



TAP WATER SAMPLING FOR LEAD AND COPPER ANALYSIS
Select NJARNG Facilities
Round 2 Results
Calendar Year 2018



Prepared for:

New Jersey Department of Military and Veterans Affairs
101 Eggert Crossing Road, Lawrenceville, NJ 08625-0340

And

New Jersey Army National Guard
CFMO
101 Eggert Crossing Road, Lawrenceville, NJ 08625-0340

Prepared by:

Stockton University Collaborative Environmental Internship Program



Intern Advisor: John Hallagan
Interns: Nicholas Cordivari, Steven Hoffman, Laurel Klein, Alexandria Petrosch, Corey Wilkinson

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Acronym List

AL - Action Level
ARNG - Army National Guard
B (floor) - Basement
Bldg - Building
CFMO - Construction and Facilities Management Office
CFR - Code of Federal Regulations
COC - Chain of Custody
Cu - Copper
EMB - Environmental Management Bureau
EPA - Environmental Protection Agency
FMS - Field Maintenance Shop
FOC – Faucet of Concern
ID - Identification
min - Minute
mL - Milliliter
N/A - Not Available
NJARNG - New Jersey Army National Guard
NJDMAVA - New Jersey Department of Military and Veterans Affairs
NJSDWA - New Jersey Save Drinking Water Act
Pb - Lead
POE – Point of Entry
ppm - Parts per Million
QA - Quality Assurance
SOP - Standard Operating Procedure
SUEIP - Stockton University Environmental Internship Program

Definitions

Action Level: The level of lead or copper which, if exceeded, triggers treatment or other requirements that a water system must follow.

Below Detection: Concentrations of Pb and Cu lower than the analytical detection limits of the laboratory equipment. The detection limit for Pb is 0.002 mg/L. The detection limit for Cu is 0.04 mg/L.

Bioaccumulate: The accumulation of a substance in a living organism.

Blank: A sample created as a quality control measure. Blanks should be handled, transported, analyzed, and treated similarly in every way as the field samples.

Faucet: For the purposes of this report, the term "Faucet" will be used to describe any fixture where water can be accessed, including water fountains and spigots.

Faucet ID: A unique label given to each faucet sampled. This ID was generated using a 12 digit random number generator consisting of numbers and uppercase letters. A Faucet Identification Table with faucet descriptions can be found in Appendix A.

Faucet of Concern: A faucet that has produced results exceeding the Pb or Cu AL during previous sampling rounds.

Point of Entry: The location where city water enters a building.

Sample ID: A unique label given to each sample collected.

1.0 Introduction

At each New Jersey Army National Guard Facility, drinking water is provided for soldiers and on-site working civilians. Facilities supply drinking water to employees using sinks and drinking-water-fountain systems. Under the NJARNG's Water Quality Management section of the Environmental Compliance Desktop Guide, facilities must comply with regulations and requirements to ensure that each site has available and protected drinking-water systems. Regulations include the Federal Safe Drinking Water Act (SDWA) and the State of New Jersey Safe Drinking Water Act (NJSDWA). These acts establish the standards set for NJARNG's drinking water and protect the integrity of each system through proper construction and operation of all facility water systems.

A priority for Water Quality Management at NJARNG facilities is to monitor the concentrations of lead (Pb) and copper (Cu) in drinking water. Routine water sampling is conducted to analyze the lead and copper concentrations for unfiltered water systems, specifically water fountains, breakroom sinks, and kitchen sinks. Lead and copper are found throughout the environment in water, air, soil, household dust, lead-based paint, and food. These toxic elements can pose a significant risk to health after excessive exposure. Lead and copper are able to bioaccumulate over many years and can cause damage to the brain, red blood cells, and kidneys. Although lead and copper pose the greatest risk to young children and pregnant women, an adult's mental and physical development can also be slowed during their growing process. According to the EPA, the exposure levels of lead and copper that warrant remedial action (action level) are lead concentrations in exceedance of 0.015 ppm or copper concentrations in exceedance of 1.3 ppm.

In the winter and spring of 2018, 101 faucets at 29 NJARNG sites were sampled by the Stockton University Environmental Internship Program (SUEIP) team in collaboration with the New Jersey Department of Military and Veterans Affairs Environmental Management Bureau (NJ DMAVA EMB). This First Round of water sampling identified 14 faucets at 12 different sites with Pb or Cu concentrations equal to or exceeding the AL standards set by the EPA SDWA. A Quality Assurance (QA) round of water sampling was conducted in May and June of

2018, during which 10 of the 14 contaminated faucets identified in Round 1 were re-tested. Five of the 10 faucets sampled during the QA Round continued to produce results exceeding the Pb or Cu AL. Detailed methods, results, and action plans from Round 1 and the QA round can be found in an earlier report titled “Tap Water Sampling for Lead and Copper Analysis, Select NJARNG Facilities, Round 1 and Quality Assurance Results, Calendar Year 2018.”

A Second Round of water sampling was conducted in the summer of 2018 to identify the source of the Pb or Cu contamination for the faucets that produced results greater than or equal to the Pb or Cu AL in Round 1. This report includes sampling methods and results from Round 2, as well as action plans and recommendations for how to address the suspected sources of contamination at each affected site.

2.0 Methods

In an effort to identify the source of contamination for each FOC (faucet of concern), samples were collected from the FOC as well as other faucets within the building. Facility armorers were consulted to identify the location where the main water line enters the building (water point of entry (POE)). Samples were collected from the faucet or spigot closest to the POE to confirm that water entering the building did not exceed the Pb or Cu AL. In some cases, the FOC was the faucet closest to the POE, in which case, a sample was collected from the nearest downstream faucet. Detailed site-specific methods can be found in Section 3.0 of this report. Floor plans showing faucet locations and water flow can be found in Appendix B.

