DEPARTMENT OF THE ARMY
PUBLIC HEALTH COMMAND EUROPE
CMR 402
APO AE 09180

MCHB-PHC 10 December 2018

MEMORANDUM FOR Directorate of Public Works, U.S. Army Garrison (USAG) Bavaria (IMBV-PW), Unit 28130, APO AE 09114

SUBJECT: Lead and Copper Drinking Water Monitoring, USAG Bavaria-Grafenwoehr, Fiscal Year 2018

1. USAG Bavaria-Grafenwoehr community water system complied with the Environmental Final Governing Standards – Germany for lead and copper drinking water monitoring and continues to qualify for ultimate reduced monitoring to take place every three years.

2. A copy of the report is enclosed. We are interested in your comments and suggestions for improving the usefulness of the information and recommendations provided in this report. If you have comments, or if this report does not meet your needs or expectations, please contact the undersigned at DSN 314-590-9912 or CIV 06371-9464-9912.

FOR THE COMMANDER:

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USAG Bavaria-Grafenwoehr Lead and Copper Drinking Water Monitoring, Fiscal Year 2018

Prepared by Mr. Wayne Jousma

Lead and Copper Drinking Water Monitoring
USAG Bavaria-Grafenwoehr
Fiscal Year 2018

1 Purpose and Background

At the request of Installation Management Command - Europe (IMCOM-E) and in accordance with the Final Governing Standards-Germany (GFGS, DoD 2016), Public Health Command Europe (PHCE) conducts lead and copper monitoring at the scheduled public drinking water system within the U.S. Army Garrison (USAG) Bavaria-Grafenwoehr.

Contained herein is a summary of findings and corresponding regulatory determinations resulting from the lead and copper drinking water monitoring conducted at the USAG Bavaria-Grafenwoehr community water system (CWS) in Fiscal Year 2018 (FY18).

2 Procedures and Methods

Appendix A details compliance requirements, sample procedures, and laboratory analysis and quality control. Lead and copper results were evaluated using the action levels (ALs) in the GFGS. Compliance is based on 90 percent of the samples being at or below the ALs for each system monitored.

3 Significant Findings

Analytical results of the first-draw samples are in Appendix B. Certificates of Analysis for all locations and analytes monitored were provided in electronic format to the Directorate of Public Works (DPW) separately from this report.

Significant findings are briefly addressed below. The DPW was notified of the results on 3 December 2018.

The Grafenwoehr CWS is on an ultimate reduced monitoring schedule. The GFGS requires lead and copper first-draw monitoring every three years. The 90th percentile results of the monitoring events in August 2018 are summarized in Table 1. Lead and copper ALs were met.

Table 1. Grafenwoehr CWS, 90th Percentile Values, FY18

Water System	FY18 Monitoring Status	Month Sampled	90th Percentile	
			Lead [mg/L]	Copper [mg/L]
Grafenwoehr CWS	Ultimate Reduced Monitoring	August 2018	0.0041	0.12
Action Level			0.015	1.3

One sample location had an elevated lead level: Building (Bldg) 111 Family Housing, Apartment B [0.072 mg/L]. The sample location (kitchen or bathroom faucet) was not provided. The DPW was advised to notify consumers and to determine if the location is included in the Operations Order (OPORD) 17-003 lead monitoring program and to implement corrective actions.

4 Conclusions and Recommendations

4.1 Compliance Monitoring Status

The USAG Bavaria Grafenwoehr CWS complied with the GFGS requirements for lead and copper drinking water monitoring. It remains in ultimate reduced monitoring, with the next scheduled monitoring event in FY21.

Table C-1, Appendix C, provides a summary of the USAG Bavaria-Grafenwoehr (and Vilseck) lead and copper drinking water monitoring compliance schedule.

4.2 Public Education and Notification

Inform the public of this study and its findings, conclusions, and recommendations in accordance with GFGS requirements. Consider preparing an annual consumer confidence report to communicate drinking water quality with the public.

4.3 Recommendations

Ensure that the apartment with the elevated lead levels (Bldg 111, Apt B) is included in the OPORD 17-003 lead monitoring program for further actions. Consider replacement of faucets.

