



September 8, 2021

Diane Czarnecki  
Industrial Hygienist  
Facilities Management Division  
GSA Public Buildings Service – Heartland Region  
2300 Main Street  
Kansas City, MO 64108

Re: Goodfellow Federal Center  
Metals in Settled Dust Sampling – Building 104  
Project No. 121244

Dear Ms. Czarnecki:

Thank you for the opportunity to assist the General Services Administration (GSA) with the metals in settled dust sampling investigation of Building 104 located at the Goodfellow Federal Center (GFC) in St. Louis, Missouri. Burns & McDonnell understands that the purpose of the investigation was to provide additional sampling data of existing environmental conditions that are present at GFC that could adversely impact the health and safety of building occupants as well as workers at the facility. The following report summarizes the sample collection activities and the laboratory analytical results of samples submitted.

## **INTRODUCTION**

Per historical use and previous characterization, Burns & McDonnell was contracted to perform settled dust sampling for the analysis of seven (7) of the Resource Conservation and Recovery Act (RCRA) target metals (arsenic, barium, cadmium, chromium, lead, selenium, and silver) from various surfaces within buildings. The purpose of this testing was to further characterize the presence and concentration of target metals in common tenant-occupied areas of the building.

The proposed sampling plan, the number of samples, the sample distribution and general methodology was developed by GSA and Burns & McDonnell. Specific sample locations were determined by sampling personnel while on-site.

Settled dust wipe sampling at Bldg. 104 was conducted on August 25, 2021 by Emily Ahlemeyer and Ashley Anstaett of Burns & McDonnell.

## **METALS IN SETTLED DUST SAMPLING**

Metals in settled dust sampling was conducted within tenant-occupied areas. Dust wipe sampling was conducted in accordance with ASTM Standard E1728: *Standard Practice for Collection of Settled Dust Samples Using Wipe Sampling Methods for Subsequent Lead Determination* and ASTM Standard D6966: *Standard Practice for Collection of Settled Dust Samples Using Wipe Sampling Methods for Subsequent Determination of Metals*. ASTM Standards E1728 and D6966 are consistent with the methodology described in the Housing and Urban Development

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Guidelines-Appendix 13.1 and 40 CFR 745.63. The Brookhaven National Laboratory's Surface Wipe Sampling Procedure (IH75190) was also used as a guideline.

Dust wipe sampling for the target metals was conducted on a variety of representative surfaces that have the potential of being disturbed by building occupants. A representative surface area of approximately one square foot (1 SF) was measured and delineated with plastic templates. The dust wipe samples were collected using dedicated dust wipe cloths meeting ASTM E1792 Standard. Each dust wipe cloth was pre-moistened and individually wrapped. Each sample was collected by wiping in a back and forth "S" pattern over a measured sampling area using a clean, disposable glove. Then, the wipe was folded over itself and the area was wiped again in a direction perpendicular to the first wipe orientation. Then, the wipe folded over itself again and the area was wiped around the perimeter. The wipe sample was then placed into a labeled, clean container. Dust wipe samples were submitted to Environmental Hazards Services, LLC (EHS) in Richmond, Virginia for Inductively Coupled Plasma (ICP) analysis of metals analysis using Environmental Protection Agency (EPA) method SW846 3050B/6010D. EHS is accredited under the American Industrial Hygiene Association (AIHA) Laboratory Accreditation Program (LAP) identification number LAP-100420.

Whereas the Occupational Safety and Health Administration (OSHA) has not established regulatory limits for surface concentrations of metals, the OSHA Technical Manual Section II: Chapter 2 (III.A) describes a method for calculating "housekeeping" standards, as recommended acceptable surface limits. Brookhaven's IH75190 procedure uses the housekeeping standards to derive a lower, "clean area limit" for non-operational areas that can be accessed or contacted without special training or precautions. Burns & McDonnell calculated clean area limits for metals not included in the Brookhaven procedure, specifically barium, chromium (total), selenium and silver. Wipe results were compared to the Brookhaven procedure's clean area limits for each metal.

