

Joint Base Pearl Harbor-Hickam (JBPHH) Public Water System No. HI0000360 & Aliamanu Military Reservation (AMR) Public Water System No. HI0000337

Drinking Water Distribution System Recovery Plan: Stage 5 Long-Term Monitoring (LTM) Month 3 Sampling Results Report for Zone H2 11 August 2022



Neighborhoods included in Zone H2: Aliamanu Military Reservation (AMR)



EXECUTIVE SUMMARY FOR ZONE H2

This report documents the results of long-term monitoring (LTM) testing for Zone H2. We are sharing this information with you to keep you updated on your water quality.

This LTM testing was performed after the November 29, 2021 <u>Public Health</u> <u>Advisory for the JBPHH Public Water System</u> for Zone H2 was amended by the Hawaii Department of Health (DOH) on March 11, 2022. The amended health advisory for Zone H2 can be found online at: <u>https://jbphh-safewaters.org</u>. The amended health advisory states that tap water can be used for all purposes including drinking, cooking, oral hygiene, and consumption by pets. The health advisory was amended based on a final review of all sample data and how the Navy water system maintains operations to ensure safe drinking water. Test results that led to the advisory amendment are summarized in the Stage 4 Residential Sampling Report. After the health advisory was amended, residents were informed that they can safely use their water for all purposes.

Zone H2 has been thoroughly flushed, sampled, and tested. This zone has completed each stage (i.e., Stage 1 – Distribution System Flushing through Stage 4 – Building Sampling) outlined in the Drinking Water Distribution System Recovery Plan.¹ Based on the samples collected and tested from water mains (Stage 2) and residences and buildings (Stage 4), this zone meets the U.S. Environmental Protection Agency (EPA) and DOH drinking water standards used during this investigation. Zone H2 is now in the LTM phase (a.k.a., Stage 5), which is described below. For additional information on the Stage 2, Stage 4, and Stage 5 sample results by zone, please visit: <u>https://jbphh-safewaters.org</u>.



¹ The Drinking Water Distribution System Recovery Plan was developed and approved by the Interagency Drinking Water System Team (IDWST). The DOH, EPA, Navy, and Army formed the IDWST to restore safe drinking water to all Navy Water System users. The JBPHH PWS #HI0000360 & ARM PWS #HI0000337 will continue the work of the IDWST by working to restore consumer confidence by ensuring tap water continues to be safe for human consumption (e.g., drinking, cooking, oral hygiene).



Long-Term Monitoring

LTM will be performed as outlined in the Drinking Water Sampling Plan, dated December 2021. LTM will take place for two years after the date of the amended health advisory. The purpose of LTM is to ensure tap water continues to be safe for human consumption (e.g., drinking, cooking, oral hygiene). Residents/occupants will be notified if and when their house/building is scheduled to be sampled. Below is the schedule for LTM in Zone H2.

Sampling Event ¹	Summary of Sampling Activities	Completion Date ²
Month 1	5% of houses/buildings (minimum of 5 houses/buildings)	March 22 – March 31, 2022
Month 2	5% of houses/buildings (minimum of 5 houses/buildings)	April 15 – April 29, 2022
Month 3	5% of houses/buildings (minimum of 5 houses/buildings)	May 24 – June 15, 2022
Month 9	10% of houses/buildings (minimum of 15 houses/buildings)	December 2022
Month 15	10% of houses/buildings (minimum of 15 houses/buildings)	June 2023
Month 21	10% of houses/buildings (minimum of 15 houses/buildings)	December 2023
Month 24	10% of houses/buildings (minimum of 15 houses/buildings)	March 2024

LTM Schedule for Zone H2

Notes:

¹ Sampling events are scheduled based on the amount of time (months) since the DOH health advisory was amended for this zone.

² Completion dates are estimated based on the date the DOH health advisory was amended for this zone.



