



National Institute for Occupational  
Safety and Health  
1090 Tusculum Avenue  
Cincinnati OH 45226

September 21, 2016  
HHE 2016-0152

Ms. Allison Acevedo  
Regional Director, Public Buildings  
General Services Administration  
2300 Main Street  
Kansas City, Missouri 64108

Dear Ms. Acevedo:

This final report is in response to the health hazard evaluation request to the National Institute for Occupational Safety and Health (NIOSH). The request, submitted by Mr. Chris Bolinger, Chief of the Safety and Environmental Branch, General Services Administration (GSA), concerned potential employee exposures to legacy contaminants such as lead and asbestos at the Goodfellow Federal Center (GFC), St. Louis, Missouri.

## Background

In response to the request, we reviewed records of prior environmental sampling and analysis at GFC performed by consultants hired by the GSA. We reviewed all environmental exposure evaluations posted on the GSA intranet, dating from 2002 until 2016. These reports documented soil contamination with polychlorinated biphenyls (PCBs), polyaromatic hydrocarbons (PAHs), trichloroethylene (TCE), and lead, including the dirt floor in crawlspaces beneath GFC buildings. Friable (easily crumbled) asbestos-containing material was also found in crawlspaces. In 2016, air sampling for lead and asbestos in the crawlspaces did not detect either substance, but sampling was done while no work was being performed. Air sampling in the office spaces throughout the complex did not detect lead or asbestos, suggesting that neither substance was being circulated through the ventilation systems. Surface wipe sampling results for lead in office spaces were all below the limit of detection (LOD). The LOD is the lowest concentration of a substance that can be reliably detected with a given analytic method. Lead was found on surfaces in crawlspaces, tunnels, and mechanical rooms; on metal beams above a dropped ceiling; on the top of ceiling tiles; and in some stairwells; among other places.

The Social Security Administration (SSA) contracted Federal Occupational Health (FOH) to perform additional sampling for lead and asbestos in SSA offices in building 110. FOH investigators collected air and surface samples for lead and asbestos in occupied office areas, in contrast to sampling discussed above where more sampling was performed in unoccupied areas.

All results were below the LOD. Results from potable water testing did not show lead contamination; however, we recommended expanding water testing in all buildings to include other Environmental Protection Agency regulated contaminants known to be present in the soil surrounding the water lines, such as PCBs, PAHs, and TCE. We made our recommendation because of the potential for back-siphonage (negative pressure in the system that draws contaminated water into the potable water supply). We also recommended continued water testing for metals including lead because of the potential for lead to leach from older pipes.

### Initial Site Evaluation

We visited the GFC on June 27–30, 2016. The goals of our site visit were (1) to determine if there were potential pathways for contaminants to move from the basement, tunnels, and crawl spaces to the occupied offices; (2) to determine if there were pathways for contaminants to enter through the outdoor air intakes in the air handling units that provided ventilation to the occupied offices; and (3) to meet with employees to listen to their concerns and provide our expert opinion concerning occupational safety and health matters.

We checked the direction of airflow at the entrances to the basement and tunnels in buildings 104, 104E, 104F, 105, 105E, 105F, 107, and 110. The entrances to the basement, tunnels, and crawl spaces in buildings 104, 104E, 104F, and 107 were under negative air pressure relative to the offices. This means that air flowed from offices into the basement, which would help minimize the migration of odors and airborne contaminants potentially coming up from the basement and into the offices. A powered fan adjacent to building 103 provided exhaust ventilation for the basements, tunnels, and crawl space network connecting buildings on the GFC campus, which was intended to help to maintain the negative pressure in these areas. According to GSA representatives, this exhaust fan was recently set to operate 24 hours per day, 7 days per week.

We found the entrances to the basement, tunnels, and crawl spaces in buildings 105, 105E, 105F, and 110 to be under neutral pressure relative to the offices (instead of negative air pressure as found in buildings 104 and 107), meaning that air neither consistently flowed into nor from the basement. This may be because these entrances were farthest from the basement/tunnel exhaust ventilation fan located adjacent to building 103. We recommended that these areas be maintained under negative pressure relative to the offices. We suggested that this could be accomplished by installing exhaust fans in the exterior walls. This would provide additional exhaust ventilation since part of buildings 105 and 110 basement walls were slightly above grade. During subsequent town hall meetings in August 2016 we were told that the GSA was evaluating engineering options to provide additional exhaust ventilation to the basement/tunnel area beneath building 110 without degrading the ventilation in other sections of the tunnel network.