Notes: In an effort to stay consistent with Round 1 and QA Round sampling methods, an 8 hour stagnation period was required prior to collecting Draw 1. Armorers were contacted in advance, and asked to place signs on faucets in an effort to prevent the FOCs from being used. In some cases, due to limited options, preventing faucets from being used by site personnel prior to sampling was not practical. Furthermore, the POE was not identified until the sampling team arrived on site, therefore signs could not be placed on those faucets in advance. In most cases,

these were faucets that were likely unused, despite not having signs. Detailed notes were collected by the sampling team if a faucet was suspected of being used prior to sampling.

Draw 1 Methods

1. A 1L wide-mouthed sample bottle was placed below the faucet. The cold water tap was opened to fill the bottle, with a flow rate similar to filling a glass of water.
2. The sample bottle was tightly capped and labeled.
3. Sample collection data was recorded on the Water Sample Collection Form and COC Form. An example of these forms can be found in Appendix E.

Draw 2 Methods

1. The cold water was flushed for several minutes until the sampler could feel a significant change in the water temperature, indicating that new water was entering the building. Flush times were recorded on the Water Sample Collection form.
2. After flushing, a second sample was collected by placing an opened bottle under the flowing water.
3. The sample bottle was tightly capped and labeled.
4. Sample collection data was recorded on the Water Sample Collection Form and COC Form.
5. Samples were transported to J.R. Henderson Labs in Beechwood, NJ for analysis within 14 days of collection. Data from the Water Sample Collection Form and lab results were entered into a database, and proofed for accuracy

Blanks

As a quality control measure, 5 blanks made from purchased Water Blank - ASTM Type I Water were also submitted for analysis. A Certificate of Reference Material for the water, as well as the lab results from these blanks, can be found in Appendix D. Methods for creating the blanks are below.

1. The sealed 4L bottle of ASTM Type I Water was opened.
2. A 1L sample bottle was opened.

3. Water was carefully poured directly from the 4L bottle into the 1L sample bottle to the 700ml mark. No funnels or other pouring aids were used.
4. The sample bottle was tightly capped and labeled.
5. Sample collection data was recorded on a Water Sample Collection Form and COC Form.
6. Samples were transported to J.R. Henderson Labs in Beechwood, NJ for analysis within 14 days of collection. Data from the Water Sample Collection Form and lab results were entered into a database, and proofed for accuracy.

3.0 Site Specific Methods, Results, and Action Plans

59 samples from 30 faucets at 12 different sites were collected during Round 2. 11 of the 30 faucets produced results exceeding the AL for Pb and/or Cu, 4 of which had not been tested previously. Detailed site-specific results as well as result interpretations and action plans are in sections 3.0 below. A complete list of all results from Round 1, the QA Round, and Round 2 can be found in Appendix C.

Atlantic City

Methods

We chose to sample from the men’s bathroom sink because it is serviced by the same plumbing that serves the Gym Kitchen Sink, and is close to the water Point of Entry (POE). Figure AC1 shows the direction of water flow between faucet locations.

Results

Pb and Cu results for both faucets were below the AL for all draws in Round 2. However the gym kitchen sink had high concentrations of Pb in both Round 1 and the QA Round.

Round 2

Collection Date	Bldg	Floor #	Faucet Description	12 Digit Faucet ID (FOC highlighted in blue)	Sample ID	Draw	Faucet Usage	Lead Results (mg/L)	Copper Results (mg/L)
9/4/2018	Armory	1	Gym Kitchen Sink	JUW0W7MN6GRN	AY-9-4-18-1A-R2	1	Not Used	0.009	0.2
9/4/2018	Armory	1	Gym Kitchen Sink	JUW0W7MN6GRN	AY-9-4-18-1B-R2	2	Not Used	<0.002	0.1
9/4/2018	Armory	1	Mens Bathroom Sink	NQIVQCIZSTQ5	AY-9-4-18-2A-R2	1	Daily	<0.002	0.3
9/4/2018	Armory	1	Mens Bathroom Sink	NQIVQCIZSTQ5	AY-9-4-18-2B-R2	2	Daily	<0.002	0.07

- *Interpretation of Results:* Neither faucet produced results exceeding the Pb or Cu AL during Round 2, making it difficult to identify the source of contamination from Round 1 and the QA Round. However, another faucet (2nd Floor Kitchen Sink: VX8I0C8C2OZX) in the building was tested during Round 1, and produced results below the laboratory detection limits (<0.002 ppm) for Pb. Because the faucet closest to the POE (1st Floor Men's Bathroom Sink: NQIVQCIZSTQ5) was below the Pb detection limit, the 2nd Floor Kitchen Sink was below the Pb detection limit, and the faucet between the two (1st Floor Kitchen Sink) exceeded the Pb AL in Round 1 and the QA Round, it is likely that the source of contamination is coming from within the fixtures and/or plumbing in the 1st floor kitchen, and not from somewhere else "upstream" of the FOC.

Action Plans

- Option 1: Replace plumbing and fixtures in the 1st floor kitchen. Conduct periodic testing of all kitchen faucets.
- Option 2: Designate the 1st floor kitchen for dishwashing only (not for consumption purposes), and install a bottle filling station that is equipped with an automatic filter status display on the first floor. Conduct periodic testing of the 2nd floor kitchen sink.
- Option 3: Test all kitchen faucets, starting with the furthest "upstream" faucet in an attempt to locate the source of contamination.

Dover

Methods

Water enters the Armory at the Southern end of the building, as shown in Figure DO1. There were no accessible faucets between the POE and the kitchen, therefore we were unable to sample "upstream" of the FOC (V5PT95H3E739). Instead, we chose to sample from the women's bathroom sink (U6O0FU1WU611) because it is the faucet immediately "downstream" of the kitchen. Figure DO1 shows the direction of water flow between faucet locations.