Tables Included in this Stage 5 Sampling Results Report for Zone H2

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Table 1-1. Contami	nants Detected in Drin	king \	Water Sa	mples Co	ollected	from Res	idences	s in Zone	H2											
					Stage 4 Sun	Sampling nmary	Stage Sampline Mo	e 5 LTM g Summary onth 1	Stage 5 LT Summar	M Sampling y Month 2	Stage 5 LT Summar	M Sampling Ty Month 3	Stage 5 LT Summar	M Sampling y Month 9	Stage 5 LT Summary	M Sampling Month 15	Stage 5 LT Summary	M Sampling Month 21	Stage 5 LT Summary	M Sampling Month 24
					01/27/22	- 02/03/22	03/22/22	- 03/31/22	04/15/22	- 04/29/22	05/25/22	- 06/15/22	Decem	ber 2022	June	e 2023	Decem	ber 2023	Marc	h 2023
Contaminant	Typical Source of Contaminant	Units	DOH Project Screening Level	Basis of DOH Screening Level ²	No. of Detects out of Samples	Minimum – Maximum (Average) ³	No. of Detects out of Samples	Minimum – Maximum (Average) ³	No. of Detects out of Samples	Minimum – Maximum (Average) ³	No. of Detects out of Samples	Minimum – Maximum (Average) ³	No. of Detects out of Samples	Minimum – Maximum (Average) ³						
Contaminants of Concern ¹		•												<u>.</u>						
Benzene	Discharge from factories; Leaching from gas storage tanks and landfills	ppb ⁶	5.0	MCL	0/31	-	0/13	-	0/15	-	0/15	-								
Ethylbenzene	Discharge from petroleum refineries	ppb	700	MCL	0/31	-	0/13	-	0/15	-	0/15	-								
Toluene	Discharge from petroleum factories	ppb	1,000	MCL	0/31	-	0/13	-	0/15	-	0/15	-								
Xylenes (Total)	Discharge from petroleum factories; Discharge from chemical factories	ppb	10,000	MCL	0/31	-	0/13	-	0/15	-	0/15	-			s will be These samples wi					
1-Methylnaphthalene	Used to make other chemicals such as dyes, and resins; also, present in cigarette smoke, wood smoke, tar, asphalt, and at some hazardous waste sites.	ppb	10	EAL	0/30	-	0/13	-	0/15	-	0/15	-							Those con	anleo will bo
2-Methylnaphthalene	Used to make other chemicals such as dyes, and resins; also used to make vitamin K; and is present in cigarette smoke, wood smoke, tar, asphalt, and at some hazardous waste sites	ppb	10	EAL	0/31	-	0/13	-	0/15	-	0/15	-	These san collected 9 the health a amended. be reporte Month 9 Results	amples will be 9 months after h advisory was d. Results will rted in a LTM 9 Sampling ults Report. These samples will be collected 15 months after the health advisor was amended. Result will be reported in a LTM Month 15 Sampling Results		nples will be 15 months alth advisory ded. Results ported in a lonth 15 a Results	These samples will be collected 21 months after the health advisory was amended. Results will be reported in a LTM Month 21 Sampling Results		after the health advis was amended. Resi will be reported in LTM Month 24 Sampling Result: Report.	24 months alth advisory ded. Results ported in a lonth 24 g Results
Naphthalene	Naphthalene is found in coal tar or crude oil and is used in the manufacture of plastics, resins, fuels, and dyes, and as a fumigant	ppb	17	EAL	0/30	-	0/13	-	0/15	-	0/15	-		·	Re	port.	Sampling Results Report.			port.
Total TPH⁴	TPH is petroleum and can contaminate drinking water through spills and other releases into the environment	ppb	211	ISP	0/31	-	2/13	ND - 55 (53)	1/15	ND - 61 (61)	3/15	ND - 78 (67.1)								
Total Organic Carbon (TOC)⁵	Naturally present in the environment, but also can be an indicator of contamination, including petroleum or other sources	ppb	4,000	ISP	19/31	ND – 4,290 (1,380)	5/13	ND - 540 (298)	0/15	-	0/15	-								
Free Chlorine (Field Test) ⁸	Water additive used to control microbes	ppb	4,000	ISP	-	-	12/12	330 – 1,050 (620)	14/14	40 - 820 (359.3)	14/14	30 - 890 (362.1)								
Metals					<u> </u>			()												
Antimony	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder	ppb	6.0	MCL	0/31	-	2/13	ND - 0.12 (0.12)	0/15	-	2/15	ND - 0.17 (0.17)	These san collected 9 the health a	These samples will be collected 9 months after the health advisory was amended Results will was amended Results will	nples will be 15 months alth advisory	These sam collected after the he	ples will be 21 months alth advisory	es will be months advisory These samples will be collected 24 months after the health advisory		
Arsenic	Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production wastes	ppb	10	MCL	1/30	ND - 0.25 (0.25)	0/13	-	0/15	-	2/15	ND - 0.59 (0.56)	amended. Results will be reported in a LTM Month 9 Sampling Results Report. Barbaro Sampling Result Report. Barbaro Sampling Result Report.	ported in a lonth 15 g Results port.	Results d in a 15 sults was amended. Result will be reported in a LTM Month 21 Sampling Results Report.	oorted in a onth 21 g Results port.	ults was amended. Results a will be reported in a LTM Month 24 s Sampling Results Report.	ported in a lonth 24 g Results port.		



