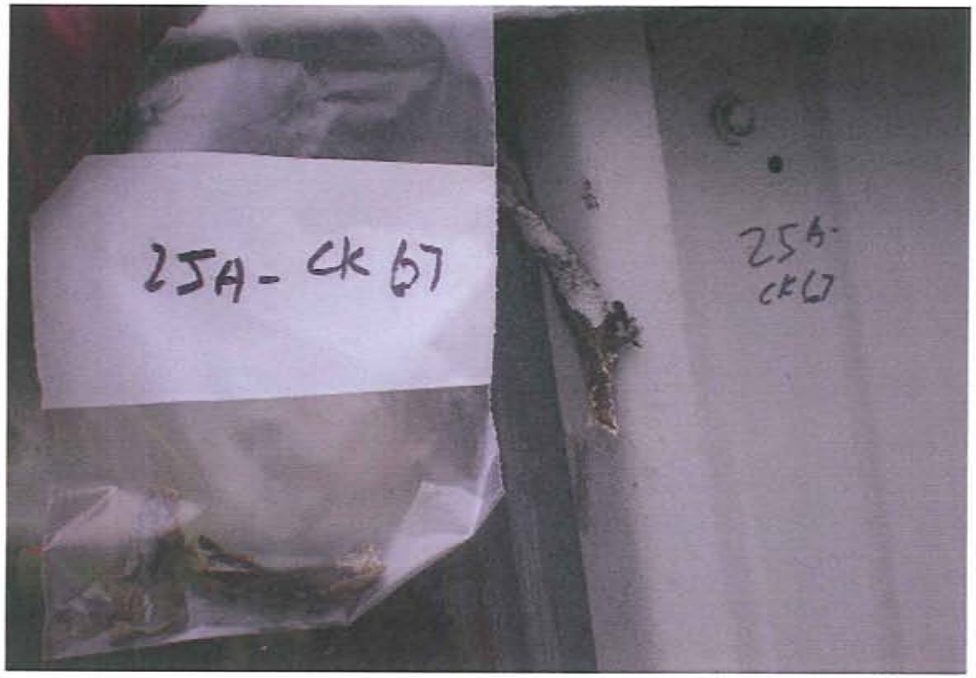
25A-
AM63


63
25A-AM~~64~~ 64
25A-
~~AM64~~
AM64

25A-AM62

WARNING
HAZARDOUS VOLTAGE!
DISCONNECT ALL ELECTRIC POWER INCLUDING REMOTE DISCONNECTS BEFORE SERVICING.
WARNING
ROTATING PARTS!
DISCONNECT ALL ELECTRIC POWER INCLUDING REMOTE DISCONNECTS BEFORE SERVICING. SECURE DRIVE SHEAVES TO ENSURE ROTOR CANNOT ENGAGE!
WARNING
PRODUCT CONTAINS FIBERGLASS WOOL!
REFER TO OWNER'S INFORMATION MANUAL PROVIDED WITH THIS UNIT FOR PROPER INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS.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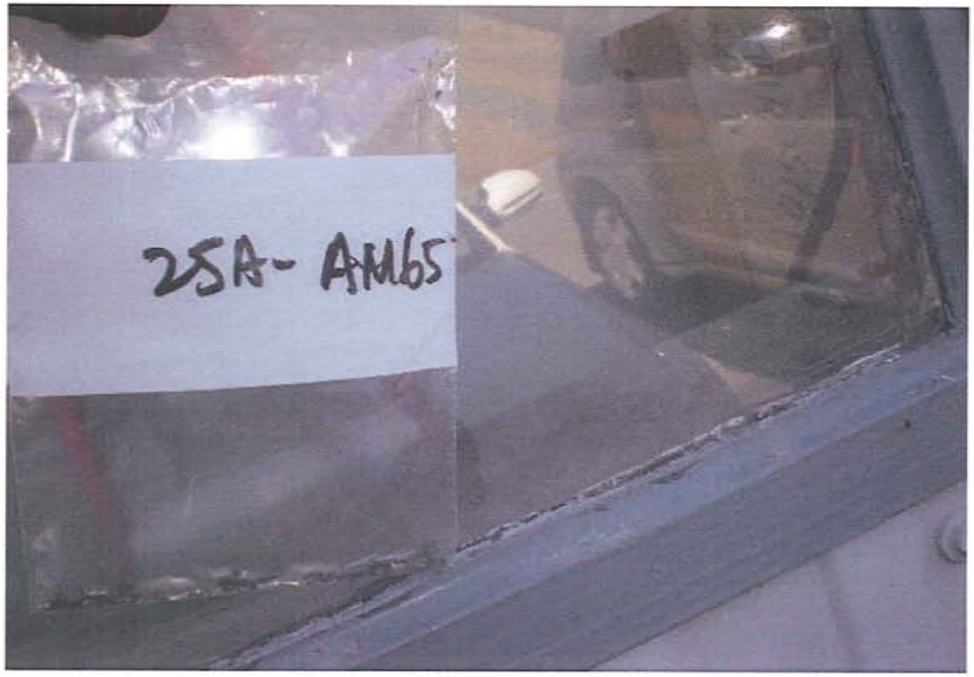
CK67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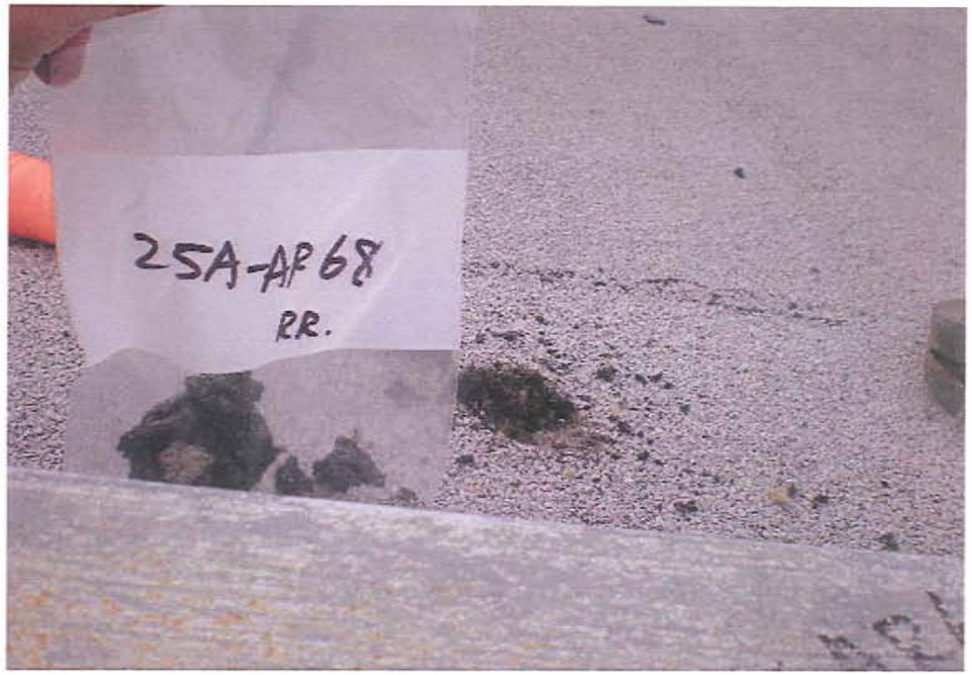
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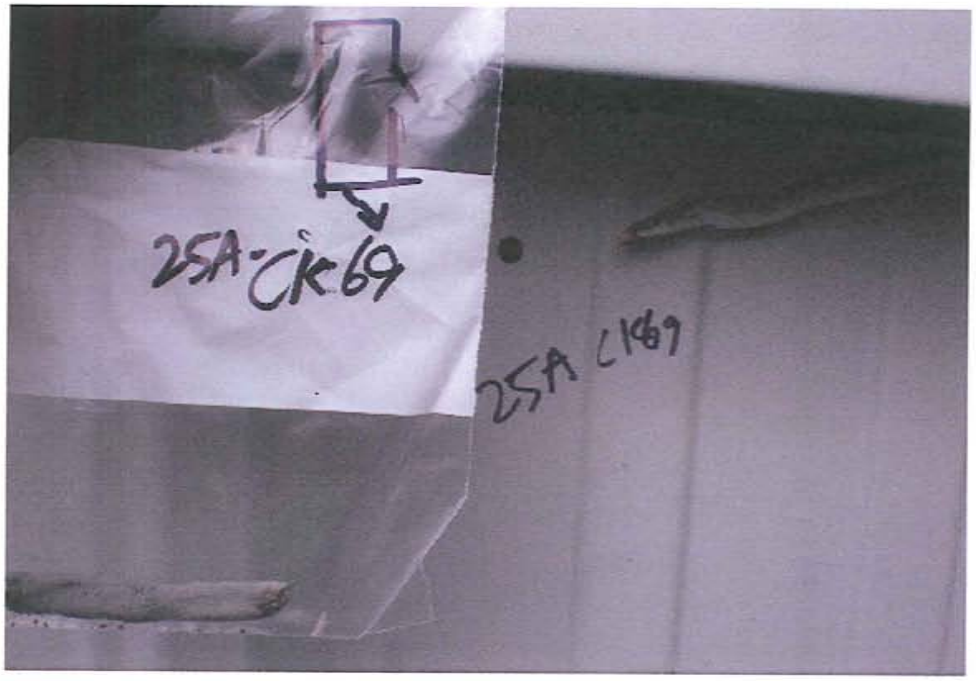
RR.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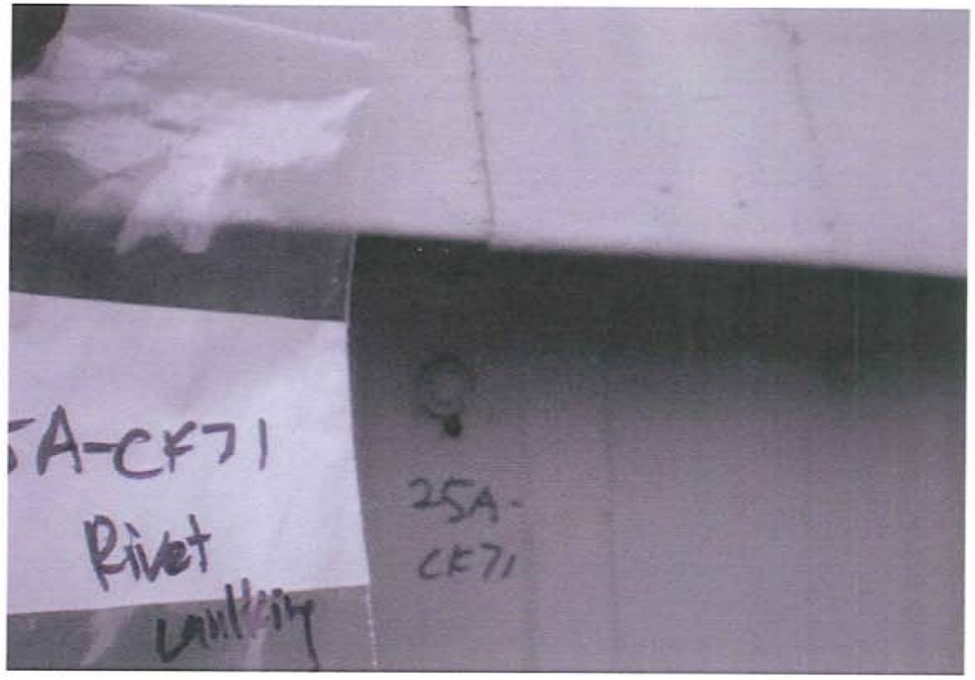
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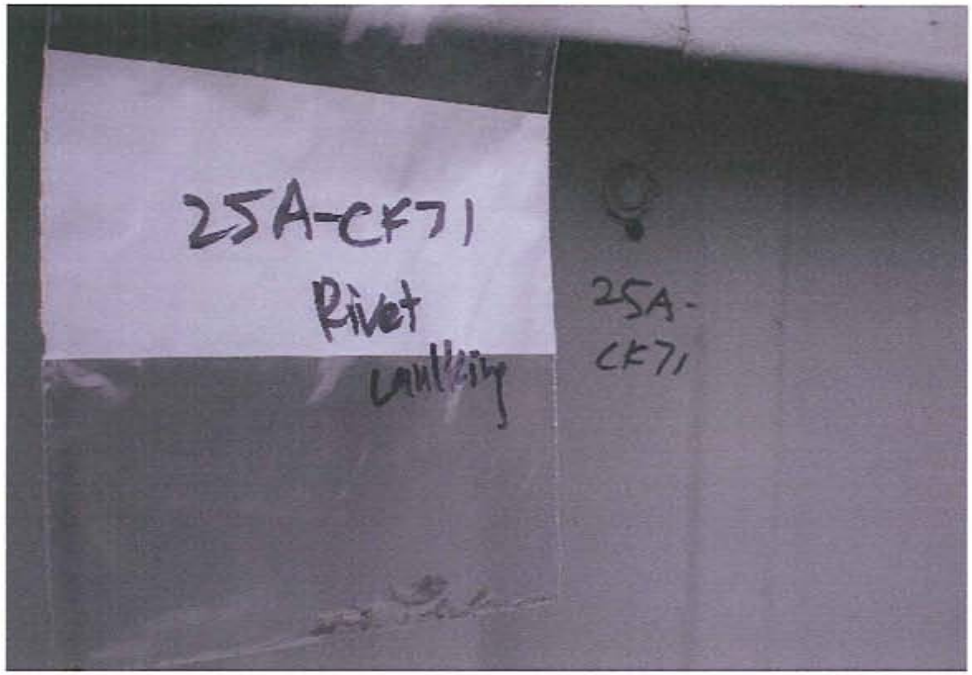
Rivet
25A-
CF71

25A- CK70
25A
CK70

25A- AR 72

25A-AR 74


25A-CF71
Rivet
Caulking
25A-
CF71

25A- AR 72

A Creative Joint Venture For Better Environmental Solutions

Lawrence Berkeley National Laboratory
Building 40
One Cyclotron Road
Berkeley, CA

KELLCO-MACS Job #1004-17

NESHAP Compliant Pre-Demolition
Asbestos and Metals in Paint Inspection Report

for

Weiss Associates
5801 Christie Avenue
Suite 600
Emeryville, CA 94608

August 9, 2010

3137 Diablo Avenue • Hayward, CA 94545-2701• (510) 786-9751 • fax (510) 786-9625
http://www.kellcomacs.com email: mailbox3137@kellcomacs.com

A Creative Joint Venture For Better Environmental Solutions

NESHAP Compliant Pre-Demolition
Asbestos and Metals in Paint Inspection Report

Date:	August 9, 2010
KELLCO-MACS Job #:	1004-17
Client:	Ms. Agata Sulczynski Weiss Associates 5801 Christie Avenue Suite 600 Emeryville, CA 94608
Location:	Lawrence Berkeley National Laboratory Building 40 One Cyclotron Road Berkeley, CA 94744
Date of Inspection:	July 19, 2010
Inspectors:	Siew Yee Lee CAC # 09-4546, CDPH Lead # 19509
Description of the Inspected Area:	This is a pre-demolition asbestos and Heavy Metals inspection on building 40 on the campus of University of California, Berkeley. Building 40 is a single story building that is constructed of an exterior wood finish on a concrete foundation. The roofing is comprised of roofing shingles and the flooring is composed of 12 x 12 white floor tiles over concrete.

Background

This is a NESHAP compliant pre-demolition asbestos and metals inspection report for Building 40 located at LBNL in Berkeley, CA.

Synopsis

Asbestos was found in the following materials:

- **Roof penetration mastic: assumed to be asbestos containing material**

  It was visually noted that the exterior paint on the wood finish is in poor condition. Furthermore, the penetration mastic around the duct vent on the roof is assumed to be asbestos containing material.

Designation of material as asbestos containing should be applied to all homogenous material of the type analyzed and found to contain asbestos.

About the Inspection

The inspection performed was both visual and tactile. Samples were taken of suspect materials located at the interior and exterior of the survey area.

The inspection was limited to those materials readily discerned in a reasonable inspection by a competent inspector. Materials that are hidden within walls, behind structures, in vertical shafts or in areas that make them not readily available to our inspector were not sampled. If future work uncovers any non-sampled materials, these should be submitted for asbestos and/or lead paint analysis.

The following numbering convention was used for this inspection:

LETTER	STANDS FOR	EXAMPLE	MEANING
XX	Building DESIGNATION based on information provided on drawings provided to us prior to inspection	B40	Building 40
Y & *Optional Z*	EITHER building SYSTEM (W: wall; F: Flooring; C: Ceiling; T: TSI; M: Misc) OR Further designation of sample location as Unit # within building	SN	Tile/ Mastic Sample
		AW	Asbestos Wall Sample
		AM	Asbestos Miscellaneous
		SC	Concrete Sample
		TSI	Thermal System Insulation
		AR	Asbestos Roofing Sample
xx	Sample number and layer	01	First Sample, First Layer
		01a	First Sample, Second Layer
		01b	First Sample, Third Layer

Asbestos Findings

Asbestos samples were analyzed in the KELLCO-MACS laboratory, by Polarized Light Microscopy, the EPA's recommended method. Copies of the full laboratory reports are attached.

Photographs of sampled materials are included. Sample locations are noted on the attached not-to-scale drawing.

The determination of a material to be Asbestos Containing Material (ACM) was made either by direct sampling or by homogeneity with at least one positive sample of the same material.

Materials that tested **positive** for asbestos are:

- **Roof penetration mastic: assumed to be asbestos containing material**

Materials for which the analytical results show **no detection** of asbestos are:

Lab Sample #	Field Sample #	Field Description
L206589-1	B40-SN01	West end of building by entryway / off white 12x12 floor tile
L206589-2	B40-SN01A	West end of building by entryway / yellow glue
L206589-3	B40-SN02	By partition wall / 12x12 floor tile
L206589-4	B40-SN02A	By partition wall / yellow glue
L206589-5	B40-SN03	Northeast corner of rear of building / 12x12 floor tile
L206589-6	B40-SN03A	Northeast corner of rear of building / yellow glue
L206589-7	B40-AM04	West wall by entryway / brown baseboard
L206589-8	B40-AM04A	West wall by entryway / mastic
L206589-9	B40-AM05	Area 101, south wall / brown baseboard & mastic
L206589-10	B40-AM05A	Area 101, south wall / mastic
L206589-11	B40-AM06	East wall by wooden stairway / brown baseboard
L206589-12	B40-AM06A	East wall by wooden stairway / mastic
L206589-13	B40-AW07	Area 101, southwest corner in front end / wall texture
L206589-14	B40-AW07a	Area 101, southwest corner in front end / drywall joint compound
L206589-15	B40-AW08	Rear end of building, southeast corner / wall texture
L206589-16	B40-AW08a	Rear end of building, southeast corner / drywall joint compound
L206589-17	B40-AW09	Rear end of building, northeast corner / wall texture
L206589-18	B40-AW09a	Rear end of building, northeast corner / drywall joint compound
L206589-19	B40-AW10	Mid-section of building, south wall / wall texture
L206589-20	B40-AW11	Front end of building, northwest corner / wall texture
L206589-21	B40-AM12	Exterior west wall of building / vapor barrier
L206589-22	B40-SC13	Exterior northwest corner of building / concrete
L206589-23	B40-SC14	Exterior southeast corner of building raised foundation / concrete

Lab Sample #	Field Sample #	Field Description
L206589-24	B40-SC15	Exterior southwest corner of building / concrete
L206589-25	B40-AM16	Exterior northeast window / window caulking
L206589-26	B40-AM17	North exterior window / window caulking
L206589-27	B40-TSI18	External pipe run east of building / pipe insulation
L206589-28	B40-AM19	Exterior southeast window / window caulking
L206589-29	B40-TSI20	External pipe run east of building / pipe elbow insulation
L206589-30	B40-TSI21	External pipe run east of building / pipe elbow insulation
L206589-31	B40-AM22	Exterior southeast corner of building, behind wall / vapor barrier
L206589-32	B40-AR23	North end of roof / roofing shingle & felt
L206589-33	B40-AR24	Northwest end of roof / roofing shingle & felt

- ***Metals in Paint Findings***

Five paint samples were collected and submitted for Heavy Metals (CAM 17) analysis to Macs Lab, Inc.

These samples were analyzed using an ICP/MS, Extraction Method SW3050B TTLC and EPA 6010B/3050 method. This method is **not** for the purpose of profiling any waste streams from this project. Profiling of the waste streams (TCLP & STLC) will be the responsibility of the contractor performing the work. The results of the profiling of the waste streams can vary dramatically depending on the means and methods utilized by the contractor during the demolition of the buildings. Care needs to be taken to ensure that all OSHA and EPA rules are abided by. The EPA rules are typically contained within title 22 and the OSHA rules are typically contained within title 8. Please find the following list as guidance; furthermore, it is not intended to be all encompassing but as a starting point for review in regulatory compliance.

Lab Sample #	Field Sample #	Field Description
206587-1	B40-PC1	Exterior west wall/ grey paint chip off wood
206587-2	B40-PC2	Exterior NW wall, NW corner/ grey & brown paint chip off wood
206587-3	B40-PC3	Interior of building/ white paint off concrete
206587-4	B40-PC4	Exterior of building/ white paint off concrete
206587-5	B40-PC5	Wooden walk way, handrail west of bldg/ brown paint off wood

Building 40:

	Lab Sample Number:	206587-1	206587-2	206587-3	206587-4	206587-5
	Client Sample Number:	B40-PC1	B40-PC2	B40-PC3	B40-PC4	B40-PC5
	Matrix:	Bulk	Bulk	Bulk	Bulk	Bulk
	Extraction Type:	Acid	Acid	Acid	Acid	Acid
	Units:	mg/kg (PPM)	mg/kg (PPM)	mg/kg (PPM)	mg/kg (PPM)	mg/kg (PPM)
Sb	Antimony	79.69	815.84	92.11	346.55	114.52
As	Arsenic	2.74	119.83	<0.01	147.30	<0.01
Ba	Barium	320.65	71,087.37	898.41	848.93	755.62
Be	Beryllium	1.02	1.19	1.51	2.41	<0.01
Cd	Cadmium	8.02	350.72	22.66	510.54	26.44
Cr	Chromium	89.92	3,296.67	252.34	3,602.26	153.29
Co	Cobalt	1,181.53	936.52	93.05	123.90	202.88
Cu	Copper	32.06	322.44	159.69	520.20	434.11
Pb	Lead	3,216.19	351,665.62	3,768.01	24,818.07	5,941.10
Hg	Mercury	10.79	11.47	37.64	8.36	19.86
Mo	Molybdenum	24.55	224.92	41.79	112.05	71.78
Ni	Nickel	23.36	423.32	134.62	1,041.28	112.60
Se	Selenium	556.71	7,115.02	5,889.77	5,573.40	9,297.26
Ag	Silver	6.54	17.57	7.42	12.06	9,297.26
Tl	Thallium	82.09	251.19	106.30	112.21	105.21
V	Vanadium	50.56	128.50	86.56	1,652.45	91.37
Zn	Zinc	2,041.44	71,118.79	2,472.26	28,996.24	3,424.66

Regulatory Requirements

The Environmental Protection Agency (EPA) defines Asbestos Containing Material as any material that contains greater than 1% asbestos. Materials containing greater than 1% asbestos must be removed prior to demolition or renovation if they will be disturbed.

Friable asbestos containing material is any material that can be crushed or pulverized by hand pressure when dry, or materials that can be rendered to a crumbled, pulverized, or powdered state when dry by crushing, sanding, sawing, shot blasting, or through demolition or renovation activities.

As stated by NESHAP regulations, any material that contains less than 10% asbestos using the visual estimation method can be point counted with gravimetric reduction. The Point Counting method is a much more accurate analytical method for determining the percent of asbestos in a particular material. If the Point Count method determines that the material contains less than 1% asbestos, the material being analyzed can be disposed of as a non-hazardous asbestos containing construction waste.

Removal or disturbance of material with any detectable amount of asbestos must be handled in accordance with OSHA regulations. Cal-OSHA registration is required if the material contains more than .1% asbestos ($1/10^{th}$ of a percent). If there is more than 100 feet (linear or square) of an asbestos containing material that will be abated or disturbed, a California State registered and licensed asbestos abatement contractor must perform the work. If there is less than 100 feet, the work does not require a licensed asbestos abatement contractor, but must still conform to Cal-OSHA regulations.

Title 8 OSHA

General Industry Safety Orders deal with exposure limits for personnel working in or around surfaces that contain heavy metals.

Element	Chapter	Group	Article	Section
Antimony (Sb)	7	16	107	5155
Arsenic (As)	7	16	110	5214
Barium (Ba)	7	16	107	5155
Beryllium (Be)	7	16	107	5155
Cadmium (Cd)	7	16	110	5206
Chromium (Cr)	7	16	110	5206
Cobalt (Co)	7	16	110	5155
Copper (Cu)	7	16	110	5155
Lead (Pb)	7	16	109	5198
Mercury (Hg)	7	16	110	5155
Molybdenum (Mo)	7	16	110	5155
Nickel (Ni)	7	16	110	5155
Selenium (Se)	7	16	110	5155
Silver (Ag)	7	16	110	5155
Thallium (Ti)	7	16	110	5155
Vanadium (V)	7	16	110	5155

Element	Chapter	Group	Article	Section
Zinc (Zn)	7	16	107	5155

Title 22- Hazardous Waste

Title 22 describes the characterization of hazardous waste as described in chapter 11, article 1, section 66261.1. Under the EPA's Resource Conservation and Recovery Act (RCRA), a national program and inventory system about handling hazardous waste, describes the minimum requirements in order to be in compliance with the Federal and/or State regulations.

Comment Regarding All Asbestos Containing Materials:

Asbestos containing materials in good condition do not necessarily need to be removed unless they will be disturbed; they should however be respected.

Employees, contract workers and others should be advised not to drill, saw, scrape or otherwise disturb this material without taking precautionary measures appropriate to asbestos containing material.

Asbestos containing material should be removed prior to the renovation and must be removed prior to demolition.

Areas Needing Immediate Corrective Action

Asbestos (in any condition) should be removed prior to renovation and must be removed prior to demolition of the survey site.

Analytical Procedures

POLARIZED LIGHT MICROSCOPY (PLM)

Bulk samples were analyzed in accordance with U.S. EPA "Test Method for Determination of Asbestos in Bulk Building Materials, 1993," with inclusion of area percent estimates of the sample components. The use of the McCrone Color Dispersion Staining Technique supplements the analysis when considered useful by the analyst. The samples are prepared with refractive immersion oil and are examined under Polarized Light Microscopy (PLM). The accuracy of the visual estimate method is 1%.

As per the standard "...The accuracy in the determination of the presence or absence of asbestos of greater than 1 area percent asbestos is greater than 99%." ASTM Committee D22.05, 1/18/88, Standard *Method of Testing for Asbestos Containing Materials by Polarized Light Microscopy*. If the sample matrix is reduced to minimize non-asbestos components, the detection limit can be mathematically enhanced, based on the amount of material remaining after matrix reduction. This method is called gravimetric reduction. This method involves ashing and chemical dissolution of the sample.

CAM 17 HEAVY METALS TESTING

CAM 17 Heavy Metals were tested by Macs Lab, Inc. using ICP-MS, Extraction Method SW3050B and Analytical Method 6010B/3050.

KELLCO-MACS Qualifications

KELLCO-MACS is a joint venture offering hazardous materials and AIHA laboratory analyses. Our credentials include:

- The KELLCO-MACS asbestos inspector is licensed with the State of California Department of Occupational Safety and Health (CAL-OSHA).

- The KELLCO-MACS lead inspector is licensed by the California Department of Public Health (CDPH)

- The laboratory accreditations include:

    - **NVLAP PLM** for Asbestos: NIST National Voluntary Laboratory Accreditation Program certificate of accreditation for bulk **asbestos** analysis by polarized light microscopy (Accreditation #101948-1).
    - **AIHA** Accreditation for **Industrial Hygiene** Analytical Laboratory for PCM, and AA for lead (Accreditation #101786).
    - **AIHA Analyst Proficiency (NIOSH PAT)** (Accreditation # 11172)
    - **AIHA ELLAP** Accreditation for Lead: Accreditation for the **Environmental Lead** Laboratory recognized by the EPA as meeting the requirements of the National Lead Laboratory Accreditation Program established under Title X (Lab ID #11109).
    - **ELAP PLM** for Asbestos: California Department of Health Services, Environmental Laboratory Accreditation Program, certificate for bulk asbestos analysis (Certificate #2027)
    - **USDA Soil** permit #39484

The following supporting documents are attached to this report:

- Laboratory analytical reports
- Photographs of sample locations
- Floor plan or sketch showing sample locations

Please call KELLCO if there are any questions and/or clarifications regarding this report. We look forward to working with you in the future.

Sincerely,

KELLCO-MACS

Tim C. Cannard CAC #94-1395, CDPH Lead #764
Senior Project Manager

Asbestos Definitions and Classifications

ACM	(Asbestos Containing Material) - Material containing more than 1% asbestos. ACM must be disposed as hazardous waste. Note: Federal OSHA and Cal-OSHA control materials containing any amount of asbestos.
ACBM	(Asbestos Containing Building Material) – AHERA/ASHARA term for material containing more than 1% asbestos in or on interior structural members or other structural components. Exceptions: Covered walkways, porticos and exterior HVAC TSI.
ACCM	(Asbestos Containing Construction Material) – California term for a manufactured construction material containing greater than .1% (one tenth of one percent) asbestos.
PACM	(Presumed Asbestos Containing Material) OSHA considers all TSI and surfacing materials installed prior to1980 to be ACM unless proven otherwise.
Friable	Asbestos Containing Material that can be crumbled pulverized or reduced to powder by hand pressure when dry.
NOA	Naturally Occurring Asbestos. CARB defines as having >.25% by point counting.

Categories of Asbestos Used BY EPA AHERA/ASHARA and OSHA/Cal-OSHA

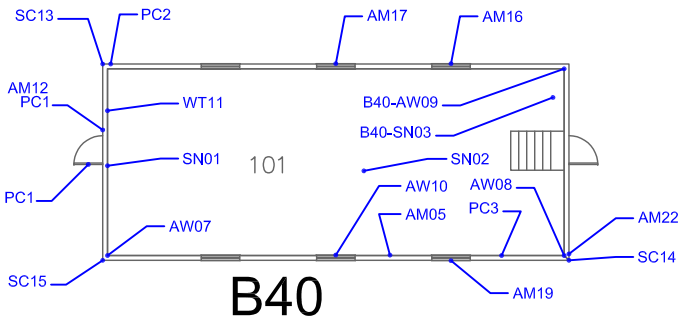
TSI	(Thermal System Insulation) - "Thermal system insulation (TSI)" means ACM applied to pipes, fittings, boilers, breeching, tanks, ducts or other structural components to prevent heat loss or gain. "Thermal system insulation ACM" is thermal system insulation which contains more than 1% asbestos.
SURFACING (usually mixed on site at time of application)	"Surfacing material" means material that is sprayed, troweled-on or otherwise applied to surfaces (such as acoustical plaster on ceilings and fireproofing materials on structural members, or other materials on surfaces for acoustical, fireproofing, and other purposes). "Surfacing ACM" means surfacing material which contains more than 1% asbestos. NOTE: OSHA/Cal-OSHA do not classify taping mud, floor tile mastic, stucco, leveling compound, and hard wall plasters or wall texturing as surfacing.
MISC.	All other ACM, including classify taping mud, floor tile mastic, stucco, leveling compound, and hard wall plasters or wall texturing as surfacing.

NESHAPS Categories for Asbestos (used by Air Quality Management Districts)

Category I	Cat I Non-friable Asbestos Containing Material refers to asbestos containing packing, gaskets, resilient floor covering, Galbestos, and asphalt roofing products containing more than 1% asbestos.
Category II	Cat II Non-friable Asbestos-Containing Material is any material that is not Cat I that contains greater than 1% asbestos.
RACM	"Regulated Asbestos-Containing Material." – Friable asbestos material (ACM) or a Category I non-friable ACM that has become friable OR a 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 reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations. RACM should be removed prior to renovation or demolition.

Characterization of Asbestos Containing Materials

Material	Estimated Quantity	TSI	Surfacing	Misc	RACM	Cat I	Cat II
Roof Penetration Mastic	~ 10 sq. ft.			X		X	



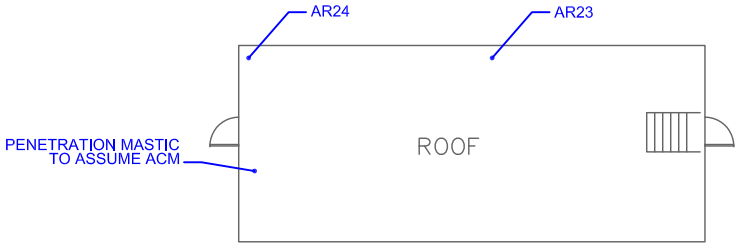
B40

ABBREVIATIONS

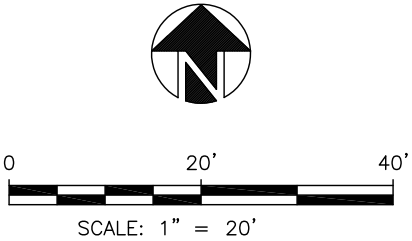
AM	Asbestos miscellaneous
AR	Asbestos roofing sample
AW	Asbestos wall sample
PC	Paint sample
SC	Concrete sample
SN	Tile/mastic sample

NOTE:

All sample locations are approximate



B40



L:\LBNL.178\Old Town Demolition\Sample Location Maps\Kellco Maps\SLM__Kellco_B40.dwg

MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Method: EPA-600/M4-82-020

KELLCO Services
3137 Diablo Ave

Hayward CA 94545

Person to contact: Tim Cannard
Contact phone: 510-786-9751
FAX phone: 510-786-9625
Sampled by: Siew Yee Lee
Sampled on: July 19, 2010
Analyzed on: July 30, 2010 at: 15:19
Corresponding invoice number: 206589

Analyst: JPL (signature)

Laboratory manager: (signature)

Job Number: 1004-17

Job Description: Lawrence Berkeley National Laboratory - Building 40 - One Cyclotron Road, Berkeley, CA 94744

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206589-1	B40-SN01 West end of building by entryway / off white 12x12 floor tile & yellow glue	**N.D.**	< 1% Cellulose	Off-white tile. Balance of sample is unspecified non-fibrous material.
L206589-2	B40-SN01A West end of building by entryway / yellow glue	**N.D.**	< 1% Cellulose	Yellow mastic. Balance of sample is unspecified non-fibrous material.
L206589-3	B40-SN02 By partition wall / 12x12 floor tile & yellow glue	**N.D.**	< 1% Cellulose	Off-white tile. Balance of sample is unspecified non-fibrous material.
L206589-4	B40-SN02A By partition wall / yellow glue	**N.D.**	< 1% Cellulose	Yellow mastic. Balance of sample is unspecified non-fibrous material.
L206589-5	B40-SN03 Northeast corner of rear of building / 12x12 floor tile & yellow glue	**N.D.**	< 1% Cellulose	Off-white tile. Balance of sample is unspecified non-fibrous material.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

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MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206589-6	B40-SN03A Northeast corner of rear of building / yellow glue	**N.D.**	< 1% Cellulose	Yellow mastic. Balance of sample is unspecified non-fibrous material.
L206589-7	B40-AM04 West wall by entryway / brown baseboard & mastic	**N.D.**	< 1% Cellulose	Brown baseboard. Balance of sample is unspecified non-fibrous material.
L206589-8	B40-AM04A West wall by entryway / mastic	**N.D.**	< 1% Cellulose	Brown mastic. Balance of sample is unspecified non-fibrous material.
L206589-9	B40-AM05 Area 101, south wall / brown baseboard & mastic	**N.D.**	No Fibers	Brown baseboard. Balance of sample is unspecified non-fibrous material.
L206589-10	B40-AM05A Area 101, south wall / mastic	**N.D.**	< 1% Cellulose	Brown mastic. Balance of sample is unspecified non-fibrous material.
L206589-11	B40-AM06 East wall by wooden stairway / brown baseboard & mastic	**N.D.**	No Fibers	Brown baseboard. Balance of sample is unspecified non-fibrous material.
L206589-12	B40-AM06A East wall by wooden stairway / mastic	**N.D.**	< 1% Cellulose	Brown mastic. Balance of sample is unspecified non-fibrous material.
L206589-13	B40-AW07 Area 101, southwest corner in front end / wall texture	**N.D.**	< 1% Cellulose	Off-white texture. Balance of sample is unspecified non-fibrous material.
L206589-14	B40-AW07a Area 101, southwest corner in front end / drywall joint compound	**N.D.**	5% Cellulose	Off-white gypsum wallboard and joint compound. Balance of sample is unspecified non-fibrous material.

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Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206589-15	B40-AW08 Rear end of building, southeast corner / wall texture	**N.D.**	< 1% Cellulose	Off-white texture. Balance of sample is unspecified non-fibrous material.
L206589-16	B40-AW08a Rear end of building, southeast corner / drywall joint compound	**N.D.**	5% Cellulose	Off-white gypsum wallboard and joint compound. Balance of sample is unspecified non-fibrous material.
L206589-17	B40-AW09 Rear end of building, northeast corner / wall texture	**N.D.**	< 1% Cellulose	Off-white texture. Balance of sample is unspecified non-fibrous material.
L206589-18	B40-AW09a Rear end of building, northeast corner / drywall joint compound	**N.D.**	5% Cellulose	Off-white gypsum wallboard and joint compound. Balance of sample is unspecified non-fibrous material.
L206589-19	B40-AW10 Mid-section of building, south wall / wall texture	**N.D.**	No Fibers	Off-white texture. Balance of sample is unspecified non-fibrous material.
L206589-20	B40-AW11 Front end of building, northwest corner / wall texture	**N.D.**	No Fibers	Off-white texture. Balance of sample is unspecified non-fibrous material.
L206589-21	B40-AM12 Exterior west wall of building / vapor barrier	**N.D.**	75% Cellulose	Brown vapor barrier. Balance of sample is organic binders and unspecified non-fibrous material.
L206589-22	B40-SC13 Exterior northwest corner of building / concrete	**N.D.**	No Fibers	Gray concrete. Balance of sample is unspecified non-fibrous material.
L206589-23	B40-SC14 Exterior southeast corner of building raised foundation / concrete	**N.D.**	No Fibers	Gray concrete. Balance of sample is unspecified non-fibrous material.

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MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206589-24	B40-SC15 Exterior southwest corner of building / concrete	**N.D.**	No Fibers	Gray concrete. Balance of sample is unspecified non-fibrous material.
L206589-25	B40-AM16 Exterior northeast window / window caulking	**N.D.**	No Fibers	Gray caulking. Balance of sample is unspecified non-fibrous material.
L206589-26	B40-AM17 North exterior window / window caulking	**N.D.**	No Fibers	Gray caulking. Balance of sample is unspecified non-fibrous material.
L206589-27	B40-TSI18 External pipe run east of building / pipe insulation	**N.D.**	No Fibers	Black insulation. Balance of sample is unspecified non-fibrous material.
L206589-28	B40-AM19 Exterior southeast window / window caulking	**N.D.**	No Fibers	Gray caulking. Balance of sample is unspecified non-fibrous material.
L206589-29	B40-TSI20 External pipe run east of building / pipe elbow insulation	**N.D.**	No Fibers	Black insulation. Balance of sample is unspecified non-fibrous material.
L206589-30	B40-TSI21 External pipe run east of building / pipe elbow insulation	**N.D.**	No Fibers	Black insulation. Balance of sample is unspecified non-fibrous material.
L206589-31	B40-AM22 Exterior southeast corner of building, behind wall / vapor barrier	**N.D.**	75%Cellulose	Brown vapor barrier. Balance of sample is organic binders and unspecified non-fibrous material.
L206589-32	B40-AR23 North end of roof / roofing shingle & felt	**N.D.**	20%Cellulose	Black roofing material. Balance of sample is organic binders and unspecified non-fibrous material.

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3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206589-33	B40-AR24 Northwest end of roof / roofing shingle & felt	**N.D.**	20% Cellulose	Black roofing material. Balance of sample is organic binders and unspecified non-fibrous material.

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MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

QA Report

Method: EPA-600/M

KELLCO Services
3137 Diablo Ave

Hayward CA 94545

Laboratory manager: _____ (signature)

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
Blank sample		**N.D.**	No fibers	
		PC*		
L206589-33	B40-AR24	**N.D.**	20%Cellulose	Roofing material. Balance of sample is organic binders and unspecified non-fibrous material.
Northwest end of roof / roofing shingle & felt				

End of report.

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NVLAP Lab Code 101948-0

CLIENT	JOBSITE
Weiss Associates 5801 Christie Avenue 600 Emeryville CA 94608	Lawrence Berkeley National Laboratory One Cyclotron Road Bldg 40 Berkeley CA 94744

KELLCO-MACS JOB#: **1004-17** LAB LOGIN # L206589

COLLECTED BY: Siew Yee Lee

COLLECTED DATE 7/19/2010

TURN AROUND TIME: 4 8 24 48 5-DAY

RESULTS NEEDED BY

CIRCLE TYPE OF BULK ANALYSIS

PLM LEAD PAINT LEAD WIPE NON VIABLE MOLD VIABLE MOLD eCOLI OTHER

SAMPLES REC'D _____ ANALYZE TO FIRST POSITIVE YES NO

REPORT RESULTS TO PROJECT MANAGER: Tim Cannard

NOTES & COMMENTS:

CHAIN OF CUSTODY & SAMPLE SUBMITAL FORM PAGE 1 OF 2

KELLCO-MACS JOB#: **1004-17**
Lawrence Berkeley National Laboratory

FIELD NUMBER	LOCATION (bldg, rm#, area)	COLOR	MATERIAL or SUBSTRATE (ft w/ size, mastic, tjc, etc.)	NOTES: Like condition, damage, quantity, inside what, beneath what? direction in building (N,S,E,W) etc.)
B40-SN01	West end of Bldg By entryway	Off white	12x12 floor tile & yellow glue.	
-SN02	By partition wall			
-SN03	NE corner of rear of Bldg			
-AM04	West wall By entryway	Brown	Baseboard & mastic	
-AM05	Area 101, South wall			
-AM06	East wall By wooden stairway			
-AW07	Area 101, SW corner in front end		wall texture	
-AW07a			drywall joint compound	
-AW08	Rear end of Bldg, SE corner		wall texture	
-AW8a			drywall joint compound	

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
[illegible]	7/26/2010	1015	D.K. [illegible]	07/26/10	10:15

CLIENT	JOBSITE
Weiss Associates 5801 Christie Avenue 600 Emeryville CA 94608	Lawrence Berkeley National Laboratory One Cyclotron Road Bldg 40 Berkeley CA 94744

KELLCO-MACS JOB#: **1004-17** LAB LOGIN # L206589

COLLECTED BY: Siew Yee Lee

COLLECTED DATE 7/19/2010

TURN AROUND TIME: 4 8 24 48 5-DAY

RESULTS NEEDED BY

CIRCLE TYPE OF BULK ANALYSIS

PLM **LEAD PAINT** **LEAD WIPE** **NON VIABLE MOLD** **VIABLE MOLD** **eCOLI** **OTHER**

SAMPLES REC'D _____ ANALYZE TO FIRST POSITIVE YES NO

REPORT RESULTS TO PROJECT MANAGER: Tim Cannard

NOTES & COMMENTS:

CHAIN OF CUSTODY & SAMPLE SUBMITAL FORM PAGE 2 OF 3

KELLCO-MACS JOB#: **1004-17**
Lawrence Berkeley National Laboratory

FIELD NUMBER	LOCATION (bldg, rm#, area)	COLOR	MATERIAL or SUBSTRATE (ft w/ size, mastic, tjc, etc.)	NOTES: Like condition, damage, quantity, inside what, beneath what? direction in building (N,S,E,W) etc.)
B40 - AW09	Rear end of Bldg, NE corner		wall texture	
- AW9a	|		drywall joint compound	
- AW10	mid-section of Bldg, south wall		wall texture	
- AW11	Front end of Bldg, NW corner		|	
- AW12	exterior west wall of Bldg,		vapor Barrier.	
- SC13	Exterior NW corner of Bldg		concrete.	
- SC14	Exterior SE corner of Bldg raised foundation		|	
- SC15	Exterior SW corner of Bldg		|	
- AW16	Exterior NE window		window caulking	

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
[illegible]	7/21/2010	1015.	A. Kahler	07/26/10	10:15

L206589

CHAIN OF CUSTODY & SAMPLE SUBMITAL FORM PAGE 3 OF 3 Bldg 40

KELLCO-MACS JOB#: **1004-17**
Lawrence Berkeley National Laboratory

FIELD NUMBER	LOCATION (bldg, rm#, area)	COLOR	MATERIAL or SUBSTRATE (ft w/ size, mastic, tjc, etc.)	NOTES: Like condition, damage, quantity, inside what, beneath what? direction in building (N,S,E,W) etc.)
B40-AM17	North exterior window		window caulking	
-TSI18	External pipe run east of Bldg		pipe insulation.	
-AM19	Exterior SE window		window caulking	
-TSI20	External pipe run east of Bldg		pipe elbow insulation	
-TSI21				
-AM22	Exterior SE corner of Bldg, behind wall		vapor barrier	
-AR23	North end of roof		roofing shingle & felt	
-AR24	NW end of roof			

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
[illegible]	7/26/2010	1015.	D.K. [illegible]	07/26/10	10:15

MACS Lab Incorporated
Analytical and Environmental Services
3137 Diablo Avenue, Hayward, Ca 94545-2701
(510) 786-9751 * (510) 786-9625 Fax * www.macslab.com

CAM-17 Bulk Materials Analysis Report - Method: EPA 6010B/3050

KELLCO Services
3137 Diablo Avenue
Hayward, CA 94545

Contact: Tim Cannard
Phone: (510) 786-9751
Email: mailbox3137@kellcomacs.com
Job #: 1004-17

Laboratory Number: 206587
Sampled By: Siew Yee Lee
Sampled On: July 19, 2010
Submitted On: July 21, 2010
Analyzed On: August 4, 2010
Reported On: August 5, 2010
SOP: CAM17
Sample Type: Bulk

Job Description: lawrence Berkeley National Lab-Building 40-One Cyclotrol Road, Berkeley, CA

	Lab Sample Number:	206587 -1	206587 -2	206587 -3	206587 -4	206587 -5
	Client Sample Number:	B40-PC1	B40-PC2	B40-PC3	B40-PC4	B40-PC5
	Matrix:	Bulk	Bulk	Bulk	Bulk	Bulk
	Extraction Type:	Acid	Acid	Acid	Acid	Acid
	Units:	mg/kg (PPM)	mg/kg (PPM)	mg/kg (PPM)	mg/kg (PPM)	mg/kg (PPM)
Sb	Antimony	79.69	815.84	92.11	346.55	114.52
As	Arsenic	2.74	119.83	<0.01	147.30	<0.01
Ba	Barium	320.65	71,087.37	898.41	848.93	755.62
Be	Beryllium	1.02	1.19	1.51	2.41	<0.01
Cd	Cadmium	8.02	350.72	22.66	510.54	26.44
Cr	Chromium	89.92	3,296.67	252.34	3,602.26	153.29
Co	Cobalt	1,181.53	936.52	93.05	123.90	202.88
Cu	Copper	32.06	322.44	159.69	520.20	434.11
Pb	Lead	3,216.19	351,665.62	3,768.01	24,818.07	5,941.10
Hg	Mercury	10.79	11.47	37.64	8.36	19.86
Mo	Molybdenum	24.55	224.92	41.79	112.05	71.78
Ni	Nickel	23.36	423.32	134.62	1,041.28	112.60
Se	Selenium	556.71	7,115.02	5,889.77	5,573.40	9,297.26
Ag	Silver	6.54	17.57	7.42	12.06	9,297.26
Tl	Thallium	82.09	251.19	106.30	112.21	105.21
V	Vanadium	50.56	128.50	86.56	1,652.45	91.37
Zn	Zinc	2,041.44	71,118.79	2,472.26	28,996.24	3,424.66

Analyst: _____ (Signature)

Laboratory Manager: _____ (Signature)

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KELLCO-MACS JOB#: **1004-17** LAB LOGIN # I 206587

COLLECTED BY: Siew Yee Lee

COLLECTED DATE 7/19/2010

TURN AROUND TIME: 4 8 24 48 5-DAY

RESULTS NEEDED BY

CIRCLE TYPE OF BULK ANALYSIS

PLM **LEAD PAINT** **LEAD WIPE** **NON VIABLE MOLD** **VIABLE MOLD** **eCOLI** **OTHER** CAM 17

SAMPLES REC'D _____ ANALYZE TO FIRST POSITIVE YES NO

REPORT RESULTS TO PROJECT MANAGER: Tim Cannard

NOTES & COMMENTS:

CHAIN OF CUSTODY & SAMPLE SUBMITAL FORM PAGE____ OF ____

KELLCO-MACS JOB#: **1004-17**
Lawrence Berkeley National Laboratory

FIELD NUMBER	LOCATION (bldg, rm#, area)	COLOR	MATERIAL or SUBSTRATE (ft w/ size, mastic, tjc, etc.)	NOTES: Like condition, damage, quantity, inside what, beneath what? direction in building (N,S,E,W) etc.)
B40-PC1	Exterior west wall	Grey	paint chip off wood.	
-PC2	Exterior N wall, NW corner	Grey & Brown	" "	
-PC3	Interior of Bldg	White	" " off concrete	
-PC4	Exterior ~~side~~ concrete wall	White	" " " "	
-PC5.	Wooden walk way handrail west of Bldg	Brown	" " off wood	

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
[illegible]	7/20/2010	1100	[illegible]	07/26/10	1100

PHOTOGRAPHS

Photographs containing no sample identification number are included for reference of the general sample locations.

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http://www.kellcomacs.com email: mailbox3137@kellcomacs.com

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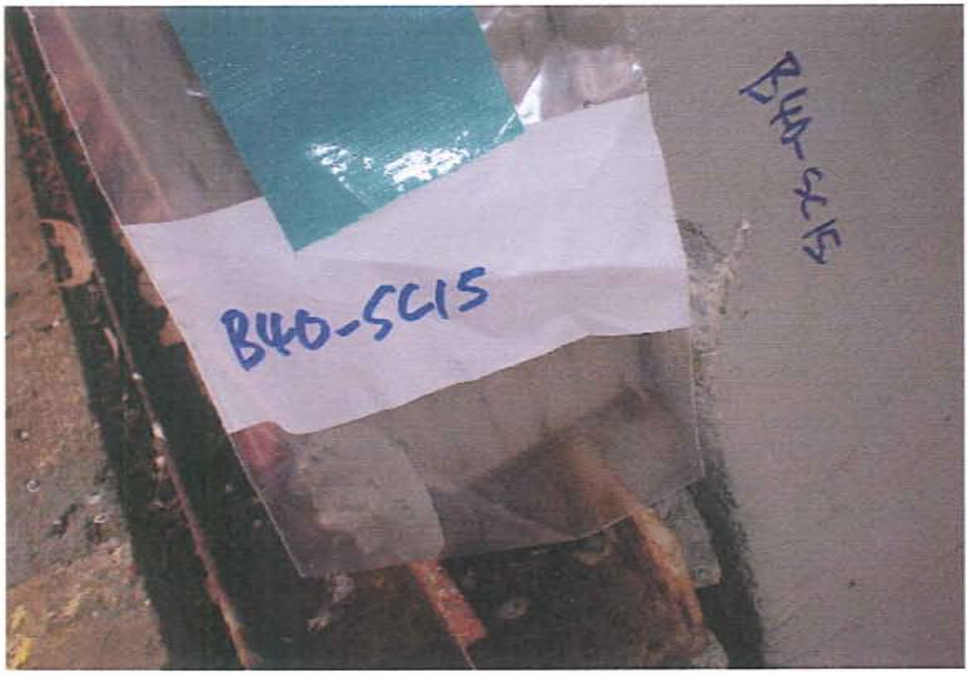
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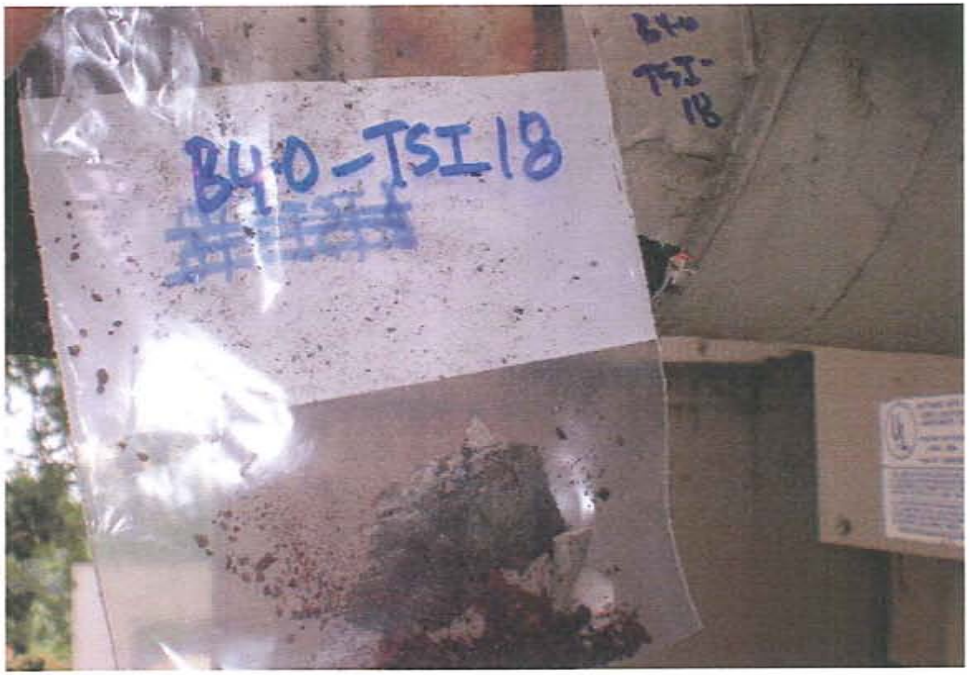
B40-SC15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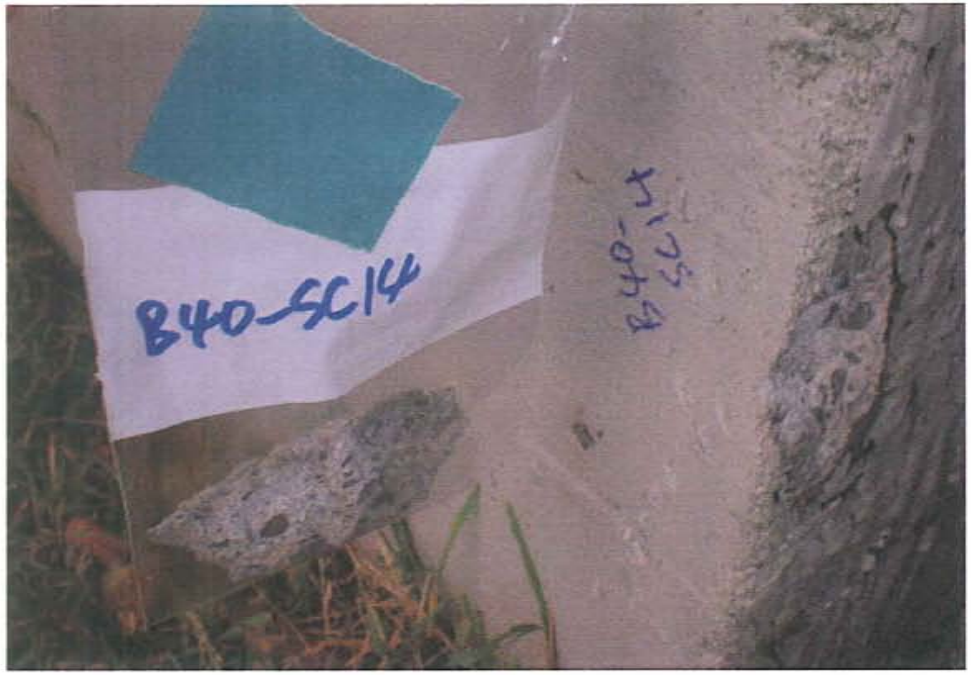
B40 TSI-18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B40-SC14

B40-AM19

B40-TSI21

B40-SL13

B40-TSI20

B40-AM12
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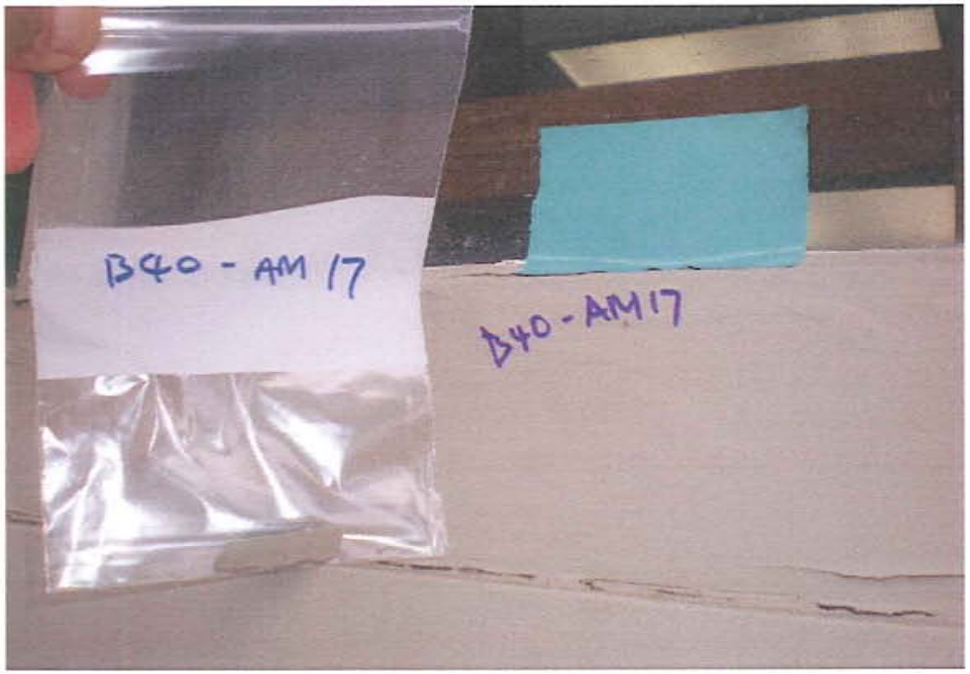
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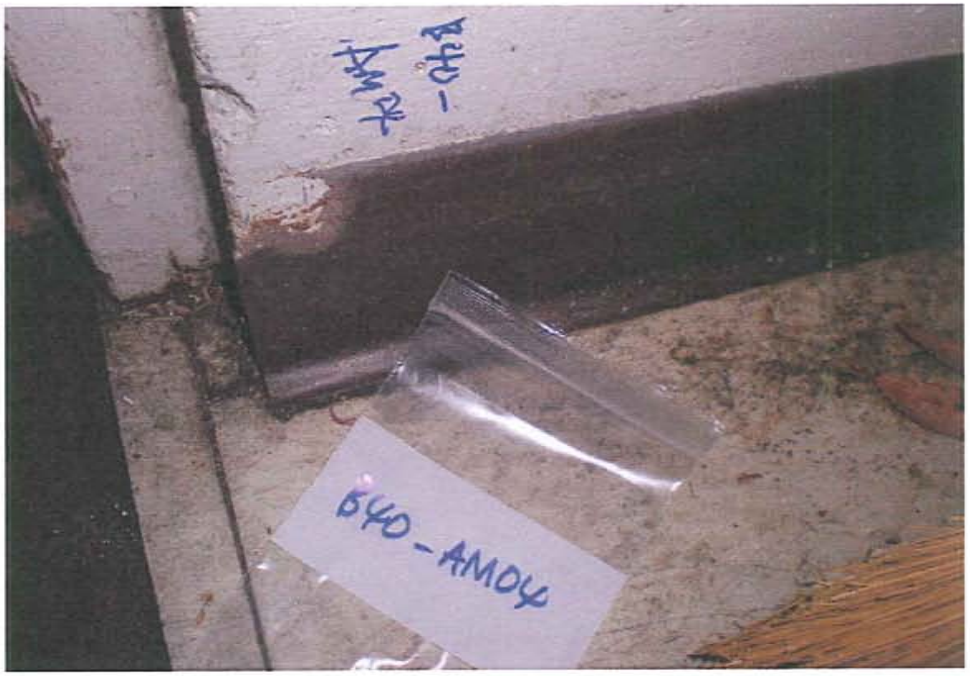
B40-AM17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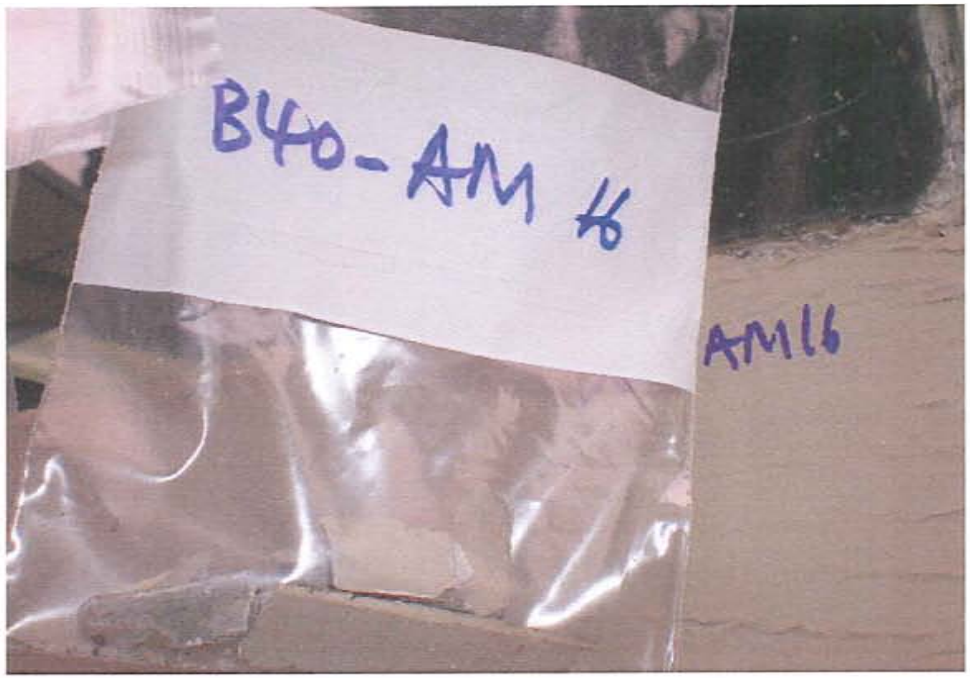
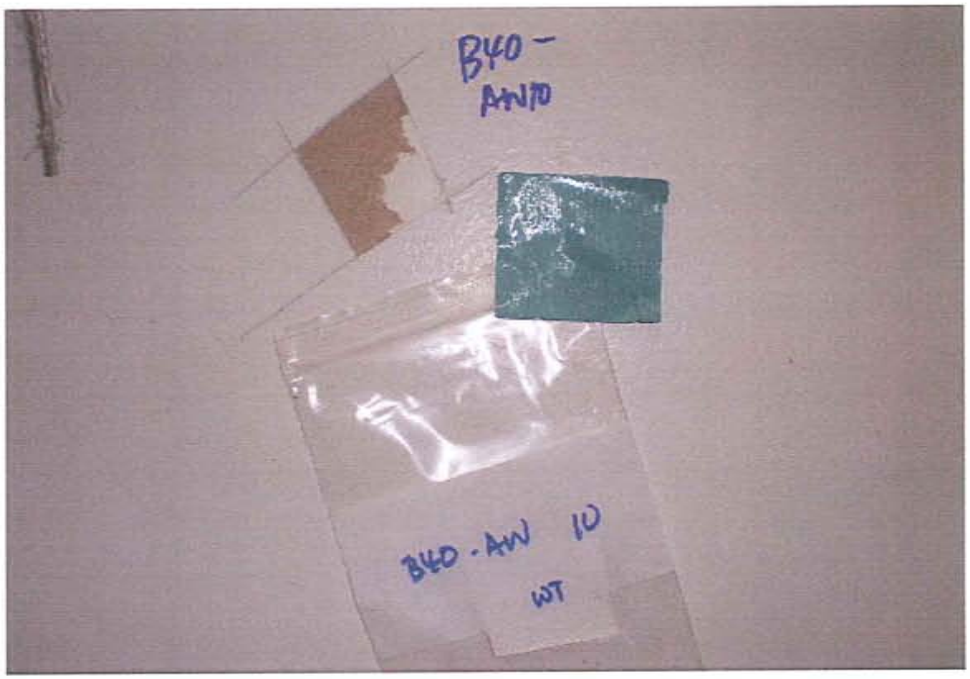

B40-AM 16
AM16

B40-AW11
WT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AW10
B40-AW 10
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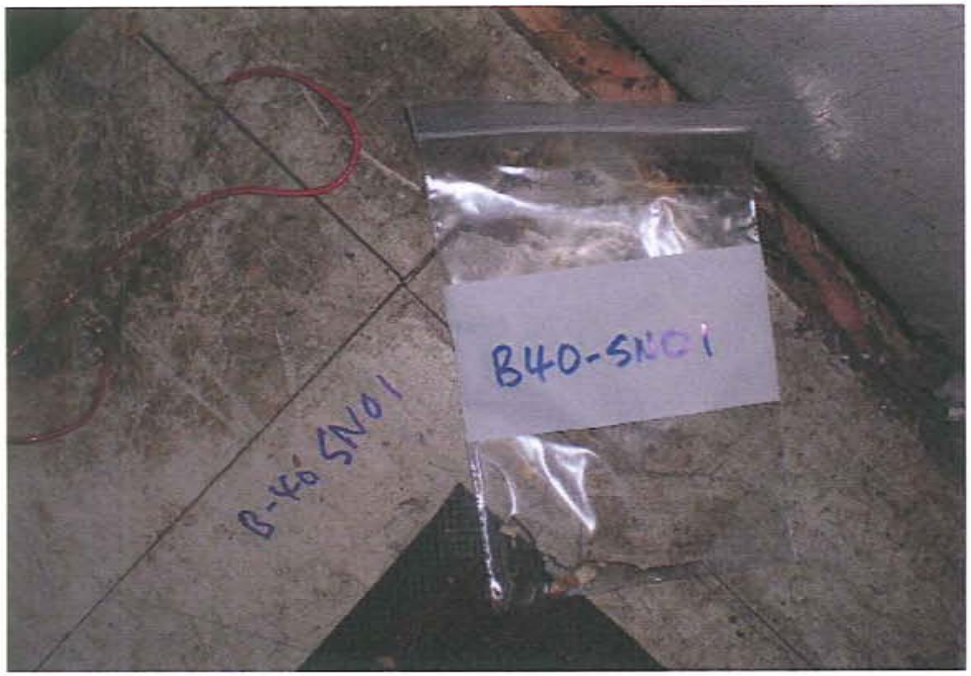
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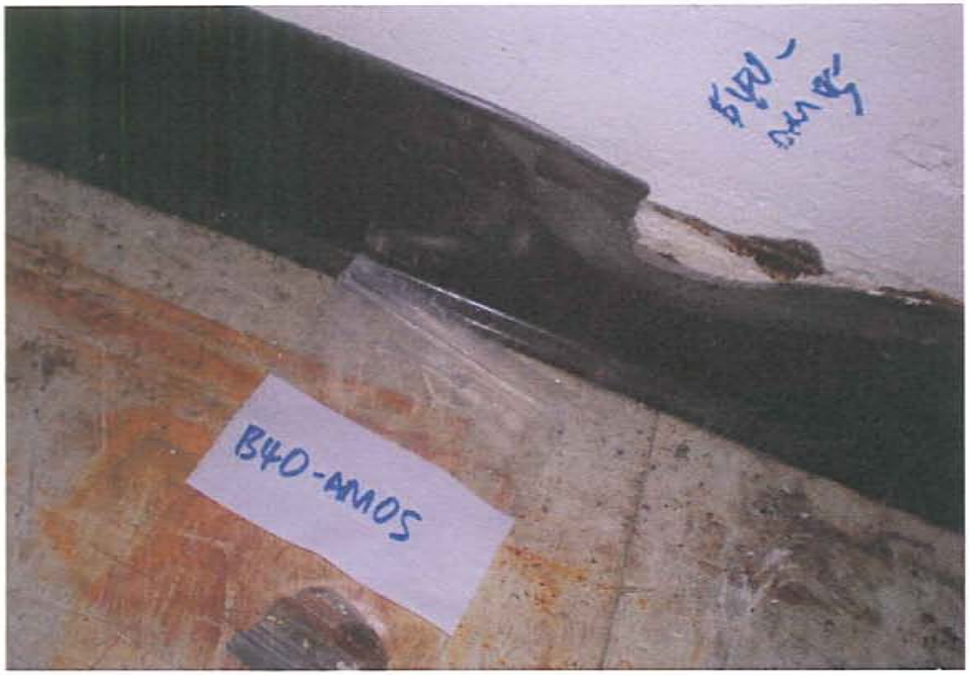
B-40 SN01

B40-
AW07
B0-AW07

B40-AM06

50 60 70 80
Honeywell
HEAT PUMP THERMOSTAT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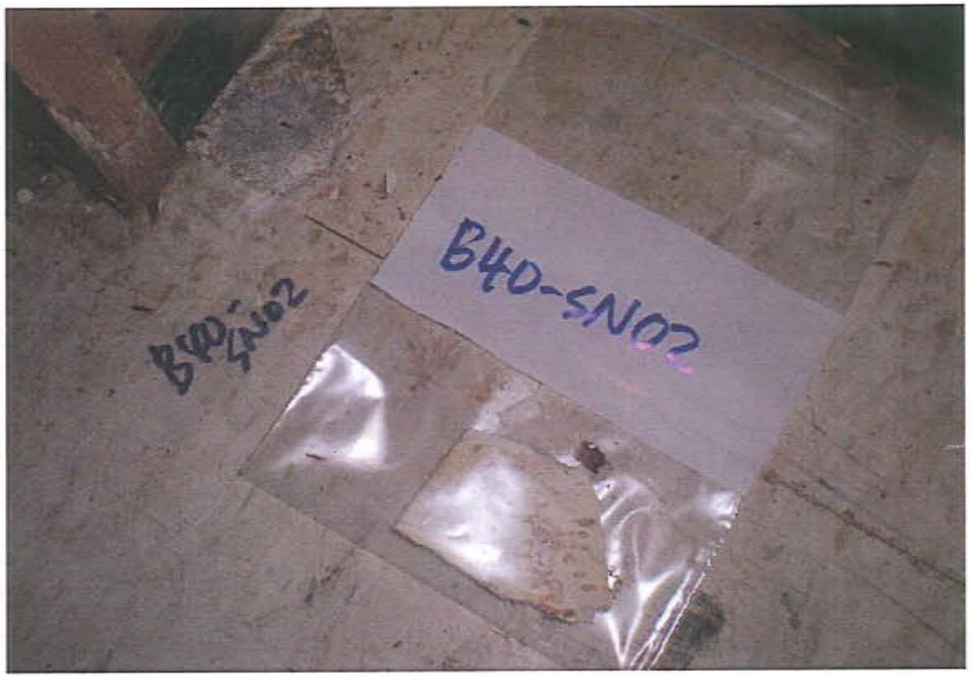
B40-AM08

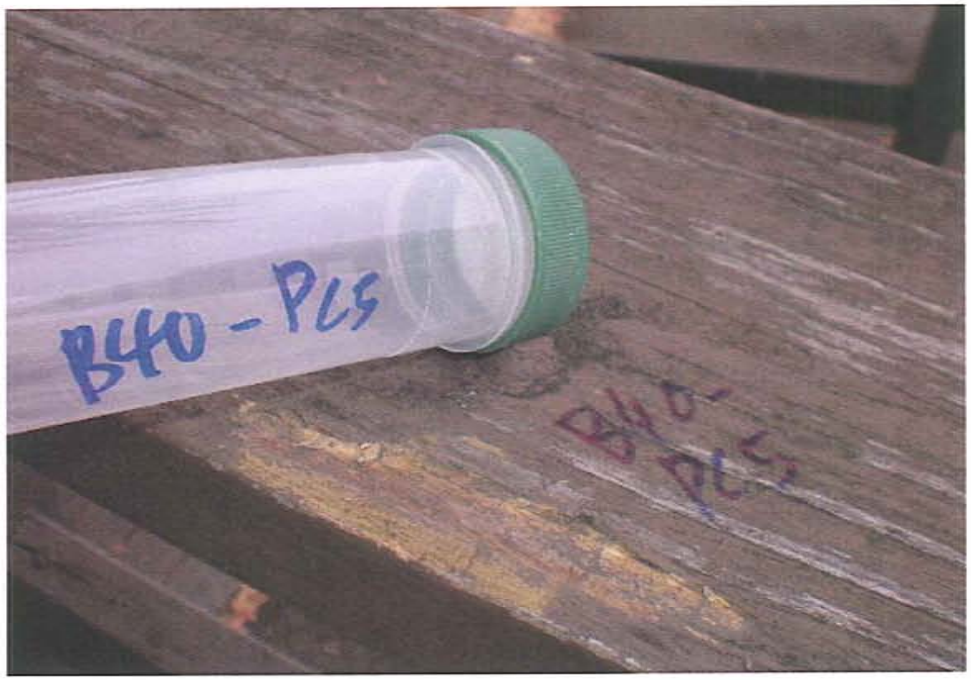

B40-SN02
B40-SN02

B40
02

B40-AM 22

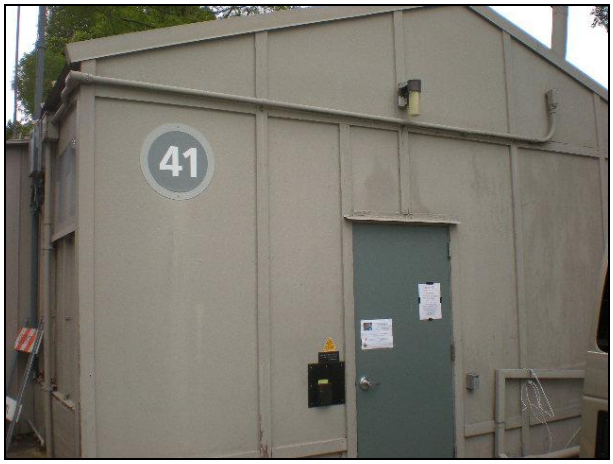
B40-AR31
B40-
AR31

B40-PC4
B40
PC4


B40-PC5
B40-
PC5

A Creative Joint Venture For Better Environmental Solutions

Lawrence Berkeley National Laboratory
Building 41
One Cyclotron Road
Berkeley, CA 94744



KELLCO-MACS Job #1004-17

Pre-Demolition NESHAP Compliant
Asbestos and Metals in Paint Inspection Report

for

Weiss Associates
5801 Christie Avenue
Suite 600
Emeryville, CA 94608

August 10, 2010

3137 Diablo Avenue • Hayward, CA 94545-2701• (510) 786-9751 • fax (510) 786-9625
http://www.kellcomacs.com email: mailbox3137@kellcomacs.com

A Creative Joint Venture For Better Environmental Solutions

Pre-Demolition NESHAP Compliant
Asbestos and Metals in Paint Inspection Report

Date:	August 10, 2010
KELLCO-MACS Job #:	1004-17
Client:	Ms. Agata Sulczynski Weiss Associates 5801 Christie Avenue Suite 600 Emeryville, CA 94608
Location:	Lawrence Berkeley National Laboratory Building 41 One Cyclotron Road Berkeley, CA 94744
Date of Inspection:	July 12 & 20, 2010 & August 4, 2010
Inspectors:	Siew Yee Lee CAC # 09-4546, CDPH Lead # 19509
Description of ohe Inspected Area:	This is an asbestos and Heavy Metals inspection on a building 41 on the University of California, Berkeley campus in Berkeley, CA. Building 41 is a single story multi-unit facility constructed of exterior metal wall panels on a concrete raised foundation. The roofing consists of metal sheeting and there are also multiple flooring materials throughout the building.

Background

This is an pre-demolition NESHAP compliant asbestos metals inspection report for Building 41 located at LBNL in Berkeley, CA.

Synopsis

Asbestos was found in the following materials:

- 12 x 12 white floor tile and mastic
- 12 x 12 brown floor tile and mastic
- HVAC Duct Joint Compound

Designation of material as asbestos containing should be applied to all homogenous materials should be considered asbestos.

About the Inspection

The inspection performed was both visual and tactile. Samples were taken of suspect materials located at the interior and exterior of the survey area.

The inspection was limited to those materials readily discerned in a reasonable inspection by a competent inspector. Materials that are hidden within walls, behind structures, in vertical shafts or in areas that make them not readily available to our inspector were not sampled. If future work uncovers any non-sampled materials, these should be submitted for asbestos and/or lead paint analysis.

The following numbering convention was used for this inspection:

LETTER	STANDS FOR	EXAMPLE	MEANING
XX	Building DESIGNATION based on information provided on drawings provided to us prior to inspection	B41	Building 41
Y & *Optional Z*	EITHER building SYSTEM (W: wall; F: Flooring; C: Ceiling; T: TSI; M: Misc) OR Further designation of sample location as Unit # within building	AC SN AM AW SC	Asbestos Ceiling Sample Tile/Mastic Sample Asbestos Miscellaneous Asbestos Wall Sample Concrete Sample
xx	Sample number and layer	01 01a 01b	First Sample, First Layer First Sample, Second Layer First Sample, Third Layer

- ***Asbestos Findings***

Asbestos samples were analyzed in the KELLCO-MACS laboratory, by Polarized Light Microscopy, the EPA's recommended method. Copies of the full laboratory reports are attached.

Photographs of sampled materials are included. Sample locations are noted on the attached not-to-scale drawing.

The determination of a material to be Asbestos Containing Material (ACM) was made either by direct sampling or by homogeneity with at least one positive sample of the same material.

Materials that tested **positive** for asbestos are:

Lab sample #	Field Sample #	Field Description	Asbestos %
L206351-2	B41-SN01a	Room 101, west end by entryway floor tile mastic	4% Chrysotile
L206351-4	B41-SN02a	Room 101, southeast corner behind southeast door floor tile mastic	4% Chrysotile
L206351-9	B41-SN05	Room 102, southwest corner by door frame / brown 12x12 floor tile	< 1% Chrysotile
L206351-10	B41-SN05a	Room 102, southwest corner by door frame floor tile mastic	4% Chrysotile
L206351-12	B41-SN06a	Room 102, center of room by table / floor tile mastic	4% Chrysotile
L206351-13	B41-SN07	Room 102, northeast side of room brown 12x12 floor tile	< 1% Chrysotile
L206351-14	B41-SN07a	Room 102, northeast side of room floor tile mastic	4% Chrysotile
L206351-29	B41-SN15a	Room 104, west wall, southwest end floor tile mastic	4% Chrysotile
L206351-43	B41-AM27	Unit AHU 1 41, air exchange unit / duct joint compound	2% Chrysotile
L206351-51	B41-AM35	Water heater closet / duct joint compound	3% Chrysotile

Samples with less than 10% asbestos can be submitted for further analysis by the Point Count method. If the Point Count method determines that the material contains less than 1% asbestos, these materials can be disposed of as non-hazardous asbestos containing construction waste.

Materials for which the analytical results show **no detection** of asbestos are:

Lab Sample #	Field Sample #	Field Description
L206956-1	B41-AC36	Area 101, southwest end of ceiling / ceiling insulation
L206351-1	B41-SN01	Room 101, west end by entryway / white 12x12 floor tile & mastic
L206351-3	B41-SN02	Room 101, southeast corner behind southeast door / white 12x12 floor tile mastic
L206351-5	B41-AM03	Room 101, west end by entry wall / black baseboard mastic
L206351-6	B41-AM03a	Room 101, west end by entry wall / black baseboard & brown mastic
L206351-7	B41-AW04	Room 101, southeast corner / wall texture

Lab Sample #	Field Sample #	Field Description
L206351-8	B41-AW04a	Room 101, southeast corner / drywall joint compound
L206351-11	B41-SN06	Room 102, center of room by table / brown 12x12 floor tile
L206351-15	B41-AW08	Room 102, southwest corner / wall texture
L206351-16	B41-AW08a	Room 102, southwest corner / drywall joint compound
L206351-17	B41-AM09	Room 102, southwest corner / black baseboard
L206351-18	B41-AM09a	Room 102, southwest corner / baseboard mastic
L206351-19	B41-AW10	Room 104, east middle wall / wall texture
L206351-20	B41-AM11	Room 103, west end by doorway / beige vinyl floor sheeting
L206351-21	B41-AM11a	Room 103, west end by doorway / vinyl floor glue
L206351-22	B41-AM12	Room 103, east side by sink end / beige vinyl floor sheeting
L206351-23	B41-AM12a	Room 103, east side by sink end / vinyl floor glue
L206351-24	B41-AM13	Room 103, south end / beige vinyl floor sheeting
L206351-25	B41-AM13a	Room 103, south end / vinyl floor glue
L206351-26	B41-AW14	Room 103, southwest end / wall texture
L206351-27	B41-AW14a	Room 103, southwest end / drywall joint compound
L206351-28	B41-SN15	Room 104, west wall, southwest end / white 12x12 floor tile
L206351-30	B41-AW16	Room 104, north wall by air exhaust / wall texture
L206351-31	B41-AW16a	Room 104, north wall by air exhaust / drywall joint compound
L206351-32	B41-AM17	Room 102, ceiling / 2x4 suspended ceiling tile
L206351-33	B41-AM18	Room 102, ceiling / 2x4 suspended ceiling tile
L206351-34	B41-AM19	Room 102, ceiling / 2x4 suspended ceiling tile
L206351-35	B41-AM20	Room 104, west end of ceiling toward door / 2x4 suspended ceiling tile
L206351-36	B41-AM21	Room 104, south lower wall / baseboard
L206351-37	B41-AM21a	Room 104, south lower wall / baseboard mastic
L206351-38	B41-AM22	Unit AHU 1 41, external air exchange / duct joint compound
L206351-39	B41-AM23	Unit AHU 1 41, external air exhange / duct, tape & joint compound
L206351-40	B41-AM24	Unit AHU 2 41, external air exchange / duct, tape & joint compound
L206351-41	B41-AM25	Unit AHU 2 41, air exchange unit / duct insulation
L206351-42	B41-AM26	Unit AHU 2 41, air exhange unit / duct joint compound
L206351-44	B41-AM28	Unit AHU 1 41, air exchange unit / expansion joint
L206351-45	B41-SC29	Exterior, northwest lower wall of building / concrete
L206351-46	B41-SC30	AUH 1 41 platform northwest corner / concrete
L206351-47	B41-SC31	Exterior southeast corner of building / concrete

Lab Sample #	Field Sample #	Field Description
L206351-48	B41-AM32	Exterior northwest wall of building (by AHU 2 41) / paint/coating
L206351-49	B41-AM33	Exterior southeast corner of building, south wall / metal panel sealant
L206351-50	B41-AM34	Exterior north wall of building, northwest end / metal panel sealant

- ***Metals in Paint Findings***

Three paint samples were collected and submitted for Heavy Metals (CAM 17) analysis to Macs Lab, Inc.

These samples were analyzed using an ICP/MS, Extraction Method SW3050B TTLC and EPA 6010B/3050 method. This method is **not** for the purpose of profiling any waste streams from this project. Profiling of the waste streams (TCLP & STLC) will be the responsibility of the contractor performing the work. The results of the profiling of the waste streams can vary dramatically depending on the means and methods utilized by the contractor during the demolition of the buildings. Care needs to be taken to ensure that all OSHA and EPA rules are abided by. The EPA rules are typically contained within title 22 and the OSHA rules are typically contained within title 8. Please find the following list as guidance; furthermore, it is not intended to be all encompassing but as a starting point for review in regulatory compliance.

Lab Sample #	Field Sample	Field Description
206484-1	B41-PC1	Exterior of Building/ Paint Chip Composite of Metal and Wood
206484-2	B41-PC2	Exterior of Building/ Paint Chip Composite
206534-1	B41-PC01	Roof/ Paint Chip/ Coating

Building 41:

	Lab Sample Number:	206484 -1	206484 -2
	Client Sample Number:	B41-PC1	B41-PC2
	Matrix:	Bulk	Bulk
	Extraction Type:	Acid	Acid
	Units:	mg/kg (PPM)	mg/kg (PPM)
Sb	Antimony	597.87	577.68
As	Arsenic	208.68	78.01
Ba	Barium	14,737.24	7,898.81
Be	Beryllium	1.26	1.34
Cd	Cadmium	478.67	428.27
Cr	Chromium	4,596.34	2,912.50
Co	Cobalt	310.59	155.77
Cu	Copper	358.38	784.52
Pb	Lead	883,472.96	794,940.48
Hg	Mercury	26.66	9.40
Mo	Molybdenum	188.42	214.67
Ni	Nickel	132.79	215.83
Se	Selenium	7,197.26	9,208.33
Ag	Silver	8.45	14.49
Tl	Thallium	470.30	777.68
V	Vanadium	148.25	138.99
Zn	Zinc	74,333.59	62,886.90

Building 41:

	Lab Sample Number:	206534 -1
	Client Sample Number:	B41-PC01
	Matrix:	Bulk
	Extraction Type:	Acid
	Units:	mg/kg (PPM)
Sb	Antimony	439.54
As	Arsenic	117.44
Ba	Barium	9,753.88
Be	Beryllium	1.77
Cd	Cadmium	208.51
Cr	Chromium	9,309.79
Co	Cobalt	130.79
Cu	Copper	583.73
Pb	Lead	485,018.73
Hg	Mercury	25.07
Mo	Molybdenum	130.95
Ni	Nickel	171.62
Se	Selenium	6,254.68
Ag	Silver	12.20
Tl	Thallium	292.67
V	Vanadium	180.98
Zn	Zinc	50,989.83

Regulatory Requirements

The Environmental Protection Agency (EPA) defines Asbestos Containing Material as any material that contains greater than 1% asbestos. Materials containing greater than 1% asbestos must be removed prior to demolition or renovation if they will be disturbed.

Friable asbestos containing material is any material that can be crushed or pulverized by hand pressure when dry, or materials that can be rendered to a crumbled, pulverized, or powdered state when dry by crushing, sanding, sawing, shot blasting, or through demolition or renovation activities.

As stated by NESHAP regulations, any material that contains less than 10% asbestos using the visual estimation method can be point counted with gravimetric reduction. The Point Counting method is a much more accurate analytical method for determining the percent of asbestos in a particular material. If the Point Count method determines that the material contains less than 1% asbestos, the material being analyzed can be disposed of as a non-hazardous asbestos containing construction waste.

Removal or disturbance of material with any detectable amount of asbestos must be handled in accordance with OSHA regulations. Cal-OSHA registration is required if the material contains more than .1% asbestos (1/10th of a percent). If there is more than 100 feet (linear or square) of an asbestos containing material that will be abated or disturbed, a California State registered and licensed asbestos abatement contractor must perform the work. If there is less than 100 feet, the work does not require a licensed asbestos abatement contractor, but must still conform to Cal-OSHA regulations.

Title 8 OSHA

General Industry Safety Orders deal with exposure limits for personnel working in or around surfaces that contain heavy metals.