Results

The FOC (V5PT95H3E739: Kitchen Sink) had Pb concentrations greater than the AL on Draw 1 (but not draw 2) of Round 2. Faucet U6O0FU1WU611 (women's bathroom) was below the AL for both contaminants for both Draws 1 and 2.

The FOC also exceeded the Pb AL during Round 1 of sampling, but was not re-tested during the QA Round.

Round 2

Round	BLDG	Collection Date	Faucet Description	Environmentalsample IDPK	Draw	Faucet Usage	Lead Results mg/L	Copper Results mg/L
1	Armory	3/9/2018	Lower level kitchen sink	V5PT95H3E739	1	Monthly	0.02	1
1	Armory	3/9/2018	Lower level kitchen sink	V5PT95H3E739	2	Monthly	<0.002	0.04
2	Armory	8/30/2018	Lower Level Kitchen Sink	V5PT95H3E739	1	Monthly	0.025	0.1
2	Armory	8/30/2018	Lower Level Kitchen Sink	V5PT95H3E739	2	Monthly	<0.002	0.05
2	Armory	8/30/2018	Women's Bathroom First Sink near door Room 24	U6O0FU1WU611	1	Daily	<0.002	0.04
2	Armory	8/30/2018	Women's Bathroom First Sink near door Room 24	U6O0FU1WU611	2	Daily	0.007	0.08

- Interpretation of Results: Because the FOC exceeded the Pb AL, and the closest faucet "downstream" of the FOC was below the Pb AL, it is possible that the source of contamination is coming from within the plumbing and/or fixtures in the kitchen after those lines branch off from the main plumbing line that continues to service the rest of the building, including the women's bathroom. Round 1 results, however, do not fully

support this theory, because samples from a 2nd floor unfiltered water fountain “downstream” of the FOC contained elevated Pb levels of 0.014 ppm. Although this does not exceed the Pb AL of 0.015 ppm, it suggests that there may be a second source of contamination, likely from within the 2nd floor water fountain itself. If the source of contamination was from the line servicing the rest of the building, we would expect to see contamination in the women’s bathroom as well as the 2nd floor water fountain and the FOC.

Action Plans

- Option 1: Replace plumbing and fixtures in the kitchen. Conduct periodic testing of all kitchen faucets, as well as the 2nd floor water fountain.
- Option 2: Designate the 1st floor kitchen for dishwashing only (not for consumption purposes), and install a bottle filling station that is equipped with an automatic filter status display on the first floor. Conduct periodic testing of the 1st and 2nd floor water fountains.
- Option 3: Test all kitchen faucets, starting with the furthest "upstream" faucet in an attempt to locate the source of contamination.

Hackettstown

Methods

Water enters the building through the boiler room as shown in Figure HT1, and quickly branches North and South. The FOC (Kitchen Sink: 758GWT8406MA) is on the North branch. There were no accessible faucets between the POE and the FOC, therefore we were not able to get a sample “upstream” of the FOC. Instead, we sampled the nearest faucet on the Southern branch (Mens Bathroom: E19W3A8DMCDW). Two draws were taken from the FOC. Only one draw was taken from the men’s bathroom sink. Figure HT1 shows the direction of water flow between faucet locations.

Results

Both the FOC and the South branch sample in the men’s bathroom were above the Pb and Cu AL in Round 2. However, during Round 1, a sample was collected from an unfiltered water fountain (T8Q8PLNOI3EX) immediately “downstream” of the FOC, producing results below the Pb and Cu AL, while the FOC was above the Pb AL.

Round 2

Round	BLDG	Collection Date	Faucet Description	Environmentalsample IDPK	Draw	Faucet Usage	Lead Results mg/L	Copper Results mg/L
1	Armory	4/5/2018	Kitchen Sink by fire extinguisher SYS1	758GWT8406MA	1	Monthly	0.017	0.2
1	Armory	4/5/2018	Kitchen Sink by fire extinguisher SYS2	758GWT8406MA	2	Monthly	<0.002	0.1
QA	Armory	6/5/2018	Kitchen Sink by fire extinguisher SYS1	758GWT8406MA	1	Monthly	0.012	0.2
2	Armory	8/30/2018	Locker Room (127), Men's Bathroom Sink	E19W3A8DMCDW	1	Daily	<0.002	0.1
2	Armory	8/30/2018	Kitchen Sink by fire extinguisher SYS1	758GWT8406MA	1	Monthly	0.003	0.3
2	Armory	8/30/2018	Kitchen Sink by fire extinguisher SYS1	758GWT8406MA	2	Monthly	<0.002	0.1

- *Interpretation of Results:* Because the kitchen faucets branch off of the same line servicing the North-end water fountain (T8Q8PLNOI3EX), it is likely that the source of contamination from Round 1 was from within the kitchen plumbing and/or fixtures, and not from the main line servicing the North side of the building. If the source of contamination was within the main line servicing the entire North-end of the building, we would expect to see elevated concentrations of Pb from the FOC and in the water fountain “downstream” of the FOC during the same sampling event.

Action Plans

- Option 1: Replace plumbing and fixtures in the kitchen. Conduct periodic testing of all kitchen faucets.
- Option 2: Designate the kitchen for dishwashing only (not for consumption purposes), and install a bottle filling station that is equipped with an automatic filter status display on the first floor. Conduct periodic testing of the bottle filling station and all water fountains.
- Option 3: Test all kitchen faucets, starting with the furthest "upstream" faucet in an attempt to locate the source of contamination.

Lawrenceville

Methods

Water enters the FMS by the door in the garage bay as shown in Figure LV1. We collected two draws from the FOC (IOFQA7QL25X2), and two draws from the spigot by the water fountain (L5CD170VA3YM). We chose to sample from this spigot because it is located directly on the main water line near the POE. Figure LV1 shows the direction of water flow between faucet locations.