Barium	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits	ppb	2,000	MCL	31/31	2.0 - 2.9 (2.4)	13/13	8.3 - 13 (11)	15/15	2.8 - 6.8 (5.7)	15/15	2.8 - 4.5 (3.8)				
Beryllium	Discharge from metal refineries and coal-burning factories; Discharge from electrical, aerospace, and defense industries	ppb	4	MCL	0/31	-	0/13	-	1/15	ND - 0.16 (0.16)	0/15	-				
Chromium	Discharge from steel and pulp mills; Erosion of natural deposits	ppb	100	MCL	30/31	ND - 1.9 (1.5)	0/13	-	3/15	ND - 0.89 (0.87)	0/15	-	These samples will be	These samples will be	These samples will be	These samples will be collected 24 months
Copper	Corrosion of household plumbing systems; Erosion of natural deposits	ppb	1,300	MCL	30/30	4.7 - 96 (16)	13/13	1.5 - 8.4 (4.2)	15/15	4.3 - 19 (10)	15/15	7.7 - 57.8 (19.9)	collected 9 months after the health advisory was amended. Results will be reported in a LTM	after the health advisory was amended. Results will be reported in a	after the health advisory was amended. Results will be reported in a	after the health advisory was amended. Results will be reported in a I TM Month 24
Lead	Corrosion of household plumbing systems; Erosion of natural deposits	ppb	15	MCL	29/31	ND - 2.4 (0.53)	10/13	ND - 0.32 (0.20)	15/15	0.17 - 0.98 (0.61)	15/15	0.23 - 3 (1)	Month 9 Sampling Results Report.	LTM Month 15 Sampling Results Report.	LTM Month 21 Sampling Results Report.	Sampling Results Report.
Mercury	Erosion of natural deposits; Discharge from refineries and factories; Runoff from landfills; Runoff from cropland	ppb	2	MCL	0/31	-	0/13	-	1/15	ND - 0.070 (0.070)	0/15	-				
Selenium	Discharge from petroleum and metal refineries; Erosion of natural deposits; Discharge from mines	ppb	50	MCL	1/30	ND - 1.0 (1.0)	1/13	ND - 0.34 (0.34)	14/15	ND - 0.90 (0.46)	11/15	ND - 1.5 (0.83)				
Volatile Organic Compoun	ds (VOCs)												•			
Total trihalomethanes (sum of chloroform, bromoform, bromodichloromethane, and di- bromochloromethane)	By-product of drinking water disinfection	ppb	80	MCL	-	-	12/13	ND - 15 (2.9)	9/15	ND - 16 (3.5)	12/15	ND - 5 (2.2)	These samples will be collected 9 months after the health advisory was amended. Results will be reported in a LTM Month 9 Sampling Results Report.	These samples will be collected 15 months after the health advisory was amended. Results will be reported in a LTM Month 15 Sampling Results Report.	These samples will be collected 21 months after the health advisory was amended. Results will be reported in a LTM Month 21 Sampling Results Report.	These samples will be collected 24 months after the health advisory was amended. Results will be reported in a LTM Month 24 Sampling Results Report.
Synthetic Organic Compo	unds (SOCs) or Semi-Volatile Orga	nic Com	npounds (SVC	Cs)									•	· ·		
Bis(2-ethylhexyl)phthalate	Discharge from rubber and chemical factories	ppb	6	MCL	3/31	ND - 0.99 (0.75)	0/13	-	0/15	-	0/15	-	- These samples will be collected 9 months after the health advisory was amended. Results will be reported in a LTM Month 9 Sampling Results Report. These samples will be collected 15 months after the health advisory was amended. Results will be reported in a LTM Month 15 Sampling Results Report.	be These samples will be collected 21 months after the health advisory was amended. Results will be reported in a LTM Month 21 Sampling Results Report.	These samples will be collected 24 months after the health advisory was amended. Results will be reported in a LTM Month 24 Sampling Results Report.	

Notes:

1. These contaminants are listed whether detected or non-detect (ND) because these are incident specific. All other contaminants are only listed if detected.

2. The DOH uses multiple criteria to assess the safety of the drinking water including maximum contaminant levels (MCLs), previously established environmental action levels (EALs) and incident specific parameters (ISPs).

3. These numbers are the minimum and maximum values from all the sample test results. The average (or mathematical mean) includes all sample test results with a detectable contaminant. An average is the sum of the results (excluding non-detects) divided by the total number results with detection only. Acronyms and explanation of terms used in this table are presented on the following pages.

4. For more information regarding Total Petroleum Hydrocarbons, refer to the FACT SHEET What Are Petroleum Hydrocarbons?, available online at: https://health.hawaii.gov/about/files/2021/12/21.12.16 What-Are-Petroleum-Hydrocarbons.pdf.