Element	Chapter	Group	Article	Section
Antimony (Sb)	7	16	107	5155
Arsenic (As)	7	16	110	5214
Barium (Ba)	7	16	107	5155
Beryllium (Be)	7	16	107	5155
Cadmium (Cd)	7	16	110	5206
Chromium (Cr)	7	16	110	5206
Cobalt (Co)	7	16	110	5155
Copper (Cu)	7	16	110	5155
Lead (Pb)	7	16	109	5198
Mercury (Hg)	7	16	110	5155
Molybdenum (Mo)	7	16	110	5155
Nickel (Ni)	7	16	110	5155
Selenium (Se)	7	16	110	5155
Silver (Ag)	7	16	110	5155
Thallium (Ti)	7	16	110	5155
Vanadium (V)	7	16	110	5155
Zinc (Zn)	7	16	107	5155

Title 22- Hazardous Waste

Title 22 describes the characterization of hazardous waste as described in chapter 11, article 1, section 66261.1. Under the EPA's Resource Conservation and Recovery Act (RCRA), a national program and inventory system about handling hazardous waste, describes the minimum requirements in order to be in compliance with the Federal and/or State regulations.

Comment Regarding All Asbestos Containing Materials:

Asbestos containing materials in good condition do not necessarily need to be removed unless they will be disturbed; they should however be respected.

Employees, contract workers and others should be advised not to drill, saw, scrape or otherwise disturb this material without taking precautionary measures appropriate to asbestos containing material.

Asbestos containing material should be removed prior to the renovation and must be removed prior to demolition.

Areas Needing Immediate Corrective Action

Asbestos (in any condition) should be removed prior to renovation and must be removed prior to demolition of the survey site.

Analytical Procedures

- ***POLARIZED LIGHT MICROSCOPY (PLM)***

  Bulk samples were analyzed in accordance with U.S. EPA "Test Method for Determination of Asbestos in Bulk Building Materials, 1993," with inclusion of area percent estimates of the sample components. The use of the McCrone Color Dispersion Staining Technique supplements the analysis when considered useful by the analyst. The samples are prepared with refractive immersion oil and are examined under Polarized Light Microscopy (PLM). The accuracy of the visual estimate method is 1%.

  As per the standard "...The accuracy in the determination of the presence or absence of asbestos of greater than 1 area percent asbestos is greater than 99%." ASTM Committee D22.05, 1/18/88, Standard *Method of Testing for Asbestos Containing Materials by Polarized Light Microscopy*. If the sample matrix is reduced to minimize non-asbestos components, the detection limit can be mathematically enhanced, based on the amount of material remaining after matrix reduction. This method is called gravimetric reduction. This method involves ashing and chemical dissolution of the sample.

- ***POINT COUNTING***

  The Point Counting method is a much more accurate analytical method for determining the percent of asbestos in a particular material. KELLCO-MACS uses a muffle furnace to ash the sample and remove organic compounds. Hydrochloric acid is used to dissolve some of the non-asbestos minerals. Under this method a minimum of 125 points are counted from each of 8

different slide preparations of the same sample (total of 1000 points min.) If the **Point Count Method** determines that the material contains less than 1% asbestos, the material being analyzed can be treated as non-hazardous asbestos containing construction waste**. Note: ONLY the Point Count Method can be used for this determination.**

- ***CAM 17 TESTING***

  CAM 17 Metals were tested by Macs Lab, Inc. using ICP-MS, Extraction Method SW3050B and Analytical Method 6010B/3050.

KELLCO-MACS Qualifications

KELLCO-MACS is a joint venture offering hazardous materials and AIHA laboratory analyses. Our credentials include:

- The KELLCO-MACS asbestos inspector is licensed with the State of California Department of Occupational Safety and Health (CAL-OSHA).

- The KELLCO-MACS lead inspector is licensed by the California Department of Public Health (CDPH)

- The laboratory accreditations include:

  - **NVLAP PLM** for Asbestos: NIST National Voluntary Laboratory Accreditation Program certificate of accreditation for bulk **asbestos** analysis by polarized light microscopy (Accreditation #101948-1).
  - **AIHA** Accreditation for **Industrial Hygiene** Analytical Laboratory for PCM, and AA for lead (Accreditation #101786).
  - **AIHA Analyst Proficiency (NIOSH PAT)** (Accreditation # 11172)
  - **AIHA ELLAP** Accreditation for Lead: Accreditation for the **Environmental Lead** Laboratory recognized by the EPA as meeting the requirements of the National Lead Laboratory Accreditation Program established under Title X (Lab ID #11109).
  - **ELAP PLM** for Asbestos: California Department of Health Services, Environmental Laboratory Accreditation Program, certificate for bulk asbestos analysis (Certificate #2027)
  - **USDA Soil** permit #39484

The following supporting documents are attached to this report:

- Laboratory analytical reports
- Photographs of sample locations
- Floor plan or sketch showing sample locations

Please call KELLCO if there are any questions and/or clarifications regarding this report. We look forward to working with you in the future.

Sincerely,

KELLCO-MACS

Tim C. Cannard CAC #94-1395, CDPH Lead #764
Senior Project Manager

Asbestos Definitions and Classifications

ACM	(Asbestos Containing Material) - Material containing more than 1% asbestos. ACM must be disposed as hazardous waste. Note: Federal OSHA and Cal-OSHA control materials containing any amount of asbestos.
ACBM	(Asbestos Containing Building Material) – AHERA/ASHARA term for material containing more than 1% asbestos in or on interior structural members or other structural components. Exceptions: Covered walkways, porticos and exterior HVAC TSI.
ACCM	(Asbestos Containing Construction Material) – California term for a manufactured construction material containing greater than .1% (one tenth of one percent) asbestos.
PACM	(Presumed Asbestos Containing Material) OSHA considers all TSI and surfacing materials installed prior to1980 to be ACM unless proven otherwise.
Friable	Asbestos Containing Material that can be crumbled pulverized or reduced to powder by hand pressure when dry.
NOA	Naturally Occurring Asbestos. CARB defines as having >.25% by point counting.

Categories of Asbestos Used BY EPA AHERA/ASHARA and OSHA/Cal-OSHA

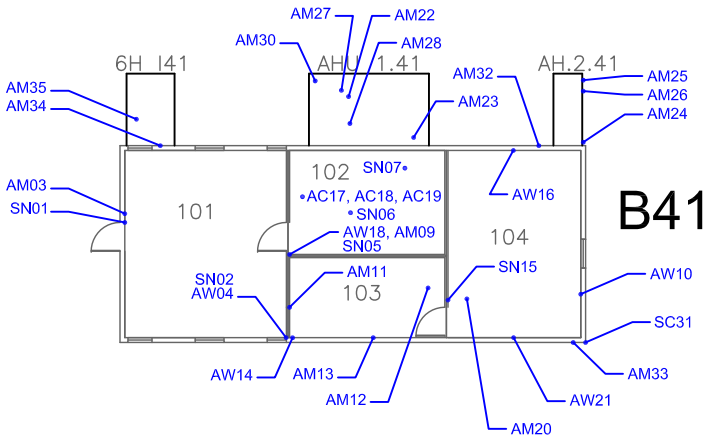
TSI	(Thermal System Insulation) - "Thermal system insulation (TSI)" means ACM applied to pipes, fittings, boilers, breeching, tanks, ducts or other structural components to prevent heat loss or gain. "Thermal system insulation ACM" is thermal system insulation which contains more than 1% asbestos.
SURFACING (usually mixed on site at time of application)	"Surfacing material" means material that is sprayed, troweled-on or otherwise applied to surfaces (such as acoustical plaster on ceilings and fireproofing materials on structural members, or other materials on surfaces for acoustical, fireproofing, and other purposes). "Surfacing ACM" means surfacing material which contains more than 1% asbestos. NOTE: OSHA/Cal-OSHA do not classify taping mud, floor tile mastic, stucco, leveling compound, and hard wall plasters or wall texturing as surfacing.
MISC.	All other ACM, including classify taping mud, floor tile mastic, stucco, leveling compound, and hard wall plasters or wall texturing as surfacing.

NESHAPS Categories for Asbestos (used by Air Quality Management Districts)

Category I	Cat I Non-friable Asbestos Containing Material refers to asbestos containing packing, gaskets, resilient floor covering, Galbestos, and asphalt roofing products containing more than 1% asbestos.
Category II	Cat II Non-friable Asbestos-Containing Material is any material that is not Cat I that contains greater than 1% asbestos.
RACM	"Regulated Asbestos-Containing Material." – Friable asbestos material (ACM) or a Category I non-friable ACM that has become friable OR a 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 reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations. RACM should be removed prior to renovation or demolition.

Characterization of Asbestos Containing Materials

Material	Estimated Quantity	TSI	Surfacing	Misc	RACM	Cat I	Cat II
12 x 12 brown floor tile and mastic	~ 250 sq. ft.			X		X	
12x12 white floor tile and mastic	~ 1,000 sq. ft.			X		X	
Unit AHU 1 41, air exchange unit / duct joint compound	~ 20 sq. ft.			X	X		
Water heater closet / duct joint compound	~ 10 sq. ft.			X	X		

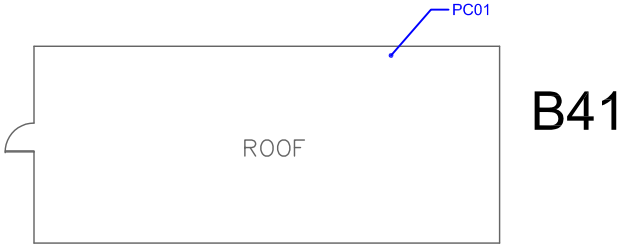


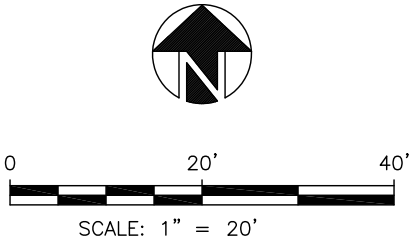
ABBREVIATIONS

AC	Asbestos ceiling sample
AM	Asbestos miscellaneous
AW	Asbestos wall sample
PC	Paint sample
SC	Concrete sample
SN	Tile/mastic sample

NOTE:

All sample locations are approximate





L:\LBNL.178\Old Town Demolition\Sample Location Maps\Kellco Maps\SLM__Kellco_B41.dwg

MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Method: EPA-600/M4-82-020

KELLCO Services
3137 Diablo Ave

Hayward CA 94545

Person to contact: Tim Cannard
Contact phone: 510-786-9751
FAX phone: 510-786-9625
Sampled by: Siew Yee Lee
Sampled on: July 12, 2010
Analyzed on: August 4, 2010 at: 17:38
Corresponding invoice number: 206351

Analyst: MACS
HCB (signature)

Laboratory manager: _____ (signature)

Job Number: 1004-17

Job Description: Lawrence Berkeley National Lab - Building B41, 1 Cyclotron Road, Berkeley, CA

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206351-1	B41-SN01 Room 101, west end by entryway / white 12x12 floor tile & mastic	**N.D.**	< 1%Cellulose	Off-white tile. Balance of sample is unspecified non-fibrous material.
L206351-2	B41-SN01a Room 101, west end by entryway / white 12x12 floor tile & mastic	**Yes**	4%Chrysotile* 5%Cellulose	Black tar. Balance of sample is organic binders.
L206351-3	B41-SN02 Room 101, southeast corner behind southeast door / white 12x12 floor tile & mastic	**N.D.**	< 1%Cellulose	Off-white tile. Balance of sample is unspecified non-fibrous material.
L206351-4	B41-SN02a Room 101, southeast corner behind southeast door / white 12x12 floor tile & mastic	**Yes**	4%Chrysotile* 4%Cellulose	Black tar. Balance of sample is organic binders.
L206351-5	B41-AM03 Room 101, west end by entrywall / black baseboard & brown mastic	**N.D.**	< 1%Cellulose	Black vinyl. Balance of sample is unspecified non-fibrous material.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

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NVLAP Lab Code 101948-0

MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206351-6	B41-AM03a Room 101, west end by entrywall / black baseboard & brown mastic	**N.D.**	3% Wollastonite < 1% Cellulose	Brown adhesive. Balance of sample is organic binders.
L206351-7	B41-AW04 Room 101, southeast corner / wall texture	**N.D.**	< 1% Cellulose	Off-white compound texture. Balance of sample is unspecified non-fibrous material.
L206351-8	B41-AW04a Room 101, southeast corner / drywall joint compound	**N.D.**	22% Cellulose 2% Fiberglass	Off-white joint compound plaster. Balance of sample is unspecified non-fibrous material.
L206351-9	B41-SN05 Room 102, southwest corner by door frame / brown 12x12 floor tile & mastic	**Yes**	< 1% Chrysotile* < 1% Cellulose	Brown tile. Balance of sample is unspecified non-fibrous material.
L206351-10	B41-SN05a Room 102, southwest corner by door frame / brown 12x12 floor tile & mastic	**Yes**	4% Chrysotile* 4% Cellulose	Black tar. Balance of sample is organic binders.
L206351-11	B41-SN06 Room 102, center of room by table / brown 12x12 floor tile & mastic	**N.D.**	< 1% Cellulose	Brown tile. Balance of sample is unspecified non-fibrous material.
L206351-12	B41-SN06a Room 102, center of room by table / brown 12x12 floor tile & mastic	**Yes**	4% Chrysotile* 5% Cellulose	Black tar. Balance of sample is organic binders.
L206351-13	B41-SN07 Room 102, northeast side of room / brown 12x12 floor tile & mastic	**Yes**	< 1% Chrysotile* < 1% Cellulose	Brown tile. Balance of sample is unspecified non-fibrous material.
L206351-14	B41-SN07a Room 102, northeast side of room / brown 12x12 floor tile & mastic	**Yes**	4% Chrysotile* 4% Cellulose	Black tar. Balance of sample is organic binders.

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MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206351-15	B41-AW08 Room 102, southwest corner / wall texture	**N.D.**	1%Cellulose	Off-white compound texture. Balance of sample is unspecified non-fibrous material.
L206351-16	B41-AW08a Room 102, southwest corner / drywall joint compound	**N.D.**	22%Cellulose 2%Fiberglass	Off-white joint compound plaster. Balance of sample is unspecified non-fibrous material.
L206351-17	B41-AM09 Room 102, southwest corner / black baseboard & mastic	**N.D.**	No Fibers	Black vinyl. Balance of sample is unspecified non-fibrous material.
L206351-18	B41-AM09a Room 102, southwest corner / black baseboard & mastic	**N.D.**	3%Wollastonite < 1%Cellulose	Brown adhesive. Balance of sample is organic binders.
L206351-19	B41-AW10 Room 104, east middle wall / wall texture	**N.D.**	1%Cellulose	Off-white compound texture. Balance of sample is unspecified non-fibrous material.
L206351-20	B41-AM11 Room 103, west end by doorway / beige vinyl floor sheeting & glue	**N.D.**	19%Cellulose 8%Synthetic 3%Fiberglass	Beige linoleum. Balance of sample is polymer and unspecified non-fibrous material.
L206351-21	B41-AM11a Room 103, west end by doorway / beige vinyl floor sheeting & glue	**N.D.**	1%Cellulose	Yellow adhesive. Balance of sample is organic binders.
L206351-22	B41-AM12 Room 103, east side by sink end / beige vinyl floor sheeting & glue	**N.D.**	18%Cellulose 8%Synthetic 3%Fiberglass	Beige linoleum. Balance of sample is polymer and unspecified non-fibrous material.
L206351-23	B41-AM12a Room 103, east side by sink end / beige vinyl floor sheeting & glue	**N.D.**	1%Cellulose < 1%Polyethylene	Yellow adhesive. Balance of sample is organic binders.

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MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206351-24	B41-AM13 Room 103, south end / beige vinyl floor sheeting & glue	**N.D.**	19% Cellulose 8% Synthetic 3% Fiberglass	Beige linoleum. Balance of sample is polymer and unspecified non-fibrous material.
L206351-25	B41-AM13a Room 103, south end / beige vinyl floor sheeting & glue	**N.D.**	2% Cellulose	Yellow adhesive. Balance of sample is organic binders.
L206351-26	B41-AW14 Room 103, southwest end / wall texture	**N.D.**	1% Cellulose	Off-white compound texture. Balance of sample is unspecified non-fibrous material.
L206351-27	B41-AW14a Room 103, southwest end / drywall joint compound	**N.D.**	22% Cellulose 2% Fiberglass	Off-white joint compound plaster. Balance of sample is unspecified non-fibrous material.
L206351-28	B41-SN15 Room 104, west wall, southwest end / white 12x12 floor tile & mastic	**N.D.**	< 1% Cellulose	Off-white tile. Balance of sample is unspecified non-fibrous material.
L206351-29	B41-SN15a Room 104, west wall, southwest end / white 12x12 floor tile & mastic	**Yes**	4% Chrysotile* 5% Cellulose	Black tar. Balance of sample is organic binders.
L206351-30	B41-AW16 Room 104, north wall by air exhaust / wall texture	**N.D.**	1% Cellulose	Off-white compound texture. Balance of sample is unspecified non-fibrous material.
L206351-31	B41-AW16a Room 104, north wall by air exhaust / drywall joint compound	**N.D.**	21% Cellulose 2% Fiberglass	Off-white compound texture. Balance of sample is unspecified non-fibrous material.
L206351-32	B41-AM17 Room 102, ceiling / 2x4 suspended ceiling tile	**N.D.**	35% Cellulose 34% Mineral Wool 1% Polyethylene	Off-white ceiling tile. Balance of sample is perlite and unspecified non-fibrous material.

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MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206351-33	B41-AM18 Room 102, ceiling / 2x4 suspended ceiling tile	**N.D.**	35% Mineral Wool 34% Cellulose 1% Polyethylene	Off-white ceiling tile. Balance of sample is perlite and unspecified non-fibrous material.
L206351-34	B41-AM19 Room 102, ceiling / 2x4 suspended ceiling tile	**N.D.**	35% Cellulose 34% Mineral Wool 1% Polyethylene	Off-white ceiling tile. Balance of sample is perlite and unspecified non-fibrous material.
L206351-35	B41-AM20 Room 104, west end of ceiling toward door / 2x4 suspended ceiling tile	**N.D.**	35% Cellulose 34% Mineral Wool 1% Polyethylene	Off-white ceiling tile. Balance of sample is perlite and unspecified non-fibrous material.
L206351-36	B41-AM21 Room 104, south lower wall / baseboard & mastic	**N.D.**	No Fibers	Black vinyl. Balance of sample is unspecified non-fibrous material.
L206351-37	B41-AM21a Room 104, south lower wall / baseboard & mastic	**N.D.**	2% Wollastonite < 1% Cellulose	Brown adhesive. Balance of sample is organic binders.
L206351-38	B41-AM22 Unit AHU 1 41, external air exchange / duct joint compound	**N.D.**	< 1% Cellulose	Off-white duct tape caulk. Balance of sample is unspecified non-fibrous material.
L206351-39	B41-AM23 Unit AHU 1 41, external air exhange / duct, tape & joint compound	**N.D.**	< 1% Cellulose	Off-white duct tape caulk. Balance of sample is unspecified non-fibrous material.
L206351-40	B41-AM24 Unit AHU 2 41, external air exchange / duct, tape & joint compound	**N.D.**	14% Cellulose	Off-white duct tape caulk. Balance of sample is unspecified non-fibrous material.
L206351-41	B41-AM25 Unit AHU 2 41, air exchange unit / duct insulation & glue	**N.D.**	< 1% Cellulose	Gray/black duct insulation. Balance of sample is unspecified non-fibrous material.

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MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206351-42	B41-AM26 Unit AHU 2 41, air exhange unit / duct joint compound	**N.D.**	< 1% Cellulose	Gray/black duct insulation. Balance of sample is unspecified non-fibrous material.
L206351-43	B41-AM27 Unit AHU 1 41, air exchange unit / duct joint compound	**Yes**	2% Chrysotile* 1% Cellulose	Off-white/gray duct tape caulk. Balance of sample is unspecified non-fibrous material.
L206351-44	B41-AM28 Unit AHU 1 41, air exchange unit / expansion joint	**N.D.**	14% Fiberglass < 1% Cellulose	Gray/black vinyl joint expansion. Balance of sample is unspecified non-fibrous material.
L206351-45	B41-SC29 Exterior, norwest lower wall of building / concrete	**N.D.**	No Fibers	Gray concrete. Balance of sample is silicate and cementitious.
L206351-46	B41-SC30 AUH 1 41 platform northwest corner / concrete	**N.D.**	< 1% Cellulose	Gray concrete. Balance of sample is silicate and cementitious.
L206351-47	B41-SC31 Exterior southeast corner of building / concrete	**N.D.**	No Fibers	Gray concrete. Balance of sample is silicate and cementitious.
L206351-48	B41-AM32 Exterior northwest wall of building (by AHU 2 41) / paint/coating	**N.D.**	No Fibers	Gray paint. Balance of sample is polymer and unspecified non-fibrous material.
L206351-49	B41-AM33 Exterior southeast corner of building, south wall / metal panel sealant	**N.D.**	2% Wollastonite < 1% Cellulose	Off-white sealant. Balance of sample is unspecified non-fibrous material.
L206351-50	B41-AM34 Exterior north wall of building, northwest end / metal panel sealant	**N.D.**	2% Wollastonite < 1% Cellulose	Off-white sealant. Balance of sample is unspecified non-fibrous material.

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MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206351-51	B41-AM35 Water heater closet / duct joint compound	**Yes**	3% Chrysotile* < 1% Cellulose	Off-white duct tape caulk. Balance of sample is unspecified non-fibrous material.

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MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

QA Report

Method: EPA-600/M

KELLCO Services
3137 Diablo Ave

Hayward CA 94545

Laboratory manager: _____ (signature)

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
Blank sample		**N.D.**	No fibers	
		PC*		
L206351-9	B41-SN05 Room 102, southwest corner by door frame / brown 12x12 floor tile & mastic	**Yes**	< 1% Chrysotile*	Brown tile. Balance of sample is unspecified non-fibrous material.
L206351-20	B41-AM11 Room 103, west end by doorway / beige vinyl floor sheeting & glue	**N.D.**	19% Cellulose 8% Synthetic 3% Fiberglass	Beige linoleum. Balance of sample is polymer and unspecified non-fibrous material.
L206351-24	B41-AM13 Room 103, south end / beige vinyl floor sheeting & glue	**N.D.**	19% Cellulose 8% Synthetic 3% Fiberglass	Beige linoleum. Balance of sample is polymer and unspecified non-fibrous material.
L206351-25	B41-AM13a Room 103, south end / beige vinyl floor sheeting & glue	**N.D.**	1% Cellulose	Yellow adhesive. Balance of sample is organic binders.

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MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

QA Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
Blank sample		**N.D.** PC*	No fibers	
L206351-29	B41-SN15a Room 104, west wall, southwest end / white 12x12 floor tile & mastic	**Yes**	4% Chrysotile* 5% Cellulose	Black tar. Balance of sample is organic binders.
L206351-40	B41-AM24 Unit AHU 2 41, external air exchange / duct, tape & joint compound	**N.D.**	14% Cellulose	Off-white caulk. Balance of sample is unspecified non-fibrous material.
L206351-43	B41-AM27 Unit AHU 1 41, air exchange unit / duct joint compound	**Yes**	2% Chrysotile* 1% Cellulose	Gray caulk. Balance of sample is unspecified non-fibrous material.
L206351-46	B41-SC30 AUH 1 41 platform northwest corner / concrete	**N.D.**	No Fibers	Gray concrete. Balance of sample is silicate and cementitious.
L206351-50	B41-AM34 Exterior north wall of building, northwest end / metal panel sealant	**N.D.**	2% Wollastonite < 1% Cellulose	Off-white sealant. Balance of sample is unspecified non-fibrous material.

End of report.

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CLIENT	JOBSITE
Weiss Associates 5801 Christie Avenue 600 Emeryville CA 94608	Lawrence Berkeley National Laboratory One Cyclotron Road Bldg B41 Berkeley CA 94744

KELLCO-MACS JOB#: **1004-17** LAB LOGIN # L206351

COLLECTED BY: Siew Yee Lee

COLLECTED DATE 7/12/2010

TURN AROUND TIME: 4 8 (24) 48 5-DAY

RESULTS NEEDED BY

CIRCLE TYPE OF BULK ANALYSIS

(PLM) LEAD PAINT LEAD WIPE NON VIABLE MOLD VIABLE MOLD eCOLI OTHER

SAMPLES REC'D _____ ANALYZE TO FIRST POSITIVE YES NO

REPORT RESULTS TO PROJECT MANAGER: Tim Cannard

NOTES & COMMENTS:

CHAIN OF CUSTODY & SAMPLE SUBMITAL FORM PAGE 1 OF ____

KELLCO-MACS JOB#: **1004-17**
Lawrence Berkeley National Laboratory

FIELD NUMBER	LOCATION (bldg, rm#, area)	COLOR	MATERIAL or SUBSTRATE (ft w/ size, mastic, tic, etc.)	NOTES: Like condition, damage, quantity, inside what, beneath what? direction in building (N,S,E,W) etc.)
B41 - SN01	Room 101, West end by entryway	White	12X12 floor tile & mastic	
- SN02	Room 101, SE corner Behind SE door	|	| |	
- AM03	Room 101, West end by entryway	Black	Baseboard & brown mastic	
- AW04	Room 101, SE corner.		Wall texture	
- ~~SN05~~ AW04a	| |		drywall joint compound	
- SN05	Room 102, SW corner By doorframe	Brown	12X12 floor tile & mastic	
- SN06	Room 102, center of Room By table	|	| |	
- SN07	Room 102, NE side of Room	|	| |	
- AW08	Room 102, SW corner		wall texture	
- AW8a	| |		drywall joint compound	

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
[illegible]	0727	7/21/2010	D. Kn[illegible]	07/21/10	07:27

L206351

CHAIN OF CUSTODY & SAMPLE SUBMITAL FORM PAGE 2 OF ____

KELLCO-MACS JOB#: **1004-17**
Lawrence Berkeley National Laboratory

FIELD NUMBER	LOCATION (bldg, rm#, area)	COLOR	MATERIAL or SUBSTRATE (ft w/ size, mastic, tjc, etc.)	NOTES: Like condition, damage, quantity, inside what, beneath what? direction in building (N,S,E,W) etc.)
B41-AM09	Room 102, SW corner	Black	Baseboard & mastic	
B41-AW10	Room 104, east ~~lower~~ middle wall		wall texture	
-AM11	Room 103, west end by doorway	Beige	vinyl floor sheeting & glue	
-AM12	Room 103, east side by ~~By end of sink end~~			
-AM13	Room 103, south end			
-AW14	Room 103, SW end		wall texture	
-AW14a			drywall joint compound	
B41 -SN15	Room 104, west wall, SW end	White	12x12 floor tile & mastic	
-AW16	Room 104, North wall by air exhaust		wall texture	
-~~AW16a~~ AW16a	~~North wall,~~		drywall joint compound.	
-AM17	Room 102, ceiling		2x4 suspended ceiling tile	
-AM18				
-AM19				
-AM-20	Room 104, west end of ceiling toward door		~~2x4~~	
-AM21	Room 104, south lower wall		Baseboard & mastic.	
-AM22	Unit AHU 1 41, external air exchange		duct joint compound	
-AM23			duct, tape & joint compound.	
-AM24	Unit AHU 2 41, external air exchange			

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
[illegible]	7/21/2010	0727	D. Kerrhah	07/21/10	07:27

L206351

CHAIN OF CUSTODY & SAMPLE SUBMITAL FORM PAGE 3 OF ____

KELLCO-MACS JOB#: **1004-17**
Lawrence Berkeley National Laboratory

FIELD NUMBER	LOCATION (bldg, rm#, area)	COLOR	MATERIAL or SUBSTRATE (ft.w/ size, mastic, jc, etc.)	NOTES: Like condition, damage, quantity, inside what, beneath what? direction in building (N,S,E,W) etc.)
B41-AM25	Unit AHU 2 41, air exchange unit		duct insulation & glue	
-AM26			duct joint compound	
-AM27	Unit AHU 1 41, air exchange unit			
-AM28			expansion joint	
-SC29	Exterior NW, upper wall of Bldg		concrete.	
-SC30	~~Unit~~ AHU 141 platform NW corner			
-SC31	Exterior SE corner of Bldg			
-AM32	Exterior NW wall of Bldg (By AH 2 41),		paint/coating	
-AM33	Exterior SE ~~wall~~ corner of Bldg South wall		metal panel sealant	
-AM34	Exterior N. wall of Bldg, NW end			
-AM35	Water heater closet		duct joint compound.	

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
[illegible]	7/21/2010	0727	[illegible]	07/21/10	07:27

MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Method: EPA-600/M4-82-020

KELLCO Services
3137 Diablo Ave

Hayward CA 94545

Person to contact: Tim Cannard
Contact phone: 510-786-9751
FAX phone: 510-786-9625
Sampled by: Siew Yee Lee
Sampled on: August 4, 2010
Analyzed on: August 4, 2010 at: 18:11
Corresponding invoice number: 206956

Analyst: HCB (signature)

Laboratory manager: (signature)

Job Number: 1004-17

Job Description: LBNL - Building 41 - Berkeley, CA

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206956-1	B41-AC36 Area 101, southwest end of ceiling / ceiling insulation	**N.D.**	96% Mineral Wool 1% Cellulose	Off-white fibrous insulation. Balance of sample is unspecified non-fibrous material.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

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NVLAP®
NVLAP Lab Code 101948-0

MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

QA Report

Method: EPA-600/M

KELLCO Services
3137 Diablo Ave

Hayward CA 94545

Laboratory manager: _____ (signature)

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
Blank sample		**N.D.**	No fibers	
		PC*		

End of report.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

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NVLAP Lab Code 101948-0

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MACS Lab Incorporated
Material Analysis and Characterization Service

L206956

Analytical and Environmental Services

Chain of Custody Record

To Be Used For All Types Of Analysis

MACS Lab # _____

Customer Code

BILLED TO		PROJECT INFORMATION		
Name: Kellco-MACS		Sampled By: Siew Yee Lee	Date: 8/4/2010	
Address:		Project Name: LBNL	Job #: 10004-17	
City:		Site Address: Bldg 41		
State:	Zip:	City, State, Zip: Berkeley, CA		
Phone No:		Site Contact: ⊖		
Fax No:		Phone No:	Fax No:	
Cell No:		Comments:		
Email:		Samples Preserved: Yes / No	Received Cold: Yes / No	

ANALYSIS REQUIRED

Required Turn Around Time: 4 Hour ___ 8 Hour ___ 24 Hour X 2 Days/48 Hour ___ 3 Days/72 Hour ___ 5+ Days/120 Hour ___

DISPOSAL: ☐ Customer ☐ MACS ☐ OTHER (Explain)

Sample #	Sample Description / Type of Work	TIME ON	TIME OFF	TOTAL TIME	FLOW RATES START	FLOW RATES STOP	PCM Asbestos Air - NIOSH 7400	PLM Asbestos Bulk - 40 CFR 763	Lead (Wipes, Air, Paint, Soil)	TEM (Air/Bulk) - AHERA/Yamate Level II	Mold - Viable / Non Viable Air / Bulk	Metals (TCLP, CAM17, STLC)		Comments /Area Social Security #
B41-AC36	Area 101, SW end of ceiling / ceiling insulation							X						

Relinquished By: [signature] *Date:* 8/4/2010 *Time:* 1012 *Accepted By:* [signature] *Date:* 08/04/10 *Time:* 10:12

TEM asbestos in water analysis requires 2 one-liter bottles shipped @ 4°C in dark containers for each sample.

LEAD USEPA 7420, Air NIOSH 7082, Soil EPA 7000/7420, Wipes NIOSH 9100
Water AIHA (method 3113B EPA 200.9)

Units Water - 1ug/l = 1 ppb
Paint - 1% = 10,000 ppm

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Analytical and Environmental Services
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CAM-17 Bulk Materials Analysis Report - Method: EPA 6010B/3050

KELLCO Services
3137 Diablo Avenue
Hayward, CA 94545

Contact: Tim Cannard
Phone: (510) 786-9751
Email: mailbox3137@kellcomacs.com
Job #: 1004-17

Laboratory Number: 206484
Sampled By: Siew Yee Lee
Sampled On: July 12, 2010
Submitted On: July 21, 2010
Analyzed On: August 3, 2010
Reported On: August 5, 2010
SOP: CAM17
Sample Type: Bulk

Job Description: Lawrence Berkeley National Laboratory-Building 41, Berkeley, CA

	Lab Sample Number:	206484 -1	206484 -2			
	Client Sample Number:	B41-PC1	B41-PC2			
	Matrix:	Bulk	Bulk			
	Extraction Type:	Acid	Acid			
	Units:	mg/kg (PPM)	mg/kg (PPM)			
Sb	Antimony	597.87	577.68			
As	Arsenic	208.68	78.01			
Ba	Barium	14,737.24	7,898.81			
Be	Beryllium	1.26	1.34			
Cd	Cadmium	478.67	428.27			
Cr	Chromium	4,596.34	2,912.50			
Co	Cobalt	310.59	155.77			
Cu	Copper	358.38	784.52			
Pb	Lead	883,472.96	794,940.48			
Hg	Mercury	26.66	9.40			
Mo	Molybdenum	188.42	214.67			
Ni	Nickel	132.79	215.83			
Se	Selenium	7,197.26	9,208.33			
Ag	Silver	8.45	14.49			
Tl	Thallium	470.30	777.68			
V	Vanadium	148.25	138.99			
Zn	Zinc	74,333.59	62,886.90			

Analyst: _____ (Signature)

Laboratory Manager: _____ (Signature)

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I206484

P206347

KELLCO-MACS

A Creative Joint Venture For Better Environmental Solutions

Chain of Custody Record

For Bulk PLM Sample Collection Only

Page ____ of ____

BILLED TO	PROJECT INFORMATION	
Name: Kellco - MACS	Sampled By: Siew Yee Lee	Date Sampled: 7/12/10
Address: 3137 Diablo Avenue	Project Manager: Tim Cannard	Job #: 1004-17
City: Hayward	Project Name: Lawrence Berkeley National Lab	
State: Ca Zip: 94545	Site Address: Bldg 41,	
Phone No: (510) 786-9751	City, State, Zip: Berkely, Ca	
Fax No: (510) 786-9625	Site Contact:	
Cell No:	Phone No:	Fax No:
Email:	Samples Preserved: Yes / No	Analyze to First Positive: Yes / No

ANALYSIS REQUIRED

Required Turn Around Time: 4 Hour ____ 8 Hour ____ 24 Hour XX 2 Days/48 Hour ____ 3 Days/72 Hour ____ 5+ Days/120 Hour ____

DISPOSAL: ☐ Customer ☒ Laboratory ☐ OTHER (Explain)

	Sample #	Sample Location / Sample Description (Color)	Lead (Paint, Wipe)	(F)riable / (N)on Friable	Condition: (G)ood / (F)air / (P)oor	Length (Feet)	Width (Feet)	Height (Feet)	Quantity
1004-17 — 1	B41-PC1	Exterior of building, various locations / paint chip composite of metal and wood	X						
1004-17 — 2	B41-PC2	Exterior of building, various locations / paint chip composite	X						
1004-17 — 3									
1004-17 — 4									
1004-17 — 5									
1004-17 — 6									
1004-17 — 7									
1004-17 — 8									
1004-17 — 9									
1004-17 — 10									

Relinquished By: [signature] *Date:* 7/21/2010 *Time:* 0729

Accepted By: [signature] *Date:* 07/21/10 *Time:* 07:29

Lab Report Number(s):

Delivery Type: DN (Drop Off) *FedEx* *Mail* *Other*

WB - Wallboard JC - Joint Compound WT - Wall Texture WBT - Wallboard Tape FT - Floor Tile FTM - Floor Tile Mastic BBM - Baseboard Mastic
RSF - Resilient Sheet Flooring CT - Ceiling Tile SAAM - Spray-Applied Acoustical Material R - Roof TSI - Thermal System Insulation EL - Elbow

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http://www.kellcomacs.com email: mailbox3137@kellcomacs.com

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Analytical and Environmental Services
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CAM-17 Bulk Materials Analysis Report - Method: EPA 6010B/3050

KELLCO Services
3137 Diablo Avenue
Hayward, CA 94545

Contact: Tim Cannard
Phone: (510) 786-9751
Email: mailbox3137@kellcomacs.com
Job #: 1004-17

Laboratory Number: 206534
Sampled By: Siew Yee Lee
Sampled On: July 20, 2010
Submitted On: July 26, 2010
Analyzed On: August 3, 2010
Reported On: August 4, 2010
SOP: CAM17
Sample Type: Bulk

Job Description: Lawrence Berkeley National Laboratory-Building 41-One Cyclotro Road, Berkeley, CA 94744

	Lab Sample Number:	206534 -1				
	Client Sample Number:	B41-PC01				
	Matrix:	Bulk				
	Extraction Type:	Acid				
	Units:	mg/kg (PPM)				
Sb	Antimony	439.54				
As	Arsenic	117.44				
Ba	Barium	9,753.88				
Be	Beryllium	1.77				
Cd	Cadmium	208.51				
Cr	Chromium	9,309.79				
Co	Cobalt	130.79				
Cu	Copper	583.73				
Pb	Lead	485,018.73				
Hg	Mercury	25.07				
Mo	Molybdenum	130.95				
Ni	Nickel	171.62				
Se	Selenium	6,254.68				
Ag	Silver	12.20				
Tl	Thallium	292.67				
V	Vanadium	180.98				
Zn	Zinc	50,989.83				

Analyst: _____ (Signature)

Laboratory Manager: _____ (Signature)

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KELLCO-MACS JOB#: **1004-17** LAB LOGIN # I206534

COLLECTED BY: Siew Yee Lee

COLLECTED DATE 7/20/2010

TURN AROUND TIME: 4 8 24 48 5-DAY

RESULTS NEEDED BY

CLIENT

Weiss Associates
5801 Christie Avenue
600
Emeryville
CA 94608

JOBSITE

Lawrence Berkeley National Laboratory
One Cyclotron Road
Bldg 41
Berkeley
CA 94744

CIRCLE TYPE OF BULK ANALYSIS

PLM LEAD PAINT LEAD WIPE NON VIABLE MOLD VIABLE MOLD eCOLI OTHER CAM17

REPORT RESULTS TO PROJECT MANAGER: Tim Cannard

SAMPLES REC'D _____ ANALYZE TO FIRST POSITIVE YES NO

NOTES & COMMENTS:

KELLCO-MACS JOB#: **1004-17**
Lawrence Berkeley National Laboratory

CHAIN OF CUSTODY & SAMPLE SUBMITAL FORM

PAGE_____ OF _____

FIELD NUMBER	LOCATION (bldg, rm, area)	COLOR	MATERIAL of SUBSTRATE (ft w/ size, mastic, tic, etc.)	NOTES: Like condition, damage, quantity, inside what, beneath what, direction in building (N, S, E, W) etc.)
B41-PC01	Roof		paint chip/coating	

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
[illegible]	7/26/2010	0845	D. Kahler	07/26/10	0845

PHOTOGRAPHS

Photographs containing no sample identification number are included for reference of the general sample locations.

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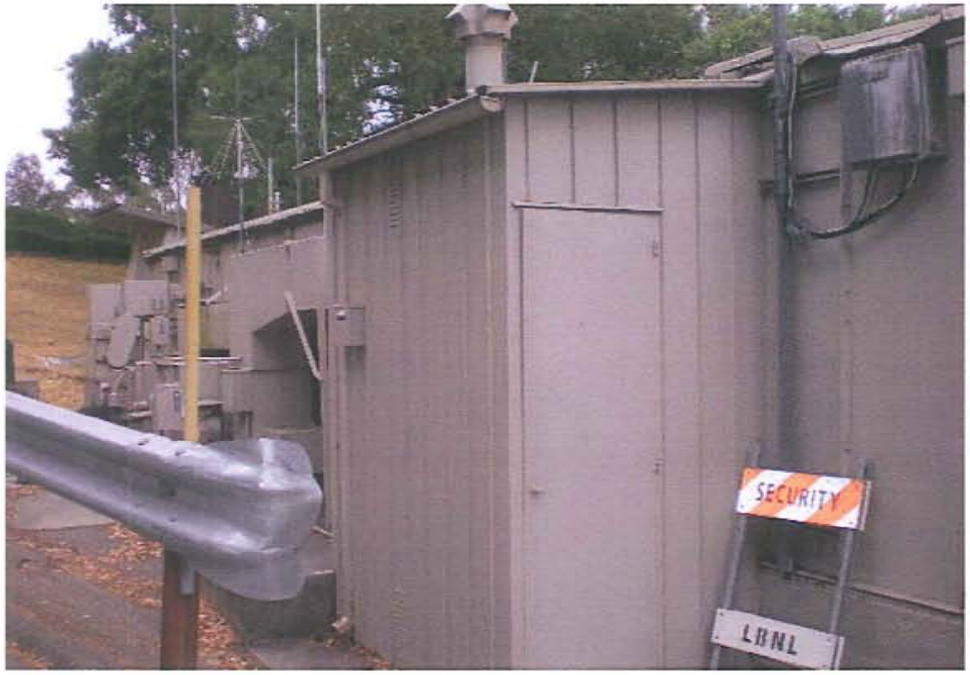
http://www.kellcomacs.com email: mailbox3137@kellcomacs.com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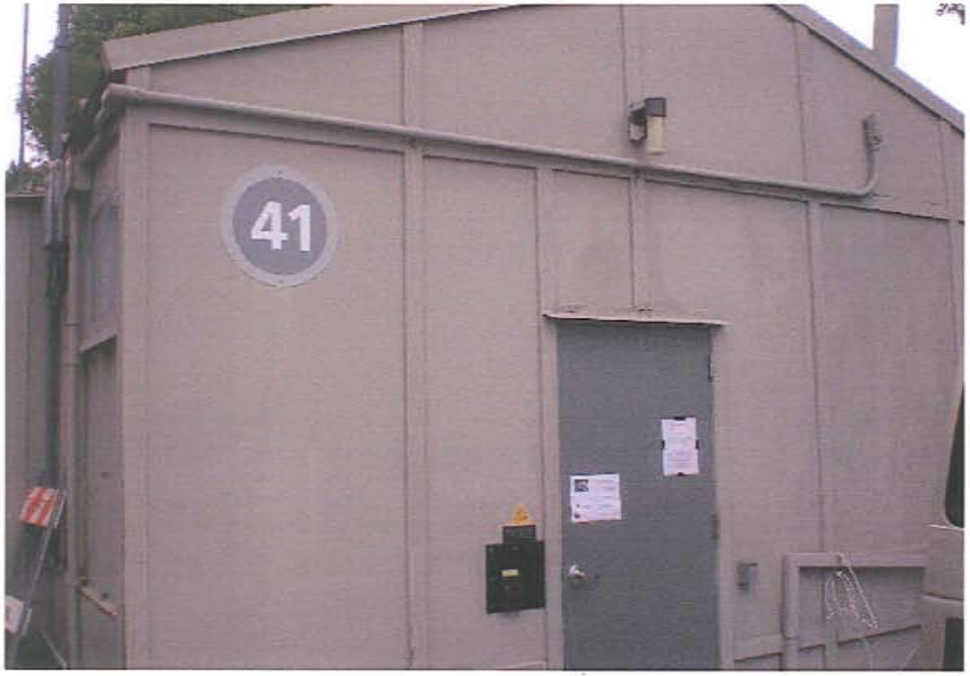
LBNL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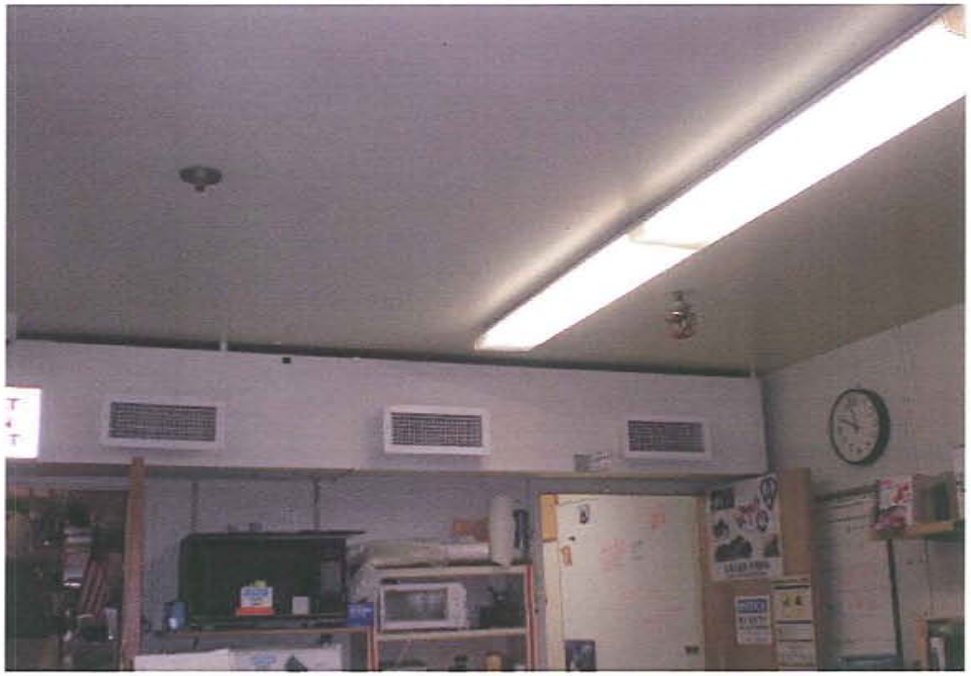

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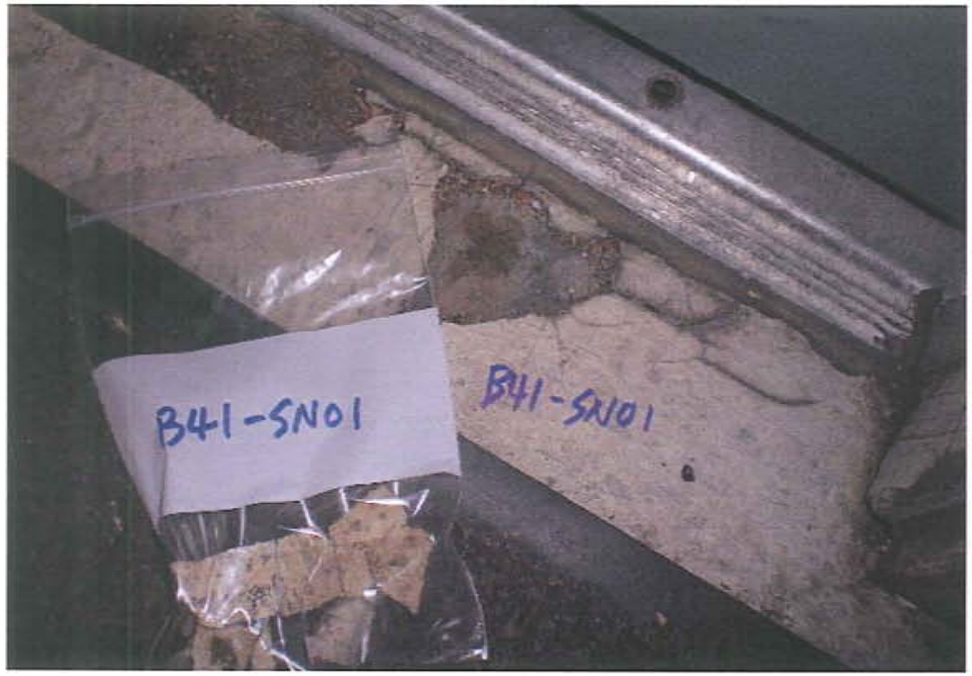
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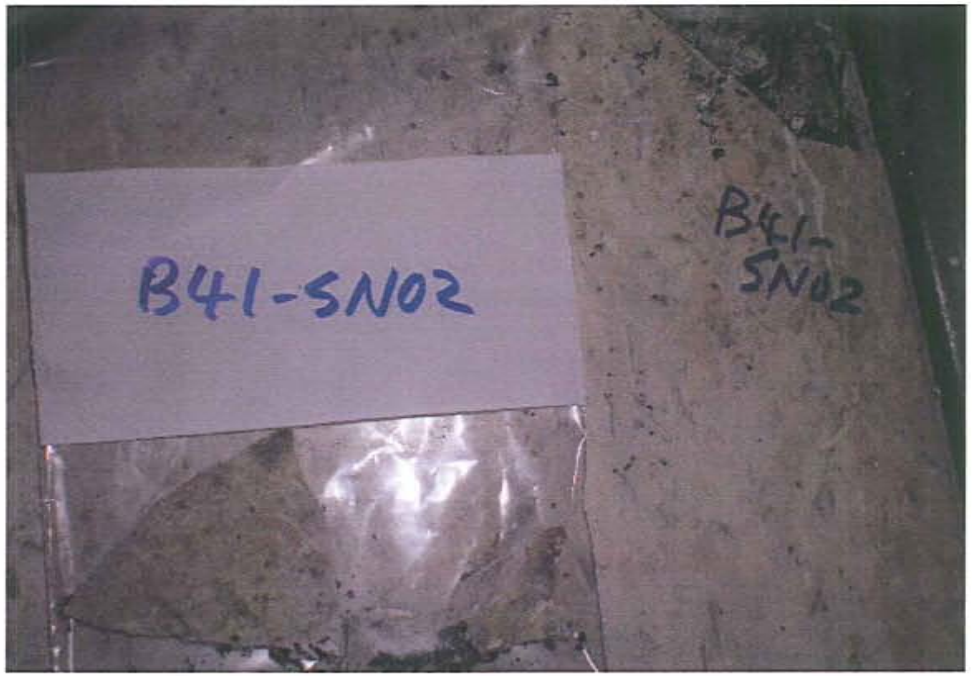
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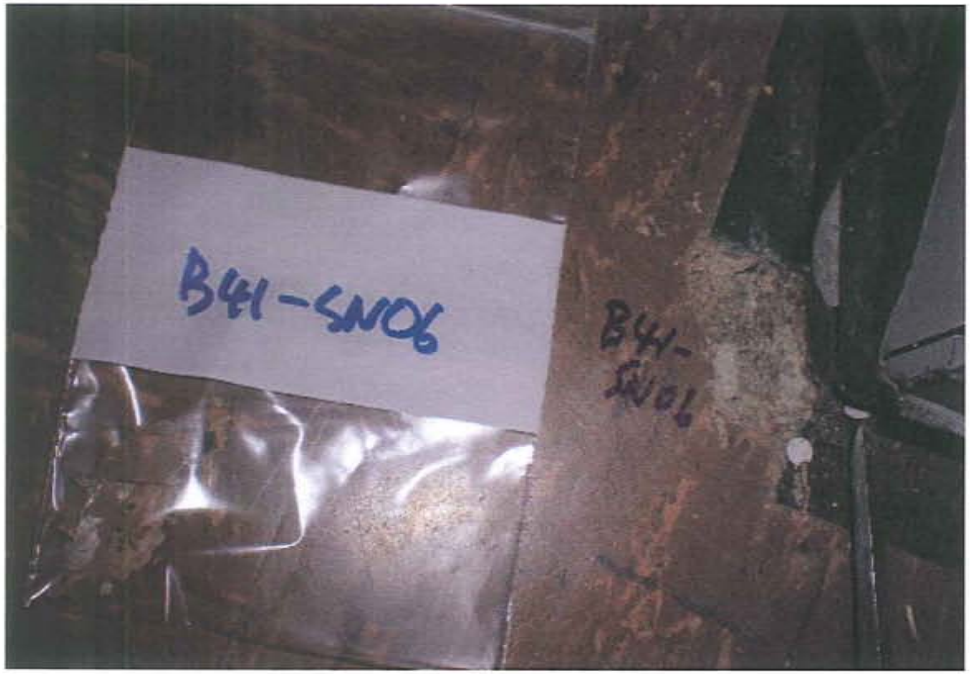
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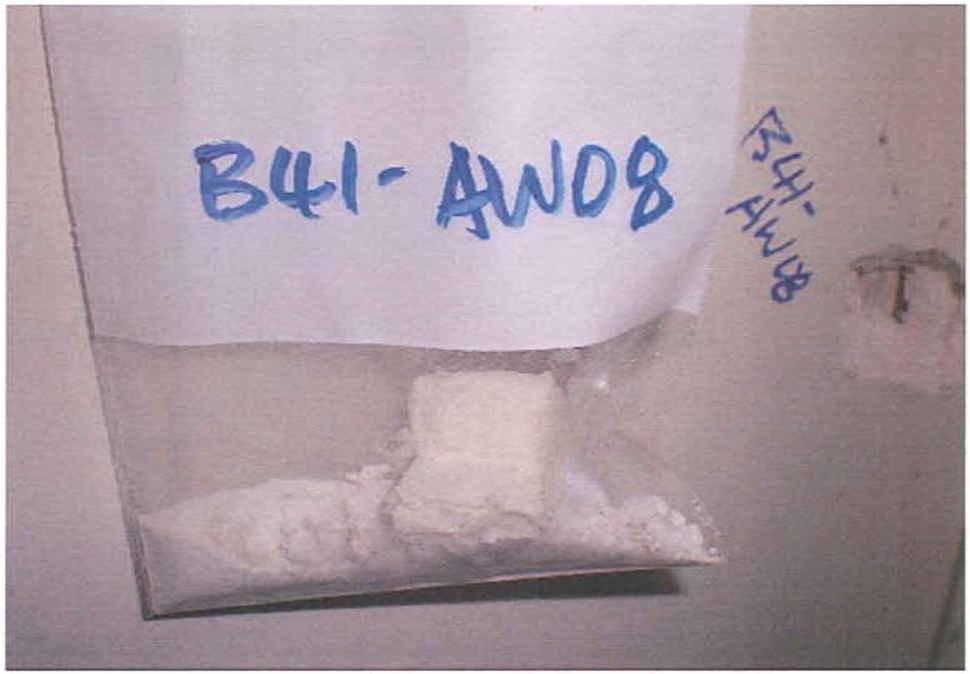
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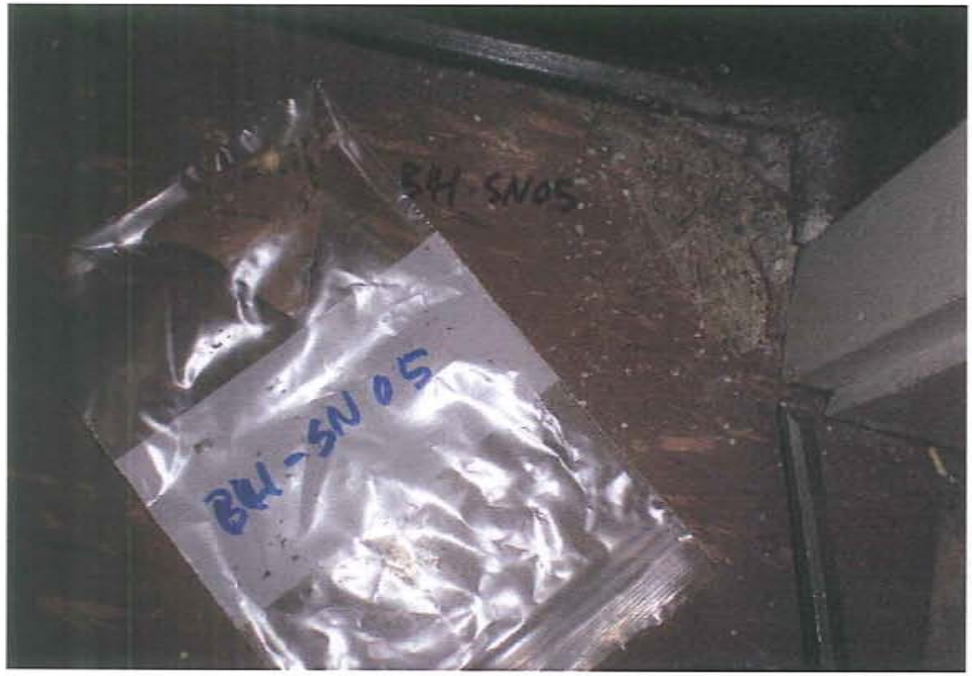
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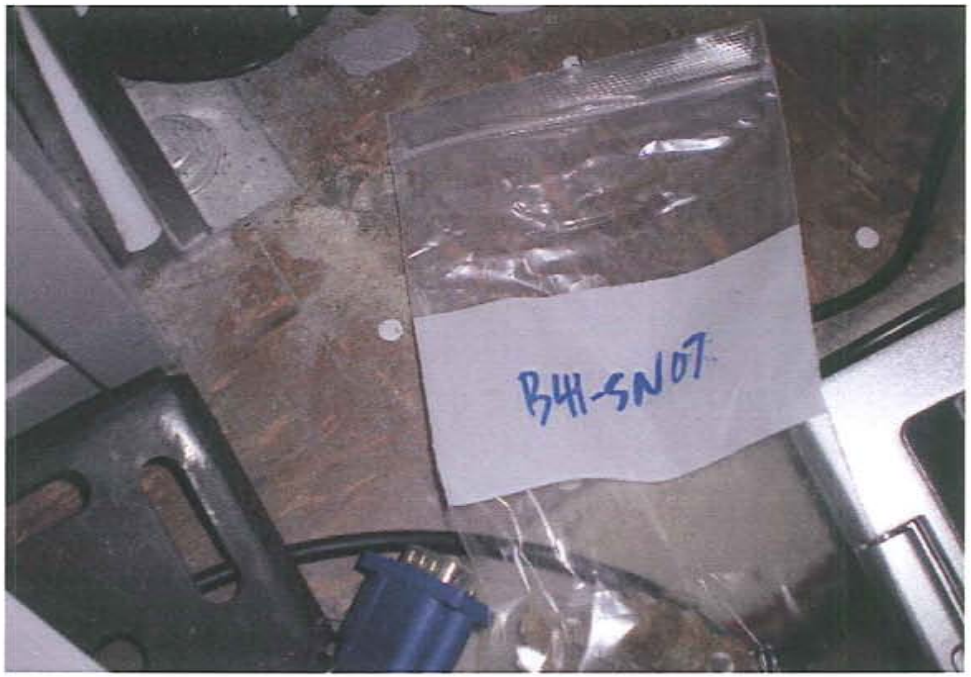
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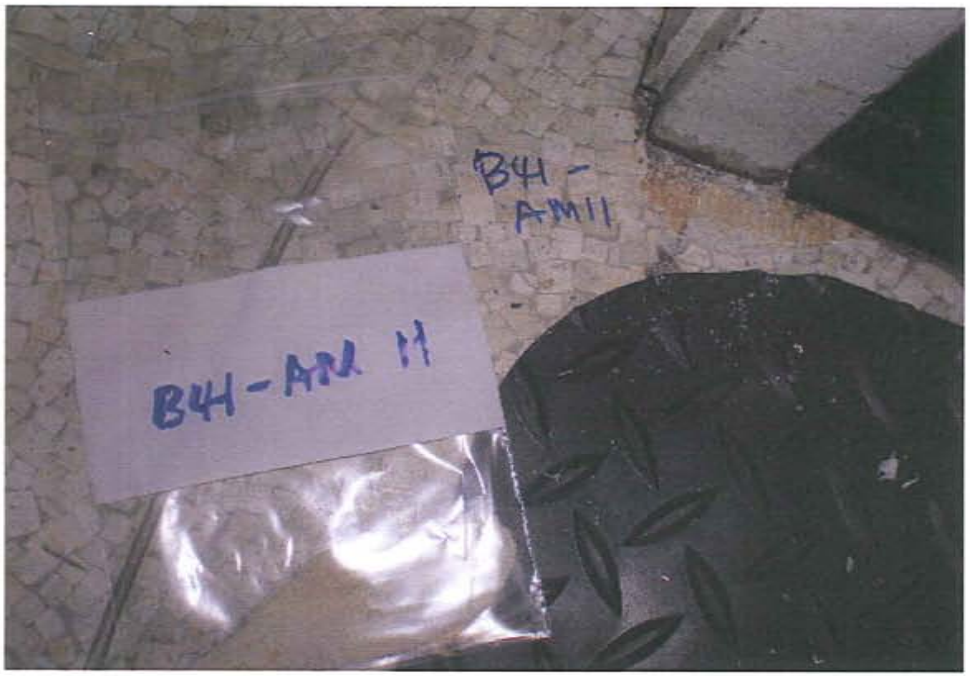
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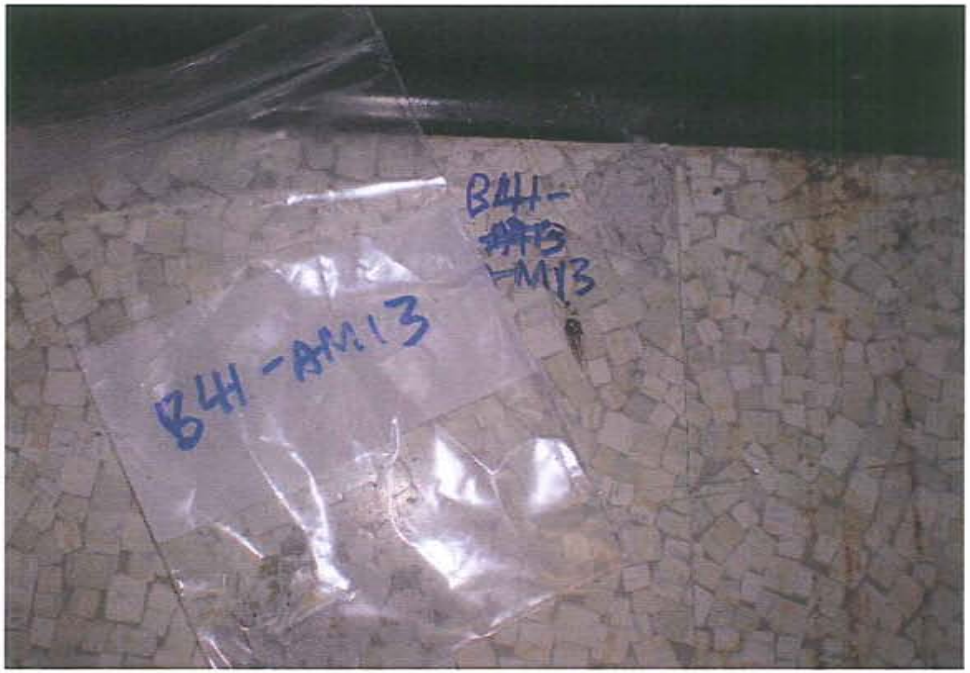
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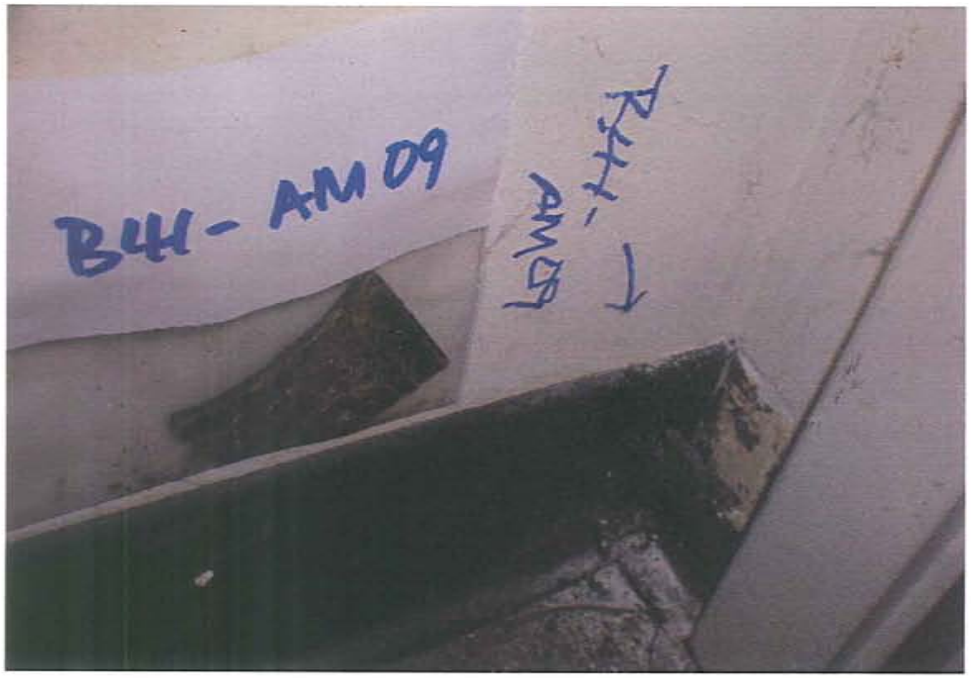
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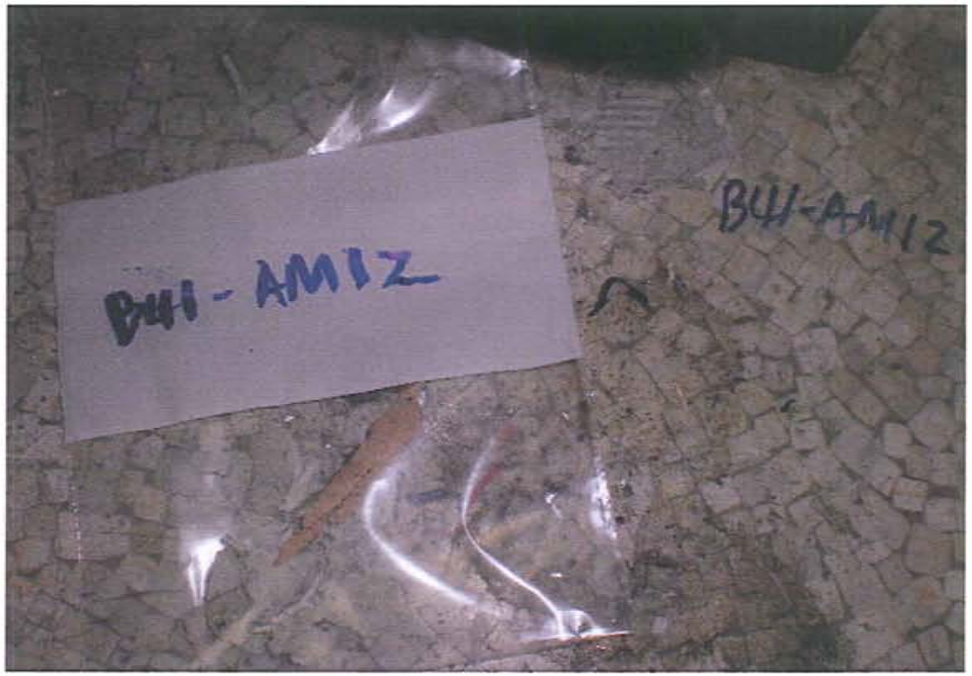
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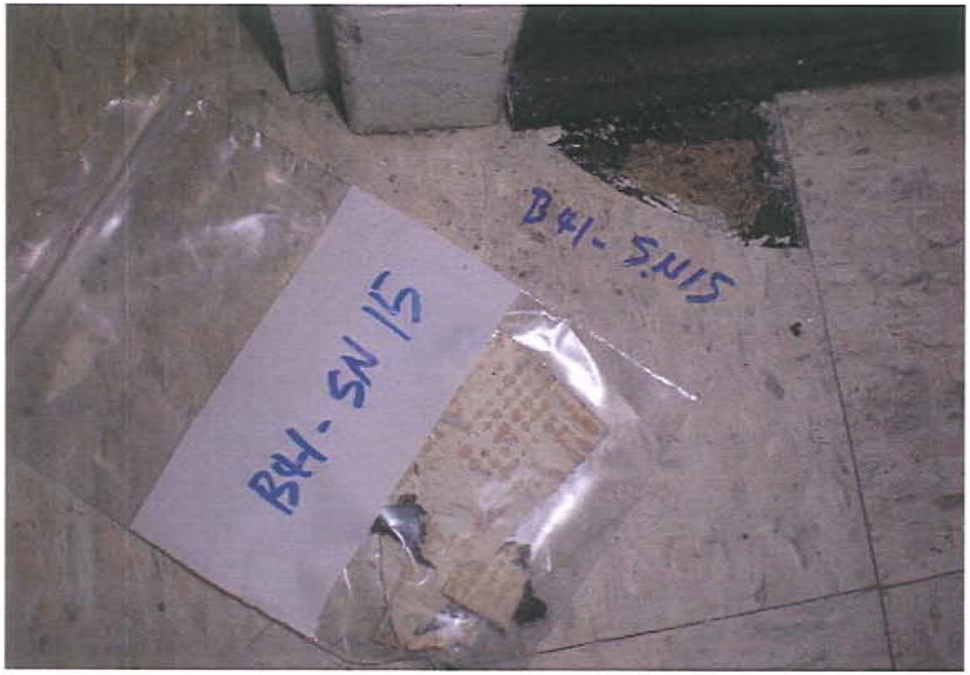
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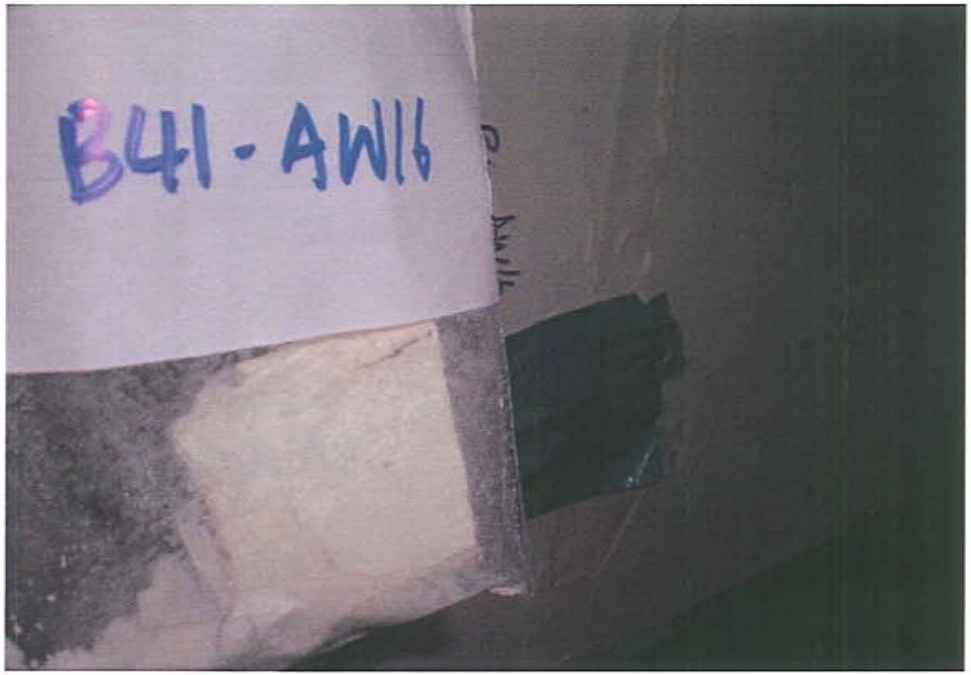
B41-SW15

B41-AW14
B41-AW14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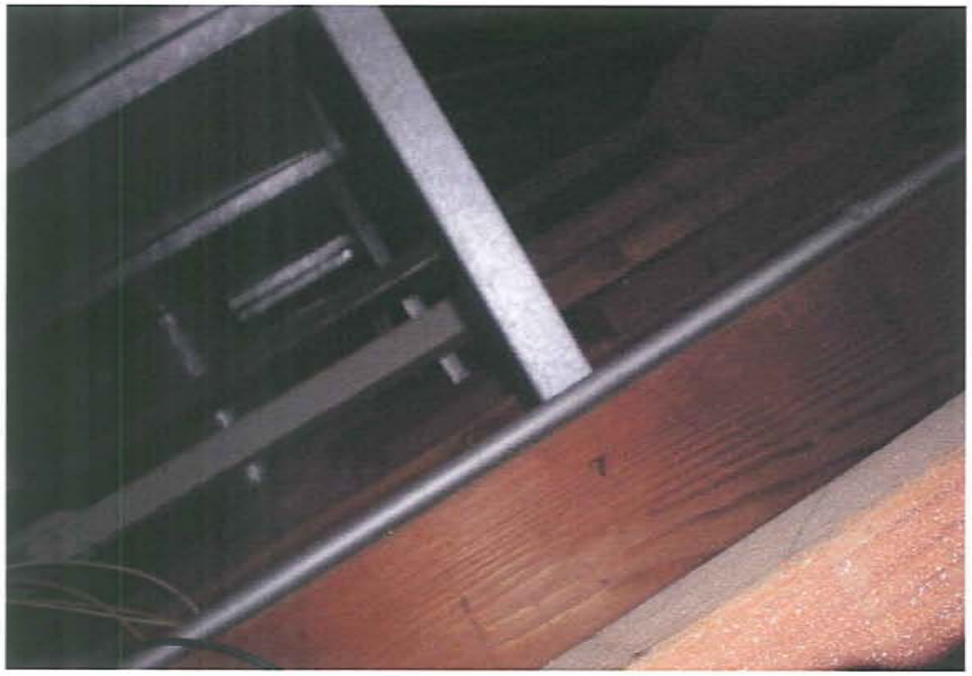

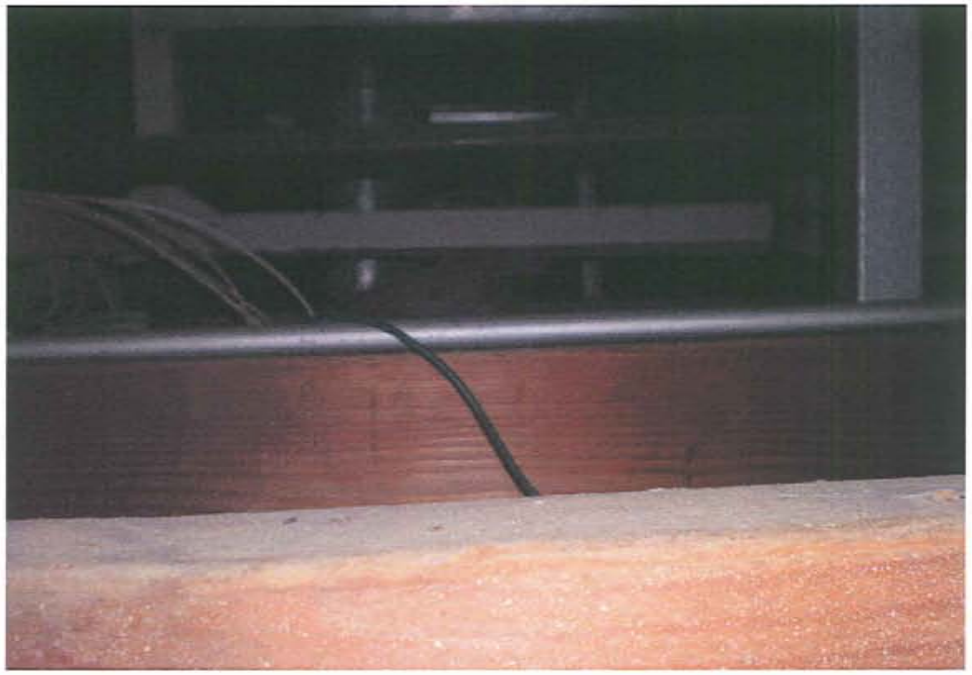

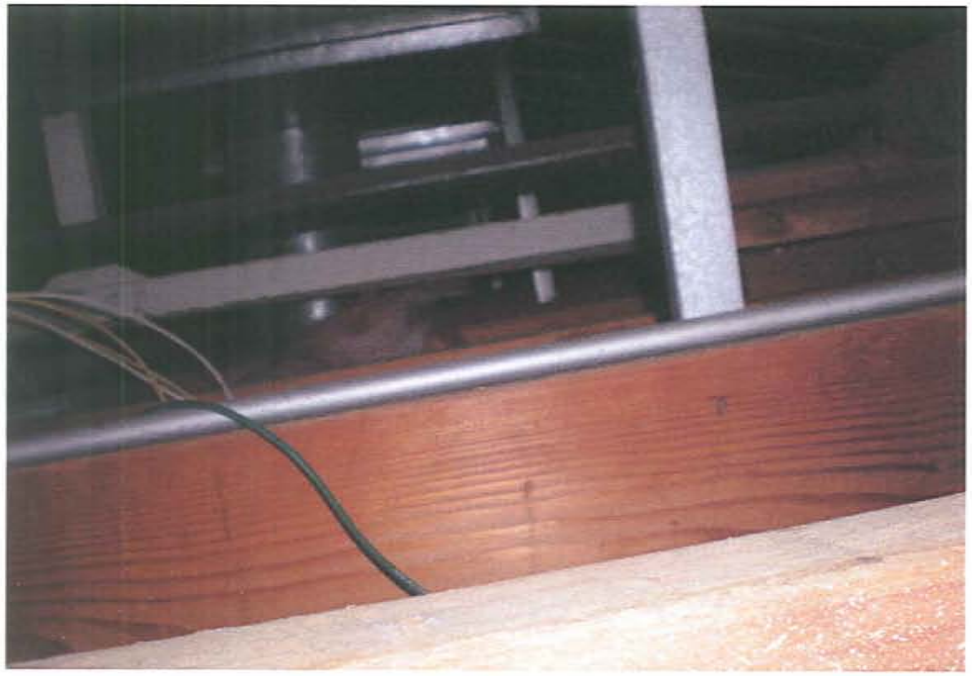

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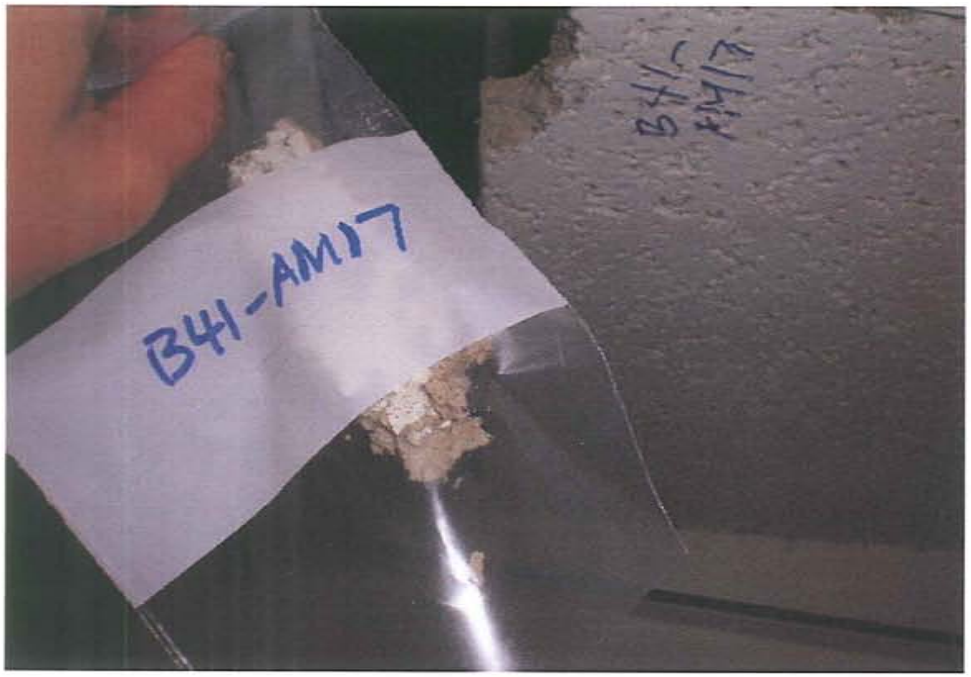
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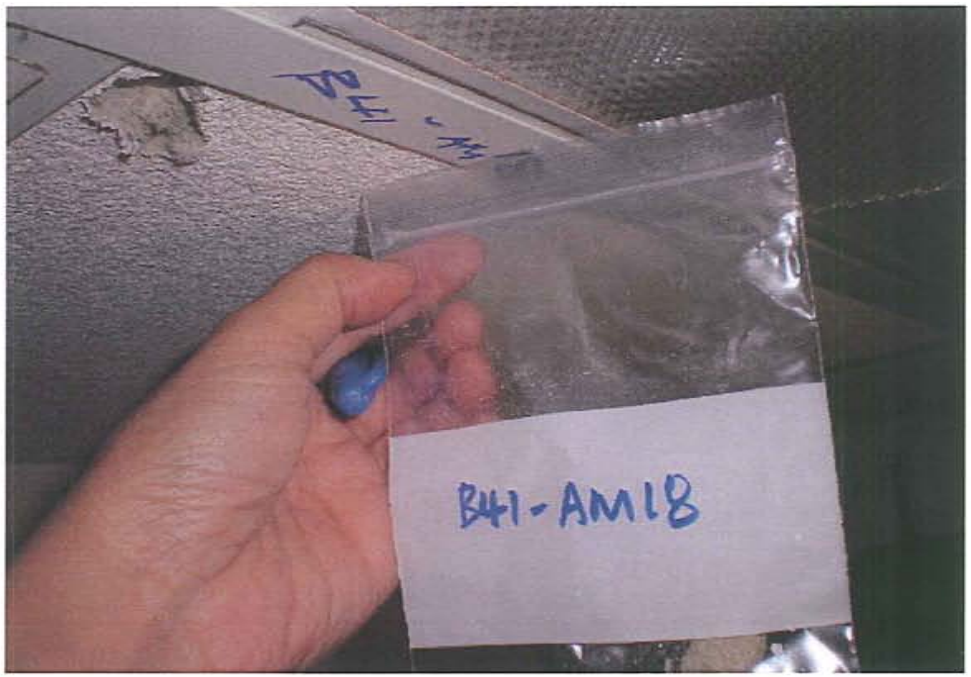
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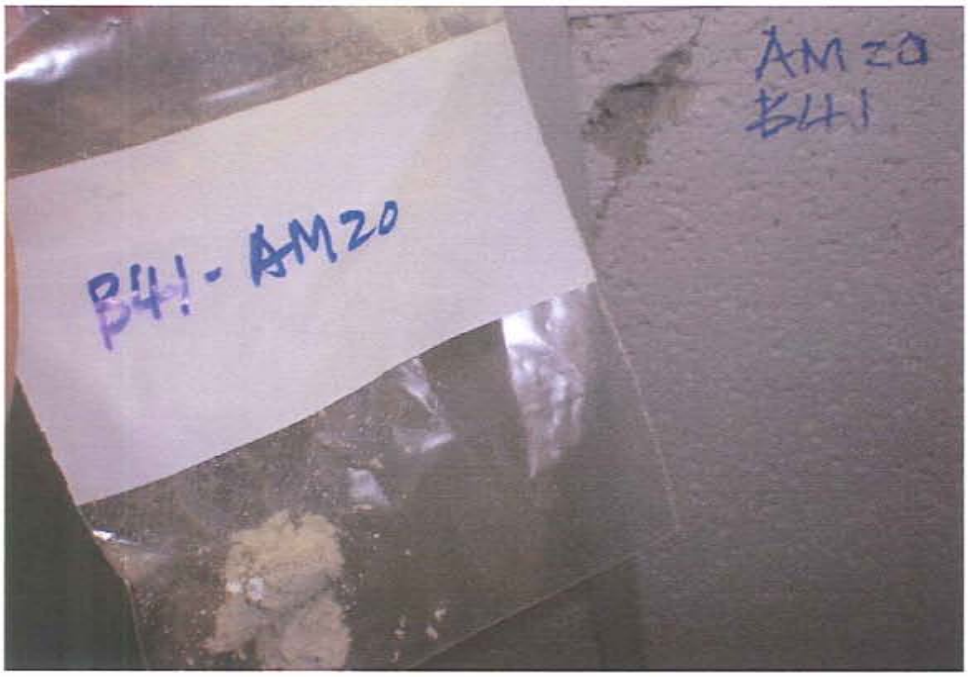
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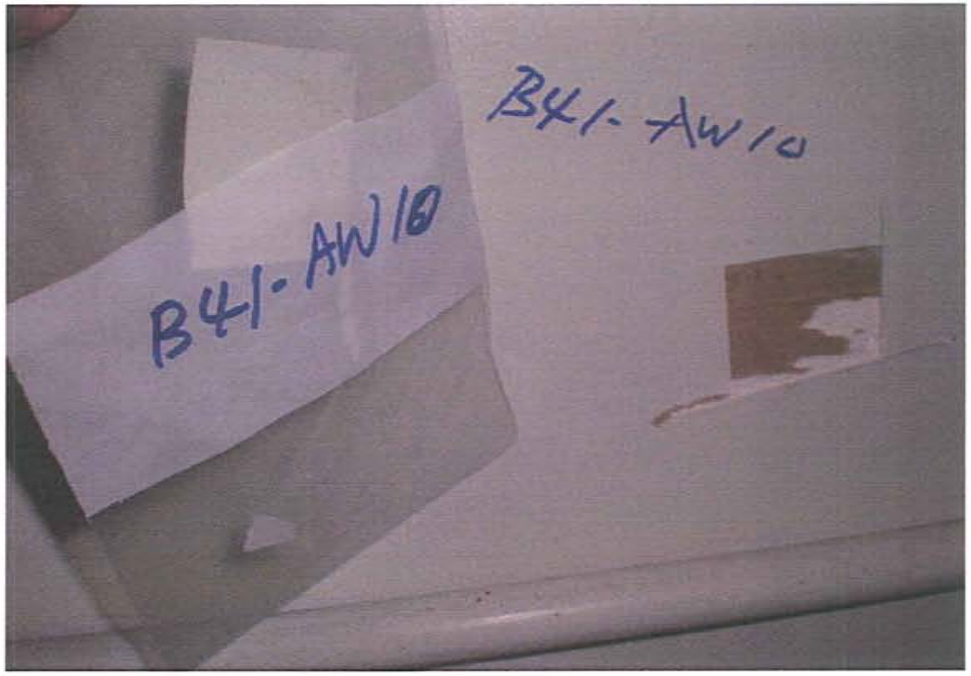
AM20
B41

B41-AM19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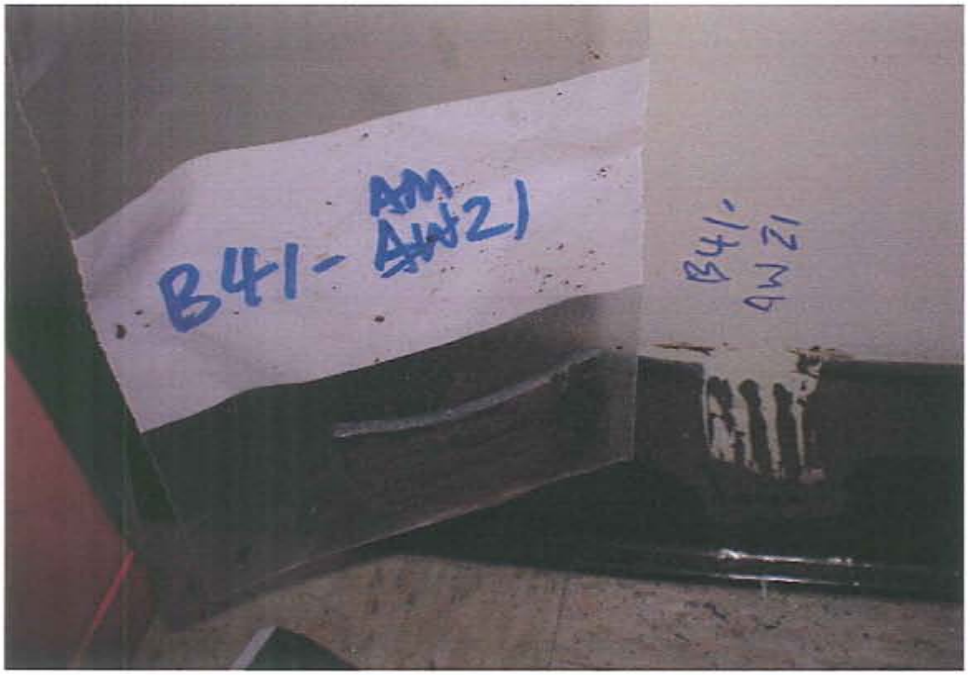
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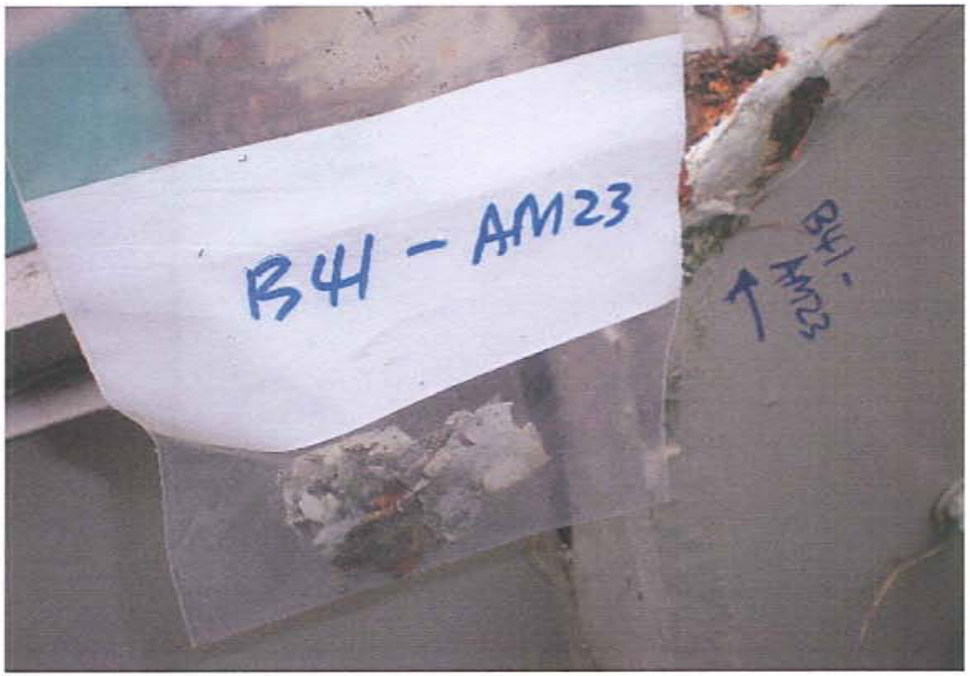
B41-
AM21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B41-
AM23