Results

The initial draw (Draw 1) from L5CD170VA3YM was very discolored, resulting in high concentrations of Pb and Cu, most likely because of stagnant water in the spigot itself. When sampling from this faucet, the water was discolored only for a moment, then immediately turned clear. The lines were not flushed prior to collecting a second sample (Draw 2), resulting in Cu concentrations below detection, and Pb concentrations nearly below detection. The FOC (FMS breakroom sink IOFQA7QL25X2) was not high in either contaminant during Round 2.

Round 2

Round	BLDG	Collection Date	Faucet Description	Environmentalsample IDPK	Draw	Faucet Usage	Lead Results mg/L	Copper Results mg/L
1	FMS	1/25/2018	Break Room Sink FMS	IOFQA7QL25X2	2	Daily	<0.002	0.04
1	FMS	2/8/2018	Break Room Sink FMS	IOFQA7QL25X2	1	Daily	0.093	0.5
1	FMS	2/8/2018	Break Room Sink FMS	IOFQA7QL25X2	2	Daily	<0.002	<0.04
QA	FMS	5/31/2018	Breakroom Sink FMS	IOFQA7QL25X2	1	Daily	<0.002	<0.04
QA	FMS	5/31/2018	Breakroom Sink FMS	IOFQA7QL25X2	2	Daily	<0.002	0.7
2	FMS	8/30/2018	Breakroom Sink FMS	IOFQA7QL25X2	1	Daily	<0.002	0.06
2	FMS	8/30/2018	Breakroom Sink FMS	IOFQA7QL25X2	2	Daily	<0.002	0.04
2	FMS	8/30/2018	Spigot by Water Fountain	L5CD170VA3YM	1	Rare	1.09	10.0
2	FMS	8/30/2018	Spigot by Water Fountain	L5CD170VA3YM	2	Rare	0.004	<0.04

- *Interpretation of Results:* As stated above, it is likely that the high Pb and Cu concentrations from L5CD170VA3YM was from stagnant water in the spigot itself. That particular spigot most likely had not been used in a long time. The second sample taken from the spigot was nearly below detection for both contaminants. Therefore we can conclude that the water is free of contaminants prior to entering the building. Because

the FOC Pb and Cu concentrations were nearly below detection for Round 2, it is difficult to speculate what the source of contamination was during Round 1. The FOC was also below detection during the QA Round of sampling. Further sampling is recommended to locate the source of contamination.

Action Plans

Recommendations: Sample from L5CD170VA3YM, the FOC, and all other accessible faucets “downstream” of the FOC.

Mercer

Methods

Two draws were collected from FOC (WTC54KMSATIG), as well as two draws from an “upstream” utility sink (SRPBRVS9CWPG). We chose to sample from the utility sink because it is the closest faucet to the water POE. Figure ME1 shows the direction of water flow between faucet locations.

Results

Pb and Cu levels for faucets SRPBRVS9CWPG and WTC54KMSATIG were below the AL for both draws in Round 2. However faucet WTC54KMSATIG exceeded the Pb AL on Draw 2 of Round 1. Faucet WTC54KMSATIG was below the Pb and Cu AL for both draws during the QA round.

Round 2

Round	BLDG	Collection Date	Faucet Description	Environmentalsample IDPK	Draw	Faucet usage	Lead Results mg/L	Copper Results mg/L
1	State police Office	2/22/2018	Breakroom Sink	WTC54KMSATIG	1	Daily	<0.002	0.07
1	State police Office	2/22/2018	Breakroom Sink	WTC54KMSATIG	2	Daily	0.048	0.07
QA	State police Office	5/31/2018	Breakroom Sink	WTC54KMSATIG	1	Daily	<0.002	<0.04
QA	State police Office	5/31/2018	Breakroom Sink	WTC54KMSATIG	2	Daily	<0.002	0.08
2	State police Office	8/30/2018	Utility Sink	SRPBRVS9CWPG	1	3XWeek	<0.002	0.08
2	State police Office	8/30/2018	Utility Sink	SRPBRVS9CWPG	2	3XWeek	<0.002	0.07
2	State police Office	8/30/2018	Breakroom Sink	WTC54KMSATIG	1	Daily	<0.002	0.08
2	State police Office	8/30/2018	Breakroom Sink	WTC54KMSATIG	2	Daily	<0.002	0.09

- *Interpretation of Results:* Results from the utility sink (SRPBRVS9CWPG) suggest that water entering the building is free of contaminants. Because Pb and Cu concentrations in samples collected from breakroom sink (WTC54KMSATIG) were below the AL during

Round 2 and the QA Round, it is difficult to speculate what the potential source of contamination was during Round 1.

Action Plans

- Option 1: Install a filtered bottle filling station that is equipped with an automatic filter status display in the breakroom, and designate the breakroom sink for dishwashing only (not for drinking).

Newark

Methods

Water enters the Newark armory in the boiler room. The FOC (IORBRPRVR102) was the first accessible faucet to the POE. Therefore we were unable to collect samples “upstream” of the FOC. Instead, we chose to sample from the women's bathroom sink (faucet TLLNBLTQQT9J) because it is immediately "downstream" of the FOC. Figure NW1 shows the direction of water flow between faucet locations.

Results

- IORBRPRVR102 produced results exceeding the Pb AL on Draw 2 of Round 2, while TLLNBLTQQT9J produced Pb and Cu results below the AL on both draws 1 and 2. Faucet IORBRPRVR102 was high in Pb for Draws 1 and 2 of Round 1, but was below the AL for both contaminants during the QA round of sampling.