We conducted walk-through surveys of mechanical rooms housing air handling units for buildings 103, 104, 105, 105E, 105F, 107, and 110. All but the building 107 mechanical room (in the basement) were located on rooftops. The mechanical rooms were uncluttered, and the air

### Page 3 – Allison Acevedo

handling units themselves appeared well maintained and had properly installed air filters that were replaced on a scheduled basis.

In response to the recent concerns about surface lead contamination at the GFC, the entrances to all of the mechanical rooms that we visited had been posted with signs warning of potential lead contamination. In addition, a site-specific safety plan written by ICE JV required their mechanical room employees to 1) don disposable shoe covers and nitrile gloves prior to entering these areas, and 2) if replacing air filters to wear a tight-fitting powered air-purifying respirator. The ICE JV maintenance employees were part of a respirator program and had received respirator training, fit-testing, and medical evaluation prior to wearing a respirator.

None of the outdoor air intakes for the air handling units we visited were in, connected to, or near the basement/tunnel network. All but two of the air handling units that we surveyed had MERV 8 air filters. MERV stands for “minimum efficiency reporting value” and is a rating scale developed by ASHRAE, an international organization that develops consensus standards dealing with ventilation. MERV 8 air filters are commonly used in office buildings. Newer air handling units in two buildings (104 and 110) were equipped with MERV 8 prefilters followed by much higher efficiency MERV 14 secondary filters. However, two of the air handlers that we inspected in building 103 were equipped with less efficient (less than MERV 8) roll-type air filters. We were informed by the maintenance contractor that a request was made to replace the roll air filters with MERV 8 air filters.

We met with employer and employee representatives from GSA, maintenance and housekeeping contractors, and tenant agencies at the office complex. The most common concerns expressed by employees in our meetings were:

- Is there lead-containing dust on top of the suspended ceiling tiles, or on beams located above the ceiling tiles, and could this dust enter the office spaces?
- Are contaminants from the crawlspaces entering the office spaces?
- Is lead or asbestos being recirculated through the ventilation systems in the office spaces?
- Is the water safe to drink?
- Should employees have medical testing specific to these potential exposures?

In our employer and employee meetings we learned more about the different tenant agencies and their work. We used this information to formulate the following comments and recommendations:

- Contract employees of ICE JV performed all maintenance work at the complex. This required routine entry into the crawlspaces, tunnels, and mechanical rooms; and work above ceiling tiles. We were informed that, until recently, these contractors were not fully

informed of the conditions of the work. Because of the nature of their work and potential exposures, we recommend that the employees performing maintenance each receive a medical evaluation consisting of a detailed occupational history and a baseline physical examination performed by an occupational medicine physician.