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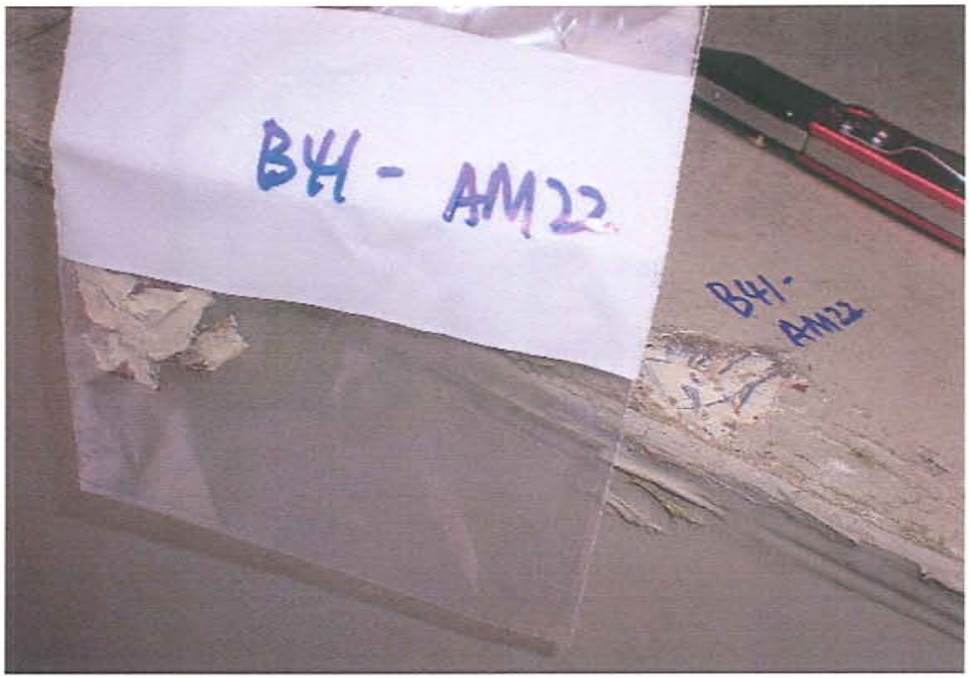
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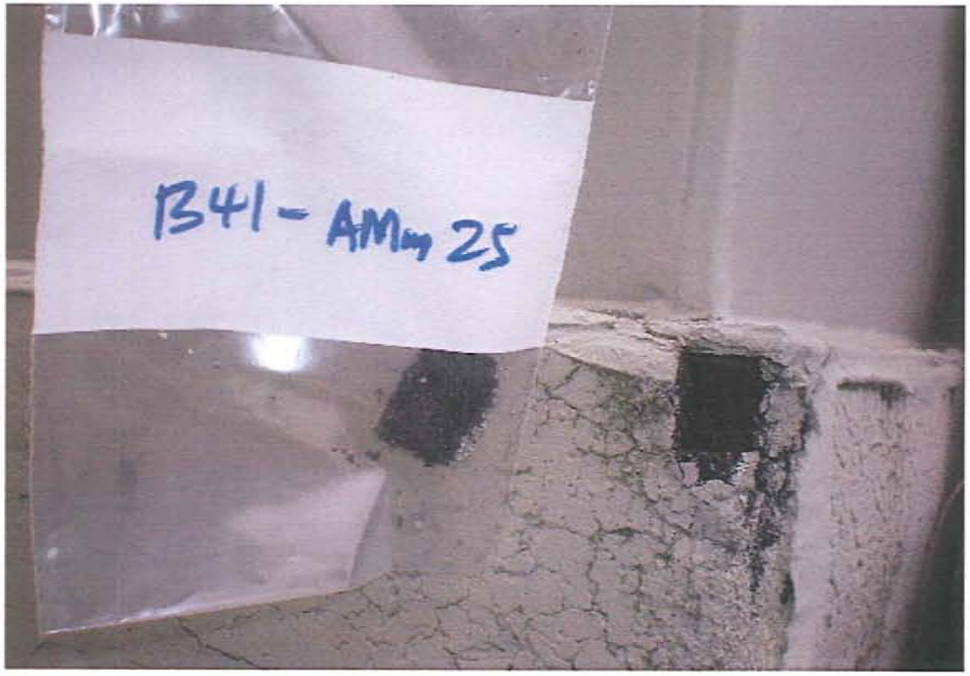
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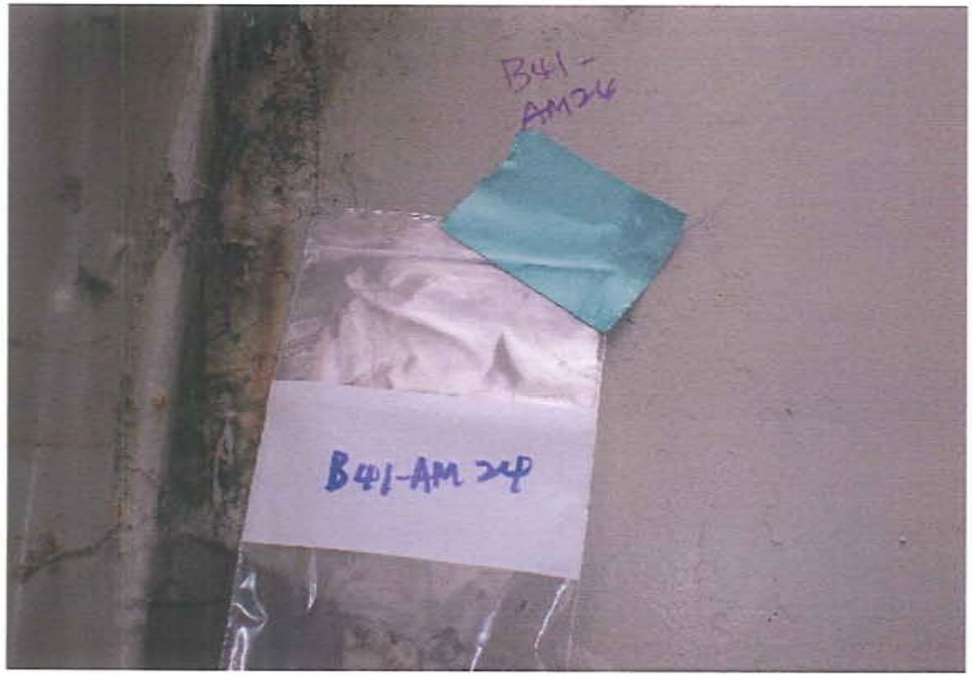
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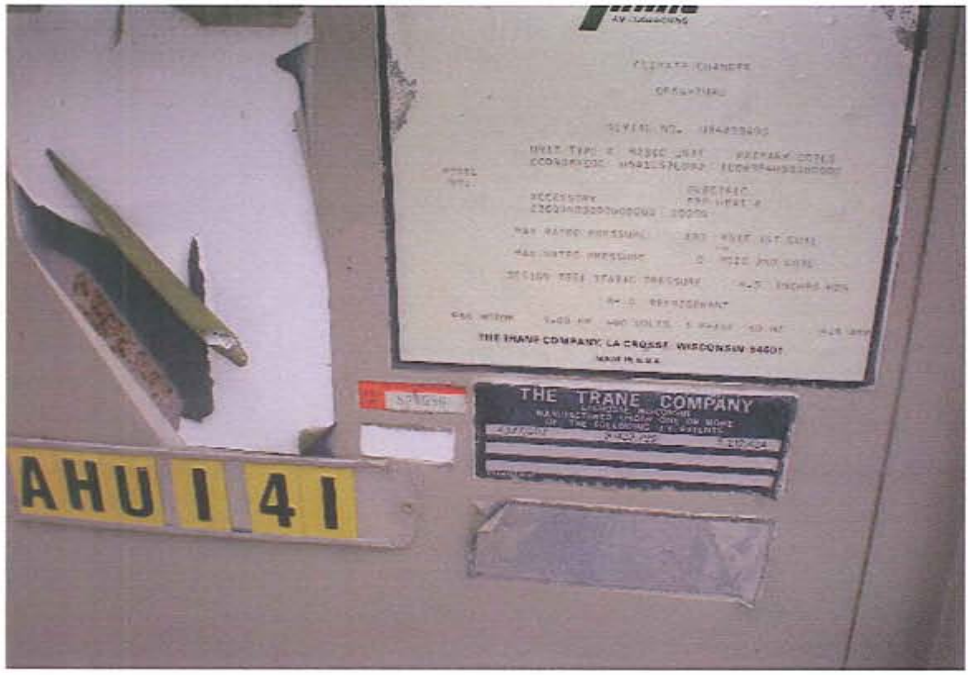
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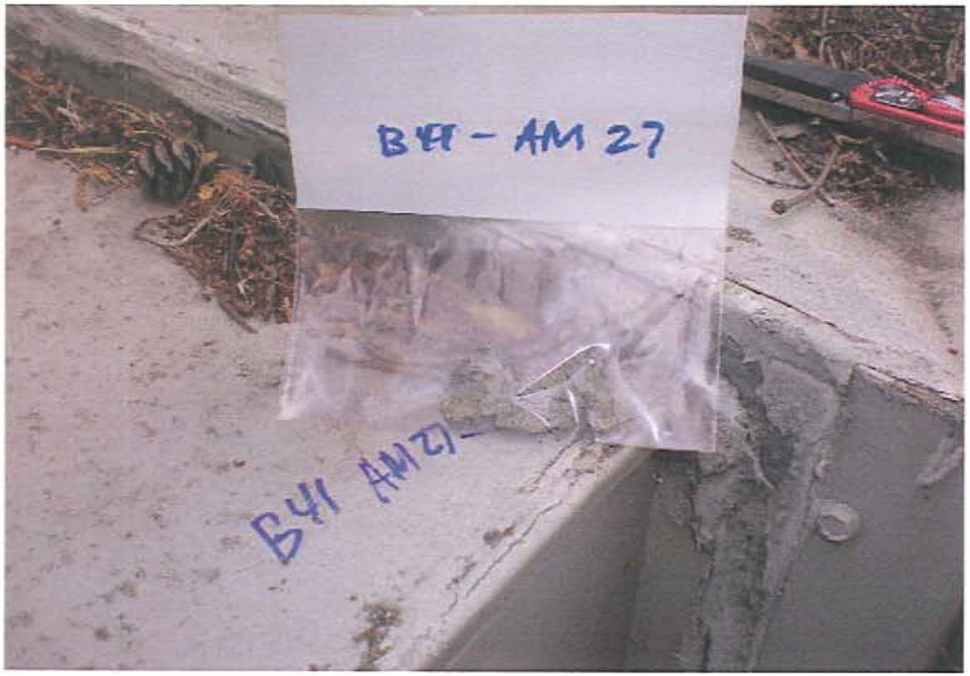
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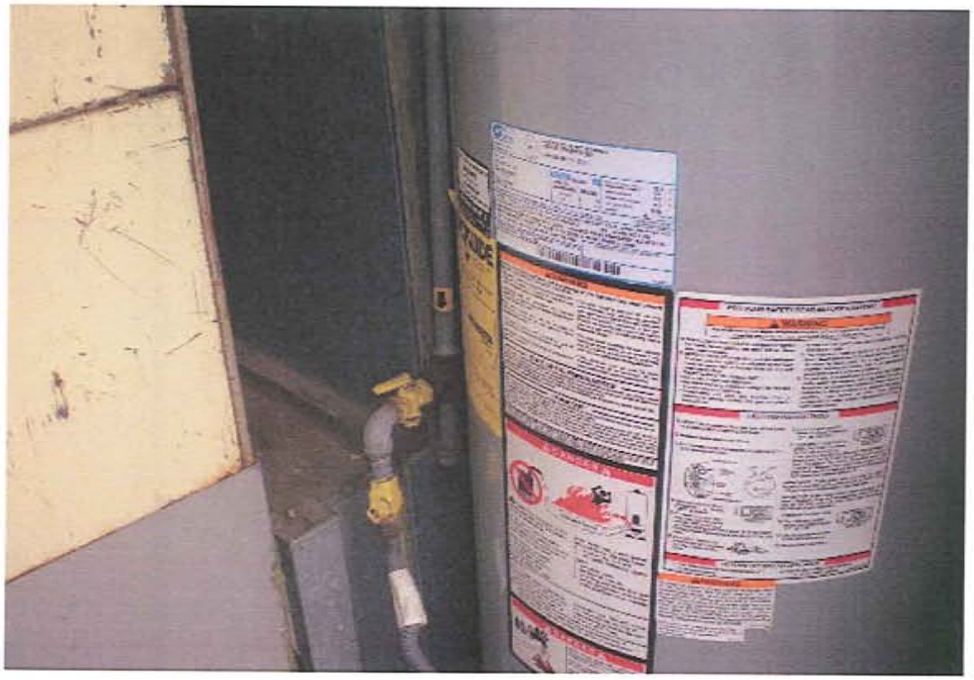

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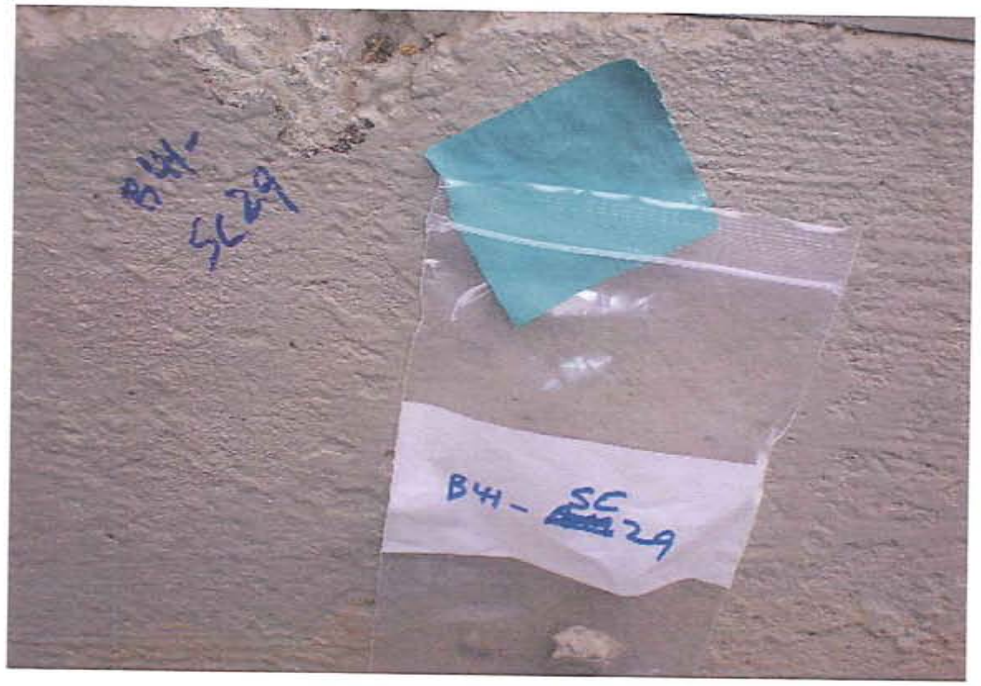
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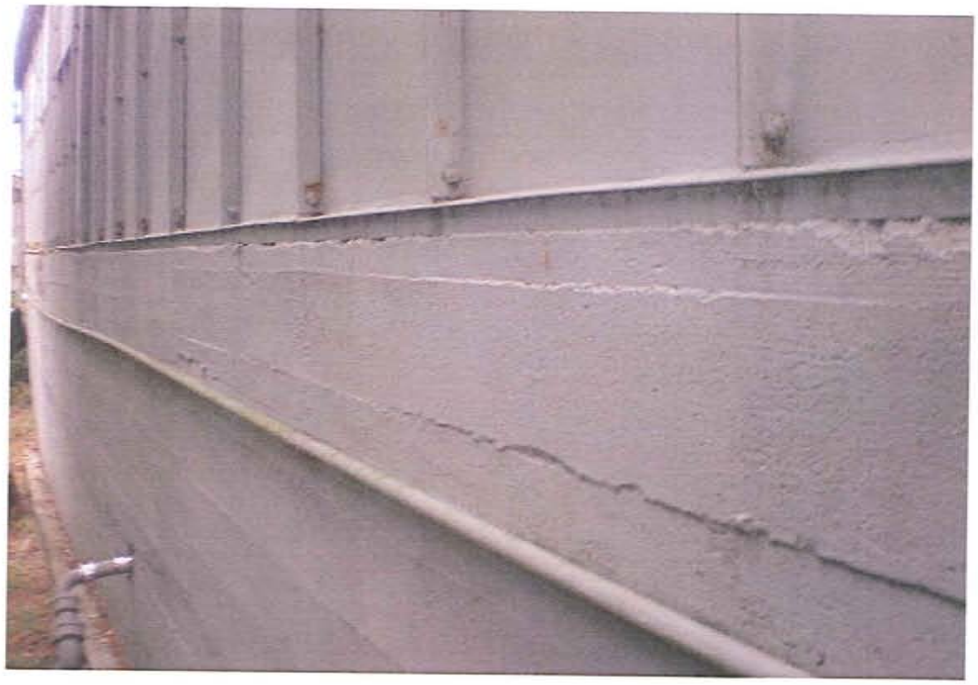

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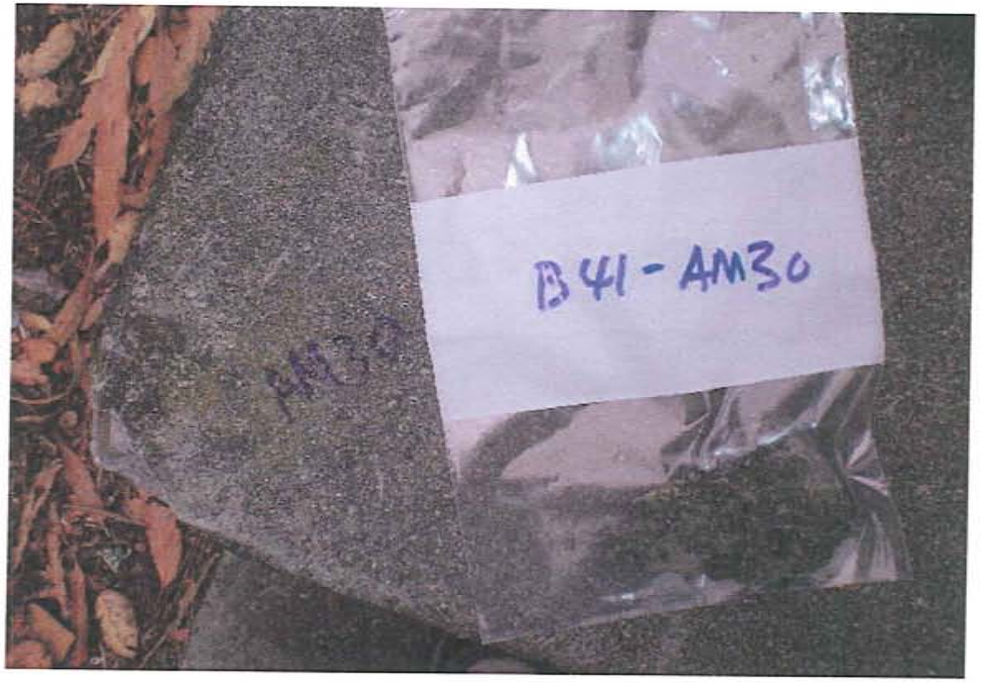
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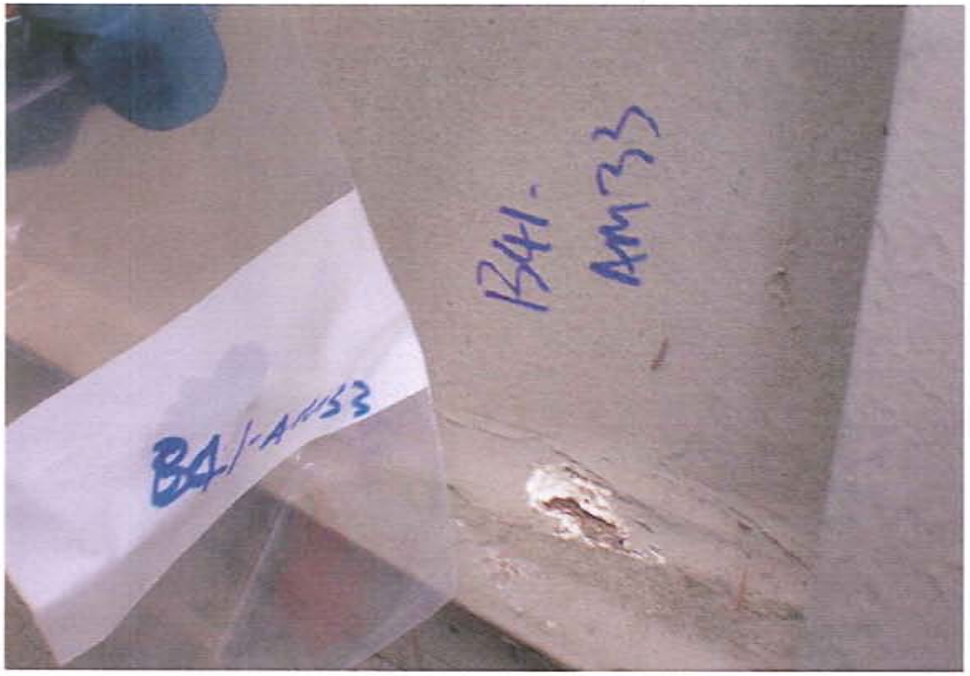
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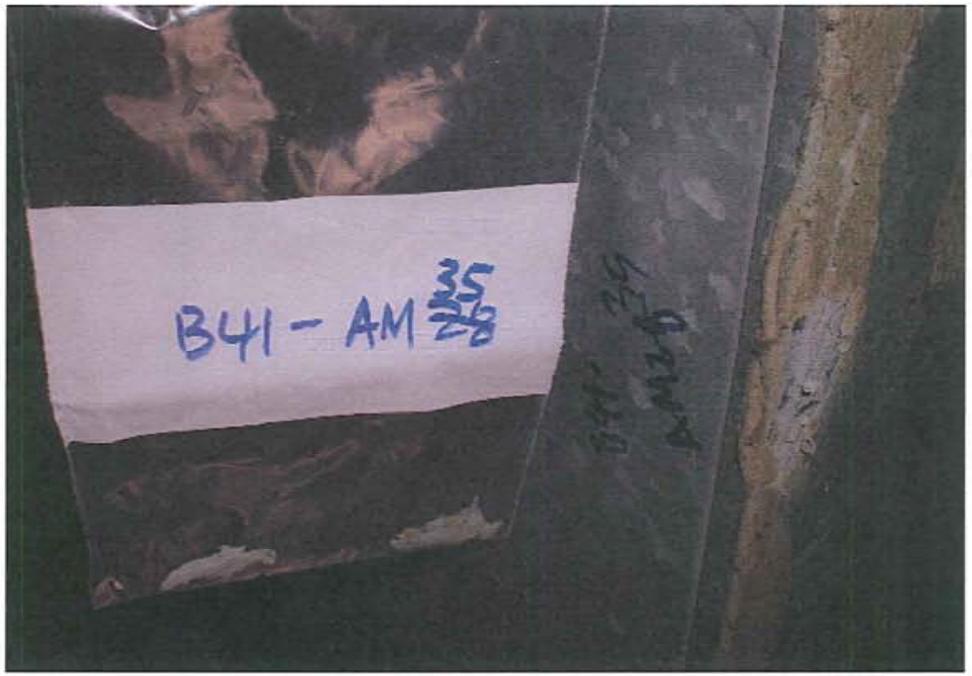
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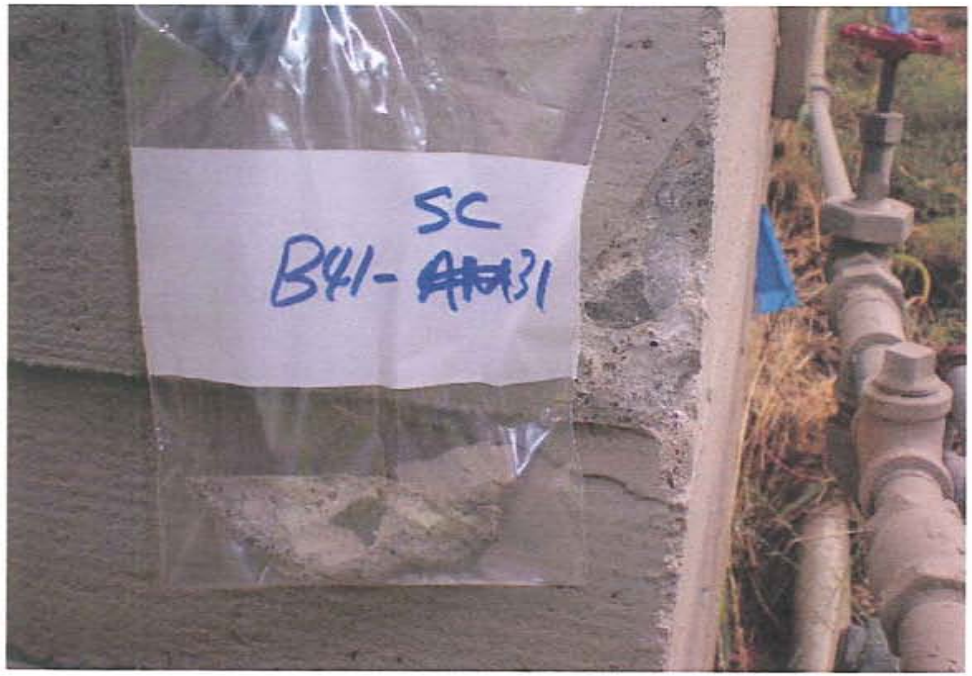
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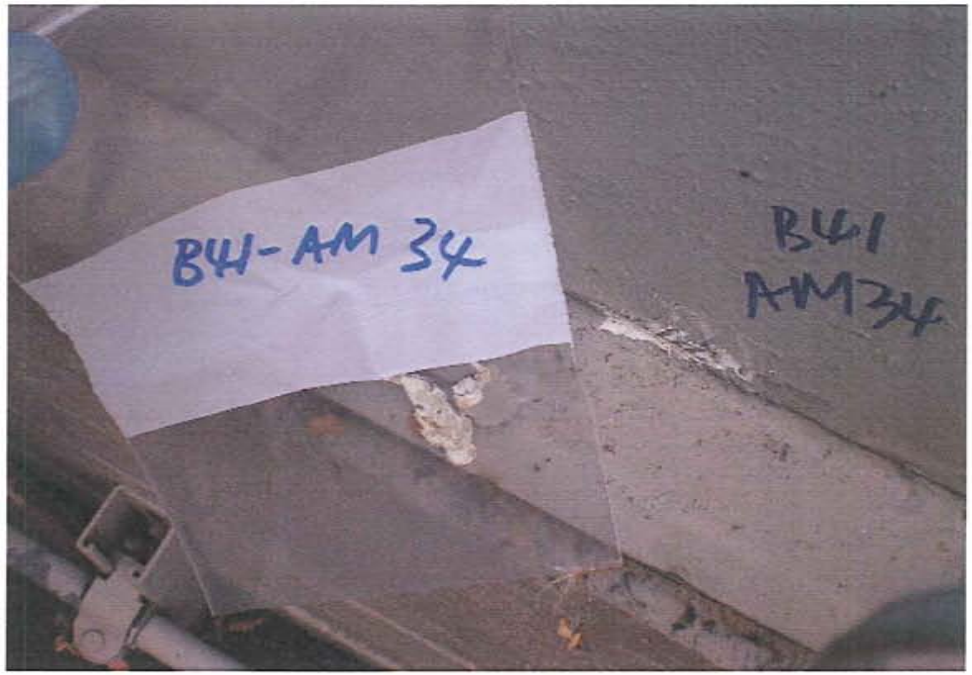
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AM34

Roofing
244

A Creative Joint Venture For Better Environmental Solutions

Lawrence Berkeley National Laboratory
Building 44
One Cyclotron Road
Berkeley, CA 94744

KELLCO-MACS Job #1004-17

NESHAP Compliant Pre-Demolition
Asbestos and Metals in Paint Inspection Report

for

Weiss Associates
5801 Christie Avenue
Suite 600
Emeryville, CA 94608

December 29, 2010
Revised

3137 Diablo Avenue • Hayward, CA 94545-2701• (510) 786-9751 • fax (510) 786-9625
http://www.kellcomacs.com email: mailbox3137@kellcomacs.com

A Creative Joint Venture For Better Environmental Solutions

NESHAP Compliant Pre-Demolition
Asbestos and Metals in Paint Inspection Report

Date:	December 29, 2010
KELLCO-MACS Job #:	1004-17
Client:	Ms. Agata Sulczynski Weiss Associates 5801 Christie Avenue Suite 600 Emeryville, CA 94608
Location:	Lawrence Berkeley National Laboratory Building 44 One Cyclotron Road Berkeley, CA 94744
Date of Inspection:	July 13, 19, 21, 22 & 26, 2010
Inspectors:	Siew Yee Lee CAC # 09-4546, CDPH Lead # 19509
Description of the Inspected Area:	This is an asbestos and Heavy Metals inspection on building 44 on the University of California, Berkeley campus in Berkeley, CA. Building 44 contains offices and workshop areas, which is constructed of exterior metal walls, metal roofing and concrete foundation. The interior of the building contains carpet and vinyl flooring over concrete.

Background

This is a NESHAP compliant pre-demolition asbestos and metals inspection report for Building 44 located at LBNL in Berkeley, CA.

Synopsis

Asbestos was found in the following materials:

- Roofing Penetration Mastic
- Wall Texture, Drywall and Joint Compound

It was visually noted that the paint within the building is in poor condition.

Designation of material as asbestos containing should be applied to homogenous materials of the type analyzed and found to contain asbestos.

About the Inspection

The inspection performed was both visual and tactile. Samples were taken of suspect materials located at the interior and exterior of the survey area.

The inspection was limited to those materials readily discerned in a reasonable inspection by a competent inspector. Materials that are hidden within walls, behind structures, in vertical shafts or in areas that make them not readily available to our inspector were not sampled. If future work uncovers any non-sampled materials, these should be submitted for asbestos and/or lead paint analysis.

The following numbering convention was used for this inspection:

LETTER	STANDS FOR	EXAMPLE	MEANING
XX	Building DESIGNATION based on information provided on drawings provided to us prior to inspection	B44	Building 44
Y & *Optional Z*	EITHER building SYSTEM (W: wall; F: Flooring; C: Ceiling; T: TSI; M: Misc) OR Further designation of sample location as Unit # within building	SN AM AC CK	Tile/Mastic Sample Asbestos Miscellaneous Asbestos Ceiling Sample Caulk Sample
xx	Sample number and layer	01 01a 02	First Sample, First Layer First Sample, Second Layer Second Sample First Layer

- ***Asbestos Findings***

Asbestos samples were analyzed in the KELLCO-MACS laboratory, by Polarized Light Microscopy, the EPA's recommended method. Copies of the full laboratory reports are attached.

Photographs of sampled materials are included. Sample locations are noted on the attached not-to-scale drawing.

The determination of a material to be Asbestos Containing Material (ACM) was made either by direct sampling or by homogeneity with at least one positive sample of the same material.

Materials that tested **positive** for asbestos are:

Building 44:

Lab Sample #	Field Sample #	Field Description	Asbestos %
L206479-14	44-AW10	Restroom 101B, west wall at 4 ft / wall texture	2% Chrysotile
L206479-15	44-AW10a	Restroom 101B, west wall at 4 ft / taping mud	2% Chrysotile
L206479-17	44-AW11	Room 101A, northwest corner / wall texture	2% Chrysotile
L206479-18	44-AW11a	Room 101A, northwest corner / taping mud	2% Chrysotile
L206479-21	44-AW13	Room 101A, south wall at 4 ft / wall texture	< 1% Chrysotile
L206479-22	44-AW13a	Room 101A, south wall at 4 ft / drywall & taping mud	< 1% Chrysotile
L206479-31	44-CK20	Ridge vent on roof / Penetration Mastic	11% Chrysotile

Samples that have less than 10% asbestos can be submitted for further analysis by the Point Count method as described elsewhere in this document. If the Point Count method determines that the material contains less than 1% asbestos, these materials can be disposed of as non-hazardous asbestos containing construction waste.

Materials for which the analytical results show **no detection** of asbestos are:

Building 44:

Lab Sample #	Field Sample #	Field Description
L206479-1	44-AM01	Towards north end of 101 grey flooring material
L206479-2	44-AM01a	Towards north end of 101 carpet glue
L206479-3	44-AM02	Center of 101 / yellow carpet glue
L206479-4	44-AM03	Room 101A / yellow carpet glue
L206479-5	44-AM04	Restroom 101B by doorway / off white vinyl floor sheeting
L206479-6	44-AM04a	Restroom 101B by doorway / off white vinyl floor sheeting & paper backing
L206479-7	44-AM05	Restroom 101B by commode / off white vinyl floor sheeting
L206479-8	44-AM05a	Restroom 101B by commode / off white vinyl floor sheeting & paper backing
L206479-9	44-AM06	Restroom 101B by partition wall / off white vinyl floor sheeting

Lab Sample #	Field Sample #	Field Description
L206479-10	44-AM06a	Restroom 101B by partition wall / off white vinyl floor sheeting & paper backing
L206479-11	44-AM07	Under sink in 101 / grey floor leveling compound
L206479-12	44-AM08	Room 101, southeast end of wall under sink / blue/grey paint and/or wall coating
L206479-13	44-CK09	Window in 10B / grey window caulking
L206479-16	44-AW10b	Restroom 101B, west wall at 4 ft / wall texture
L206479-19	44-AW11b	Room 101A, northwest corner / wall texture
L206479-20	44-AW12	Room 101B, between metal & concrete wall / brown crack filler
L206479-23	44-AW13b	Room 101A, south wall at 4 ft / drywall
L206479-24	44-AW14	Room 101 / brown sink counter top
L206479-25	44-AW14a	Room 101 / brown sink counter top
L206479-26	44-CK15	Room 101A / window caulking
L206479-27	44-AM16	Room 101, west wall / paint or wall coating
L206479-28	44-CK17	Room 101, air conditioner / duct joint compound
L206479-29	44-AW18	Exterior east wall of building / paint or wall coating
L206479-30	44-SC19	Under east exit of building / concrete
L206479-32	44-AM21	Under Ridge Vent / Insulation

- ***Metals in Paint Findings***

Two (2) paint samples were collected and submitted for Heavy Metals (CAM 17) analysis to Macs Lab, Inc.

These samples were analyzed using an ICP/MS, Extraction Method SW3050B TTLC and EPA 6010B/3050 method. This method is **not** for the purpose of profiling any waste streams from this project. Profiling of the waste streams (TCLP & STLC) will be the responsibility of the contractor performing the work. The results of the profiling of the waste streams can vary dramatically depending on the means and methods utilized by the contractor during the demolition of the buildings. Care needs to be taken to ensure that all OSHA and EPA rules are abided by. The EPA rules are typically contained within title 22 and the OSHA rules are typically contained within title 8. Please find the following list as guidance; furthermore, it is not intended to be all encompassing but as a starting point for review in regulatory compliance.

Lab Sample #	Field Sample	Field Description
206481-1	44-PC1	Interior- Paint Chip off Metal
206481-2	44-PC2	Exterior- Paint Chip off Metal

Building 44

	Lab Sample Number:	206481 -1	206481 -2	206592-1
	Client Sample Number:	44-PC1	44-PC2	B44-PC1
	Matrix:	Bulk	Bulk	Bulk
	Extraction Type:	Acid	Acid	Acid
	Units:	mg/kg (PPM)	mg/kg (PPM)	mg/kg (PPM)
Sb	Antimony	1,012.84	1,082.35	1,075.81
As	Arsenic	109.17	250.82	972.99
Ba	Barium	153.24	828.47	1647.19
Be	Beryllium	0.63	0.71	0.98
Cd	Cadmium	573.17	323.76	177.67
Cr	Chromium	165.40	7,856.47	19,393.56
Co	Cobalt	394.73	232.38	437.46
Cu	Copper	116.75	183.20	311.59
Pb	Lead	22,173.57	44,047.06	119,014.53
Hg	Mercury	4.35	14.66	3.51
Mo	Molybdenum	187.59	217.22	178.30
Ni	Nickel	36.11	29.18	94.01
Se	Selenium	7,228.06	7,268.24	7,209.41
Ag	Silver	26.89	13.39	36.59
Tl	Thallium	112.18	116.66	156.25
V	Vanadium	64.73	36.89	92.29
Zn	Zinc	55,594.47	81,058.82	57,548.96

Regulatory Requirements

The Environmental Protection Agency (EPA) defines Asbestos Containing Material as any material that contains greater than 1% asbestos. Materials containing greater than 1% asbestos must be removed prior to demolition or renovation if they will be disturbed.

Friable asbestos containing material is any material that can be crushed or pulverized by hand pressure when dry, or materials that can be rendered to a crumbled, pulverized, or powdered state when dry by crushing, sanding, sawing, shot blasting, or through demolition or renovation activities.

As stated by NESHAP regulations, any material that contains less than 10% asbestos using the visual estimation method can be point counted with gravimetric reduction. The Point Counting method is a much more accurate analytical method for determining the percent of asbestos in a particular material. If the Point Count method determines that the material contains less than 1% asbestos, the material being analyzed can be disposed of as non-hazardous asbestos containing construction waste.

Removal or disturbance of material with any detectable amount of asbestos must be handled in accordance with OSHA regulations. Cal-OSHA registration is required if the material contains more than .1% asbestos (1/10th of a percent). If there is more than 100 feet (linear or square) of an asbestos containing material that will be abated or disturbed, a California State registered and licensed asbestos abatement contractor must perform the work. If there is less than 100 feet, the work does not require a licensed asbestos abatement contractor, but must still conform to Cal-OSHA regulations.

Title 8 OSHA

General Industry Safety Orders deal with exposure limits for personnel working in or around surfaces that contain heavy metals.

Element	Chapter	Group	Article	Section
Antimony (Sb)	7	16	107	5155
Arsenic (As)	7	16	110	5214
Barium (Ba)	7	16	107	5155
Beryllium (Be)	7	16	107	5155
Cadmium (Cd)	7	16	110	5206
Chromium (Cr)	7	16	110	5206
Cobalt (Co)	7	16	110	5155
Copper (Cu)	7	16	110	5155
Lead (Pb)	7	16	109	5198
Mercury (Hg)	7	16	110	5155
Molybdenum (Mo)	7	16	110	5155
Nickel (Ni)	7	16	110	5155
Selenium (Se)	7	16	110	5155
Silver (Ag)	7	16	110	5155
Thallium (Ti)	7	16	110	5155

Element	Chapter	Group	Article	Section
Vanadium (V)	7	16	110	5155
Zinc (Zn)	7	16	107	5155

Title 22- Hazardous Waste

Title 22 describes the characterization of hazardous waste as described in chapter 11, article 1, section 66261.1. Under the EPA's Resource Conservation and Recovery Act (RCRA), a national program and inventory system about handling hazardous waste, describes the minimum requirements in order to be in compliance with the Federal and/or State regulations. Building 44

Comment Regarding All Asbestos Containing Materials:

Asbestos containing materials in good condition do not necessarily need to be removed unless they will be disturbed; they should however be respected.

Employees, contract workers and others should be advised not to drill, saw, scrape or otherwise disturb this material without taking precautionary measures appropriate to asbestos containing material.

Asbestos containing material should be removed prior to the renovation and must be removed prior to demolition.

Areas Needing Immediate Corrective Action

Asbestos (in any condition) should be removed prior to renovation and must be removed prior to demolition of the survey site.

Analytical Procedures

- ***POLARIZED LIGHT MICROSCOPY (PLM)***

  Bulk samples were analyzed in accordance with U.S. EPA "Test Method for Determination of Asbestos in Bulk Building Materials, 1993," with inclusion of area percent estimates of the sample components. The use of the McCrone Color Dispersion Staining Technique supplements the analysis when considered useful by the analyst. The samples are prepared with refractive immersion oil and are examined under Polarized Light Microscopy (PLM). The accuracy of the visual estimate method is 1%.

  As per the standard "...The accuracy in the determination of the presence or absence of asbestos of greater than 1 area percent asbestos is greater than 99%." ASTM Committee D22.05, 1/18/88, Standard *Method of Testing for Asbestos Containing Materials by Polarized Light Microscopy*. If the sample matrix is reduced to minimize non-asbestos components, the detection limit can be mathematically enhanced, based on the amount of material remaining

after matrix reduction. This method is called gravimetric reduction. This method involves ashing and chemical dissolution of the sample.

- ***POINT COUNTING***

  The Point Counting method is a much more accurate analytical method for determining the percent of asbestos in a particular material. KELLCO-MACS uses a muffle furnace to ash the sample and remove organic compounds. Hydrochloric acid is used to dissolve some of the non-asbestos minerals. Under this method a minimum of 125 points are counted from each of 8 different slide preparations of the same sample (total of 1000 points min.) If the **Point Count Method** determines that the material contains less than 1% asbestos, the material being analyzed can be treated as non-hazardous asbestos containing construction waste**. Note: ONLY the Point Count Method can be used for this determination.**

- ***CAM 17 TESTING***

  CAM 17 Metals were tested by Macs Lab, Inc. using ICP-MS, Extraction Method SW3050B and Analytical Method 6010B/3050.

KELLCO-MACS Qualifications

KELLCO-MACS is a joint venture offering hazardous materials and AIHA laboratory analyses. Our credentials include:

- The KELLCO-MACS asbestos inspector is licensed with the State of California Department of Occupational Safety and Health (CAL-OSHA).

- The KELLCO-MACS lead inspector is licensed by the California Department of Public Health (CDPH)

- The laboratory accreditations include:

  - **NVLAP PLM** for Asbestos: NIST National Voluntary Laboratory Accreditation Program certificate of accreditation for bulk **asbestos** analysis by polarized light microscopy (Accreditation #101948-1).
  - **AIHA** Accreditation for **Industrial Hygiene** Analytical Laboratory for PCM, and AA for lead (Accreditation #101786).
  - **AIHA Analyst Proficiency (NIOSH PAT)** (Accreditation # 11172)
  - **AIHA ELLAP** Accreditation for Lead: Accreditation for the **Environmental Lead** Laboratory recognized by the EPA as meeting the requirements of the National Lead Laboratory Accreditation Program established under Title X (Lab ID #11109).
  - **ELAP PLM** for Asbestos: California Department of Health Services, Environmental Laboratory Accreditation Program, certificate for bulk asbestos analysis (Certificate #2027)
  - **USDA Soil** permit #39484

The following supporting documents are attached to this report:

- Laboratory analytical reports
- Photographs of sample locations
- Floor plan or sketch showing sample locations

Please call KELLCO if there are any questions and/or clarifications regarding this report. We look forward to working with you in the future.

Sincerely,

KELLCO-MACS

Tim C. Cannard CAC #94-1395, CDPH Lead #764
Senior Project Manager

Asbestos Definitions and Classifications

ACM	(Asbestos Containing Material) - Material containing more than 1% asbestos. ACM must be disposed as hazardous waste. Note: Federal OSHA and Cal-OSHA control materials containing any amount of asbestos.
ACBM	(Asbestos Containing Building Material) – AHERA/ASHARA term for material containing more than 1% asbestos in or on interior structural members or other structural components. Exceptions: Covered walkways, porticos and exterior HVAC TSI.
ACCM	(Asbestos Containing Construction Material) – California term for a manufactured construction material containing greater than .1% (one tenth of one percent) asbestos.
PACM	(Presumed Asbestos Containing Material) OSHA considers all TSI and surfacing materials installed prior to1980 to be ACM unless proven otherwise.
Friable	Asbestos Containing Material that can be crumbled pulverized or reduced to powder by hand pressure when dry.
NOA	Naturally Occurring Asbestos. CARB defines as having >.25% by point counting.

Categories of Asbestos Used BY EPA AHERA/ASHARA and OSHA/Cal-OSHA

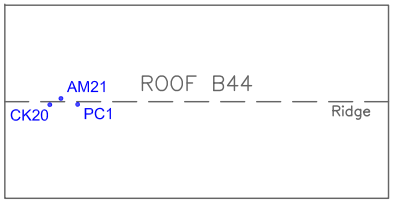
TSI	(Thermal System Insulation) - "Thermal system insulation (TSI)" means ACM applied to pipes, fittings, boilers, breeching, tanks, ducts or other structural components to prevent heat loss or gain. "Thermal system insulation ACM" is thermal system insulation which contains more than 1% asbestos.
SURFACING (usually mixed on site at time of application)	"Surfacing material" means material that is sprayed, troweled-on or otherwise applied to surfaces (such as acoustical plaster on ceilings and fireproofing materials on structural members, or other materials on surfaces for acoustical, fireproofing, and other purposes). "Surfacing ACM" means surfacing material which contains more than 1% asbestos. NOTE: OSHA/Cal-OSHA do not classify taping mud, floor tile mastic, stucco, leveling compound, and hard wall plasters or wall texturing as surfacing.
MISC.	All other ACM, including classify taping mud, floor tile mastic, stucco, leveling compound, and hard wall plasters or wall texturing as surfacing.

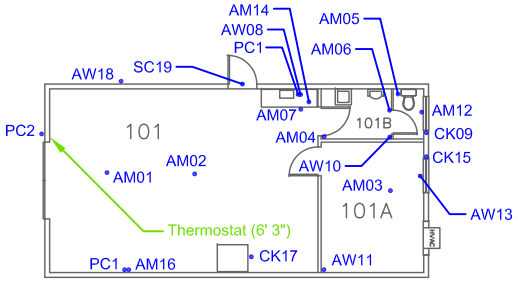
NESHAPS Categories for Asbestos (used by Air Quality Management Districts)

Category I	Cat I Non-friable Asbestos Containing Material refers to asbestos containing packing, gaskets, resilient floor covering, Galbestos, and asphalt roofing products containing more than 1% asbestos.
Category II	Cat II Non-friable Asbestos-Containing Material is any material that is not Cat I that contains greater than 1% asbestos.
RACM	"Regulated Asbestos-Containing Material." – Friable asbestos material (ACM) or a Category I non-friable ACM that has become friable OR a 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 reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations. RACM should be removed prior to renovation or demolition.

Characterization of Asbestos Containing Materials

Material	Estimated Quantity	TSI	Surfacing	Misc	RACM	Cat I	Cat II
Building 44							
Wall texture, drywall and joint compound	~ 500 sq. ft.		X		X		
Roofing / Penetration Mastic	~ 30 sq. ft.			X		X	





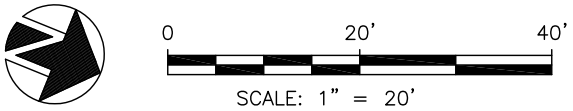
B44

ABBREVIATIONS

AM	Asbestos miscellaneous
AW	Asbestos wall sample
CK	Caulk sample
PC	Paint sample
SC	Concrete sample

NOTE:

All sample locations are approximate



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MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Method: EPA-600/M4-82-020

KELLCO Services
3137 Diablo Ave

Hayward CA 94545

Person to contact: Tim Cannard
Contact phone: 510-786-9751
FAX phone: 510-786-9625
Sampled by: Siew Yee Lee
Sampled on: July 13, 2010
Analyzed on: July 29, 2010 at: 12:36
Corresponding invoice number: 206479

Analyst: HCB
HCB (signature)

Laboratory manager: _____
(signature)

Job Number: 1004-17

Job Description: Lawrence Berkeley National Laboratory - One Cyclotron Road - Building 44 - Berkeley, CA 94744

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206479-1	44-AM01 Towards north end of 101 grey flooring material & carpet glue	**N.D.**	< 1% Cellulose	Gray leveling compound. Balance of sample is cementitious.
L206479-2	44-AM01a Towards north end of 101 grey flooring material & carpet glue	**N.D.**	1% Cellulose	Yellow adhesive. Balance of sample is organic binders.
L206479-3	44-AM02 Center of 101 / yellow carpet glue	**N.D.**	1% Cellulose	Yellow adhesive. Balance of sample is organic binders.
L206479-4	44-AM03 Room 101A / yellow carpet glue	**N.D.**	1% Cellulose	Yellow adhesive. Balance of sample is organic binders.
L206479-5	44-AM04 Restroom 101B by doorway / off white vinyl floor sheeting & paper backing	**N.D.**	23% Cellulose 4% Fiberglass 1% Polyethylene	Off-white linoleum. Balance of sample is polymer and unspecified non-fibrous material.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

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NVLAP Lab Code 101948-0

MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

QA Report

Method: EPA-600/M

KELLCO Services
3137 Diablo Ave

Hayward CA 94545

Laboratory manager: _____ (signature)

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
Blank sample		**N.D.** PC*	No fibers	
L206479-5	44-AM04 Restroom 101B by doorway / off white vinyl floor sheeting & paper backing	**N.D.**	23% Cellulose 4% Fiberglass 1% Polyethylene	Off-white linoleum. Balance of sample is polymer and unspecified non-fibrous material.
L206479-9	44-AM06 Restroom 101B by partition wall / off white vinyl floor sheeting & paper backing	**N.D.**	17% Cellulose 8% Synthetic 3% Fiberglass	Off-white linoleum. Balance of sample is polymer and unspecified non-fibrous material.
L206479-12	44-AM08 Room 101, southeast end of wall under sink / blue/grey paint and/or wall coating	**N.D.**	No Fibers	Gray coating/paint. Balance of sample is unspecified non-fibrous material.
L206479-24	44-AW14 Room 101 / brown sink counter top	**N.D.**	68% Cellulose	Brown counter top. Balance of sample is unspecified non-fibrous material.

End of report.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

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MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206479-6	44-AM04a Restroom 101B by doorway / off white vinyl floor sheeting & paper backing	**N.D.**	1%Cellulose	Yellow adhesive. Balance of sample is organic binders.
L206479-7	44-AM05 Restroom 101B by commode / off white vinyl floor sheeting & paper backing	**N.D.**	16%Cellulose 10%Synthetic 4%Fiberglass	Off-white linoleum. Balance of sample is polymer and unspecified non-fibrous material.
L206479-8	44-AM05a Restroom 101B by commode / off white vinyl floor sheeting & paper backing	**N.D.**	1%Cellulose	Yellow adhesive. Balance of sample is organic binders.
L206479-9	44-AM06 Restroom 101B by partition wall / off white vinyl floor sheeting & paper backing	**N.D.**	15%Cellulose 9%Synthetic 4%Fiberglass	Off-white linoleum. Balance of sample is polymer and unspecified non-fibrous material.
L206479-10	44-AM06a Restroom 101B by partition wall / off white vinyl floor sheeting & paper backing	**N.D.**	1%Cellulose	Yellow adhesive. Balance of sample is organic binders.
L206479-11	44-AM07 Under sink in 101 / grey floor leveling compound	**N.D.**	< 1%Cellulose	Gray levelling compound. Balance of sample is cementitious.
L206479-12	44-AM08 Room 101, southeast end of wall under sink / blue/grey paint and/or wall coating	**N.D.**	No Fibers	Gray coating/paint. Balance of sample is unspecified non-fibrous material.
L206479-13	44-CK09 Window in 10B / grey window caulking	**N.D.**	1%Cellulose	Off-white caulk. Balance of sample is unspecified non-fibrous material.
L206479-14	44-AW10 Restroom 101B, west wall at 4 ft / wall texture, drywall & taping mud	**Yes**	2%Chrysotile* 1%Cellulose	Off-white compound texture. Balance of sample is unspecified non-fibrous material.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

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MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206479-15	44-AW10a Restroom 101B, west wall at 4 ft / wall texture, drywall & taping mud	**Yes**	2%Chrysotile* 33%Cellulose	Off-white plaster compound/tape. Balance of sample is unspecified non-fibrous material.
L206479-16	44-AW10b Restroom 101B, west wall at 4 ft / wall texture, drywall & taping mud	**N.D.**	22%Cellulose	Off-white plaster. Balance of sample is unspecified non-fibrous material.
L206479-17	44-AW11 Room 101A, northwest corner / wall texture, drywall & taping mud	**Yes**	2%Chrysotile* < 1%Cellulose	Off-white compound texture. Balance of sample is unspecified non-fibrous material.
L206479-18	44-AW11a Room 101A, northwest corner / wall texture, drywall & taping mud	**Yes**	2%Chrysotile* 34%Cellulose	Off-white joint compound/tape. Balance of sample is unspecified non-fibrous material.
L206479-19	44-AW11b Room 101A, northwest corner / wall texture, drywall & taping mud	**N.D.**	22%Cellulose	Off-white plaster. Balance of sample is unspecified non-fibrous material.
L206479-20	44-AW12 Room 101B, between metal & concrete wall / brown crack filler	**N.D.**	82%Cellulose	Brown fibrous filler. Balance of sample is unspecified non-fibrous material.
L206479-21	44-AW13 Room 101A, south wall at 4 ft / wall texture, drywall & taping mud	**Yes**	< 1%Chrysotile* 1%Cellulose	Off-white compound texture. Balance of sample is unspecified non-fibrous material.
L206479-22	44-AW13a Room 101A, south wall at 4 ft / wall texture, drywall & taping mud	**Yes**	< 1%Chrysotile* 32%Cellulose	Off-white joint compound/tape. Balance of sample is unspecified non-fibrous material.
L206479-23	44-AW13b Room 101A, south wall at 4 ft / wall texture, drywall & taping mud	**N.D.**	22%Cellulose	Off-white plaster. Balance of sample is unspecified non-fibrous material.

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L206479

KELLCO-MACS

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Chain of Custody Record

For Bulk PLM Sample Collection Only

Page 1 of

BILLED TO	PROJECT INFORMATION	
Name: Kellco - MACS	Sampled By: Siew Yee Lee	Date Sampled: 7/13/10
Address: 3137 Diablo Avenue	Project Manager: Tim Cannard	Job #: 1004-17
City: Hayward	Project Name: Lawrence Berkeley National Lab	
State: Ca Zip: 94545	Site Address: Bldg 44,	
Phone No: (510) 786-9751	City, State, Zip: Berkely, Ca	
Fax No: (510) 786-9625	Site Contact:	
Cell No:	Phone No:	Fax No:
Email:	Samples Preserved: Yes / No	Analyze to First Positive: Yes / No

ANALYSIS REQUIRED

Required Turn Around Time: 4 Hour ___ 8 Hour ___ 24 Hour XX 2 Days/48 Hour ___ 3 Days/72 Hour ___ 5+ Days/120 Hour ___

DISPOSAL: ☐ Customer ☒ Laboratory ☐ OTHER (Explain)

	Sample #	Sample Location / Sample Description (Color)	PLM (Bulk) - 40 CFR - Chap. 1, Part 763, Subpart F Appendix A or current EPA method	(F)riable / (N)on Friable	Condition: (G)ood / (F)air / (P)oor	Length (Feet)	Width (Feet)	Height (Feet)	Quantity
1004-17 — 1	44-AM01	Towards north end of 101 / flooring material and carpet glue (grey)	X						
1004-17 — 2	44-AM02	Center of 101 / carpet glue (yellow)	X						
1004-17 — 3	44-AM03	Room 101A / carpet glue (yellow)	X						
1004-17 — 4	44-AM04	Restroom 101B by doorway/ vinyl floor sheeting and paper backing (off white)	X						
1004-17 — 5	44-AM05	Restroom 101B by commote/ vinyl floor sheeting and paper backing (off white)	X						
1004-17 — 6	44-AM06	Restroom 101B by partition wall/ vinyl floor sheeting and paper backin (off white)	X						
1004-17 — 7	44-AM07	Under sink in 101 / floor leveling compound (grey)	X						
1004-17 — 8	44-AM08	Room 101, SE end of wall under sink / paint and/or wall coating (blue/grey)	X						
1004-17 — 9	44-CK09	Window in 101B / window caulking (grey)	X						
1004-17 — 10	44-AW10	Restooom 101 B , west wall at 4 ft / Wall texture, drywall and taping mud	X						

Relinquished By: [signature] *Date:* 7/21/2010 *Time:* 0720

Accepted By: D. Kaleb *Date:* 07/21/10 *Time:* 07:20

Lab Report Number(s):

Delivery Type: ~~Drop Off~~ *FedEx* *Mail* *Other*

WB - Wallboard JC - Joint Compound WT - Wall Texture WBT - Wallboard Tape FT - Floor Tile FTM - Floor Tile Mastic BBM - Baseboard Mastic
RSF - Resilient Sheet Flooring CT - Ceiling Tile SAAM - Spray-Applied Acoustical Material R - Roof TSI - Thermal System Insulation EL - Elbow

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http://www.kellcomacs.com email: mailbox3137@kellcomacs.com

MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206479-24	44-AW14 Room 101 / brown sink counter top	**N.D.**	69%Cellulose	Brown counter top. Balance of sample is unspecified non-fibrous material.
L206479-25	44-AW14a Room 101 / brown sink counter top	**N.D.**	< 1%Cellulose	Brown adhesive. Balance of sample is unspecified non-fibrous material.
L206479-26	44-CK15 Room 101A / window caulking	**N.D.**	1%Cellulose	Gray caulk. Balance of sample is unspecified non-fibrous material.
L206479-27	44-AM16 Room 101, west wall / paint or wall coating	**N.D.**	< 1%Cellulose	Gray coating/paint. Balance of sample is unspecified non-fibrous material.
L206479-28	44-CK17 Room 101, air conditioner / duct joint compound	**N.D.**	< 1%Cellulose	Gray duct compound caulk. Balance of sample is unspecified non-fibrous material.
L206479-29	44-AW18 Exterior east wall of building / paint or wall coating	**N.D.**	< 1%Cellulose	Gray coating/paint. Balance of sample is unspecified non-fibrous material.
L206479-30	44-SC19 Under east exit of building / concrete	**N.D.**	No Fibers	Gray concrete. Balance of sample is silicate and cementitious.
L206479-31	44-CK20 Ridge vent on roof / Penetration Mastic	**Yes**	11%Chrysotile* 4%Cellulose	Black roofing mastic. Balance of sample is organic binders.
L206479-32	44-AM21 Under Ridge Vent / Insulation	**N.D.**	78%Mineral Wool 1%Cellulose	Brown fibrous insulation. Balance of sample is unspecified non-fibrous material.

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NVLAP Lab Code 101948-0

L206479

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Chain of Custody Record

For Bulk PLM Sample Collection Only

Page ____ of ____

BILLED TO	PROJECT INFORMATION	
Name: Kellco - MACS	Sampled By: Siew Yee Lee	Date Sampled: 7/13/10
Address: 3137 Diablo Avenue	Project Manager: Tim Cannard	Job #: 1004-17
City: Hayward	Project Name: Lawrence Berkeley National Lab	
State: Ca Zip: 94545	Site Address: Bldg 44,	
Phone No: (510) 786-9751	City, State, Zip: Berkely, Ca	
Fax No: (510) 786-9625	Site Contact:	
Cell No:	Phone No:	Fax No:
Email:	Samples Preserved: Yes / No	Analyze to First Positive: Yes / No

ANALYSIS REQUIRED

Required Turn Around Time: 4 Hour ____ 8 Hour ____ 24 Hour XX 2 Days/48 Hour ____ 3 Days/72 Hour ____ 5+ Days/120 Hour ____

DISPOSAL: ☐ Customer ☒ Laboratory ☐ OTHER (Explain)

	Sample #	Sample Location / Sample Description (Color)	PLM (Bulk) - 40 CFR - Chap. 1, Part 763, Subpart F Appendix A or current EPA method	(F)riable / (N)on Friable	Condition: (G)ood / (F)air / (P)oor	Length (Feet)	Width (Feet)	Height (Feet)	Quantity
1004-17 — 11	44-AW11	Room 101A, NW corner / wall texture, drywall and taping mud	X						
1004-17 — 12	44-AW12	Room 101B, between metal and concrete wall / crack filler (brown)	X						
1004-17 — 13	44-AW13	Room 101A, South wall at 4 ft / wall texture, drywall and taping mud	X						
1004-17 — 14	44-AW14	Room 101, sink counter top (brown)	X						
1004-17 — 15	44-CK15	Room 101A / window caulking	X						
1004-17 — 16	44-AM16	Room 101, west wall / paint or wall coating	X						
1004-17 — 17	44-CK17	Room 101, air conditioner / duct joint compound	X						
1004-17 — 18	44-AW18	Exterior east wall of building / paint or wall coating	X						
1004-17 — 19	44-SC19	Under east exit of bldg / concrete	X						
1004-17 — 20	44CK20	Ridge vent on roof / penetration mastic	X						

Relinquished By: [signature] *Date:* 7/21/2010 *Time:* 0720 *Accepted By:* [signature] *Date:* 07/21/10 *Time:* 07:20

Lab Report Number(s): *Delivery Type:* Drop Off FedEx Mail Other

WB - Wallboard JC - Joint Compound WT - Wall Texture WBT - Wallboard Tape FT - Floor Tile FTM - Floor Tile Mastic BBM - Baseboard Mastic
RSF - Resilient Sheet Flooring CT - Ceiling Tile SAAM - Spray-Applied Acoustical Material R - Roof TSI - Thermal System Insulation EL - Elbow

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http://www.kellcomacs.com email: mailbox3137@kellcomacs.com

CHAIN OF CUSTODY & SAMPLE SUBMITAL FORM PAGE_____ OF ____

KELLCO-MACS JOB#: **1004-17**
Lawrence Berkeley National Laboratory

FIELD NUMBER	LOCATION (bldg, rm#, area)	COLOR	MATERIAL or SUBSTRATE (ft.w/ size, mastic, tic, etc.)	NOTES: Like condition, damage, quantity, inside what, beneath what? direction in building (N,S,E,W) etc.)
44-AM21	Insulation under Ridge vent		insulation	

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME

MACS Lab Incorporated
Analytical and Environmental Services
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(510) 786-9751 * (510) 786-9625 Fax * www.macslab.com

CAM-17 Bulk Materials Analysis Report - Method: EPA 6010B/3050

KELLCO Services
3137 Diablo Avenue
Hayward, CA 94545

Contact: Tim Cannard
Phone: (510) 786-9751
Email: mailbox3137@kellcomacs.com
Job #: 1004-17

Laboratory Number: 206481
Sampled By: Siew Yee Lee
Sampled On: July 13, 2010
Submitted On: July 21, 2010
Analyzed On: August 3, 2010
Reported On: August 5, 2010
SOP: CAM17
Sample Type: Bulk

Job Description: Lawrence Berkeley National Laboratory-Building 44, Berkeley, CA

	Lab Sample Number:	206481 -1	206481 -2			
	Client Sample Number:	44-PC1	44-PC2			
	Matrix:	Bulk	Bulk			
	Extraction Type:	Acid	Acid			
	Units:	mg/kg (PPM)	mg/kg (PPM)			
Sb	Antimony	1,012.84	1,082.35			
As	Arsenic	109.17	250.82			
Ba	Barium	153.24	828.47			
Be	Beryllium	0.63	0.71			
Cd	Cadmium	573.17	323.76			
Cr	Chromium	165.40	7,856.47			
Co	Cobalt	394.73	232.38			
Cu	Copper	116.75	183.20			
Pb	Lead	22,173.57	44,047.06			
Hg	Mercury	4.35	14.66			
Mo	Molybdenum	187.59	217.22			
Ni	Nickel	36.11	29.18			
Se	Selenium	7,228.06	7,268.24			
Ag	Silver	26.89	13.39			
Tl	Thallium	112.18	116.66			
V	Vanadium	64.73	36.89			
Zn	Zinc	55,594.47	81,058.82			

Analyst: _____ (Signature)

Laboratory Manager: _____ (Signature)

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I206481

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Chain of Custody Record

For Bulk PLM Sample Collection Only

Page ____ of ____

BILLED TO	PROJECT INFORMATION	
Name: Kellco - MACS	Sampled By: Siew Yee Lee	Date Sampled: 7/13/10
Address: 3137 Diablo Avenue	Project Manager: Tim Cannard	Job #: 1004-17
City: Hayward	Project Name: Lawrence Berkeley National Lab	
State: Ca Zip: 94545	Site Address: Bldg 44,	
Phone No: (510) 786-9751	City, State, Zip: Berkely, Ca	
Fax No: (510) 786-9625	Site Contact:	
Cell No:	Phone No:	Fax No:
Email:	Samples Preserved: Yes / No	Analyze to First Positive: Yes / No

Required Turn Around Time

4 Hour ____
8 Hour ____
24 Hour XX
2 Days/48 Hour ____
3 Days/72 Hour ____
5+ Days/120 Hour ____

DISPOSAL

☐ Customer
☒ Laboratory
☐ OTHER (Explain)

Sample #	Type	Sample Location / Sample Description (Color)	Lead (paint, wipe)	(F)riable / (N)on Friable	Condition: (G)ood / (F)air / (P)oor	Length (Feet)	Width (Feet)	Height (Feet)	Quantity
1004-17— 1	44-PC1	Interior wall of bldg, / paint chip off metal	X						
1004-17— 2	44-PC2	Exterior wall of bldg, / paint chip off metal	X						
1004-17— 3									
1004-17— 4									
1004-17— 5									
1004-17— 6									
1004-17— 7									
1004-17— 8									
1004-17— 9									
1004-17— 10									

Relinquished By: [signature] *Date:* 7/21/2010 *Time:* 0730 *Accepted By:* D.K [signature] *Date* 07/21/10 *Time:* 0730

Lab Report Number(s): *Delivery Type:* ~~Drop Off~~ DN *FedEx* *Mail* *Other*

WB - Wallboard JC - Joint Compound WT - Wall Texture WBT - Wallboard Tape FT - Floor Tile FTM - Floor Tile Mastic BBM - Baseboard Mastic
RSF - Resilient Sheet Flooring CT - Ceiling Tile SAAM - Spray-Applied Acoustical Material R - Roof TSI - Thermal System Insulation EL - Elbow

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http://www.kellcomacs.com email: mailbox3137@kellcomacs.com

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Analytical and Environmental Services
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(510) 786-9751 * (510) 786-9625 Fax * www.macslab.com

CAM-17 Bulk Materials Analysis Report - Method: EPA 6010B/3050

KELLCO Services
3137 Diablo Avenue
Hayward, CA 94545

Contact: Tim Cannard
Phone: (510) 786-9751
Email: mailbox3137@kellcomacs.com
Job #: 1004-17

Laboratory Number: 206592
Sampled By: Siew Yee Lee
Sampled On: July 22, 2010
Submitted On: July 26, 2010
Analyzed On: August 4, 2010
Reported On: August 5, 2010
SOP: CAM17
Sample Type: Bulk

Job Description: lawrence Berkeley National Lab, Building 44-One Cyclotron Road, Berkeley, CA 94744

	Lab Sample Number:	206592 -1				
	Client Sample Number:	B44-PC1				
	Matrix:	Bulk				
	Extraction Type:	Acid				
	Units:	mg/kg (PPM)				
Sb	Antimony	1,075.81				
As	Arsenic	972.99				
Ba	Barium	1,647.19				
Be	Beryllium	0.98				
Cd	Cadmium	177.67				
Cr	Chromium	19,393.56				
Co	Cobalt	437.46				
Cu	Copper	311.59				
Pb	Lead	119,014.53				
Hg	Mercury	3.51				
Mo	Molybdenum	178.30				
Ni	Nickel	94.01				
Se	Selenium	7,209.41				
Ag	Silver	36.59				
Tl	Thallium	156.25				
V	Vanadium	92.29				
Zn	Zinc	57,548.96				

Analyst: _____ (Signature)

Laboratory Manager: _____ (Signature)

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CLIENT	JOBSITE
Weiss Associates	Lawrence Berkeley National Laboratory
5801 Christie Avenue	One Cyclotron Road
600	
Emeryville	Berkeley
CA 94608	CA 94744

KELLCO-MACS JOB#: **1004-17** LAB LOGIN # I206592

COLLECTED BY: Siew Yee Lee

COLLECTED DATE 7/22/2010

TURN AROUND TIME: 4 8 (24) 48 5-DAY

RESULTS NEEDED BY

CIRCLE TYPE OF BULK ANALYSIS

PLM **LEAD PAINT** **LEAD WIPE** **NON VIABLE MOLD** **VIABLE MOLD** **eCOLI** **OTHER** CAM17

SAMPLES REC'D _____ ANALYZE TO FIRST POSITIVE YES NO

REPORT RESULTS TO PROJECT MANAGER: Tim Cannard

NOTES & COMMENTS:

CHAIN OF CUSTODY & SAMPLE SUBMITAL FORM PAGE____ OF ____

KELLCO-MACS JOB#: **1004-17**
Lawrence Berkeley National Laboratory

FIELD NUMBER	LOCATION (bldg, rm# area)	COLOR	MATERIAL or SUBSTRATE (ft w/ size, mastic, etc. etc.)	NOTES: Like condition, damage, quantity, inside what, beneath what? direction in building (N,S,E,W) etc.)
B44-PC1	Ridge vent on Roof	Grey	paint chip off metal	

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
[illegible]	7/26/10	1530	[illegible]	07/26/10	15:30

PHOTOGRAPHS

Photographs containing no sample identification number are included for reference of the general sample locations.

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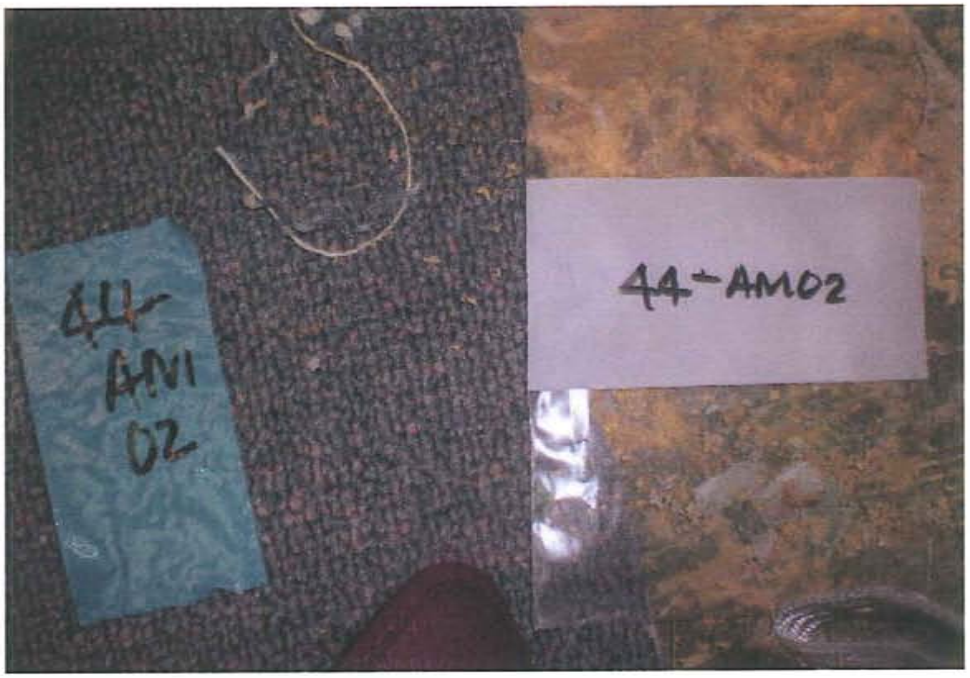
http://www.kellcomacs.com email: mailbox3137@kellcomacs.com