Round 2

Round	BLDG	Collection Date	Faucet Description	EnvironmentalsampleIDPK	Draw	Faucet Usage	Lead Results mg/L	Copper Results mg/L
1	Armory	4/13/2018	Break room sink	IORBRPRVR102	1	Monthly	0.017	0.7
1	Armory	4/13/2018	Break room sink	IORBRPRVR102	2	Monthly	0.034	0.6
QA	Armory	6/5/2018	Breakrom Sink	IORBRPRVR102	1	Monthly	0.005	0.1
QA	Armory	6/5/2018	Breakroom Sink	IORBRPRVR102	2	Monthly	0.005	0.5
2	Armory	9/6/2018	Breakroom Sink	IORBRPRVR102	1	Monthly	0.009	0.6
2	Armory	9/6/2018	Breakroom Sink	IORBRPRVR102	2	Monthly	0.018	0.5
2	Armory	9/6/2018	Womens Room Sink	TLLNBLTQQT9J	1	Monthly	<0.002	0.1
2	Armory	9/6/2018	Womens Room Sink	TLLNBLTQQT9J	2	Monthly	<0.002	0.08

- *Interpretation of Results:* Because samples from the breakroom sink contained Pb concentrations exceeding the AL, and water from the closest "downstream" faucet (women's bathroom sink) was below the AL, this suggests that the source of contamination for the breakroom sink is from the plumbing branching off from the main water line to the breakroom sink, or from within the breakroom sink fixtures itself, and not from the main water line servicing the rest of the building. It is unclear why Draw 1 was below the Pb AL, but Draw 2 was above the Pb AL. Faucet IORBRPRVR102 was

high in Pb for Draws 1 and 2 of Round 1, but was below the AL for both contaminants during the QA round of sampling.

Action Plans

- Option 1: Designate the breakroom sink for dishwashing only (not for consumption purposes). Replace plumbing and breakroom fixtures with a new appliances while regularly testing faucet IORBRPRVR102, since it is the closest faucet to the POE.
- Option 2: Install a filtered bottle filling station that is equipped with an automatic filter status display in the breakroom, and designate the breakroom sink for dishwashing only (not for drinking).

Sea Girt

Methods

Water enters the Sea Girt museum in the boiler room. Two draws were taken from the boiler room spigot (HHVTPNRQF002) and two more draws were taken from a bathroom sink (55ZH2355LAMI), which lies “downstream” of the boiler room and immediately “upstream” from the FOC (GD0WVDEBE3UQ). Figure SG1 shows the direction of water flow between faucet locations.

Results

Draw 1 of the Boiler Room Spigot (HHVTPNRQF002) was discolored, and high in Pb and Cu. Draw 2 of the spigot was taken immediately (without flushing) after draw 1 was completed and was below the AL for both contaminants. The Non-handicapped bathroom sink also produced results below the Pb and Cu AL for both draws. The water fountain (GD0WVDEBE3UQ) produced results with Pb levels above the AL on Draw 2 of Round 2, as well as on Draw 1 of Round 1, and Draw 2 of the QA round.

Round 2

Round	BLDG	Collection Date	Faucet Description	Environmentalsample IDPK	Draw	Faucet Usage	Lead Results mg/L	Copper Results mg/L
1	Museum	3/1/2018	Water fountain	GD0WVDEBE3UQ	1	Not Used	0.023	0.04
1	Museum	3/1/2018	Water fountain	GD0WVDEBE3UQ	2	Not Used	0.014	0.04
QA	Museum	6/6/2018	Water fountain	GD0WVDEBE3UQ	1	Not Used	0.019	0.5
2	Museum	9/5/2018	Boiler Room Spigot	HHVTPNRQF002	1	Daily	0.053	5.5
2	Museum	9/5/2018	Boiler Room Spigot	HHVTPNRQF002	2	Daily	<0.002	0.04
2	Museum	9/5/2018	Non-handicapped Bathroom Sink	55ZH2355LAMI	1	Daily	0.004	0.1
2	Museum	9/5/2018	Non-handicapped Bathroom Sink	55ZH2355LAMI	2	Daily	<0.002	0.07
2	Museum	9/5/2018	Water Fountain	GD0WVDEBE3UQ	1	Not Used	<0.002	0.5
2	Museum	9/5/2018	Water Fountain	GD0WVDEBE3UQ	2	Not Used	0.031	0.1

- Interpretation of Results: It is likely that the high Pb and Cu concentrations from HHVTPNRQF002 was from stagnant water in the spigot itself. That spigot most likely had not been used in a long time. The second, immediate sample taken from the spigot was below detection for both contaminants. Therefore we can conclude that the water is free of contaminants prior to entering the building. Since Pb and Cu concentrations for

faucet (55ZH2355LAMI) were below the AL while the FOC (GD0WVDEBE3UQ) still produced Pb results exceeding the AL, we can conclude that the contamination likely occurs within the water fountain itself.

Action Plans

- Option 1: Replace the whole water fountain fixture with a filtered bottle filling station that is equipped with an automatic filter status display.

Somerset

Methods

Two draws were taken from the FOC (39RS3F3TIVXM), as well as two draws from a bar sink (1RFJROM7QORH) that resides “upstream”. The bar sink is also the closest accessible fixture to the water POE, which makes it an ideal faucet to sample. Figure ST1 shows the direction of water flow between faucet locations.

Results

The bar sink (1RFJROM7QORH), which is rarely used, produced results exceeding the Pb AL on Draw 1 of Round 2, but was below the AL on Draw 2. The Kitchen sink (39RS3FTIVXM) was below the AL for both contaminants during both draws of Round 2, but was above the Pb AL during Round 1 and the QA round.