Educate all consumers to implement the following recommendations to control lead and copper at the tap for best management practice:

- Advise consumers to flush their water faucets for at least one minute prior to use for consumption.

- Advise consumers to use only cold water for consumption (since lead and copper dissolve more rapidly at higher temperatures).

- Clean the faucet aerator screens regularly (i.e., at least monthly) as sediments that may contain lead can collect on faucet screens. Replace faucet aerators as necessary.

- Regularly flush the distribution and interior building plumbing system to reduce stagnant water and sediment build-up, with primary focus on dead ends and infrequently used water lines.

Advise housing office representatives to establish and implement administrative procedures aiming at full occupacy of the family housing buildings as much as possible to prevent stagnant conditions within the interior plumbing system.

5 Point of Contact

Direct questions concerning this report to Mr. Wayne Jousma at DSN: 314-590-9780, commercial: 06371-9464-9780, or e-mail: wayne.r.jousma.civ@mail.mil. Direct requests for additional services to MAJ Gregory L. Schaefer at DSN: 314-590-9838, commercial: 06371-9464-9831, or e-mail: gregory.l.schaefer.mil@mail.mil.

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Appendix A

Procedures and Methods

A-1 Compliance Requirements

The U.S. Environmental Protection Agency (USEPA) and the Environmental Final Governing Standards-Germany (GFGS) established action levels (ALs) of 0.015 milligrams per liter (mg/L) for lead and 1.3 mg/L for copper in drinking water. Compliance is based on 90 percent of the samples being at or below the ALs.

A-1.1 Determination of the 90th Percentile

The 90th percentile is calculated by ranking the analytical results in ascending order from the sample with the lowest concentration to the sample with the highest concentration. The total number is then multiplied by 0.9 to arrive at the sample that represents the 90th percentile. The concentration of this sample determines compliance with the GFGS ALs for lead and copper.

For water systems that collect five samples per monitoring event, the 90th percentile is computed by taking the average of the highest and the second highest concentration.

A-1.2 Monitoring Frequency

Standard Monitoring. Water systems must conduct *Standard Monitoring* every six months unless they qualify for reduced monitoring.

Annual Reduced Monitoring (Annually). If the system is below the lead and copper ALs for two consecutive six-month monitoring events, monitoring can be reduced to annually. Sampling must be conducted during the four warmest months of the year.

Ultimate Reduced Monitoring (Triennually). Any small or medium-sized system serving less than 50,000 people that meets the lead and copper ALs during three consecutive years may reduce the monitoring for lead and copper from annually to once every three years, during the four warmest months of the year.

A-1.3 Action Level Exceedance

An AL exceedance triggers other requirements. Water systems that are above the ALs established for lead and copper are required to take corrective actions and to educate and protect consumers. Corrective actions include the collection of water quality parameter (WQP) samples in duplicate, source water monitoring, determining corrosion control treatment options, and conducting plumbing modifications, if appropriate.

A-2 Sample Procedures

A-2.1 Sample Number Requirements

The GFGS defines the minimum number of first-draw and WQP samples to be collected based upon the the population served per water system and the monitoring status as summarized in Table A-1. The current population of the monitored water systems was obtained from the Directorate of Public Works (DPW) and are provided in Appendix C.

Table A-1. Population and Sample Number Requirements

Population Range Served	Number of First Draw Samples		Number of WQP Samples (in Duplicates)
	Standard Monitoring	Reduced Monitoring	Required in Case of Action Level Exceedance
≤100	5	5	1
101-500	10	5	1
501-3,300	20	10	2
3,301-10,000	40	20	3
10,001-100,000	60	30	10

A-2.2 First-Draw Sample Collection

Public Health Command Europe (PHCE) in conjunction with the DPW maintains a target list of representative sites throughout the distribution system in which the plumbing materials used at that site would be commonly found at other sites served by the water system. Critical customers are also considered. Sample locations are selected from the target list for each monitoring event. The target list may change due to building renovation, additions or usage changes.

The USEPA protocol for first-draw samples requires collection from an interior tap from which water is typically drawn for consumption after a minimum six hour period of non-use, not allowing for any flushing or wasting of water. There is no upper limit on stagnation time. The samples are preserved in the laboratory within ten days of sample collection.