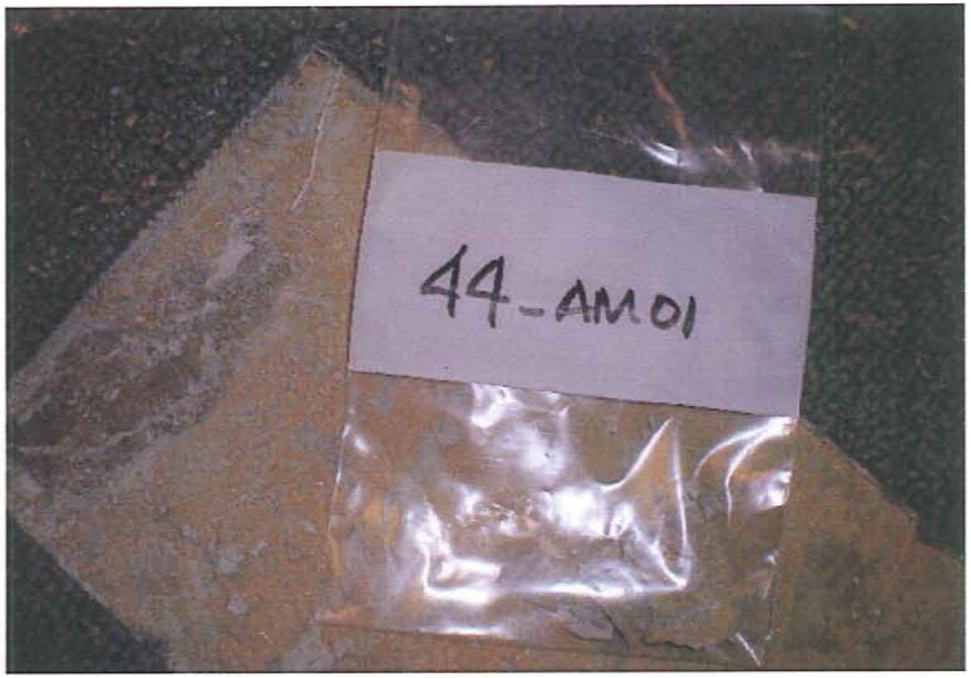
44

44

OPEN


44-AM02
44-AM1 02

UH 3 44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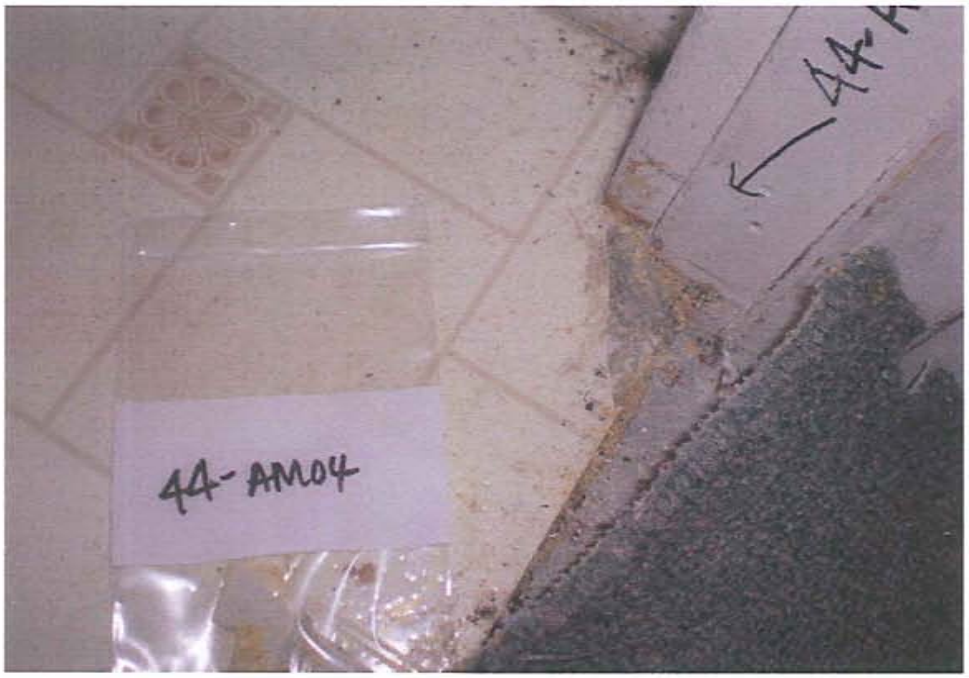
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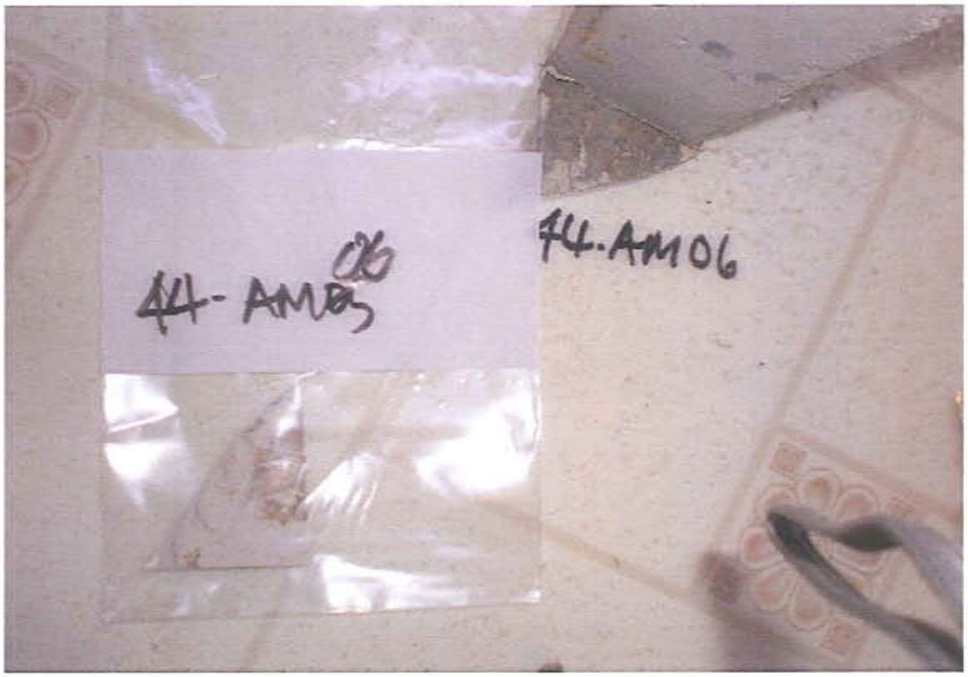
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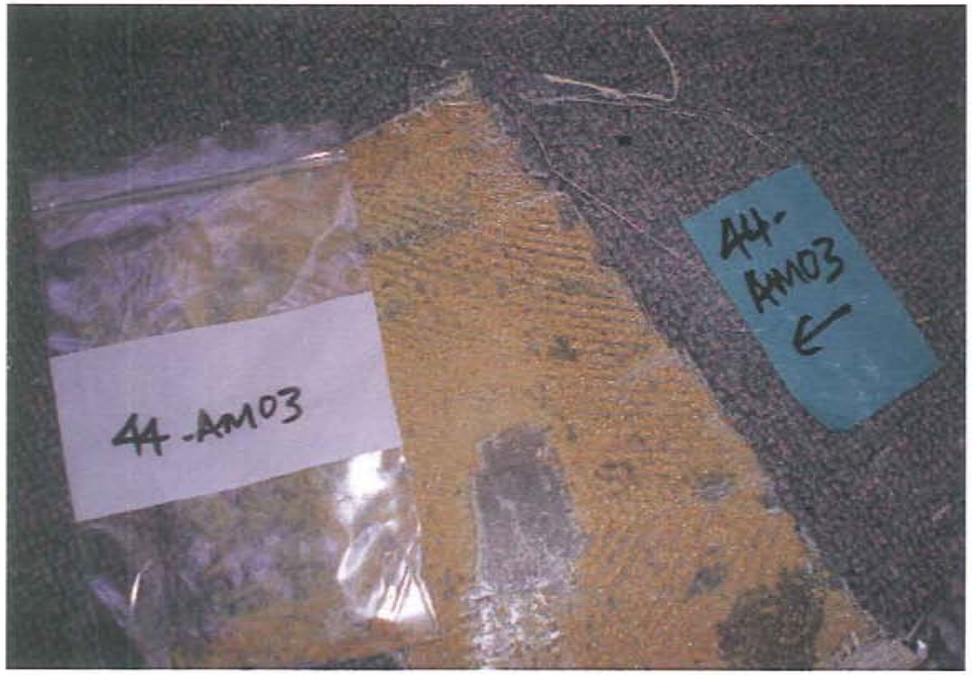
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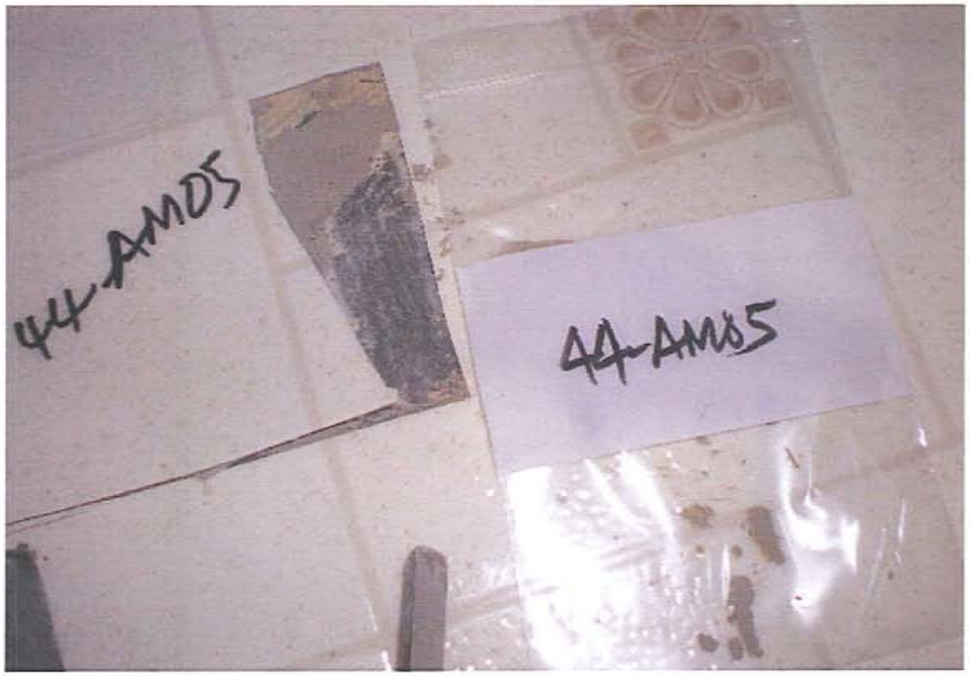
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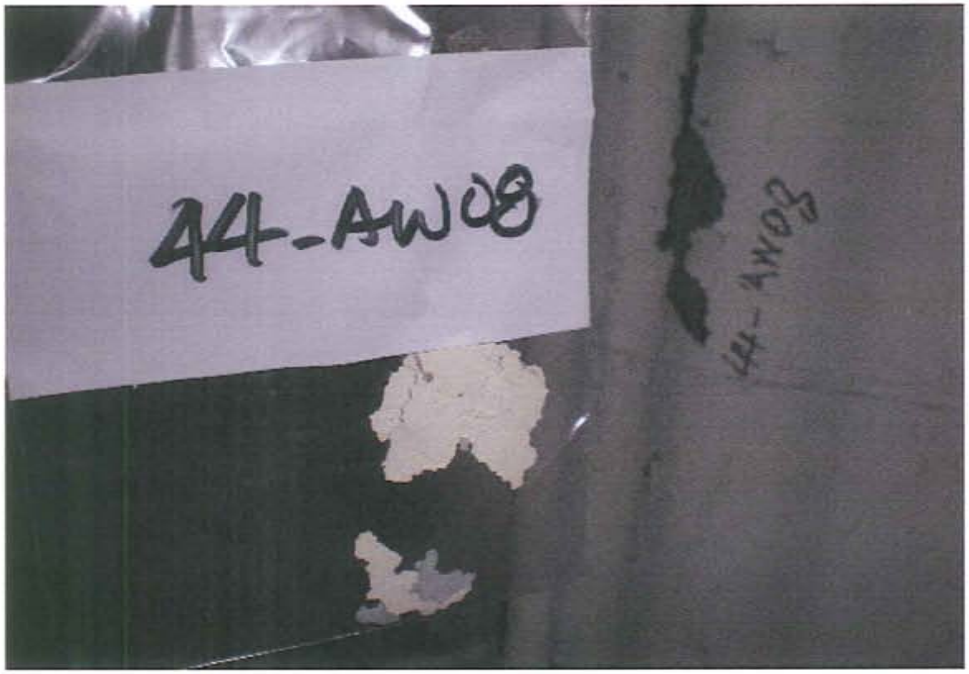
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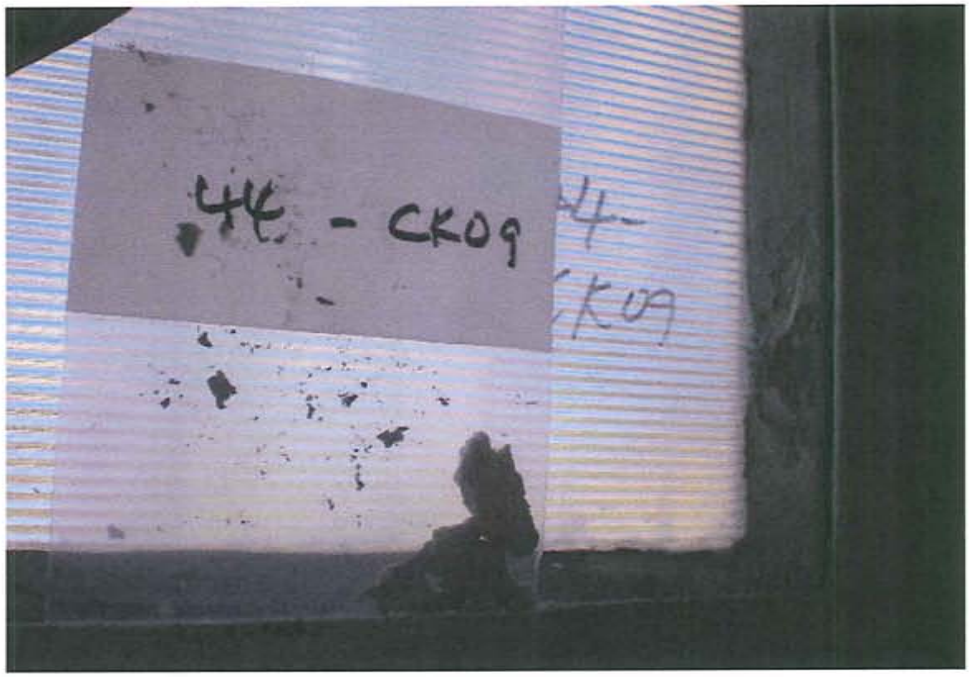
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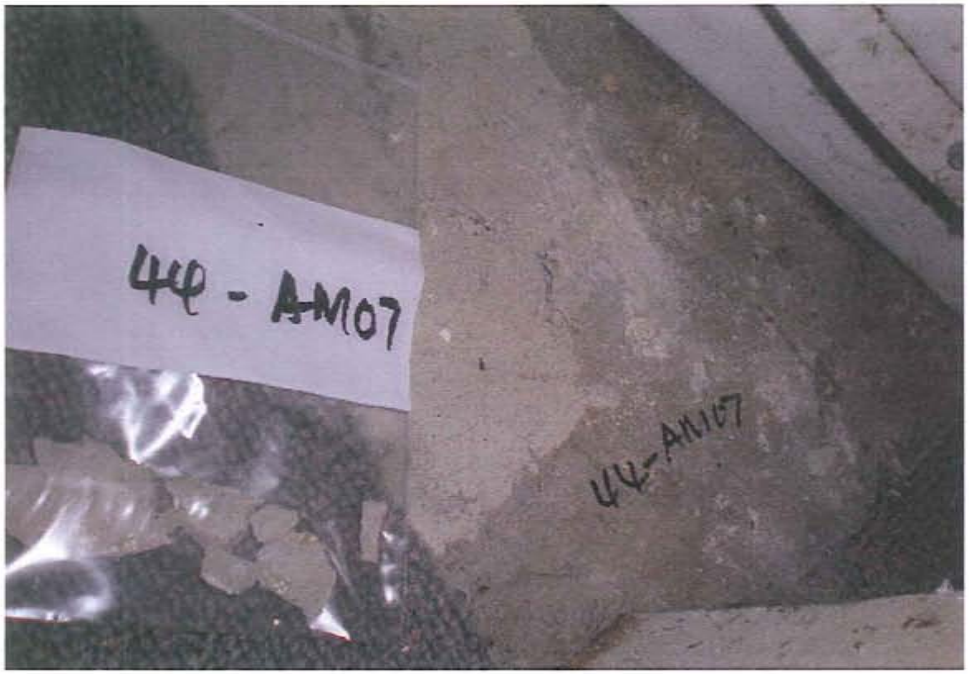
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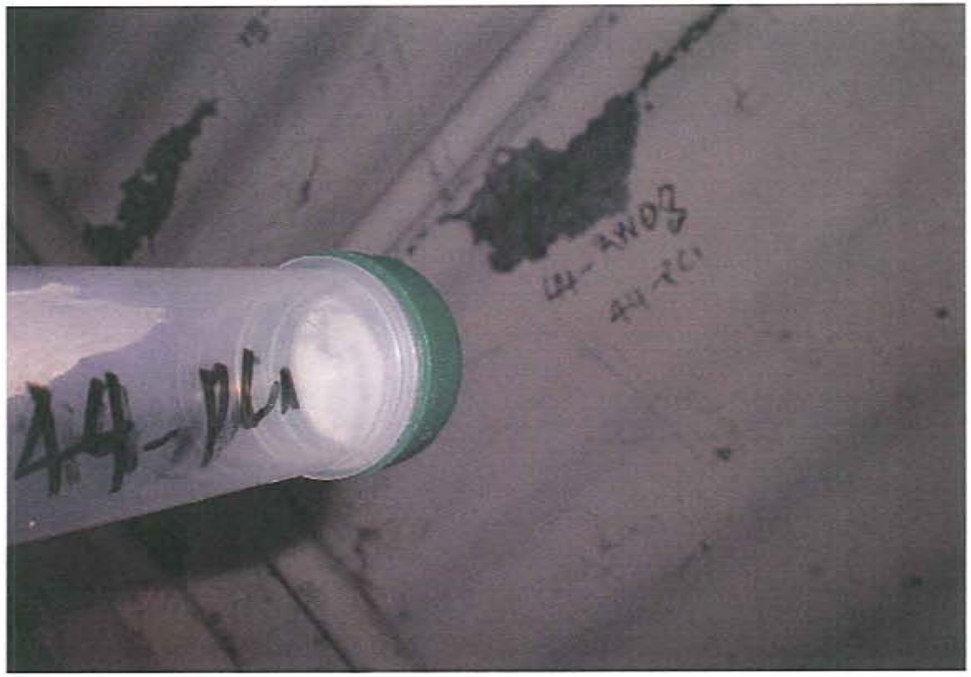
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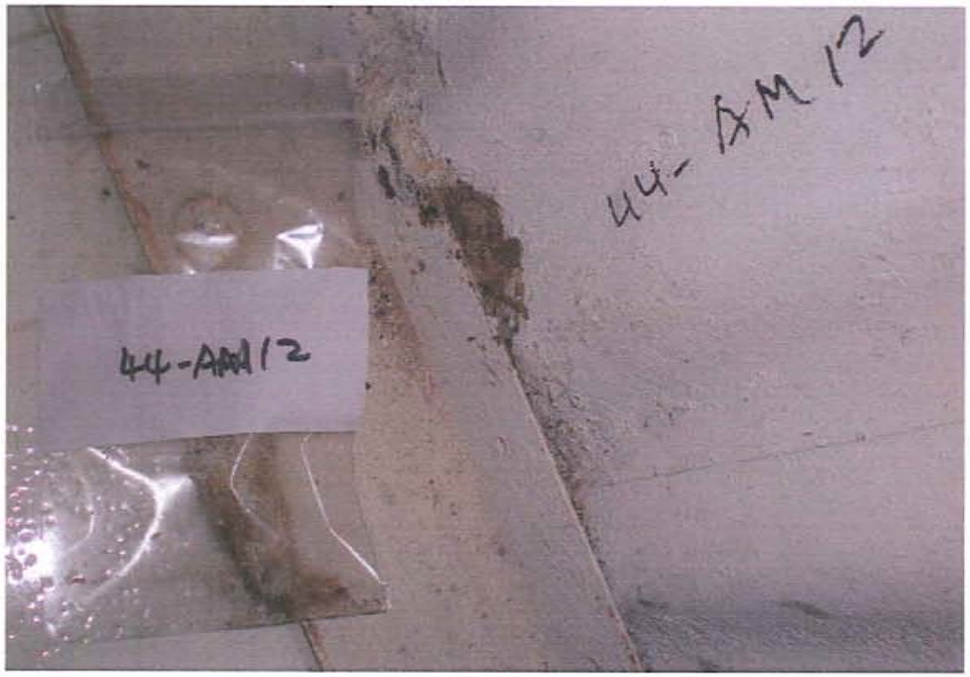
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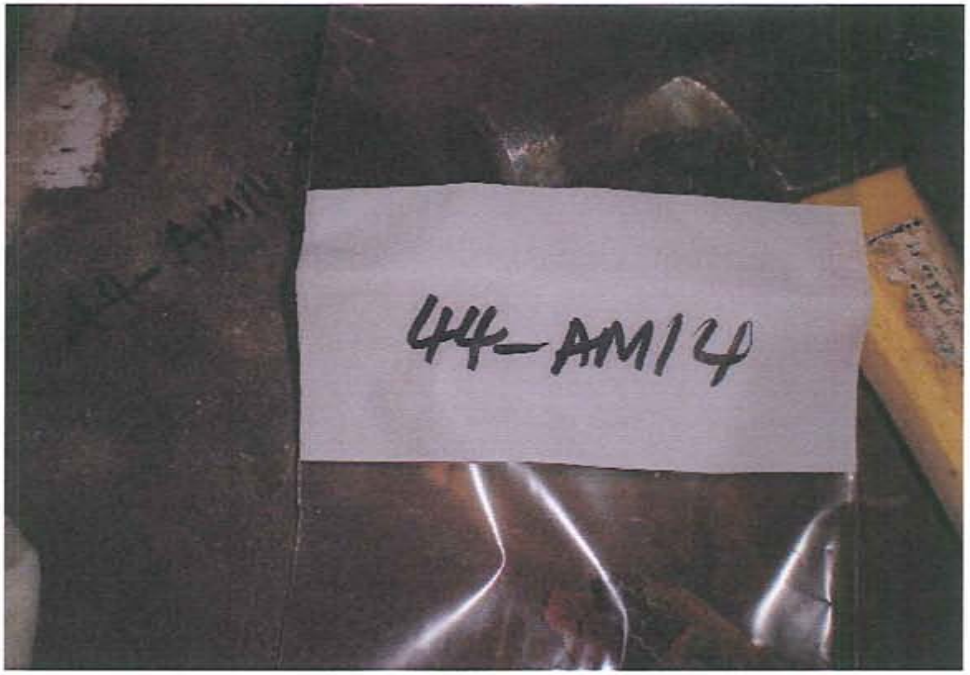
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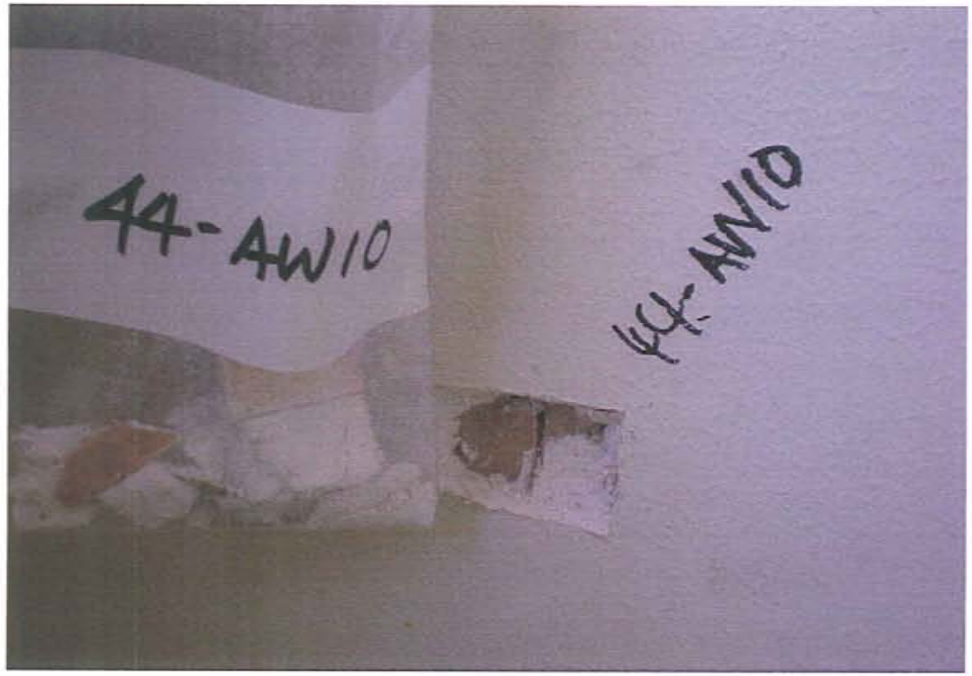
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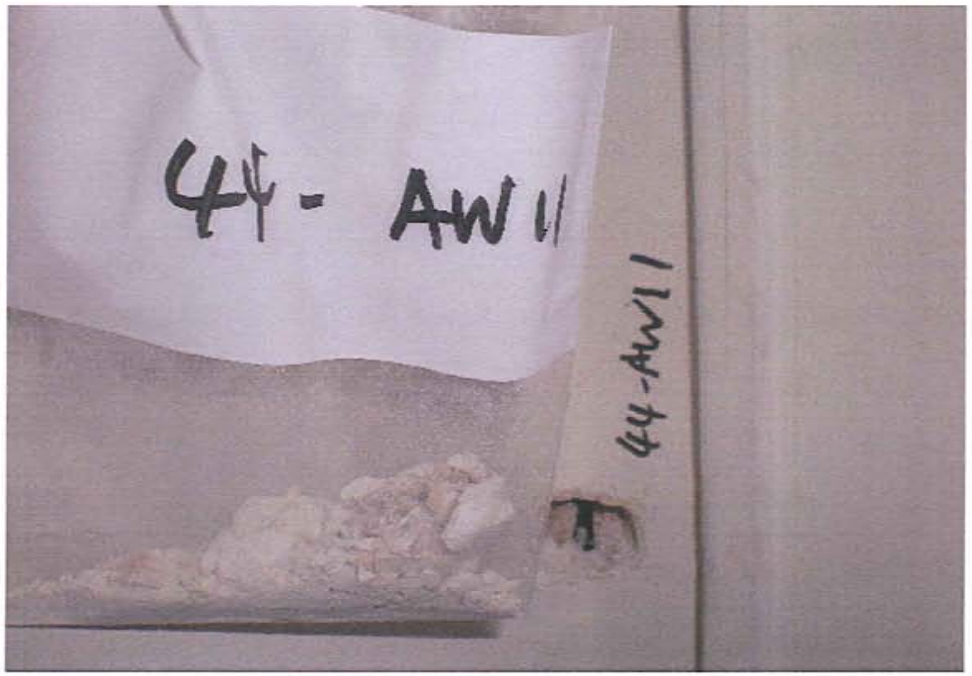
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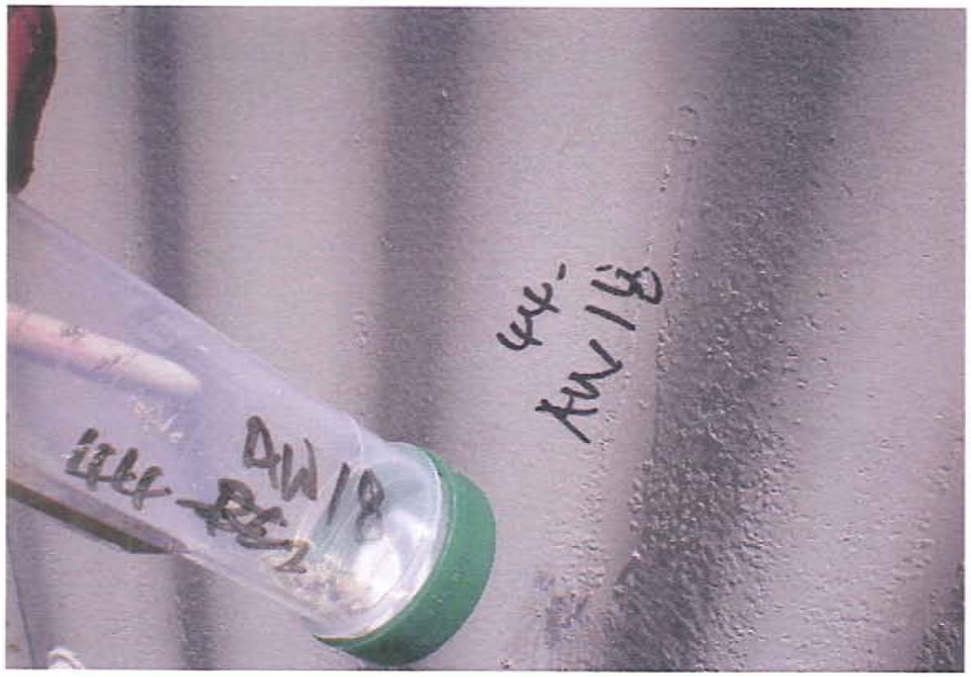
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AW 18
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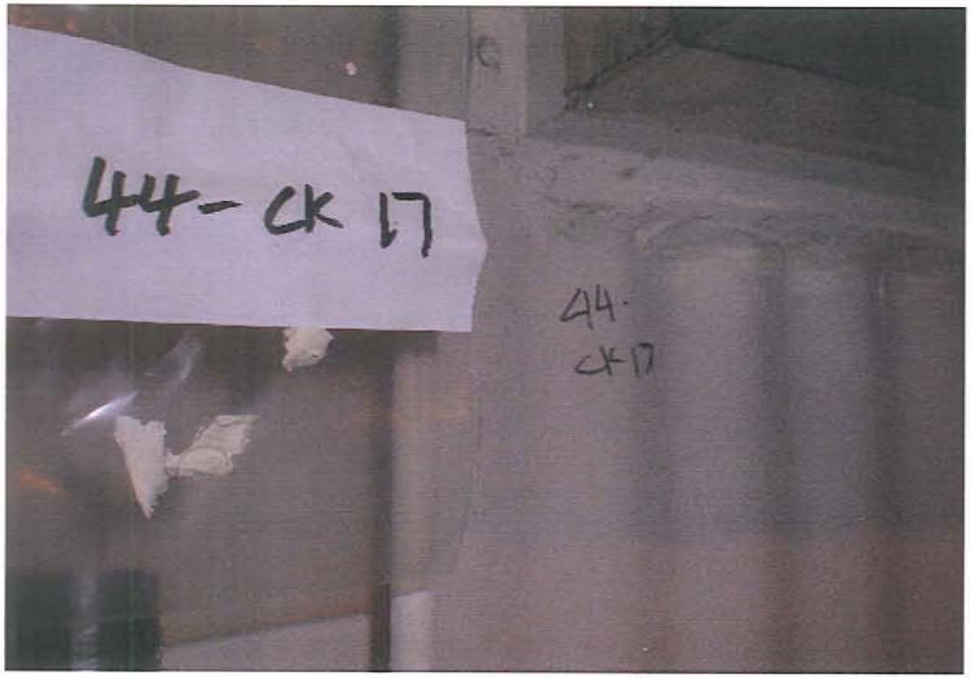
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CK17

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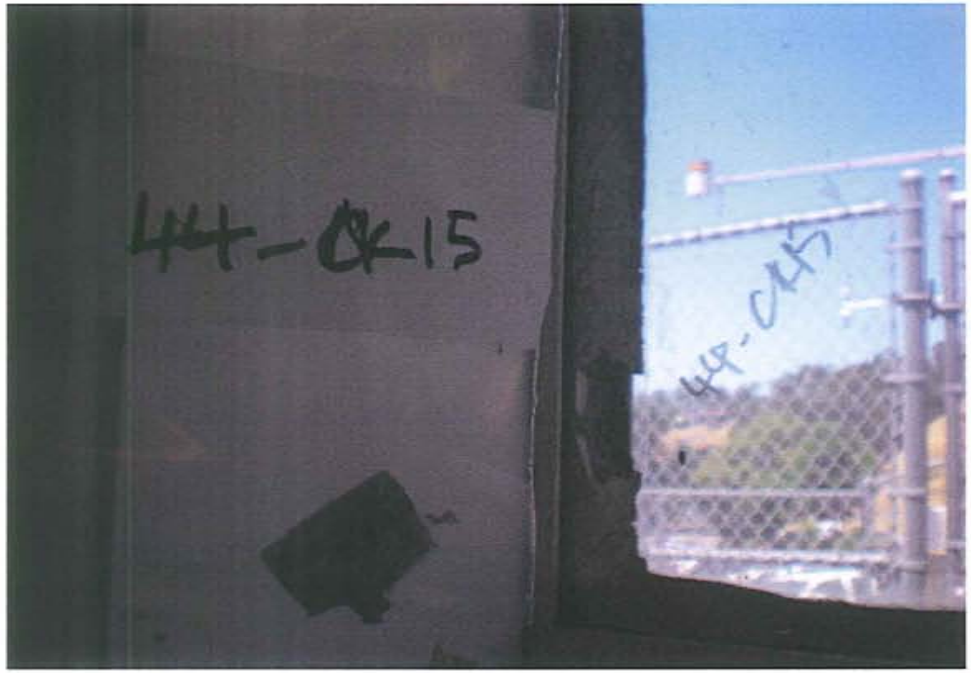
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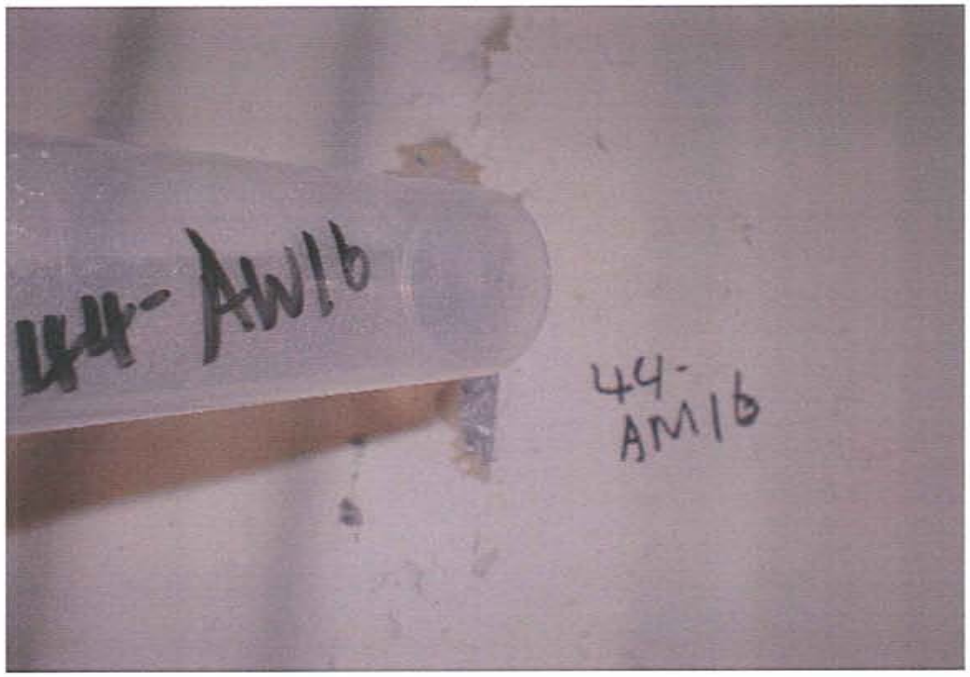
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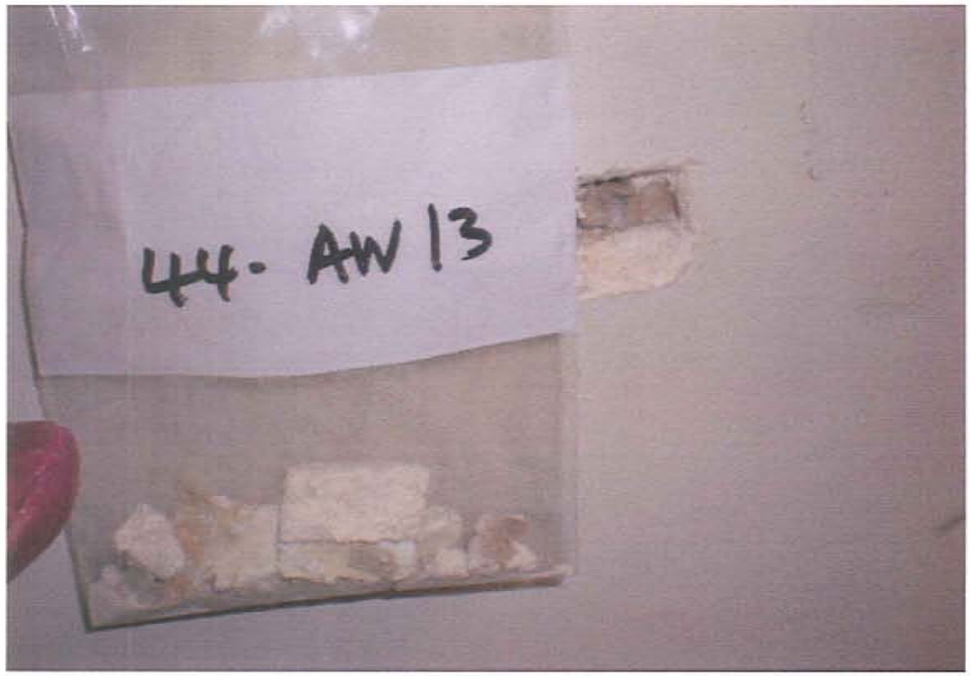
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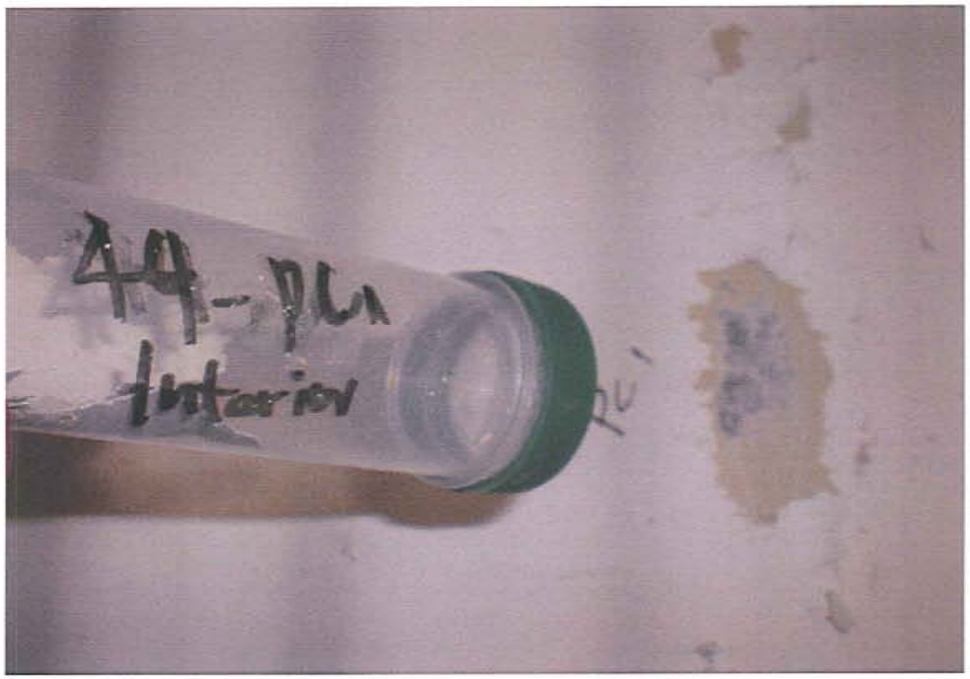

44-PL1
Interior

B44-PC
PC

B44-
AM21
B44-AM21
Roof
Insulation

A Creative Joint Venture For Better Environmental Solutions

Lawrence Berkeley National Laboratory
Building 44A
One Cyclotron Road
Berkeley, CA 94744

KELLCO-MACS Job #1004-17

NESHAP Compliant Pre-Demolition
Asbestos and Metals in Paint Inspection Report

for

Weiss Associates
5801 Christie Avenue
Suite 600
Emeryville, CA 94608

August 9, 2010

3137 Diablo Avenue • Hayward, CA 94545-2701• (510) 786-9751 • fax (510) 786-9625
http://www.kellcomacs.com email: mailbox3137@kellcomacs.com

A Creative Joint Venture For Better Environmental Solutions

NESHAP Compliant Pre-Demolition Asbestos and Metals in Paint Inspection Report

Date:	August 9, 2010
KELLCO-MACS Job #:	1004-17
Client:	Ms. Agata Sulczynski Weiss Associates 5801 Christie Avenue Suite 600 Emeryville, CA 94608
Location:	Lawrence Berkeley National Laboratory Building 44A One Cyclotron Road Berkeley, CA 94744
Date of Inspection:	July 13, 19, 21, 22 & 26, 2010
Inspectors:	Siew Yee Lee CAC # 09-4546, CDPH Lead # 19509
Description of the Inspected Area:	This is an asbestos and Heavy Metals inspection on building 44A on the University of California, Berkeley campus in Berkeley, CA. Building 44A is a mobile office trailer which is constructed of exterior metal sheeting supported by I beams and concrete blocks. The roofing contains metal caps and the flooring is 12 x 12 floor tile on mastic. The exterior lower wood siding paint was visually inspected and appears to be in poor condition.

Background

This is a NESHAP compliant pre-demolition asbestos and metals inspection report for Building 44A located at LBNL in Berkeley, CA.

Synopsis

Asbestos was found in the following materials:

- Exterior Walls Weather Strip Caulking
- Black Exterior Wall Patch
- Roofing Patch
- 12 x 12 Floor Tile and Mastic

The exterior lower wood siding paint was visually inspected and appears to be in poor condition.

Designation of material as asbestos containing should be applied to all homogenous materials of the analyzed and found to contain asbestos.

About the Inspection

The inspection performed was both visual and tactile. Samples were taken of suspect materials located at the interior and exterior of the survey area.

The inspection was limited to those materials readily discerned in a reasonable inspection by a competent inspector. Materials that are hidden within walls, behind structures, in vertical shafts or in areas that make them not readily available to our inspector were not sampled. If future work uncovers any non-sampled materials, these should be submitted for asbestos and/or lead paint analysis.

The following numbering convention was used for this inspection:

LETTER	STANDS FOR	EXAMPLE	MEANING
XX	Building DESIGNATION based on information provided on drawings provided to us prior to inspection	44A	Building 44A
Y & *Optional Z*	EITHER building SYSTEM (W: wall; F: Flooring; C: Ceiling; T: TSI; M: Misc) OR Further designation of sample location as Unit # within building	SN AM AC CK	Tile/Mastic Sample Asbestos Miscellaneous Asbestos Ceiling Sample Caulk Sample
xx	Sample number and layer	01 01a 02	First Sample, First Layer First Sample, Second Layer Second Sample First Layer

- ***Asbestos Findings***

Asbestos samples were analyzed in the KELLCO-MACS laboratory, by Polarized Light Microscopy, the EPA's recommended method. Copies of the full laboratory reports are attached.

Photographs of sampled materials are included. Sample locations are noted on the attached not-to-scale drawing.

The determination of a material to be Asbestos Containing Material (ACM) was made either by direct sampling or by homogeneity with at least one positive sample of the same material.

Materials that tested **positive** for asbestos are:

Building 44A:

Lab Sample #	Field Sample #	Field Description	Asbestos %
L206478-1	44A-SN01	Room 102 / 12x12 floor tile	2% Chrysotile
L206478-2	44A-SN01a	Room 102 / 12x12 floor tile	< 1% Chrysotile
L206478-3	44A-SN02	Room 101B / black mastic	2% Chrysotile
L206478-4	44A-SN02a	Room 101B / black mastic	< 1% Chrysotile
L206478-5	44A-SN03	Room 101A, by south doorway / 12x12 floor tile	3% Chrysotile
L206478-6	44A-SN03a	Room 101A, by south doorway / black mastic	< 1% Chrysotile
L206478-12	44A-AM09	Exterior of building, southwest corner / weather strip caulking	11% Chrysotile
L206478-13	44A-AM10	Exterior of building, southeast corner / weather strip caulking	12% Chrysotile
L206478-14	44A-AM11	Exterior of building, northeast corner / weather strip caulking	11% Chrysotile
L206478-15	44A-AM12	Southeast end of building on steel support bar / black mastic patch	2% Chrysotile
L206478-18	44A-AM15	South end of building on wood support / black mastic patch	2% Chrysotile
L206478-21	44A-AM18	North end of building, on metal support beam / mastic patch	2% Chrysotile
L206478-26	44A-CK23	By 101A, exterior wall / Grey wall sealant	2% Chrysotile

Samples with less than 10% asbestos can be submitted for further analysis by the Point Count method. If the Point Count method determines that the material contains less than 1% asbestos, these materials can be disposed of as non-hazardous asbestos containing construction waste.

Materials for which the analytical results show **no detection** of asbestos are:

Building 44A

Lab Sample #	Field Sample #	Field Description
L206478-7	44A-AM04	Room 102, exterior of window / window frame caulking
L206478-8	44A-AM05	Room 101B, exterior of window / window frame caulking

Lab Sample #	Field Sample #	Field Description
L206478-9	44A-AM06	Room 101A, exterior of window / window frame caulking
L206478-10	44A-AM07	Exterior of north door frame / sealant
L206478-11	44A-AM08	Exterior of building, northwest corner / weather strip caulking
L206478-16	44A-AM13	Southeast end of building / panel paint coating
L206478-17	44A-AM14	South end of building / concrete block mortar
L206478-19	44A-AM16	South end of building between concrete block & wood panel / sealant
L206478-20	44A-AM17	South end of building / concrete block mortar
L206478-22	44A-AC19	Room 101A / ceiling soundboard
L206478-23	44A-AC20	Room 101B / ceiling soundboard
L206478-24	44A-AC21	Room 102 / ceiling soundboard
L206478-25	44A-CK22	Center of Roof / roof sealant

- ***Metals in Paint Findings***

Three paint samples were collected and submitted for Heavy Metals (CAM 17) analysis to Macs Lab, Inc.

These samples were analyzed using an ICP/MS, Extraction Method SW3050B TTLC and EPA 6010B/3050 method. This method is **not** for the purpose of profiling any waste streams from this project. Profiling of the waste streams (TCLP & STLC) will be the responsibility of the contractor performing the work. The results of the profiling of the waste streams can vary dramatically depending on the means and methods utilized by the contractor during the demolition of the buildings. Care needs to be taken to ensure that all OSHA and EPA rules are abided by. The EPA rules are typically contained within title 22 and the OSHA rules are typically contained within title 8. Please find the following list as guidance; furthermore, it is not intended to be all encompassing but as a starting point for review in regulatory compliance.

Building 44A

Lab Sample #	Field Sample	Field Description
206483-1	44A-PC1	Wooden walkway outside bldg 44A/ Paint chip composite off wood
206483-2	44A-PC2	South side of bldg, lower wood panels/ Paint chip off wood
206483-3	44A-PC3	Exterior east wall/ Paint chip off metal

Building 44A

	Lab Sample Number:	206483 -1	206483 -2	206483 -3
	Client Sample Number:	44A-PC1	44A-PC2	44A-PC3
	Matrix:	Bulk	Bulk	Bulk
	Extraction Type:	Acid	Acid	Acid
	Units:	mg/kg (PPM)	mg/kg (PPM)	mg/kg (PPM)
Sb	Antimony	409.23	38.78	91.02
As	Arsenic	128.64	<0.01	<0.01
Ba	Barium	1,558.72	70,152.60	186,479.13
Be	Beryllium	2.26	0.07	0.18
Cd	Cadmium	422.89	12.32	22.05
Cr	Chromium	28,957.45	1,023.34	811.34
Co	Cobalt	1,464.68	33.64	80.85
Cu	Copper	896.60	857.50	1,016.33
Pb	Lead	139,787.23	2,177.51	5,748.64
Hg	Mercury	42.00	49.51	111.98
Mo	Molybdenum	100.77	19.88	58.89
Ni	Nickel	97.87	47.24	167.88
Se	Selenium	11,978.72	2,342.91	5,570.78
Ag	Silver	17.66	3.66	<0.01
Tl	Thallium	210.77	33.35	81.03
V	Vanadium	81.06	25.45	101.27
Zn	Zinc	2,894.89	1,665.17	6,393.83

Regulatory Requirements

The Environmental Protection Agency (EPA) defines Asbestos Containing Material as any material that contains greater than 1% asbestos. Materials containing greater than 1% asbestos must be removed prior to demolition or renovation if they will be disturbed.

Friable asbestos containing material is any material that can be crushed or pulverized by hand pressure when dry, or materials that can be rendered to a crumbled, pulverized, or powdered state when dry by crushing, sanding, sawing, shot blasting, or through demolition or renovation activities.

As stated by NESHAP regulations, any material that contains less than 10% asbestos using the visual estimation method can be point counted with gravimetric reduction. The Point Counting method is a much more accurate analytical method for determining the percent of asbestos in a particular material. If the Point Count method determines that the material contains less than 1% asbestos, the material being analyzed can be disposed of as a non-hazardous asbestos containing construction waste.

Removal or disturbance of material with any detectable amount of asbestos must be handled in accordance with OSHA regulations. Cal-OSHA registration is required if the material contains more than .1% asbestos ($1/10^{th}$ of a percent). If there is more than 100 feet (linear or square) of an asbestos containing material that will be abated or disturbed, a California State registered and licensed asbestos abatement contractor must perform the work. If there is less than 100 feet, the work does not require a licensed asbestos abatement contractor, but must still conform to Cal-OSHA regulations.

Title 8 OSHA

General Industry Safety Orders deal with exposure limits for personnel working in or around surfaces that contain heavy metals.

Element	Chapter	Group	Article	Section
Antimony (Sb)	7	16	107	5155
Arsenic (As)	7	16	110	5214
Barium (Ba)	7	16	107	5155
Beryllium (Be)	7	16	107	5155
Cadmium (Cd)	7	16	110	5206
Chromium (Cr)	7	16	110	5206
Cobalt (Co)	7	16	110	5155
Copper (Cu)	7	16	110	5155
Lead (Pb)	7	16	109	5198
Mercury (Hg)	7	16	110	5155
Molybdenum (Mo)	7	16	110	5155
Nickel (Ni)	7	16	110	5155
Selenium (Se)	7	16	110	5155
Silver (Ag)	7	16	110	5155
Thallium (Ti)	7	16	110	5155

Element	Chapter	Group	Article	Section
Vanadium (V)	7	16	110	5155
Zinc (Zn)	7	16	107	5155

Title 22- Hazardous Waste

Title 22 describes the characterization of hazardous waste as described in chapter 11, article 1, section 66261.1. Under the EPA's Resource Conservation and Recovery Act (RCRA), a national program and inventory system about handling hazardous waste, describes the minimum requirements in order to be in compliance with the Federal and/or State regulations

Comment Regarding All Asbestos Containing Materials:

Asbestos containing materials in good condition do not necessarily need to be removed unless they will be disturbed; they should however be respected.

Employees, contract workers and others should be advised not to drill, saw, scrape or otherwise disturb this material without taking precautionary measures appropriate to asbestos containing material.

Asbestos containing material should be removed prior to the renovation and must be removed prior to demolition.

Areas Needing Immediate Corrective Action

Asbestos (in any condition) should be removed prior to renovation and must be removed prior to demolition of the survey site.

Analytical Procedures

- ***POLARIZED LIGHT MICROSCOPY (PLM)***

  Bulk samples were analyzed in accordance with U.S. EPA "Test Method for Determination of Asbestos in Bulk Building Materials, 1993," with inclusion of area percent estimates of the sample components. The use of the McCrone Color Dispersion Staining Technique supplements the analysis when considered useful by the analyst. The samples are prepared with refractive immersion oil and are examined under Polarized Light Microscopy (PLM). The accuracy of the visual estimate method is 1%.

  As per the standard "...The accuracy in the determination of the presence or absence of asbestos of greater than 1 area percent asbestos is greater than 99%." ASTM Committee D22.05, 1/18/88, Standard *Method of Testing for Asbestos Containing Materials by Polarized Light Microscopy*. If the sample matrix is reduced to minimize non-asbestos components, the detection limit can be mathematically enhanced, based on the amount of material remaining after matrix reduction. This method is called gravimetric reduction. This method involves ashing and chemical dissolution of the sample.

- ***POINT COUNTING***

  The Point Counting method is a much more accurate analytical method for determining the percent of asbestos in a particular material. KELLCO-MACS uses a muffle furnace to ash the sample and remove organic compounds. Hydrochloric acid is used to dissolve some of the non-asbestos minerals. Under this method a minimum of 125 points are counted from each of 8 different slide preparations of the same sample (total of 1000 points min.) If the **Point Count Method** determines that the material contains less than 1% asbestos, the material being analyzed can be treated as non-hazardous asbestos containing construction waste**. Note: ONLY the Point Count Method can be used for this determination.**

- ***CAM 17 TESTING***

  CAM 17 Metals were tested by Macs Lab, Inc. using ICP-MS, Extraction Method SW3050B and Analytical Method 6010B/3050.

KELLCO-MACS Qualifications

KELLCO-MACS is a joint venture offering hazardous materials and AIHA laboratory analyses. Our credentials include:

- The KELLCO-MACS asbestos inspector is licensed with the State of California Department of Occupational Safety and Health (CAL-OSHA).

- The KELLCO-MACS lead inspector is licensed by the California Department of Public Health (CDPH)

- The laboratory accreditations include:

  - **NVLAP PLM** for Asbestos: NIST National Voluntary Laboratory Accreditation Program certificate of accreditation for bulk **asbestos** analysis by polarized light microscopy (Accreditation #101948-1).
  - **AIHA** Accreditation for **Industrial Hygiene** Analytical Laboratory for PCM, and AA for lead (Accreditation #101786).
  - **AIHA Analyst Proficiency (NIOSH PAT)** (Accreditation # 11172)
  - **AIHA ELLAP** Accreditation for Lead: Accreditation for the **Environmental Lead** Laboratory recognized by the EPA as meeting the requirements of the National Lead Laboratory Accreditation Program established under Title X (Lab ID #11109).
  - **ELAP PLM** for Asbestos: California Department of Health Services, Environmental Laboratory Accreditation Program, certificate for bulk asbestos analysis (Certificate #2027)
  - **USDA Soil** permit #39484

The following supporting documents are attached to this report:

- Laboratory analytical reports

- Photographs of sample locations
- Floor plan or sketch showing sample locations

Please call KELLCO if there are any questions and/or clarifications regarding this report. We look forward to working with you in the future.

Sincerely,

KELLCO-MACS

Tim C. Cannard CAC #94-1395, CDPH Lead #764
Senior Project Manager

Asbestos Definitions and Classifications

ACM	(Asbestos Containing Material) - Material containing more than 1% asbestos. ACM must be disposed as hazardous waste. Note: Federal OSHA and Cal-OSHA control materials containing any amount of asbestos.
ACBM	(Asbestos Containing Building Material) – AHERA/ASHARA term for material containing more than 1% asbestos in or on interior structural members or other structural components. Exceptions: Covered walkways, porticos and exterior HVAC TSI.
ACCM	(Asbestos Containing Construction Material) – California term for a manufactured construction material containing greater than .1% (one tenth of one percent) asbestos.
PACM	(Presumed Asbestos Containing Material) OSHA considers all TSI and surfacing materials installed prior to1980 to be ACM unless proven otherwise.
Friable	Asbestos Containing Material that can be crumbled pulverized or reduced to powder by hand pressure when dry.
NOA	Naturally Occurring Asbestos. CARB defines as having >.25% by point counting.

Categories of Asbestos Used BY EPA AHERA/ASHARA and OSHA/Cal-OSHA

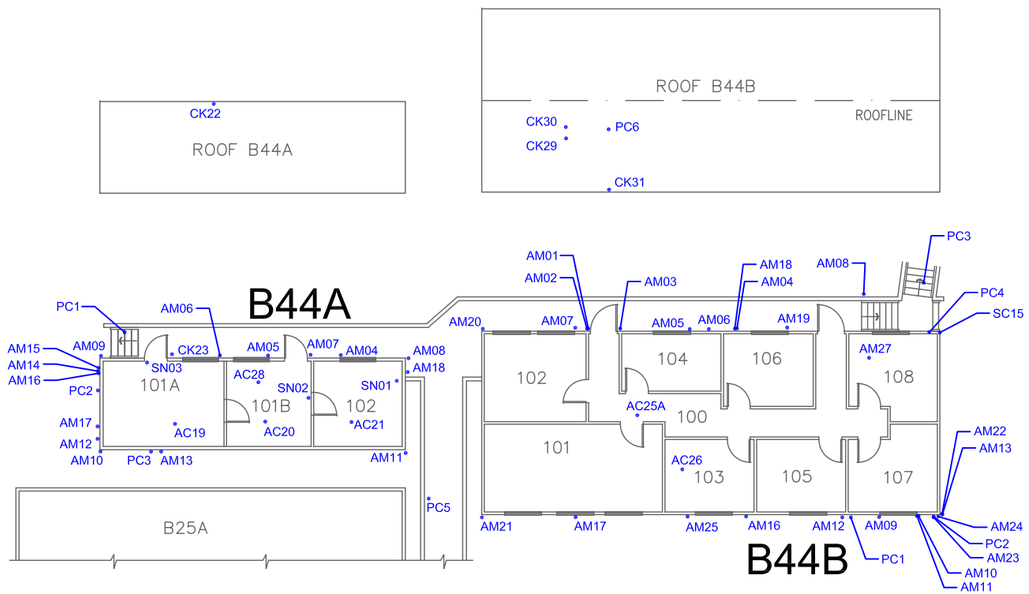
TSI	(Thermal System Insulation) - "Thermal system insulation (TSI)" means ACM applied to pipes, fittings, boilers, breeching, tanks, ducts or other structural components to prevent heat loss or gain. "Thermal system insulation ACM" is thermal system insulation which contains more than 1% asbestos.
SURFACING (usually mixed on site at time of application)	"Surfacing material" means material that is sprayed, troweled-on or otherwise applied to surfaces (such as acoustical plaster on ceilings and fireproofing materials on structural members, or other materials on surfaces for acoustical, fireproofing, and other purposes). "Surfacing ACM" means surfacing material which contains more than 1% asbestos. NOTE: OSHA/Cal-OSHA do not classify taping mud, floor tile mastic, stucco, leveling compound, and hard wall plasters or wall texturing as surfacing.
MISC.	All other ACM, including classify taping mud, floor tile mastic, stucco, leveling compound, and hard wall plasters or wall texturing as surfacing.

NESHAPS Categories for Asbestos (used by Air Quality Management Districts)

Category I	Cat I Non-friable Asbestos Containing Material refers to asbestos containing packing, gaskets, resilient floor covering, Galbestos, and asphalt roofing products containing more than 1% asbestos.
Category II	Cat II Non-friable Asbestos-Containing Material is any material that is not Cat I that contains greater than 1% asbestos.
RACM	"Regulated Asbestos-Containing Material." – Friable asbestos material (ACM) or a Category I non-friable ACM that has become friable OR a 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 reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations. RACM should be removed prior to renovation or demolition.

Characterization of Asbestos Containing Materials

Material	Estimated Quantity	TSI	Surfacing	Misc	RACM	Cat I	Cat II
Building 44 A							
Exterior Walls Weather Strip Caulking	~ 40 sq. ft.			X			X
Black Exterior Wall Patch	~ 35 sq. ft.			X			X
Roofing Patch	~ 30 sq. ft.			X		X	
12 x 12 Floor Tile and Mastic	~ 500 sq. ft.			X		X	

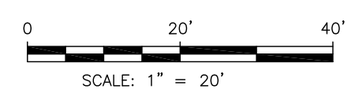


ABBREVIATIONS

AC	Asbestos ceiling sample
AM	Asbestos miscellaneous
CK	Caulk sample
PC	Paint sample
SC	Concrete sample
SN	Tile/mastic sample

NOTE:

All sample locations are approximate



L:\LBNL.178\Old Town Demolition\Sample Location Maps\Kellco Maps\SLM_Kellco_B44A-44B.dwg

MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Method: EPA-600/M4-82-020

KELLCO Services
3137 Diablo Ave

Hayward CA 94545

Person to contact: Tim Cannard
Contact phone: 510-786-9751
FAX phone: 510-786-9625
Sampled by: Siew Yee Lee
Sampled on: July 13, 2010
Analyzed on: July 28, 2010 at: 14:05
Corresponding invoice number: 206478

Analyst: VACB
HCB (signature)

Laboratory manager: _____ (signature)

Job Number: 1004-17

Job Description: Lawrence Berkeley National Laboratory - One Cyclotron Road - Building 44A - Berkeley, CA 94744

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206478-1	44A-SN01 Room 102 / 12x12 floor tile & black mastic	**Yes**	2%Chrysotile* < 1%Cellulose	Tan tile. Balance of sample is unspecified non-fibrous material.
L206478-2	44A-SN01a Room 102 / 12x12 floor tile & black mastic	**Yes**	< 1%Chrysotile* 4%Cellulose	Black tar. Balance of sample is organic binders.
L206478-3	44A-SN02 Room 101B / 12x12 floor tile & black mastic	**Yes**	2%Chrysotile* < 1%Cellulose	Tan tile. Balance of sample is unspecified non-fibrous material.
L206478-4	44A-SN02a Room 101B / 12x12 floor tile & black mastic	**Yes**	< 1%Chrysotile* 4%Cellulose	Black tar. Balance of sample is organic binders.
L206478-5	44A-SN03 Room 101A, by south doorway / 12x12 floor tile & black mastic	**Yes**	3%Chrysotile* < 1%Cellulose	Off-white tile. Balance of sample is unspecified non-fibrous material.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

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MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206478-6	44A-SN03a Room 101A, by south doorway / 12x12 floor tile & black mastic	**Yes**	< 1% Chrysotile* 3% Cellulose	Black tar. Balance of sample is organic binders.
L206478-7	44A-AM04 Room 102, exterior of window / window frame caulking	**N.D.**	< 1% Cellulose	Off-white caulk. Balance of sample is unspecified non-fibrous material.
L206478-8	44A-AM05 Room 101B, exterior of window / window frame caulking	**N.D.**	< 1% Polyethylene	Off-white caulk. Balance of sample is unspecified non-fibrous material.
L206478-9	44A-AM06 Room 101A, exterior of window / window frame caulking	**N.D.**	No Fibers	Clear caulk. Balance of sample is unspecified non-fibrous material.
L206478-10	44A-AM07 Exterior of north door frame / sealant	**N.D.**	No Fibers	Clear caulk. Balance of sample is unspecified non-fibrous material.
L206478-11	44A-AM08 Exterior of building, northwest corner / weather strip caulking	**N.D.**	< 1% Cellulose	Off-white caulk. Balance of sample is unspecified non-fibrous material.
L206478-12	44A-AM09 Exterior of building, southwest corner / weather strip caulking	**Yes**	11% Chrysotile* 2% Cellulose	Off-white caulk. Balance of sample is unspecified non-fibrous material.
L206478-13	44A-AM10 Exterior of building, southeast corner / weather strip caulking	**Yes**	12% Chrysotile* 2% Cellulose	Off-white caulk. Balance of sample is unspecified non-fibrous material.
L206478-14	44A-AM11 Exterior of building, northeast corner / weather strip caulking	**Yes**	11% Chrysotile* 2% Cellulose	Off-white caulk. Balance of sample is unspecified non-fibrous material.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

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MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206478-15	44A-AM12 Southeast end of building on steel support bar / black mastic patch	**Yes**	2%Chrysotile* < 1%Cellulose	Black adhesive. Balance of sample is unspecified non-fibrous material.
L206478-16	44A-AM13 Southeast end of building / panel paint coating	**N.D.**	< 1%Cellulose	Gray coating/paint. Balance of sample is unspecified non-fibrous material.
L206478-17	44A-AM14 South end of building / concrete block mortar	**N.D.**	No Fibers	Gray mortar. Balance of sample is silicate and cementitious.
L206478-18	44A-AM15 South end of building on wood support / black mastic patch	**Yes**	2%Chrysotile* < 1%Cellulose	Black adhesive. Balance of sample is unspecified non-fibrous material.
L206478-19	44A-AM16 South end of building between concrete block & wood panel / sealant	**N.D.**	< 1%Cellulose	Off-white sealant. Balance of sample is unspecified non-fibrous material.
L206478-20	44A-AM17 South end of building / concrete block mortar	**N.D.**	No Fibers	Gray mortar. Balance of sample is silicate and cementitious.
L206478-21	44A-AM18 North end of building, on metal support beam / mastic patch	**Yes**	2%Chrysotile* < 1%Cellulose	Black adhesive. Balance of sample is unspecified non-fibrous material.
L206478-22	44A-AC19 Room 101A / ceiling soundboard	**N.D.**	87%Cellulose	Brown ceiling tile fiber board. Balance of sample is unspecified non-fibrous material.
L206478-23	44A-AC20 Room 101B / ceiling soundboard	**N.D.**	86%Cellulose	Brown ceiling tile fiber board. Balance of sample is unspecified non-fibrous material.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

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MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206478-24	44A-AC21 Room 102 / ceiling soundboard	**N.D.**	87%Cellulose	Brown ceiling tile fiber board. Balance of sample is unspecified non-fibrous material.
L206478-25	44A-CK22 Center of Roof / roof sealant	**N.D.**	1%Cellulose < 1%Polyethylene	Gray sealant. Balance of sample is unspecified non-fibrous material.
L206478-26	44A-CK23 By 101A, exterior wall / Grey wall sealant	**Yes**	2%Chrysotile* 1%Cellulose	Gray sealant. Balance of sample is unspecified non-fibrous material.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

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MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

QA Report

Method: EPA-600/M

KELLCO Services
3137 Diablo Ave

Hayward CA 94545

Laboratory manager: _____ (signature)

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
Blank sample		**N.D.**	No fibers	
		PC*		
L206478-5	44A-SN03	**Yes**	3%Chrysotile*	Off-white tile. Balance of sample is unspecified non-fibrous material.
Room 101A, by south doorway / 12x12 floor tile & black mastic			< 1%Cellulose	

End of report.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

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CLIENT	JOBSITE
Weiss Associates 5801 Christie Avenue 600 Emeryville CA 94608	Lawrence Berkeley National Laboratory One Cyclotron Road Bldg 44A Berkeley CA 94744

KELLCO-MACS JOB#: **1004-17** LAB LOGIN # L206478

COLLECTED BY: Siew Yee Lee

COLLECTED DATE 7/13/2010

TURN AROUND TIME: 4 8 (24) 48 5-DAY

RESULTS NEEDED BY

CIRCLE TYPE OF BULK ANALYSIS

(PLM) LEAD PAINT LEAD WIPE NON VIABLE MOLD VIABLE MOLD eCOLI OTHER

SAMPLES REC'D ____ ANALYZE TO FIRST POSITIVE YES NO

REPORT RESULTS TO PROJECT MANAGER: Tim Cannard

NOTES & COMMENTS:

CHAIN OF CUSTODY & SAMPLE SUBMITAL FORM PAGE ____ OF ____

KELLCO-MACS JOB#: **1004-17**
Lawrence Berkeley National Laboratory

FIELD NUMBER	LOCATION (bldg, mat, area)	COLOR	MATERIAL of SUBSTRATE (ft w/ size, mastic, tyc. etc.)	NOTES: Like condition, damage, quantity, inside what, beneath what? direction in building (N,S,E,W) etc.)
44A-SN01	Room 102		12X12 floor tile & Black mastic	
44A-SN02	Room 101B			
-SN03	Room 101A, By south doorway			
-AM04	Room 102, exterior of window		window frame caulking.	
-AM05	Room 101B, exterior of window			
-AM06	Room 101A, exterior of window			
-AM07	exterior of North doorframe		sealant	
-AM08	exterior of Bldg, NW corner		weather strip caulking	
-AM09	Exterior of Bldg, SW corner			
-AM10	exterior of Bldg, SE corner			

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
[illegible]	7/21/2010	0722	O. Kahler	07/21/10	0722

L206478

CHAIN OF CUSTODY & SAMPLE SUBMITAL FORM PAGE_____ OF _____

KELLCO-MACS JOB#: **1004-17**
Lawrence Berkeley National Laboratory

FIELD NUMBER	LOCATION (bldg, rm#, area)	COLOR	MATERIAL or SUBSTRATE (ft w/ size, mastic, tjc, etc.)	NOTES: Like condition, damage, quantity, inside what, beneath what? direction in building (N,S,E,W) etc.)
44A - AM11	Exterior of Bldg, NE Corner		Weather strip caulking	
- AM12	~~on~~ SE end of Bldg on steel support bar	Black	mastic patch	
- AM13	~~SE end of Rear of~~ SE end of Bldg		~~#~~ panel paint coating	
- AM14	South end of Bldg.		concrete Block mortar	
- AM15	South end of Bldg on wood support	Black	mastic patch	
- AM16	south end of Bldg Between concrete block + wood panel		sealant	
- AM17	South end of Bldg		concrete Block mortar.	
- AM18	North end of Bldg, on Metal support beam		mastic patch	
- AC19	Room 101A		ceiling soundboard	
- AC20	Room 101B			
- AC21	Room 102			
~~- AC~~				
44A - CK22	Center of roof.		Roof sealant	
44A - CK23	By 101A, exterior wall	Grey	Wall sealant	

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
[illegible]	7/21/2010.	0722	[illegible]	07/21/10	0722

MACS Lab Incorporated
Analytical and Environmental Services
3137 Diablo Avenue, Hayward, Ca 94545-2701 (510) 786-9751 * (510) 786-9625 Fax * www.macslab.com

CAM-17 Bulk Materials Analysis Report - Method: EPA 6010B/3050

KELLCO Services
3137 Diablo Avenue
Hayward, CA 94545

Contact: Tim Cannard
Phone: (510) 786-9751
Email: mailbox3137@kellcomacs.com
Job #: 1004-17

Laboratory Number: 206483
Sampled By: Siew Yee Lee
Sampled On: July 13, 2010
Submitted On: July 21, 2010
Analyzed On: August 3, 2010
Reported On: August 4, 2010
SOP: CAM17
Sample Type: Bulk

Job Description: Lawrence Berkeley National Laboratory-Building 44A, Berkeley, CA

	Lab Sample Number:	206483 -1	206483 -2	206483 -3		
	Client Sample Number:	44A-PC1	44A-PC2	44A-PC3		
	Matrix:	Bulk	Bulk	Bulk		
	Extraction Type:	Acid	Acid	Acid		
	Units:	mg/kg (PPM)	mg/kg (PPM)	mg/kg (PPM)		
Sb	Antimony	409.23	38.78	91.02		
As	Arsenic	128.64	<0.01	<0.01		
Ba	Barium	1,558.72	70,152.60	186,479.13		
Be	Beryllium	2.26	0.07	0.18		
Cd	Cadmium	422.89	12.32	22.05		
Cr	Chromium	28,957.45	1,023.34	811.34		
Co	Cobalt	1,464.68	33.64	80.85		
Cu	Copper	896.60	857.50	1,016.33		
Pb	Lead	139,787.23	2,177.51	5,748.64		
Hg	Mercury	42.00	49.51	111.98		
Mo	Molybdenum	100.77	19.88	58.89		
Ni	Nickel	97.87	47.24	167.88		
Se	Selenium	11,978.72	2,342.91	5,570.78		
Ag	Silver	17.66	3.66	<0.01		
Tl	Thallium	210.77	33.35	81.03		
V	Vanadium	81.06	25.45	101.27		
Zn	Zinc	2,894.89	1,665.17	6,393.83		

Analyst: _____ (Signature)

Laboratory Manager: _____ (Signature)

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I206483

CLIENT	JOBSITE
Weiss Associates 5801 Christie Avenue 600 Emeryville CA 94608	Lawrence Berkeley National Laboratory One Cyclotron Road Bldg 44A Berkeley CA 94744

KELLCO-MACS JOB#: **1004-17** LAB LOGIN # P206348

COLLECTED BY: Siew Yee Lee

COLLECTED DATE 7/13/2010

TURN AROUND TIME: 4 8 24 48 5-DAY

RESULTS NEEDED BY

CIRCLE TYPE OF BULK ANALYSIS

PLM **LEAD PAINT** **LEAD WIPE** **NON VIABLE MOLD** **VIABLE MOLD** **eCOLI** **OTHER** _____

SAMPLES REC'D _____ ANALYZE TO FIRST POSITIVE YES NO

REPORT RESULTS TO PROJECT MANAGER: Tim Cannard

NOTES & COMMENTS:

CHAIN OF CUSTODY & SAMPLE SUBMITAL FORM PAGE 1 OF 1

KELLCO-MACS JOB#: **1004-17**
Lawrence Berkeley National Laboratory

FIELD NUMBER	LOCATION (bldg, rm#, area)	COLOR	MATERIAL or SUBSTRATE (ft w/ size, mastic, tjc, etc.)	NOTES: Like condition, damage, quantity, inside what, beneath what? direction in building (N,S,E,W) etc.)
44A-PC1	Wooden walkway outside of Bldg 44A		paint chip composite off wood	
-PC2	South side of Bldg, lower wood panels		paint chip off wood	
-PC3	Exterior east wall, SE end		" " off metal	

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
[illegible]	7/21/2010	0730	D. Kuhl	07/21/10	07:30
			DK		

PHOTOGRAPHS

Photographs containing no sample identification number are included for reference of the general sample locations.

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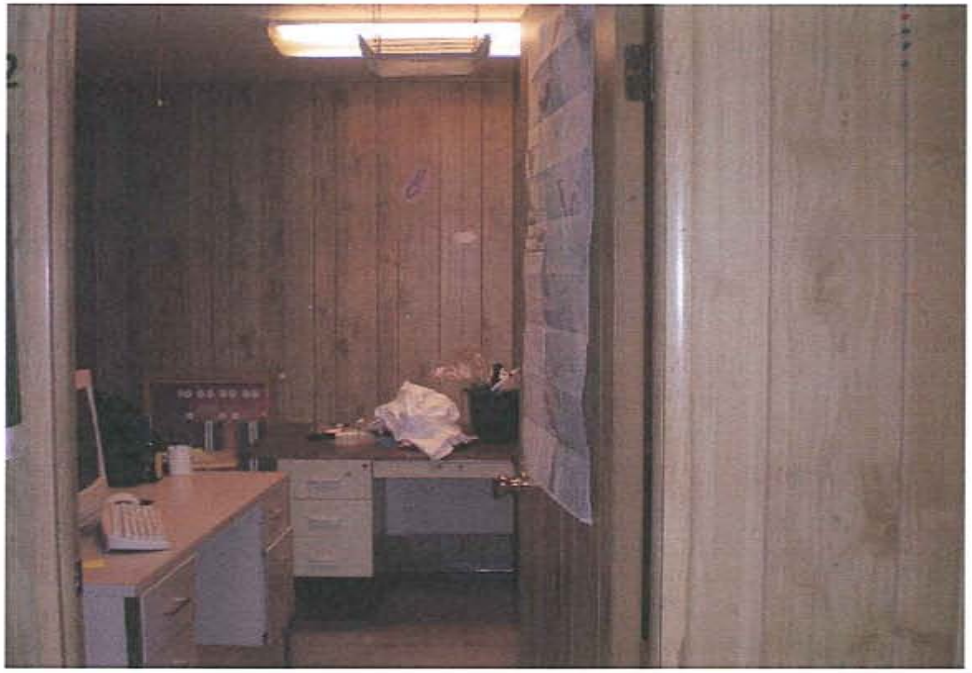
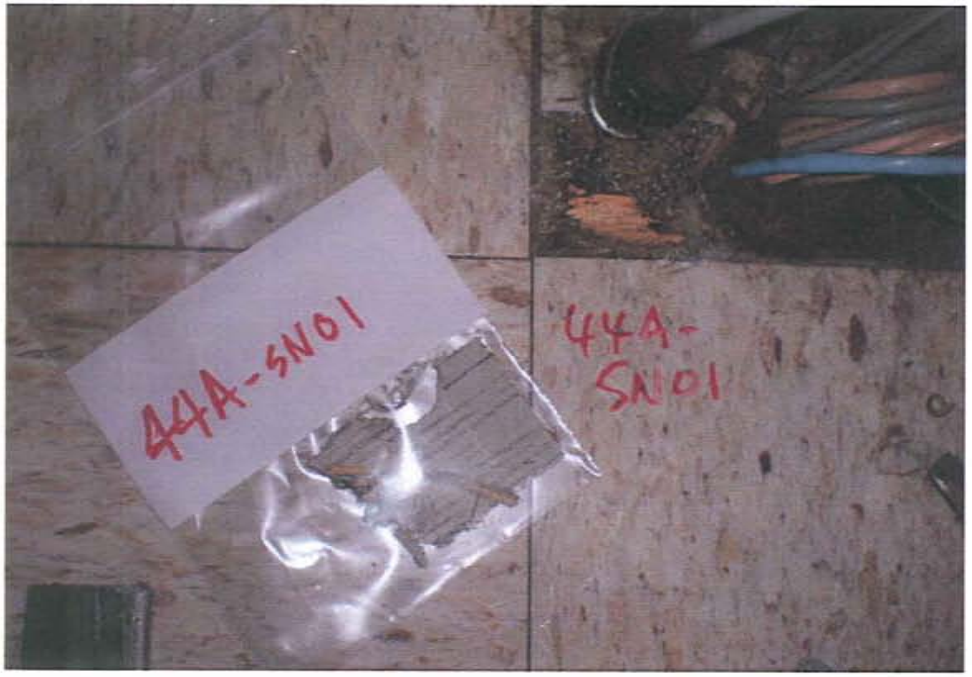
http://www.kellcomacs.com email: mailbox3137@kellcomacs.com

44A



44A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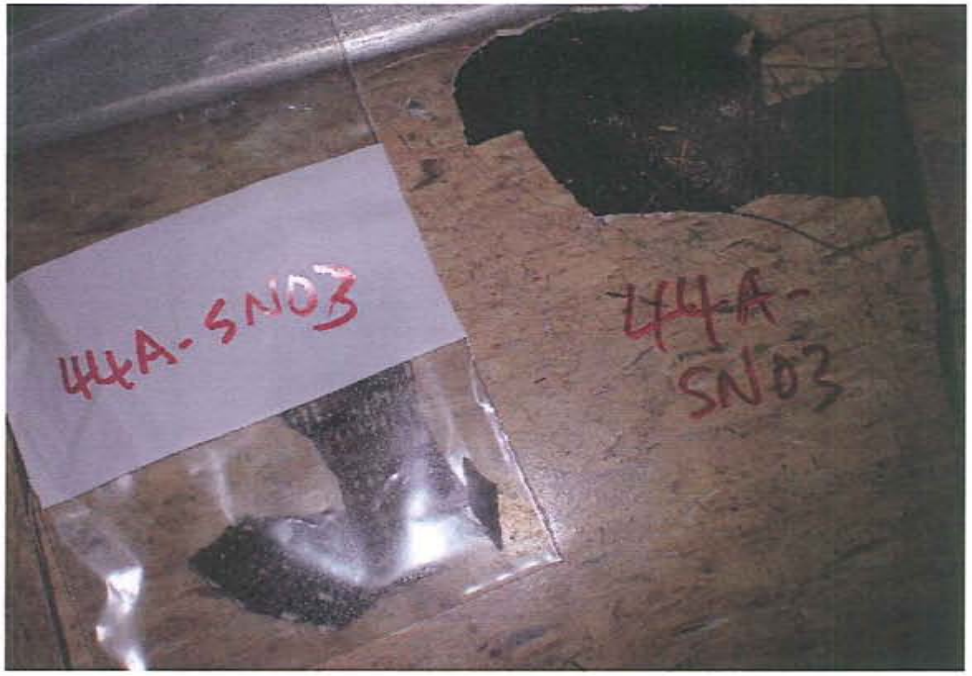
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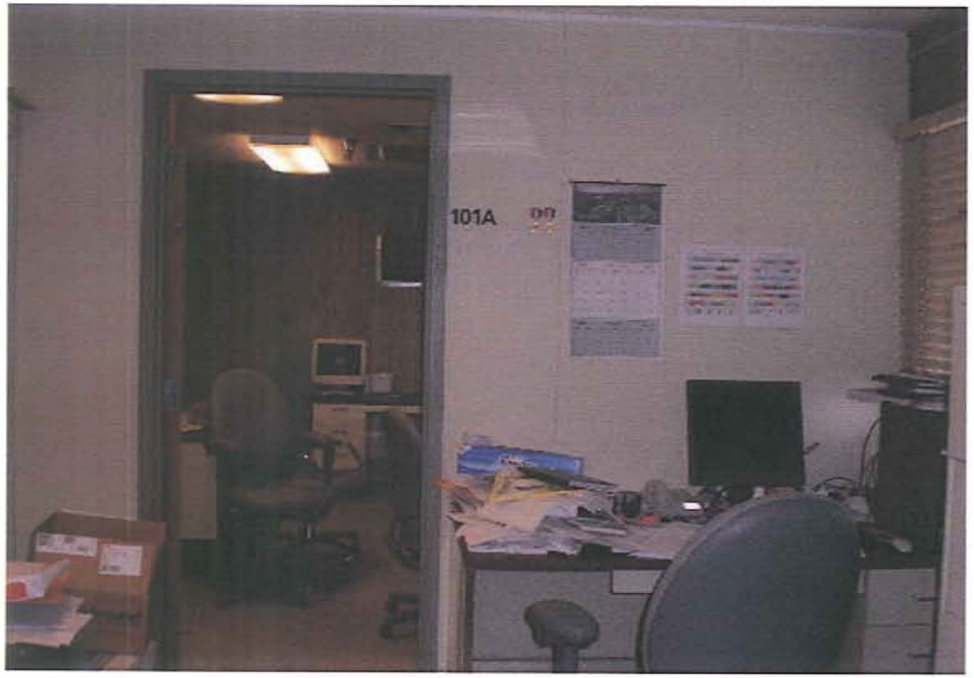
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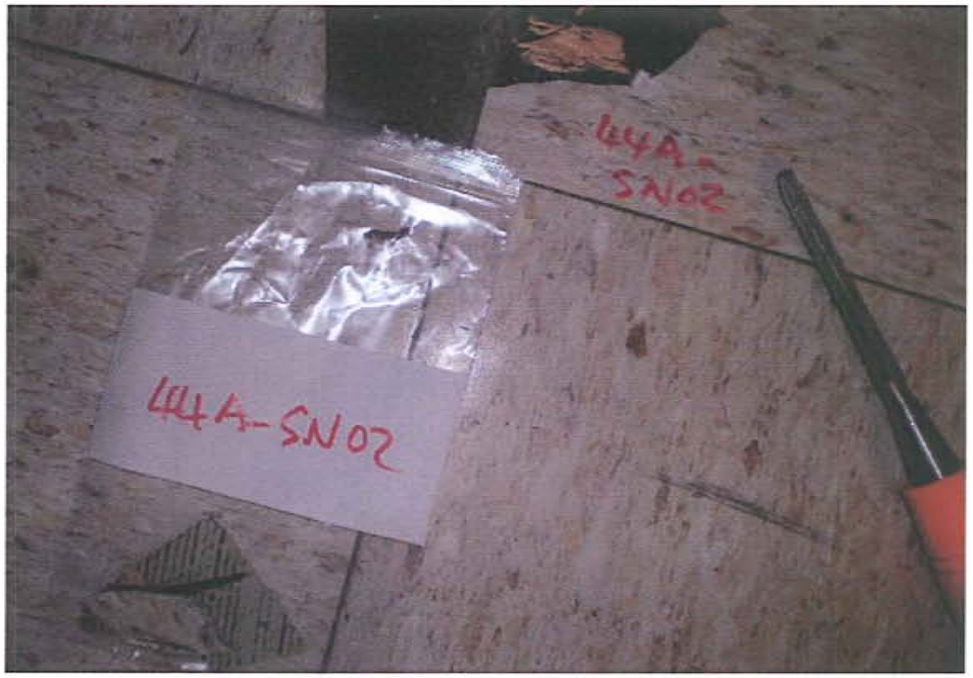
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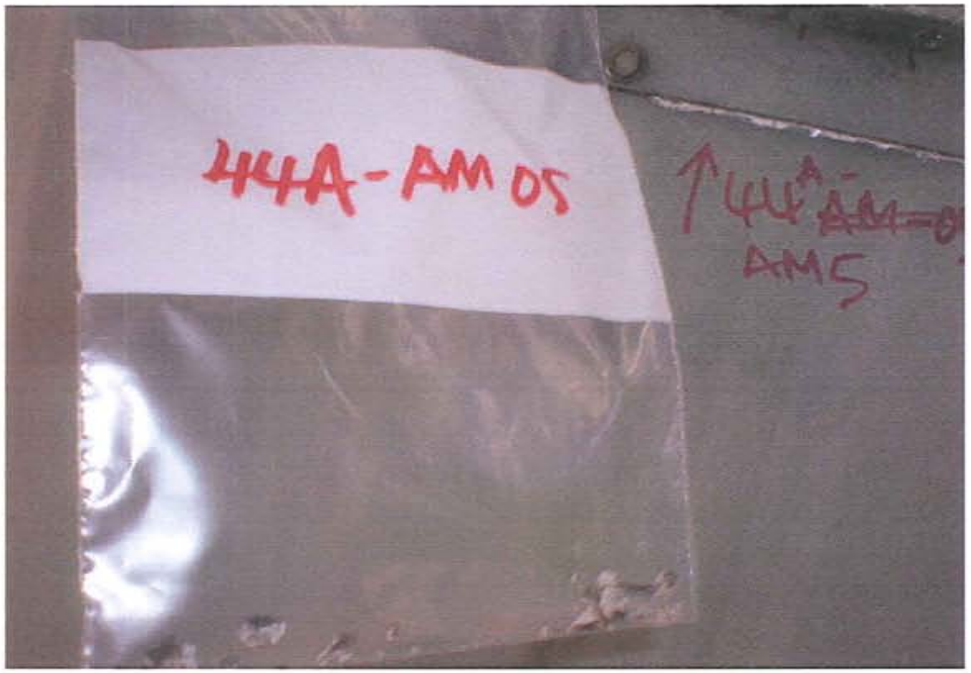
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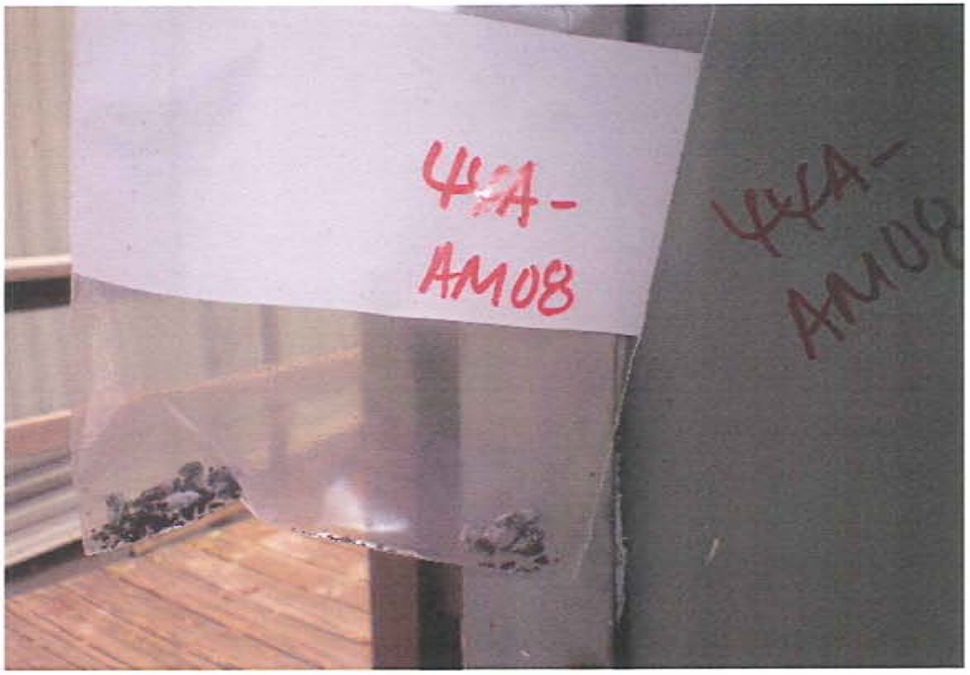
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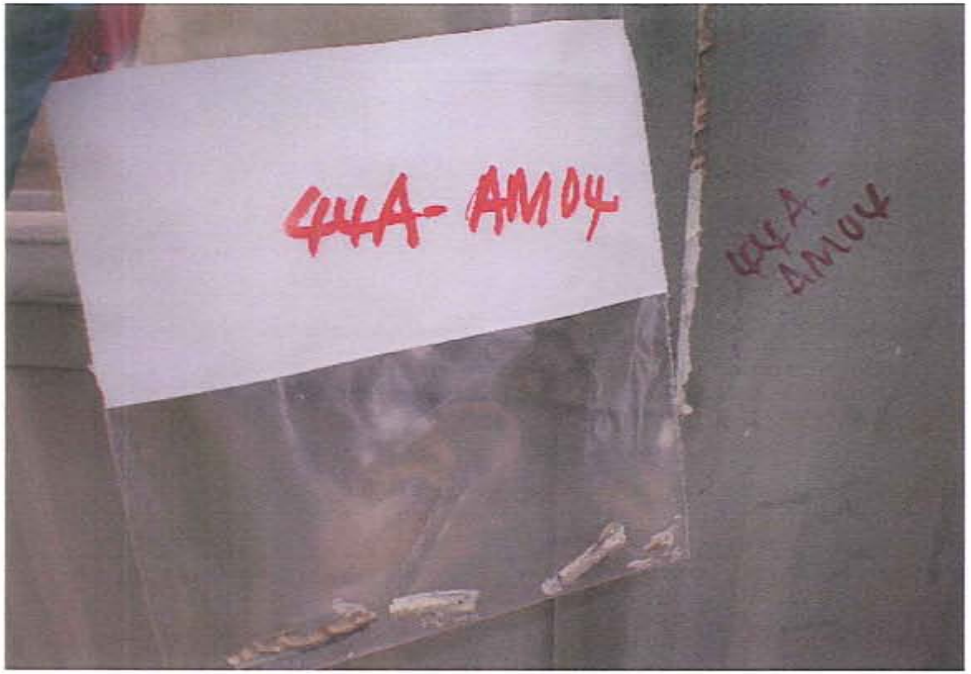
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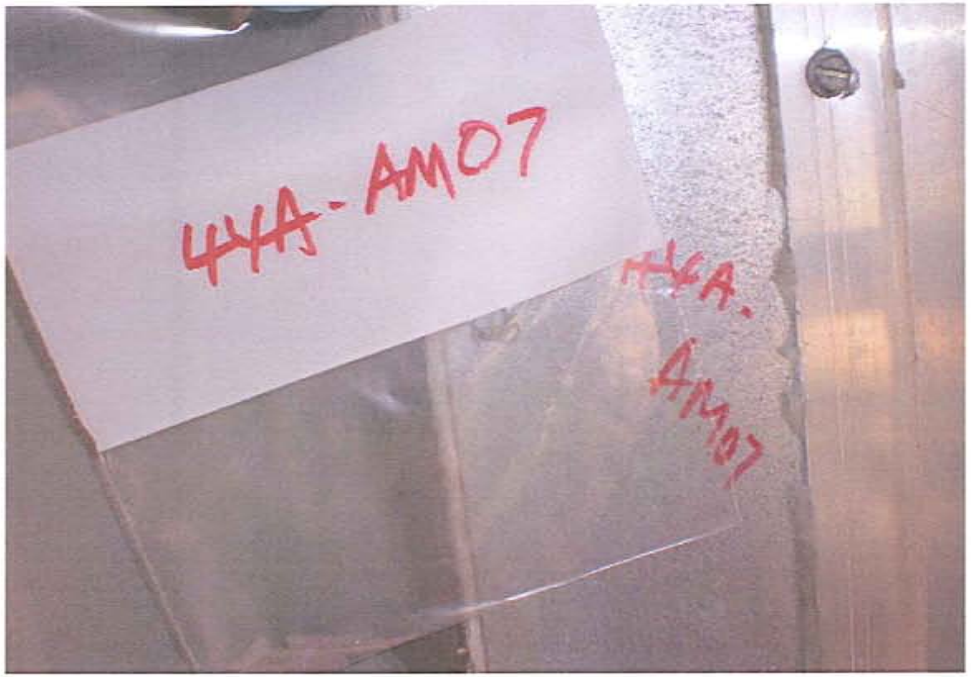
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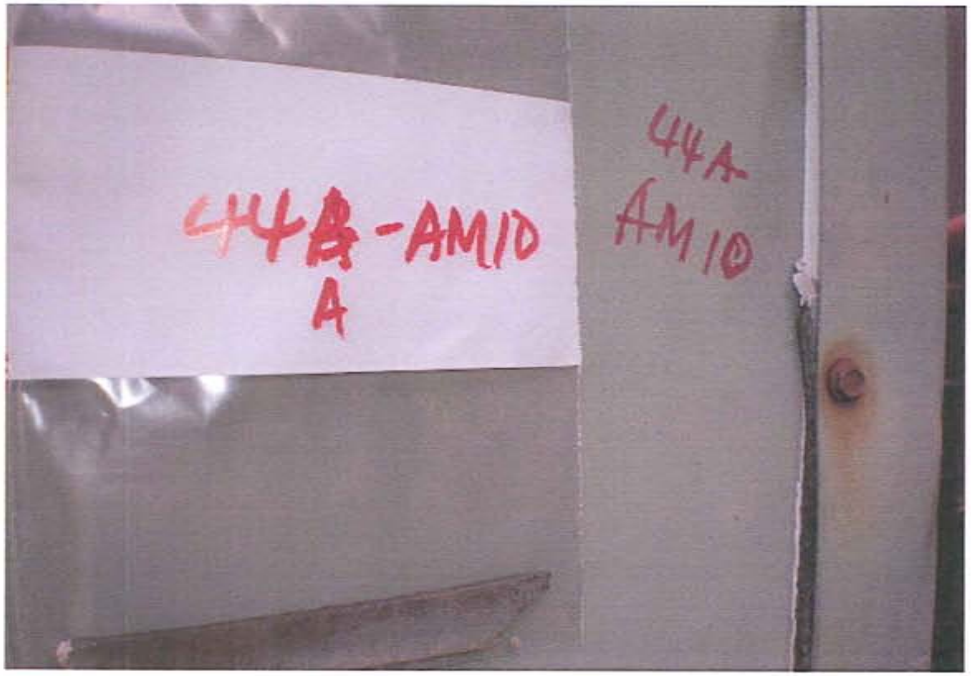
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44A
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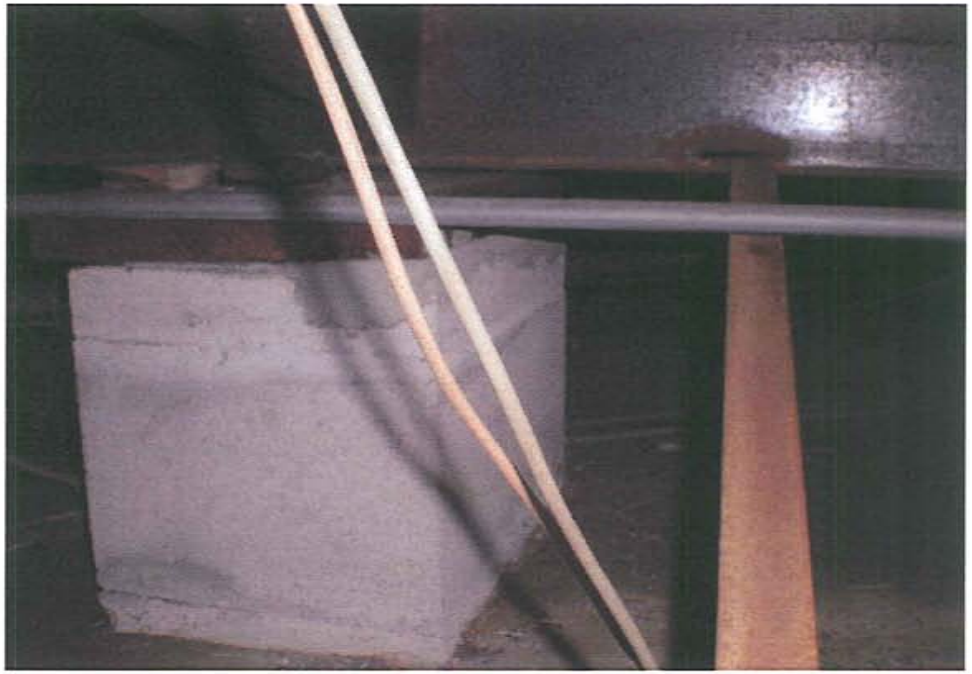

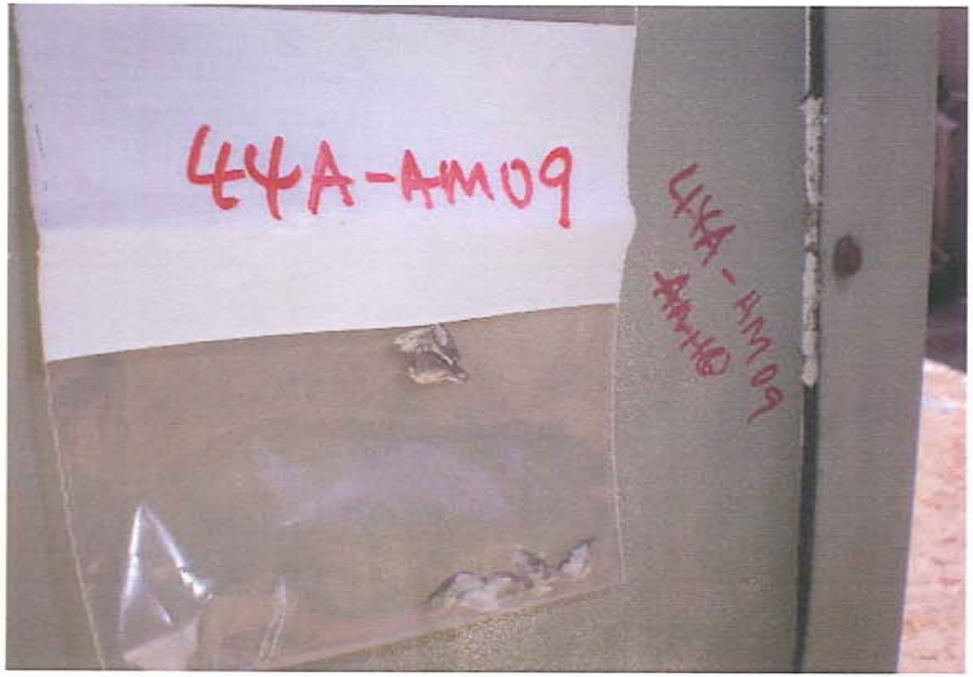
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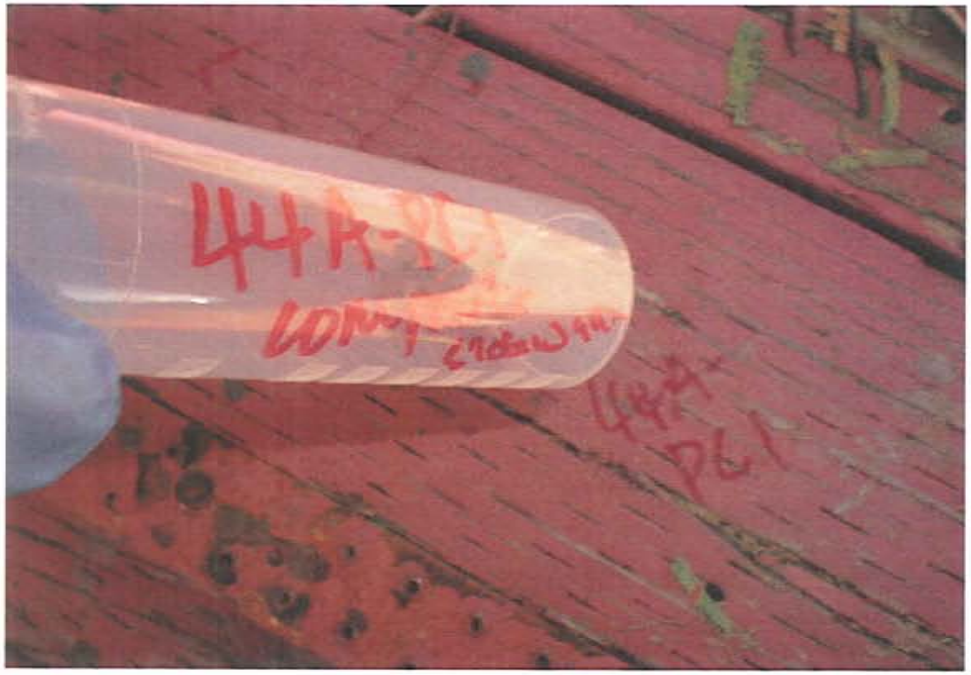
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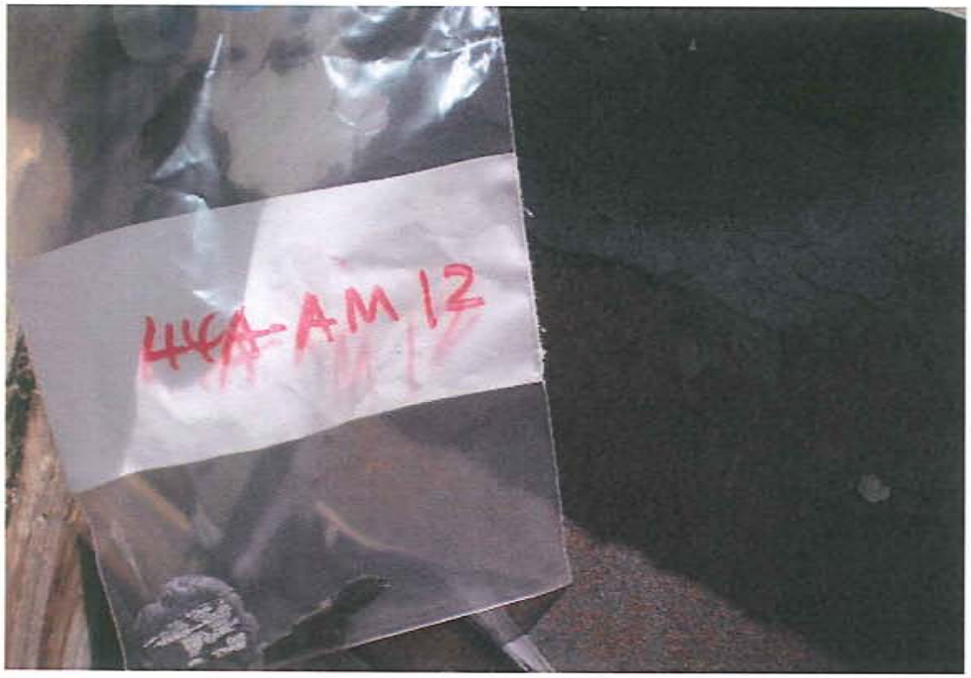
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44A-PC1
composite