Round 2

Round	BLDG	Collection Date	Faucet Description	Environmentalsample IDPK	Draw	Faucet Usage	Lead Results mg/L	Copper Results mg/L
1	Armory	2/15/2018	Kitchen Sink 2, Food Prep, Under Space Heater	39RS3F3TIVXM	1	Rare	0.05	1
1	Armory	2/15/2018	Kitchen Sink 2, Food Prep, Under Space Heater	39RS3F3TIVXM	2	Rare	<0.002	0.2
QA	Armory	5/16/2018	Kitchen Sink 2 Food prep under space heater	39RS3F3TIVXM	1	Rare	0.015	<0.04
2	Armory	9/6/2018	Kitchen Sink 2, Food Prep, Under Space Heater	39RS3F3TIVXM	1	Rare	0.009	0.3
2	Armory	9/6/2018	Kitchen Sink 2, Food Prep, Under Space Heater	39RS3F3TIVXM	2	Rare	<0.002	0.2
2	Armory	9/6/2018	Bar Sink	1RFJROM7QORH	1	Rare	0.019	0.9
2	Armory	9/6/2018	Bar Sink	1RFJROM7QORH	2	Rare	<0.002	0.09

- *Interpretation of Results:* It is likely that the high Pb and Cu concentrations from the first draw of 1RFJROM7QORH is from stagnant water in the faucet due to it going untouched for a long period of time. The second draw produced levels that fell below the AL for both contaminants, therefore we can assume that the water entering the building is safe. Because the FOC samples came up below the AL for both contaminants on both draws for round 2, it is difficult to conclude as to what caused the contamination that occurred during round 1 and the QA round.

Action Plans

- Option 1: Install a filtered bottle filling station that is equipped with an automatic filter status display on the Armory first floor, and designate the kitchen sink for dishwashing only (not for drinking).

Teaneck

Methods

We chose to sample from the Sprinkler Room spigot (TNC108HAK6ZM) because it is the faucet closest to the POE on the same line as the FOC (L4A2L7C5B2B4). Although faucet TNC108HAK6ZM is in the sprinkler room, it is not from the lines servicing the sprinkler system (see Photo X in Appendix X). Two samples were taken from both of these faucets. Figure TNA1 shows the direction of water flow between faucet locations.

Results

Faucet L4A2L7C5B2B4 produced results below the Pb and Cu AL on both draws of Round 2. Faucet TNC108HAK6Z was above the Pb AL during draw 1 of Round 2. Faucet L4A2L7C5B2B4 was above the Cu AL on Draw 1 of Round 1, but was below the AL during the QA Round.

Round 2

Round	BLDG	Collection Date	Faucet Description	EnvironmentalsampleIDPK	Draw	Faucet Usage	Lead Results mg/L	Copper Results mg/L_
1	Armory	2/2/2018	Basement Sink 2	L4A2L7C5B2B4	1	Rarely	<0.002	5.9
1	Armory	2/2/2018	Basement Sink 2	L4A2L7C5B2B4	2	Rarely	<0.002	0.06
QA	Armory	5/16/2018	Basement Sink 2	L4A2L7C5B2B4	1	Rarely	0.005	<0.04
2	Armory	9/6/2018	Basement Sink 2	L4A2L7C5B2B4	1	Rarely	<0.002	0.733
2	Armory	9/6/2018	Basement Sink 2	L4A2L7C5B2B4	2	Rarely	0.006	0.737
2	Armory	9/6/2018	Basement Spigot in Sprinkler Room	TNC108HAK6ZM	1	Rarely	0.010	0.741
2	Armory	9/6/2018	Basement Spigot in Sprinkler Room	TNC108HAK6ZM	2	Rarely	0.002	0.745

- Interpretation of Results: It is likely that the Pb exceedance from the basement sprinkler room spigot (TNC108HAK6Z) was from accumulated contaminants within the spigot fixture. That faucet had likely gone unused for years, allowing for stagnant water and settled debris to accumulate in the spigot fixture itself. Because draw 2 was below the AL, we can conclude that water entering the building does not contain elevated levels of Pb or Cu. The FOC (L4A2L7C5B2B4) Pb and Cu results were below the AL on both draws, which makes it unclear as to why it exceeded the Cu AL during the first draw of Round 1. The basement kitchen plumbing is rarely used, and therefore is susceptible to accumulating elevated levels of Pb and Cu.

Action Plans

- Option 1: Create a faucet flushing plan, with scheduled and documented flushing of all basement faucets.
- Option 2: Designate the basement sinks/kitchen faucets for dish washing only (not for consumption). Install a water bottle filling station that is equipped with an automatic filter status display on the basement floor.

Westfield Armory

Methods

We chose to sample from the Boiler Room Spigot (HI8A48C6P1A5) because it is close to the water POE. The Boiler Room Spigot was located on the first floor, while the FOC (A90F16RP25HQ) is located in the basement. Although these faucets are located on two separate floors, the boiler room spigot still resides “upstream” from the FOC. Two draws were taken from both of these faucets. Figure WF1 shows the direction of water flow between faucet locations.

Results

The initial draw from the spigot (HI8A48C6P1A5) was discolored and produced results exceeding the Pb and Cu AL. The second draw however, was taken immediately after the first with no flush time and produced results below the AL for both contaminants. The Bar sink (A90F16RP25HQ), which had high levels of Pb and Cu on Draw 1 of Round 1, continued to exceed the Cu AL during Draw 1 of Round 2. The Pb AL was not exceeded by the FOC (A90F16RP25HQ) during Round 2. This faucet was not sampled during the QA round because it is rarely used.

