

October 20, 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 the top of horizontal surfaces greater than 70 inches above the floor. The purpose of this testing was to further characterize the presence and concentration of target metals in areas of the building that do not have a drop ceiling.

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 Building 104 was conducted on October 5, 2021 by 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



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are consistent with the methodology described in the Housing and Urban Development 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 11 of the 12 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 ^(a) (μg/sq. ft) ^(b)	Highest Concentration ^(a) (μg/sq. ft) ^(b)	Clean Area Limit (c) µg/sq. ft (b)
Silver	< 0.5	<5.0	62
Arsenic	<2.5	<25	62
Barium	21.0	290	3,094
Cadmium	<0.1	1.6	31
Chromium (Total)	<1.0	18	3,094
Lead	7.7	380	10 ^(d)
Selenium	<2.5	<25	1,236

- (a) Samples with a "<" sign indicate that the results were below the laboratory's reporting limit.
- (b) μ g/sq. ft = micrograms per square foot of surface area.
- (c) Clean Area Limit per Brookhaven IH75190=OSHA Housekeeping Limit [[PEL (μg/m³) x 10 m³/100cm²] x 929cm²/sq.ft.] / 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 11 samples that had detectable levels of one or more analytes, 10 of them exceeded the clean area limit.

- A sample taken from the top of a metal diffuser attached to duct work near column G51 of the space on the 2nd floor had a lead concentration of 50 μg/sq. ft.
- 2. A sample taken from the top of a large rectangular overhead hanging light between columns G48 and G49 of the (b) (7)(F) space on the 2nd floor had a lead concentration of 36 µg/sq. ft.
- 3. A sample taken from a long, thin, overhead light between columns G49 and G50 of the space on the 2^{nd} floor had a lead concentration of $14 \mu g/sq$. ft.
- 4. A sample taken from the top of the hot water return pipe near the restroom of the space on the 2^{nd} floor had a lead concentration of 83 μ g/sq. ft.
- 5. A sample taken from the top of the large duct feeding into the trunk line between columns H41 and H42 of the (b) (7)(F) space on the 2nd floor had a lead concentration of 170 μg/sq. ft.
- 6. A sample taken from the duct trunk line between columns G37 and H37 of the space on the 2^{nd} floor had a lead concentration of 120 μ g/sq. ft.
- 7. A sample taken from the Hidden Valley break room hanging light between columns B31 and B32 of the (b) (7)(F) space on the 2nd floor had a lead concentration of 380 µg/sq. ft.
- 8. A sample taken from the top of the heating water supply pipe between columns D13 and C13 of Room 4 in the (b) (7)(F) had a lead concentration of 22 μg/sq. ft.



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- 9. A sample taken from the top of the glycol supply pipe by column C11 of Room 3 in the had a lead concentration of 130 µg/sq. ft.
- 10. A sample taken from the top of the overhead light between columns D5 and D6 of Room 2 in the (b) (7)(F) had a lead concentration of 65 μg/sq. ft.

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,



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 reenvironmental@gsa.gov.



Sample Number	Location	Area Description	Analyte		Result	Units	Clean Area Limit*
104-W-01	Field blank		Arsenic	<	2.50	μg/ft²	
			Barium	<	0.500	μg/ft²	
			Cadmium	<	0.100	μg/ft²	
			Chromium	<	1.00	μg/ft²	
			Lead	<	0.500	μg/ft²	
			Selenium	<	2.50	μg/ft²	
			Silver	<	0.500	μg/ft²	
104-W-02	2nd floor, (b) (7)(F)	Metal diffuser on duct work	Arsenic	<	2.5	μg/ft²	62
		Column G51	Barium		120	μg/ft²	3,094
			Cadmium		0.44	μg/ft²	31
			Chromium		7.7	μg/ft²	3,094
			Lead		50**	μg/ft²	10
			Selenium	<	2.5	μg/ft²	1,236
			Silver		1.5	μg/ft²	62
104-W-03	2nd floor, <mark>(b) (7)(F)</mark>	Large overhead hanging light	Arsenic	<	25	μg/ft²	62
		between columns G48 and G49	Barium		66	μg/ft²	3,094
			Cadmium	<	1.0	μg/ft²	31
			Chromium		18	μg/ft²	3,094
			Lead		36**	μg/ft²	10
			Selenium	<	25	μg/ft ²	1,236
			Silver	<	5.0	μg/ft²	62