44A-AM15

44A-AM17

44A-AM14

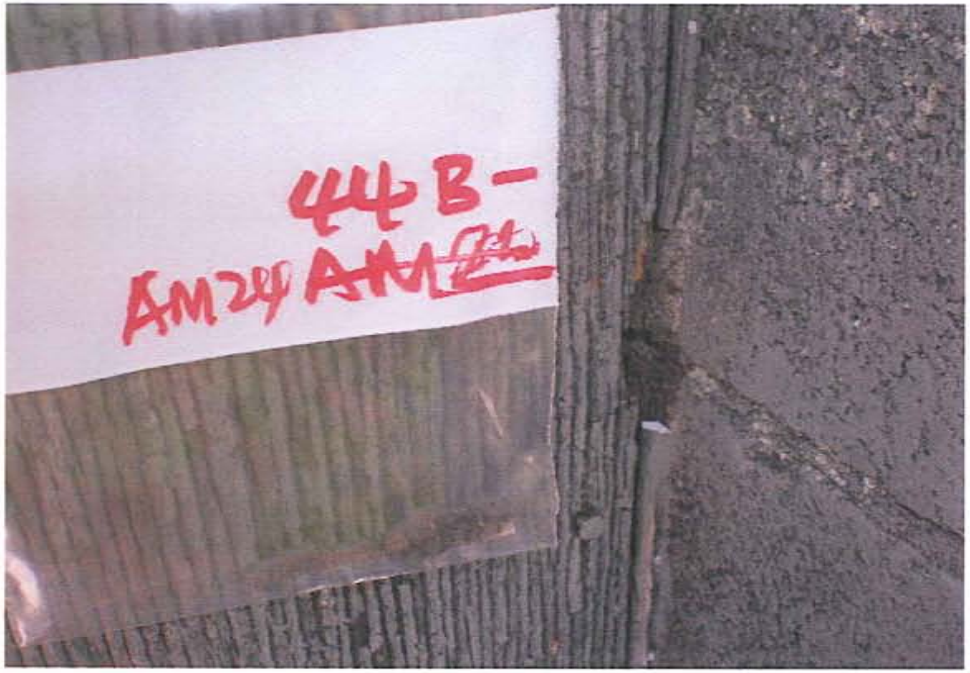
44A-AM16

44B-
AM20

44B &
AM 22

44A-AM18

44B-
AM21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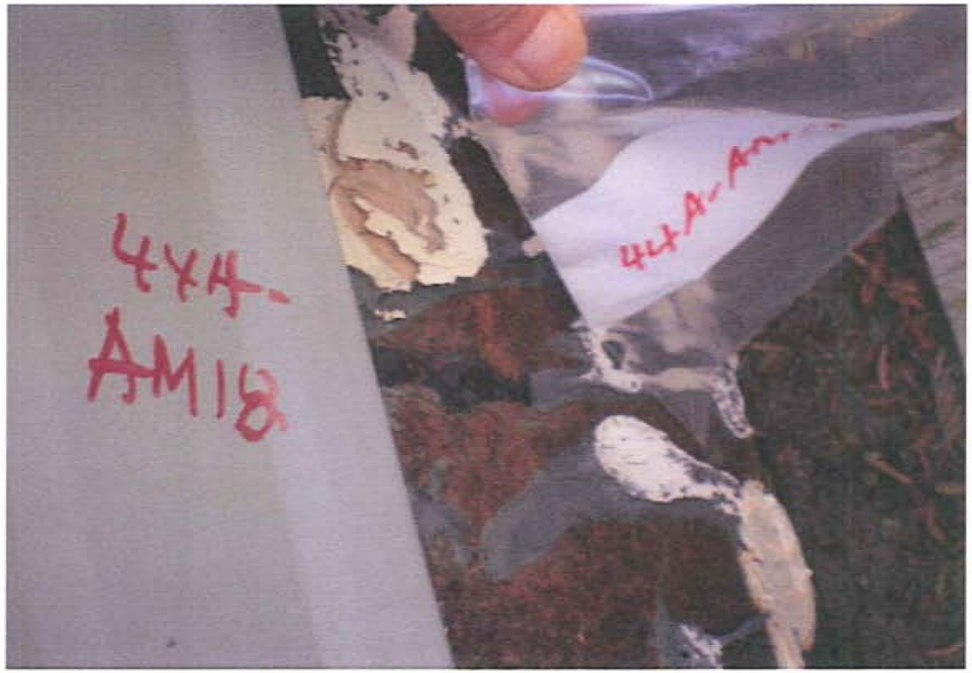
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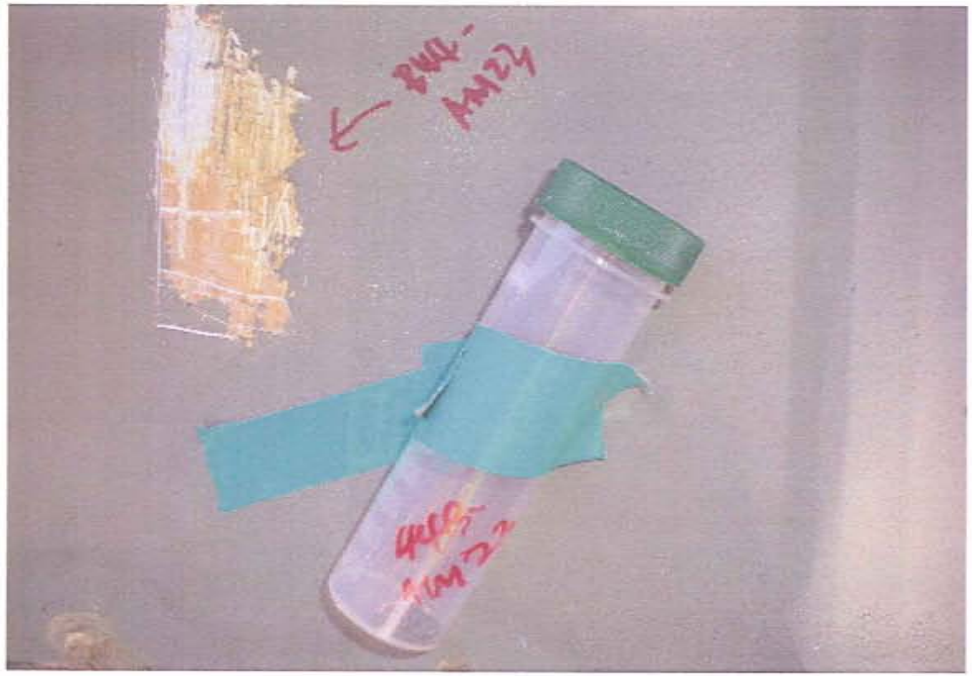
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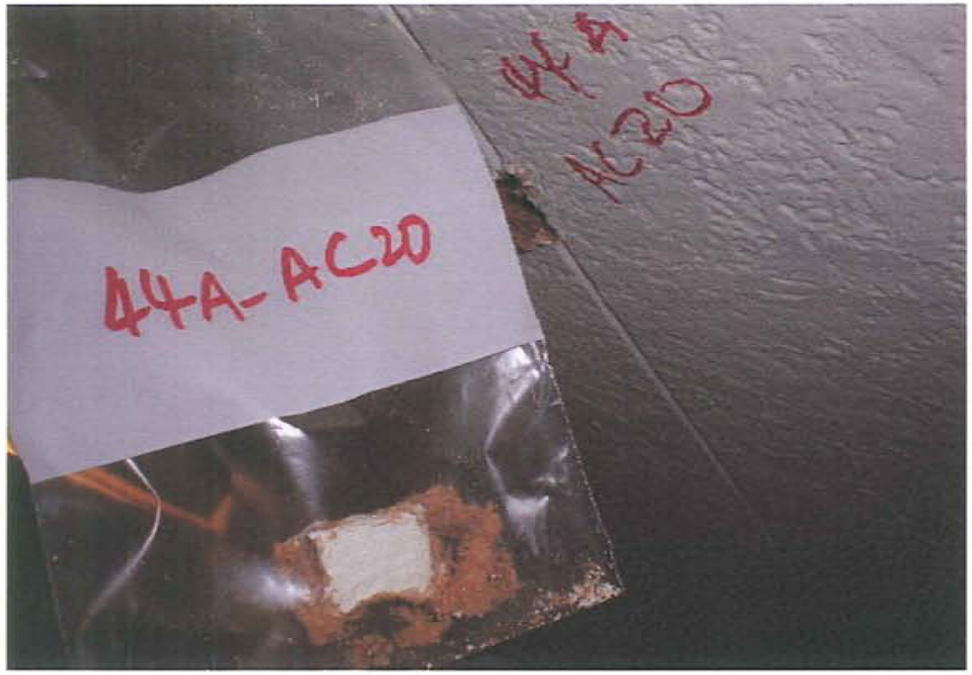
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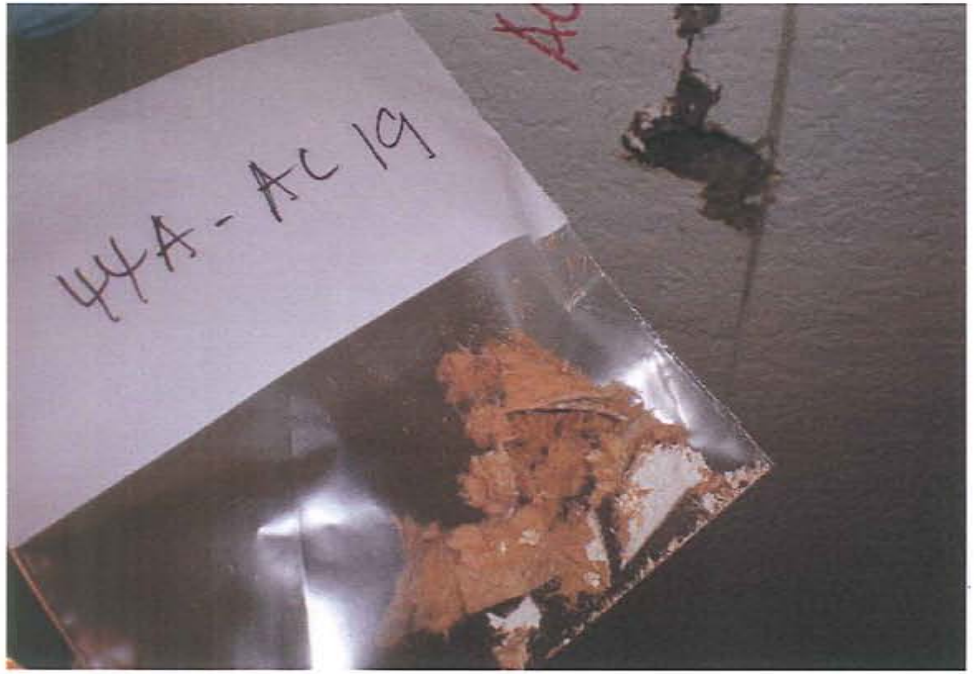
AC20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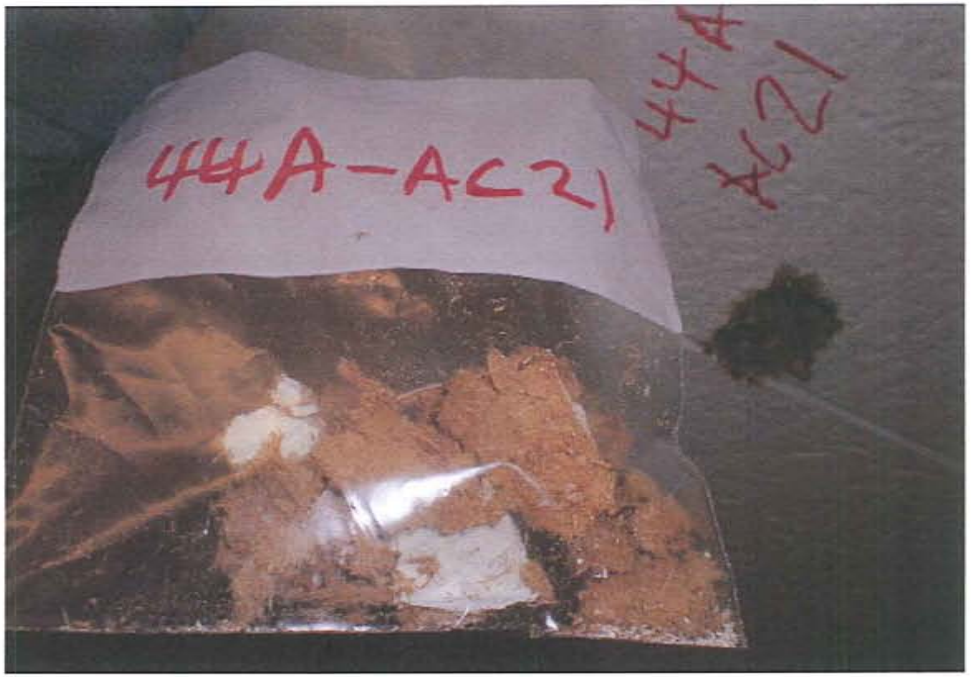
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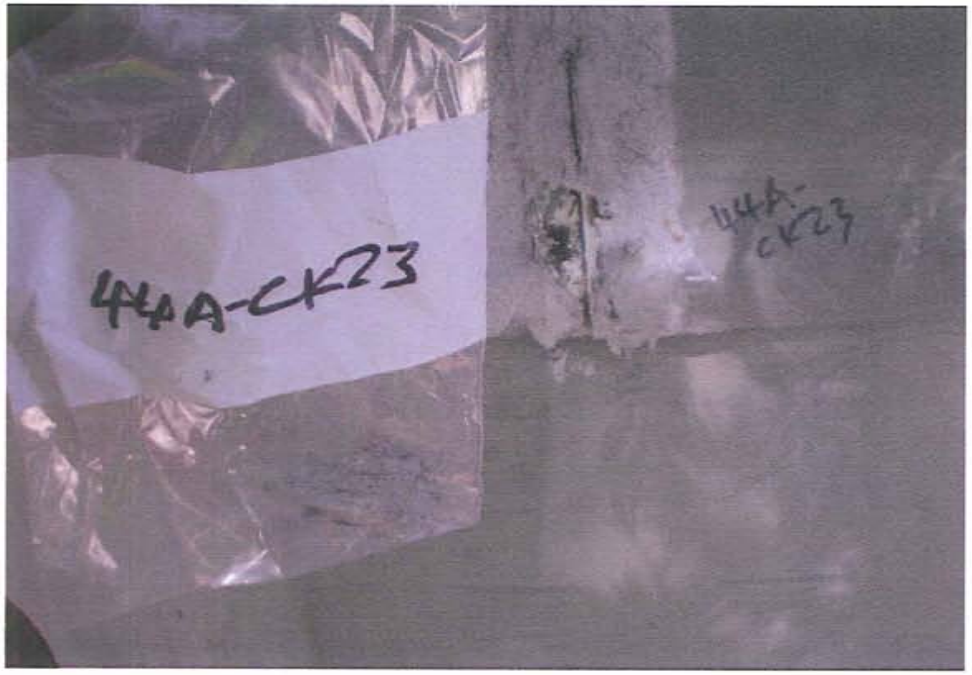
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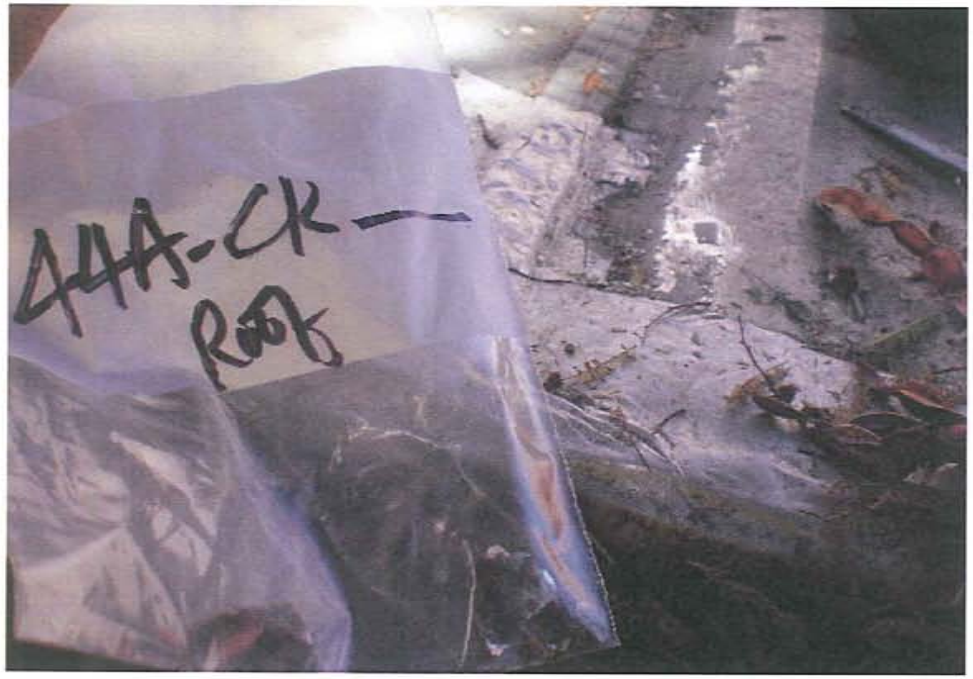

44A-CK—
Roof

A Creative Joint Venture For Better Environmental Solutions

Lawrence Berkeley National Laboratory
Building 44B
One Cyclotron Road
Berkeley, CA 94744

KELLCO-MACS Job #1004-17

NESHAP Compliant Pre-Demolition
Asbestos and Metals in Paint Inspection Report

for

Weiss Associates
5801 Christie Avenue
Suite 600
Emeryville, CA 94608

August 9, 2010

3137 Diablo Avenue • Hayward, CA 94545-2701• (510) 786-9751 • fax (510) 786-9625
http://www.kellcomacs.com email: mailbox3137@kellcomacs.com

A Creative Joint Venture For Better Environmental Solutions

NESHAP Compliant Pre-Demolition
Asbestos and Metals in Paint Inspection Report

Date:	August 9, 2010
KELLCO-MACS Job #:	1004-17
Client:	Ms. Agata Sulczynski Weiss Associates 5801 Christie Avenue Suite 600 Emeryville, CA 94608
Location:	Lawrence Berkeley National Laboratory Building 44B One Cyclotron Road Berkeley, CA 94744
Date of Inspection:	July 13, 19, 21, 22 & 26, 2010
Inspectors:	Siew Yee Lee CAC # 09-4546, CDPH Lead # 19509
Description of the Inspected Area:	This is an asbestos and Heavy Metals inspection on building 44B on the University of California, Berkeley campus in Berkeley, CA. Building 44B is a mobile office trailer which is constructed of exterior metal sheeting supported by I beams and concrete blocks. The roofing contains metal sheeting and the flooring consists of carpet on tack strips over a wooden subfloor.

Background

This is a NESHAP compliant pre-demolition asbestos and metals inspection report for Building 44B located in at LBNL in Berkeley, CA.

3137 Diablo Avenue • Hayward, CA 94545-2701• (510) 786-9751 • fax (510) 786-9625
http://www.kellcomacs.com email: mailbox3137@kellcomacs.com

Synopsis

Asbestos was found in the following materials:

Weather Strip Caulking Sealant

- Exterior Walls

Black Wall Patch

- Exterior roof covering

Window Caulking

Black Roof Patch

Designation of material as asbestos containing should be applied to all homogenous material of the type analyzed and found to contain asbestos.

About the Inspection

The inspection performed was both visual and tactile. Samples were taken of suspect materials located at the interior and exterior of the survey area.

The inspection was limited to those materials readily discerned in a reasonable inspection by a competent inspector. Materials that are hidden within walls, behind structures, in vertical shafts or in areas that make them not readily available to our inspector were not sampled. If future work uncovers any non-sampled materials, these should be submitted for asbestos and/or lead paint analysis.

The following numbering convention was used for this inspection:

LETTER	STANDS FOR	EXAMPLE	MEANING
XX	Building DESIGNATION based on information provided on drawings provided to us prior to inspection	B44B	Building 44B
Y & *Optional Z*	EITHER building SYSTEM (W: wall; F: Flooring; C: Ceiling; T: TSI; M: Misc) OR Further designation of sample location as Unit # within building	SN	Tile/Mastic Sample
		AM	Asbestos Miscellaneous
		AC	Asbestos Ceiling Sample
		CK	Caulk Sample

LETTER	STANDS FOR	EXAMPLE	MEANING
xx	Sample number and layer	01	First Sample, First Layer
		01a	First Sample, Second Layer
		02	Second Sample First Layer

- ***Asbestos Findings***

Asbestos samples were analyzed in the KELLCO-MACS laboratory, by Polarized Light Microscopy, the EPA's recommended method. Copies of the full laboratory reports are attached.

Photographs of sampled materials are included. Sample locations are noted on the attached not-to-scale drawing.

The determination of a material to be Asbestos Containing Material (ACM) was made either by direct sampling or by homogeneity with at least one positive sample of the same material.

Materials that tested **positive** for asbestos are:

Building 44B:

Lab Sample #	Field Sample #	Field Description	Asbestos %
L206353-3	44B-AM03	Exterior west wall of Room 104, between wall & floor panels / grey sealant	11% Chrysotile
L206353-4	44B-AM04	Exterior west wall of Room 106, between wall & floor panels / grey sealant	11% Chrysotile
L206353-7	44B-AM06a	Exterior roof cover of Room 104 / black wall patch	10% Chrysotile
L206353-10	44B-AM09	Exterior window of Room 107 / grey window caulking	11% Chrysotile
L206353-14	44B-AM12a	Exterior wall panels between Room 107 & 105 / sealant	10% Chrysotile
L206353-20	44B-AM18	Roof cover outside of Room 106, south end / black wall patch	10% Chrysotile
L206353-21	44B-AM19	Roof cover outside of Room 106, north end / black wall patch	2% Chrysotile
L206353-23	44B-AM21	Exterior southeast corner of building / panel sealant	10% Chrysotile
L206353-24	44B-AM22	Exterior southeast corner of building / panel sealant	11% Chrysotile
L206588-2	44B-CK29	Roof, roof patch / grey patch	5% Chrysotile

Samples with less than 10% asbestos can be submitted for further analysis by the Point Count method. If the Point Count method determines that the material contains less than 1% asbestos, these materials can be disposed of as non-hazardous asbestos containing construction waste.

Materials for which the analytical results show **no detection** of asbestos are:

Building 44B

Lab Sample #	Field Sample #	Field Description
L206588-1	44B-AC28	Room 101, supply air duct intestitial ceiling / yellow insulation
L206588-3	44B-CK30	Roof, roof patch / black patch
L206588-4	44B-CK31	Roof, east end of roof seam / sealant
L206353-1	44B-AM01	South door frame / white sealant
L206353-2	44B-AM02	South door frame, end corner / black sealant
L206353-5	44B-AM05	Exterior west window of Room 104 / grey window caulking
L206353-6	44B-AM06	Exterior roof cover of Room 104 / black wall patch
L206353-8	44B-AM07	Exterior west window of Room 102 / grey window caulking
L206353-9	44B-AM08	North door frame / white sealant
L206353-11	44B-AM10	Behind metal wall panels of Room 107 / pink insulation
L206353-12	44B-AM11	Exterior east wall of Room 107, between metal panels / sealant
L206353-13	44B-AM12	Exterior wall panels between Room 107 & 105 / sealant
L206353-15	44B-AM13	Northeast corner of building / concrete block mortar
L206353-16	44B-SC14	Pylon under Room 108 / concrete
L206353-17	44B-SC15	Northwest corner of building / concrete
L206353-18	44B-AM16	Support column under Room 103 / grey concrete block mortar
L206353-19	44B-AM17	Support column under Room 101 / grey concrete block mortar
L206353-22	44B-AM20	Exterior southwest corner of building / panel sealant
L206353-25	44B-AM23	Exterior northeast side of building / wall paint or coating
L206353-26	44B-AM24	Exterior northeast side of building, between wood & concrete block / sealant
L206353-27	44B-AM25	Exterior east side of Room 103, between wood & concrete block / sealant
L206353-28	44B-AC25A	Hallway between Rooms 101 & 104 / ceiling sound board
L206353-29	44B-AC26	Room 103 / ceiling sound board
L206353-30	44B-AC27	Room 108 / ceiling sound board
L206294-1	44B-AM01	Hallway, Under Carpet / Carpet Padding

- ***Metals in Paint Findings***

Six (6) paint samples were collected and submitted for Heavy Metals (CAM 17) analysis to Macs Lab, Inc.

These samples were analyzed using an ICP/MS, Extraction Method SW3050B TTLC and EPA 6010B/3050 method. This method is **not** for the purpose of profiling any waste streams from this project. Profiling of the waste streams (TCLP & STLC) will be the responsibility of the contractor performing the work. The results of the profiling of the waste streams can vary dramatically depending on the means and methods utilized by the contractor during the demolition of the buildings. Care needs to be taken to ensure that all OSHA and EPA rules are abided by. The EPA rules are typically contained within title 22 and the OSHA rules are typically contained within title 8. Please find the following list as guidance; furthermore, it is not intended to be all encompassing but as a starting point for review in regulatory compliance.

Lab Sample #	Field Sample	Field Description
206485-1	44B-PC1	Exterior east side of bldg./ Green paint chip off wood
206485-2	44B-PC2	Exterior east side of bldg./ green paint off metal
206485-3	44B-PC3	Broken wood, walkway NW of bldg./ Maroon/ brown paint chip composite off wood
206485-4	44B-PC4	Metal I-beam under structure, NW corner/ Maroon pain chip off metal
206485-5	44B-PC5	Wooden walkway east entrance/ Red paint chip off wood
206485-6	44B-PC6	Roof/ Grey paint chip off metal

Building 44 B

	Lab Sample Number:	206485-1	206485-2	206485-3	206485-4	206485-5
	Client Sample Number:	44B-PC1	44B-PC2	44B-PC3	44B-PC4	44B-PC5
	Matrix:	Bulk	Bulk	Bulk	Bulk	Bulk
	Extraction Type:	Acid	Acid	Acid	Acid	Acid
	Units:	mg/kg (PPM)	mg/kg (PPM)	mg/kg (PPM)	mg/kg (PPM)	mg/kg (PPM)
Sb	Antimony	45.10	171.68	175.25	169.42	179.17
As	Arsenic	<0.01	<0.01	78.91	388.83	42.06
Ba	Barium	88,063.73	134,686.35	715.87	88,482.49	5,743.57
Be	Beryllium	0.07	<0.01	3.21	1.60	1.17
Cd	Cadmium	6.23	19.83	66.11	169.49	70.28
Cr	Chromium	595.59	2,016.61	4,692.36	1,194.55	9,745.00
Co	Cobalt	44.73	77.31	1,398.55	929.57	985.22
Cu	Copper	438.24	569.74	514.69	888.33	500.71
Pb	Lead	2,556.37	6,537.82	21,379.19	19,136.19	6,930.41
Hg	Mercury	50.22	47.14	8.49	46.69	10.80
Mo	Molybdenum	21.08	61.53	163.84	150.97	85.41
Ni	Nickel	63.60	87.55	117.94	443.19	169.92
Se	Selenium	3,127.45	10,009.23	9,173.87	15,910.51	8,203.05
Ag	Silver	5.37	5.54	16.49	21.56	17.18
Tl	Thallium	48.06	180.35	121.60	189.11	93.40
V	Vanadium	38.36	54.52	103.27	341.28	120.95
Zn	Zinc	2,018.38	4,458.49	5,212.58	2,891.83	9,234.99

	Lab Sample Number:	206485 -6
	Client Sample Number:	44B-PC6
	Matrix:	Bulk
	Extraction Type:	Acid
	Units:	mg/kg (PPM)
Sb	Antimony	1,400.30
As	Arsenic	266.62
Ba	Barium	133,635.01
Be	Beryllium	0.30
Cd	Cadmium	71.66
Cr	Chromium	1,442.43
Co	Cobalt	105.34
Cu	Copper	2,931.75
Pb	Lead	32,551.93
Hg	Mercury	47.33
Mo	Molybdenum	31,854.60
Ni	Nickel	194.96
Se	Selenium	72,210.68
Ag	Silver	22.85
Tl	Thallium	931.31
V	Vanadium	238.58
Zn	Zinc	7,320.47

Regulatory Requirements

The Environmental Protection Agency (EPA) defines Asbestos Containing Material as any material that contains greater than 1% asbestos. Materials containing greater than 1% asbestos must be removed prior to demolition or renovation if they will be disturbed.

Friable asbestos containing material is any material that can be crushed or pulverized by hand pressure when dry, or materials that can be rendered to a crumbled, pulverized, or powdered state when dry by crushing, sanding, sawing, shot blasting, or through demolition or renovation activities.

As stated by NESHAP regulations, any material that contains less than 10% asbestos using the visual estimation method can be point counted with gravimetric reduction. The Point Counting method is a much more accurate analytical method for determining the percent of asbestos in a particular material. If the Point Count method determines that the material contains less than 1% asbestos, the material being analyzed can be disposed of as a non-hazardous asbestos containing construction waste.

Removal or disturbance of material with any detectable amount of asbestos must be handled in accordance with OSHA regulations. Cal-OSHA registration is required if the material contains more than .1% asbestos ($1/10^{th}$ of a percent). If there is more than 100 feet (linear or square) of an asbestos containing material that will be abated or disturbed, a California State registered and licensed asbestos abatement contractor must perform the work. If there is less than 100 feet, the work does not require a licensed asbestos abatement contractor, but must still conform to Cal-OSHA regulations.

Title 8 OSHA

General Industry Safety Orders deal with exposure limits for personnel working in or around surfaces that contain heavy metals.

Element	Chapter	Group	Article	Section
Antimony (Sb)	7	16	107	5155
Arsenic (As)	7	16	110	5214
Barium (Ba)	7	16	107	5155
Beryllium (Be)	7	16	107	5155
Cadmium (Cd)	7	16	110	5206
Chromium (Cr)	7	16	110	5206
Cobalt (Co)	7	16	110	5155
Copper (Cu)	7	16	110	5155
Lead (Pb)	7	16	109	5198
Mercury (Hg)	7	16	110	5155
Molybdenum (Mo)	7	16	110	5155
Nickel (Ni)	7	16	110	5155
Selenium (Se)	7	16	110	5155
Silver (Ag)	7	16	110	5155
Thallium (Ti)	7	16	110	5155

Element	Chapter	Group	Article	Section
Vanadium (V)	7	16	110	5155
Zinc (Zn)	7	16	107	5155

Title 22- Hazardous Waste

Title 22 describes the characterization of hazardous waste as described in chapter 11, article 1, section 66261.1. Under the EPA's Resource Conservation and Recovery Act (RCRA), a national program and inventory system about handling hazardous waste, describes the minimum requirements in order to be in compliance with the Federal and/or State regulations

Comment Regarding All Asbestos Containing Materials:

Asbestos containing materials in good condition do not necessarily need to be removed unless they will be disturbed; they should however be respected.

Employees, contract workers and others should be advised not to drill, saw, scrape or otherwise disturb this material without taking precautionary measures appropriate to asbestos containing material.

Asbestos containing material should be removed prior to the renovation and must be removed prior to demolition.

Areas Needing Immediate Corrective Action

Asbestos (in any condition) should be removed prior to renovation and must be removed prior to demolition of the survey site.

Analytical Procedures

- ***POLARIZED LIGHT MICROSCOPY (PLM)***

  Bulk samples were analyzed in accordance with U.S. EPA "Test Method for Determination of Asbestos in Bulk Building Materials, 1993," with inclusion of area percent estimates of the sample components. The use of the McCrone Color Dispersion Staining Technique supplements the analysis when considered useful by the analyst. The samples are prepared with refractive immersion oil and are examined under Polarized Light Microscopy (PLM). The accuracy of the visual estimate method is 1%.

  As per the standard "...The accuracy in the determination of the presence or absence of asbestos of greater than 1 area percent asbestos is greater than 99%." ASTM Committee D22.05, 1/18/88, Standard *Method of Testing for Asbestos Containing Materials by Polarized Light Microscopy*. If the sample matrix is reduced to minimize non-asbestos components, the detection limit can be mathematically enhanced, based on the amount of material remaining

after matrix reduction. This method is called gravimetric reduction. This method involves ashing and chemical dissolution of the sample.

- ***POINT COUNTING***

  The Point Counting method is a much more accurate analytical method for determining the percent of asbestos in a particular material. KELLCO-MACS uses a muffle furnace to ash the sample and remove organic compounds. Hydrochloric acid is used to dissolve some of the non-asbestos minerals. Under this method a minimum of 125 points are counted from each of 8 different slide preparations of the same sample (total of 1000 points min.) If the **Point Count Method** determines that the material contains less than 1% asbestos, the material being analyzed can be treated as non-hazardous asbestos containing construction waste**. Note: ONLY the Point Count Method can be used for this determination.**

- ***CAM 17 TESTING***

  CAM 17 Metals were tested by Macs Lab, Inc. using ICP-MS, Extraction Method SW3050B and Analytical Method 6010B/3050.

KELLCO-MACS Qualifications

KELLCO-MACS is a joint venture offering hazardous materials and AIHA laboratory analyses. Our credentials include:

- The KELLCO-MACS asbestos inspector is licensed with the State of California Department of Occupational Safety and Health (CAL-OSHA).

- The KELLCO-MACS lead inspector is licensed by the California Department of Public Health (CDPH)

- The laboratory accreditations include:

  - **NVLAP PLM** for Asbestos: NIST National Voluntary Laboratory Accreditation Program certificate of accreditation for bulk **asbestos** analysis by polarized light microscopy (Accreditation #101948-1).
  - **AIHA** Accreditation for **Industrial Hygiene** Analytical Laboratory for PCM, and AA for lead (Accreditation #101786).
  - **AIHA Analyst Proficiency (NIOSH PAT)** (Accreditation # 11172)
  - **AIHA ELLAP** Accreditation for Lead: Accreditation for the **Environmental Lead** Laboratory recognized by the EPA as meeting the requirements of the National Lead Laboratory Accreditation Program established under Title X (Lab ID #11109).
  - **ELAP PLM** for Asbestos: California Department of Health Services, Environmental Laboratory Accreditation Program, certificate for bulk asbestos analysis (Certificate #2027)
  - **USDA Soil** permit #39484

The following supporting documents are attached to this report:

- Laboratory analytical reports
- Photographs of sample locations
- Floor plan or sketch showing sample locations

Please call KELLCO if there are any questions and/or clarifications regarding this report. We look forward to working with you in the future.

Sincerely,

KELLCO-MACS

Tim C. Cannard CAC #94-1395, CDPH Lead #764
Senior Project Manager

Asbestos Definitions and Classifications

ACM	(Asbestos Containing Material) - Material containing more than 1% asbestos. ACM must be disposed as hazardous waste. Note: Federal OSHA and Cal-OSHA control materials containing any amount of asbestos.
ACBM	(Asbestos Containing Building Material) – AHERA/ASHARA term for material containing more than 1% asbestos in or on interior structural members or other structural components. Exceptions: Covered walkways, porticos and exterior HVAC TSI.
ACCM	(Asbestos Containing Construction Material) – California term for a manufactured construction material containing greater than .1% (one tenth of one percent) asbestos.
PACM	(Presumed Asbestos Containing Material) OSHA considers all TSI and surfacing materials installed prior to1980 to be ACM unless proven otherwise.
Friable	Asbestos Containing Material that can be crumbled pulverized or reduced to powder by hand pressure when dry.
NOA	Naturally Occurring Asbestos. CARB defines as having >.25% by point counting.

Categories of Asbestos Used BY EPA AHERA/ASHARA and OSHA/Cal-OSHA

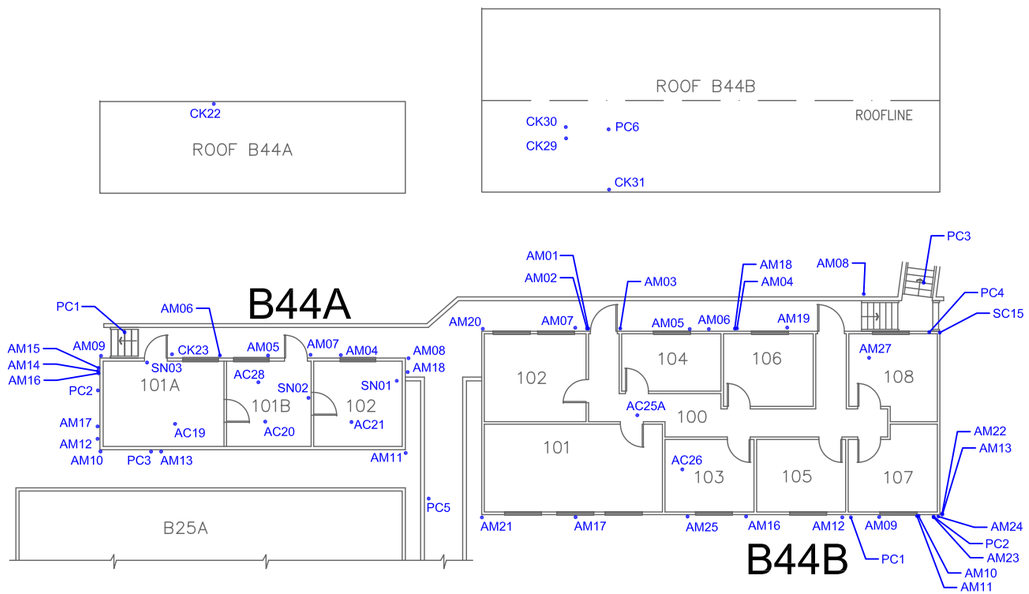
TSI	(Thermal System Insulation) - "Thermal system insulation (TSI)" means ACM applied to pipes, fittings, boilers, breeching, tanks, ducts or other structural components to prevent heat loss or gain. "Thermal system insulation ACM" is thermal system insulation which contains more than 1% asbestos.
SURFACING (usually mixed on site at time of application)	"Surfacing material" means material that is sprayed, troweled-on or otherwise applied to surfaces (such as acoustical plaster on ceilings and fireproofing materials on structural members, or other materials on surfaces for acoustical, fireproofing, and other purposes). "Surfacing ACM" means surfacing material which contains more than 1% asbestos. NOTE: OSHA/Cal-OSHA do not classify taping mud, floor tile mastic, stucco, leveling compound, and hard wall plasters or wall texturing as surfacing.
MISC.	All other ACM, including classify taping mud, floor tile mastic, stucco, leveling compound, and hard wall plasters or wall texturing as surfacing.

NESHAPS Categories for Asbestos (used by Air Quality Management Districts)

Category I	Cat I Non-friable Asbestos Containing Material refers to asbestos containing packing, gaskets, resilient floor covering, Galbestos, and asphalt roofing products containing more than 1% asbestos.
Category II	Cat II Non-friable Asbestos-Containing Material is any material that is not Cat I that contains greater than 1% asbestos.
RACM	"Regulated Asbestos-Containing Material." – Friable asbestos material (ACM) or a Category I non-friable ACM that has become friable OR a 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 reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations. RACM should be removed prior to renovation or demolition.

Characterization of Asbestos Containing Materials

Material	Estimated Quantity	TSI	Surfacing	Misc	RACM	Cat I	Cat II
Building 44B							
Exterior Walls & Window Weather Strip Caulking	~ 40 sq. ft.			X			X
Black Exterior Wall Patch	~ 70 sq. ft.			X			X
Roof Patching	~ 50 sq. ft.			X		X	

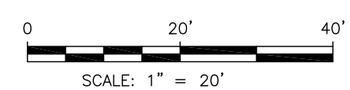


ABBREVIATIONS

AC	Asbestos ceiling sample
AM	Asbestos miscellaneous
CK	Caulk sample
PC	Paint sample
SC	Concrete sample
SN	Tile/mastic sample

NOTE:

All sample locations are approximate



L:\LBNL.178\Old Town Demolition\Sample Location Maps\Kellco Maps\SLM_Kellco_B44A-44B.dwg

MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Method: EPA-600/M4-82-020

KELLCO Services
3137 Diablo Ave

Hayward CA 94545

Person to contact:
Contact phone: 510-786-9751
FAX phone: 510-786-9625
Sampled by: Siew Yee Lee
Sampled on: July 19, 2010
Analyzed on: July 19, 2010 at: 17:01
Corresponding invoice number: 206294

Analyst: HCB (signature)

Laboratory manager: (signature)

Job Number: 1004-17

Job Description: Lawrence Berkeley - Bldg 44B, Berkeley, CA

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206294-1	44B-AM01	**N.D.**	49% Cellulose 42% Synthetic	Beige fibrous padding. Balance of sample is unspecified non-fibrous material.
Hallway, Under Carpet / Carpet Padding				

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

This report shall not be reproduced except in full without written approval of MACS Lab, Inc. This report relates only to the items tested. Samples will be destroyed after one month. Test per 40 Code of Federal Reg. Chap I (1-1-87) Part 763, Subpart F, Appendix A or current EPA method. Percentages are approximate. MACS Lab is an accredited laboratory of the National Voluntary Laboratory Accreditation Program (NVLAP) and is Lab Code 101948-0. No product endorsement by NVLAP or any agency of the U.S. Government may be claimed as a result of this analysis. Calif Dept of Health ELAP #2027. This method is not reliable for analysis of tile or other materials when fiber size is less than 10μ. TEM analysis should be used. Method Detection limit for asbestos is 1% per CA law. See QC page attached to this page for blank and retest data .

NVLAP®
NVLAP Lab Code 101948-0

MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

QA Report

Method: EPA-600/M

KELLCO Services
3137 Diablo Ave

Hayward CA 94545

Laboratory manager: _____
(signature)

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
Blank sample		**N.D.**	No fibers	
		PC*		

End of report.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

NVLAP®
NVLAP Lab Code 101948-0

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MACS Lab Incorporated
Material Analysis and Characterization Service

L206294

Analytical and Environmental Services

Chain of Custody Record

To Be Used For All Types Of Analysis

MACS Lab # _____

Customer Code

BILLED TO		PROJECT INFORMATION	
Name: Kellco-MACS		Sampled By: Siew Yee Lee	Date: 7/19/2010
Address:		Project Name: Lawrence Berkeley	Job #: 1004-17
City:		Site Address: Bldg 44 B	
State:	Zip:	City, State, Zip: Berkeley, CA	
Phone No:		Site Contact:	
Fax No:		Phone No:	Fax No:
Cell No:		Comments:	
Email:		Samples Preserved: Yes / No	Received Cold: Yes / No

ANALYSIS REQUIRED

Required Turn Around Time: 4 Hour X; 8 Hour; 24 Hour; 2 Days/48 Hour; 3 Days/72 Hour; 5+ Days/120 Hour

DISPOSAL: ☐ Customer ☐ MACS ☐ OTHER (Explain)

Sample #	Sample Description / Type of Work		TIME ON	TIME OFF	TOTAL TIME	FLOW RATES START	FLOW RATES STOP	PCM Asbestos Air - NIOSH 7400	PLM Asbestos Bulk - 40 CFR 763	Lead (Wipes, Air, Paint, Soil)	TEM (Air/Bulk) - AHERA/Yamate Level II	Mold - Viable / Non Viable Air / Bulk	Metals (TCLP, CAM17, STLC)		Comments /Area Social Security #
LLB-AM01	Hallway under carpet	carpet padding							X						

Relinquished By: [signature] *Date:* 7/19/2010. *Time:* 1655. *Accepted By:* Danielle Nichols *Date:* 7/19/10 *Time:* 4:53

TEM asbestos in water analysis requires 2 one-liter bottles shipped @ 4°C in dark containers for each sample.

LEAD USEPA 7420, Air NIOSH 7082, Soil EPA 7000/7420, Wipes NIOSH 9100
Water AIHA (method 3113B EPA 200.9)

Units Water - 1ug/l = 1 ppb
Paint - 1% = 10,000 ppm

3137 Diablo Avenue • Hayward, CA 94545-2701• (510) 786-9751 • fax (510) 786-9625 • http://www.macslab.com • email: info@macslab.com

MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Method: EPA-600/M4-82-020

KELLCO Services
3137 Diablo Ave

Hayward CA 94545

Person to contact: Tim Cannard
Contact phone: 510-786-9751
FAX phone: 510-786-9625
Sampled by: Siew Yee Lee
Sampled on: July 13, 2010
Analyzed on: July 23, 2010 at: 15:34
Corresponding invoice number: 206353

Analyst: HCB (signature)

Laboratory manager: (signature)

Job Number: 1004-17

Job Description: Lawrence Berkeley National Lab - Building B44B, 1 Cyclotron Road, Berkeley, CA

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206353-1	44B-AM01 South door frame / white sealant	**N.D.**	< 1%Cellulose	Off-white sealant. Balance of sample is unspecified non-fibrous material.
L206353-2	44B-AM02 South door frame, end corner / black sealant	**N.D.**	< 1%Cellulose	Black sealant. Balance of sample is unspecified non-fibrous material.
L206353-3	44B-AM03 Exterior west wall of Room 104, between wall & floor panels / grey sealant	**Yes**	11%Chrysotile* 2%Cellulose	Gray sealant. Balance of sample is unspecified non-fibrous material.
L206353-4	44B-AM04 Exterior west wall of Room 106, between wall & floor panels / grey sealant	**Yes**	11%Chrysotile* 1%Cellulose	Gray sealant. Balance of sample is unspecified non-fibrous material.
L206353-5	44B-AM05 Exterior west window of Room 104 / grey window caulking	**N.D.**	< 1%Cellulose	Off-white caulk. Balance of sample is unspecified non-fibrous material.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

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MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206353-6	44B-AM06 Exterior roof cover of Room 104 / black wall patch	**N.D.**	< 1% Polyethylene	Black sealant. Balance of sample is unspecified non-fibrous material.
L206353-7	44B-AM06a Exterior roof cover of Room 104 / black wall patch	**Yes**	10% Chrysotile* 2% Cellulose	Off-white sealant. Balance of sample is unspecified non-fibrous material.
L206353-8	44B-AM07 Exterior west window of Room 102 / grey window caulking	**N.D.**	1% Cellulose	Gray caulk. Balance of sample is unspecified non-fibrous material.
L206353-9	44B-AM08 North door frame / white sealant	**N.D.**	< 1% Cellulose	Off-white sealant. Balance of sample is unspecified non-fibrous material.
L206353-10	44B-AM09 Exterior window of Room 107 / grey window caulking	**Yes**	11% Chrysotile* 2% Cellulose	Gray caulk. Balance of sample is unspecified non-fibrous material.
L206353-11	44B-AM10 Behind metal wall panels of Room 107 / pink insulation	**N.D.**	78% Mineral Wool 6% Cellulose	Yellow fibrous insulation. Balance of sample is unspecified non-fibrous material.
L206353-12	44B-AM11 Exterior east wall of Room 107, between metal panels / sealant	**N.D.**	< 1% Cellulose	Off-white sealant. Balance of sample is unspecified non-fibrous material.
L206353-13	44B-AM12 Exterior wall panels between Room 107 & 105 / sealant	**N.D.**	< 1% Cellulose	Off-white sealant. Balance of sample is unspecified non-fibrous material.
L206353-14	44B-AM12a Exterior wall panels between Room 107 & 105 / sealant	**Yes**	10% Chrysotile* 2% Cellulose	Gray sealant. Balance of sample is unspecified non-fibrous material.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

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NVLAP Lab Code 101948-0

MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206353-15	44B-AM13 Northeast corner of building / concrete block mortar	**N.D.**	No Fibers	Gray mortar. Balance of sample is silicate and cementitious.
L206353-16	44B-SC14 Pylon under Room 108 / concrete	**N.D.**	< 1%Cellulose	Gray concrete. Balance of sample is silicate and cementitious.
L206353-17	44B-SC15 Northwest corner of building / conrete	**N.D.**	No Fibers	Gray concrete. Balance of sample is silicate and cementitious.
L206353-18	44B-AM16 Support column under Room 103 / grey concrete block mortar	**N.D.**	1%Cellulose	Gray mortar. Balance of sample is silicate and cementitious.
L206353-19	44B-AM17 Support column under Room 101 / grey concrete block mortar	**N.D.**	< 1%Cellulose	Gray mortar. Balance of sample is silicate and cementitious.
L206353-20	44B-AM18 Roof cover outside of Room 106, south end / black wall patch	**Yes**	10%Chrysotile* 2%Cellulose	Black mastic. Balance of sample is organic binders.
L206353-21	44B-AM19 Roof cover outside of Room 106, north end / black wall patch	**Yes**	2%Chrysotile* 5%Cellulose	Black mastic. Balance of sample is organic binders.
L206353-22	44B-AM20 Exterior southwest corner of building / panel sealant	**N.D.**	1%Cellulose	Off-white sealant. Balance of sample is unspecified non-fibrous material.
L206353-23	44B-AM21 Exterior southeast corner of building / panel sealant	**Yes**	10%Chrysotile* 2%Cellulose	Off-white sealant. Balance of sample is unspecified non-fibrous material.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

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NVLAP Lab Code 101948-0

MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206353-24	44B-AM22 Exterior southeast corner of building / panel sealant	**Yes**	11%Chrysotile* 2%Cellulose	Off-white sealant. Balance of sample is unspecified non-fibrous material.
L206353-25	44B-AM23 Exterior northeast side of building / wall paint or coating	**N.D.**	< 1%Cellulose	Gray paint/coating. Balance of sample is unspecified non-fibrous material.
L206353-26	44B-AM24 Exterior northeast side of building, between wood & concrete block / sealant	**N.D.**	< 1%Cellulose	Off-white sealant. Balance of sample is unspecified non-fibrous material.
L206353-27	44B-AM25 Exterior east side of Room 103, between wood & concrete block / sealant	**N.D.**	< 1%Cellulose	Off-white sealant. Balance of sample is unspecified non-fibrous material.
L206353-28	44B-AC25A Hallway between Rooms 101 & 104 / ceiling sound board	**N.D.**	89%Cellulose	Brown fiber board. Balance of sample is unspecified non-fibrous material.
L206353-29	44B-AC26 Room 103 / ceiling sound board	**N.D.**	89%Cellulose	Brown fiber board. Balance of sample is unspecified non-fibrous material.
L206353-30	44B-AC27 Room 108 / ceiling sound board	**N.D.**	89%Cellulose	Brown fiber board. Balance of sample is unspecified non-fibrous material.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

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MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

QA Report

Method: EPA-600/M

KELLCO Services
3137 Diablo Ave

Hayward CA 94545

Laboratory manager: _____ (signature)

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
Blank sample		**N.D.**	No fibers	
		PC*		
L206353-23	44B-AM21	**Yes**	10%Chrysotile*	Off-white sealant. Balance of sample is unspecified non-fibrous material.
Exterior southeast corner of building / panel sealant			3%Cellulose	

End of report.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

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L206353

KELLCO-MACS

A Creative Joint Venture For Better Environmental Solutions

Chain of Custody Record

For Bulk PLM Sample Collection Only

BILLED TO	PROJECT INFORMATION	
Name: Kellco - MACS	Sampled By: Siew Yee Lee	Date Sampled: 7/13/2010
Address: 3137 Diablo Avenue	Project Manager: Tim Cannard	Job #: 1004-17
City: Hayward	Project Name: Lawrence Berkeley National Lab	
State: Ca Zip: 94545	Site Address: Bldg 44B, 1 Cyclotron Rd.,	
Phone No: (510) 786-9751	City, State, Zip: Berkeley ca	
Fax No: (510) 786-9625	Site Contact:	
Cell No:	Phone No:	Fax No:
Email:	Samples Preserved: Yes / No	Analyze to First Positive: Yes / No

ANALYSIS REQUIRED

Required Turn Around Time: 4 Hour ___ 8 Hour ___ 24 Hour XX 2 Days/48 Hour ___ 3 Days/72 Hour ___ 5+ Days/120 Hour ___

DISPOSAL: ☐ Customer ☒ Laboratory ☐ OTHER (Explain)

	Sample #	Sample Location / Sample Description (Color)	PLM (Bulk) - 40 CFR - Chap. 1, Part 763,	(F)riable / (N)on Friable	Condition: (G)ood / (F)air / (P)oor	Length (Feet)	Width (Feet)	Height (Feet)	Quantity
1004-17 1	44B-AM01	South door frame/sealant (white)	X						
1004-17— 2	44B-AM02	South door frame, end corner/sealant (black)	X						
1004-17— 3	44B-AM03	Exterior west wall of Room 104, between wall and floor panels/sealant (Grey)	X						
1004-17— 4	44B-AM04	Exterior west wall of Room 106, between wall and floor panels/sealant (Grey)	X						
1004-17— 5	44B-AM05	Exterior west window of Room 104/window caulking (Grey)	X						
1004-17— 6	44B-AM06	Exeterior Roof cover of Room 104/ wall patch (black)	X						
1004-17— 7	44B-AM07	Exterior west window of Room 102/window caulking (Grey)	X						
1004-17— 8	44B-AM08	North door frame/ sealant (white)	X						
1004-17— 9	44B-AM09	Exterior window of Room 107/ window caulking (grey)	X						
1004-17— 10	44B-AM10	Behind metal wall panels of Room 107 / insulation (pink)	X						

Relinquished By: [signature]	*Date:* 7/21/10 *Time:* 0725	*Accepted By:* [signature]	*Date:* 07/21/10 *Time:* 07:25
Lab Report Number(s):		*Delivery Type:* ~~Drop Off~~	*FedEx* *Mail* *Other*

WB - Wallboard JC - Joint Compound WT - Wall Texture WBT - Wallboard Tape FT - Floor Tile FTM - Floor Tile Mastic BBM - Baseboard Mastic
RSF - Resilient Sheet Flooring CT - Ceiling Tile SAAM - Spray-Applied Acoustical Material R - Roof TSI - Thermal System Insulation EL - Elbow

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http://www.kellcomacs.com email: mailbox3137@kellcomacs.com

L206353

KELLCO-MACS

A Creative Joint Venture For Better Environmental Solutions

Chain of Custody Record

For Bulk PLM Sample Collection Only

BILLED TO	PROJECT INFORMATION	
Name: Kellco - MACS	Sampled By: Siew Yee Lee	Date Sampled: 7/13/2010
Address: 3137 Diablo Avenue	Project Manager: Tim Cannard	Job #: 1004-17
City: Hayward	Project Name: Lawrence Berkeley National Lab	
State: Ca Zip: 94545	Site Address: Bldg 44B, 1 Cyclotron Rd.,	
Phone No: (510) 786-9751	City, State, Zip: Berkeley, CA	
Fax No: (510) 786-9625	Site Contact:	
Cell No:	Phone No:	Fax No:
Email:	Samples Preserved: Yes / No	Analyze to First Positive: Yes / No

ANALYSIS REQUIRED

Required Turn Around Time: 4 Hour ___ 8 Hour ___ 24 Hour XX 2 Days/48 Hour ___ 3 Days/72 Hour ___ 5+ Days/120 Hour ___

DISPOSAL: ☐ Customer ☒ Laboratory ☐ OTHER (Explain)

	Sample #2	Sample Location / Sample Description (Color)	PLM (Bulk) - 40 CFR - Chap. 1, Part 763, Subpart F, Appendix A, EPA	(F)riable / (N)on Friable	Condition: (G)ood / (F)air / (P)oor	Length (Feet)	Width (Feet)	Height (Feet)	Quantity
1004-17— 11	[redacted]	Exterior East wall of 107, Between metal panels / sealant	X						
1004-17— 12	44B-AM12	Exterior wall panels between Rooms 107 and 105/sealant	X						
1004-17— 13	44B-AM13	Northeast corner of building/concrete block mortar	X						
1004-17— 14	44B-SC14	Pylon under Room 108/ concrete	X						
1004-17— 15	44B-SC15	Northwest corner of bldg/ concrete	X						
1004-17— 16	44B-AM16	Support column under Room 103/ concrete block mortar (grey)	X						
1004-17— 17	44B-AM17	Support column under Room 101/ concrete block mortar (grey)	X						
1004-17— 18	44B-AM18	Roof cover outside of Room 106, South end/ wall patch (black)	X						
1004-17— 19	44B-AM19	Roof cover outside of Room 106, North end/ wall patch (black)	X						
1004-17— 20	44B-AM20	Exterior southwest corner of bldg/ panel sealant	X						

Relinquished By: [illegible] *Date:* 7/21/10 *Time:* 0725 *Accepted By:* D. Kahler *Date:* 07/21/10 *Time:* 07:25

Lab Report Number(s): *Delivery Type:* Drop Off FedEx Mail Other

WB - Wallboard JC - Joint Compound WT - Wall Texture WBT - Wallboard Tape FT - Floor Tile FTM - Floor Tile Mastic BBM - Baseboard Mastic
RSF - Resilient Sheet Flooring CT - Ceiling Tile SAAM - Spray-Applied Acoustical Material R - Roof TSI - Thermal System Insulation EL - Elbow

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http://www.kellcomacs.com email: mailbox3137@kellcomacs.com

L206353

KELLCO-MACS

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Chain of Custody Record

For Bulk PLM Sample Collection Only

Page ____ of ____

BILLED TO	PROJECT INFORMATION	
Name: Kellco - MACS	Sampled By: Siew Yee Lee	Date Sampled: 7/1/3/2010
Address: 3137 Diablo Avenue	Project Manager: Tim Cannard	Job #: 1004-17
City: Hayward	Project Name: Lawrence Berkeley National Lab	
State: Ca Zip: 94545	Site Address: Bldg 44B, 1 Cyclotron Rd.,	
Phone No: (510) 786-9751	City, State, Zip: Berkeley, CA	
Fax No: (510) 786-9625	Site Contact:	
Cell No:	Phone No:	Fax No:
Email:	Samples Preserved: Yes / No	Analyze to First Positive: Yes / No

ANALYSIS REQUIRED

Required Turn Around Time: 4 Hour ___ 8 Hour ___ 24 Hour XX 2 Days/48 Hour ___ 3 Days/72 Hour ___ 5+ Days/120 Hour ___

DISPOSAL: ☐ Customer ☒ Laboratory ☐ OTHER (Explain)

Sample #	Type	Sample Location / Sample Description (Color)	PLM (Bulk) - 40 CFR - Chap. 1, Part 763, Subpart E, Appendix A, EPA	(F)riable / (N)on Friable	Condition: (G)ood / (F)air / (P)oor	Length (Feet)	Width (Feet)	Height (Feet)	Quantity
1004-17— 21	44B-AM21	Exterior Southeast corner of bldg/panel sealant	X						
1004-17— 22	44B-AM22	Exterior Southeast corner of bldg/panel sealant	X						
1004-17— 23	44B-AM23	Exterior Northeast side of bldg / wall paint or coating	X						
1004-17— 24	44B-AM24	Exterior Northeast side of bldg, between wood and concrete block / sealant	X						
1004-17— 25	44B-AM25	Exterior east side of Rm 103, between wood and concrete block / sealant	X						
1004-17— 26	44B-AC25A	Hallway between 101 and 104/ceiling sound board	X						
1004-17— 27	44B-AC26	Room 103/ ceiling sound board	X						
1004-17— 28	44B-AC27	Room 108/ ceiling sound board	X						
1004-17— 29			X						
1004-17— 30			X						

Relinquished By: [signature]	*Date:* 7/21/10 *Time:* 0725	*Accepted By:* [signature]	*Date:* 07/21/10 *Time:* 07:25
Lab Report Number(s):		*Delivery Type:* *Drop Off* *FedEx* *Mail* *Other*	

WB - Wallboard JC - Joint Compound WT - Wall Texture WBT - Wallboard Tape FT - Floor Tile FTM - Floor Tile Mastic BBM - Baseboard Mastic
RSF - Resilient Sheet Flooring CT - Ceiling Tile SAAM - Spray-Applied Acoustical Material R - Roof TSI - Thermal System Insulation EL - Elbow

3137 Diablo Avenue • Hayward, CA 94545-2701• (510) 786-9751 • fax (510) 786-9625
http://www.kellcomacs.com email: mailbox3137@kellcomacs.com

CLIENT	JOBSITE
Weiss Associates	Lawrence Berkeley National Laboratory
5801 Christie Avenue	One Cyclotron Road
600	
Emeryville	Berkeley
CA 94608	CA 94744

KELLCO-MACS JOB#: **1004-17** LAB LOGIN # L206353

COLLECTED BY: Siew Yee Lee

COLLECTED DATE 7/13/2010

TURN AROUND TIME: 4 8 24 48 5-DAY

RESULTS NEEDED BY

CIRCLE TYPE OF BULK ANALYSIS

PLM LEAD PAINT LEAD WIPE NON VIABLE MOLD VIABLE MOLD eCOLI OTHER

SAMPLES REC'D _____ ANALYZE TO FIRST POSITIVE YES NO

REPORT RESULTS TO PROJECT MANAGER: Tim Cannard

NOTES & COMMENTS:

CHAIN OF CUSTODY & SAMPLE SUBMITAL FORM PAGE____ OF ____

KELLCO-MACS JOB#: **1004-17**
Lawrence Berkeley National Laboratory

FIELD NUMBER	LOCATION (bldg, rm#, area)	COLOR	MATERIAL or SUBSTRATE (ft w/ size, mastic, ftc. etc.)	NOTES: Like condition, damage, quantity, inside what, beneath what? direction in building (N,S,E,W) etc.)
~~448~~ - AM1	south main door, ~~exterior~~ frame, exterior		door sealant	
448 - AM2	South main ~~door~~ entry, exterior door, Bottom	grey	door patch.	
- AM03	Exterior metal floorboard		Panel ~~metal~~ sealant	
- AM04				
- AM05	Exterior window of Room 104		window caulking	
- AM06	Exterior ceiling panel of office 104	Black	wall patch	
- AM07	North window ~~of~~ of Room 102		window caulking	
- AM08	North entry, exterior of door		frame sealant	
09			window caulking	

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
			D. Kahler	07/21/10	0725

L206353

CHAIN OF CUSTODY & SAMPLE SUBMITAL FORM PAGE_____ OF ____

KELLCO-MACS JOB#: **1004-17**
Lawrence Berkeley National Laboratory

FIELD NUMBER	LOCATION (bldg-rm#-area)	COLOR	MATERIAL or SUBSTRATE (ft w/ size, mastic, fic, etc.)	NOTES: Like condition, damage, quantity, inside what, beneath what? direction in building (N,S,E,W) etc.)
44B ~~SC~~ - AM10	Behind ~~the~~ exterior metal sheeting		Batt insulation	
44B - AM11			rivet and wall panel sealant	
44B - AM12	~~of~~ Metal floor exterior panels		panel sealant	
- AM13			~~to binder~~ concrete Block mortar.	
- SC AM14	Pylon under Room 108		concrete ~~pylon~~	
- SC15				
- AM16			concrete Block mortar	
- AM17				
- AM18	exterior metal ceiling panel	Black	patch	
- AM19			patch	
- AM20		Grey	panel ~~seals~~ caulking	
- AM21				
- AM22				
- AM23			panel paint/coating	
- AM24	Between wood panel & concrete Block		sealant	
- AM25				
~~- AM26~~				

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
			[illegible]	07/21/10	0225

MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Method: EPA-600/M4-82-020

KELLCO Services
3137 Diablo Ave

Hayward CA 94545

Person to contact: Tim Cannard
Contact phone: 510-786-9751
FAX phone: 510-786-9625
Sampled by: Siew Yee Lee
Sampled on: July 22, 2010
Analyzed on: July 28, 2010 at: 15:31
Corresponding invoice number: 206588

Analyst: _____ (signature)

Laboratory manager: _____ (signature)

Job Description: Lawrence Berkeley National Laboratory - Bldg 44B (continue) - One Cyclotron Road, Berkeley, CA 94744

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206588-1	44B-AC28 Room 101, supply air duct intestitial ceiling / yellow insulation	**N.D.**	45% Fiberglass	Yellow insulation. Balance of sample is unspecified non-fibrous material.
L206588-2	44B-CK29 Roof, roof patch / grey patch	**Yes**	5% Chrysotile* 5% Cellulose	Black roofing material. Balance of sample is organic binders and unspecified non-fibrous material.
L206588-3	44B-CK30 Roof, roof patch / black patch	**N.D.**	5% Cellulose	Black roofing material. Balance of sample is organic binders and unspecified non-fibrous material.
L206588-4	44B-CK31 Roof, east end of roof seam / sealant	**N.D.**	< 1% Cellulose	Black sealant. Balance of sample is unspecified non-fibrous material.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

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NVLAP Lab Code 101948-0

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MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

QA Report

Method: EPA-600/M

KELLCO Services
3137 Diablo Ave

Hayward CA 94545

Laboratory manager: _____ (signature)

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
Blank sample		**N.D.**	No fibers	
		PC*		
L206588-2	44B-CK29	**Yes**	5%Chrysotile*	Black roofing material. Balance of sample is organic binders and unspecified non-fibrous material.
Roof, roof patch / grey patch			5%Cellulose	

End of report.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

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NVLAP®
NVLAP Lab Code 101948-0

CLIENT	JOBSITE
Weiss Associates 5801 Christie Avenue 600 Emeryville CA 94608	Lawrence Berkeley National Laboratory One Cyclotron Road Bldg 44B (continue) Berkeley CA 94744

KELLCO-MACS JOB#: **1004-17** LAB LOGIN # L 206588

COLLECTED BY: Siew Yee Lee

COLLECTED DATE 7/22/2010.

TURN AROUND TIME: 4 8 (24) 48 5-DAY

RESULTS NEEDED BY

CIRCLE TYPE OF BULK ANALYSIS

(PLM) LEAD PAINT LEAD WIPE NON VIABLE MOLD VIABLE MOLD eCOLI OTHER

SAMPLES REC'D _____ ANALYZE TO FIRST POSITIVE YES NO

REPORT RESULTS TO PROJECT MANAGER: Tim Cannard

NOTES & COMMENTS:

CHAIN OF CUSTODY & SAMPLE SUBMITAL FORM PAGE____ OF ____

KELLCO-MACS JOB#: **1004-17**
Lawrence Berkeley National Laboratory

FIELD NUMBER	LOCATION (bldg, rm# area)	COLOR	MATERIAL or SUBSTRATE (ft w/ size, mastic, tjc, etc.)	NOTES: Like condition, damage, quantity, inside what, beneath what? direction in building (N, S, E, W) etc.)
44B - AC28	Room 101 supply air duct interstitial ceiling	yellow	insulation	
- CK29	Roof, roof patch	Grey	~~caulk~~ patch	
- CK30		~~clear~~ Black	?	
- CK31	Roof, east end of roof seam		sealant.	

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
[illegible]	7/26/200	1042	[illegible]	07/26/10	10:42

MACS Lab Incorporated
Analytical and Environmental Services
3137 Diablo Avenue, Hayward, Ca 94545-2701
(510) 786-9751 * (510) 786-9625 Fax * www.macslab.com

CAM-17 Bulk Materials Analysis Report - Method: EPA 6010B/3050

KELLCO Services
3137 Diablo Avenue
Hayward, CA 94545

Contact: Tim Cannard
Phone: (510) 786-9751
Email: mailbox3137@kellcomacs.com
Job #: 1004-17

Laboratory Number: 206485
Sampled By: Siew Yee Lee
Sampled On: July 13, 2010
Submitted On: July 21, 2010
Analyzed On: August 4, 2010
Reported On: August 5, 2010
SOP: CAM17
Sample Type: Bulk

Job Description: lawrence Berkeley National Lab, Bldg 44B, Berkeley, CA

	Lab Sample Number:	206485 -6				
	Client Sample Number:	44B-PC6				
	Matrix:	Bulk				
	Extraction Type:	Acid				
	Units:	mg/kg (PPM)				
Sb	Antimony	1,400.30				
As	Arsenic	266.62				
Ba	Barium	133,635.01				
Be	Beryllium	0.30				
Cd	Cadmium	71.66				
Cr	Chromium	1,442.43				
Co	Cobalt	105.34				
Cu	Copper	2,931.75				
Pb	Lead	32,551.93				
Hg	Mercury	47.33				
Mo	Molybdenum	31,854.60				
Ni	Nickel	194.96				
Se	Selenium	72,210.68				
Ag	Silver	22.85				
Tl	Thallium	931.31				
V	Vanadium	238.58				
Zn	Zinc	7,320.47				

Analyst: _____ (Signature)

Laboratory Manager: _____ (Signature)

NOTICE

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Analytical and Environmental Services
(510) 786-9751 * (510) 786-9625 Fax * www.macslab.com

CAM-17 Bulk Materials Analysis Report - Method: EPA 6010B/3050

KELLCO Services
3137 Diablo Avenue
Hayward, CA 94545

Contact: Tim Cannard
Phone: (510) 786-9751
Email: mailbox3137@kellcomacs.com
Job #: 1004-17

Laboratory Number: 206485
Sampled By: Siew Yee Lee
Sampled On: July 13, 2010
Submitted On: July 21, 2010
Analyzed On: August 4, 2010
Reported On: August 5, 2010
SOP: CAM17
Sample Type: Bulk

Job Description: lawrence Berkeley National Lab, Bldg 44B, Berkeley, CA

	Lab Sample Number:	206485 -1	206485 -2	206485 -3	206485 -4	206485 -5
	Client Sample Number:	44B-PC1	44B-PC2	44B-PC3	44B-PC4	44B-PC5
	Matrix:	Bulk	Bulk	Bulk	Bulk	Bulk
	Extraction Type:	Acid	Acid	Acid	Acid	Acid
	Units:	mg/kg (PPM)	mg/kg (PPM)	mg/kg (PPM)	mg/kg (PPM)	mg/kg (PPM)
Sb	Antimony	45.10	171.68	175.25	169.42	179.17
As	Arsenic	<0.01	<0.01	78.91	388.83	42.06
Ba	Barium	88,063.73	134,686.35	715.87	88,482.49	5,743.57
Be	Beryllium	0.07	<0.01	3.21	1.60	1.17
Cd	Cadmium	6.23	19.83	66.11	169.49	70.28
Cr	Chromium	595.59	2,016.61	4,692.36	1,194.55	9,745.00
Co	Cobalt	44.73	77.31	1,398.55	929.57	985.22
Cu	Copper	438.24	569.74	514.69	888.33	500.71
Pb	Lead	2,556.37	6,537.82	21,379.19	19,136.19	6,930.41
Hg	Mercury	50.22	47.14	8.49	46.69	10.80
Mo	Molybdenum	21.08	61.53	163.84	150.97	85.41
Ni	Nickel	63.60	87.55	117.94	443.19	169.92
Se	Selenium	3,127.45	10,009.23	9,173.87	15,910.51	8,203.05
Ag	Silver	5.37	5.54	16.49	21.56	17.18
Tl	Thallium	48.06	180.35	121.60	189.11	93.40
V	Vanadium	38.36	54.52	103.27	341.28	120.95
Zn	Zinc	2,018.38	4,458.49	5,212.58	2,891.83	9,234.99

Analyst: _____ (Signature)

Laboratory Manager: _____ (Signature)

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I 206485

CLIENT	JOBSITE
Weiss Associates 5801 Christie Avenue 600 Emeryville CA 94608	Lawrence Berkeley National Laboratory One Cyclotron Road Bldg 44B Berkeley CA 94744

KELLCO-MACS JOB#: **1004-17** LAB LOGIN # R2046346

COLLECTED BY: Siew Yee Lee

COLLECTED DATE 7/13/2010

TURN AROUND TIME: 4 8 (24) 48 5-DAY

RESULTS NEEDED BY

CIRCLE TYPE OF BULK ANALYSIS

PLM (LEAD PAINT) LEAD WIPE NON VIABLE MOLD VIABLE MOLD eCOLI OTHER

SAMPLES REC'D _____ ANALYZE TO FIRST POSITIVE YES NO

REPORT RESULTS TO PROJECT MANAGER: Tim Cannard

NOTES & COMMENTS:

CHAIN OF CUSTODY & SAMPLE SUBMITAL FORM PAGE____ OF ____

KELLCO-MACS JOB#: **1004-17**
Lawrence Berkeley National Laboratory

FIELD NUMBER	LOCATION (bldg, rm#, area)	COLOR	MATERIAL or SUBSTRATE (ft w/ size, mastic, tjc, etc.)	NOTES: Like condition, damage, quantity, inside what, beneath, what?, direction in building (N,S,E,W) etc.)
44B-PC1	Exterior east side of Bldg, NE end	green	paint chip off wood	
-PC2	Exterior east side of Bldg, NE end	"	" " off metal	
-PC3	Broken wood walkway NW of Bldg	~~Red~~ Maroon &	Brown paint chip composite off wood	
-PC4	Metal I-Beam under structure NW corner	Maroon	paint chip off metal	
-PC5	~~East~~ Wooden walkway, east entrance	Red	" " off wood	
-PC6	Roof	Grey	~~Metal~~ paint chip off metal	

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
[illegible]	7/21/2010	0725	[illegible]	07/21/10	0730

P1206346 I 206485

KELLCO-MACS

A Creative Joint Venture For Better Environmental Solutions

Chain of Custody Record

For Bulk PLM Sample Collection Only

Page ____ of ____

BILLED TO	PROJECT INFORMATION	
Name: Kellco - MACS	Sampled By: Siew Yee Lee	Date Sampled: 7/13/2010
Address: 3137 Diablo Avenue	Project Manager: Tim Cannard	Job #: 1004-17
City: Hayward	Project Name: Lawrence Berkeley National Lab	
State: Ca Zip: 94545	Site Address: Building 44B, 1 Cyclotron Rd.,	
Phone No: (510) 786-9751	City, State, Zip: Berkeley ca	
Fax No: (510) 786-9625	Site Contact:	
Cell No:	Phone No:	Fax No:
Email:	Samples Preserved: Yes / No	Analyze to First Positive: Yes / No

ANALYSIS REQUIRED

Required Turn Around Time: 4 Hour ___ 8 Hour ___ 24 Hour XX 2 Days/48 Hour ___ 3 Days/72 Hour ___ 5+ Days/120 Hour ___

DISPOSAL: ☐ Customer ☒ Laboratory ☐ OTHER (Explain)

	Sample #	Sample Location / Sample Description (Color)	PLM (Bulk) - 40 CFR - Chap. 1, Part 763,	Lead, Paint	Condition: (G)ood / (F)air / (P)oor	Length (Feet)	Width (Feet)	Height (Feet)	Quantity
1004-17— 1	44B -PC1	wallboard below bldg structure/Paint chip off wood		x					
1004-17— 2	44B-PC2	Northeast wall panel of bldg / paint chip off metal		x					
1004-17— 3	44B-PC3	Broken wooden walkway northwest of bldg/paint chip composite off wood		x					
1004-17— 4	44B-PC4	I-beam under structure/ maroon paint chip off metal		x					
1004-17— 5	44B-PC5	Wooden walkway, east entryway / maroon paint chip off wood		x					
1004-17— 6									
1004-17— 7									
1004-17— 8									
1004-17— 9									
1004-17— 10									

Relinquished By:	*Date:*	*Time:*	*Accepted By:* A. Kr[illegible] *Date:* 07/21/10 *Time:* 07:30
Lab Report Number(s):			*Delivery Type:* DN (Drop Off) *FedEx* *Mail* *Other*

WB - Wallboard JC - Joint Compound WT - Wall Texture WBT - Wallboard Tape FT - Floor Tile FTM - Floor Tile Mastic BBM - Baseboard Mastic
RSF - Resilient Sheet Flooring CT - Ceiling Tile SAAM - Spray-Applied Acoustical Material R - Roof TSI - Thermal System Insulation EL - Elbow

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Chain of Custody Record

For Bulk PLM Sample Collection Only

Page ____ of ____

BILLED TO	PROJECT INFORMATION	
Name: Kellco - MACS	Sampled By: Siew Yee Lee	Date Sampled: 7/13/10
Address: 3137 Diablo Avenue	Project Manager: Tim Cannard	Job #: 1004-17
City: Hayward	Project Name: Lawrence Berkeley National Lab	
State: Ca Zip: 94545	Site Address: Building 44B, 1 Cyclotron Rd.,	
Phone No: (510) 786-9751	City, State, Zip: Berkeley ca	
Fax No: (510) 786-9625	Site Contact:	
Cell No:	Phone No:	Fax No:
Email:	Samples Preserved: Yes / No	Analyze to First Positive: Yes / No

ANALYSIS REQUIRED

Required Turn Around Time: 4 Hour ____ / 8 Hour ____ / 24 Hour XX / 2 Days/48 Hour ____ / 3 Days/72 Hour ____ / 5+ Days/120 Hour ____

DISPOSAL: ☐ Customer ☒ Laboratory ☐ OTHER (Explain)

	Sample #	Sample Location / Sample Description (Color)	PLM (Bulk) - 40 CFR - Chap. 1, Part 763, Subpart F Appendix A or current EPA method	Lead, Paint	Condition: (G)ood / (F)air / (P)oor	Length (Feet)	Width (Feet)	Height (Feet)	Quantity
1004-17 — 1	44B -PC1	wallboard below bldg structure/Paint chip off wood		x					
1004-17 — 2	44B-PC2	Northeast wall panel of bldg / paint chip off metal		x					
1004-17 — 3	44B-PC3	Broken wooden walkway northwest of bldg/paint chip composite off wood		x					
1004-17 — 4	44B-PC4	I-beam under structure/ maroon paint chip off metal		x					
1004-17 — 5	44B-PC5	Wooden walkway, east entryway / maroon paint chip off wood		x					
1004-17 — 6									
1004-17 — 7									
1004-17 — 8									
1004-17 — 9									
1004-17 — 10									

Relinquished By: [illegible] *Date:* 7/21/2010 *Time:* 0730 *Accepted By:* [illegible] *Date:* 07/21/10 *Time:* 0730

Lab Report Number(s): *Delivery Type:* DN *Drop Off* *FedEx* *Mail* *Other*

WB - Wallboard JC - Joint Compound WT - Wall Texture WBT - Wallboard Tape FT - Floor Tile FTM - Floor Tile Mastic BBM - Baseboard Mastic
RSF - Resilient Sheet Flooring CT - Ceiling Tile SAAM - Spray-Applied Acoustical Material R - Roof TSI - Thermal System Insulation EL - Elbow

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http://www.kellcomacs.com email: mailbox3137@kellcomacs.com

PHOTOGRAPHS

Photographs containing no sample identification number are included for reference of the general sample locations.