- Because of their potential exposure to asbestos fibers, which had been found on asbestos-wrapped pipes and in the soil in the crawlspaces and tunnels, we also recommended that the ICE JV maintenance employees have spirometry (a measurement of breathing capacity) and a baseline chest x-ray with B-reading (a specialized chest x-ray interpretation that looks for changes caused by inhaling certain toxic dusts like asbestos). Information about medical surveillance for asbestos exposed employees is available at [https://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=STANDARDS&p\\_id=10003](https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10003).
- At the beginning of our evaluation we recommended that ICE JV maintenance employees have periodic blood lead level (BLL) testing. We based this recommendation on the fact that maintenance employees working in the crawlspaces, tunnels, and above the ceiling spaces could disturb materials containing lead. Just prior to our initial visit in June 2016 the ICE JV maintenance employees were tested twice, and all results were below the laboratory LOD of 3 micrograms per deciliter of blood ( $\mu\text{g}/\text{dL}$ ). However, they had not been working in the areas of concern (the basement, tunnels, and crawlspaces) for 2 months. Therefore, we recommended continuing BLL tests on all lead-exposed employees every 6 months once they resumed their regular maintenance duties. The continuing need for BLL testing should be re-evaluated in the future by an occupational medicine physician. The decision to continue will depend on the BLL results and assessment of the work exposures.
- We recommended that personal air sampling be conducted while these ICE JV employees perform their usual work duties in the crawlspaces and tunnels to better assess the potential exposures from the work. As with the BLL testing, the continuing need for personal air sampling should be re-evaluated in the future for employees with repeated very low exposures.
- During our evaluation we learned that some GSA employees intermittently entered the crawlspaces, tunnels, and mechanical rooms to inspect contractor work. We recommended that these employees have a one-time history and physical examination performed by an occupational medicine physician, a chest radiograph with a B-reading, spirometry, and a BLL test.
- We also learned that the Defense Information Systems Agency (DISA) had employees called escorts. For security reasons these escorts were required to accompany non-DISA employees during all work in their office, mechanical rooms, basement, tunnels, and crawlspaces. On this basis we recommended these employees have a one-time history

and physical examination performed by an occupational medicine physician, a chest radiograph with a B-reading, spirometry, and a BLL test.

- The U.S. Department of Veterans Affairs, Veterans Benefits Administration (VBA) had file clerks who spent their day in the expansive Records Management Center (RMC) file room, filing incoming records and pulling records of veterans to be sent to regional offices. The file room had an exposed ceiling and beams that had been sprayed with fireproofing material. The ventilation system for this area was very sophisticated and included MERV 8 and MERV 14 air filters, humidification, and ultraviolet germicidal irradiation lamps in the ductwork. Results from limited surface sampling for lead done by a GSA contractor in this area prior to our evaluation were below the LOD, but additional surface sampling on the top of file cabinets and on a lower shelf done by an Occupational Safety and Health Administration compliance officer found lead levels up to about 3,000 micrograms per sample. We recommended BLL testing on these employees, requiring employees to wear gloves while handling files, and advising employees to wash their hands prior to eating in the designated break room. We noted that additional NIOSH recommendations may be made once the results of the BLLs on file clerks were obtained.
- We did not recommend any medical testing of other GFC employees whose work did not require entry into the basement, tunnels, or crawlspaces, or routine entry into the VBA RMC file room. Two employees reported having BLL tests done by their healthcare provider, and both were below the LOD. It is important to note that an employee in building 110 reported to us that they had an elevated BLL of 5 µg/dL. However, when we examined the employee's laboratory report we found it had been misinterpreted and the BLL result was actually below the LOD of 3 µg/dL. We did recommend that all employees have documentation of the potential for exposure to lead and asbestos noted in their personnel file.

### Follow-up Evaluation and Town Hall Meetings on August 1–3, 2016

Following our initial site visit, we reviewed additional industrial hygiene sampling and BLL testing results that were completed in response to the higher-than-expected surface wipe sample results for lead from the VBA RMC file room. This industrial hygiene testing was done by a GSA contractor and the blood lead testing was done by the U.S. Department of Veterans Affairs Medical Center in St. Louis, Missouri. All results were shared with us.

#### *Surface Wipe Sampling*

- In late June, GSA contracted with an independent environmental consultant to collect additional surface wipe samples. The purpose of this sampling was to further characterize the potential surface contamination in the file room and adjacent VBA offices. These samples were analyzed for lead and other metals, including chromium,

arsenic, and cadmium. In most instances each surface wipe sample was collected over 100 square centimeters (100 cm<sup>2</sup>). We reviewed 235 surface wipe sample results.