Round 2

Round	BLDG	Collection Date	Faucet Description	EnvironmentalsampleIDPK	Draw	Faucet Usage	Lead Results mg/L	Copper Results mg/L
1	Armory	2/2/2018	Bar Sink	A90F16RP25HQ	1	Rarely	0.219	12
1	Armory	2/2/2018	Bar Sink	A90F16RP25HQ	2	Rarely	<0.002	0.4
2	Armory	9/6/2018	Bar Sink	A90F16RP25HQ	1	Rarely	<0.002	4.0
2	Armory	9/6/2018	Bar Sink	A90F16RP25HQ	2	Rarely	<0.002	0.1
2	Armory	9/6/2018	Boiler Room Spigot	HI8A48C6P1A5	1	Rarely	0.016	2.6
2	Armory	9/6/2018	Boiler Room Spigot	HI8A48C6P1A5	2	Rarely	0.005	0.3

- *Interpretation of Results:* It is likely that the reason the initial draw of HI8A48C6P1A5 was discolored is due to stagnant water in the spigot fixture itself. This particular faucet is rarely ever used, and likely had compiled rust and contaminants over the years of non-use. Since the results of the second draw came back clean, we can assume the water entering the building does not include elevated levels of Pb or Cu. The FOC (A90F16RP25HQ) exceeded the AL for Pb and Cu on the first draw of Round 1, but was below the AL during the second draw. The FOC continued to have elevated Cu concentrations during draw 1 of Round 2, but did not have elevated Pb levels. This

faucet's usage is very rare which may be the cause of the elevated contaminant concentrations during first draws and low concentrations on second draws, due to stagnant water that builds up within the fixture over time.

Action Plans

- Option 1: Since the FOC's usage is rare, designate this bar sink for washing purposes only (not for consumption). Install a water bottle filling station that is equipped with an automatic filter status display within the armory and regularly test the bar sink to monitor its levels Pb and Cu.
- Option 2: Completely replace bar sink fixture and plumbing while installing a new system with a clean filter.
- Option 3: Remove the bar sink fixture completely and do not replace since this sink is rarely ever used.

Westfield FMS

Methods

We chose to sample from the Men's Bathroom Spigot (0FKRI1YYAKOD) because it is the accessible faucet closest to the water POE. We also chose to sample from the water fountain (KIY5F7UFZ26Q), which is immediately "upstream" of the FOC (DBMZHS6P6AA). Two samples were taken from each of the faucets mentioned. Figure WF2 shows the direction of water flow between faucet locations.

Results

All 3 faucets, on both draws 1 and 2 of Round 2, produced results below the AL for both contaminants. The Cu levels during Round 1 were equal to (not exceeding) the Cu AL.

Round 2

Round	BLDG	Collection_Date	Faucet Description	EnvironmentalsampleIDPK	Draw	Faucet Usage	Lead Results mg/L	Copper Results mg/L
1	FMS	2/2/2018	Sink by washer FMS	DBMZHS6P6AA		1 Rarely	0.005	1.3
1	FMS	2/2/2018	Sink by washer FMS	DBMZHS6P6AA		2 Rarely	<0.002	1.3
2	FMS	9/6/2018	Sink by washer FMS	DBMZHS6P6AA		1 Rarely	0.002	0.8
2	FMS	9/6/2018	Sink by washer FMS	DBMZHS6P6AA		2 Rarely	<0.002	0.8
2	FMS	9/6/2018	Fountain by Sink and Laundry	KIY5F7UFZ26Q		1 Rarely	<0.002	0.2
2	FMS	9/6/2018	Fountain by Sink and Laundry	KIY5F7UFZ26Q		2 Rarely	<0.002	<0.04
2	FMS	9/6/2018	Mens Bathroom Spigot	0FKRI1YYAKOD		1 Rarely	<0.002	0.8
2	FMS	9/6/2018	Mens Bathroom Spigot	0FKRI1YYAKOD		2 Rarely	<0.002	0.6

- Interpretation of Results: Pb and Cu levels were below the AL for faucet 0FKRI1YYAKOD, which leads us to safely conclude that the water coming into the building does not contain elevated levels of Pb or Cu. Faucet KIY5F7UFZ26Q also produced results below the AL for both contaminants. Although Cu levels were elevated for the FOC during Round 1, it fell below the AL during Round 2 on both draws. This makes it unclear as to why the levels of Cu were elevated during the Round 1.

Action Plans

- Recommendation: Because a source of contamination can not be determined based on two rounds of sampling, we recommend designating faucet DBMZHS6P6AA for cleaning purposes only (not for consumption purposes), and installing a filtered bottle

filling station that is equipped with an automatic filter status display in the newly renovated FMS break room. We also recommend creating a filter changing schedule, regularly testing the POE, FOC, and new bottle filling station for Cu, especially since the source of contamination for faucet DBMZHSM6P6AA during Round 1 could not be identified.

Woodbridge

Methods

We chose to sample from the Men's Room sink (PRGS84SJDYL9) because it is close to the water POE, and is “upstream” of all of the other faucets sampled (V89GI2FCHBZI, S8T11IS3V2LX, and XLHI846PHLXX). We also sampled from the Womens room sink (XLHI846PHLXX), which is directly "upstream" of the water fountain (S8T11IS3V2LX). Two samples were taken from each faucet. Figure WB1 shows the direction of water flow between faucet locations.

Results

Water from the Men's room sink (PRGS84SJDYL9), the Woman's room sink (XLHI846PHLXX), the water fountain (S8T11IS3V2LX) were below the AL for Cu and Pb during Round 2. However, the water fountain exceeded the Pb AL during Round 1. The Kitchen Sink (V89GI2FCKBZI), which is "downstream" of the POE, was above the Pb AL during Round 1, the QA Round, and Round 2.