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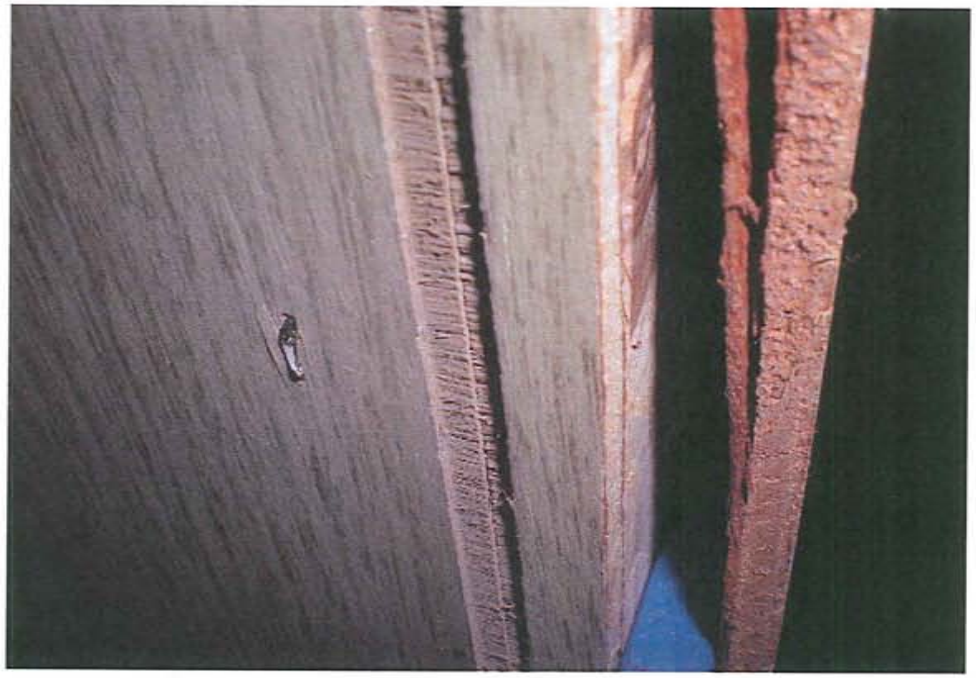
http://www.kellcomacs.com email: mailbox3137@kellcomacs.com

44B



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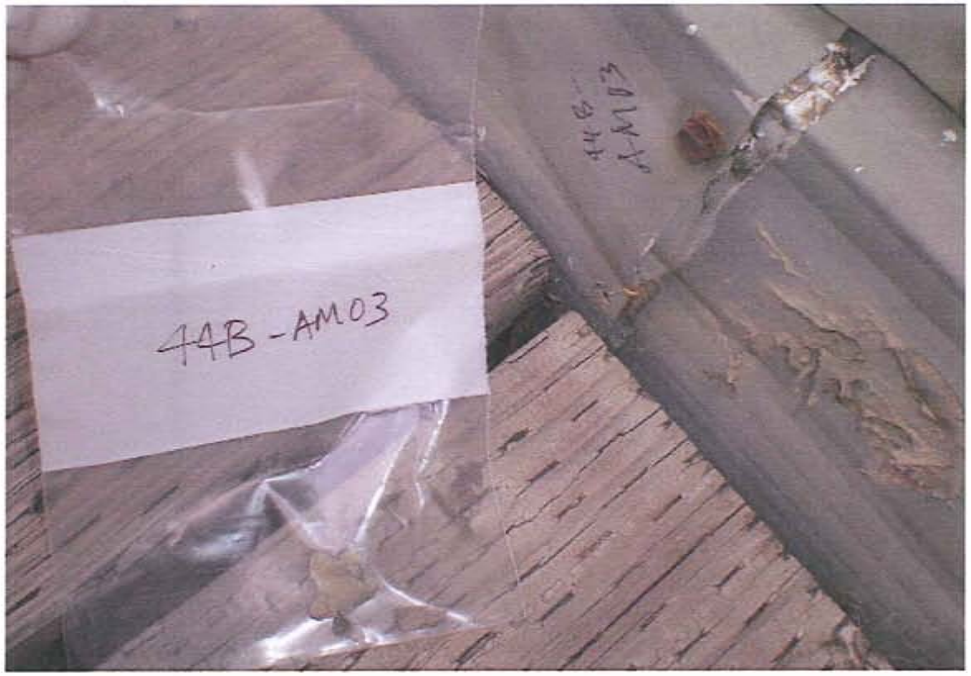
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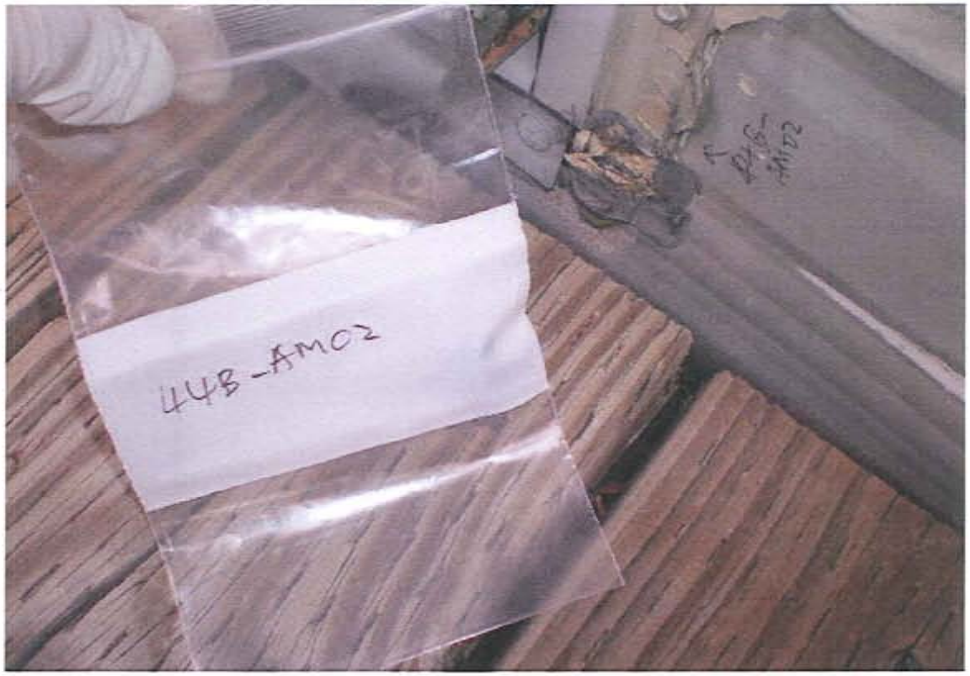
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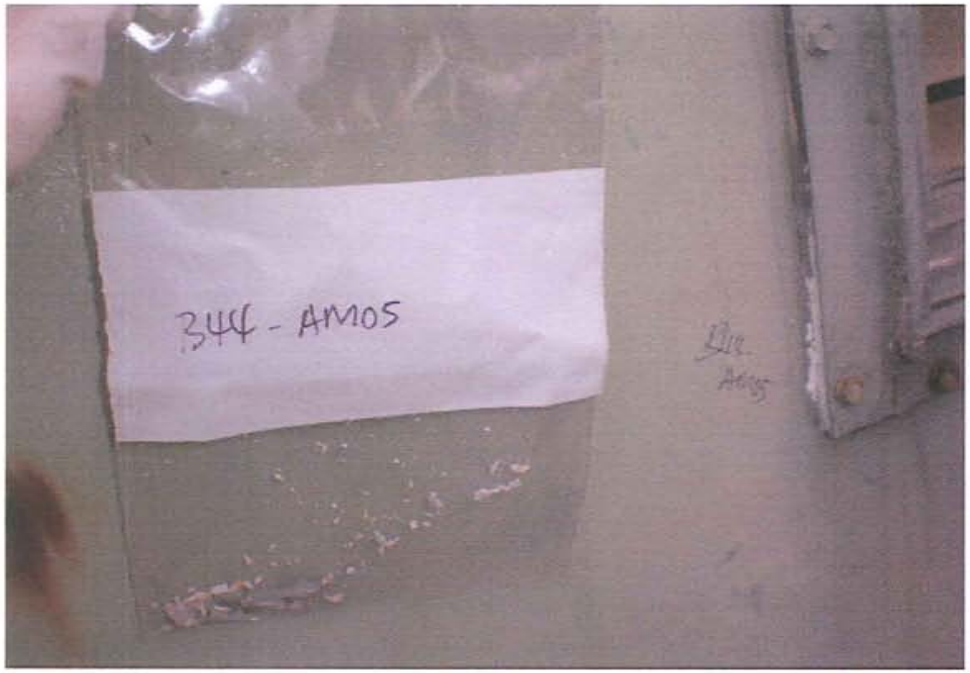
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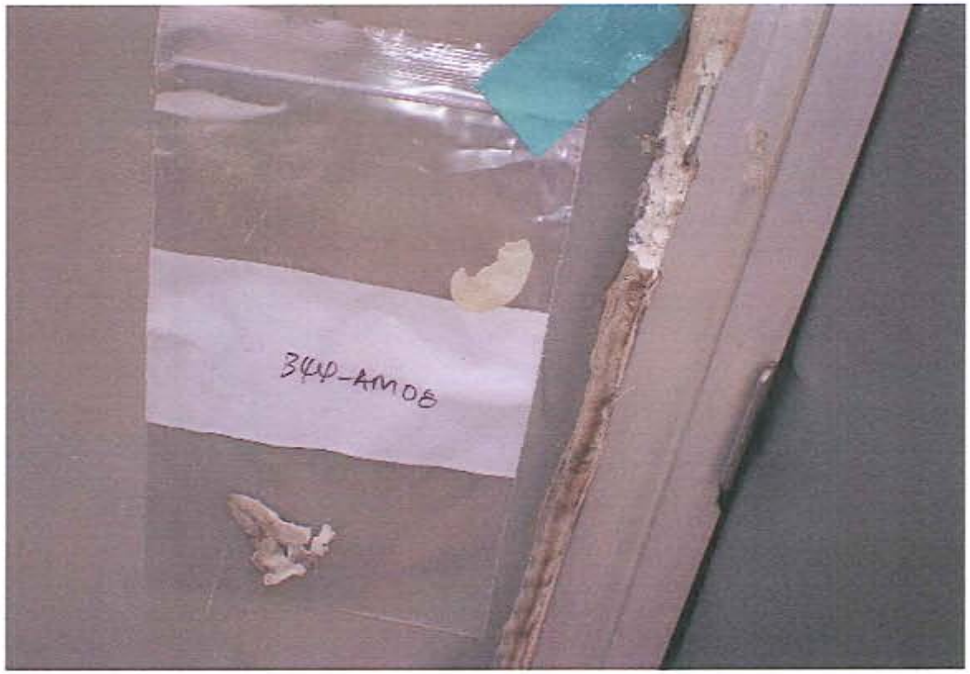
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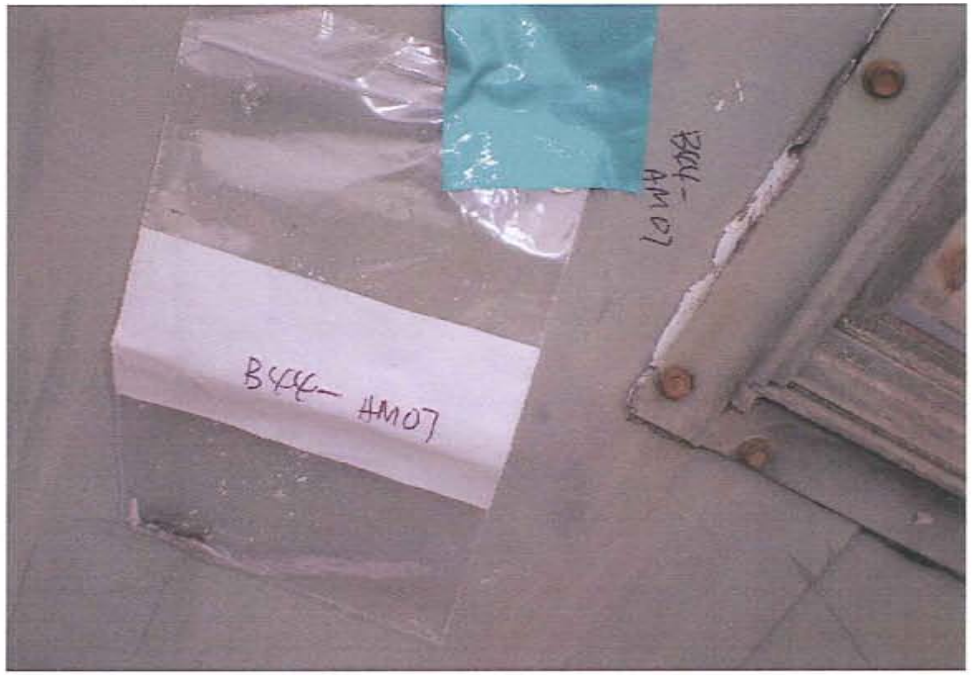
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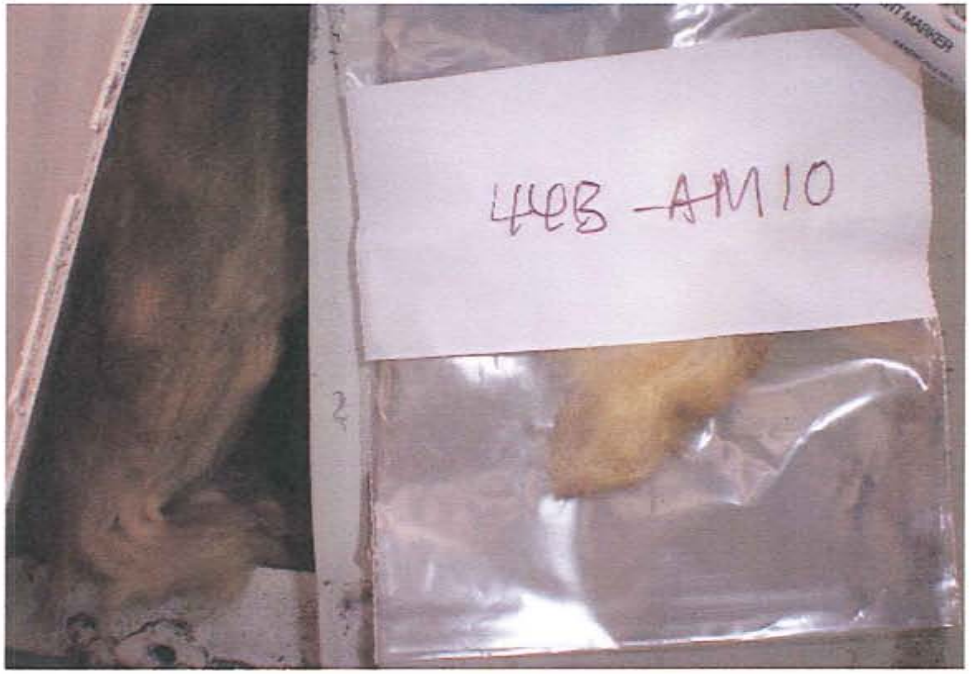
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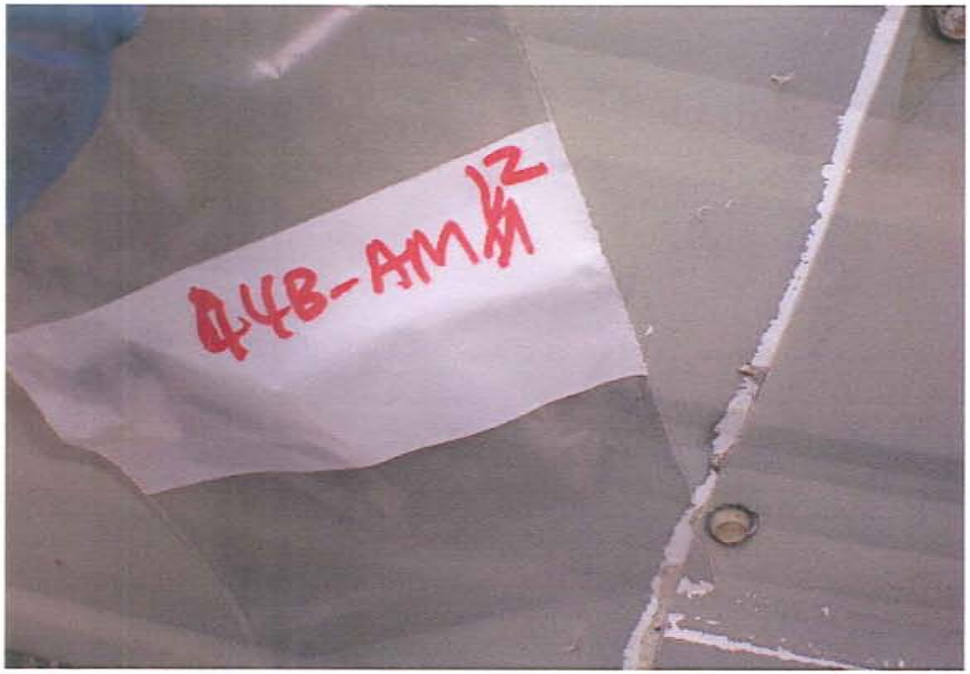
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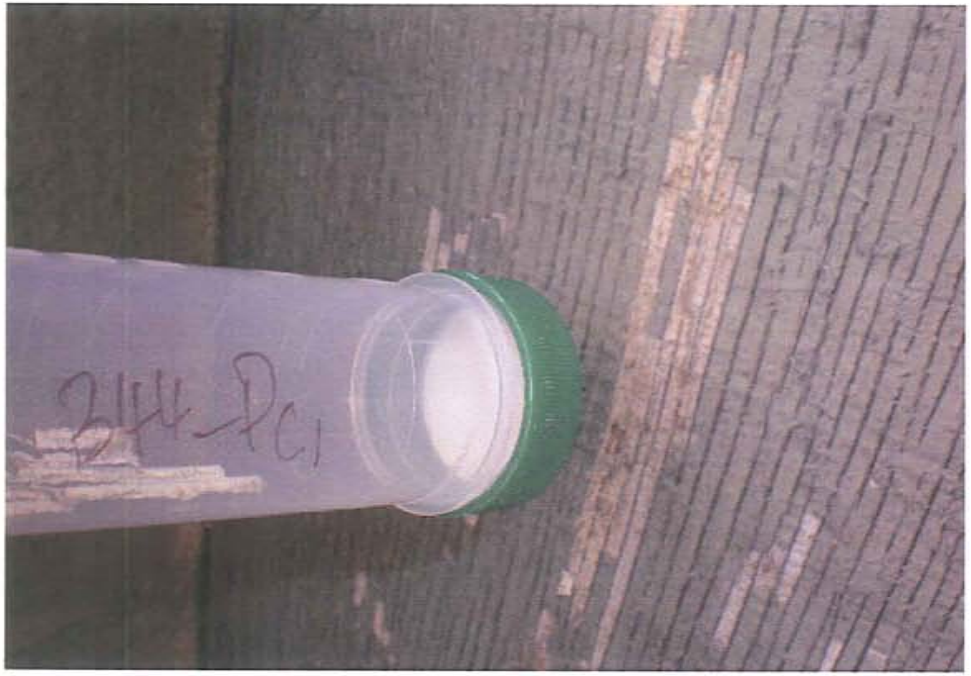
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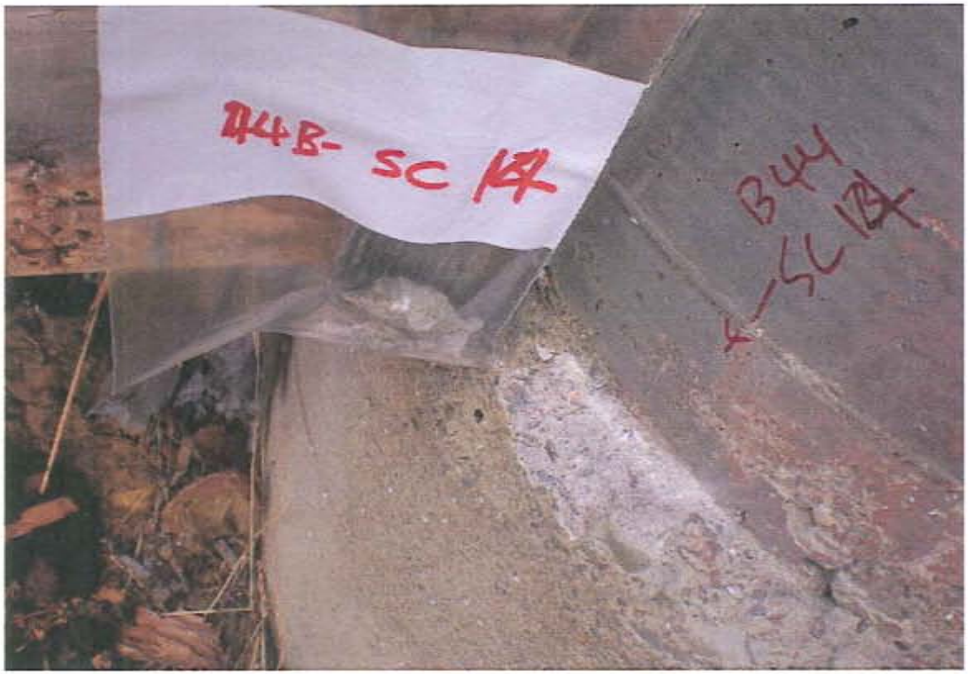
B44-PC3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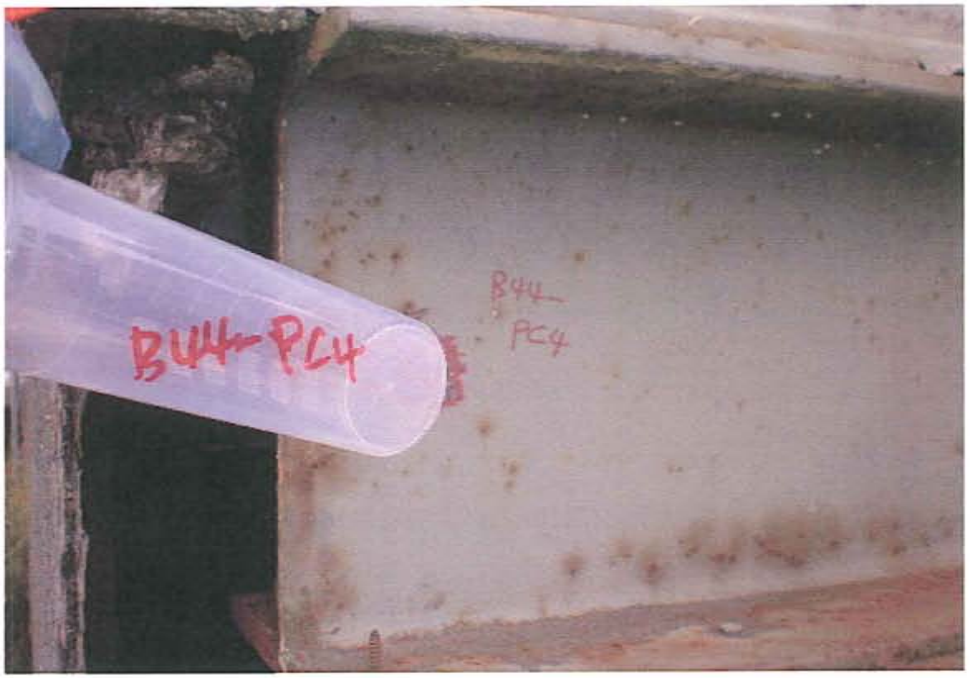
B44
SC 13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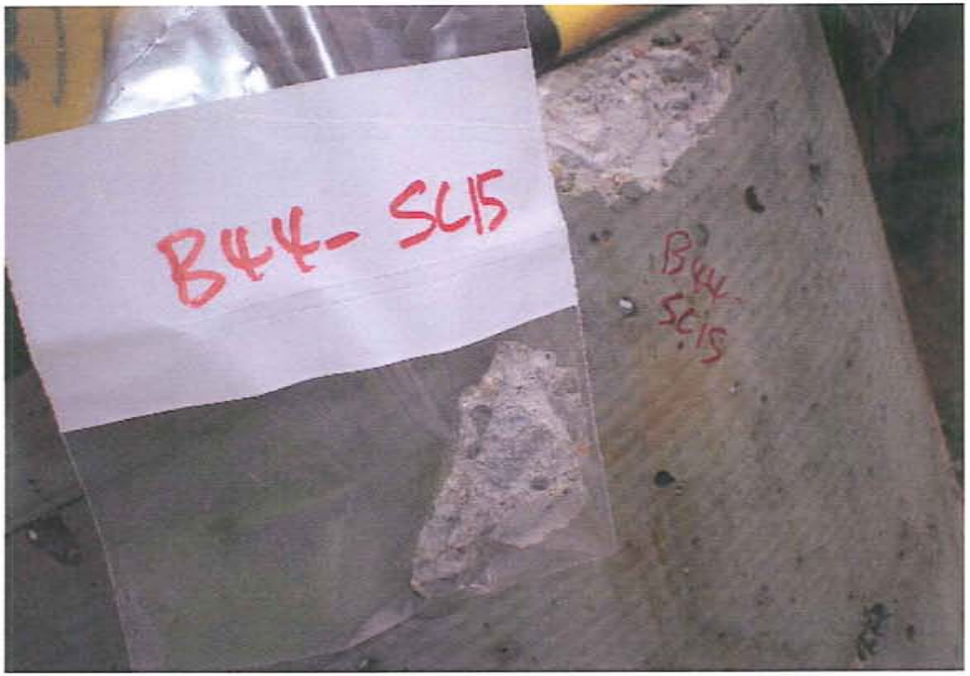
B44-
PC4

B44-
PC3
B44-PC3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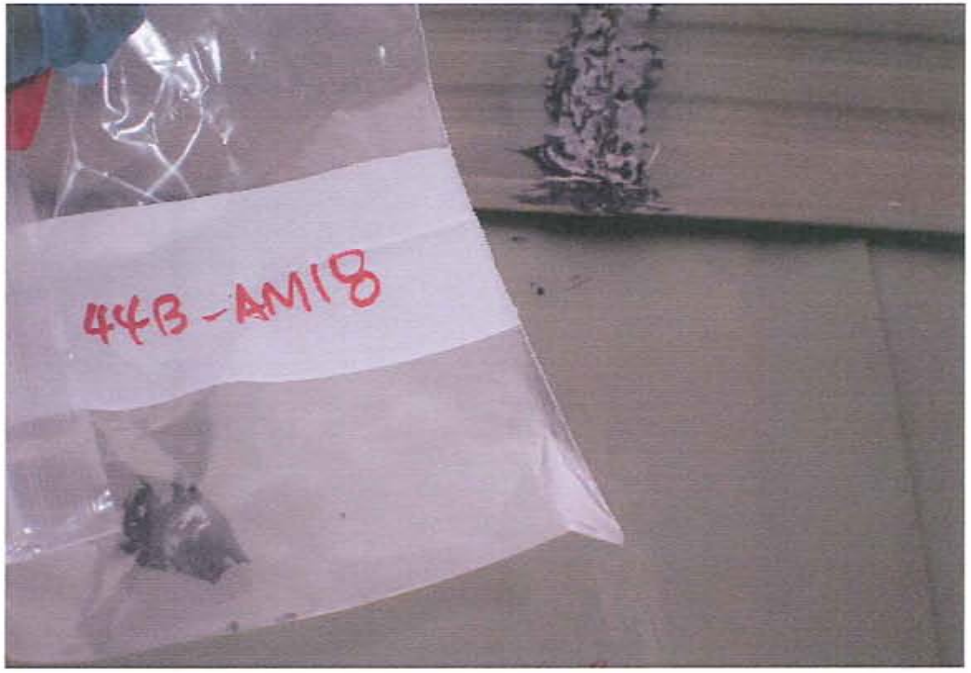
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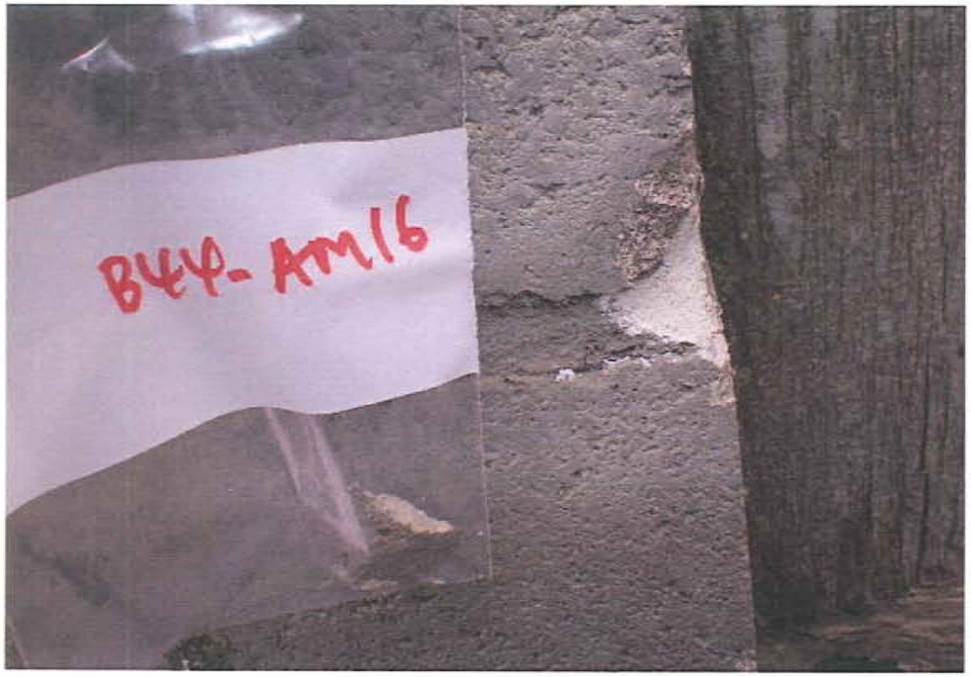
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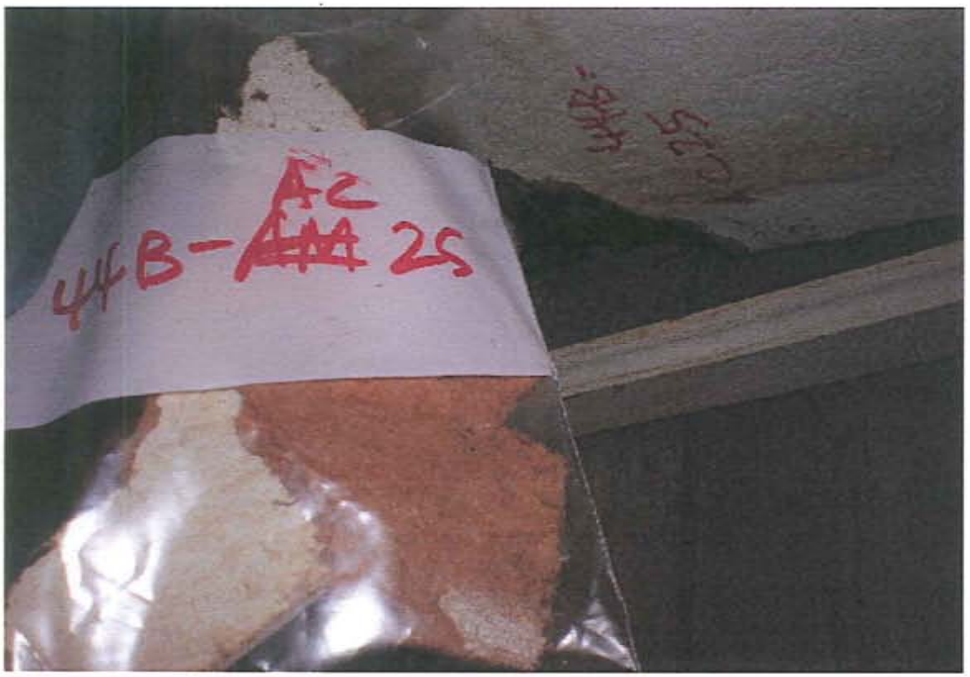
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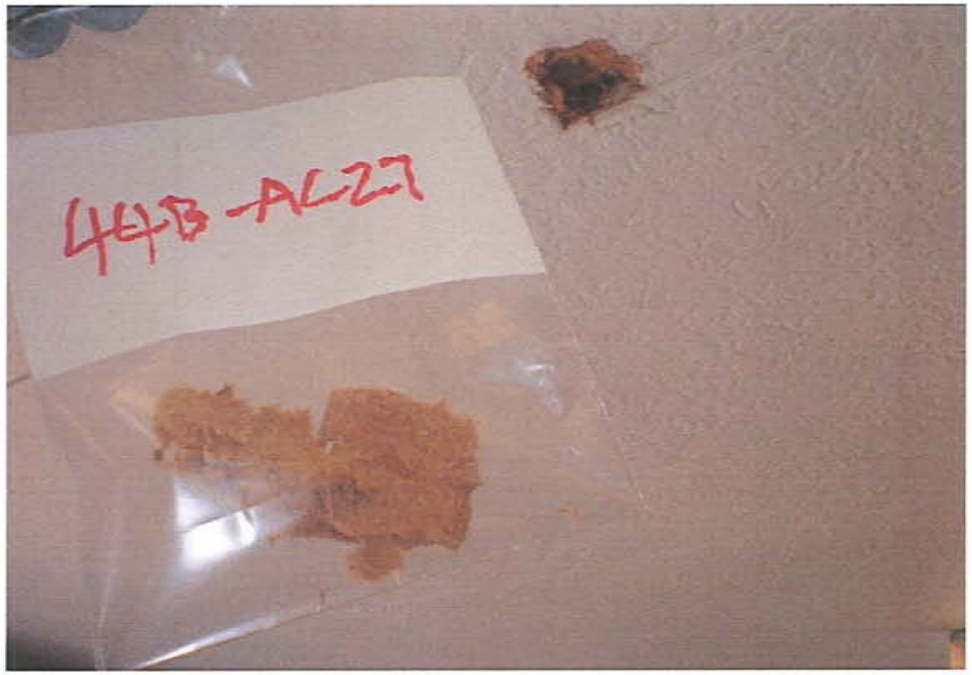
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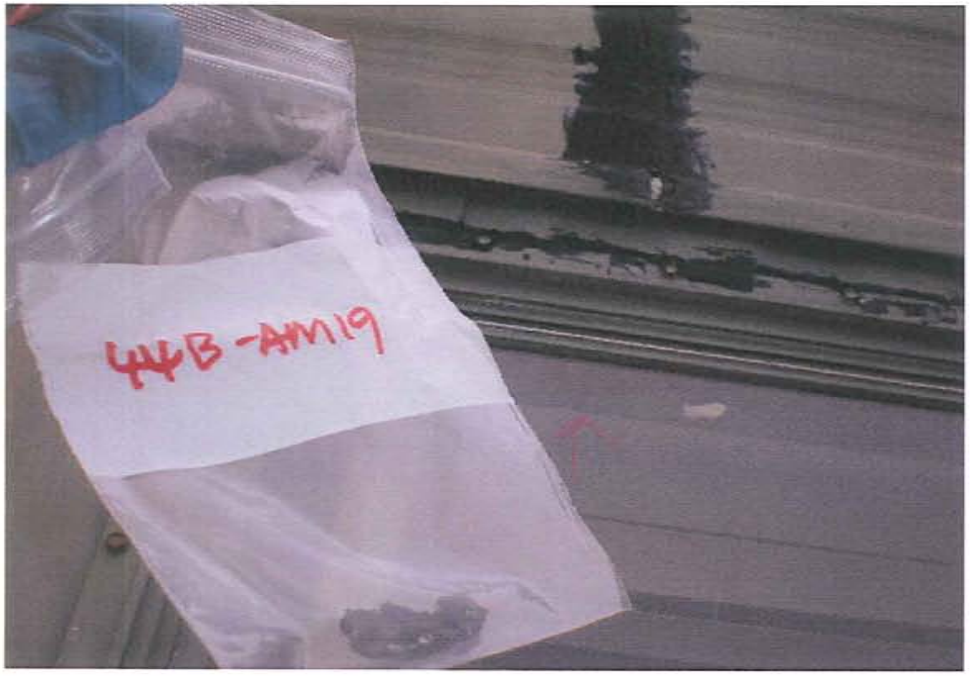
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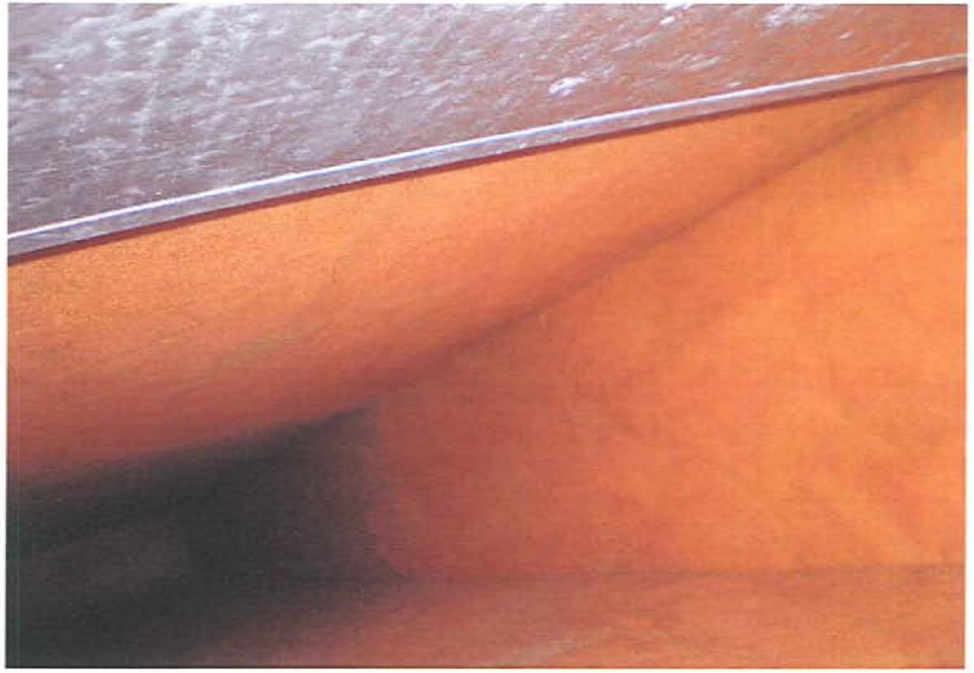
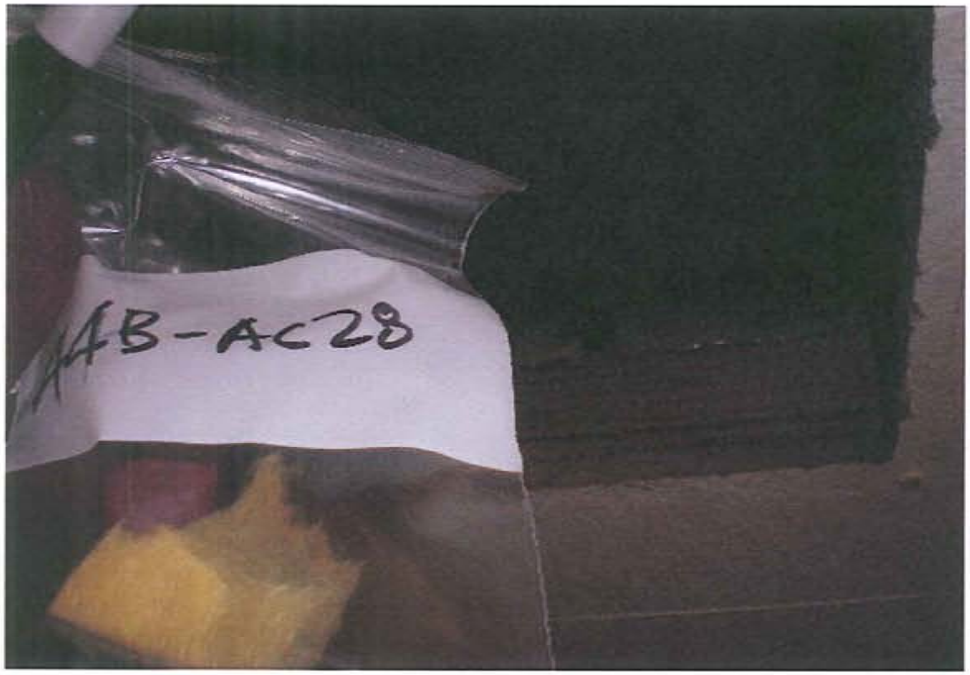
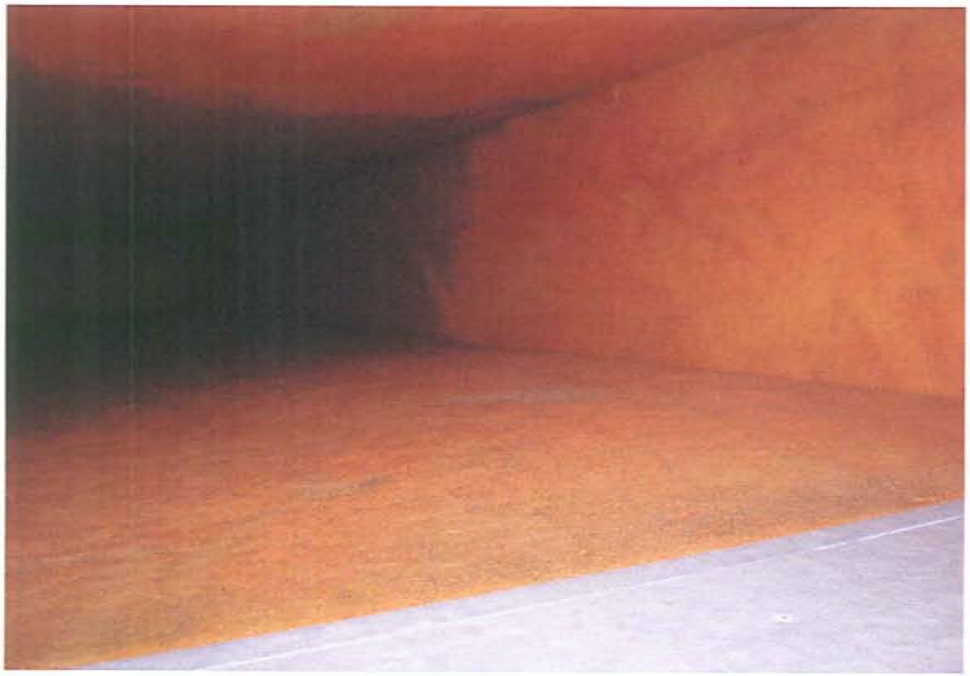
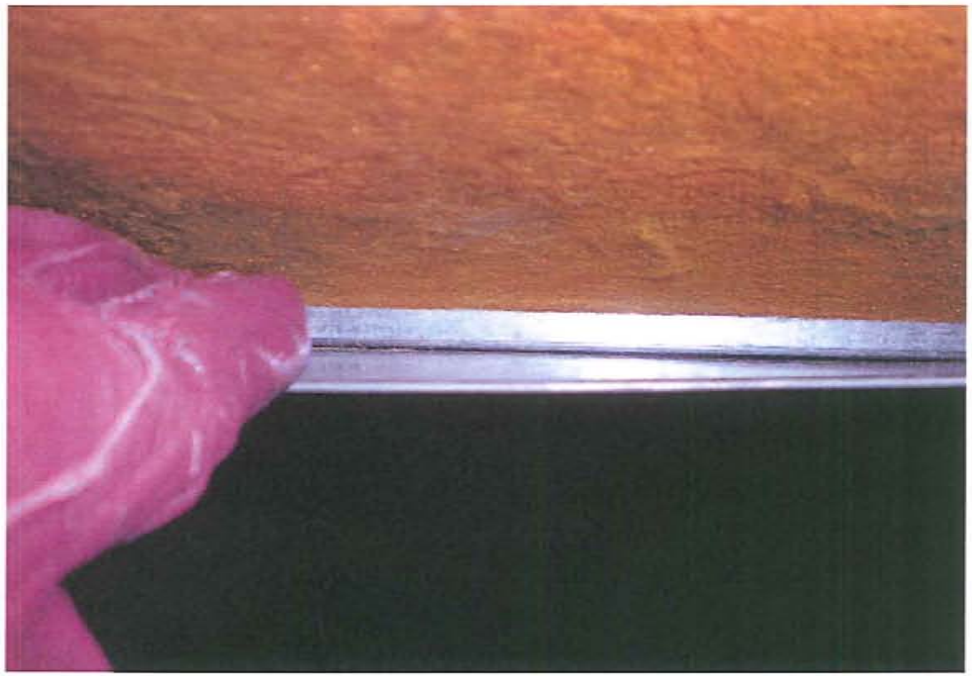


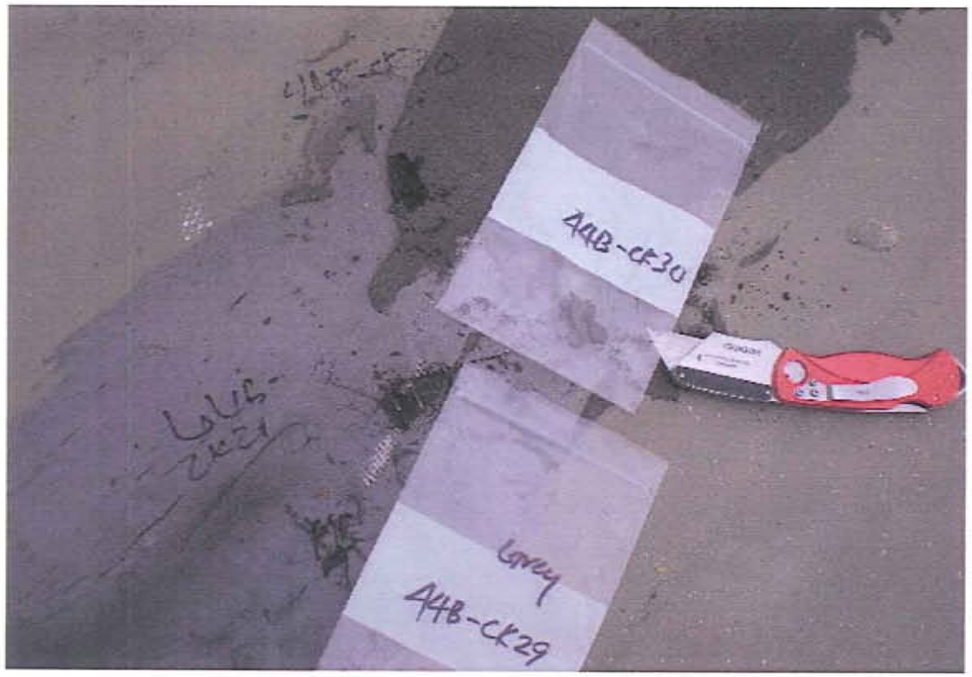

4B-AC28





44B

44Back 31
Edge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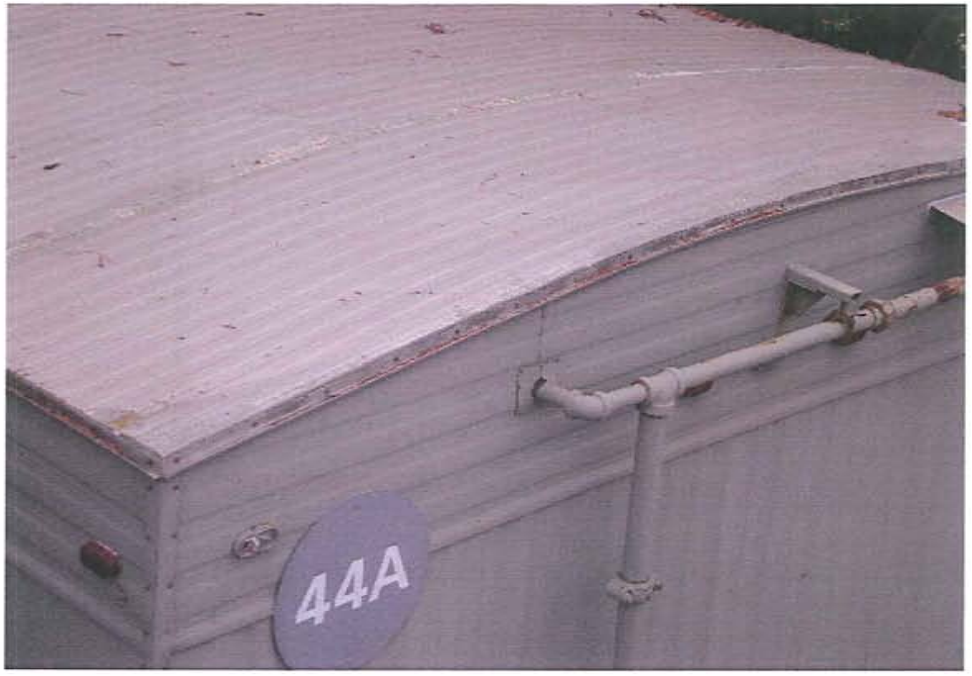
44B-CK29


44A

A Creative Joint Venture For Better Environmental Solutions

Lawrence Berkeley National Laboratory
Building 52
One Cyclotron Road
Berkeley, CA 94744

KELLCO-MACS Job #1004-17

NESHAP Compliant Pre-Demolition
Asbestos and Metals in Paint Inspection Report

for

Weiss Associates
5801 Christie Avenue
Suite 600
Emeryville, CA 94608

January 4, 2011
REVISED #2

3137 Diablo Avenue • Hayward, CA 94545-2701• (510) 786-9751 • fax (510) 786-9625
http://www.kellcomacs.com email: mailbox3137@kellcomacs.com

NESHAP Compliant Pre-Demolition
Asbestos and Metals in Paint Inspection Report

Date:	January 4, 2011 – REVISED #2
KELLCO-MACS Job #:	1004-17
Client:	Ms. Agata Sulczynski Weiss Associates 5801 Christie Avenue Suite 600 Emeryville, CA 94608
Location:	Lawrence Berkeley National Laboratory Building 52 One Cyclotron Road Berkeley, CA 94744
Date of Inspection:	July 10, 13, 20 & 21, 2010 & August 4, 2010
Inspectors:	Siew Yee Lee CAC # 09-4546, CDPH Lead # 19509
Description Of The Inspected Area:	This is an asbestos and Heavy Metals inspection on a building 52 on the University of California, Berkeley campus in Berkeley, CA. Building 52 is a 2 story, multi-unit facility which includes a mezzanine floor. The exterior are constructed with corrugated wall panels on a concrete foundation. There is metal roofing with VIP paint.

Background

This is a NESHAP compliant pre-demolition asbestos and metals inspection report for Building 52 located in LBNL in Berkeley, CA.

Synopsis

Asbestos was found in the following materials:

- 12 x 12 floor tile and mastic
- Wall texture, drywall & joint compound
- Wall patching
- Rolled roof mastic – Storage Shed

- Miscellaneous black pipe insulation – Refrigeration Closet
- Sealant – Roof, Duct Vent
- Pipe Caulking – Mezzanine Floor

Assumed asbestos containing materials:
- Fume Hood with Asbestos Panels

Designation of material as asbestos containing should be applied to all homogenous material of the type analyzed and found to contain asbestos.

Fluorescent lights, fluorescent fixture ballasts and thermostats may contain PCB's and mercury.

About the Inspection

The inspection performed was both visual and tactile. Samples were taken of suspect materials located at the interior and exterior of the survey area.

The inspection was limited to those materials readily discerned in a reasonable inspection by a competent inspector. Materials that are hidden within walls, behind structures, in vertical shafts or in areas that make them not readily available to our inspector were not sampled. If future work uncovers any non-sampled materials, these should be submitted for asbestos and/or lead paint analysis.

The following numbering convention was used for this inspection:

LETTER	STANDS FOR	EXAMPLE	MEANING
XX	Building DESIGNATION based on information provided on drawings provided to us prior to inspection	B52	Building 52
Y & *Optional Z*	EITHER building SYSTEM (W: wall; F: Flooring; C: Ceiling; T: TSI; M: Misc) OR Further designation of sample location as Unit # within building	SC	Concrete Sample
		AM	Asbestos Miscellaneous
		CK	Caulk Sample
		AW	Asbestos Wall Sample
		AC	Asbestos Ceiling Sample
		AR	Asbestos Roofing Sample
xx	Sample number and layer	01	First Sample, First Layer
		01a	First Sample, Second Layer
		01b	First Sample, Third Layer

- ***Asbestos Findings***

Asbestos samples were analyzed in the KELLCO-MACS laboratory, by Polarized Light Microscopy, the EPA's recommended method. Copies of the full laboratory reports are attached.

Photographs of sampled materials are included. Sample locations are noted on the attached not-to-scale drawing.

The determination of a material to be Asbestos Containing Material (ACM) was made either by direct sampling or by homogeneity with at least one positive sample of the same material.

Materials that tested **positive** for asbestos are:

Lab sample #	Field Sample #	Field Description	Asbestos %
L206538-2	B52-CK02	2nd floor, west end 2" pipe in Area 211 / pipe caulking	4% Chrysotile
L206538-3	B52-CK03	2nd floor, west end 2" pipe in Area 211 / pipe caulking	3% Chrysotile
L206538-8	B52-SN08	Room 103, east corner by doorway / 12x12 floor tile	3% Chrysotile
L206538-9	B52-SN08a	Room 103, east corner by doorway / mastic	5% Chrysotile
L206538-10	B52-SN09	Room 107, east corner at doorway / 12x12 floor tile	3% Chrysotile
L206538-11	B52-SN09a	Room 107, east corner at doorway / mastic	5% Chrysotile
L206538-12	B52-SN10	Room 109, east corner / 12x12 floor tile	3% Chrysotile
L206538-13	B52-SN10a	Room 109, east corner / mastic	5% Chrysotile
L206538-32	B52-AW25	Room 117, southwest corner / wall texture	< 1% Chrysotile
L206538-33	B52-AW25a	Room 117, southwest corner / drywall & joint compound	< 1% Chrysotile
L206538-36	B52-AW28	Room 103, southwest corner / wall texture	< 1% Chrysotile
L206538-37	B52-AW28a	Room 103, southwest corner / drywall joint compound	< 1% Chrysotile
L206538-40	B52-AW31	Storage shed, behind wooden wall / wall patching	6% Chrysotile
L206538-45	B52-CK36	Exterior metal panel, northeast end / wall patching	< 1% Chrysotile
L206538-46	B52-CK37	Exterior metal panel, east end / wall patching	5% Chrysotile
L206538-47	B52-CK38	Exterior east wall panel, southeast end / wall patching	2% Chrysotile
L206538-57	B52-AS45	Refrigeration closet / old water pipe insulation (black) on unit	3% Chrysotile
L206538-62	B52-AR47b	Storage shed, east corner / rolled roof mastic	2% Chrysotile
L206538-63	B52-AM48	Refrigeration closet / old water pipe insulation (black) on unit	2% Chrysotile
L206538-68	B52-CK52	Roof, northwest duct vent / sealant	4% Chrysotile

Samples with less than 10% asbestos can be submitted for further analysis by the Point Count method. If the Point Count method determines that the material contains less than 1% asbestos, these materials can be disposed of as non-hazardous asbestos containing construction waste.

Materials for which the analytical results show **no detection** of asbestos are:

Lab Sample #	Field Sample #	Field Description
L206538-1	B52-AW1	2nd floor, east wall, northeast end in Area 211 / drywall, tape & joint compound
L206538-4	B52-AW04	2nd floor, east wall by AHU / drywall, tape & joint compound
L206538-5	B52-AM05	2nd floor, AHU 352 / duct joint tape
L206538-6	B52-AM06	2nd floor, AHU 352 / expansion joint
L206538-7	B52-AS07	2nd floor, old water pipe south of mezzanine / pipe insulation & jacket
L206538-14	B52-AM11	Room 109, east wall / brown baseboard
L206538-15	B52-AM11a	Room 109, east wall / mastic
L206538-16	B52-AW12	Area 100, north wall by sliding door / wall texture
L206538-17	B52-AW12a	Area 100, north wall by sliding door / drywall & joint compound
L206538-18	B52-SC13	Area 100, northwest end of north wall / raised wall, concrete
L206538-19	B52-AM14	Area 100, northwest end of north side / steel cable insulator
L206538-20	B52-AM15	Area 100, northeast end of north wall / brown baseboard
L206538-21	B52-AM15a	Area 100, northeast end of north wall / mastic
L206538-22	B52-AC16	Room 109, east end towards door / 12x12 row-holed ceiling tile
L206538-23	B52-AC17	Room 109, center of room / 12x12 row-holed ceiling tile
L206538-24	B52-AC18	Room 109, southeast corner / 12x12 row-holed ceiling tile
L206538-25	B52-AC19	Room 109, west end / 12x12 ceiling tile
L206538-26	B52-CK20	Area 100, east central window / window caulking
L206538-27	B52-AM21	Area 100, east central wall / brown baseboard
L206538-28	B52-AM21a	Area 100, east central wall / mastic
L206538-29	B52-CK22	Area 100, south window / window caulking
L206538-30	B52-AC23	Area 100, ceiling under 219 / wall texture
L206538-31	B52-SC24	Area 100, south end / concrete floor
L206538-34	B52-SC26	Area 100, southwest exit floor / concrete
L206538-35	B52-CK27	Room 103, west wall / window caulking
L206538-38	B52-AM29	Exterior of building north end / steel cable insulator
L206538-39	B52-AW30	Storage shed, behind wooden wall / vapor barrier
L206538-41	B52-AM32	Storage shed, east wall, between wood & concrete walls / sealant
L206538-42	B52-AM33	Refrigeration closet / small tank wrap
L206538-43	B52-AW34	Refrigeration closet / unit paint and or coating
L206538-44	B52-AW35	Area 100, north wall / wall batt insulation
L206538-48	B52-AM39	Under exterior north metal wall panel / black weather strip

Lab Sample #	Field Sample #	Field Description
L206538-49	B52-AC40	Room 103, northeast end / 12x12 ceiling tile
L206538-50	B52-AC40a	Room 103, northeast end / mastic
L206538-51	B52-AC41	Room 103, west end / 12x12 ceiling tile
L206538-52	B52-AC41a	Room 103, west end / mastic
L206538-53	B52-AC42	Room 103, debris on south light fixture / 12x12 ceiling tile
L206538-54	B52-AC42a	Room 103, debris on south light fixture / mastic
L206538-55	B52-SC43	Storage shed, east wall / concrete wall
L206538-56	B52-SC44	Refrigeration closet, unit floor / concrete
L206538-58	B52-AR46	Storage shed, northeast corner / rolled roof
L206538-59	B52-AR46a	Storage shed, northeast corner / rolled roof felt
L206538-60	B52-AR47	Storage shed, east corner / rolled roof
L206538-61	B52-AR47a	Storage shed, east corner / rolled roof, felt
L206538-64	B52-AM49	South exterior of building / electrical conduit insulator
L206538-65	B52-AW50	Room 117, southwest corner / Certain Tweed wall insulation (yellow)
L206538-66	B52-AW50a	Room 117, southwest corner / Certain Tweed wall insulation (yellow)
L206538-67	B52-AC51	Area 100, central ceiling / pink insulation
L206538-69	B52-AR53	Roof, northwest corner / VIP paint
L206955-1	B52-SC54	Building 52 Cryo Pit surface / concrete
L206955-2	B52-SC55	Building 52 Cryo Pit surface / concrete
L206955-3	B52-AM001	Panel PNL-001-52 / cloth wire
L206955-4	B52-AM002	Panel 15A747A / explosive proof tape

- ***Metals in Paint Findings***

Six paint samples were collected and submitted for Heavy Metals (CAM 17) analysis to Macs Lab, Inc.

These samples were analyzed using an ICP/MS, Extraction Method SW3050B TTLC and EPA 6010B/3050 method. This method is **not** for the purpose of profiling any waste streams from this project. Profiling of the waste streams (TCLP & STLC) will be the responsibility of the contractor performing the work. The results of the profiling of the waste streams can vary dramatically depending on the means and methods utilized by the contractor during the demolition of the buildings. Care needs to be taken to ensure that all OSHA and EPA rules are abided by. The EPA rules are typically contained within title 22 and the OSHA rules are typically contained within title 8. Please find the following list as guidance; furthermore, it is not intended to be all encompassing but as a starting point for review in regulatory compliance.

Building 52:

Lab Sample #	Field Sample	Field Description
206530-1	B52-PC1	Paint Chip Off Metal/ 2nd Floor Metal Wall
206530-2	B52-PC2	Paint Chip Off Wood, Area 150 Window Still

Lab Sample #	Field Sample	Field Description
206530-3	B52-PC3	Paint Chip Off Metal/ Refrigeration Closet
206530-4	B52-PC4	Paint Chip Composite/ Exterior
206530-5	B52-PC5	VIP Paint, Roof
206530-6	B52-PC6	Paint Chip Off Metal/ Bathroom Wall

Building 52: Miscellaneous Areas

	Lab Sample Number:	206530 -1	206530 -2	206530 -3	206530 -4	206530 -5
	Client Sample Number:	B52-PC1	B52-PC2	B52-PC3	B52-PC4	B52-PC5
	Matrix:	Bulk	Bulk	Bulk	Bulk	Bulk
	Extraction Type:	Acid	Acid	Acid	Acid	Acid
	Units:	mg/kg (PPM)	mg/kg (PPM)	mg/kg (PPM)	mg/kg (PPM)	mg/kg (PPM)
Sb	Antimony	4,816.18	401.82	574.39	1,845.83	487.48
As	Arsenic	1,343.01	176.80	401.40	130.35	21.52
Ba	Barium	714.71	20,583.57	2,015.09	9,643.97	91.53
Be	Beryllium	0.37	2.24	1.33	2.64	1.02
Cd	Cadmium	560.66	647.06	1,703.16	172.83	19.86
Cr	Chromium	1,131.25	3,877.68	44,982.46	170,877.98	861.90
Co	Cobalt	81.62	95.56	4,343.86	865.19	19.86
Cu	Copper	10,125.00	2,717.55	8,042.11	2,879.36	115.56
Pb	Lead	103,235.29	82,166.20	52,596.49	111,959.90	4,077.13
Hg	Mercury	770.22	81.84	37.61	15.38	13.78
Mo	Molybdenum	980.51	127.68	588.07	146.82	895.02
Ni	Nickel	447.79	356.58	1,100.00	96.22	29.25
Se	Selenium	247,647.06	16,638.66	10,273.68	8,888.70	2,915.29
Ag	Silver	91.91	46.64	87.65	20.26	16.20
Tl	Thallium	3,019.12	245.89	176.00	230.21	58.29
V	Vanadium	972.79	244.07	218.63	268.75	38.28
Zn	Zinc	15,400.74	36,643.32	45,403.51	39,249.91	42,831.25

	Lab Sample Number:	206530 -6
	Client Sample Number:	B52-PC6
	Matrix:	Bulk
	Extraction Type:	Acid
	Units:	mg/kg (PPM)
Sb	Antimony	4,805.56
As	Arsenic	1,431.48
Ba	Barium	574.07
Be	Beryllium	0.31
Cd	Cadmium	484.57
Cr	Chromium	2,699.69
Co	Cobalt	102.78
Cu	Copper	12,583.33
Pb	Lead	102,808.64
Hg	Mercury	163.58
Mo	Molybdenum	1,023.46
Ni	Nickel	534.26
Se	Selenium	242,222.22
Ag	Silver	104.01
Tl	Thallium	2,976.54
V	Vanadium	964.81
Zn	Zinc	27,577.16

- ***Other Hazardous Materials***

The building contains light fixtures with fluorescent bulbs and ballasts that may contain PCB's. These should be handled in accordance with regulations.

It is also anticipated that the fluorescent light tubes may contain mercury. If they are to be removed, they should be recycled properly

Thermostats were observed throughout the building to be of the mercury type.

PCB's were used to increase flexibility in many construction materials, such as sealants, mastics, window putty, etc. We recommend testing mastic and putty-like materials for PCB's.

Regulatory Requirements

The Environmental Protection Agency (EPA) defines Asbestos Containing Material as any material that contains greater than 1% asbestos. Materials containing greater than 1% asbestos must be removed prior to demolition or renovation if they will be disturbed.

Friable asbestos containing material is any material that can be crushed or pulverized by hand pressure when dry, or materials that can be rendered to a crumbled, pulverized, or powdered state when dry by crushing, sanding, sawing, shot blasting, or through demolition or renovation activities.

As stated by NESHAP regulations, any material that contains less than 10% asbestos using the visual estimation method can be point counted with gravimetric reduction. The Point Counting method is a much more accurate analytical method for determining the percent of asbestos in a particular material. If the Point Count method determines that the material contains less than 1% asbestos, the material being analyzed can be disposed of as non-hazardous asbestos containing construction waste.

Removal or disturbance of material with any detectable amount of asbestos must be handled in accordance with OSHA regulations. Cal-OSHA registration is required if the material contains more than .1% asbestos ($1/10^{th}$ of a percent). If there is more than 100 feet (linear or square) of an asbestos containing material that will be abated or disturbed, a California State registered and licensed asbestos abatement contractor must perform the work. If there is less than 100 feet, the work does not require a licensed asbestos abatement contractor, but must still conform to Cal-OSHA regulations.

Removal or disturbance of any amount of lead paint requires adherence to the Cal-OSHA and CDPH regulations, including proper training and certification for workers and supervisors

The OSHA lead (1532) regulations require that a Negative Initial Determination for lead exposure be made with paint that contains greater than 0.06% (600 ppm) of lead. Paint with less than 0.06% lead should still be treated within the OSHA guidelines, but with reasonable work practices should not generate OSHA action levels of lead exposure.

Building components with intact lead paint and no other hazardous materials can be disposed of as non-hazardous construction waste. Paint chips and debris must be disposed of as lead containing hazardous waste.

Title 8 OSHA

General Industry Safety Orders deal with exposure limits for personnel working in or around surfaces that contain heavy metals.

Element	Chapter	Group	Article	Section
Antimony (Sb)	7	16	107	5155
Arsenic (As)	7	16	110	5214
Barium (Ba)	7	16	107	5155
Beryllium (Be)	7	16	107	5155
Cadmium (Cd)	7	16	110	5206
Chromium (Cr)	7	16	110	5206
Cobalt (Co)	7	16	110	5155
Copper (Cu)	7	16	110	5155
Lead (Pb)	7	16	109	5198
Mercury (Hg)	7	16	110	5155
Molybdenum (Mo)	7	16	110	5155
Nickel (Ni)	7	16	110	5155
Selenium (Se)	7	16	110	5155
Silver (Ag)	7	16	110	5155
Thallium (Ti)	7	16	110	5155
Vanadium (V)	7	16	110	5155
Zinc (Zn)	7	16	107	5155

Title 22- Hazardous Waste

Title 22 describes the characterization of hazardous waste as described in chapter 11, article 1, section 66261.1. Under the EPA's Resource Conservation and Recovery Act (RCRA), a national program and inventory system about handling hazardous waste, describes the minimum requirements in order to be in compliance with the Federal and/or State regulations.

Comment Regarding All Asbestos Containing Materials:

Asbestos containing materials in good condition do not necessarily need to be removed unless they will be disturbed; they should however be respected.

Employees, contract workers and others should be advised not to drill, saw, scrape or otherwise disturb this material without taking precautionary measures appropriate to asbestos containing material.

Asbestos containing material should be removed prior to the renovation and must be removed prior to demolition.

Comment Regarding All Lead Containing Materials:

Lead is a known health hazard. Lead containing materials in good condition do not necessarily need to be removed if they are not disturbed; they should however be respected.

Painted surfaces that contain lead should be made known to contractors who may disturb them during their work. OSHA guidelines for workers in contact with lead paint apply if ANY detectable lead is found.

Anyone coming in contact with leaded paint should be advised not to disturb it without taking precautionary measures appropriate to avoid lead contamination or lead exposure.

Areas Needing Immediate Corrective Action

Asbestos (in any condition) and chipping and peeling lead paint should be removed prior to renovation and must be removed prior to demolition of the survey site**.**

Analytical Procedures

- ***POLARIZED LIGHT MICROSCOPY (PLM)***

  Bulk samples were analyzed in accordance with U.S. EPA "Test Method for Determination of Asbestos in Bulk Building Materials, 1993," with inclusion of area percent estimates of the sample components. The use of the McCrone Color Dispersion Staining Technique supplements the analysis when considered useful by the analyst. The samples are prepared with refractive immersion oil and are examined under Polarized Light Microscopy (PLM). The accuracy of the visual estimate method is 1%.

  As per the standard "...The accuracy in the determination of the presence or absence of asbestos of greater than 1 area percent asbestos is greater than 99%." ASTM Committee D22.05, 1/18/88, Standard *Method of Testing for Asbestos Containing Materials by Polarized Light Microscopy*. If the sample matrix is reduced to minimize non-asbestos components, the detection limit can be mathematically enhanced, based on the amount of material remaining after matrix reduction. This method is called gravimetric reduction. This method involves ashing and chemical dissolution of the sample.

- ***POINT COUNTING***

  The Point Counting method is a much more accurate analytical method for determining the percent of asbestos in a particular material. KELLCO-MACS uses a muffle furnace to ash the

sample and remove organic compounds. Hydrochloric acid is used to dissolve some of the non-asbestos minerals. Under this method a minimum of 125 points are counted from each of 8 different slide preparations of the same sample (total of 1000 points min.) If the **Point Count Method** determines that the material contains less than 1% asbestos, the material being analyzed can be treated as non-hazardous asbestos containing construction waste**. Note: ONLY the Point Count Method can be used for this determination.**

- ***ATOMIC ABSORPTION FOR LEAD***

  Paint samples were collected for atomic absorption (AA) analysis. The detection limit for each sample depends upon many factors including the sensitivity of the instrument and the sample size. In the KELLCO-MACS laboratory utilizing flame AA, the detection limit is normally .01% or 100 parts per million (ppm).

- ***CAM 17 TESTING***

  CAM 17 Metals were tested by Macs Lab, Inc. using ICP-MS, Extraction Method SW3050B and Analytical Method 6010B/3050.

KELLCO-MACS Qualifications

KELLCO-MACS is a creative joint venture offering hazardous materials and AIHA laboratory analyses. Our credentials include:

- The KELLCO-MACS asbestos inspector is licensed with the State of California Department of Occupational Safety and Health (CAL-OSHA).

- The KELLCO-MACS lead inspector is licensed by the California Department of Public Health (CDPH)

- The laboratory accreditations include:

  - **NVLAP PLM** for Asbestos: NIST National Voluntary Laboratory Accreditation Program certificate of accreditation for bulk **asbestos** analysis by polarized light microscopy (Accreditation #101948-1).
  - **AIHA** Accreditation for **Industrial Hygiene** Analytical Laboratory for PCM, and AA for lead (Accreditation #101786).
  - **AIHA Analyst Proficiency (NIOSH PAT)** (Accreditation # 11172)
  - **AIHA ELLAP** Accreditation for Lead: Accreditation for the **Environmental Lead** Laboratory recognized by the EPA as meeting the requirements of the National Lead Laboratory Accreditation Program established under Title X (Lab ID #11109).
  - **ELAP PLM** for Asbestos: California Department of Health Services, Environmental Laboratory Accreditation Program, certificate for bulk asbestos analysis (Certificate #2027)
  - **USDA Soil** permit #39484

The following supporting documents are attached to this report:

- Laboratory analytical reports
- Photographs of sample locations
- Floor plan or sketch showing sample locations

Please call KELLCO if there are any questions and/or clarifications regarding this report. We look forward to working with you in the future.

Sincerely,

KELLCO-MACS

Tim C. Cannard CAC #94-1395, CDPH Lead #764
Senior Project Manager

Asbestos Definitions and Classifications

ACM	(Asbestos Containing Material) - Material containing more than 1% asbestos. ACM must be disposed as hazardous waste. Note: Federal OSHA and Cal-OSHA control materials containing any amount of asbestos.
ACBM	(Asbestos Containing Building Material) – AHERA/ASHARA term for material containing more than 1% asbestos in or on interior structural members or other structural components. Exceptions: Covered walkways, porticos and exterior HVAC TSI.
ACCM	(Asbestos Containing Construction Material) – California term for a manufactured construction material containing greater than .1% (one tenth of one percent) asbestos.
PACM	(Presumed Asbestos Containing Material) OSHA considers all TSI and surfacing materials installed prior to1980 to be ACM unless proven otherwise.
Friable	Asbestos Containing Material that can be crumbled pulverized or reduced to powder by hand pressure when dry.
NOA	Naturally Occurring Asbestos. CARB defines as having >.25% by point counting.

Categories of Asbestos Used BY EPA AHERA/ASHARA and OSHA/Cal-OSHA

TSI	(Thermal System Insulation) - "Thermal system insulation (TSI)" means ACM applied to pipes, fittings, boilers, breeching, tanks, ducts or other structural components to prevent heat loss or gain. "Thermal system insulation ACM" is thermal system insulation which contains more than 1% asbestos.
SURFACING (usually mixed on site at time of application)	"Surfacing material" means material that is sprayed, troweled-on or otherwise applied to surfaces (such as acoustical plaster on ceilings and fireproofing materials on structural members, or other materials on surfaces for acoustical, fireproofing, and other purposes). "Surfacing ACM" means surfacing material which contains more than 1% asbestos. NOTE: OSHA/Cal-OSHA do not classify taping mud, floor tile mastic, stucco, leveling compound, and hard wall plasters or wall texturing as surfacing.
MISC.	All other ACM, including classify taping mud, floor tile mastic, stucco, leveling compound, and hard wall plasters or wall texturing as surfacing.

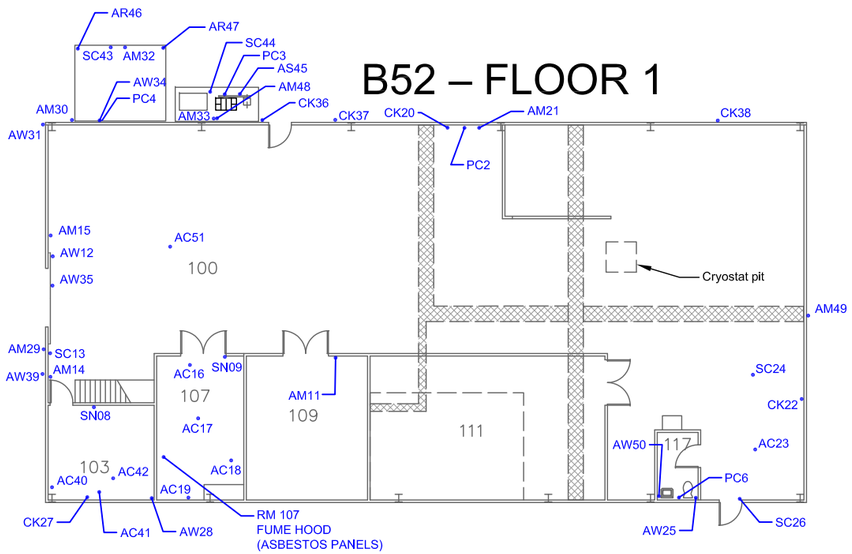
NESHAPS Categories for Asbestos (used by Air Quality Management Districts)

Category I	Cat I Non-friable Asbestos Containing Material refers to asbestos containing packing, gaskets, resilient floor covering, Galbestos, and asphalt roofing products containing more than 1% asbestos.
Category II	Cat II Non-friable Asbestos-Containing Material is any material that is not Cat I that contains greater than 1% asbestos.
RACM	"Regulated Asbestos-Containing Material." – Friable asbestos material (ACM) or a Category I non-friable ACM that has become friable OR a 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 reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations. RACM should be removed prior to renovation or demolition.

Characterization of Asbestos Containing Materials

Material	Estimated Quantity	TSI	Surfacing	Misc	RACM	Cat I	Cat II
Building 52							
12 x 12 floor tile and mastic	~ 850 sq. ft.			X		X	
Wall texture, drywall & joint compound	~ 9,250 sq. ft.		X		X		
Wall patching	~ 65 sq. ft.			X			X
Miscellaneous pipe caulking	~ 10 sq. ft.			X			X
Rolled roof mastic	~ 120 sq. ft.			X		X	
Refrigeration closet/ Miscellaneous black pipe insulation	~ 20 linear feet	X			X		
Roof & duct vent/ Sealant	~ 40 sq. ft.			X			X
Fume Hood with Asbestos Panels – Is Assumed Asbestos Containing Material	~75 sq. ft.			X			X

B52 – FLOOR 1



ABBREVIATIONS

AC	Asbestos ceiling sample
AM	Asbestos miscellaneous
AR	Asbestos roofing sample
AW	Asbestos wall sample
CK	Caulk sample
PC	Paint sample
SC	Concrete sample
SN	Tile/mastic sample

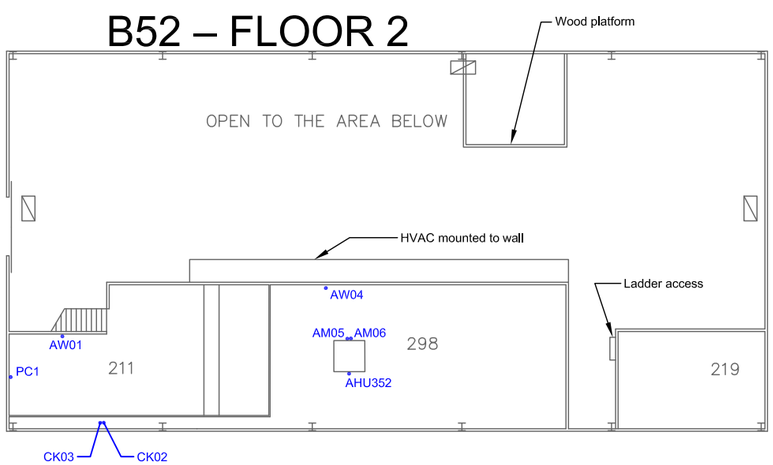
NOTE:

All sample locations are approximate

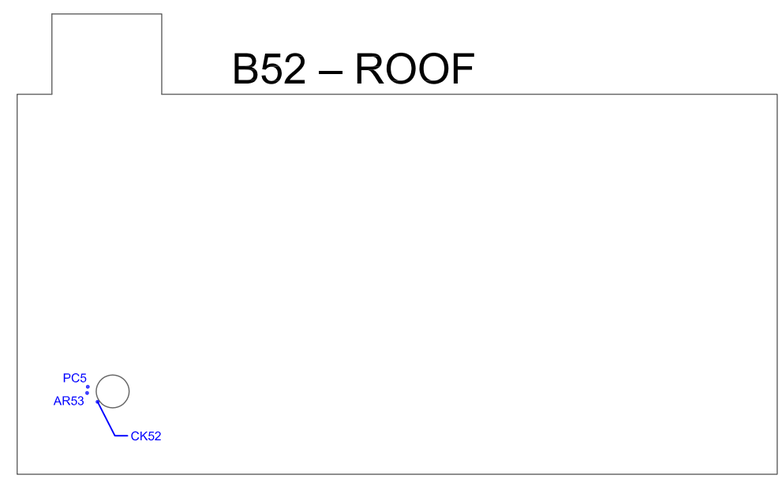
0 20' 40'

SCALE: 1" = 20'

B52 – FLOOR 2



B52 – ROOF



L:\LBNL.178\Old Town Demolition\Sample Location Maps\Kellco Maps\SLM_Kellco_B52.dwg

MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Method: EPA-600/M4-82-020

KELLCO Services
3137 Diablo Ave

Hayward CA 94545

Person to contact: Tim Cannard
Contact phone: 510-786-9751
FAX phone: 510-786-9625
Sampled by: Siew Yee Lee
Sampled on: July 13, 2010
Analyzed on: August 5, 2010 at: 17:03
Corresponding invoice number: 206538

Analyst: HCB (signature)

Laboratory manager: (signature)

Job Number: 1004-17

Job Description: Lawrence Berkeley National Laboratory - Building 52 - One Cyclotro Road, Berkeley, CA 94744

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206538-1	B52-AW1 2nd floor, east wall, northeast end in Area 211 / drywall, tape & joint compound	**N.D.**	28%Cellulose	Off-white joint compound/tape plaster. Balance of sample is unspecified non-fibrous material.
L206538-2	B52-CK02 2nd floor, west end 2" pipe in Area 211 / pipe caulking	**Yes**	4%Chrysotile* 3%Cellulose	Off-white caulk. Balance of sample is unspecified non-fibrous material.
L206538-3	B52-CK03 2nd floor, west end 2" pipe in Area 211 / pipe caulking	**Yes**	3%Chrysotile* 3%Cellulose	Off-white caulk. Balance of sample is unspecified non-fibrous material.
L206538-4	B52-AW04 2nd floor, east wall by AHU / drywall, tape & joint compound	**N.D.**	27%Cellulose	Off-white joint compound/tape plaster. Balance of sample is unspecified non-fibrous material.
L206538-5	B52-AM05 2nd floor, AHU 352 / duct joint tape	**N.D.**	45%Cellulose 5%Synthetic	Gray duct tape. Balance of sample is unspecified non-fibrous material.

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Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206538-6	B52-AM06 2nd floor, AHU 352 / expansion joint	**N.D.**	26% Fiberglass < 1% Cellulose	Black vinyl joint. Balance of sample is unspecified non-fibrous material.
L206538-7	B52-AS07 2nd floor, old water pipe south of mezzanine / pipe insulation & jacket	**N.D.**	36% Cellulose	Black insulation. Balance of sample is unspecified non-fibrous material.
L206538-8	B52-SN08 Room 103, east corner by doorway / 12x12 floor tile & mastic	**Yes**	3% Chrysotile* < 1% Cellulose	Off-white tile. Balance of sample is unspecified non-fibrous material.
L206538-9	B52-SN08a Room 103, east corner by doorway / 12x12 floor tile & mastic	**Yes**	5% Chrysotile* 4% Cellulose	Black tar. Balance of sample is organic binders.
L206538-10	B52-SN09 Room 107, east corner at doorway / 12x12 floor tile & mastic	**Yes**	3% Chrysotile* < 1% Cellulose	Off-white tile. Balance of sample is unspecified non-fibrous material.
L206538-11	B52-SN09a Room 107, east corner at doorway / 12x12 floor tile & mastic	**Yes**	5% Chrysotile* 4% Cellulose	Black tar. Balance of sample is organic binders.
L206538-12	B52-SN10 Room 109, east corner / 12x12 floor tile & mastic	**Yes**	3% Chrysotile* < 1% Cellulose	Off-white tile. Balance of sample is unspecified non-fibrous material.
L206538-13	B52-SN10a Room 109, east corner / 12x12 floor tile & mastic	**Yes**	5% Chrysotile* 3% Cellulose	Black tar. Balance of sample is organic binders.
L206538-14	B52-AM11 Room 109, east wall / brown baseboard & mastic	**N.D.**	No Fibers	Brown vinyl. Balance of sample is unspecified non-fibrous material.

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510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206538-15	B52-AM11a Room 109, east wall / brown baseboard & mastic	**N.D.**	< 1%Cellulose	Brown adhesive. Balance of sample is organic binders.
L206538-16	B52-AW12 Area 100, north wall by sliding door / wall texture	**N.D.**	1%Cellulose	Off-white compound texture. Balance of sample is unspecified non-fibrous material.
L206538-17	B52-AW12a Area 100, north wall by sliding door / drywall & joint compound	**N.D.**	22%Cellulose 2%Fiberglass	Off-white joint compound plaster. Balance of sample is unspecified non-fibrous material.
L206538-18	B52-SC13 Area 100, northwest end of north wall / raised wall, concrete	**N.D.**	No Fibers	Gray concrete. Balance of sample is cementitious.
L206538-19	B52-AM14 Area 100, northwest end of north side / steel cable insulator	**N.D.**	No Fibers	Black vinyl. Balance of sample is unspecified non-fibrous material.
L206538-20	B52-AM15 Area 100, northeast end of north wall / brown baseboard & mastic	**N.D.**	No Fibers	Brown vinyl. Balance of sample is unspecified non-fibrous material.
L206538-21	B52-AM15a Area 100, northeast end of north wall / brown baseboard & mastic	**N.D.**	3%Wollastonite < 1%Cellulose	Brown adhesive. Balance of sample is organic binders.
L206538-22	B52-AC16 Room 109, east end towards door / 12x12 row-holed ceiling tile	**N.D.**	88%Cellulose	Brown ceiling tile. Balance of sample is unspecified non-fibrous material.
L206538-23	B52-AC17 Room 109, center of room / 12x12 row-holed ceiling tile	**N.D.**	87%Cellulose	Brown ceiling tile. Balance of sample is unspecified non-fibrous material.

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Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206538-24	B52-AC18 Room 109, southeast corner / 12x12 row-holed ceiling tile	**N.D.**	88%Cellulose	Brown ceiling tile. Balance of sample is unspecified non-fibrous material.
L206538-25	B52-AC19 Room 109, west end / 12x12 ceiling tile	**N.D.**	1%Cellulose	Off-white compound texture. Balance of sample is unspecified non-fibrous material.
L206538-26	B52-CK20 Area 100, east central window / window caulking	**N.D.**	1%Cellulose	Gray caulk. Balance of sample is unspecified non-fibrous material.
L206538-27	B52-AM21 Area 100, east central wall / brown baseboard & mastic	**N.D.**	No Fibers	Brown vinyl. Balance of sample is unspecified non-fibrous material.
L206538-28	B52-AM21a Area 100, east central wall / brown baseboard & mastic	**N.D.**	3%Wollastonite < 1%Cellulose	Brown adhesive. Balance of sample is organic binders.
L206538-29	B52-CK22 Area 100, south window / window caulking	**N.D.**	1%Cellulose	Gray caulk. Balance of sample is unspecified non-fibrous material.
L206538-30	B52-AC23 Area 100, ceiling under 219 / wall texture	**N.D.**	No Fibers	Off-white compound texture. Balance of sample is unspecified non-fibrous material.
L206538-31	B52-SC24 Area 100, south end / concrete floor	**N.D.**	No Fibers	Gray concrete. Balance of sample is cementitious.
L206538-32	B52-AW25 Room 117, southwest corner / wall texture	**Yes**	< 1%Chrysotile* 1%Cellulose	Off-white compound texture. Balance of sample is unspecified non-fibrous material.

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Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206538-33	B52-AW25a Room 117, southwest corner / drywall & joint compound	**Yes**	< 1% Chrysotile* 22% Cellulose	Off-white joint compound plaster. Balance of sample is unspecified non-fibrous material.
L206538-34	B52-SC26 Area 100, southwest exit floor / concrete	**N.D.**	No Fibers	Gray concrete. Balance of sample is cementitious.
L206538-35	B52-CK27 Room 103, west wall / window caulking	**N.D.**	1% Cellulose	Gray caulk. Balance of sample is unspecified non-fibrous material.
L206538-36	B52-AW28 Room 103, southwest corner / wall texture	**Yes**	< 1% Chrysotile* 2% Cellulose	Off-white compound texture. Balance of sample is unspecified non-fibrous material.
L206538-37	B52-AW28a Room 103, southwest corner / drywall joint compound	**Yes**	< 1% Chrysotile* 23% Cellulose	Off-white joint compound plaster. Balance of sample is unspecified non-fibrous material.
L206538-38	B52-AM29 Exterior of building north end / steel cable insulator	**N.D.**	No Fibers	Black vinyl. Balance of sample is unspecified non-fibrous material.
L206538-39	B52-AW30 Storage shed, behind wooden wall / vapor barrier	**N.D.**	42% Cellulose 2% Synthetic	Black felt. Balance of sample is organic binders.
L206538-40	B52-AW31 Storage shed, behind wooden wall / wall patching	**Yes**	6% Chrysotile* 2% Cellulose	Off-white putty. Balance of sample is unspecified non-fibrous material.
L206538-41	B52-AM32 Storage shed, east wall, between wood & concrete walls / sealant	**N.D.**	No Fibers	Clear sealant. Balance of sample is unspecified non-fibrous material.

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Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206538-42	B52-AM33 Refrigeration closet / small tank wrap	**N.D.**	41% Cellulose 2% Synthetic	Black felt. Balance of sample is organic binders.
L206538-43	B52-AW34 Refrigeration closet / unit paint and or coating	**N.D.**	No Fibers	Off-white coating paint. Balance of sample is polymer and unspecified non-fibrous material.
L206538-44	B52-AW35 Area 100, north wall / wall batt insulation	**N.D.**	61% Mineral Wool 18% Cellulose 6% Fiberglass	Silver wrap paper fibrous insulation. Balance of sample is unspecified non-fibrous material.
L206538-45	B52-CK36 Exterior metal panel, northeast end / wall patching	**Yes**	< 1% Chrysotile* 1% Cellulose	Off-white caulk. Balance of sample is unspecified non-fibrous material.
L206538-46	B52-CK37 Exterior metal panel, east end / wall patching	**Yes**	5% Chrysotile* 1% Cellulose	Off-white caulk. Balance of sample is unspecified non-fibrous material.
L206538-47	B52-CK38 Exterior east wall panel, southeast end / wall patching	**Yes**	2% Chrysotile* 1% Cellulose	Off-white caulk. Balance of sample is unspecified non-fibrous material.
L206538-48	B52-AM39 Under exterior north metal wall panel / black weather strip	**N.D.**	No Fibers	Black rubber. Balance of sample is unspecified non-fibrous material.
L206538-49	B52-AC40 Room 103, northeast end / 12x12 ceiling tile & mastic	**N.D.**	65% Mineral Wool 13% Cellulose < 1% Polyethylene	Off-white ceiling tile. Balance of sample is unspecified non-fibrous material.
L206538-50	B52-AC40a Room 103, northeast end / 12x12 ceiling tile & mastic	**N.D.**	< 1% Cellulose	Brown adhesive. Balance of sample is organic binders.

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3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206538-51	B52-AC41 Room 103, west end / 12x12 ceiling tile & mastic	**N.D.**	35% Cellulose 34% Mineral Wool 1% Polyethylene	Off-white ceiling tile. Balance of sample is perlite and unspecified non-fibrous material.
L206538-52	B52-AC41a Room 103, west end / 12x12 ceiling tile & mastic	**N.D.**	< 1% Cellulose	Brown adhesive. Balance of sample is organic binders.
L206538-53	B52-AC42 Room 103, debris on south light fixture / 12x12 ceiling tile & mastic	**N.D.**	35% Cellulose 35% Mineral Wool 1% Polyethylene	Off-white ceiling tile. Balance of sample is unspecified non-fibrous material.
L206538-54	B52-AC42a Room 103, debris on south light fixture / 12x12 ceiling tile & mastic	**N.D.**	< 1% Cellulose	Brown adhesive. Balance of sample is organic binders.
L206538-55	B52-SC43 Storage shed, east wall / concrete wall	**N.D.**	No Fibers	Gray concrete. Balance of sample is silicate and cementitious.
L206538-56	B52-SC44 Refrigeration closet, unit floor / concrete	**N.D.**	No Fibers	Gray concrete. Balance of sample is silicate and cementitious.
L206538-57	B52-AS45 Refrigeration closet / old water pipe insulation (black) on unit	**Yes**	3% Chrysotile* 1% Cellulose	Black tar insulation. Balance of sample is organic binders and unspecified non-fibrous material.
L206538-58	B52-AR46 Storage shed, northeast corner / rolled roof, felt & mastic	**N.D.**	12% Synthetic 2% Cellulose	Black roofing aggregate. Balance of sample is silicate and organic binders.
L206538-59	B52-AR46a Storage shed, northeast corner / rolled roof, felt & mastic	**N.D.**	42% Cellulose 2% Synthetic	Black felt. Balance of sample is organic binders.

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Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206538-60	B52-AR47 Storage shed, east corner / rolled roof, felt & mastic	**N.D.**	12% Synthetic 2% Cellulose	Black roofing aggregate. Balance of sample is silicate and organic binders.
L206538-61	B52-AR47a Storage shed, east corner / rolled roof, felt & mastic	**N.D.**	41% Cellulose 2% Synthetic < 1% Polyethylene	Black felt. Balance of sample is organic binders.
L206538-62	B52-AR47b Storage shed, east corner / rolled roof, felt & mastic	**Yes**	2% Chrysotile* 19% Cellulose 1% Polyethylene	Black mastic. Balance of sample is organic binders.
L206538-63	B52-AM48 Refrigeration closet / old water pipe insulation (black) on unit	**Yes**	2% Chrysotile* 1% Cellulose	Black tar insulation. Balance of sample is organic binders and unspecified non-fibrous material.
L206538-64	B52-AM49 South exterior of building / electrical conduit insulator	**N.D.**	20% Cellulose	Black fibrous vinyl. Balance of sample i unspecified non-fibrous material.
L206538-65	B52-AW50 Room 117, southwest corner / Certain Tweed wall insulation (yellow)	**N.D.**	89% Mineral Wool 2% Cellulose	Yellow fibrous insulation. Balance of sample is unspecified non-fibrous material.
L206538-66	B52-AW50a Room 117, southwest corner / Certain Tweed wall insulation (yellow)	**N.D.**	41% Cellulose 2% Synthetic	Black felt. Balance of sample is organic binders.
L206538-67	B52-AC51 Area 100, central ceiling / pink insulation	**N.D.**	61% Mineral Wool 19% Cellulose 6% Fiberglass	Silver wrap paper fibrous insulation. Balance of sample is unspecified non-fibrous material.
L206538-68	B52-CK52 Roof, northwest duct vent / sealant	**Yes**	4% Chrysotile* 1% Cellulose	Gray/black sealant mastic. Balance of sample is organic binders and unspecified non-fibrous material.

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510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206538-69	B52-AR53 Roof, northwest corner / VIP paint	**N.D.**	< 1%Cellulose	Gray caulk. Balance of sample is unspecified non-fibrous material.

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NVLAP Lab Code 101948-0

MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

QA Report

Method: EPA-600/M

KELLCO Services
3137 Diablo Ave

Hayward CA 94545

Laboratory manager: _____ (signature)

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
Blank sample		**N.D.**	No fibers	
		PC*		
L206538-50	B52-AC40a Room 103, northeast end / 12x12 ceiling tile & mastic	**N.D.**	< 1%Cellulose	Brown adhesive. Balance of sample is organic binders.

End of report.