Results of the dust wipe samples collected from the building indicate that 8 of the 10 samples contained concentrations of target metals above laboratory reporting limits. The following table identifies the range of results for each of the seven metals that were analyzed. Samples with a "<" sign indicate that the results were below the lab's reportable limit.

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**Table 1. Summary of Dust Wipe Results**

Analyte	Lowest Concentration <sup>(a)</sup> (µg/sq. ft) <sup>(b)</sup>	Highest Concentration <sup>(a)</sup> (µg/sq. ft) <sup>(b)</sup>	Clean Area Limit <sup>(c)</sup> µg/sq. ft <sup>(b)</sup>
Silver	<0.3	0.7	62
Arsenic	<1.5	<2.5	62
Barium	<0.5	2.6	3,094
Cadmium	<0.1	<0.1	31
Chromium (Total)	<0.6	<1.0	3,094
Lead	<0.3	0.9	10 <sup>(d)</sup>
Selenium	<1.5	<2.5	1,236

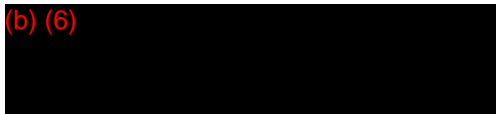
- (a) Samples with a “<” sign indicate that the results were below the laboratory’s reporting limit.
- (b) µg/sq. ft = micrograms per square foot of surface area.
- (c) Clean Area Limit per Brookhaven IH75190=OSHA Housekeeping Limit [PEL (µg/m<sup>3</sup>) x 10 m<sup>3</sup>/100cm<sup>2</sup>] / 15.
- (d) Lead clean area limit: Brookhaven references EPA/HUD limit for floors, set at 10 µg/sq. ft. as of January 2020.

Of the 8 samples that had detectable levels of one or more analytes, none of them exceeded the clean area limit.

Burns & McDonnell appreciates the opportunity to work with the GSA on this project. Please contact us if you have any questions regarding this report or if we may be of any additional service.

Sincerely,

(b) (6)



Matt Shanahan, CHMM  
 Project Manager

- Attachments:
- Appendix A – Sample Summary Table
  - Appendix B – Laboratory Analysis Report

Information in Appendices A and B is not accessible for people using screen reader technology. If this information is required, it can be furnished upon request by contacting 816-223-6198 or [r6environmental@gsa.gov](mailto:r6environmental@gsa.gov).

**APPENDIX A – SAMPLE SUMMARY TABLE**

**Appendix A**  
**Sample Summary Table**

Sample Number	Location	Area Description	Analyte	Result	Units	Clean Area Limit*
104-W-01	Field blank	--	Arsenic	< 2.50	µg/ft <sup>2</sup>	--
			Barium	< 0.500	µg/ft <sup>2</sup>	--
			Cadmium	< 0.100	µg/ft <sup>2</sup>	--
			Chromium	< 1.00	µg/ft <sup>2</sup>	--
			Lead	< 0.500	µg/ft <sup>2</sup>	--
			Selenium	< 2.50	µg/ft <sup>2</sup>	--
			Silver	< 0.500	µg/ft <sup>2</sup>	--
104-W-02	2nd floor, USDA office area	Keyboard pad on desk, column H38	Arsenic	< 2.5	µg/ft <sup>2</sup>	62
			Barium	0.96	µg/ft <sup>2</sup>	3,094
			Cadmium	< 0.10	µg/ft <sup>2</sup>	31
			Chromium	< 1.0	µg/ft <sup>2</sup>	3,094
			Lead	0.88	µg/ft <sup>2</sup>	10
			Selenium	< 2.5	µg/ft <sup>2</sup>	1,236
			Silver	0.74	µg/ft <sup>2</sup>	62
104-W-03	2nd floor, USDA office area	Room F40W1, desk surface	Arsenic	< 2.5	µg/ft <sup>2</sup>	62
			Barium	1.1	µg/ft <sup>2</sup>	3,094
			Cadmium	< 0.10	µg/ft <sup>2</sup>	31
			Chromium	< 1.0	µg/ft <sup>2</sup>	3,094
			Lead	< 0.50	µg/ft <sup>2</sup>	10
			Selenium	< 2.5	µg/ft <sup>2</sup>	1,236
			Silver	< 0.50	µg/ft <sup>2</sup>	62