Sample Number	Location	Area Description	Analyte	Result	Units	Clean Area Limit*
104-W-04	2nd floor, ^(b) (^{7)(F)}	Long, thin, overhead light	Arsenic	< 2.5	μg/ft²	62
		between columns G49 and G50	Barium	34	μg/ft²	3,094
			Cadmium	0.14	μg/ft²	31
			Chromium	3.5	μg/ft²	3,094
			Lead	14**	μg/ft²	10
			Selenium	< 2.5	μg/ft²	1,236
			Silver	< 0.50	μg/ft²	62
104-W-05	2nd floor, (b) (7)(F)	Hot water return pipe near restroom	Arsenic	< 25	μg/ft²	62
			Barium	130	μg/ft²	3,094
			Cadmium	< 1.0	μg/ft²	31
			Chromium	17	μg/ft²	3,094
			Lead	83**	μg/ft²	10
			Selenium	< 25	μg/ft²	1,236
			Silver	< 5.0	μg/ft²	62
104-W-06	2nd floor, (b) (7)(F)	Large duct feeding into trunk line	Arsenic	< 25	μg/ft²	62
		between columns H41 and H42	Barium	290	μg/ft²	3,094
			Cadmium	< 1.0	μg/ft²	31
			Chromium	16	μg/ft²	3,094
			Lead	170**	μg/ft²	10
			Selenium	< 25	μg/ft²	1,236
			Silver	< 5.0	μg/ft²	62

Appendix A Sample Summary Table

Sample Number	Location	Area Description	Analyte	Result	Units	Clean Area Limit*
104-W-07	2nd floor, (b) (7)(F)	Duct trunk line	Arsenic	< 25	μg/ft²	62
		between columns G37 and H37	Barium	220	μg/ft²	3,094
			Cadmium	< 1.0	μg/ft²	31
			Chromium	18	μg/ft²	3,094
			Lead	120**	μg/ft²	10
			Selenium	< 20	μg/ft²	1,236
			Silver	< 5.0	μg/ft²	62
104-W-08	2nd floor, (b) (7)(F)	Hidden Valley break room	Arsenic	< 12	μg/ft²	62
		between columns B31 and B32	Barium	170	μg/ft²	3,094
		Hanging Light	Cadmium	1.6	μg/ft²	31
			Chromium	18	μg/ft²	3,094
			Lead	380**	μg/ft²	10
			Selenium	< 12	μg/ft²	1,236
			Silver	< 2.5	μg/ft²	62
104-W-09	2nd floor, (b) (7)(F) room 4	Heating water supply	Arsenic	< 2.5	μg/ft²	62
		between columns D13 and C13	Barium	32	μg/ft²	3,094
			Cadmium	0.43	μg/ft²	31
			Chromium	3.0	μg/ft²	3,094
			Lead	22**	μg/ft²	10
			Selenium	< 2.5	μg/ft²	1,236
			Silver	2.0	μg/ft²	62

Sample Number	Location	Area Description	Analyte	Result	Units	Clean Area Limit*
104-W-10	2nd floor, (b) (7)(F) room 3	Glycol Supply by column C11	Arsenic	< 12	μg/ft²	62
	·		Barium	110	μg/ft²	3,094
			Cadmium	1.2	μg/ft²	31
			Chromium	12	μg/ft²	3,094
			Lead	130**	μg/ft²	10
			Selenium	< 12	μg/ft²	1,236
			Silver	3.7	μg/ft²	62
104-W-11	2nd floor, (b) (7)(F) room 2	Overhead light between column D5 & D6	Arsenic	< 2.5	μg/ft²	62
			Barium	71	μg/ft²	3,094
			Cadmium	0.64	μg/ft²	31
			Chromium	4.4	μg/ft²	3,094
			Lead	65**	μg/ft²	10
			Selenium	< 2.5	μg/ft²	1,236
			Silver	1.2	μg/ft²	62

							Clean Area
Sample Number	Location	Area Description	Analyte		Result	Units	Limit*
104-W-12	2nd floor, hallway	Hanging light by column F13	Arsenic	<	2.5	μg/ft²	62
			Barium		21	μg/ft²	3,094
			Cadmium		0.18	μg/ft²	31
			Chromium	<	1.0	μg/ft²	3,094
			Lead		7.7	μg/ft²	10
			Selenium	<	2.5	μg/ft²	1,236
			Silver	<	0.50	μg/ft²	62

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

^{**} Indicates results at or above the Clean Area Limit





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

Telephone: 800.347.4010

9400 Ward Pkwy. Kansas City, MO 64114

Wipe Metals Analysis Report

Report Number: 21-10-01190

Received Date: 10/07/2021 Analyzed Date: 10/13/2021 Reported Date: 10/14/2021

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

Burns & McDonnell Engineering

Client Number:

Client:

Fax Number: **Laboratory Results** 816-822-3494 26-3514

Lab Sample Number	Client Sample Number	Analyte:	Wipe Area (ft²)	Total Metal (ug)	Concentration (ug/ft²)	Narrative ID
21-10-01190-001	104-W-01	Arsenic (As)		<2.50		L01
		Barium (Ba)		<0.500		L01
		Cadmium (Cd)		<0.100		L01
		Chromium (Cr)		<1.00		L01
		Lead (Pb)		<0.500		L01
		Selenium (Se)		<2.50		L01
		Silver (Ag)		<0.500		L01
21-10-01190-002	104-W-02	Arsenic (As)	1.00	<2.50	<2.5	L01
		Barium (Ba)	1.00	124	120	L01
		Cadmium (Cd)	1.00	0.445	0.44	L01
		Chromium (Cr)	1.00	7.69	7.7	L01

Client Number:

26-3514

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

Report Number:

Lab Sample Number	Client Sample Number	Analyte:	Wipe Area (ft²)	Total Metal (ug)	Concentration (ug/ft²)	Narrative ID
		Lead (Pb)	1.00	50.2	50	L01
		Selenium (Se)	1.00	<2.50	<2.5	L01
		Silver (Ag)	1.00	1.48	1.5	L01
21-10-01190-003	104-W-03	Arsenic (As)	1.00	<25.0	<25	L01
		Barium (Ba)	1.00	66.4	66	L01
		Cadmium (Cd)	1.00	<1.00	<1.0	L01
		Chromium (Cr)	1.00	18.2	18	L01
		Lead (Pb)	1.00	35.9	36	L01
		Selenium (Se)	1.00	<25.0	<25	L01
		Silver (Ag)	1.00	<5.00	<5.0	L01
21-10-01190-004	104-W-04	Arsenic (As)	1.00	<2.50	<2.5	L01
		Barium (Ba)	1.00	33.7	34	L01
		Cadmium (Cd)	1.00	0.140	0.14	L01
		Chromium (Cr)	1.00	3.50	3.5	L01
		Lead (Pb)	1.00	14.4	14	L01
		Selenium (Se)	1.00	<2.50	<2.5	L01
		Silver (Ag)	1.00	<0.500	<0.50	L01
21-10-01190-005	104-W-05	Arsenic (As)	1.00	<25.0	<25	L01
		Barium (Ba)	1.00	129	130	L01

Client Number:

26-3514

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

Report Number:

Lab Sample Number	Client Sample Number	Analyte:	Wipe Area (ft²)	Total Metal (ug)	Concentration (ug/ft²)	Narrative ID
		Cadmium (Cd)	1.00	<1.00	<1.0	L01
		Chromium (Cr)	1.00	16.6	17	L01
		Lead (Pb)	1.00	83.0	83	L01
		Selenium (Se)	1.00	<25.0	<25	L01
		Silver (Ag)	1.00	<5.00	<5.0	L01
21-10-01190-006	104-W-06	Arsenic (As)	1.00	<25.0	<25	L01
		Barium (Ba)	1.00	289	290	L01
		Cadmium (Cd)	1.00	<1.00	<1.0	L01
		Chromium (Cr)	1.00	16.3	16	L01
		Lead (Pb)	1.00	172	170	L01
		Selenium (Se)	1.00	<25.0	<25	L01
		Silver (Ag)	1.00	<5.00	<5.0	L01
21-10-01190-007	104-W-07	Arsenic (As)	1.00	<25.0	<25	L01
		Barium (Ba)	1.00	216	220	L01
		Cadmium (Cd)	1.00	<1.00	<1.0	L01
		Chromium (Cr)	1.00	17.6	18	L01
		Lead (Pb)	1.00	124	120	L01
		Selenium (Se)	1.00	<20.5	<20	L01
		Silver (Ag)	1.00	<5.00	<5.0	L01

Client Number:

26-3514

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

Report Number:

Lab Sample Number	Client Sample Number	Analyte:	Wipe Area (ft²)	Total Metal (ug)	Concentration (ug/ft²)	Narrative ID
21-10-01190-008	104-W-08	Arsenic (As)	1.00	<12.5	<12	L01
		Barium (Ba)	1.00	170	170	L01
		Cadmium (Cd)	1.00	1.61	1.6	L01
		Chromium (Cr)	1.00	18.0	18	L01
		Lead (Pb)	1.00	376	380	L01
		Selenium (Se)	1.00	<12.5	<12	L01
		Silver (Ag)	1.00	<2.50	<2.5	L01
21-10-01190-009	104-W-09	Arsenic (As)	1.00	<2.50	<2.5	L01
		Barium (Ba)	1.00	32.4	32	L01
		Cadmium (Cd)	1.00	0.430	0.43	L01
		Chromium (Cr)	1.00	3.00	3.0	L01
		Lead (Pb)	1.00	22.4	22	L01
		Selenium (Se)	1.00	<2.50	<2.5	L01
		Silver (Ag)	1.00	1.97	2.0	L01
21-10-01190-010	104-W-10	Arsenic (As)	1.00	<12.5	<12	L01
		Barium (Ba)	1.00	109	110	L01
		Cadmium (Cd)	1.00	1.24	1.2	L01
		Chromium (Cr)	1.00	11.9	12	L01
		Lead (Pb)	1.00	127	130	L01

Client Number:

26-3514

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

Report Number:

Lab Sample Number	Client Sample Number	Analyte:	Wipe Area (ft²)	Total Metal (ug)	Concentration (ug/ft²)	Narrative ID
		Selenium (Se)	1.00	<12.5	<12	L01
		Silver (Ag)	1.00	3.74	3.7	L01
21-10-01190-011	104-W-11	Arsenic (As)	1.00	<2.50	<2.5	L01

			\ \ ' \	(**5)	(***3****/	
		Selenium (Se)	1.00	<12.5	<12	L01
		Silver (Ag)	1.00	3.74	3.7	L01
21-10-01190-011	104-W-11	Arsenic (As)	1.00	<2.50	<2.5	L01
		Barium (Ba)	1.00	71.4	71	L01
		Cadmium (Cd)	1.00	0.645	0.64	L01
		Chromium (Cr)	1.00	4.41	4.4	L01
		Lead (Pb)	1.00	65.2	65	L01
		Selenium (Se)	1.00	<2.50	<2.5	L01
		Silver (Ag)	1.00	1.24	1.2	L01
21-10-01190-012	104-W-12	Arsenic (As)	1.00	<2.50	<2.5	L01
		Barium (Ba)	1.00	21.3	21	L01
		Cadmium (Cd)	1.00	0.185	0.18	L01
		Chromium (Cr)	1.00	<1.00	<1.0	L01
		Lead (Pb)	1.00	7.74	7.7	L01
		Selenium (Se)	1.00	<2.50	<2.5	L01
		Silver (Ag)	1.00	<0.500	<0.50	L01

Client Number: 26-3514 **Report Number:** 21-10-01190

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

Lab Sample Client Sample Analyte: Wipe Area Total Metal Concentration Narrative Number (ft²) (ug) (ug/ft²) ID

Sample Narratives:

LO1: LCSD percent recovery for Se exceeded acceptance limits.

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. These sample results do not reflect blank correction. This report shall not be reproduced except in full, without the written consent of Environmental Hazards Services, L.L.C. NY ELAP #11714.

Legend ug = microgram $ug/ft^2 = micrograms$ per square foot

mL = milliliter $ft^2 = square foot$

ENVIRONMENTAL HAZARDS SERVICES, LLC

Metals Chain of Custody Form

Pg of

	Company Name	Burns & McDonnell										Account # 26-3514										
Co	ompany Address	9400 Ward Parkway										City/State/Zip Ka				Cansas City, MO 64114						
Phone 314-302-4661				1661								Email eaah				ah	nlemeyer@burnsmcd.com					
P	roject Name / Te	sting	Address	GFC / 430	0 G	00	dfe	llo	w E	3lv	d											
	PO Number	168765 Collected By										Ashley anstaett										
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1	104-W-01	ω	15/21	0845			nerse					Ag, AS,	, Ba, Ca Pb, Se		39.36		366					NA×NA
2	104-W-09			1045								, , , , , , , , , , , , , , , , , , ,										24 × 6
3	104-W-03			1052																		12 × 12
4	104-W-04	1		1053																		12×12
5	104-W-05)		1105																		12× 12
6	104-W-0	و		1115																		12 × 16
7	104-W-0"	7		1125																		12 × 12
8	104-6-0			1140					-													24 × 6
9	104-W-06			1210																		12 × 12
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(b) (6) Signature:	
Date: $10/7/2$ Time: $1:04$ DAM \square PM	21-10-01190
Portal Contact Added	Due Date:
2 7469 WHITEPINE RD, RICHMOND, VA 23237 (800)-347-4010	10/14/2021
F RESULTS VIA CLIENT PORTAL AVAILABLE @ www.leadlab.com	(Thursday)
	L EL MM-L