- The hazardous metal most frequently detected in the surface wipe samples, and at the highest concentrations, was lead; lead levels ranged from “not detected” to 52 µg/100 cm<sup>2</sup>.
- The wipe sample results fell into three groups:
  - 35% not detectable, that is, below the laboratory LODs of either 0.5 µg or 1.0 µg of lead per sample
  - 43% below 4.3 µg per 100 cm<sup>2</sup>, the Environmental Protection Agency (EPA) guideline for cleanup of commercial and residential buildings following the World Trade Center attack.
  - 22% above the EPA guideline
- The highest surface wipe result was 52 µg/100 cm<sup>2</sup>, well below the 3,000 µg/wipe sample result obtained during the prior OSHA investigation.
- Most (75%) of the 235 surface wipe samples had no detectable levels of cadmium (LOD was 0.2 µg per sample). Of the samples with detectable cadmium, the median concentration was 0.92 µg per 100 cm<sup>2</sup> (range 0.21 to 34 µg per 100 cm<sup>2</sup>). There are no Federal guidelines for cadmium on surfaces. Arsenic was not detected in any samples.
- Other generally nonhazardous metals were detected, including trivalent chromium and selenium (both essential elements for humans), barium, and silver.
- Because some employees had expressed concern that files transferred from the file room to the VBA offices might be contaminated, 24 surface wipe samples were collected on the outside and the inside of paper files. Most samples did not detect any metals. Lead levels were very low in the wipe samples where metals were detected (range: not detected to 3.1 µg per 100 cm<sup>2</sup>).

#### *Background levels of metals on surfaces*

It is important to note that metals, both hazardous and nonhazardous, are present on surfaces in many environments in low levels. For example, a recent NIOSH investigation in an office found lead in 15 of 15 surface wipe samples (in concentrations ranging from the LOD to 10 µg per 100 cm<sup>2</sup>), cadmium in 15 of 15 samples (in concentrations ranging from the LOD to 3.4 µg per 100 cm<sup>2</sup>), and barium in 15 of 15 samples (in concentrations ranging from the LOD to 77 µg per 100 cm<sup>2</sup>). At that facility, no manufacturing or production activities that generate these metals were performed and there were no other known sources of these metals.

*Blood Lead Level Testing*

We reviewed the results from 75 VBA employees, including file clerks, who received a BLL test. In addition, 15 DISA employees had BLL testing done by FOH. All but four of the 75 VBA employees' BLLs were below the laboratory LOD of 2 µg/dL. The lead levels of four employees (3 µg/dL) were within the range of lead that is found in the U.S. general population, which is up to 3.36 µg/dL. It was reported to us that all DISA employees' BLLs were below the laboratory LOD. On the basis of these results we did not recommend any further BLL testing or biological testing for other metals of VBA or DISA employees.

*Employee Town Hall Meetings at the Goodfellow Federal Complex*

We returned to GFC again from August 1–3, 2016, to discuss the results of the additional industrial hygiene sampling and BLL testing and to answer employees' questions. We did this via a series of town hall meetings that were open to all employees. We mentioned that cleaning of the VBA facility was ongoing, and emphasized the importance of continued good housekeeping and employee work practices in the file room after this major cleaning effort was completed.

Additional NIOSH Recommendations

The following are recommendations that were not included in our previous letters.

1. Clean the mechanical rooms housing air handling units for buildings 103, 104, 105, 105E, 105F, 107, and 110. We recommend cleaning methods that minimize airborne dust, for example wet cleaning or using vacuums equipped with high-efficiency particulate arrestance air filters. After cleaning we recommend collecting surface wipe samples and personal air samples for lead. The sampling results should be used to (1) determine if lead warning signs are needed at the mechanical room entrances and (2) if the need for personal protective equipment when entering and working these areas (such as replacing air filters) could be reduced or eliminated for maintenance personnel.
2. Evaluate replacing the current roll-type air filters used in two of the air handlers in building 103 with more efficient MERV 8 air filters. This determination should be made in consultation with a ventilation engineer with a goal of avoiding damage to the air handlers after installing higher efficiency air filters.

This letter serves as a final report and concludes this health hazard evaluation. According to federal regulation (42CFR85.11), the employer must post a copy of this letter for 30 days at or near work areas of affected employees. In this instance, please share this letter with all employees of the tenants at the GFC complex. We are sending a copy of this letter to the

**Page 8 – Allison Acevedo**

Occupational Safety and Health Administration Region VII Office and the Missouri Department of Health and Senior Services. If you have questions, please contact Gregory Burr at 513-841-4582 or Elena Page at 513-458-7144.

Sincerely yours,

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