A-2.3 Source and Distribution Water Quality Parameter Sample Collection

WQP sample collection is only required if an AL was exceeded. At least one sample must be collected from the point of entry to the distribution system. If more than one sample is required, additional samples are collected within the distribution system.

The sampling protocol for WQPs requires that the water flow moderately for three to five minutes until the temperature stabilizes to purge any stagnant water in the distribution system prior to sample collection. Samples are collected in duplicates and

preserved at the time of collection and kept cool during transport from the collection site to the laboratory.

As part of the WQP monitoring, free chlorine, conductivity, pH, temperature and turbidity are measured on site using the following HACH® meters: DR890 (Conductivity, total dissolved solids (TDS), pH, temperature), Pocket Colorimeter™ (free chlorine), and 2100Q Portable Turbidimeter (turbidity). Calibration and operation procedures are performed consistent with the manufacturer's instruction manuals.

A-3 Laboratory Analyses and Quality Control

A-3.1 Sample Analyses

Samples are submitted to Laboratory Sciences (LS), PHCE, for analysis. First-draw samples are analyzed for lead and copper. WQP samples (if applicable) are analyzed for alkalinity, TDS, lead, copper, calcium, magnesium, and total phosphorus.

A-3.2 Laboratory Accreditation/Registration

PHCE, LS, is accredited by the internationally recognized *Deutsches Akkreditierungssystem Prüfwesen* GmbH (DAP) to DIN EN ISO/IEC 17025:2005. Contract laboratories are, at a minimum, accredited to ISO 17025. Analytical methods utilized for each analyte are noted on the laboratory certificates of analysis provided to the DPW. Additional information is available upon request.

Appendix B

Analytical Results

First-Draw Sample – A 1-liter sample of tap water that has been standing in plumbing at least 6 hours and is collected without flushing the tap.

Action level (AL) – The concentration of lead or copper in tap water which determines whether a water system may be required to install corrosion control treatment, collect water quality parameter samples, collect source water samples, replace lead service lines, and/or deliver public education about lead.

Lead AL – 0.015 mg/L
Copper AL – 1.3 mg/L

90th Percentile – The highest concentration of lead or copper in tap water that is exceeded by 10 percent of the sites sampled during a monitoring period. This value is compared to the action levels to determine whether a system is in compliance or if corrective actions are required. The 90th percentile value is rounded to the same number of significant digits as the respective AL, when possible based on laboratory results provided.

The table below contains the following acronyms and identifiers.

Shaded	Area represents the 90th percentile value
BOLD	Value is above the respective AL
Bldg	Building
CWS	Community Water System
FHA	Family Housing Area
mg/L	Milligram Per Liter
Rm	Room

Certificates of analysis for all analytes monitored were provided in electronic format to the Directorate of Public Works (DPW) separately from this report. Results are tracked and stored under the following PHCE laboratory report numbers:

Project Name	Date Turned Into Lab	Date Received From Lab	SRN Number	Laboratory Report Number
GRAF PbCu FY18	9-Aug-18	24-Aug-18	18-0355	E18-00715

