

**ARGONNE
NATIONAL
LABORATORY**

INTRA-LABORATORY MEMO

April 11, 2003

To: E. Chang

AOD

From: J. T. Davis



EQO-Industrial Hygiene

Subject: INDUSTRIAL HYGIENE SURVEY SUMMARY REPORT

Operation Surveyed: Lead Surface Contamination Cleanup

Location Surveyed: Building 432, 7-ID-C

Material or Hazard Measured: Lead

Method of Measurement: Air: 0.8 μm MCE Filters
Analysis by Flame Atomic Absorption

Surface: Whatman #44 with deionized water
Analysis by Flame Atomic Absorption

Sample Description and Results:

Surface lead sampling was conducted following installation of new slot windows in experiment enclosures 7-ID-C and 7-ID-D. Dark gray dust was observed on the floor below the new windows and on plastic sheeting covering some equipment. Some cleanup had been attempted and a small shop vacuum was observed on an equipment platform. Surface lead samples were collected from the floor and equipment surfaces. Results are shown in Table 1. Areas exceeding the surface lead criterion were identified in bold numbers.

Surface cleaning of the floor and equipment surfaces was conducted by the contractor (TecKnit) on Feb. 10. Area air samples were collected in the experiment enclosures during surface cleaning. Air sample results are shown in Table 2. Sample results were less than the limit of detection indicating that airborne lead was effectively controlled during cleaning.

Surface lead samples were collected following cleaning. Results of these follow-up samples are shown in Table 3. Cleaning resulted in large reductions of lead on surfaces but some floor areas remained above the surface lead criterion. Areas exceeding the surface lead criterion were identified in bold numbers.

Applicable Standards: OSHA Lead Standard, 29 CFR 1910.1025

Permissible Exposure Limit (PEL): 50 $\mu\text{g}/\text{m}^3$, 8-hour Time-Weighted Average
Action Level (AL): 30 $\mu\text{g}/\text{m}^3$, 8-hour Time-Weighted Average

OSHA Lead in Construction, 29 CFR 1926.62, Inspection
and Compliance Procedures

Surface Contamination: 200 µg/sq. ft. (22 µg/100 cm²)

Recommendations:

1. Incorporate cleanup specifications into contracts for enclosure modifications.
2. Establish procedures for enforcement of contract provisions.
3. Arrange for exposure monitoring during enclosure modifications.
4. Prevent users from attempting lead cleanup.
5. Use only HEPA-filtered vacuum cleaners which have passed an annual aerosol challenge test.
6. Contact EQO-Industrial Hygiene for HEPA vacuum testing and appropriate labels.
7. Instruct users how to obtain assistance when unusual conditions are observed.

This monitoring was done to evaluate workplace exposure conditions. Employees have a right to exposure monitoring results that affect them. Recent occupational exposure regulations specify that employees be notified in writing.

Supervisors in areas monitored must notify employees of representative sampling results in writing, either individually or by posting sampling results in an area accessible to affected personnel. The entire survey report need not be presented; however, where exposures exceed permissible exposure levels, planned corrective action must be indicated. Records of this notification must be maintained by your Division in an auditable form and may be reviewed during DOE or internal audits. If you or employees have questions regarding interpretation of results, contact Industrial Hygiene at 2-3310.

Survey Date: 1/22 – 2/11/2003
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IH File: Building 432
Lead

TABLE 1
BUILDING 432, 7-ID-C
SURFACE DUST SAMPLING FOLLOWING SLOT WINDOW INSTALLATION
DETAILED SAMPLE DESCRIPTION AND RESULTS

SAMPLE	DATE	LOCATION	LEAD CONC. ($\mu\text{g}/100\text{cm}^2$)¹
32401	1/22/03	Floor below window inside hutch (6 in. from upstream wall, 6 ft. from inboard wall)	223 ²
32402	1/22/03	Upper outlet strip on upstream wall (2 in. from upstream wall, 5 ft. from inboard wall)	70
32403	1/22/03	Experiment table near upstream wall (29 in. from upstream wall, 57 in. from inboard wall)	21
32404	1/22/03	Experiment table, outboard side (51 in. from upstream wall, 77 in. from inboard wall)	9
32405	1/22/03	Plastic over power supply near outboard wall (42 in. from outboard wall, 68 in. from downstream wall)	1910
32406	1/22/03	Plastic over power supply near outboard wall (25 in. from outboard wall, 69 in. from downstream wall)	1095
32407	1/22/03	Floor below window inside hutch (4 in. from downstream wall, 47 in. from outboard wall)	2201
32408	1/22/03	Outlet strip on downstream wall below window (1 in. from downstream wall, 49 in. from outboard wall)	31
32409	1/22/03	Plastic over electrical rack on downstream wall (2 in. from downstream wall, 59 in. from outboard wall)	1199
32410	1/22/03	Outside hutch, lower ledge of upstream wall below window (1 in. from upstream wall, 68 in. from inboard wall)	739
32411	1/22/03	Inside hutch 7-ID-D, lower ledge of upstream wall below window (1 in. from upstream wall, 59 in. from outboard wall)	897