**Appendix A**  
**Sample Summary Table**

Sample Number	Location	Area Description	Analyte	Result	Units	Clean Area Limit*
104-W-04	2nd floor, USDA office area	Break room counter, column D43	Arsenic	< 2.5	µg/ft <sup>2</sup>	62
			Barium	< 0.50	µg/ft <sup>2</sup>	3,094
			Cadmium	< 0.10	µg/ft <sup>2</sup>	31
			Chromium	< 1.0	µg/ft <sup>2</sup>	3,094
			Lead	0.74	µg/ft <sup>2</sup>	10
			Selenium	< 2.5	µg/ft <sup>2</sup>	1,236
			Silver	< 0.50	µg/ft <sup>2</sup>	62
104-W-05	2nd floor, USDA office area	Printer near column C50	Arsenic	< 1.5	µg/ft <sup>2</sup>	62
			Barium	1.4	µg/ft <sup>2</sup>	3,094
			Cadmium	< 0.061	µg/ft <sup>2</sup>	31
			Chromium	< 0.61	µg/ft <sup>2</sup>	3,094
			Lead	< 0.30	µg/ft <sup>2</sup>	10
			Selenium	< 1.5	µg/ft <sup>2</sup>	1,236
			Silver	< 0.30	µg/ft <sup>2</sup>	62
104-W-06	2nd floor, USDA office area	Room F48C1, conference room table	Arsenic	< 2.5	µg/ft <sup>2</sup>	62
			Barium	0.99	µg/ft <sup>2</sup>	3,094
			Cadmium	< 0.10	µg/ft <sup>2</sup>	31
			Chromium	< 1.0	µg/ft <sup>2</sup>	3,094
			Lead	< 0.50	µg/ft <sup>2</sup>	10
			Selenium	< 2.5	µg/ft <sup>2</sup>	1,236
			Silver	< 0.50	µg/ft <sup>2</sup>	62

**Appendix A**  
**Sample Summary Table**

Sample Number	Location	Area Description	Analyte	Result	Units	Clean Area Limit*
104-W-07	2nd floor, USDA office area	Desk surface, column D28	Arsenic	< 2.5	µg/ft <sup>2</sup>	62
			Barium	0.82	µg/ft <sup>2</sup>	3,094
			Cadmium	< 0.10	µg/ft <sup>2</sup>	31
			Chromium	< 1.0	µg/ft <sup>2</sup>	3,094
			Lead	< 0.50	µg/ft <sup>2</sup>	10
			Selenium	< 2.5	µg/ft <sup>2</sup>	1,236
			Silver	< 0.50	µg/ft <sup>2</sup>	62
104-W-08	2nd floor, USDA office area	Shredder across from room E27E2	Arsenic	< 2.5	µg/ft <sup>2</sup>	62
			Barium	1.4	µg/ft <sup>2</sup>	3,094
			Cadmium	< 0.10	µg/ft <sup>2</sup>	31
			Chromium	< 1.0	µg/ft <sup>2</sup>	3,094
			Lead	< 0.50	µg/ft <sup>2</sup>	10
			Selenium	< 2.5	µg/ft <sup>2</sup>	1,236
			Silver	< 0.50	µg/ft <sup>2</sup>	62
104-W-09	2nd floor, USDA office area	Desk surface, column J24	Arsenic	< 2.5	µg/ft <sup>2</sup>	62
			Barium	2.6	µg/ft <sup>2</sup>	3,094
			Cadmium	< 0.10	µg/ft <sup>2</sup>	31
			Chromium	< 1.0	µg/ft <sup>2</sup>	3,094
			Lead	< 0.50	µg/ft <sup>2</sup>	10
			Selenium	< 2.5	µg/ft <sup>2</sup>	1,236
			Silver	< 0.50	µg/ft <sup>2</sup>	62