Table B-1. Grafenwoehr CWS, Ultimate Reduced Monitoring

WATER SUPPLIER	Stadtwerke Grafenwoehr					ACTION LEVELS (ALs)	
						Lead (Pb)	Copper (Cu)
						0.015	1.3
WATER SYSTEM	Grafenwoehr CWS					mg/L	mg/L
SAMPLE ID	SAMPLE LOCATION				COLLECTION DATE	RESULTS	
	AREA	BLDG	FLOOR	DESCRIPTION			
E18-00715-001	MC-B124-Elem	124	1	Front Kitchen	7-Aug-18	0.012	0.038
E18-00715-002	MC-B170-Fitness	170	1	Employee Kitchen	7-Aug-18	0.0041	0.12
E18-00715-003	MC-B260-CDC	260	1	Kitchen	7-Aug-18	0.0037	0.048
E18-00715-004	MC-B313-Legal	313	B	Kitchen in Building 106 used, CDC was moved	8-Aug-18	0.0036	0.017
E18-00715-005	MC-B329-DPW	329	1	Kitchen	7-Aug-18	<0.00020	0.021
E18-00715-006	MC-B475-Clinic	475	1	Kitchen	7-Aug-18	<0.00020	0.18
E18-00715-007	MC-B539-Safety	539	1	Kitchen	7-Aug-18	0.00026	0.037
E18-00715-008	MC-B542-Admin	542	1	Kitchen	7-Aug-18	<0.00020	0.014
E18-00715-009	MC-B607-Cafe	607	1	Kitchen	7-Aug-18	0.00077	0.018
E18-00715-010	MC-B619-Lodging	619	?	Available Room - No notes specifying where sampled	7-Aug-18	<0.00020	0.0088
E18-00715-011	BCT-B720-Unk1	720	1	Hallway Water Fountain	8-Aug-18	0.0029	0.083
E18-00715-012	BCT-B725-Unk2	725	1	Hallway Water Fountain	8-Aug-18	0.0018	0.061
E18-00715-013	BCT-B740-Unk3	740	1	Hallway Water Fountain	8-Aug-18	0.00077	0.021
E18-00715-015	BCT-B780-Unk5	780	1	Hallway Water Fountain	8-Aug-18	0.0030	0.096
E18-00715-016	FHA-B112-H	112	1	Apt. A	7-Aug-18	0.00075	0.051
E18-00715-017	FHA-B111-H	111	1	Apt. B	8-Aug-18	**0.072**	0.45
E18-00715-018	FHA-B115-H	115	1	Apt. 13	7-Aug-18	0.00070	0.033
E18-00715-019	FHA-B271-H	271	1	Apt. B4	8-Aug-18	0.00034	0.014
E18-00715-020	FHA-B231-H	231	1	Apt. B	7-Aug-18	0.0012	0.046
E18-00715-021	FHA-B259-H	289	1	Apt. B	6-Aug-18	0.00051	0.061
E18-00715-022	FHA-B277-H	277	1	Apt. A1	7-Aug-18	<0.00020	0.036
E18-00715-023	FHA-B288-H	288	1	Apt. B2	7-Aug-18	0.0010	0.077
90TH PERCENTILE VALUE						0.0041	0.12

Appendix C

Table C-1. USAG Bavaria-Grafenwoehr (and Vilseck) Lead and Copper Drinking Water Monitoring Compliance Schedule

Name	Water Source/Supplier	Area Supplied	Last Monitoring Event	Next Required Monitoring Event			
				Status/Fiscal Year	Current Population*	Population Range	Required Samples
Grafenwoehr CWS	Stadtwerke Grafenwoehr	Main / Field Camps, Family Housing, Brigade Combat Team Area	C3 (FY18)	C4 (FY21)	6,500	3,301-10,000	20 First-Draw
Eschenbach NTNCWS	Stadtwerke Eschenbach	Netzaberg Village Center (Schools, CDC, Teen Center, Chapel, Shoppette), Ranges 101 and 102	C2 (FY17)	C3 (FY20)	< 500	101-500	5 First-Draw
Auerbach TNCWS	AquaOpta GmbH	Range 213; TAC Site 17	Lead and Copper Monitoring is not required for TNCWSs.				
Kirchenthumbach TNCWS	Stadtwerke Kirchenthumbach	Range 301, 305, 307					
Koenigstein TNCWS	Stadtwerke Koenigstein	Range 211; German Golf Course					
Vilseck CWS	Stadtwerke Schoeffelhoff	Fitzthum Village	C2 (FY17)	C3 (FY20)	< 500	3,301-10,000	20 First-Draw
		South Camp (Rose Barracks and Family Housing), Range 204			6,500		

PWS – Public Water System
CWS – CommunityWater System
NTNCWS – Non-Transient, Non-Community Water System
TNCWS – Transient, Non-Community Water System
NCWS – Non-Community Water System

A1, A2 – Standard Monitoring: first and second six-month monitoring events
B1, B2 – Annual Reduced Monitoring: first and second annual reduced monitoring events during the summer months
C1, C2, C3 … – Ultimate Reduced Monitoring: every three years during the summer months
ICA … – Implementing corrective actions due to action level exceedance, Standard Monitoring is required again

* based on population data received from the Directorate of Public Works (DPW)