¹ micrograms of Lead/100 square centimeters of surface

² Bold numbers identify samples which exceed surface clearance criterion (22 $\mu\text{g}/100\text{cm}^2$ for Lead)

TABLE 2
BUILDING 432, 7-ID-C
AREA AIR SAMPLING DURING SURFACE CLEANING
DETAILED SAMPLE DESCRIPTION AND RESULTS

SAMPLE	DATE	LOCATION	LEAD CONC. ($\mu\text{g}/\text{m}^3$)¹
33044	2/10/03	Inside 7-ID-D	< 1.02 *
33045	2/10/03	Inside 7-ID-C	< 1.07 *

¹ micrograms of Lead/cubic meter of air

* Samples identified with < (less than) were less than the analytical limit of detection

**TABLE 3
BUILDING 432, 7-ID-C
SURFACE DUST SAMPLING FOLLOWING EQUIPMENT AND FLOOR CLEANING
DETAILED SAMPLE DESCRIPTION AND RESULTS**

SAMPLE	DATE	LOCATION	LEAD CONC. ($\mu\text{g}/100\text{cm}^2$)¹
32422	2/11/03	Floor below window inside hutch (6 in. from upstream wall, 68 in. from inboard wall)	126 ²
32423	2/11/03	Upper outlet strip on upstream wall (2 in. from upstream wall, 63 in. from inboard wall)	7.9
32424	2/11/03	Experiment table 1 near upstream wall (29 in. from upstream wall, 57 in. from inboard wall)	< 2.5 ³
32425	2/11/03	Experiment table 2, outboard side (157 in. from upstream wall, 56 in. from inboard wall)	6.02
32426	2/11/03	Diffractionmeter, outboard side upstream (59 in. from inboard wall, 94 in. from downstream wall)	5.82
32427	2/11/03	Diffractionmeter, outboard side downstream (63 in. from inboard wall, 66 in. from downstream wall)	4.62
32428	2/11/03	Outlet strip on downstream wall below window (2 in. from downstream wall, 48 in. from outboard wall)	11.0
32429	2/11/03	Floor below window inside hutch (4 in. from downstream wall, 46 in. from outboard wall)	77.6
32430	2/11/03	Outside hutch 7ID-C, lower ledge of upstream wall below window (2 in. from upstream wall, 68 in. from inboard wall)	26.0

¹ micrograms of Lead/100 square centimeters of surface

² Bold numbers identify samples which exceed surface clearance criterion
(22 $\mu\text{g}/100\text{cm}^2$ for Lead)

³ Samples identified by < were less than the analytical reporting limit for the method
(2.5 μg of Lead/sample)

TABLE 3 (CONTINUED)
BUILDING 432, 7-ID-C
SURFACE DUST SAMPLING FOLLOWING EQUIPMENT AND FLOOR CLEANING
DETAILED SAMPLE DESCRIPTION AND RESULTS

SAMPLE	DATE	LOCATION	LEAD CONC. ($\mu\text{g}/100\text{cm}^2$)¹
32431	2/11/03	Inside hutch 7-ID-D, lower ledge of upstream wall below window (2 in. from upstream wall, 58 in. from outboard wall)	41.0 ²
32432	2/11/03	Inside hutch 7-ID-D, floor near upstream wall (21 in. from upstream wall, 69 in. from outboard wall)	55.2
32434	2/11/03	Floor outside door to 7-ID-C (5 ft. from 7-ID-C door, 8 ft. from upstream wall)	41.4
32435	2/11/03	Floor outside door to 7-ID-D (4 ft. from 7-ID-D door, 8 ft.4 in. from upstream wall)	62.7
32436	2/11/03	Floor at outboard walkway (19 ft. 7 in. from 7-ID-C door, 78 in. from column 85)	23.8

¹ micrograms of Lead/100 square centimeters of surface

² Bold numbers identify samples which exceed surface clearance criterion (22 $\mu\text{g}/100\text{cm}^2$ for Lead)