**Appendix A**  
**Sample Summary Table**

Sample Number	Location	Area Description	Analyte	Result	Units	Clean Area Limit*
104-W-10	2nd floor, USDA office area	Executive desk, column H17	Arsenic	< 2.5	µg/ft <sup>2</sup>	62
			Barium	< 0.50	µg/ft <sup>2</sup>	3,094
			Cadmium	< 0.10	µg/ft <sup>2</sup>	31
			Chromium	< 1.0	µg/ft <sup>2</sup>	3,094
			Lead	< 0.50	µg/ft <sup>2</sup>	10
			Selenium	< 2.5	µg/ft <sup>2</sup>	1,236
			Silver	< 0.50	µg/ft <sup>2</sup>	62

\* Clean Area Limit per Brookhaven IH75190=OSHA Housekeeping Limit [PEL (µg/m<sup>3</sup>) x 10 m<sup>3</sup>/100cm<sup>2</sup>] / 15. Lead clean area limit: Brookhaven references EPA/HUD limit for floors, set at 10 µg/sq. ft. as of January 2020.



**APPENDIX B – LABORATORY ANALYSIS REPORT**



Environmental Hazards Services, L.L.C.  
 7469 Whitepine Rd  
 Richmond, VA 23237  
 Telephone: 800.347.4010

## Wipe Metals Analysis Report

**Client:** Burns & McDonnell Engineering  
 9400 Ward Pkwy.  
 Kansas City, MO 64114

**Report Number:** 21-08-04928  
**Received Date:** 08/30/2021  
**Analyzed Date:** 08/31/2021  
**Reported Date:** 09/03/2021

**Project/Test Address:** 168765; GFC; 4300 Goodfellow Blvd

**Client Number:**  
 26-3514

# Laboratory Results

**Fax Number:**  
 816-822-3494

Lab Sample Number	Client Sample Number	Analyte:	Wipe Area (ft <sup>2</sup> )	Total Metal (ug)	Concentration (ug/ft <sup>2</sup> )	Narrative ID
21-08-04928-001	104-W-01	Arsenic (As)		<2.50	---	
		Barium (Ba)		<0.500	---	
		Cadmium (Cd)		<0.100	---	
		Chromium (Cr)		<1.00	---	
		Lead (Pb)		<0.500	---	
		Selenium (Se)		<2.50	---	
		Silver (Ag)		<0.500	---	
21-08-04928-002	104-W-02	Arsenic (As)	1.00	<2.50	<2.5	
		Barium (Ba)	1.00	0.955	0.96	
		Cadmium (Cd)	1.00	<0.100	<0.10	
		Chromium (Cr)	1.00	<1.00	<1.0	

# Environmental Hazards Services, L.L.C

**Client Number:** 26-3514

**Report Number:** 21-08-04928

**Project/Test Address:** 168765; GFC; 4300 Goodfellow Blvd

Lab Sample Number	Client Sample Number	Analyte:	Wipe Area (ft <sup>2</sup> )	Total Metal (ug)	Concentration (ug/ft <sup>2</sup> )	Narrative ID
		Lead (Pb)	1.00	0.880	0.88	
		Selenium (Se)	1.00	<2.50	<2.5	
		Silver (Ag)	1.00	0.740	0.74	
21-08-04928-003	104-W-03	Arsenic (As)	1.00	<2.50	<2.5	
		Barium (Ba)	1.00	1.10	1.1	
		Cadmium (Cd)	1.00	<0.100	<0.10	
		Chromium (Cr)	1.00	<1.00	<1.0	
		Lead (Pb)	1.00	<0.500	<0.50	
		Selenium (Se)	1.00	<2.50	<2.5	
		Silver (Ag)	1.00	<0.500	<0.50	
21-08-04928-004	104-W-04	Arsenic (As)	1.00	<2.50	<2.5	
		Barium (Ba)	1.00	<0.500	<0.50	
		Cadmium (Cd)	1.00	<0.100	<0.10	
		Chromium (Cr)	1.00	<1.00	<1.0	
		Lead (Pb)	1.00	0.745	0.74	
		Selenium (Se)	1.00	<2.50	<2.5	
		Silver (Ag)	1.00	<0.500	<0.50	
21-08-04928-005	104-W-05	Arsenic (As)	1.65	<2.50	<1.5	
		Barium (Ba)	1.65	2.36	1.4	