Round 2

Round	BLDG	Collection Date	Faucet Description	Environmentalsample IDPK	Draw	Faucet Usage	Lead Results mg/L	Copper Results mg/L
1	Armory	2/15/2018	Armory Fountain*	S8T11IS3V2LX	1	Rarely	0.005	0.2
1	Armory	2/15/2018	Armory Fountain *	S8T11IS3V2LX	2	Rarely	0.02	0.2
1	Armory	2/15/2018	Armory Right Kitchen Sink	V89GI2FCKBZI	1	Weekly	0.235	0.2
1	Armory	2/15/2018	Armory Right Kitchen Sink	V89GI2FCKBZI	2	Weekly	0.011	0.1
QA	Armory	6/6/2018	Armory Fountain*	S8T11IS3V2LX	1	Rarely	0.004	0.3
QA	Armory	6/6/2018	Armory Right Kitchen Sink	V89GI2FCKBZI	1	Weekly	0.209	0.2
2	Armory	9/6/2018	Armory Fountain	S8T11IS3V2LX	1	Rarely	0.002	0.749
2	Armory	9/6/2018	Armory Fountain	S8T11IS3V2LX	2	Rarely	<0.002	0.759
2	Armory	9/6/2018	Armory Right Kitchen Sink	V89GI2FCKBZI	1	Weekly	0.226	0.809
2	Armory	9/6/2018	Armory Right Kitchen Sink	V89GI2FCKBZI	2	Weekly	<0.002	0.824
2	Armory	9/6/2018	Mens Room Sink	PRGS84SJDYL9	1	Daily	<0.002	0.844
2	Armory	9/6/2018	Mens Room Sink	PRGS84SJDYL9	2	Daily	<0.002	0.848
2	Armory	9/6/2018	Womens Room Sink	XLHI846PHLXX	1	Daily	<0.002	0.851
2	Armory	9/6/2018	Womens Room Sink	XLHI846PHLXX	2	Daily	<0.002	0.855

- *Interpretation of Results:* The results for faucet PRGS84SJDYL9, which is the faucet closest to the POE, fell below the Pb and Cu AL confirming that the water coming into the building does not have elevated levels of Pb or Cu. “Downstream” of the POE is one of the FOC (V89GI2FCKBZI) which exceeded the Pb AL on the first draw of Round 2. It is likely that the contamination is occurring from within the kitchen fixtures and/or secondary plumbing, and not from the lines servicing the rest of the building. The other FOC (S8T11IS3V2LX) fell below the AL for both contaminants, as well as the faucet immediately “upstream” (XLHI846PHLXX). This makes it difficult to determine as to why this FOC exceeded the Pb AL during Round 1. A clean faucet (XLHI846PHLXX) “upstream” suggests that the source of contamination is from within the water fountain itself, or from the secondary plumbing servicing the water fountain.

Action Plans

- Option 1: Completely replace the kitchen sink (V89GI2FCKBZI) fixture and plumbing while installing a new system with a clean filter.
- Option 2: Designate the kitchen sink for washing only, and not for human consumption. Install a filtered water bottle filling station on the first floor, equipped with an automatic filter status display. Continue to test kitchen sinks regularly.
- Recommendation for FOC (S8T11IS3V2LX): Further sample this faucet, as well as any “upstream” or “downstream” faucets to locate a source of contamination, if any.

Woodstown

Methods

Water enters the Woodstown Armory in the boiler room. Two draws were taken from the boiler room spigot (MFPFT8IA2W82), which is located “upstream” from the FOC. Two samples were taken from the FOC (LU62FCJZAJLM) as well. Figure WT1 shows the direction of water flow between the two faucet locations. Faucet EA2CDSBJ3LINA was not sampled during Round 2 because it was below the Pb and Cu AL during Round 1.

Results

Draw 1 for both faucets during Round 2 were below the AL for Pb and Cu. However Draw 2 for both faucets exceeded the AL for Pb, and faucet LU62FCJZAJLM also exceeded the AL for Cu. LU62FCJZAJLM exceeded the Pb AL during Round 1 and the QA Round as well.

Round 2

Round	BLDG	Collection_Date	Faucet_Description	EnvironmentalsampleIDPK	Draw	Faucet Usage	Lead Results mg/L	Copper Results mg/L
1	Armory	2/23/2018	Right sink by wall	LU62FCJZAJLM	1	Not Used	0.033	0.2
1	Armory	2/23/2018	Right sink by wall	LU62FCJZAJLM	2	Not Used	<0.002	0.1
QA	Armory	6/7/2018	Right sink by wall	LU62FCJZAJLM	1	Not Used	0.023	0.2
2	Armory	9/4/2018	Right sink by wall	LU62FCJZAJLM	1	Not Used	<0.002	0.4
2	Armory	9/4/2018	Right sink by wall	LU62FCJZAJLM	2	Not Used	0.065	1.5
2	Armory	9/4/2018	Boiler Room Main	MFPFT8IA2W82	1	Daily	0.014	0.1
2	Armory	9/4/2018	Boiler Room Main	MFPFT8IA2W82	2	Daily	0.117	0.5

- *Interpretation of Results:* Since both faucets exceeded action levels during second draws of round 2 there is cause for concern. It is unusual because normally Draw 1 is higher in concentration than Draw 2, especially when taken directly from the water main. The POE tested high for Pb only, while the FOC tested high for Pb and Cu. At first, these results suggest that the water coming into the building is the cause of contamination. However during round 1 a sink (EA2CDSBJ3UNA) that lies directly in between the POE and the FOC was tested. The results of this faucet fell below the AL of both contaminants on both draws. It is unusual that this faucet would come up clean even though it resides between the two ‘contaminated’ faucets tested during round 2. This makes it very

difficult to determine where contamination occurs because it could be from the water entering the building or from the fixture itself.

Action Plans

- Recommendation: Collect samples (2 draws) from every accessible faucet in the building, including faucets sampled in previous rounds. Samples should be collected by starting at the furthest "upstream" faucet, and working "downstream." We would not recommend using any of the facility faucets for human consumption until a cause can be determined.

4.0 References

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