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L206538

KELLCO-MACS

A Creative Joint Venture For Better Environmental Solutions

Chain of Custody Record

For Bulk PLM Sample Collection Only

Page 1 of

BILLED TO	PROJECT INFORMATION	
Name: Kellco - MACS	Sampled By: Siew Yee Lee	Date Sampled: 7/13/10
Address: 3137 Diablo Avenue	Project Manager: Tim Cannard	Job #: 1004-17
City: Hayward	Project Name: Lawrence Berkeley National Lab	
State: Ca Zip: 94545	Site Address: Bldg 52,	
Phone No: (510) 786-9751	City, State, Zip: Berkely, Ca	
Fax No: (510) 786-9625	Site Contact:	
Cell No:	Phone No:	Fax No:
Email:	Samples Preserved: Yes / No	Analyze to First Positive: Yes / No

ANALYSIS REQUIRED

Required Turn Around Time: 4 Hour ___ 8 Hour ___ 24 Hour XX 2 Days/48 Hour ___ 3 Days/72 Hour ___ 5+ Days/120 Hour ___

DISPOSAL: ☐ Customer ☒ Laboratory ☐ OTHER (Explain)

Sample #	Type	Sample Location / Sample Description (Color)	PLM (Bulk) - 40 CFR - Chap. 1, Part 763, Subpart F Appendix A or current EPA method	(F)riable / (N)on Friable	Condition: (G)ood / (F)air / (P)oor	Length (Feet)	Width (Feet)	Height (Feet)	Quantity
1004-17 — 1	B52-AW1	2nd Floor, East wall, NE end in Area 211/ Drywall, tape and joint compound	X						
1004-17 — 2	B52-CK02	2nd Floor, West end 2" pipe in Area 211/ Pipe caulking	X						
1004-17 — 3	B52-CK03	2nd Floor, West end 2" pipe in Area 211 / Pipe caulking	X						
1004-17 — 4	B52-AW04	2nd Floor, East wall by AHU/ Drywall, tape and joint compound	X						
1004-17 — 5	B52-AM05	2nd Floor, AHU 352 / duct joint tape	X						
1004-17 — 6	B52-AM06	2nd Floor, AHU 352 / expansion joint	X						
1004-17 — 7	B52-AS07	2nd Floor, old water pipe south of mezzanine / pipe insulation and jacket	X						
1004-17 — 8	B52-SN08	Room 103, east corner by doorway / 12x12 floor tile and mastic	X						
1004-17 — 9	B52-SN09	Room 107, east corner at doorway / 12x12 floor tile and mastic	X						
1004-17 — 10	B52-SN10	Room 109, east corner / 12x12 floor tile and mastic	X						

Relinquished By:	*Date:* 7/26/10 *Time:* 0902	*Accepted By:* D. Kn[illegible]	*Date:* 07/26/10 *Time:* 0752
Lab Report Number(s):	0752	*Delivery Type:* Drop Off	FedEx Mail Other

WB - Wallboard JC - Joint Compound WT - Wall Texture WBT - Wallboard Tape FT - Floor Tile FTM - Floor Tile Mastic BBM - Baseboard Mastic
RSF - Resilient Sheet Flooring CT - Ceiling Tile SAAM - Spray-Applied Acoustical Material R - Roof TSI - Thermal System Insulation EL - Elbow

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KELLCO-MACS

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Chain of Custody Record

For Bulk PLM Sample Collection Only

BILLED TO

Name: Kellco - MACS
Address: 3137 Diablo Avenue
City: Hayward
State: Ca Zip: 94545
Phone No: (510) 786-9751
Fax No: (510) 786-9625
Cell No:
Email:

PROJECT INFORMATION

Sampled By: Siew Yee Lee
Date Sampled: 7/13/10
Project Manager: Tim Cannard
Job #: 1004-17
Project Name: Lawrence Berkeley National Lab
Site Address: Bldg 52,
City, State, Zip:
Site Contact:
Phone No:
Fax No:
Samples Preserved: Yes / No
Analyze to First Positive: Yes / No

ANALYSIS REQUIRED

Required Turn Around Time: 4 Hour ___ 8 Hour ___ 24 Hour XX 2 Days/48 Hour ___ 3 Days/72 Hour ___ 5+ Days/120 Hour ___

DISPOSAL: [ ] Customer [X] Laboratory [ ] OTHER (Explain)

Sample #	Type	Sample Location / Sample Description (Color)	PLM (Bulk) - 40 CFR - Chap. 1, Part 763, Subpart F Appendix A or current EPA method	(F)riable / (N)on Friable	Condition: (G)ood / (F)air / (P)oor	Length (Feet)	Width (Feet)	Height (Feet)	Quantity
1004-17 — 11	B52-AM11	Room 109, east wall / Brown baseboard and mastic	X						
1004-17 — 12	B52-AW12	Area 100, North wall by sliding door / Wall texture	X						
1004-17 — 13	B52-AW12a	Area 100, North wall by sliding door / Drywall and joint compound	X						
1004-17 — 14	B52-SC13	Area 100, NW end of N wall / Raised wall, concrete	X						
1004-17 — 15	B52-AM14	Area 100, NW end of N side / Steel cable insulator	X						
1004-17 — 16	B52-AM15	Area 100, NE end of N wall / Brown baseboard and mastic	X						
1004-17 — 17	B52-AC16	Room 109, East end towards door / 12x12 row-holed ceiling tile	X						
1004-17 — 18	B52-AC17	Room 109, center of room / 12x12 row-holed ceiling tile	X						
1004-17 — 19	B52-AC18	Room 109, SE corner / 12x12 row-holed ceiling tile	X						
1004-17 — 20	B52-AC19	Room 109, west end / 12x12 ceiling tile	X						

Relinquished By: [signature] *Date:* 7/23/10 *Time:* 0902
Accepted By: [signature] *Date:* 07/26/10 *Time:* 0752
Lab Report Number(s): 7/26/10 0752
Delivery Type: Drop Off FedEx Mail Other

WB - Wallboard JC - Joint Compound WT - Wall Texture WBT - Wallboard Tape FT - Floor Tile FTM - Floor Tile Mastic BBM - Baseboard Mastic
RSF - Resilient Sheet Flooring CT - Ceiling Tile SAAM - Spray-Applied Acoustical Material R - Roof TSI - Thermal System Insulation EL - Elbow

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Chain of Custody Record

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BILLED TO	PROJECT INFORMATION	
Name: Kellco - MACS	Sampled By: Siew Yee Lee	Date Sampled: 7/13/10
Address: 3137 Diablo Avenue	Project Manager: Tim Cannard	Job #: 1004-17
City: Hayward	Project Name: Lawrence Berkeley National Lab	
State: Ca Zip: 94545	Site Address: Bldg 52,	
Phone No: (510) 786-9751	City, State, Zip:	
Fax No: (510) 786-9625	Site Contact:	
Cell No:	Phone No:	Fax No:
Email:	Samples Preserved: Yes / No	Analyze to First Positive: Yes / No

ANALYSIS REQUIRED

Required Turn Around Time: 4 Hour ___ 8 Hour ___ 24 Hour XX 2 Days/48 Hour ___ 3 Days/72 Hour ___ 5+ Days/120 Hour ___

DISPOSAL: [ ] Customer [X] Laboratory [ ] OTHER (Explain)

Sample #	Type	Sample Location / Sample Description (Color)	PLM (Bulk) - 40 CFR - Chap. 1, Part 763, Subpart F Appendix A or current EPA method	(F)riable / (N)on Friable	Condition: (G)ood / (F)air / (P)oor	Length (Feet)	Width (Feet)	Height (Feet)	Quantity
1004-17 — 21	B52-CK20	Area 100, east central window / Window caulking	X						
1004-17 — 22	B52-AM21	Area 100, east central wall / Brown baseboard and mastic	X						
1004-17 — 23	B52-CK22	Area 100, South window / Window caulking	X						
1004-17 — 24	B52-AC23	Area 100, ceiling under 219 / wall texture	X						
1004-17 — 25	B52-SC24	Area 100, south end / concrete floor	X						
1004-17 — 26	B52-AW25	Room 117, SW corner / wall texture	X						
1004-17 — 27	B52-AW25a	Room 117, SW corner / drywall and joint compound	X						
1004-17 — 28	B52-SC26	Area 100, SW exit floor / concrete	X						
1004-17 — 29	B52-CK27	Room 103, West wall / Window caulking	X						
1004-17 — 30	B52-AW28	Room 103, SW corner / wall texture	X						

Relinquished By:	*Date:* 7/23/10	*Time:* 0902	*Accepted By:*	*Date:* 07/26/10	*Time:* 0752
Lab Report Number(s):	7/26/10	0756	*Delivery Type:*	Drop Off / FedEx / Mail / Other	

WB - Wallboard JC - Joint Compound WT - Wall Texture WBT - Wallboard Tape FT - Floor Tile FTM - Floor Tile Mastic BBM - Baseboard Mastic
RSF - Resilient Sheet Flooring CT - Ceiling Tile SAAM - Spray-Applied Acoustical Material R - Roof TSI - Thermal System Insulation EL - Elbow

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BILLED TO	PROJECT INFORMATION	
Name: Kellco - MACS	Sampled By: Siew Yee Lee	Date Sampled: 7/13/10
Address: 3137 Diablo Avenue	Project Manager: Tim Cannard	Job #: 1004-17
City: Hayward	Project Name: Lawrence Berkeley National Lab	
State: Ca Zip: 94545	Site Address: Bldg 52,	
Phone No: (510) 786-9751	City, State, Zip:	
Fax No: (510) 786-9625	Site Contact:	
Cell No:	Phone No:	Fax No:
Email:	Samples Preserved: Yes / No	Analyze to First Positive: Yes / No

Required Turn Around Time: 4 Hour ___ 8 Hour ___ 24 Hour XX 2 Days/48 Hour ___ 3 Days/72 Hour ___ 5+ Days/120 Hour ___

DISPOSAL: ☐ Customer ☒ Laboratory ☐ OTHER (Explain)

Sample #	Type	Sample Location / Sample Description (Color)	PLM (Bulk) - 40 CFR - Chap. 1, Part 763, Subpart F Appendix A or current EPA method	(F)riable / (N)on Friable	Condition: (G)ood / (F)air / (P)oor	Length (Feet)	Width (Feet)	Height (Feet)	Quantity
1004-17— 31	B52-AW28a	Room 103, SW corner / Drywall joint compound	X						
1004-17— 32	B52-AM29	Exterior of bldg, N. end / Steel cable insulator	X						
1004-17— 33	B52-AW30	Storage Shed, behind wooden wall / vapor barrier	X						
1004-17— 34	B52-AW31	Storage Shed, behind wooden wall / wall patching	X						
1004-17— 35	B52- AM32	Storage Shed, east wall, Between wood and concrete walls/ sealant	X						
1004-17— 36	B52-AM33	Refrigeration closet / small tank wrap	X						
1004-17— 37	B52- AW34	Refrigeration closet / unit Paint and or coating	X						
1004-17— 38	B52-AW35	Area 100, North wall / Wall batt insulation	X						
1004-17— 39	B52-CK36	Exterior metal panel NE end / wall patching	X						
1004-17— 40	B52-CK 37	Exterior metal panel, East end / wall patching	X						

Relinquished By: [signature]	*Date:* 7/23/10	*Time:* ~~0900~~	*Accepted By:* A. Kuhl
Date: 07/26/10	*Time:* 0752		
Lab Report Number(s):	7/26/10	0756	*Delivery Type:* Drop Off FedEx Mail Other

WB - Wallboard JC - Joint Compound WT - Wall Texture WBT - Wallboard Tape FT - Floor Tile FTM - Floor Tile Mastic BBM - Baseboard Mastic
RSF - Resilient Sheet Flooring CT - Ceiling Tile SAAM - Spray-Applied Acoustical Material R - Roof TSI - Thermal System Insulation EL - Elbow

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Page ____ of ____

BILLED TO	PROJECT INFORMATION	
Name: Kellco - MACS	Sampled By: Siew Yee Lee	Date Sampled: 7/13/10
Address: 3137 Diablo Avenue	Project Manager: Tim Cannard	Job #: 1004-17
City: Hayward	Project Name: Lawrence Berkeley National Lab	
State: Ca Zip: 94545	Site Address: Bldg 52,	
Phone No: (510) 786-9751	City, State, Zip:	
Fax No: (510) 786-9625	Site Contact:	
Cell No:	Phone No:	Fax No:
Email:	Samples Preserved: Yes / No	Analyze to First Positive: Yes / No

ANALYSIS REQUIRED

Required Turn Around Time: 4 Hour ____ 8 Hour ____ 24 Hour XX 2 Days/48 Hour ____ 3 Days/72 Hour ____ 5+ Days/120 Hour ____

DISPOSAL: ☐ Customer ☒ Laboratory ☐ OTHER (Explain)

Sample #	Type	Sample Location / Sample Description (Color)	PLM (Bulk) - 40 CFR - Chap. 1, Part 763, Subpart F Appendix A or current EPA method	(F)riable / (N)on Friable	Condition: (G)ood / (F)air / (P)oor	Length (Feet)	Width (Feet)	Height (Feet)	Quantity
1004-17 — 41	B52-CK38	Exterior East wall panel, SE end / Wall patching	X						
1004-17 — 42	B52-AM39	Under exterior north metal wall panel / black weather strip	X						
1004-17 — 43	B52-AC40	12x12 ceiling tile and mastic / Room 103, NE end	X						
1004-17 — 44	B52-AC41	12x12 ceiling tile and mastic / Room 103, West end	X						
1004-17 — 45	B52-AC42	12x12 ceiling tile and mastic / Room 103, debris on south light fixture	X						
1004-17 — 46	B52-SC43	Storage Shed, east wall / concrete wall	X						
1004-17 — 47	B52-SC44	Refrigeration closet, unit floor/ concrete	X						
1004-17 — 48	B52-AS45	Refrigeration closet / Old water pipe insulation (black) on unit	X						
1004-17 — 49	B52-AR46	Storage Shed, NE corner / rolled roof, felt and mastic	X						
1004-17 — 50	B52-AR47	Storage Shed, East corner / rolled roof, felt and mastic	X						

Relinquished By: [signature]	*Date:* 7/26/2010 *Time:* 0756	*Accepted By:* A. Kuhl	*Date:* 07/26/10 *Time:* 0752
Lab Report Number(s):		*Delivery Type:* (Drop Off) FedEx Mail Other	

WB - Wallboard JC - Joint Compound WT - Wall Texture WBT - Wallboard Tape FT - Floor Tile FTM - Floor Tile Mastic BBM - Baseboard Mastic
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Page ____ of ____

BILLED TO	PROJECT INFORMATION	
Name: Kellco - MACS	Sampled By: Siew Yee Lee	Date Sampled: 7/13/10
Address: 3137 Diablo Avenue	Project Manager: Tim Cannard	Job #: 1004-17
City: Hayward	Project Name: Lawrence Berkeley National Lab	
State: Ca Zip: 94545	Site Address: Bldg 52,	
Phone No: (510) 786-9751	City, State, Zip:	
Fax No: (510) 786-9625	Site Contact:	
Cell No:	Phone No:	Fax No:
Email:	Samples Preserved: Yes / No	Analyze to First Positive: Yes / No

ANALYSIS REQUIRED

Required Turn Around Time: 4 Hour ____ 8 Hour ____ 24 Hour XX 2 Days/48 Hour ____ 3 Days/72 Hour ____ 5+ Days/120 Hour ____

DISPOSAL: [ ] Customer [X] Laboratory [ ] OTHER (Explain)

Sample #	Type	Sample Location / Sample Description (Color)	PLM (Bulk) - 40 CFR - Chap. 1, Part 763, Subpart F Appendix A or current EPA method	(F)riable / (N)on Friable	Condition: (G)ood / (F)air / (P)oor	Length (Feet)	Width (Feet)	Height (Feet)	Quantity
1004-17— 51	B52-AM48	Refrigeration closet / Old water pipe insulation (black) on unit	X						
1004-17— 52	B52-AM49	South exterior of bldg / electrical conduit insulator	X						
1004-17— 53	B52-AW50	Room 117, SW corner / CertainTweed wall insulation (yellow)	X						
1004-17— 54	B52-AC51	Area 100, Central ceiling / pink insulation	X						
1004-17— 55	B52-CK52	Roof, NW duct vent / sealant	X						
1004-17— 56	B52-AR53	Roof, NW corner / VIP paint	X						
1004-17— 57			X						
1004-17— 58			X						
1004-17— 59			X						
1004-17— 60			X						

Relinquished By: [signature] *Date:* 7/26/10 *Time:* 0756

Accepted By: [signature] *Date:* 07/26/10 *Time:* 0752

Lab Report Number(s):

Delivery Type: ~~Drop Off~~ *FedEx* *Mail* *Other*

WB - Wallboard JC - Joint Compound WT - Wall Texture WBT - Wallboard Tape FT - Floor Tile FTM - Floor Tile Mastic BBM - Baseboard Mastic
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MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Method: EPA-600/M4-82-020

KELLCO Services
3137 Diablo Ave

Hayward CA 94545

Person to contact: Tim Cannard
Contact phone: 510-786-9751
FAX phone: 510-786-9625
Sampled by: Siew Yee Lee
Sampled on: August 4, 2010
Analyzed on: August 4, 2010 at: 18:10
Corresponding invoice number: 206955

Analyst: HCB (signature)

Laboratory manager: (signature)

Job Number: 1004-17

Job Description: LBNL - Building 52 - Berkeley, CA

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206955-1	B52-SC54 Building 52 Cryo Pit surface / concrete	**N.D.**	No Fibers	Gray concrete. Balance of sample is silicate and cementitious.
L206955-2	B52-SC55 Building 52 Cryo Pit surface / concrete	**N.D.**	No Fibers	Gray concrete. Balance of sample is silicate and cementitious.
L206955-3	B52-AM001 Panel PNL-001-52 / cloth wire	**N.D.**	1%Cellulose < 1%Synthetic	Black cloth wire. Balance of sample is unspecified non-fibrous material.
L206955-4	B52-AM002 Panel 15A747A / explosive proof tape	**N.D.**	59%Cellulose	Black tape. Balance of sample is unspecified non-fibrous material.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

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NVLAP Lab Code 101948-0

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MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

QA Report

Method: EPA-600/M

KELLCO Services
3137 Diablo Ave

Hayward CA 94545

Laboratory manager: _____ (signature)

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
Blank sample		**N.D.**	No fibers	
		PC*		
L206955-1	B52-SC54	**N.D.**	No Fibers	Gray concrete. Balance of sample is silicate and cementitious.
Building 52 Cryo Pit surface / concrete				

End of report.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

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NVLAP Lab Code 101948-0

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MACS Lab Incorporated
Material Analysis and Characterization Service

L206955

Analytical and Environmental Services

Chain of Custody Record

To Be Used For All Types Of Analysis

MACS Lab # _____

Customer Code

BILLED TO		PROJECT INFORMATION		
Name: ~~1004-17~~ Kellco-MACS.		Sampled By: Siew Yee Lee	Date: 8/04/2010	
Address:		Project Name: LBNL	Job #: 1004-17	
City:		Site Address: Building 52		
State:	Zip:	City, State, Zip: Berkeley, CA.		
Phone No:		Site Contact:		
Fax No:		Phone No:	Fax No:	
Cell No:		Comments:		
Email:		Samples Preserved: Yes / No	Received Cold: Yes / No	

ANALYSIS REQUIRED

Required Turn Around Time: 4 Hour ___ 8 Hour ___ 24 Hour X 2 Days/48 Hour ___ 3 Days/72 Hour ___ 5+ Days/120 Hour ___

DISPOSAL: ☐ Customer ☐ MACS ☐ OTHER (Explain)

Sample #	Sample Description / Type of Work	TIME ON	TIME OFF	TOTAL TIME	FLOW RATES START	FLOW RATES STOP	PCM Asbestos Air - NIOSH 7400	PLM Asbestos Bulk - 40 CFR 763	Lead (Wipes, Air, Paint, Soil)	TEM (Air/Bulk) - AHERA/Yamate Level II	Mold - Viable / Non Viable Air / Bulk	Metals (TCLP, CAM17, STLC)		Comments /Area Social Security #
B52-5454	Bldg ~~52~~ 52 Cryo pit surface / concrete							X						
B52-5455	surface / concrete.							X						
B52-AM001	Panel PNL-001-52 / cloth wire							X						
B52-AM002	Panel 15A7A7A / explosive proof tape.							X						

Relinquished By: [signature] Date: 8/04/2010 Time: 1007.

Accepted By: D. Kahler Date: 08/04/10 Time: 1007

TEM asbestos in water analysis requires 2 one-liter bottles shipped @ 4°C in dark containers for each sample.

LEAD USEPA 7420, Air NIOSH 7082, Soil EPA 7000/7420, Wipes NIOSH 9100
Water AIHA (method 3113B EPA 200.9)

Units Water - 1ug/l = 1 ppb
Paint - 1% = 10,000 ppm

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MACS Lab Incorporated
Analytical and Environmental Services
3137 Diablo Avenue, Hayward, Ca 94545-2701
(510) 786-9751 * (510) 786-9625 Fax * www.macslab.com

CAM-17 Bulk Materials Analysis Report - Method: EPA 6010B/3050

KELLCO Services
3137 Diablo Avenue
Hayward, CA 94545

Contact: Tim Cannard
Phone: (510) 786-9751
Email: mailbox3137@kellcomacs.com
Job #: 1004-17

Laboratory Number: 206530
Sampled By: Tim Cannard
Sampled On: July 21, 2010
Submitted On: July 26, 2010
Analyzed On: August 3, 2010
Reported On: August 5, 2010
SOP: CAM17
Sample Type: Bulk

Job Description: Lawrence Berkeley National Laboratory-Building 52- One Cyclotro Road, Berkeley CA 94744

	Lab Sample Number:	206530 -1	206530 -2	206530 -3	206530 -4	206530 -5
	Client Sample Number:	B52-PC1	B52-PC2	B52-PC3	B52-PC4	B52-PC5
	Matrix:	Bulk	Bulk	Bulk	Bulk	Bulk
	Extraction Type:	Acid	Acid	Acid	Acid	Acid
	Units:	mg/kg (PPM)	mg/kg (PPM)	mg/kg (PPM)	mg/kg (PPM)	mg/kg (PPM)
Sb	Antimony	4,816.18	401.82	574.39	1,845.83	487.48
As	Arsenic	1,343.01	176.80	401.40	130.35	21.52
Ba	Barium	714.71	20,583.57	2,015.09	9,643.97	91.53
Be	Beryllium	0.37	2.24	1.33	2.64	1.02
Cd	Cadmium	560.66	647.06	1,703.16	172.83	19.86
Cr	Chromium	1,131.25	3,877.68	44,982.46	170,877.98	861.90
Co	Cobalt	81.62	95.56	4,343.86	865.19	19.86
Cu	Copper	10,125.00	2,717.55	8,042.11	2,879.36	115.56
Pb	Lead	103,235.29	82,166.20	52,596.49	111,959.90	4,077.13
Hg	Mercury	770.22	81.84	37.61	15.38	13.78
Mo	Molybdenum	980.51	127.68	588.07	146.82	895.02
Ni	Nickel	447.79	356.58	1,100.00	96.22	29.25
Se	Selenium	247,647.06	16,638.66	10,273.68	8,888.70	2,915.29
Ag	Silver	91.91	46.64	87.65	20.26	16.20
Tl	Thallium	3,019.12	245.89	176.00	230.21	58.29
V	Vanadium	972.79	244.07	218.63	268.75	38.28
Zn	Zinc	15,400.74	36,643.32	45,403.51	39,249.91	42,831.25

Analyst: _____ (Signature)

Laboratory Manager: _____ (Signature)

NOTICE

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MACS Lab Incorporated
Analytical and Environmental Services
3137 Diablo Avenue, Hayward, Ca 94545-2701 (510) 786-9751 * (510) 786-9625 Fax * www.macslab.com

CAM-17 Bulk Materials Analysis Report - Method: EPA 6010B/3050

KELLCO Services
3137 Diablo Avenue
Hayward, CA 94545

Contact: Tim Cannard
Phone: (510) 786-9751
Email: mailbox3137@kellcomacs.com
Job #: 1004-17

Laboratory Number: 206530
Sampled By: Tim Cannard
Sampled On: July 21, 2010
Submitted On: July 26, 2010
Analyzed On: August 3, 2010
Reported On: August 5, 2010
SOP: CAM17
Sample Type: Bulk

Job Description: Lawrence Berkeley National Laboratory-Building 52- One Cyclotro Road, Berkeley CA 94744

	Lab Sample Number:	206530 -6				
	Client Sample Number:	B52-PC6				
	Matrix:	Bulk				
	Extraction Type:	Acid				
	Units:	mg/kg (PPM)				
Sb	Antimony	4,805.56				
As	Arsenic	1,431.48				
Ba	Barium	574.07				
Be	Beryllium	0.31				
Cd	Cadmium	484.57				
Cr	Chromium	2,699.69				
Co	Cobalt	102.78				
Cu	Copper	12,583.33				
Pb	Lead	102,808.64				
Hg	Mercury	163.58				
Mo	Molybdenum	1,023.46				
Ni	Nickel	534.26				
Se	Selenium	242,222.22				
Ag	Silver	104.01				
Tl	Thallium	2,976.54				
V	Vanadium	964.81				
Zn	Zinc	27,577.16				

Analyst: _____ (Signature)

Laboratory Manager: _____ (Signature)

NOTICE

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CLIENT	JOBSITE
Weiss Associates 5801 Christie Avenue 600 Emeryville CA 94608	Lawrence Berkeley National Laboratory One Cyclotron Road Bldg 52 Berkeley CA 94744

KELLCO-MACS JOB#: **1004-17** LAB LOGIN # P.206520

COLLECTED BY: Siew Yee Lee

COLLECTED DATE 7/21/2010

TURN AROUND TIME: 4 8 (24) 48 5-DAY

RESULTS NEEDED BY

CIRCLE TYPE OF BULK ANALYSIS

PLM (LEAD PAINT) LEAD WIPE NON VIABLE MOLD VIABLE MOLD eCOLI (OTHER) CAM 17

SAMPLES REC'D _____ ANALYZE TO FIRST POSITIVE YES NO

REPORT RESULTS TO PROJECT MANAGER: Tim Cannard

NOTES & COMMENTS:

CHAIN OF CUSTODY & SAMPLE SUBMITAL FORM PAGE____ OF ____

KELLCO-MACS JOB#: **1004-17**
Lawrence Berkeley National Laboratory

FIELD NUMBER	LOCATION (bldg, rm, area)	COLOR	MATERIAL of SUBSTRATE (ft w/ size, mastic, tic, etc.)	NOTES: Like condition, damage, quantity, inside what, beneath what? direction in building (N,S,E,W) etc.)
B52 -PC1	2nd floor, ~~metal wall~~ north metal wall		paint chip off metal	
-PC2	Area 150, east window sill		" " off wood	
-PC3	Refrigeration closet, unit		" " off metal	
-PC4	Exterior of building, various locations		" " ~~off meta~~ composite	
-PC5	Roof, NW end		VIP paint.	
-PC6	Bathroom wall		paint chip off metal.	

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
[illegible]	~~7/23/2010~~		[illegible]	07/26/10	0745
	7/26/2010	0745			

PHOTOGRAPHS

Photographs containing no sample identification number are included for reference of the general sample locations.

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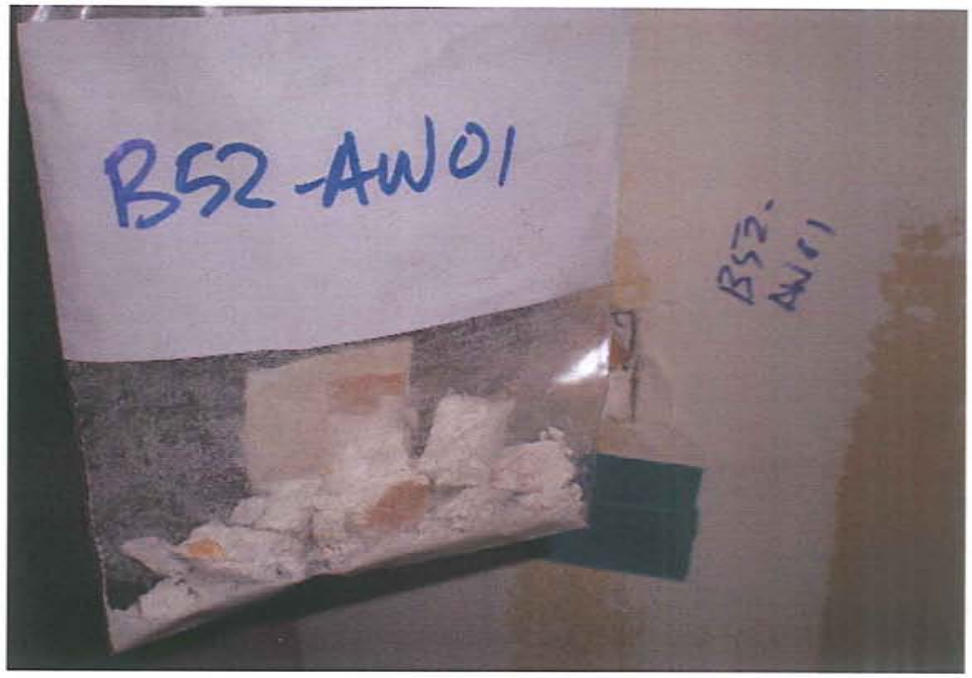
http://www.kellcomacs.com email: mailbox3137@kellcomacs.com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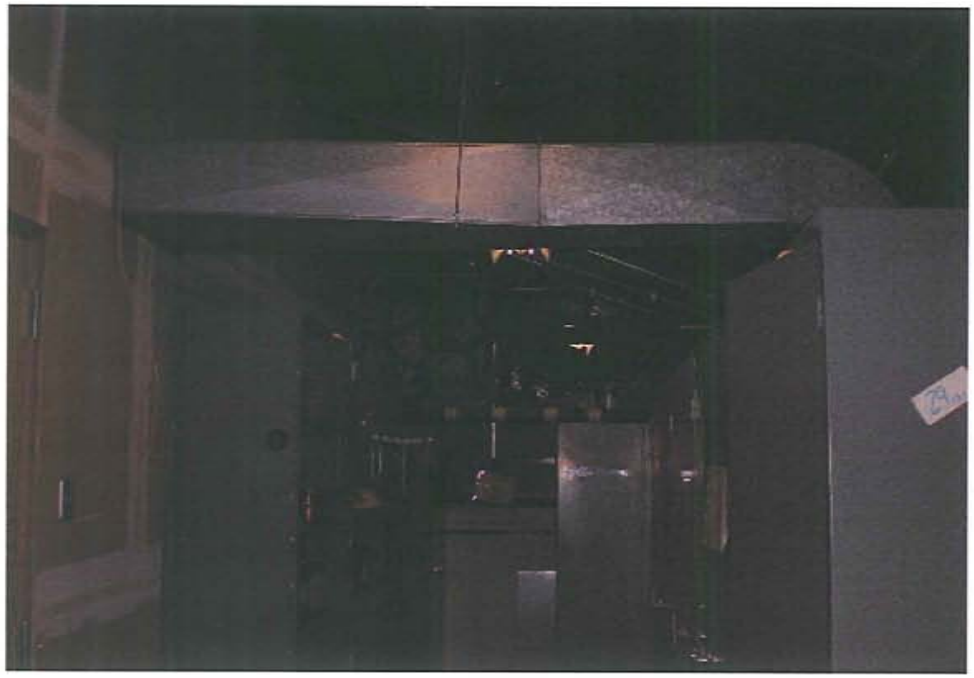

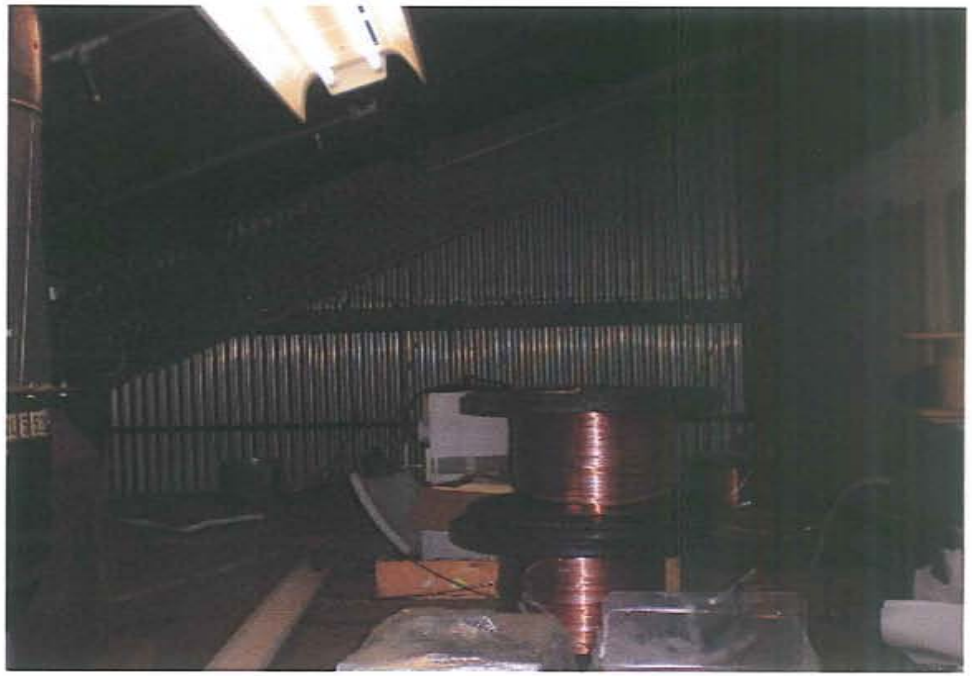

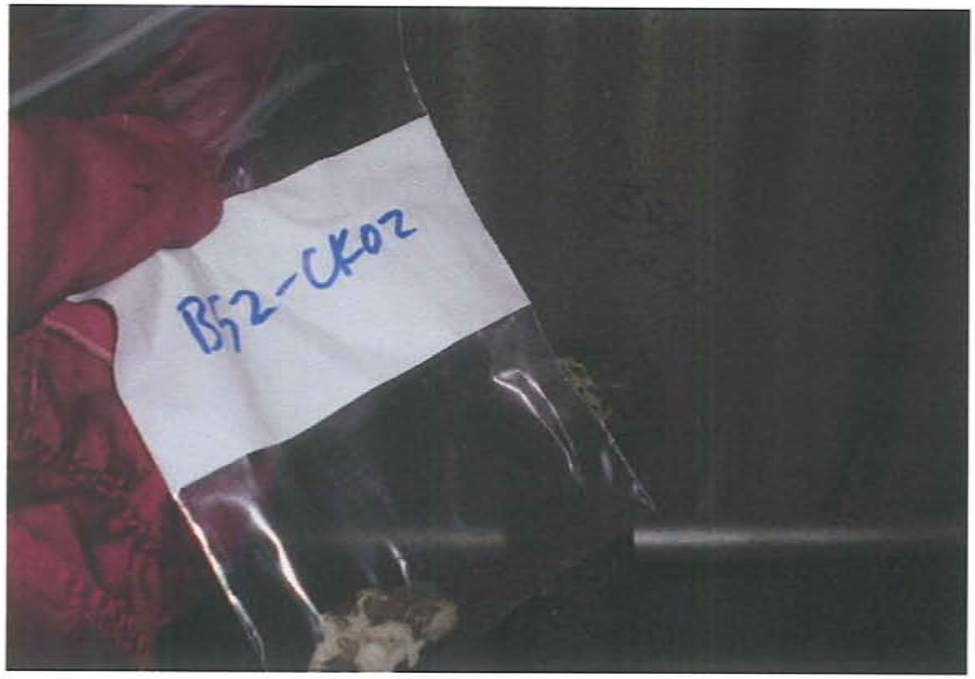
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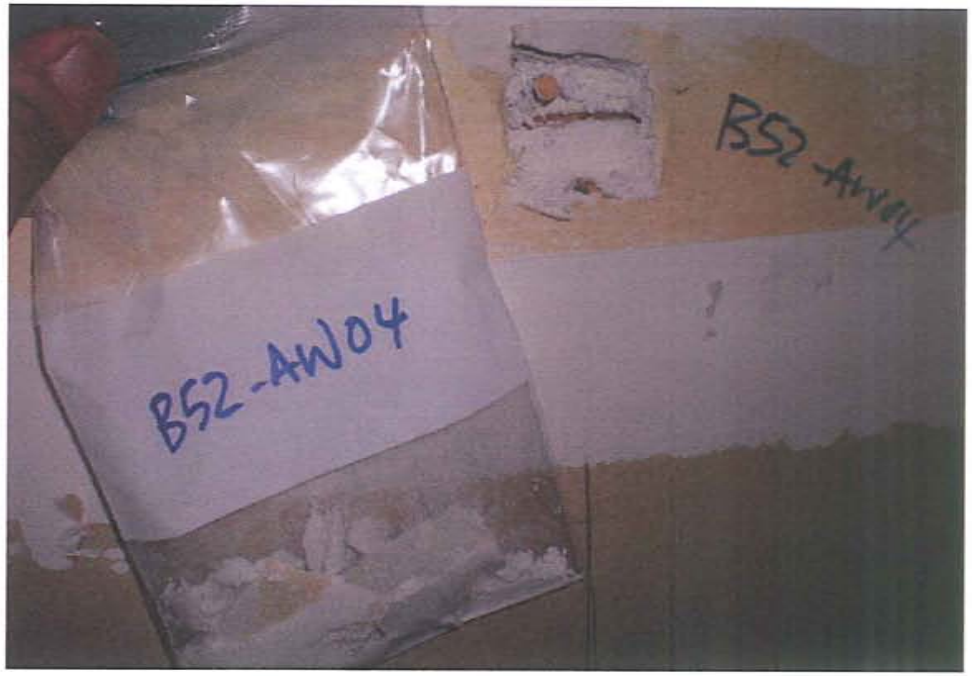
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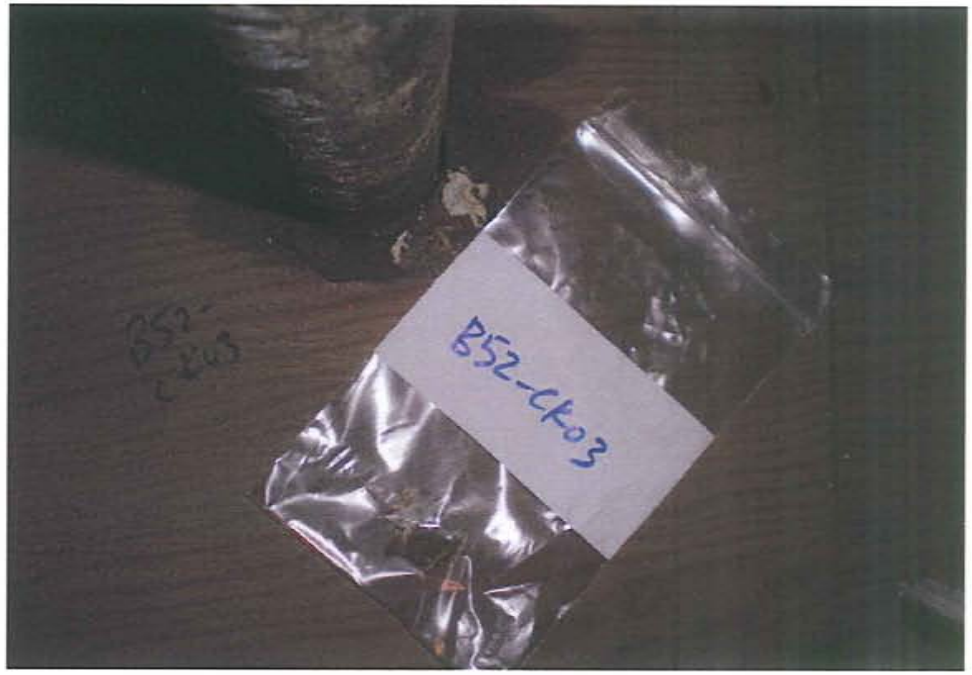
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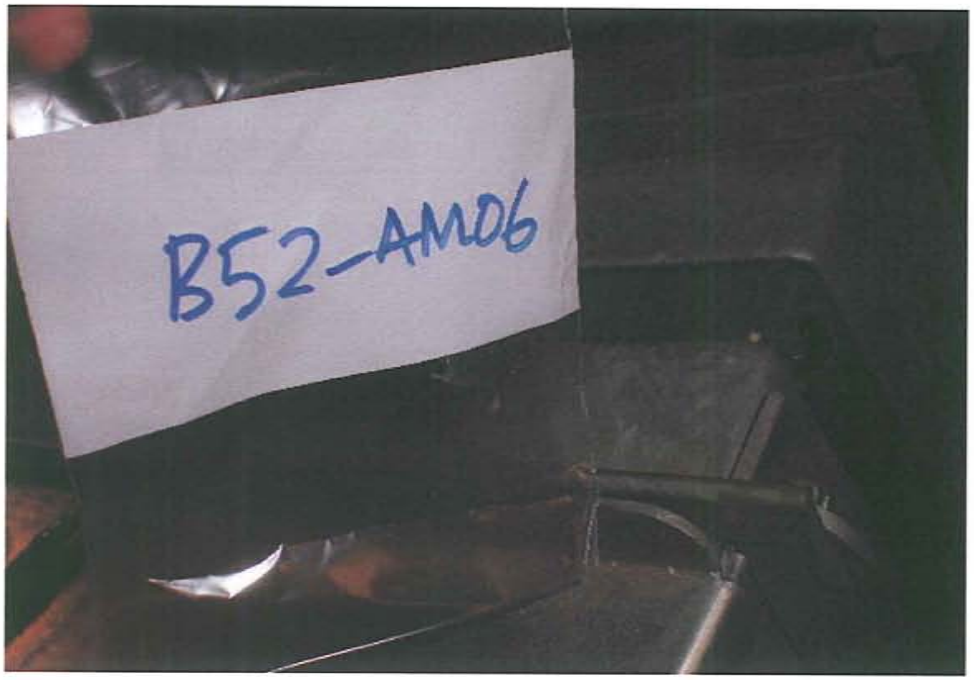
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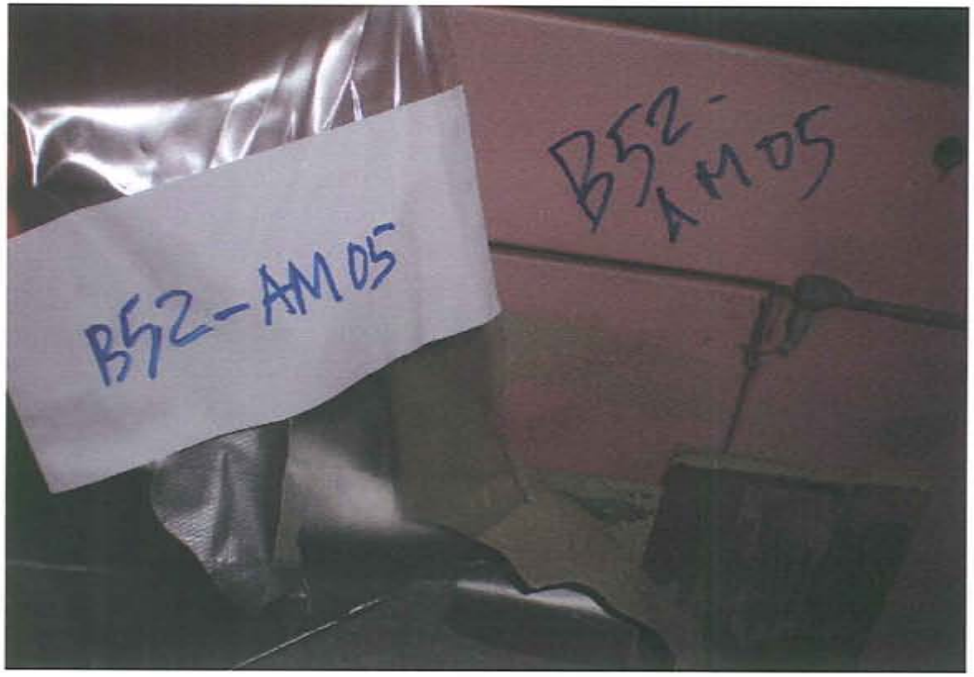
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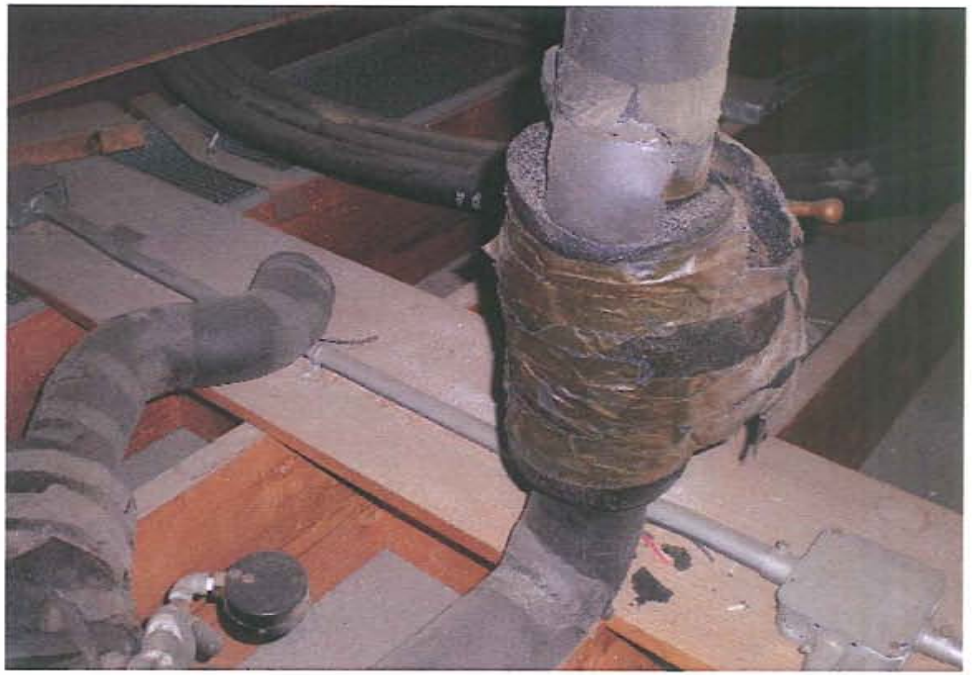

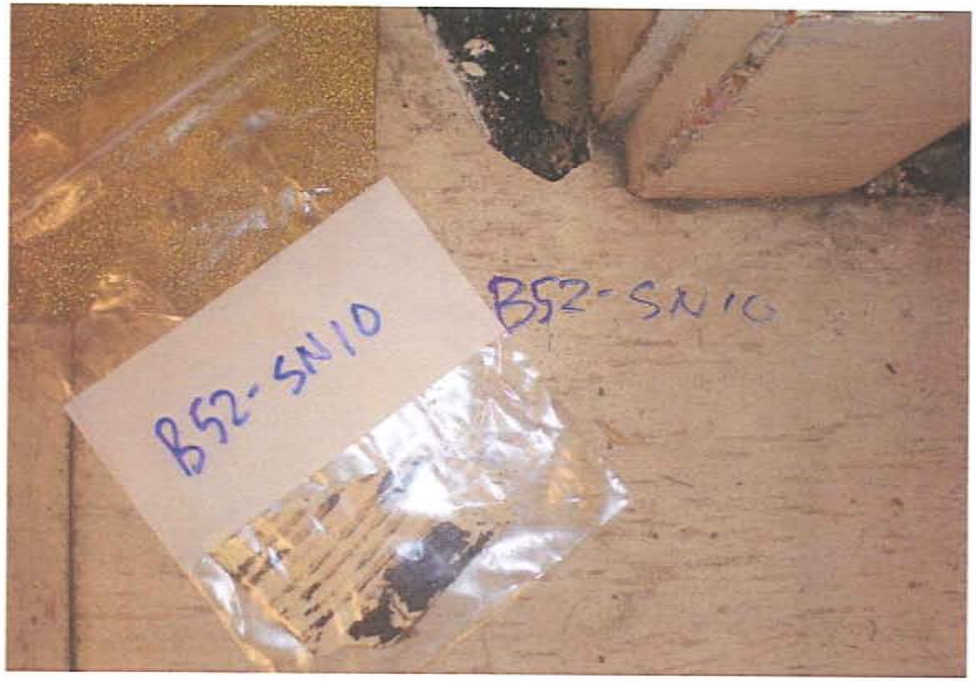
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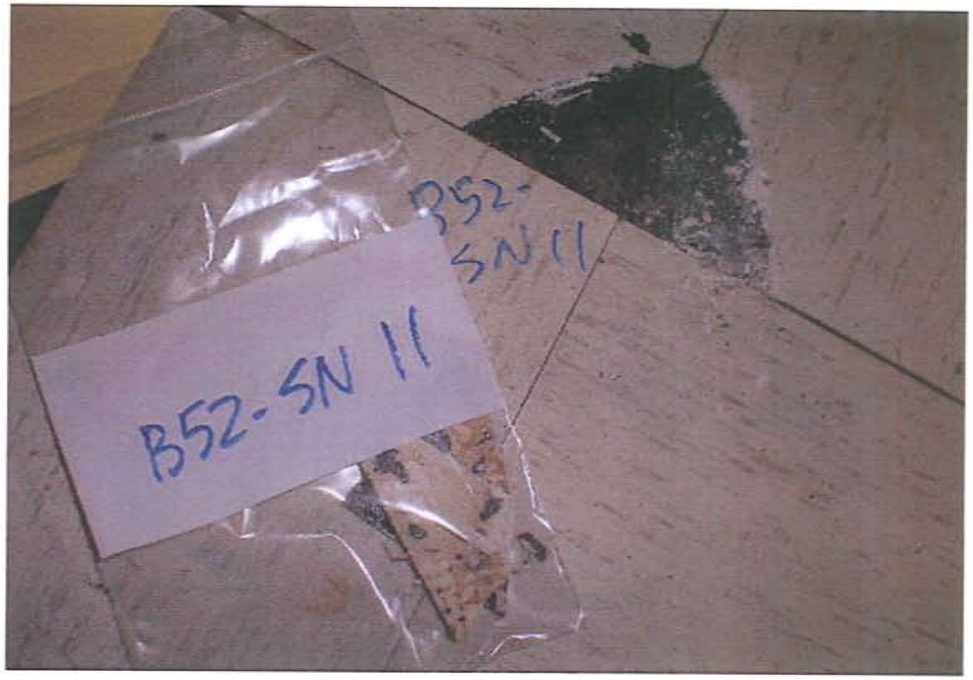
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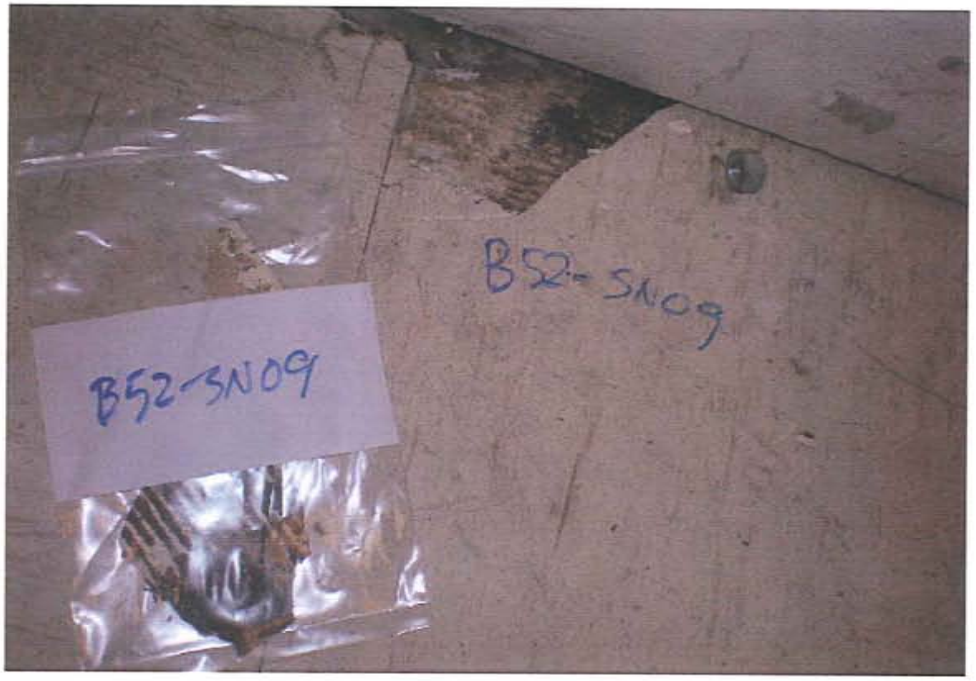
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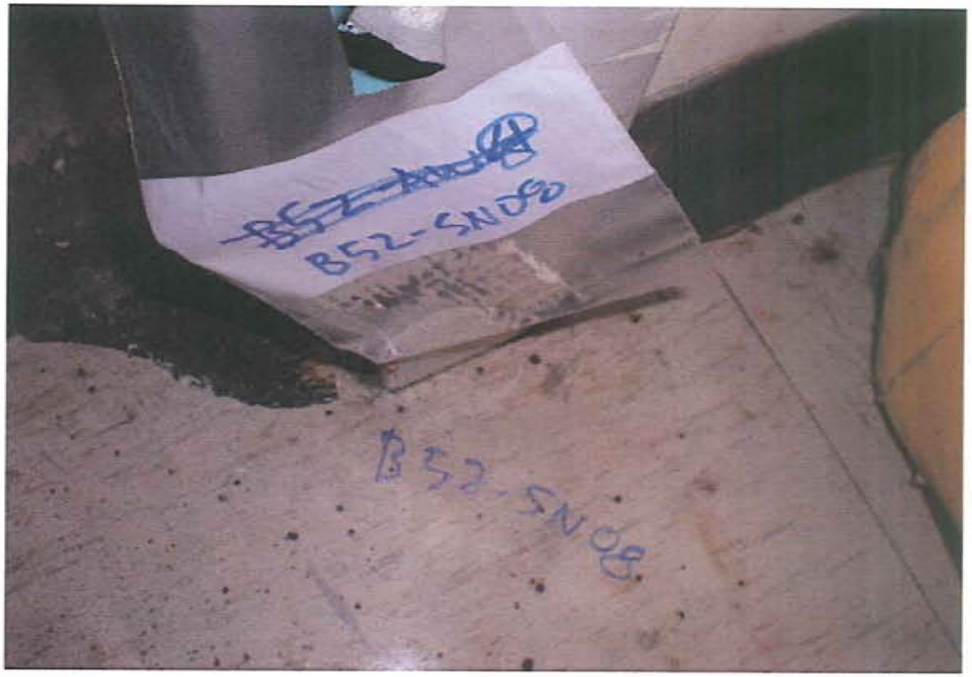
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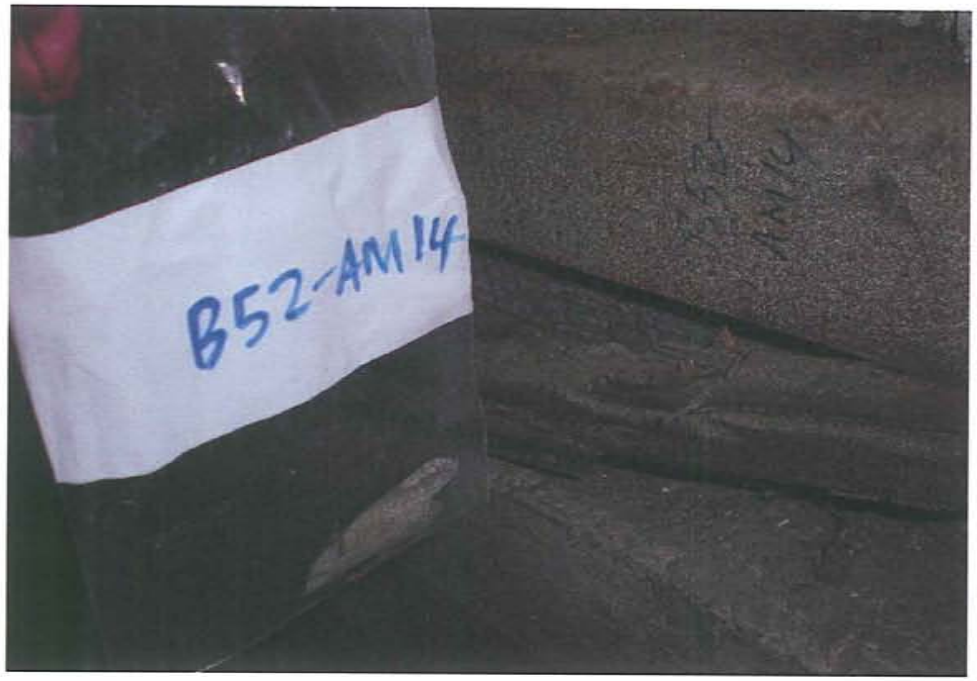
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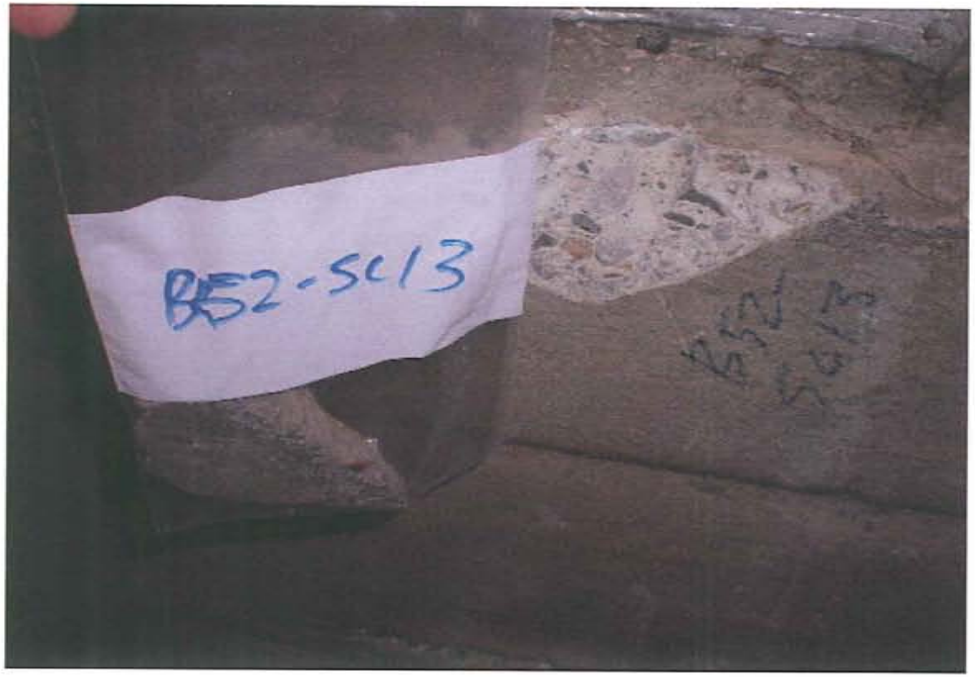
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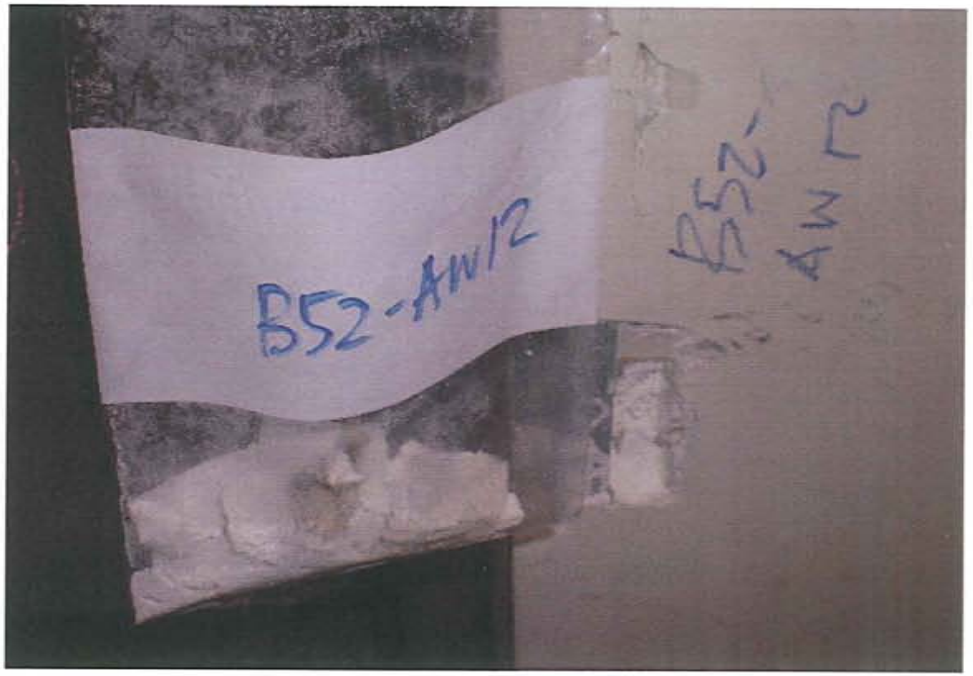
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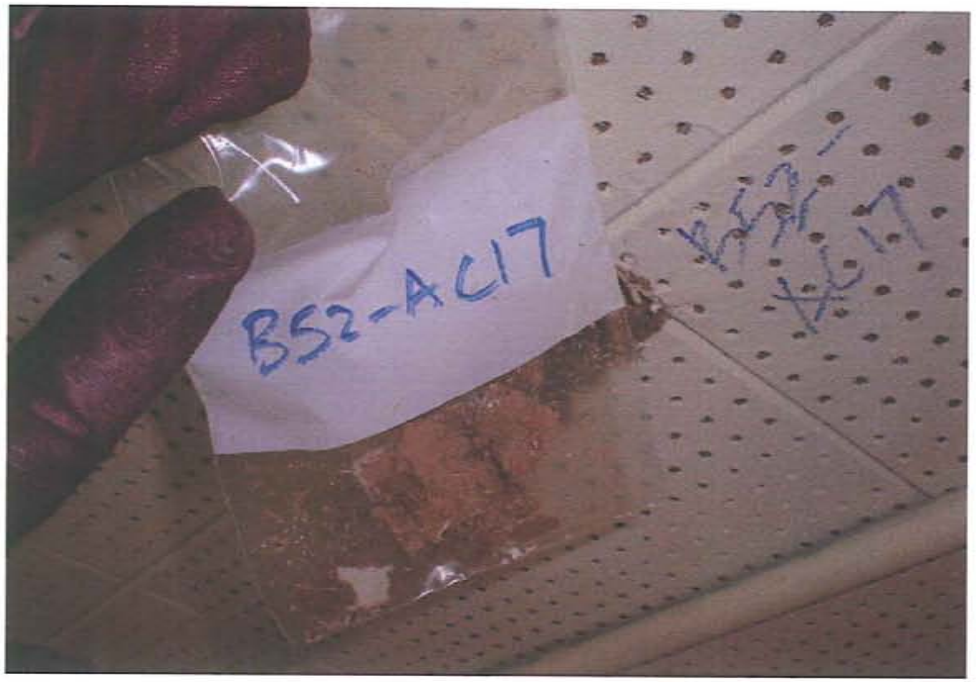
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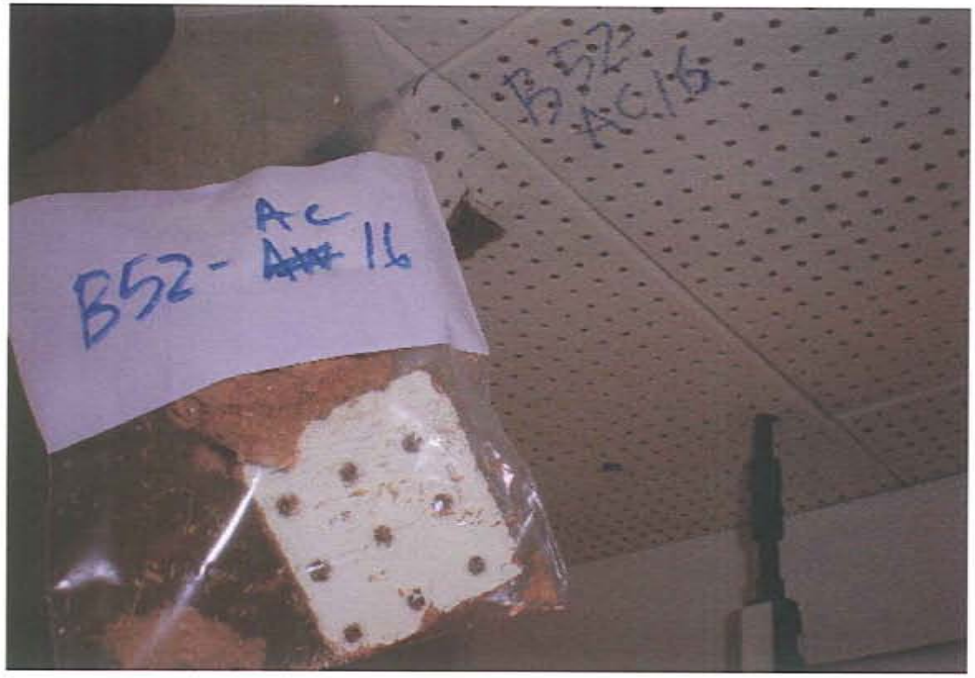
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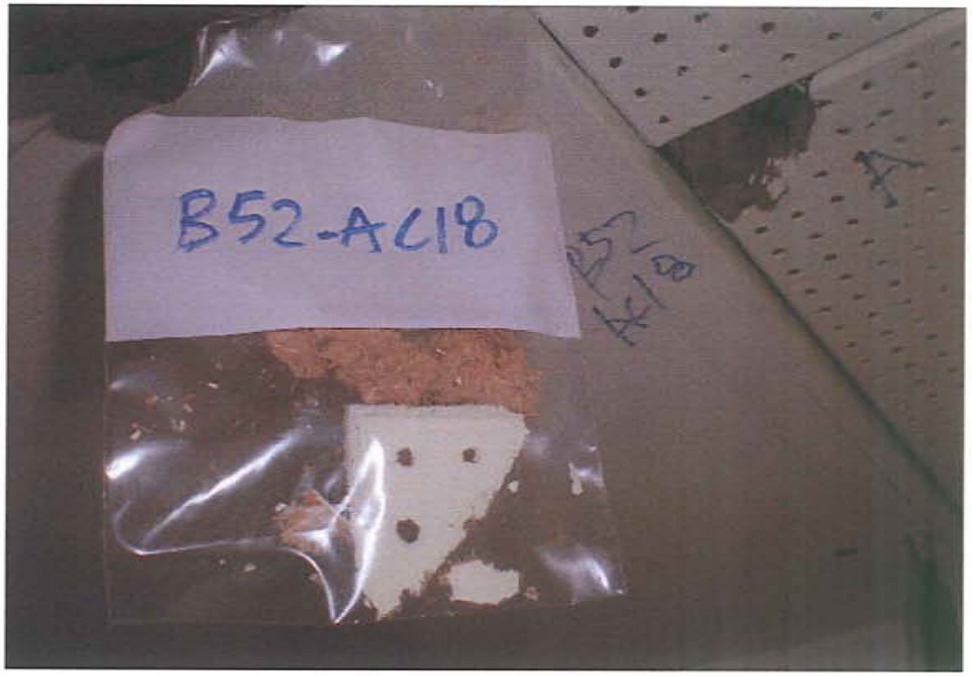
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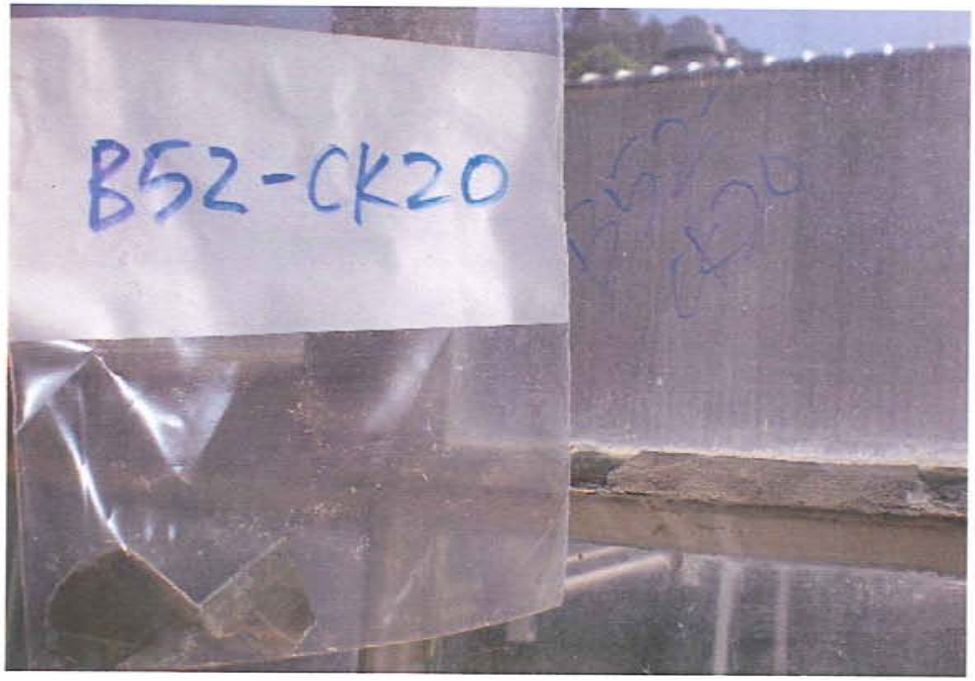
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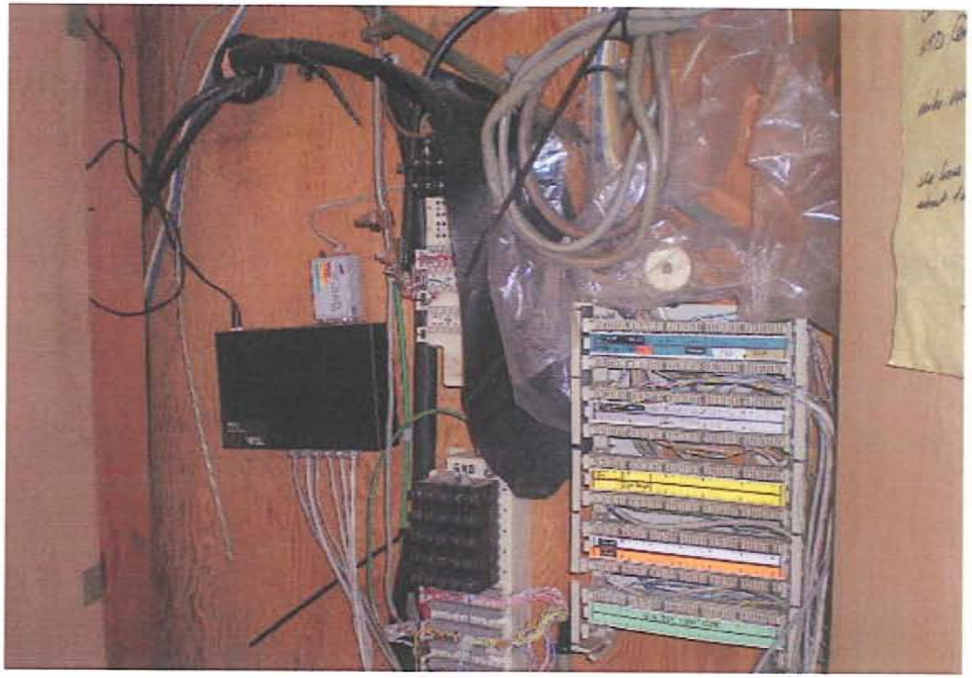

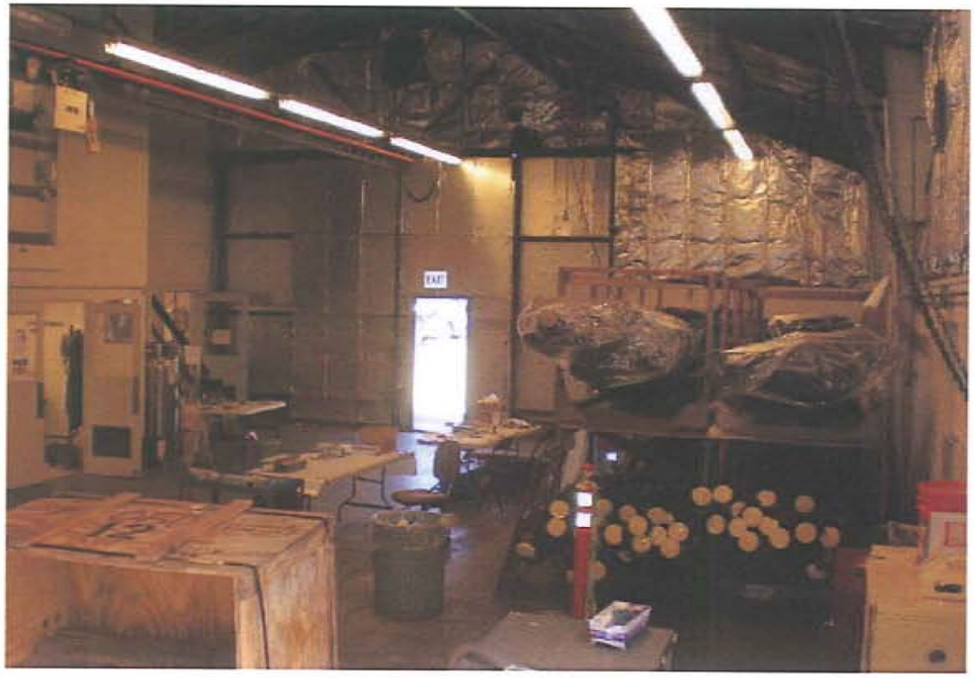

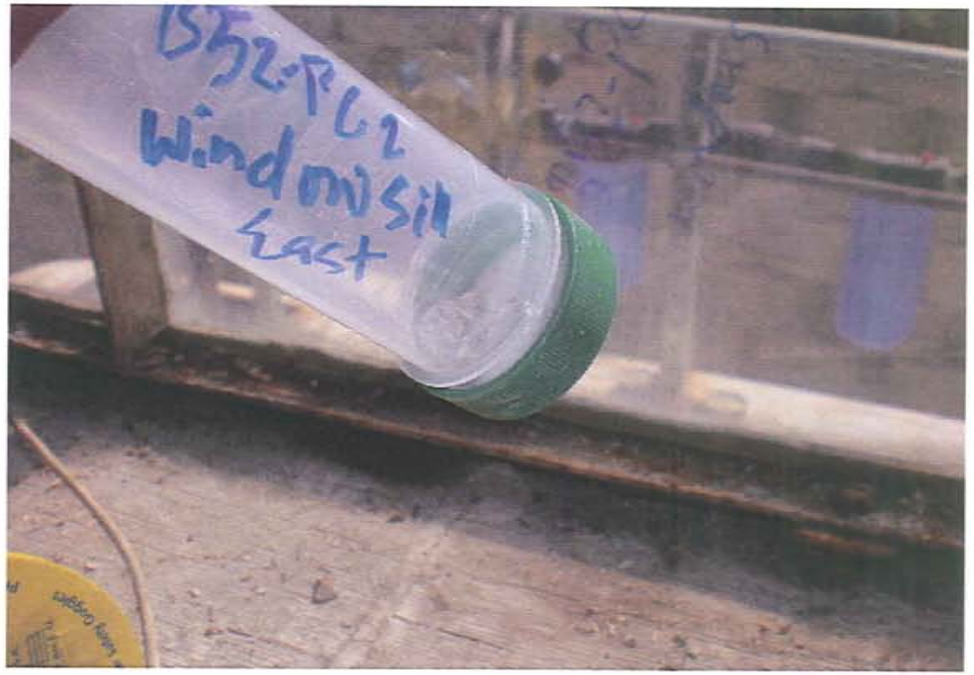
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East

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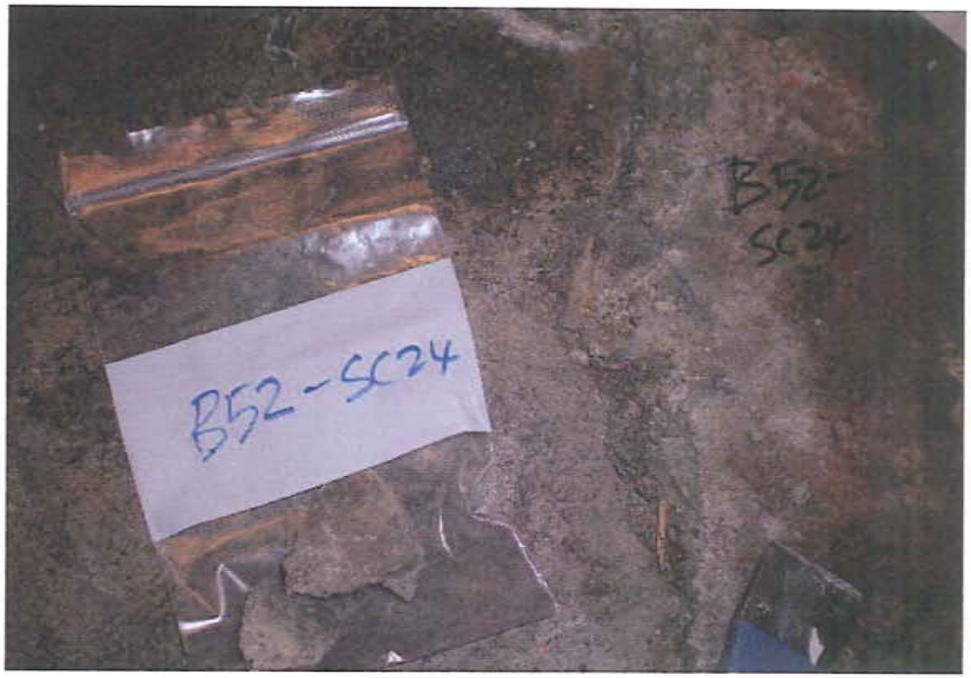
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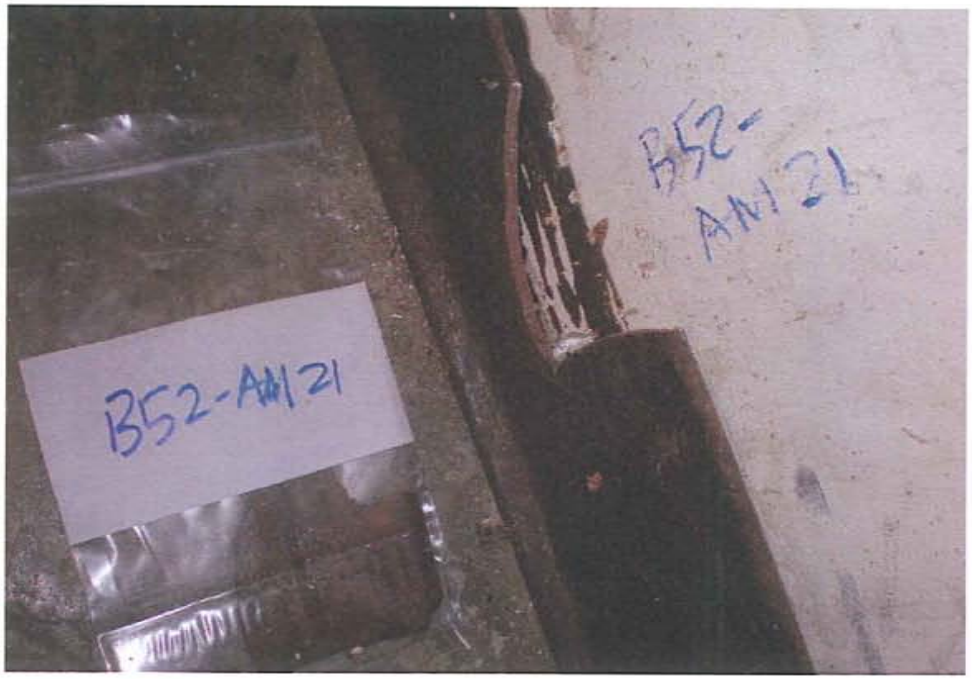
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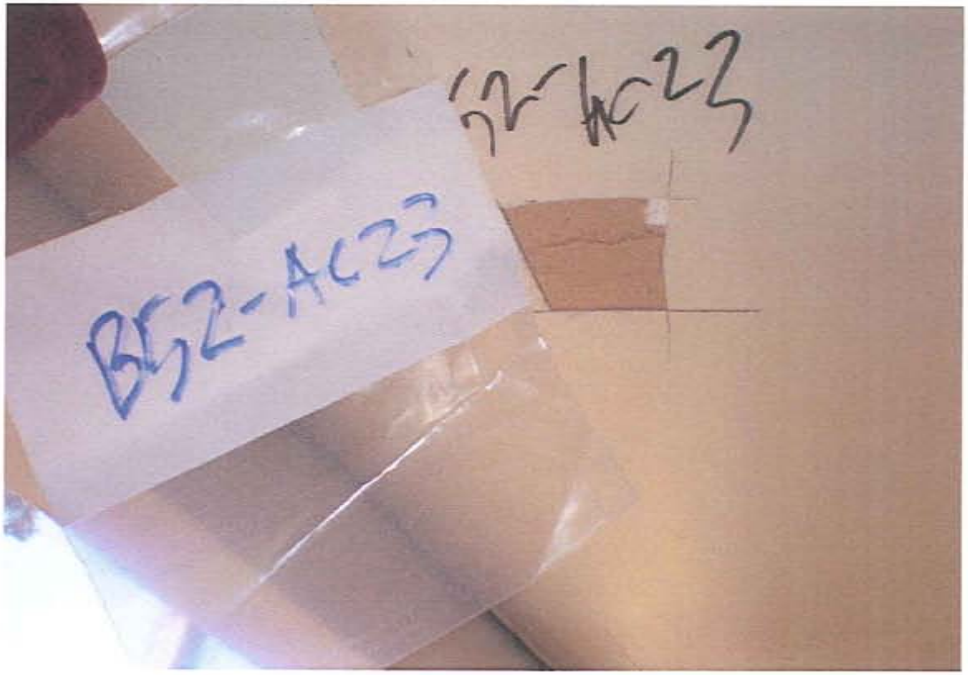
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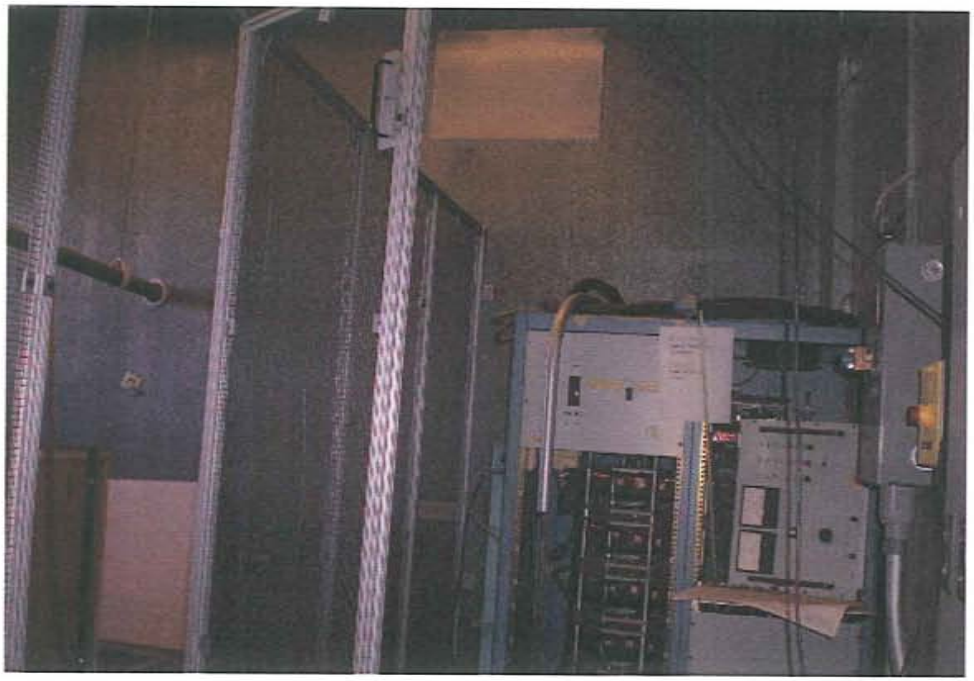
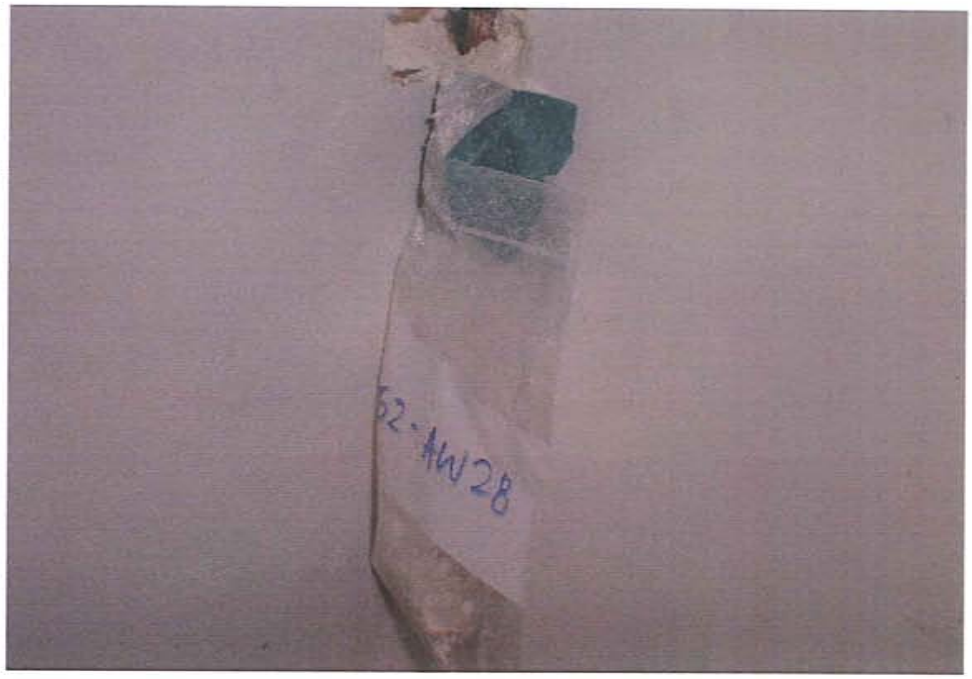
111
NOTICE
TROLLED AREA
Authorized Personnel Only

B52-
AW25
B52-AW25

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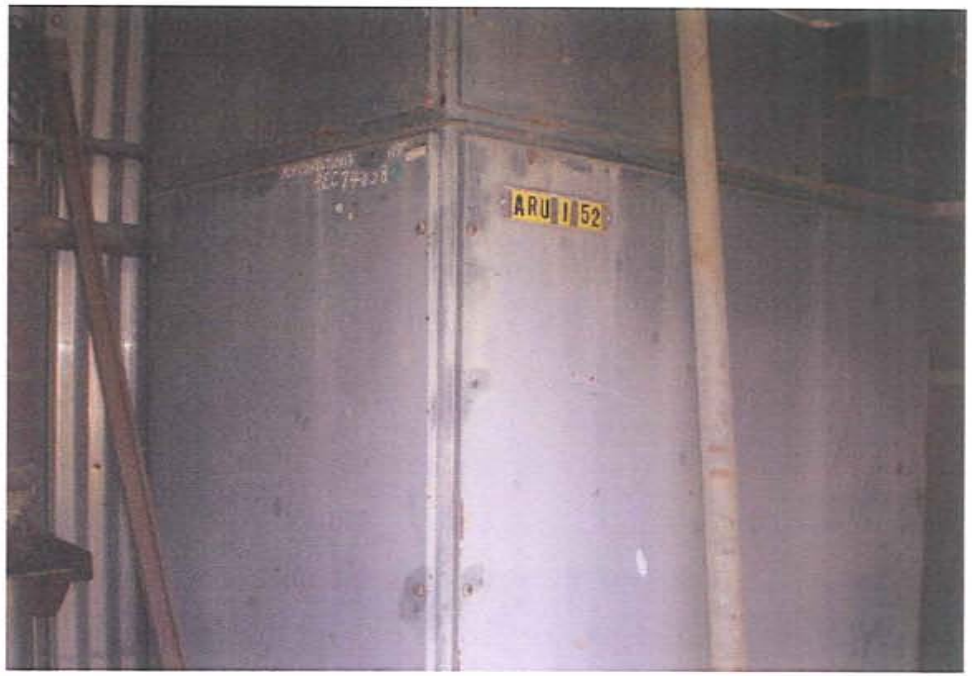
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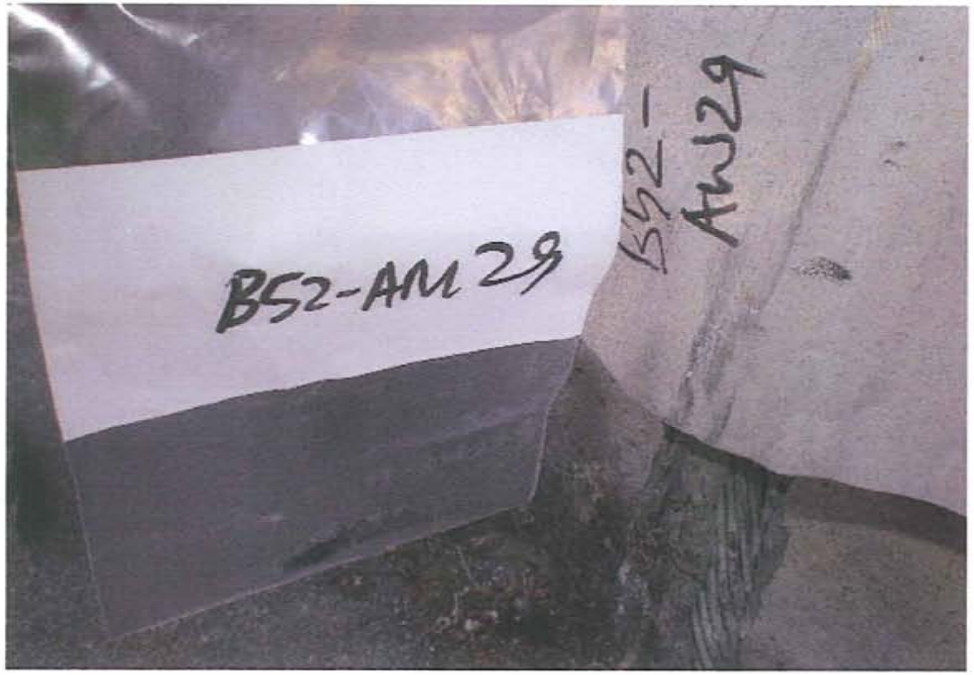
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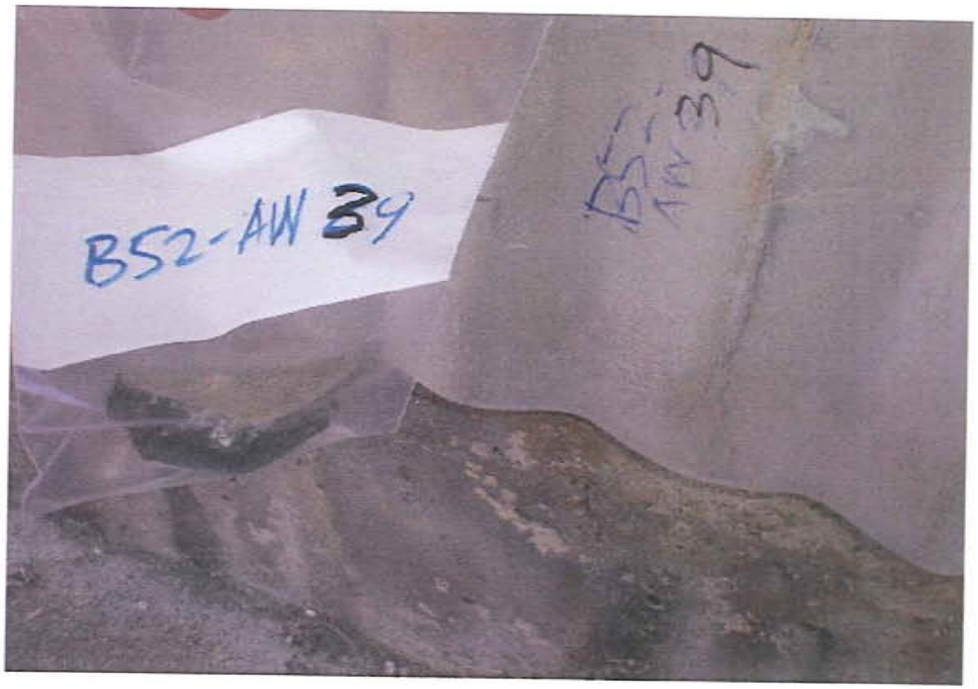
B52-AW 39

A Creative Joint Venture For Better Environmental Solutions

Lawrence Berkeley National Laboratory
Building 52A
One Cyclotron Road
Berkeley, CA 94744

KELLCO-MACS Job #1004-17

NESHAP Compliant Pre-Demolition
Asbestos and Metals in Paint Inspection Report

for

Weiss Associates
5801 Christie Avenue
Suite 600
Emeryville, CA 94608

January 4, 2011
REVISED

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http://www.kellcomacs.com email: mailbox3137@kellcomacs.com

NESHAP Compliant Pre-Demolition
Asbestos and Metals in Paint Inspection Report

Date:	January 4, 2011 - REVISED
KELLCO-MACS Job #:	1004-17
Client:	Ms. Agata Sulczynski Weiss Associates 5801 Christie Avenue Suite 600 Emeryville, CA 94608
Location:	Lawrence Berkeley National Laboratory Building 52A One Cyclotron Road Berkeley, CA 94744
Date of Inspection:	July 10, 13, 20 & 21, 2010 & August 4, 2010
Inspectors:	Siew Yee Lee CAC # 09-4546, CDPH Lead # 19509
Description of the Inspected Area:	This is an asbestos and Heavy Metals inspection on a building 52A on the University of California, Berkeley campus in Berkeley, CA. Building 52A, the "Butler", is a single story multi-unit facility consisting of exterior corrugated metal walls on a concrete foundation. The flooring is constructed of concrete and the roofing contains a metal cap.