# Environmental Hazards Services, L.L.C

**Client Number:** 26-3514

**Report Number:** 21-08-04928

**Project/Test Address:** 168765; GFC; 4300 Goodfellow Blvd

Lab Sample Number	Client Sample Number	Analyte:	Wipe Area (ft <sup>2</sup> )	Total Metal (ug)	Concentration (ug/ft <sup>2</sup> )	Narrative ID
		Cadmium (Cd)	1.65	<0.100	<0.061	
		Chromium (Cr)	1.65	<1.00	<0.61	
		Lead (Pb)	1.65	<0.500	<0.30	
		Selenium (Se)	1.65	<2.50	<1.5	
		Silver (Ag)	1.65	<0.500	<0.30	
21-08-04928-006	104-W-06	Arsenic (As)	1.00	<2.50	<2.5	
		Barium (Ba)	1.00	0.990	0.99	
		Cadmium (Cd)	1.00	<0.100	<0.10	
		Chromium (Cr)	1.00	<1.00	<1.0	
		Lead (Pb)	1.00	<0.500	<0.50	
		Selenium (Se)	1.00	<2.50	<2.5	
		Silver (Ag)	1.00	<0.500	<0.50	
21-08-04928-007	104-W-07	Arsenic (As)	1.00	<2.50	<2.5	
		Barium (Ba)	1.00	0.820	0.82	
		Cadmium (Cd)	1.00	<0.100	<0.10	
		Chromium (Cr)	1.00	<1.00	<1.0	
		Lead (Pb)	1.00	<0.500	<0.50	
		Selenium (Se)	1.00	<2.50	<2.5	
		Silver (Ag)	1.00	<0.500	<0.50	

# Environmental Hazards Services, L.L.C

**Client Number:** 26-3514

**Report Number:** 21-08-04928

**Project/Test Address:** 168765; GFC; 4300 Goodfellow Blvd

Lab Sample Number	Client Sample Number	Analyte:	Wipe Area (ft <sup>2</sup> )	Total Metal (ug)	Concentration (ug/ft <sup>2</sup> )	Narrative ID
21-08-04928-008	104-W-08	Arsenic (As)	1.00	<2.50	<2.5	
		Barium (Ba)	1.00	1.42	1.4	
		Cadmium (Cd)	1.00	<0.100	<0.10	
		Chromium (Cr)	1.00	<1.00	<1.0	
		Lead (Pb)	1.00	<0.500	<0.50	
		Selenium (Se)	1.00	<2.50	<2.5	
		Silver (Ag)	1.00	<0.500	<0.50	
21-08-04928-009	104-W-09	Arsenic (As)	1.00	<2.50	<2.5	
		Barium (Ba)	1.00	2.58	2.6	
		Cadmium (Cd)	1.00	<0.100	<0.10	
		Chromium (Cr)	1.00	<1.00	<1.0	
		Lead (Pb)	1.00	<0.500	<0.50	
		Selenium (Se)	1.00	<2.50	<2.5	
		Silver (Ag)	1.00	<0.500	<0.50	
21-08-04928-010	104-W-10	Arsenic (As)	1.00	<2.50	<2.5	
		Barium (Ba)	1.00	<0.500	<0.50	
		Cadmium (Cd)	1.00	<0.100	<0.10	
		Chromium (Cr)	1.00	<1.00	<1.0	
		Lead (Pb)	1.00	<0.500	<0.50	

# Environmental Hazards Services, L.L.C

Client Number: 26-3514

Report Number: 21-08-04928

Project/Test Address: 168765; GFC; 4300 Goodfellow Blvd

Lab Sample Number	Client Sample Number	Analyte:	Wipe Area (ft <sup>2</sup> )	Total Metal (ug)	Concentration (ug/ft <sup>2</sup> )	Narrative ID
		Selenium (Se)	1.00	<2.50	<2.5	
		Silver (Ag)	1.00	<0.500	<0.50	