Background

This is a NESHAP compliant pre-demolition asbestos and metals inspection report for Building 52A located at LBNL in Berkeley, CA.

Synopsis

Asbestos was found in the following materials:

- **Exterior wall caulking**

Designation of material as asbestos containing should be applied to all homogenous materials of the type and found to contain asbestos.

Fluorescent lights, fluorescent fixture ballasts and thermostats may contain PCB's and mercury.

About the Inspection

The inspection performed was both visual and tactile. Samples were taken of suspect materials located at the interior and exterior of the survey area.

The inspection was limited to those materials readily discerned in a reasonable inspection by a competent inspector. Materials that are hidden within walls, behind structures, in vertical shafts or in areas that make them not readily available to our inspector were not sampled. If future work uncovers any non-sampled materials, these should be submitted for asbestos and/or lead paint analysis.

The following numbering convention was used for this inspection:

LETTER	STANDS FOR	EXAMPLE	MEANING
XX	Building DESIGNATION based on information provided on drawings provided to us prior to inspection	B52A	Building 52 A
Y & *Optional Z*	EITHER building SYSTEM (W: wall; F: Flooring; C: Ceiling; T: TSI; M: Misc) OR Further designation of sample location as Unit # within building	SC	Concrete Sample
		AM	Asbestos Miscellaneous
		CK	Caulk Sample
		AW	Asbestos Wall Sample
		AC	Asbestos Ceiling Sample
		AR	Asbestos Roofing Sample
xx	Sample number and layer	01	First Sample, First Layer
		01a	First Sample, Second Layer
		01b	First Sample, Third Layer

- ***Asbestos Findings***

Asbestos samples were analyzed in the KELLCO-MACS laboratory, by Polarized Light Microscopy, the EPA's recommended method. Copies of the full laboratory reports are attached.

Photographs of sampled materials are included. Sample locations are noted on the attached not-to-scale drawing.

The determination of a material to be Asbestos Containing Material (ACM) was made either by direct sampling or by homogeneity with at least one positive sample of the same material.

Materials that tested **positive** for asbestos are:

Lab sample #	Field Sample #	Field Description	Asbestos %
L206533-4	B52A-CK04	Southwest exterior of building, between wall panel & sidewalk / caulking	3% Chrysotile
L206533-5	B52A-CK05	West exterior of building, between wall panel & sidewalk / caulking	3% Chrysotile

Samples with less than 10% asbestos can be submitted for further analysis by the Point Count method. If the Point Count method determines that the material contains less than 1% asbestos, these materials can be disposed of as non-hazardous asbestos containing construction waste.

Materials for which the analytical results show **no detection** of asbestos are:

Lab Sample #	Field Sample #	Field Description
L206533-1	B52A-SC01	South end of building / concrete floor
L206533-2	B52A-SC02	North end of building / concrete floor
L206533-3	B52A-SC03	Sidewalk, southwest of building / concrete floor
L206533-6	B52A-AW06	Exterior southwest wall of building / paint/wall coating
L206533-7	B52A-AW07	South end of building, wall / insulation

- ***Metals in Paint Findings***

One (1) paint sample was collected and submitted for Heavy Metals analysis to Macs Lab, Inc. using the.

These samples were analyzed using an ICP/MS, Extraction Method SW3050B TTLC and EPA 6010B/3050 method. This method is **not** for the purpose of profiling any waste streams from this project. Profiling of the waste streams (TCLP & STLC) will be the responsibility of the contractor performing the work. The results of the profiling of the waste streams can vary dramatically depending on the means and methods utilized by the contractor during the demolition of the buildings. Care needs to be taken to ensure that all OSHA and EPA rules are abided by. The EPA rules are typically contained within title 22 and the OSHA rules are typically contained within title 8. Please find the following list as guidance; furthermore, it is not intended to be all encompassing but as a starting point for review in regulatory compliance.

Lab Sample #	Field Sample	Field Description
206531	B52A-PC1	Bldg Exterior

52A: Exterior Building

	Lab Sample Number:	206531 -1
	Client Sample Number:	B52A-PC1
	Matrix:	Bulk
	Extraction Type:	Acid
	Units:	mg/kg (PPM)
Sb	Antimony	614.36
As	Arsenic	<0.01
Ba	Barium	2,741.19
Be	Beryllium	6.79
Cd	Cadmium	157.65
Cr	Chromium	1,029.23
Co	Cobalt	113.07
Cu	Copper	956.15
Pb	Lead	12,257.09
Hg	Mercury	331.47
Mo	Molybdenum	224.29
Ni	Nickel	303.91
Se	Selenium	6,754.08
Ag	Silver	15.65
Tl	Thallium	91.14
V	Vanadium	37.83
Zn	Zinc	89,079.97

- ***Other Hazardous Materials***

The building contains light fixtures with fluorescent bulbs and ballasts that may contain PCB's. These should be handled in accordance with regulations.

It is also anticipated that the fluorescent light tubes may contain mercury. If they are to be removed, they should be recycled properly.

PCB's were used to increase flexibility in many construction materials, such as sealants, mastics, window putty, etc. We recommend testing mastic and putty-like materials for PCB's.

Regulatory Requirements

The Environmental Protection Agency (EPA) defines Asbestos Containing Material as any material that contains greater than 1% asbestos. Materials containing greater than 1% asbestos must be removed prior to demolition or renovation if they will be disturbed.

Friable asbestos containing material is any material that can be crushed or pulverized by hand pressure when dry, or materials that can be rendered to a crumbled, pulverized, or powdered state when dry by crushing, sanding, sawing, shot blasting, or through demolition or renovation activities.

As stated by NESHAP regulations, any material that contains less than 10% asbestos using the visual estimation method can be point counted with gravimetric reduction. The Point Counting method is a much more accurate analytical method for determining the percent of asbestos in a particular material. If the Point Count method determines that the material contains less than 1% asbestos, the material being analyzed can be disposed of as a non-hazardous asbestos containing construction waste.

Removal or disturbance of material with any detectable amount of asbestos must be handled in accordance with OSHA regulations. Cal-OSHA registration is required if the material contains more than .1% asbestos ($1/10^{th}$ of a percent). If there is more than 100 feet (linear or square) of an asbestos containing material that will be abated or disturbed, a California State registered and licensed asbestos abatement contractor must perform the work. If there is less than 100 feet, the work does not require a licensed asbestos abatement contractor, but must still conform to Cal-OSHA regulations.

Removal or disturbance of any amount of lead paint requires adherence to the Cal-OSHA and CDPH regulations, including proper training and certification for workers and supervisors

The OSHA lead (1532) regulations require that a Negative Initial Determination for lead exposure be made with paint that contains greater than 0.06% (600 ppm) of lead. Paint with less than 0.06% lead should still be treated within the OSHA guidelines, but with reasonable work practices should not generate OSHA action levels of lead exposure.

Building components with intact lead paint and no other hazardous materials can be disposed of as non-hazardous construction waste. Paint chips and debris must be disposed of as lead containing hazardous waste.

Title 8 OSHA

General Industry Safety Orders deal with exposure limits for personnel working in or around surfaces that contain heavy metals.

Element	Chapter	Group	Article	Section
Antimony (Sb)	7	16	107	5155
Arsenic (As)	7	16	110	5214
Barium (Ba)	7	16	107	5155
Beryllium (Be)	7	16	107	5155
Cadmium (Cd)	7	16	110	5206
Chromium (Cr)	7	16	110	5206
Cobalt (Co)	7	16	110	5155
Copper (Cu)	7	16	110	5155
Lead (Pb)	7	16	109	5198
Mercury (Hg)	7	16	110	5155
Molybdenum (Mo)	7	16	110	5155
Nickel (Ni)	7	16	110	5155
Selenium (Se)	7	16	110	5155
Silver (Ag)	7	16	110	5155
Thallium (Ti)	7	16	110	5155
Vanadium (V)	7	16	110	5155
Zinc (Zn)	7	16	107	5155

Title 22- Hazardous Waste

Title 22 describes the characterization of hazardous waste as described in chapter 11, article 1, section 66261.1. Under the EPA's Resource Conservation and Recovery Act (RCRA), a national program and inventory system about handling hazardous waste, describes the minimum requirements in order to be in compliance with the Federal and/or State regulations.

Comment Regarding All Asbestos Containing Materials:

Asbestos containing materials in good condition do not necessarily need to be removed unless they will be disturbed; they should however be respected.

Employees, contract workers and others should be advised not to drill, saw, scrape or otherwise disturb this material without taking precautionary measures appropriate to asbestos containing material.

Asbestos containing material should be removed prior to the renovation and must be removed prior to demolition.

Comment Regarding All Lead Containing Materials:

Lead is a known health hazard. Lead containing materials in good condition do not necessarily need to be removed if they are not disturbed; they should however be respected.

Painted surfaces that contain lead should be made known to contractors who may disturb them during their work. OSHA guidelines for workers in contact with lead paint apply if ANY detectable lead is found.

Anyone coming in contact with leaded paint should be advised not to disturb it without taking precautionary measures appropriate to avoid lead contamination or lead exposure.

Areas Needing Immediate Corrective Action

Asbestos (in any condition) and chipping and peeling lead paint should be removed prior to renovation and must be removed prior to demolition of the survey site.

Analytical Procedures

- ***POLARIZED LIGHT MICROSCOPY (PLM)***

  Bulk samples were analyzed in accordance with U.S. EPA "Test Method for Determination of Asbestos in Bulk Building Materials, 1993," with inclusion of area percent estimates of the sample components. The use of the McCrone Color Dispersion Staining Technique supplements the analysis when considered useful by the analyst. The samples are prepared with refractive immersion oil and are examined under Polarized Light Microscopy (PLM). The accuracy of the visual estimate method is 1%.

  As per the standard "...The accuracy in the determination of the presence or absence of asbestos of greater than 1 area percent asbestos is greater than 99%." ASTM Committee D22.05, 1/18/88, Standard *Method of Testing for Asbestos Containing Materials by Polarized Light Microscopy*. If the sample matrix is reduced to minimize non-asbestos components, the detection limit can be mathematically enhanced, based on the amount of material remaining after matrix reduction. This method is called gravimetric reduction. This method involves ashing and chemical dissolution of the sample.

- ***POINT COUNTING***

  The Point Counting method is a much more accurate analytical method for determining the percent of asbestos in a particular material. KELLCO-MACS uses a muffle furnace to ash the sample and remove organic compounds. Hydrochloric acid is used to dissolve some of the non-asbestos minerals. Under this method a minimum of 125 points are counted from each of 8 different slide preparations of the same sample (total of 1000 points min.)

If the **Point Count Method** determines that the material contains less than 1% asbestos, the material being analyzed can be treated as non-hazardous asbestos containing construction waste**.** **Note: ONLY the Point Count Method can be used for this determination.**

- ***ATOMIC ABSORPTION FOR LEAD***

Paint samples were collected for atomic absorption (AA) analysis. The detection limit for each sample depends upon many factors including the sensitivity of the instrument and the sample size. In the KELLCO-MACS laboratory utilizing flame AA, the detection limit is normally .01% or 100 parts per million (ppm).

- ***CAM 17 TESTING***

  CAM 17 Metals were tested by Macs Lab, Inc. using ICP-MS, Extraction Method SW3050B and Analytical Method 6010B/3050.

KELLCO-MACS Qualifications

KELLCO-MACS is a joint venture offering hazardous materials and AIHA laboratory analyses. Our credentials include:

- The KELLCO-MACS asbestos inspector is licensed with the State of California Department of Occupational Safety and Health (CAL-OSHA).

- The KELLCO-MACS lead inspector is licensed by the California Department of Public Health (CDPH)

- The laboratory accreditations include:

  - **NVLAP PLM** for Asbestos: NIST National Voluntary Laboratory Accreditation Program certificate of accreditation for bulk **asbestos** analysis by polarized light microscopy (Accreditation #101948-1).
  - **AIHA** Accreditation for **Industrial Hygiene** Analytical Laboratory for PCM, and AA for lead (Accreditation #101786).
  - **AIHA Analyst Proficiency (NIOSH PAT)** (Accreditation # 11172)
  - **AIHA ELLAP** Accreditation for Lead: Accreditation for the **Environmental Lead** Laboratory recognized by the EPA as meeting the requirements of the National Lead Laboratory Accreditation Program established under Title X (Lab ID #11109).
  - **ELAP PLM** for Asbestos: California Department of Health Services, Environmental Laboratory Accreditation Program, certificate for bulk asbestos analysis (Certificate #2027)
  - **USDA Soil** permit #39484

The following supporting documents are attached to this report:

- Laboratory analytical reports
- Photographs of sample locations

- Floor plan or sketch showing sample locations

Please call KELLCO if there are any questions and/or clarifications regarding this report. We look forward to working with you in the future.

Sincerely,

KELLCO-MACS

Tim C. Cannard CAC #94-1395, CDPH Lead #764
Senior Project Manager

Asbestos Definitions and Classifications

ACM	(Asbestos Containing Material) - Material containing more than 1% asbestos. ACM must be disposed as hazardous waste. Note: Federal OSHA and Cal-OSHA control materials containing any amount of asbestos.
ACBM	(Asbestos Containing Building Material) – AHERA/ASHARA term for material containing more than 1% asbestos in or on interior structural members or other structural components. Exceptions: Covered walkways, porticos and exterior HVAC TSI.
ACCM	(Asbestos Containing Construction Material) – California term for a manufactured construction material containing greater than .1% (one tenth of one percent) asbestos.
PACM	(Presumed Asbestos Containing Material) OSHA considers all TSI and surfacing materials installed prior to1980 to be ACM unless proven otherwise.
Friable	Asbestos Containing Material that can be crumbled pulverized or reduced to powder by hand pressure when dry.
NOA	Naturally Occurring Asbestos. CARB defines as having >.25% by point counting.

Categories of Asbestos Used BY EPA AHERA/ASHARA and OSHA/Cal-OSHA

TSI	(Thermal System Insulation) - "Thermal system insulation (TSI)" means ACM applied to pipes, fittings, boilers, breeching, tanks, ducts or other structural components to prevent heat loss or gain. "Thermal system insulation ACM" is thermal system insulation which contains more than 1% asbestos.
SURFACING (usually mixed on site at time of application)	"Surfacing material" means material that is sprayed, troweled-on or otherwise applied to surfaces (such as acoustical plaster on ceilings and fireproofing materials on structural members, or other materials on surfaces for acoustical, fireproofing, and other purposes). "Surfacing ACM" means surfacing material which contains more than 1% asbestos. NOTE: OSHA/Cal-OSHA do not classify taping mud, floor tile mastic, stucco, leveling compound, and hard wall plasters or wall texturing as surfacing.
MISC.	All other ACM, including classify taping mud, floor tile mastic, stucco, leveling compound, and hard wall plasters or wall texturing as surfacing.

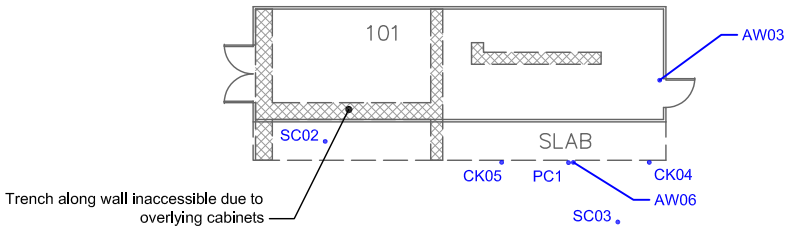
NESHAPS Categories for Asbestos (used by Air Quality Management Districts)

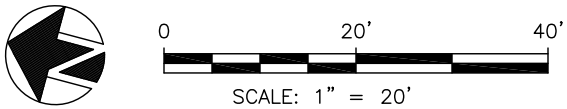
Category I	Cat I Non-friable Asbestos Containing Material refers to asbestos containing packing, gaskets, resilient floor covering, Galbestos, and asphalt roofing products containing more than 1% asbestos.
Category II	Cat II Non-friable Asbestos-Containing Material is any material that is not Cat I that contains greater than 1% asbestos.
RACM	"Regulated Asbestos-Containing Material." – Friable asbestos material (ACM) or a Category I non-friable ACM that has become friable OR a 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 reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations. RACM should be removed prior to renovation or demolition.

Characterization of Asbestos Containing Materials

Material	Estimated Quantity	TSI	Surfacing	Misc	RACM	Cat I	Cat II
Building 52A							
Exterior wall caulking	~ 30 sq. ft.			X			X

B52A





L:\LBNL.178\Old Town Demolition\Sample Location Maps\Kellco Maps\SLM_Kellco_B52A.dwg

ABBREVIATIONS

AW	Asbestos wall sample
CK	Caulk sample
PC	Paint sample
SC	Concrete sample

NOTE:

All sample locations are approximate

MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Method: EPA-600/M4-82-020

KELLCO Services
3137 Diablo Ave

Hayward CA 94545

Person to contact: Tim Cannard
Contact phone: 510-786-9751
FAX phone: 510-786-9625
Sampled by: Siew Yee Lee
Sampled on: July 20, 2010
Analyzed on: July 27, 2010 at: 07:35
Corresponding invoice number: 206533

Analyst: JPL (signature)

Laboratory manager: (signature)

Job Number: 1004-17

Job Description: Lawrence Berkeley National Laboratory - Building 52A - One Cyclotro Road, Berkeley, CA 94744

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206533-1	B52A-SC01 South end of building / concrete floor	**N.D.**	< 1% Cellulose	Gray concrete. Balance of sample is unspecified non-fibrous material.
L206533-2	B52A-SC02 North end of building / concrete floor	**N.D.**	< 1% Cellulose	Gray concrete. Balance of sample is unspecified non-fibrous material.
L206533-3	B52A-SC03 Sidewalk, southwest of building / concrete floor	**N.D.**	< 1% Cellulose	Gray concrete. Balance of sample is unspecified non-fibrous material.
L206533-4	B52A-CK04 Southwest exterior of building, between wall panel & sidewalk / caulking	**Yes**	3% Chrysotile* < 1% Cellulose	Black caulking. Balance of sample is unspecified non-fibrous material.
L206533-5	B52A-CK05 West exterior of building, between wall panel & sidewalk / caulking	**Yes**	3% Chrysotile* < 1% Cellulose	Black caulking. Balance of sample is unspecified non-fibrous material.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

NVLAP Lab Code 101948-0

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MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206533-6	B52A-AW06 Exterior southwest wall of building / paint/wall coating	**N.D.**	No Fibers	Gray coating. Balance of sample is unspecified non-fibrous material.
L206533-7	B52A-AW07 South end of building, wall / insulation	**N.D.**	75% Fiberglass	Yellow insulation. Balance of sample is unspecified non-fibrous material.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

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NVLAP®
NVLAP Lab Code 101948-0

MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

QA Report

Method: EPA-600/M

KELLCO Services
3137 Diablo Ave

Hayward CA 94545

Laboratory manager: _____ (signature)

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
Blank sample		**N.D.**	No fibers	
		PC*		
L206533-2	B52A-SC02	**N.D.**	< 1% Cellulose	Concrete. Balance of sample is unspecified non-fibrous material.
North end of building / concrete floor				

End of report.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

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NVLAP Lab Code 101948-0

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CLIENT	JOBSITE
Weiss Associates 5801 Christie Avenue 600 Emeryville CA 94608	Lawrence Berkeley National Laboratory One Cyclotron Road Bldg 52A Berkeley CA 94744

KELLCO-MACS JOB#: **1004-17** LAB LOGIN # L206533

COLLECTED BY: Siew Yee Lee

COLLECTED DATE 7/20/2010

TURN AROUND TIME: 4 8 24 48 5-DAY

RESULTS NEEDED BY

CIRCLE TYPE OF BULK ANALYSIS

PLM **LEAD PAINT** **LEAD WIPE** **NON VIABLE MOLD** **VIABLE MOLD** **eCOLI** **OTHER** _____

SAMPLES REC'D _____ ANALYZE TO FIRST POSITIVE YES NO

REPORT RESULTS TO PROJECT MANAGER: Tim Cannard

NOTES & COMMENTS:

CHAIN OF CUSTODY & SAMPLE SUBMITAL FORM PAGE_____ OF _____

KELLCO-MACS JOB#: **1004-17**
Lawrence Berkeley National Laboratory

FIELD NUMBER	LOCATION (bldg, rm#, area)	COLOR	MATERIAL or SUBSTRATE (ft.w/size, mastic, tjc, etc.)	NOTES: Like condition, damage, quantity, inside what, beneath what, direction in building (N,S,E,W) etc.)
B52A-SC-01	South end of Bldg.		concrete floor	
-SC02	North end of Bldg.		concrete floor	
-SC03	Sidewalk, SW of Bldg		" "	
-CK04	SW exterior of Bldg, Between wall panel & sidewalk		caulking.	
-CK05	West exterior of Bldg, Between wall panel & sidewalk			
-AW06	Exterior SW wall of Bldg,		paint/wall coating	
-AW07	South end of Bldg, wall		insulation.	

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
[illegible]	7/26/10	0755	D. K[illegible]	07/26/10	0755

MACS Lab Incorporated
Analytical and Environmental Services
3137 Diablo Avenue, Hayward, Ca 94545-2701 (510) 786-9751 * (510) 786-9625 Fax * www.macslab.com

CAM-17 Bulk Materials Analysis Report - Method: EPA 6010B/3050

KELLCO Services
3137 Diablo Avenue
Hayward, CA 94545

Contact: Tim Cannard
Phone: (510) 786-9751
Email: mailbox3137@kellcomacs.com
Job #: 1004-17

Laboratory Number: 206531
Sampled By: Siew Yee Lee
Sampled On: July 20, 2010
Submitted On: July 26, 2010
Analyzed On: August 3, 2010
Reported On: August 4, 2010
SOP: CAM17
Sample Type: Bulk

Job Description: Lawrence Berkeley National Laboratory-Building 52A-One Cycloto Road, Berkeley, CA 94744

	Lab Sample Number:	206531 -1				
	Client Sample Number:	B52A-PC1				
	Matrix:	Bulk				
	Extraction Type:	Acid				
	Units:	mg/kg (PPM)				
Sb	Antimony	614.36				
As	Arsenic	<0.01				
Ba	Barium	2,741.19				
Be	Beryllium	6.79				
Cd	Cadmium	157.65				
Cr	Chromium	1,029.23				
Co	Cobalt	113.07				
Cu	Copper	956.15				
Pb	Lead	12,257.09				
Hg	Mercury	331.47				
Mo	Molybdenum	224.29				
Ni	Nickel	303.91				
Se	Selenium	6,754.08				
Ag	Silver	15.65				
Tl	Thallium	91.14				
V	Vanadium	37.83				
Zn	Zinc	89,079.97				

Analyst: _____ (Signature)

Laboratory Manager: _____ (Signature)

NOTICE

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CLIENT	JOBSITE
Weiss Associates 5801 Christie Avenue 600 Emeryville CA 94608	Lawrence Berkeley National Laboratory One Cyclotron Road Berkeley CA 94744

KELLCO-MACS JOB#: **1004-17** LAB LOGIN # I 206531

COLLECTED BY: Steve Yeeles

COLLECTED DATE 7/20/2010

TURN AROUND TIME: 4 8 24 48 5-DAY

RESULTS NEEDED BY

CIRCLE TYPE OF BULK ANALYSIS

PLM ~~LEAD PAINT~~ LEAD WIPE NON VIABLE MOLD VIABLE MOLD eCOLI OTHER CAM17

SAMPLES REC'D _____ ANALYZE TO FIRST POSITIVE YES NO

REPORT RESULTS TO PROJECT MANAGER: Tim Cannard

NOTES & COMMENTS:

CHAIN OF CUSTODY & SAMPLE SUBMITAL FORM PAGE____ OF ____

KELLCO-MACS JOB#: **1004-17**
Lawrence Berkeley National Laboratory

FIELD NUMBER	LOCATION (bldg, rm#, area)	COLOR	MATERIAL or SUBSTRATE (ft w/ size, mastic, tjc, etc.)	NOTES: Like condition, damage, quantity, inside what, beneath what?, direction in building (N,S,E,W) etc.)
B52A-PC1	Bldg exterior		paint chip composite	

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
[illegible]	7/26/10	0755	[illegible]	07/26/10	0755

PHOTOGRAPHS

Photographs containing no sample identification number are included for reference of the general sample locations.

3137 Diablo Avenue • Hayward, CA 94545-2701 • (510) 786-9751 • fax (510) 786-9625
http://www.kellcomacs.com email: mailbox3137@kellcomacs.com

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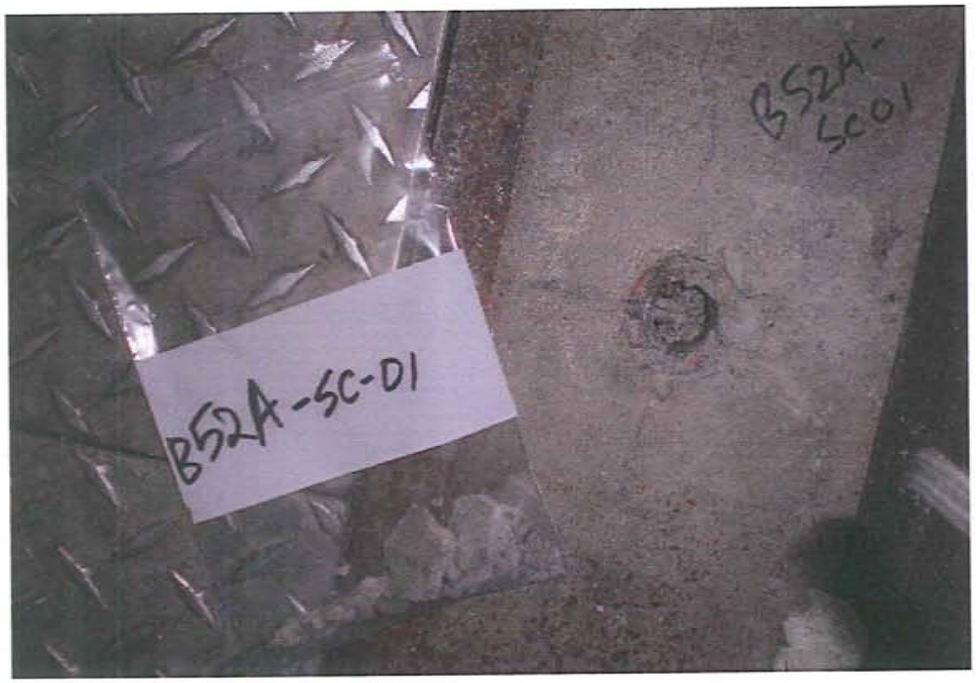
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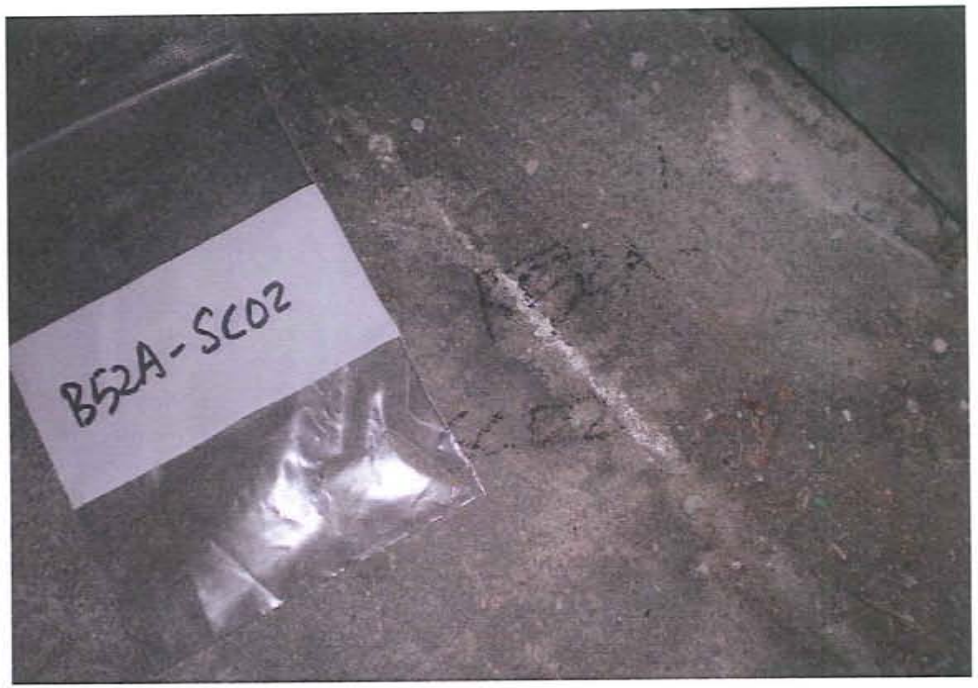
B52A-SC01

Lawrence Road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B52A-SC

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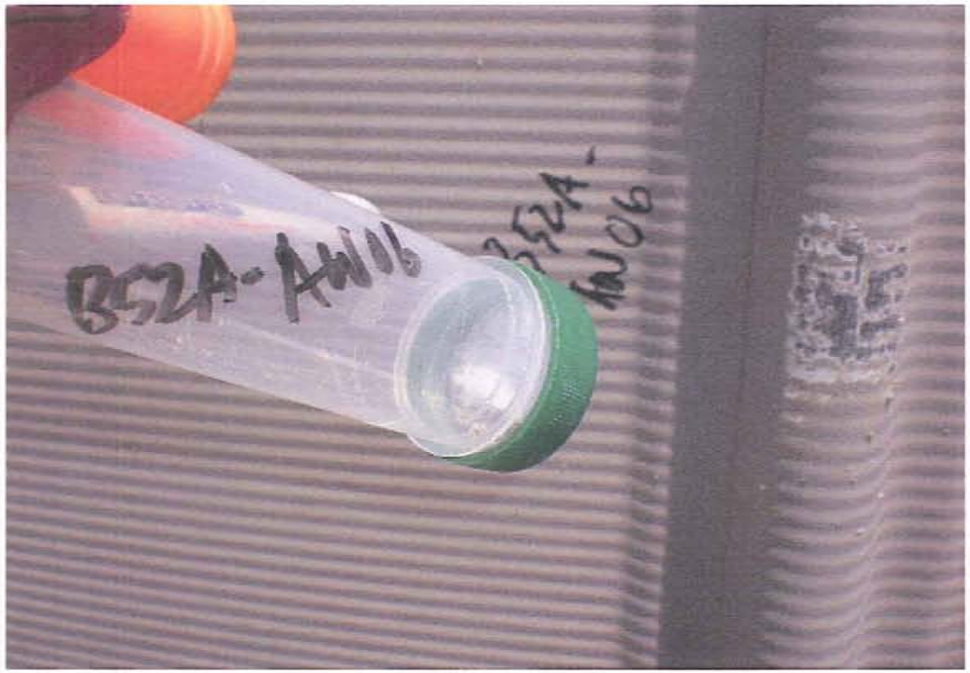
PC1

B52A-CK04
B52A
CK04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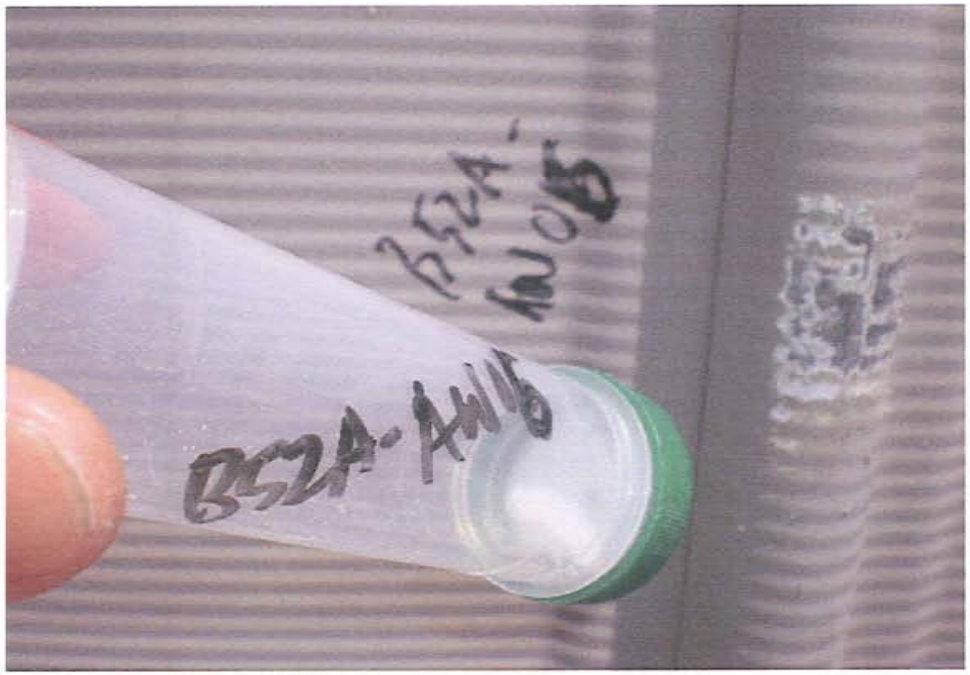
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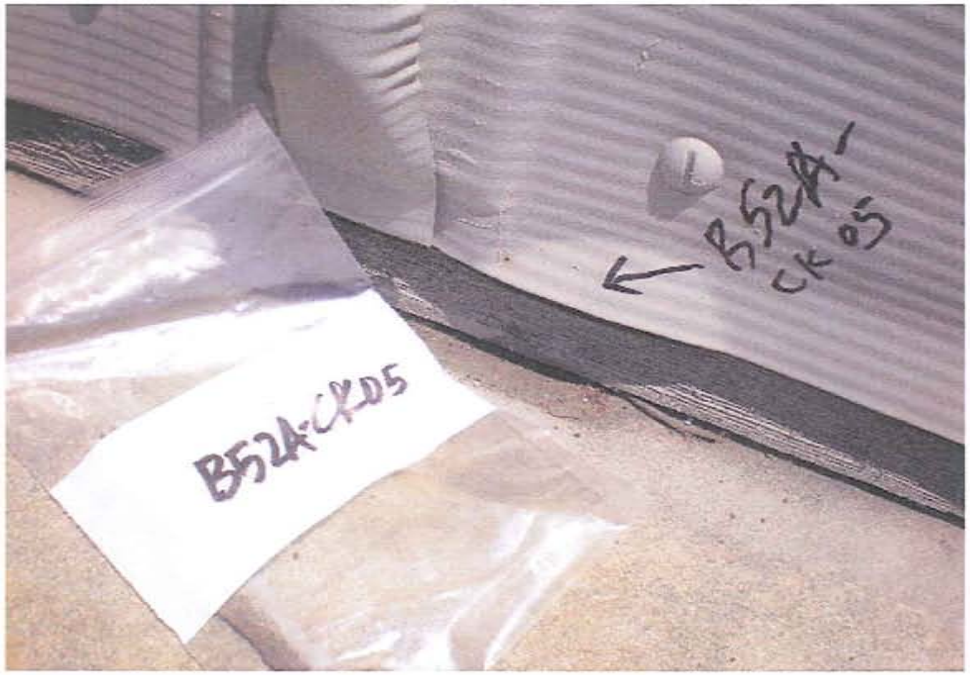
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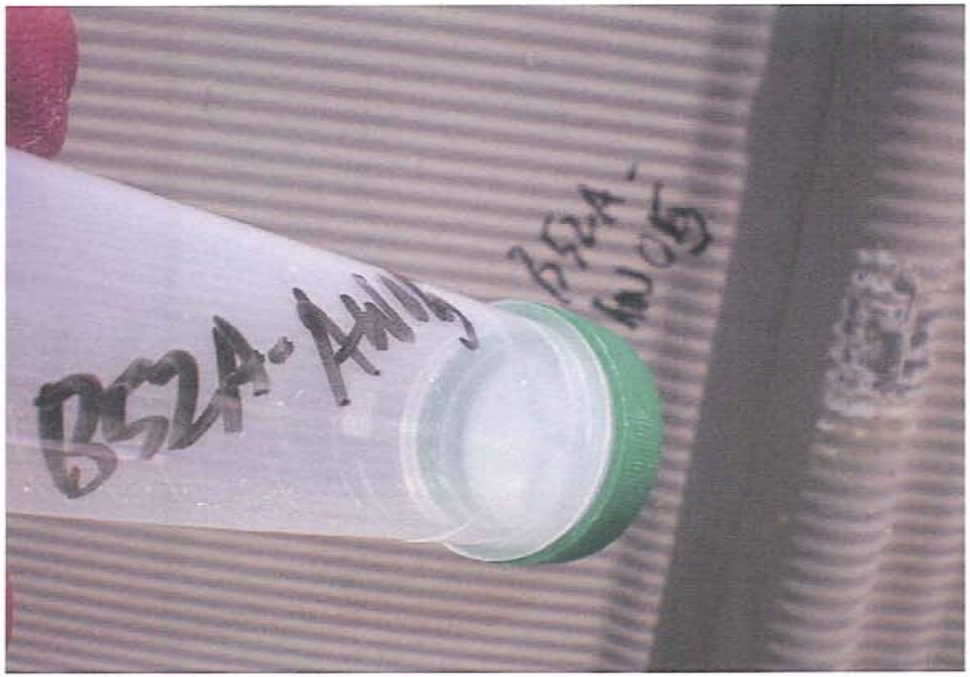
B52A-AW05
B52A-
AW05

A Creative Joint Venture For Better Environmental Solutions

Lawrence Berkeley National Laboratory
Gardener Shed
One Cyclotron Road
Berkeley, CA 94744

KELLCO-MACS Job #1004-17

NESHAP Compliant Pre-Demolition
Asbestos and Metals in Paint Inspection Report

for

Weiss Associates
5801 Christie Avenue
Suite 600
Emeryville, CA 94608

August 9, 2010

3137 Diablo Avenue • Hayward, CA 94545-2701• (510) 786-9751 • fax (510) 786-9625
http://www.kellcomacs.com email: mailbox3137@kellcomacs.com

A Creative Joint Venture For Better Environmental Solutions

NESHAP Compliant Pre-Demolition
Asbestos and Metals in Paint Inspection Report

Date:	August 9, 2010
KELLCO-MACS Job #:	1004-17
Client:	Ms. Agata Sulczynski Weiss Associates 5801 Christie Avenue Suite 600 Emeryville, CA 94608
Location:	Lawrence Berkeley National Laboratory Gardener Shed One Cyclotron Road Berkeley, CA 94744
Date of Inspection:	July 22, 2010
Inspectors:	Siew Yee Lee CAC # 09-4546, CDPH Lead # 19509
Description of the Inspected Area:	This is an asbestos and Heavy Metals inspection on the gardener shed on the University of California, Berkeley campus in Berkeley, CA. The gardener shed is constructed of a wooden structure on a wooden foundation of approximately 50 sq/ft. The roof is an elastomeric style roof and the flooring is composed of wood.

Background

This is a NESHAP compliant pre-demolition asbestos and metals inspection report for the Gardener Shed located at LBNL in Berkeley, CA.

Synopsis

Asbestos was found in the following materials:

- Roof and roof coating

Designation of material as asbestos containing should be applied to all homogenous material of the type analyzed and found to contain asbestos.

About the Inspection

The inspection performed was both visual and tactile. Samples were taken of suspect materials located at the exterior of the survey area.

The inspection was limited to those materials readily discerned in a reasonable inspection by a competent inspector. Materials that are hidden within walls, behind structures, in vertical shafts or in areas that make them not readily available to our inspector were not sampled. If future work uncovers any non-sampled materials, these should be submitted for asbestos and/or lead paint analysis.

The following numbering convention was used for this inspection:

LETTER	STANDS FOR	EXAMPLE	MEANING
XX	Building DESIGNATION based on information provided on drawings provided to us prior to inspection	Gardener	Gardener Shed
Y & *Optional Z*	EITHER building SYSTEM (W: wall; F: Flooring; C: Ceiling; T: TSI; M: Misc)	AR	Asbestos Roofing Sample
xx	Sample number and layer	01 02	First Sample, First Layer Second Sample, Second Layer

- ***Asbestos Findings***

Asbestos samples were analyzed in the KELLCO-MACS laboratory, by Polarized Light Microscopy, the EPA's recommended method. Copies of the full laboratory reports are attached.

Photographs of sampled materials are included. Sample locations are noted on the attached not-to-scale drawing.

The determination of a material to be Asbestos Containing Material (ACM) was made either by direct sampling or by homogeneity with at least one positive sample of the same material.

Materials that tested **positive** for asbestos are:

Lab Sample #	Field Sample #	Field Description	Asbestos %
L206532-1	Gardener-AR-01	Southeast end of roof / roof coating	10% Chrysotile

Lab Sample #	Field Sample #	Field Description	Asbestos %
L206532-2	Gardener-AR-02	Northeast end of roof / roof coating	10% Chrysotile

Samples with less than 10% asbestos can be submitted for further analysis by the Point Count method. If the Point Count method determines that the material contains less than 1% asbestos, these materials can be disposed of as non-hazardous asbestos containing construction waste.

Materials for which the analytical results show **no detection** of asbestos are: **None**

- ***Metals in Paint Findings***

One (1) paint sample was collected and submitted for CAM 17 Heavy Metals analysis to Macs Lab, Inc.

The sample was analyzed using an ICP/MS, Extraction Method SW3050B TTLC and EPA 6010B/3050 method. This method is **not** for the purpose of profiling any waste streams from this project. Profiling of the waste streams (TCLP & STLC) will be the responsibility of the contractor performing the work. The results of the profiling of the waste streams can vary dramatically depend on the means and methods utilized by the contractor during the demolition of the buildings. Care needs to be taken to ensure that all OSHA and EPA rules are abided by. The EPA rules are typically contained within title 22 and the OSHA rules are typically contained within title 8. Please find the following list as guidance; furthermore, it is not intended to be all encompassing but as a starting point
for review in regulatory compliance.

Lab Sample #	Field Sample	Field Description
206529-1	Gardener-PC1	Paint chip composite

Gardener Shed

	Lab Sample Number:	206529 -1
	Client Sample Number:	Gardener-PC1
	Matrix:	Bulk
	Extraction Type:	Acid
	Units:	mg/kg (PPM)
Sb	Antimony	259.36
As	Arsenic	<0.01
Ba	Barium	36,158.91
Be	Beryllium	2.40
Cd	Cadmium	74.87
Cr	Chromium	1,592.36
Co	Cobalt	406.38
Cu	Copper	510.88
Pb	Lead	64,195.34
Hg	Mercury	105.09
Mo	Molybdenum	112.12
Ni	Nickel	110.88
Se	Selenium	4,299.09
Ag	Silver	9.03
Tl	Thallium	109.26
V	Vanadium	78.19
Zn	Zinc	48,633.60

Regulatory Requirements

The Environmental Protection Agency (EPA) defines Asbestos Containing Material as any material that contains greater than 1% asbestos. Materials containing greater than 1% asbestos must be removed prior to demolition or renovation if they will be disturbed.

Friable asbestos containing material is any material that can be crushed or pulverized by hand pressure when dry, or materials that can be rendered to a crumbled, pulverized, or powdered state when dry by crushing, sanding, sawing, shot blasting, or through demolition or renovation activities.

As stated by NESHAP regulations, any material that contains less than 10% asbestos using the visual estimation method can be point counted with gravimetric reduction. The Point Counting method is a much more accurate analytical method for determining the percent of asbestos in a particular material. If the Point Count method determines that the material contains less than 1% asbestos, the material being analyzed can be disposed of as a non-hazardous asbestos containing construction waste.

Removal or disturbance of material with any detectable amount of asbestos must be handled in accordance with OSHA regulations. Cal-OSHA registration is required if the material contains more than .1% asbestos ($1/10^{th}$ of a percent). If there is more than 100 feet (linear or square) of an asbestos containing material that will be abated or disturbed, a California State registered and licensed asbestos abatement contractor must perform the work. If there is less than 100 feet, the work does not require a licensed asbestos abatement contractor, but must still conform to Cal-OSHA regulations.

Title 8 OSHA

General Industry Safety Orders deal with exposure limits for personnel working in or around surfaces that contain heavy metals.

Element	Chapter	Group	Article	Section
Antimony (Sb)	7	16	107	5155
Arsenic (As)	7	16	110	5214
Barium (Ba)	7	16	107	5155
Beryllium (Be)	7	16	107	5155
Cadmium (Cd)	7	16	110	5206
Chromium (Cr)	7	16	110	5206
Cobalt (Co)	7	16	110	5155
Copper (Cu)	7	16	110	5155
Lead (Pb)	7	16	109	5198
Mercury (Hg)	7	16	110	5155
Molybdenum (Mo)	7	16	110	5155
Nickel (Ni)	7	16	110	5155
Selenium (Se)	7	16	110	5155

Element	Chapter	Group	Article	Section
Silver (Ag)	7	16	110	5155
Thallium (Ti)	7	16	110	5155
Vanadium (V)	7	16	110	5155
Zinc (Zn)	7	16	107	5155

Title 22- Hazardous Waste

Title 22 describes the characterization of hazardous waste as described in chapter 11, article 1, section 66261.1. Under the EPA's Resource Conservation and Recovery Act (RCRA), a national program and inventory system about handling hazardous waste, describes the minimum requirements in order to be in compliance with the Federal and/or State regulations.

Comment Regarding All Asbestos Containing Materials:

Asbestos containing materials in good condition do not necessarily need to be removed unless they will be disturbed; they should however be respected.

Employees, contract workers and others should be advised not to drill, saw, scrape or otherwise disturb this material without taking precautionary measures appropriate to asbestos containing material.

Asbestos containing material should be removed prior to the renovation and must be removed prior to demolition.

Areas Needing Immediate Corrective Action

Asbestos (in any condition) should be removed prior to renovation and must be removed prior to demolition of the survey site.

Analytical Procedures

- ***POLARIZED LIGHT MICROSCOPY (PLM)***

  Bulk samples were analyzed in accordance with U.S. EPA "Test Method for Determination of Asbestos in Bulk Building Materials, 1993," with inclusion of area percent estimates of the sample components. The use of the McCrone Color Dispersion Staining Technique supplements the analysis when considered useful by the analyst. The samples are prepared with refractive immersion oil and are examined under Polarized Light Microscopy (PLM). The accuracy of the visual estimate method is 1%.

  As per the standard "...The accuracy in the determination of the presence or absence of asbestos of greater than 1 area percent asbestos is greater than 99%." ASTM Committee D22.05, 1/18/88, Standard *Method of Testing for Asbestos Containing Materials by Polarized Light Microscopy*. If the sample matrix is reduced to minimize non-asbestos components, the

detection limit can be mathematically enhanced, based on the amount of material remaining after matrix reduction. This method is called gravimetric reduction. This method involves ashing and chemical dissolution of the sample.

- ***POINT COUNTING***

  The Point Counting method is a much more accurate analytical method for determining the percent of asbestos in a particular material. KELLCO-MACS uses a muffle furnace to ash the sample and remove organic compounds. Hydrochloric acid is used to dissolve some of the non-asbestos minerals. Under this method a minimum of 125 points are counted from each of 8 different slide preparations of the same sample (total of 1000 points min.) If the **Point Count Method** determines that the material contains less than 1% asbestos, the material being analyzed can be treated as non-hazardous asbestos containing construction waste**. Note: ONLY the Point Count Method can be used for this determination.**

- ***CAM 17 TESTING***

  CAM 17 Metals were tested by Macs Lab, Inc. using ICP-MS, Extraction Method SW3050B and Analytical Method 6010B/3050.

KELLCO-MACS Qualifications

KELLCO-MACS is a joint venture offering hazardous materials and AIHA laboratory analyses. Our credentials include:

- The KELLCO-MACS asbestos inspector is licensed with the State of California Department of Occupational Safety and Health (CAL-OSHA).

- The KELLCO-MACS lead inspector is licensed by the California Department of Public Health (CDPH)

- The laboratory accreditations include:

  - **NVLAP PLM** for Asbestos: NIST National Voluntary Laboratory Accreditation Program certificate of accreditation for bulk **asbestos** analysis by polarized light microscopy (Accreditation #101948-1).
  - **AIHA** Accreditation for **Industrial Hygiene** Analytical Laboratory for PCM, and AA for lead (Accreditation #101786).
  - **AIHA Analyst Proficiency (NIOSH PAT)** (Accreditation # 11172)
  - **AIHA ELLAP** Accreditation for Lead: Accreditation for the **Environmental Lead** Laboratory recognized by the EPA as meeting the requirements of the National Lead Laboratory Accreditation Program established under Title X (Lab ID #11109).
  - **ELAP PLM** for Asbestos: California Department of Health Services, Environmental Laboratory Accreditation Program, certificate for bulk asbestos analysis (Certificate #2027)
  - **USDA Soil** permit #39484

The following supporting documents are attached to this report:

- Laboratory analytical reports
- Photographs of sample locations
- Floor plan or sketch showing sample locations

Please call KELLCO if there are any questions and/or clarifications regarding this report. We look forward to working with you in the future.

Sincerely,

KELLCO-MACS

Tim C. Cannard CAC #94-1395, CDPH Lead #764
Senior Project Manager

Asbestos Definitions and Classifications

ACM	(Asbestos Containing Material) - Material containing more than 1% asbestos. ACM must be disposed as hazardous waste. Note: Federal OSHA and Cal-OSHA control materials containing any amount of asbestos.
ACBM	(Asbestos Containing Building Material) – AHERA/ASHARA term for material containing more than 1% asbestos in or on interior structural members or other structural components. Exceptions: Covered walkways, porticos and exterior HVAC TSI.
ACCM	(Asbestos Containing Construction Material) – California term for a manufactured construction material containing greater than .1% (one tenth of one percent) asbestos.
PACM	(Presumed Asbestos Containing Material) OSHA considers all TSI and surfacing materials installed prior to1980 to be ACM unless proven otherwise.
Friable	Asbestos Containing Material that can be crumbled pulverized or reduced to powder by hand pressure when dry.
NOA	Naturally Occurring Asbestos. CARB defines as having >.25% by point counting.

Categories of Asbestos Used BY EPA AHERA/ASHARA and OSHA/Cal-OSHA

TSI	(Thermal System Insulation) - "Thermal system insulation (TSI)" means ACM applied to pipes, fittings, boilers, breeching, tanks, ducts or other structural components to prevent heat loss or gain. "Thermal system insulation ACM" is thermal system insulation which contains more than 1% asbestos.
SURFACING (usually mixed on site at time of application)	"Surfacing material" means material that is sprayed, troweled-on or otherwise applied to surfaces (such as acoustical plaster on ceilings and fireproofing materials on structural members, or other materials on surfaces for acoustical, fireproofing, and other purposes). "Surfacing ACM" means surfacing material which contains more than 1% asbestos. NOTE: OSHA/Cal-OSHA do not classify taping mud, floor tile mastic, stucco, leveling compound, and hard wall plasters or wall texturing as surfacing.
MISC.	All other ACM, including classify taping mud, floor tile mastic, stucco, leveling compound, and hard wall plasters or wall texturing as surfacing.

NESHAPS Categories for Asbestos (used by Air Quality Management Districts)

Category I	Cat I Non-friable Asbestos Containing Material refers to asbestos containing packing, gaskets, resilient floor covering, Galbestos, and asphalt roofing products containing more than 1% asbestos.
Category II	Cat II Non-friable Asbestos-Containing Material is any material that is not Cat I that contains greater than 1% asbestos.
RACM	"Regulated Asbestos-Containing Material." – Friable asbestos material (ACM) or a Category I non-friable ACM that has become friable OR a 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 reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations. RACM should be removed prior to renovation or demolition.

Characterization of Asbestos Containing Materials

Material	Estimated Quantity	TSI	Surfacing	Misc	RACM	Cat I	Cat II
Southeast end of roof	~50 sq. ft.			X		X	
Northeast end of roof coating	~50 sq. ft.			X		X	

MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

Report

Method: EPA-600/M4-82-020

KELLCO Services
3137 Diablo Ave

Hayward CA 94545

Person to contact: Tim Cannard
Contact phone: 510-786-9751
FAX phone: 510-786-9625
Sampled by: Siew Yee Lee
Sampled on: July 22, 2010
Analyzed on: July 27, 2010 at: 07:36
Corresponding invoice number: 206532

Analyst: JPL (signature)

Laboratory manager: (signature)

Job Number: 1004-17

Job Description: Lawrence Berkeley National Laboratory - Gardener Shed - One Cyclotro Road, Berkeley, CA 94744

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L206532-1	Gardener-AR-01 Southeast end of roof / roof coating	**Yes**	10% Chrysotile* 10% Cellulose	Black roofing material. Balance of sample is unspecified non-fibrous material and organic binders.
L206532-2	Gardener-AR-02 Northeast end of roof / roof coating	**Yes**	10% Chrysotile* 10% Cellulose	Black roofing material. Balance of sample is unspecified non-fibrous material and organic binders.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

This report shall not be reproduced except in full without written approval of MACS Lab, Inc. This report relates only to the items tested. Samples will be destroyed after one month. Test per 40 Code of Federal Reg. Chap I (1-1-87) Part 763, Subpart F, Appendix A or current EPA method. Percentages are approximate. MACS Lab is an accredited laboratory of the National Voluntary Laboratory Accreditation Program (NVLAP) and is Lab Code 101948-0. No product endorsement by NVLAP or any agency of the U.S. Government may be claimed as a result of this analysis. Calif Dept of Health ELAP #2027. This method is not reliable for analysis of tile or other materials when fiber size is less than 10μ. TEM analysis should be used. Method Detection limit for asbestos is 1% per CA law. See QC page attached to this page for blank and retest data .

NVLAP®
NVLAP Lab Code 101948-0

MACS Lab, Inc.
3137 Diablo Ave
Hayward, CA 94545-2701

510-786-9751

Bulk Asbestos Analysis

QA Report

Method: EPA-600/M

KELLCO Services
3137 Diablo Ave

Hayward CA 94545

Laboratory manager: _____ (signature)

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
Blank sample		**N.D.**	No fibers	
		PC*		

End of report.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

This report shall not be reproduced except in full without written approval of MACS Lab, Inc. This report relates only to the items tested. Samples will be destroyed after one month. Test per 40 Code of Federal Reg. Chap I (1-1-87) Part 763, Subpart F, Appendix A or current EPA method. Percentages are approximate. MACS Lab is an accredited laboratory of the National Voluntary Laboratory Accreditation Program (NVLAP) and is Lab Code 101948-0. No product endorsement by NVLAP or any agency of the U.S. Government may be claimed as a result of this analysis. Calif Dept of Health ELAP #2027. This method is not reliable for analysis of tile or other materials when fiber size is less than 10μ. TEM analysis should be used. Method Detection limit for asbestos is 1% per CA law. See QC page attached to this page for blank and retest data .

NVLAP®
NVLAP Lab Code 101948-0

CLIENT	JOBSITE
Weiss Associates 5801 Christie Avenue 600 Emeryville CA 94608	Lawrence Berkeley National Laboratory One Cyclotron Road ~~Bldg 40~~ Gardener Shed Berkeley CA 94744

KELLCO-MACS JOB#: **1004-17** LAB LOGIN # L206532

COLLECTED BY: Siew Yee Lee

COLLECTED DATE 7/22/2010

TURN AROUND TIME: 4 8 24 48 5-DAY

RESULTS NEEDED BY

CIRCLE TYPE OF BULK ANALYSIS

PLM LEAD PAINT LEAD WIPE NON VIABLE MOLD VIABLE MOLD eCOLI OTHER

SAMPLES REC'D _____ ANALYZE TO FIRST POSITIVE YES NO

REPORT RESULTS TO PROJECT MANAGER: Tim Cannard

NOTES & COMMENTS:

CHAIN OF CUSTODY & SAMPLE SUBMITAL FORM PAGE____ OF ____

KELLCO-MACS JOB#: **1004-17**
Lawrence Berkeley National Laboratory

FIELD NUMBER	LOCATION (bldg.,rm# area)	COLOR	MATERIAL of SUBSTRATE (ft w/size, mastic,tjc, etc.)	NOTES: Like condition, damage, quantity, inside what, beneath what?, direction in building (N,S,E,W, etc.)
Gardener-AR-01	SE end of roof		roof coating	
AR-02	NE end of roof			

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
	7/26/2010	0747	D. Kinhuh	07/26/10	0747

MACS Lab Incorporated
Analytical and Environmental Services
3137 Diablo Avenue, Hayward, Ca 94545-2701
(510) 786-9751 * (510) 786-9625 Fax * www.macslab.com

CAM-17 Bulk Materials Analysis Report - Method: EPA 6010B/3050

KELLCO Services
3137 Diablo Avenue
Hayward, CA 94545

Contact: Tim Cannard
Phone: (510) 786-9751
Email: mailbox3137@kellcomacs.com
Job #: 1004-17

Laboratory Number: 206529
Sampled By: Siew Yee Lee
Sampled On: July 22, 2010
Submitted On: July 26, 2010
Analyzed On: August 3, 2010
Reported On: August 4, 2010
SOP: CAM17
Sample Type: Bulk

Job Description: Lawrence Berkeley National Laboratory-Gardener Shed-One Cycloto Road, Berkeley, CA 94744

	Lab Sample Number:	206529 -1				
	Client Sample Number:	Gardener-PC1				
	Matrix:	Bulk				
	Extraction Type:	Acid				
	Units:	mg/kg (PPM)				
Sb	Antimony	259.36				
As	Arsenic	<0.01				
Ba	Barium	36,158.91				
Be	Beryllium	2.40				
Cd	Cadmium	74.87				
Cr	Chromium	1,592.36				
Co	Cobalt	406.38				
Cu	Copper	510.88				
Pb	Lead	64,195.34				
Hg	Mercury	105.09				
Mo	Molybdenum	112.12				
Ni	Nickel	110.88				
Se	Selenium	4,299.09				
Ag	Silver	9.03				
Tl	Thallium	109.26				
V	Vanadium	78.19				
Zn	Zinc	48,633.60				

Analyst: _____ (Signature)

Laboratory Manager: _____ (Signature)

NOTICE

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CLIENT	JOBSITE
Weiss Associates 5801 Christie Avenue 600 Emeryville CA 94608	Lawrence Berkeley National Laboratory One Cyclotron Road Gardener shed Berkeley CA 94744

KELLCO-MACS JOB#: **1004-17** LAB LOGIN # I206529

COLLECTED BY: Siew Yee Lee

COLLECTED DATE 7/22/2010

TURN AROUND TIME: 4 8 (24) 48 5-DAY

RESULTS NEEDED BY

CIRCLE TYPE OF BULK ANALYSIS

PLM ~~LEAD PAINT~~ LEAD WIPE NON VIABLE MOLD VIABLE MOLD eCOLI (OTHER) CAM 17

SAMPLES REC'D _____ ANALYZE TO FIRST POSITIVE YES NO

REPORT RESULTS TO PROJECT MANAGER: Tim Cannard

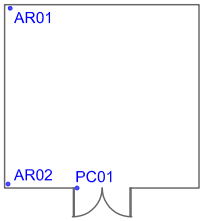
NOTES & COMMENTS:

CHAIN OF CUSTODY & SAMPLE SUBMITAL FORM PAGE____ OF ____

KELLCO-MACS JOB#: **1004-17**
Lawrence Berkeley National Laboratory

FIELD NUMBER	LOCATION (bldg, rm#, area)	COLOR	MATERIAL or SUBSTRATE (ft w/ size, mastic, tic, etc.)	NOTES: Like condition, damage, quantity, inside what, beneath what? direction in building (N,S,E,W) etc.)
Gardener-PC1	Shed, various locations		paint chip composite	

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
[illegible]	7/26/2010	0745	[illegible]	07/26/10	0745



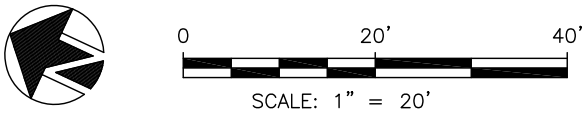
GARDENER SHED

ABBREVIATIONS

AR Asbestos roofing sample
PC Paint sample

NOTE:

All sample locations are approximate

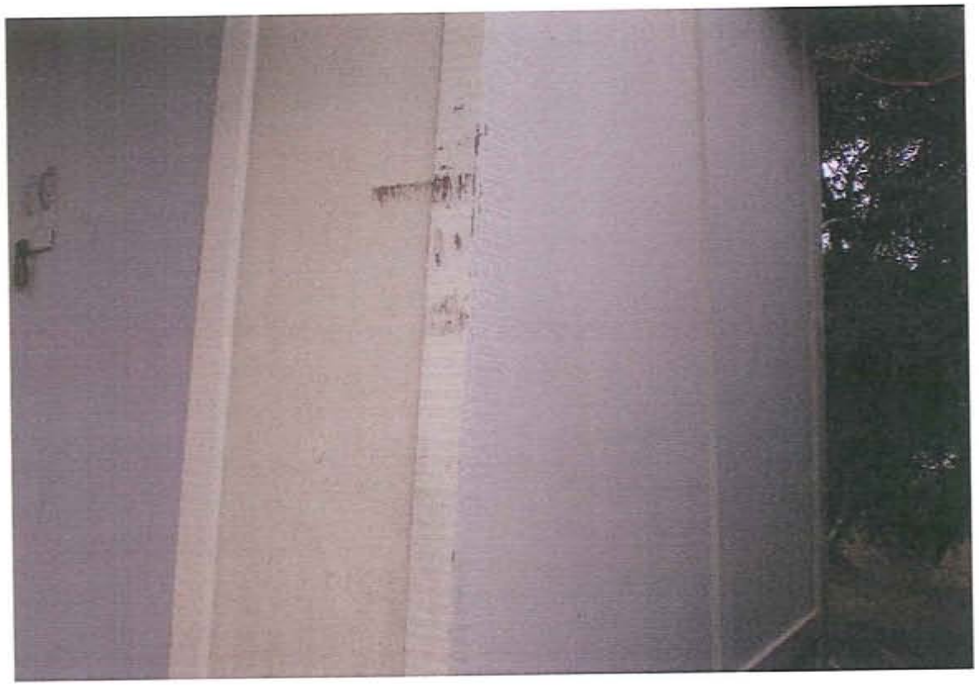


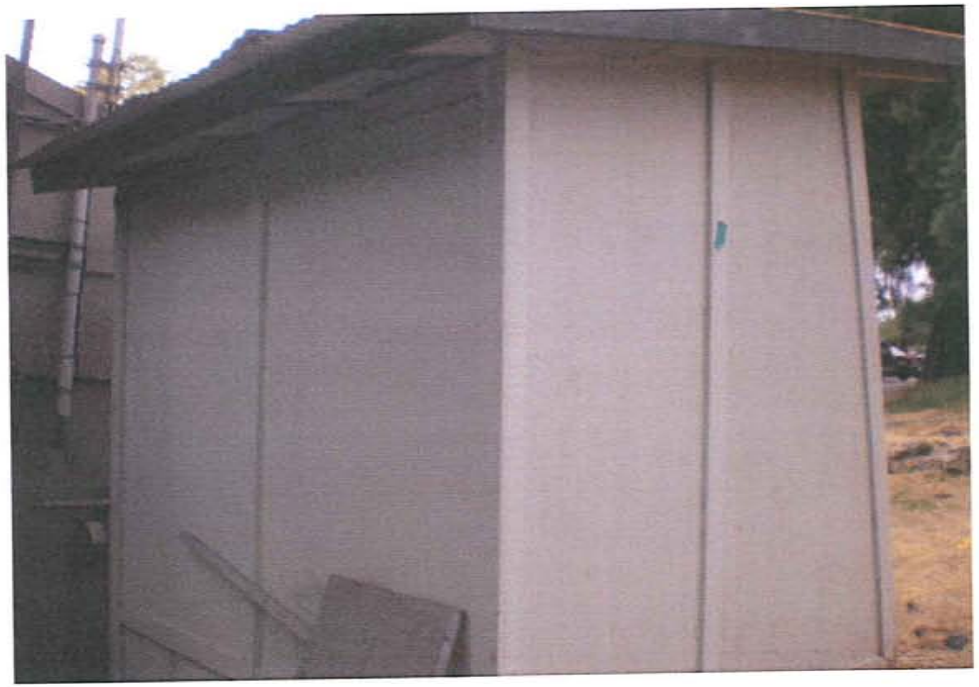
L:\LBNL.178\Old Town Demolition\Sample Location Maps\Kellco Maps\SLM_Kellco_GardenerShed.dwg

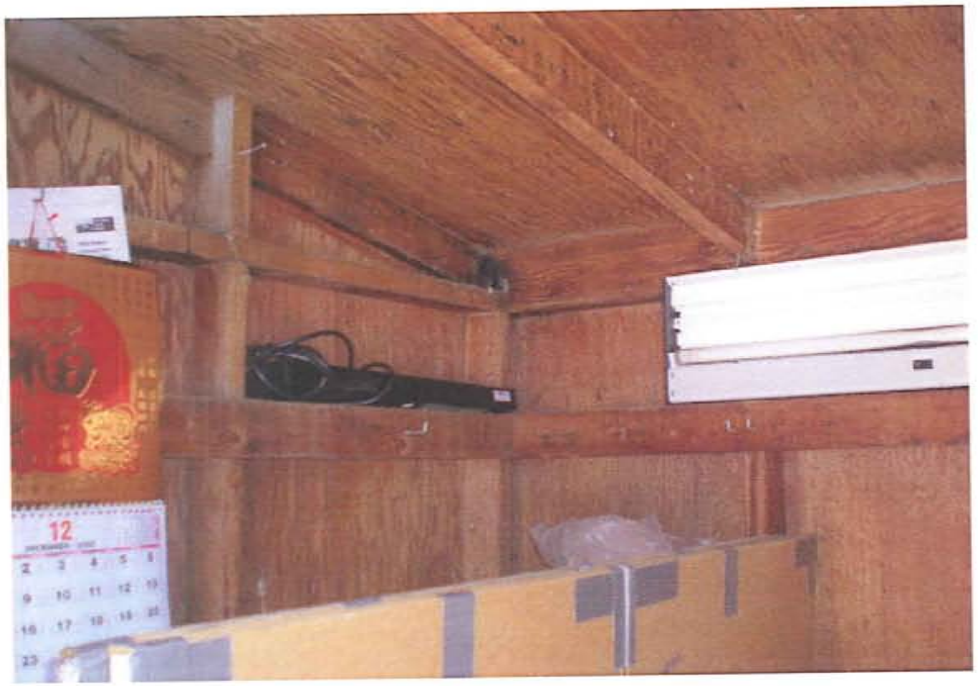
PHOTOGRAPHS

Photographs containing no sample identification number are included for reference of the general sample locations.

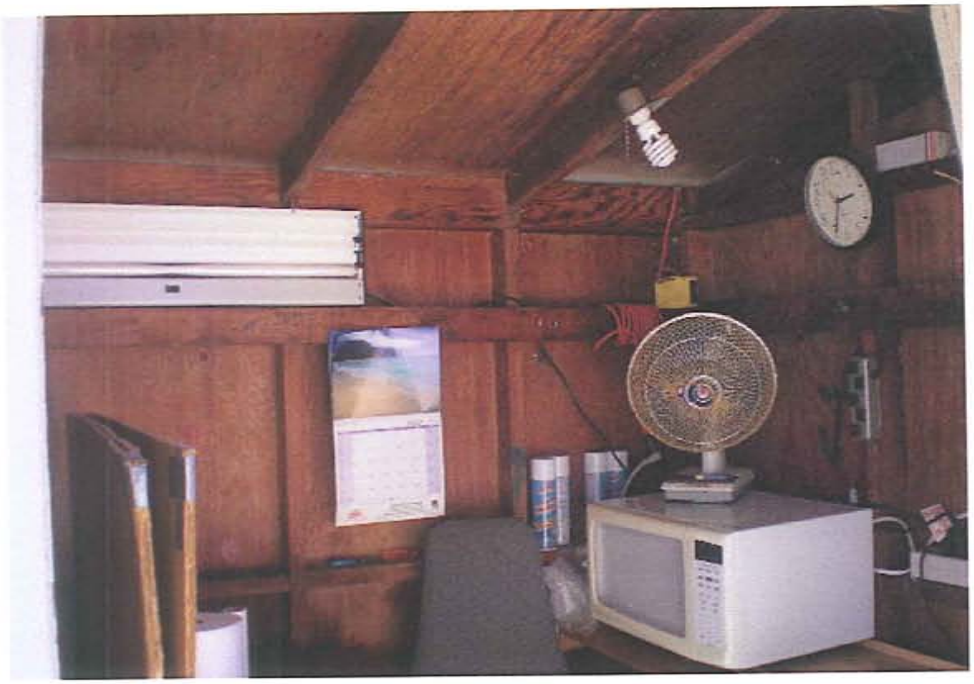
3137 Diablo Avenue • Hayward, CA 94545-2701• (510) 786-9751 • fax (510) 786-9625
http://www.kellcomacs.com email: mailbox3137@kellcomacs.com







GARDENER-AR-01



Gardner-PC1

GARDENER-AR02

APPENDIX D

RESULTS OF PERSONAL AIR MONITORING

August 11, 2010

Agata Sulczynski
WEISS ASSOCIATES
5801 Christie Avenue
Suite 600
Emeryville, CA 94608-

Bureau Veritas Work Order No. 10080141

Reference: 178-1911

Dear Agata Sulczynski:

Bureau Veritas North America, Inc. received 4 samples on 8/3/2010 for the analyses presented in the following report.

Enclosed is a copy of the Chain-of-Custody record, acknowledging receipt of these samples. Please note that any unused portion of the samples will be discarded 30 days after the date of this report, unless you have requested otherwise.

This material is confidential and is intended solely for the person to whom it is addressed. If this is received in error, please contact the number provided below.

We appreciate the opportunity to assist you. If you have any questions concerning this report, please contact a Client Services Representative at (800) 806-5887.

Sincerely,

Karen Coonan

Karen Coonan
Client Services Representative

cc: Tim Utterback

Bureau Veritas North America, Inc.
22345 Roethel Drive
Novi, MI 48375

Main: (248) 344.1770
Fax: (248) 344.2655
www.us.bureauveritas.com

CASE NARRATIVE

Date: ***11-Aug-10***

Client:	**WEISS ASSOCIATES**
Project:	**178-1911**
Work Order No	**10080141**

The results of this report relate only to the samples listed in the body of this report.

Unless otherwise noted below, the following statements apply: 1) all samples were received in acceptable condition, 2) all quality control results associated with this sample set were within acceptable limits and/or do not adversely affect the reported results, and 3) the industrial hygiene results have not been blank corrected.

Analytical Comments for Method N0600PVCXR, sample -004A: Actual value of the particulate blank was -10ug; the results have been blank corrected.

ANALYTICAL RESULTS

Date: *11-Aug-10*

Client: WEISS ASSOCIATES

Work Order No: 10080141

Project: 178-1911

Analyte	Concentration (µg)	Concentration (mg/m³)	Concentration %	Reporting Limit (µg)	Test Method	Date Analyzed /Analyst	
Client ID: 49748	**Lab ID:** 001A	**Date Sampled:** 7/19/2010			**Matrix:** PVC 5 Filter, Tared	**Air Vol.(L)** 860	
Particulate, Respirable	150	0.17	--	50	NIOSH 0600	08/05/2010	AJP
Cristobalite	<10	<0.012	<6.7	10	NIOSH 7500	08/09/2010	NMB
Quartz	11	0.013	7.3	10	NIOSH 7500	08/09/2010	NMB
Tridymite	<10	<0.012	<6.7	10	NIOSH 7500	08/09/2010	NMB
Client ID: 50015	**Lab ID:** 002A	**Date Sampled:** 7/20/2010			**Matrix:** PVC 5 Filter, Tared	**Air Vol.(L)** 790.5	
Particulate, Respirable	70	0.089	--	50	NIOSH 0600	08/05/2010	AJP
Cristobalite	<10	<0.013	<14	10	NIOSH 7500	08/09/2010	NMB
Quartz	<10	<0.013	<14	10	NIOSH 7500	08/09/2010	NMB
Tridymite	<10	<0.013	<14	10	NIOSH 7500	08/09/2010	NMB
Client ID: 49979	**Lab ID:** 003A	**Date Sampled:** 7/21/2010			**Matrix:** PVC 5 Filter, Tared	**Air Vol.(L)** 836.4	
Particulate, Respirable	120	0.14	--	50	NIOSH 0600	08/05/2010	AJP
Cristobalite	<10	<0.012	<8.3	10	NIOSH 7500	08/09/2010	NMB
Quartz	22	0.026	18	10	NIOSH 7500	08/09/2010	NMB
Tridymite	<10	<0.012	<8.3	10	NIOSH 7500	08/09/2010	NMB
Client ID: 50054 BLANK	**Lab ID:** 004A	**Date Sampled:**			**Matrix:** PVC 5 Filter, Tared	**Air Vol.(L)** NA	
Particulate, Respirable	<50	--	--	50	NIOSH 0600	08/05/2010	AJP
Cristobalite	<10	--	--	10	NIOSH 7500	08/09/2010	NMB
Quartz	<10	--	--	10	NIOSH 7500	08/09/2010	NMB
Tridymite	<10	--	--	10	NIOSH 7500	08/09/2010	NMB

Bureau Veritas North America, Inc.

Date: *11-Aug-10*

CLIENT: WEISS ASSOCIATES
Work Order: 10080141
Project: 178-1911

QC SUMMARY REPORT

Method Blank

Sample ID: **MB-R151437** Batch ID: **R151437** Units: **µg** Analysis Date **8/9/2010** Prep Date:

Client ID: Run ID: **AS_RG4D_100809B** SeqNo: **2363153**

Analyte	Result 1	PQL	Spike Added	Unspiked Sample Result	%REC	LowLimit	HighLimit	Result 2	%RPD	RPDLimit	Qual
Quartz	ND	10									
Cristobalite	ND	10									
Tridymite	ND	10									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below Reporting Limit
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

Bureau Veritas North America, Inc.

Date: *11-Aug-10*

CLIENT: WEISS ASSOCIATES
Work Order: 10080141
Project: 178-1911

QC SUMMARY REPORT

Laboratory Control Spike

Sample ID: **LCS-R151437** Batch ID: **R151437** Units: **µg** Analysis Date **8/9/2010** Prep Date:
Client ID: Run ID: **AS_RG4D_100809B** SeqNo: **2363154**

Analyte	Result 1	PQL	Spike Added	Unspiked Sample Result	%REC	LowLimit	HighLimit	Result 2	%RPD	RPDLimit	Qual
Quartz	47.4	10	50	0	94.8	79.4	137	0			

Sample ID: **LCSD-R151437** Batch ID: **R151437** Units: **µg** Analysis Date **8/9/2010** Prep Date:
Client ID: Run ID: **AS_RG4D_100809B** SeqNo: **2363155**

Analyte	Result 1	PQL	Spike Added	Unspiked Sample Result	%REC	LowLimit	HighLimit	Result 2	%RPD	RPDLimit	Qual
Quartz	56.6	10	50	0	113	79.4	137	47.4	17.6	22.5	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below Reporting Limit
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

10080141

Chain of Custody Record

Bureau Veritas
22345 Roethel Drive
Novi, MI 48375-1319
Phone: (248) 344-1770
Fax: (248) 344-2655

Please send analytic results, EDD, and the original chain-of-custody form to:
labresults@weiss.com
Agata Sulczynski (aas@weiss.com)
Tim Utterback (tru@weiss.com)
Project ID: 178-1911
Protocol path: J:\LBNL\Old_Town_Demolition\Safey\air_monitoring

INSTRUCTIONS FOR LAB PERSONNEL:
Include laboratory QA/QC data with report.
Specify analytic/prep method and detection limit in report.
Notify us of any anomalous peaks in GC or other scans.
Call immediately with any questions or problems.

Weiss Associates
Environmental Science, Engineering and Management Services
5801 Christie Avenue, Suite 600, Emeryville, CA 94608
Phone: 510-450-6000 Fax: 510-547-5043

Client Contact	Project Manager: Agata Sulczynski	Sampled by: Siew Yee Lee	Date: 8/2/10	COC Number: LBNL IH01
Weiss Associates	Tel: 510-450-6119	Lab Contact: Karen Coonan	Carrier: Fed Ex	Page 1 of 1
5801 Christie Avenue, Suite 600	Analysis Turnaround Time			Job No. 178-1911
Emeryville, CA 94608	Calendar (C) or Work Days (W) --- ~~21C~~			
(510) 450-6000 Phone	TAT if different from Below - standard 5 business days			SDG No.
(510) 547-5043 FAX	☐ 3 weeks			
	☐ 1 week			
Job Name: LBNL Old Town	☐ 2 days			
Address: Cyclotron Road LBNL	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Air Flow Rate	Matrix	# of Cont.	Silica by NIOSH 7500	respirable particulate NIOSH 0600	Sample Specific Notes:
49748	7/19/10	430 min	2 lpm	air	1	x	x	collected with cyclone
50015	7/20/10	465 min	1.7 lpm	air	1	x	x	collected with cyclone
49979	7/21/10	492 min	1.7 lpm	air	1	x	x	collected with cyclone
50054	n/a	n/a	blank	air	1	x	x	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	Weiss Associates	8/2/10 11:50 am	Sanya Rhee	Bureau Veritas	8/3/10 11:20
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

CLIENT	JOBSITE
Weiss Associates 5801 Christie Avenue 600 Emeryville CA 94608	Lawrence Berkeley National Laboratory One Cyclotron Road Berkeley CA 94744

KELLCO-MACS JOB#: **1004-17** LAB LOGIN #_____

COLLECTED BY: Siew Yee Lee

COLLECTED DATE 7/21/2010

TURN AROUND TIME: 4 8 24 48 5-DAY

RESULTS NEEDED BY

CIRCLE TYPE OF AIR ANALYSIS

PCM TEM TEM AHERA LEAD NON VIABLE MOLD VIABLE MOLD

OTHER Silica

REPORT RESULTS TO PROJECT MANAGER: Tim Cannard

NOTES & COMMENTS:

ROTAMETER # LV-Kellco MACS

ROTAMETER CALIBRATION DATE: 4-8-10

CHAIN OF CUSTODY & SAMPLE SUBMITAL FORM

PAGE_____ OF ____

KELLCO-MACS JOB#: **1004-17**
Lawrence Berkeley National Laboratory

SAMPLE NUMBER	IWA OWA	SAMPLE LOCATION	WORK ACTIVITY	Respirator	WORKER NAME LAST 4 DIGITS SS#	TIME ON / TIME OFF	FLOW ON / FLOW OFF	MINUTES / VOLUME	Fibers	Fields	F/CC	TWA / 8 HR TWA
49979	IWA OWA	Bldg 52	Personal air monitoring during coring	NONE HF PAPR		0730 1612	1.7 1.7					
	IWA OWA			NONE HF PAPR								
	IWA OWA			NONE HF PAPR								
	IWA OWA			NONE HF PAPR								
	IWA OWA			NONE HF PAPR								
	IWA OWA			NONE HF PAPR								

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
[illegible]	7/21/2010	1619			

CLIENT	JOBSITE
Weiss Associates 5801 Christie Avenue 600 Emeryville CA 94608	Lawrence Berkeley National Laboratory One Cyclotron Road Berkeley CA 94744

KELLCO-MACS JOB#: **1004-17** LAB LOGIN #_____

COLLECTED BY: SY Lee

COLLECTED DATE 7/20/2010

TURN AROUND TIME: 4 8 24 48 5-DAY

RESULTS NEEDED BY

CIRCLE TYPE OF AIR ANALYSIS

PCM TEM TEM AHERA LEAD NON VIABLE MOLD VIABLE MOLD

OTHER Silica.

REPORT RESULTS TO PROJECT MANAGER: Tim Cannard

NOTES & COMMENTS: Cori

ROTAMETER # LV

ROTAMETER CALIBRATION DATE: 4/8/10

CHAIN OF CUSTODY & SAMPLE SUBMITAL FORM

PAGE_____ OF ____

KELLCO-MACS JOB#: **1004-17**
Lawrence Berkeley National Laboratory

SAMPLE NUMBER	IWA OWA	SAMPLE LOCATION	WORK ACTIVITY	Respirator	WORKER NAME LAST 4 DIGITS SS#	TIME ON / TIME OFF	FLOW ON / FLOW OFF	MINUTES / VOLUME	Fibers	Fields	F/CC	TWA / 8 HR TWA
50015	IWA OWA	Bldg 52	Coring activity in 2 locations	NONE HF PAPR		0800 1545	1.7 1.7					
	IWA OWA			NONE HF PAPR								
	IWA OWA			NONE HF PAPR								
	IWA OWA			NONE HF PAPR								
	IWA OWA			NONE HF PAPR								
	IWA OWA			NONE HF PAPR								

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
	7/21/2010	1619.			

CLIENT	JOBSITE
Weiss Associates 5801 Christie Avenue 600 Emeryville CA 94608	Lawrence Berkeley National Laboratory One Cyclotron Road Berkeley CA 94744

KELLCO-MACS JOB#: **1004-17** LAB LOGIN #_____

COLLECTED BY: Siew Hee Lee

COLLECTED DATE 7/19/2010

TURN AROUND TIME: 4 8 24 48 5-DAY

RESULTS NEEDED BY

CIRCLE TYPE OF AIR ANALYSIS

PCM TEM TEM AHERA LEAD NON VIABLE MOLD VIABLE MOLD

OTHER Silica

REPORT RESULTS TO PROJECT MANAGER: Tim Cannard

NOTES & COMMENTS:

ROTAMETER # LV-Kellco-MACS

ROTAMETER CALIBRATION DATE:

CHAIN OF CUSTODY & SAMPLE SUBMITAL FORM

PAGE_____ OF _____

KELLCO-MACS JOB#: **1004-17**
Lawrence Berkeley National Laboratory

SAMPLE NUMBER	IWA OWA	SAMPLE LOCATION	WORK ACTIVITY	Respirator	WORKER NAME LAST 4 DIGITS SS#	TIME ON / TIME OFF	FLOW ON / FLOW OFF	MINUTES / VOLUME	Fibers	Fields	F/CC	TWA / 8 HR TWA
49748	IWA	Bldg 52	Personal air monitoring during coring	NONE HF PAPR			2.0	430				
	OWA						2.0					
	IWA			NONE HF PAPR								
	OWA											
	IWA			NONE HF PAPR								
	OWA											
	IWA			NONE HF PAPR								
	OWA											
	IWA			NONE HF PAPR								
	OWA											
	IWA			NONE HF PAPR								
	OWA											

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
	7/21/2010	1630			

APPENDIX E

ANALYTICAL DATA ON CD ROM