## Sample Narratives:

**Analyst:** Kailee Guthrie

**Method:** Mercury (Hg): EPA SW846 7471B

All other metals: EPA SW846 3050B/6010D

(b) (6)

Reviewed By Authorized Signatory:

*Tasha Eaddy*

QA/QC Clerk

Sample Results denoted with a "less than" (<) sign contains less than the reporting limit for each particular metal, based on a 50mL volume. The reporting limit for Cadmium is 0.10ug, Barium, Lead and Silver are 0.50ug, Arsenic and Chromium are 1.0ug, and Selenium is 2.5ug.

The condition of the samples analyzed was acceptable upon receipt per laboratory protocol unless otherwise noted on this report. Results represent the analysis of samples submitted by the client. Unless otherwise noted, samples are reported without a dry weight correction. Sample location, description, area, volume, etc., was provided by the client. If the report does not contain the result for a field blank, it is due to the fact that the client did not include a field blank with their samples. EHS sample results do not reflect blank correction. This report shall not be reproduced except in full, without the written consent of the Environmental Hazards Service, L.L.C. California Certification #2319 NY ELAP #11714.

Legend                    ug = microgram                    ug/ft<sup>2</sup> = micrograms per square foot  
                                  mL = milliliter                    ft<sup>2</sup> = square foot

# ENVIRONMENTAL HAZARDS SERVICES, LLC

## Metals Chain of Custody Form

Pg 1 of 1

Company Name	Burns & McDonnell	Account #	26-3514
Company Address	9400 Ward Parkway	City/State/Zip	Kansas City, MO 64114
Phone	314-302-4661	Email	eaahlemeyer@burnsmcd.com
Project Name / Testing Address: GFC / 4300 Goodfellow Blvd			
PO Number	168765	Collected By	Emily Ahlemeyer & Ashley Anstaett
Turn-Around Time	<input checked="" type="radio"/> 3 DAY <input type="radio"/> 2 DAY <input type="radio"/> 1 DAY <input type="radio"/> SAME DAY OR WEEKEND - Must Call Ahead		

LAB NUMBER	Client Sample ID	Collection Date & Time	METALS						Other Metals	PARTICULATES					AIR			WIPES  AREA Circle The Unit of Measurement Used cm or <input checked="" type="radio"/> in	
			Pb TCLP	TCLP RCRA 8	RCRA 8 Total	Toxic Metal Profile	Welding Fume Profile	TX 11 TCLP		CA 17 Total	Total Nuisance Dust	Respirable Dust	TSP Gravimetric	TSP Pb	PM-10	Total Time Mins.	Flow Rate L/min.		Vol. Total Liters
1	104-W-01	8/25/2021; 1330							Ag, As, Ba, Cd Cr, Pb, Se										NA x NA
2	104-W-02	8/25/2021; 1333																	12 x 12
3	104-W-03	8/25/2021; 1334																	12 x 12
4	104-W-04	8/25/2021; 1347																	12 x 12
5	104-W-05	8/25/2021; 1350																	14 x 12.5
6	104-W-06	8/25/2021; 1353																	12 x 12
7	104-W-07	8/25/2021; 1358																	12 x 12
8	104-W-08	8/25/2021; 1401																	12 x 12
9	104-W-09	8/25/2021; 1404																	12 x 12
10	104-W-10	8/25/2021; 1408																	12 x 12
11																			x
12																			x
13																			x
14																			x
15																			x

Released By: Ashley Anstaett	Date: 8/27/2021	Time: 1000
Signature: (b) (6)		

LAB USE ONLY – BELOW THIS LINE

Received By: T. Bohan

Signature: (b) (6)

Date: 8/30/21 Time: 13:  AM  PM

Portal Contact Added

21-08-04928

Due Date:  
**09/02/2021**  
(Thursday)  
EL                      MM-L