5. Total Organic Carbon (TOC) test results report any constituent containing carbon, many of which are naturally occurring and some of which may be man-made. The DOH selected a TOC project screening level of 2,000 ppb under Stage 4. Each exceedance was investigated by reviewing the associated water quality data (e.g., BTEX results, TPH) and the IDWST determined that all TOC exceedances were inconclusive in association with petroleum hydrocarbons. Under review during the LTM Month 3 report for Zone H2), DOH revised the TOC screening level to 4,000 ppb (previously 2,000 ppb).

6. Parts per billion (ppb) refers to the amount (or concentration) of a contaminant in the water.

7. Cells highlighted in green indicate the water sample results were below DOH Screening Levels.



 Table 1-2. Contaminants Detected in Drinking Water Samples Collected from Schools in Zone H2

There are no schools in this zone.

Table 1-3. Contaminants Detected in Drinking Water Samples Collected from Child Development Centers in Zone H2

There are no Child Development Centers in this zone.



Table 1-4. Contaminants Detected in Drinking Water Samples Collected from Other Buildings in Zone H2

					Stage 4 Sum	Sampling Imary	Stage Sampling Mo	e 5 LTM g Summary nth 1	Stage Sampling Mor	e 5 LTM J Summary nth 2	Stage Sampling Mor	e 5 LTM J Summary nth 3	Stage Sampling Mo	e 5 LTM g Summary nth 9	Stage Sampling Mor	e 5 LTM g Summary nth 15	Stage Sampling Mor	e 5 LTM g Summary hth 21	Stage Sampling Mor	e 5 LTM g Summary nth 24
					02/0	2/22	03/	22/22	04/2	22/22	05/2	27/22	Decem	ber 2022	Jun	e 2023	Decem	ber 2023	Marc	ch 2023
			DOH Project Screening	Basis of DOH Screening	No. of Detects out of Samples	Minimum – Maximum (Average) ³	No. of Detects out of Samples	Minimum – Maximum (Average) ³	No. of Detects out of Samples	Minimum – Maximum (Average) ³	No. of Detects out of Samples	Minimum – Maximum (Average) ³	No. of Detects out of Samples	Minimum – Maximum (Average) ³						
Contaminant Contaminants of Concern ¹	Typical Source of Contaminant	Units	Level	Level ²	oumpiee	(rtorugo)	Gampies	(, tronugo)	Cumpico	(Firefuge)	campico	(Horage)	oumpiee	(rtorugo)	Campico	(rtorugo)	Gampieo	(, troidgo)	Campico	(, tronugo)
Benzene	Discharge from factories; Leaching from gas storage tanks and landfills	ppb ⁶	5.0	MCL	-	-	0/1	-	0/2	-	0/1	-								
Ethylbenzene	Discharge from petroleum refineries	ppb	700	MCL	-	-	0/1	-	0/2	-	0/1	-								
Toluene	Discharge from petroleum factories	ppb	1,000	MCL	-	-	0/1	-	0/2	-	0/1	-								
Xylenes (total)	Discharge from petroleum factories; Discharge from chemical factories	ppb	10,000	MCL	-	-	0/1	-	0/2	-	0/1	-								
1-Methylnaphthalene	Used to make other chemicals such as dyes, and resins; also, present in cigarette smoke, wood smoke, tar, asphalt, and at some hazardous waste sites.	ppb	10	EAL	-	-	0/1	-	0/2	-	0/1	-								
2-Methylnaphthalene	Used to make other chemicals such as dyes, and resins; also used to make vitamin K; and is present in cigarette smoke, wood smoke, tar, asphalt, and at some hazardous waste sites	ppb	10	EAL	-	-	0/1	-	0/2	-	0/1	-	These sar collected after th advis amended. be reporte Month 9	nples will be d 9 months ne health ory was . Results will ed in a LTM 9 Sampling	These samples will be collected 15 months after the health advisory was amended. Results will be reported in a LTM Month 15 Sampling Results Report.	nples will be 15 months he health ory was Results will ed in a LTM	e These samples will be collected 21 months after the health advisory was amended Results will be reported in a LTM Month 21 Sampling Results Report.	nples will be 21 months he health as amended. I be reported Month 21	These sar collected after th advisory w Results wil in a LTM	mples will be 24 months he health ras amended. Il be reported 1 Month 24
Naphthalene	Naphthalene is found in coal tar or crude oil and is used in the manufacture of plastics, resins, fuels, and dyes, and as a fumigant	ppb	17	EAL	-	-	0/1	-	0/2	-	0/1	-	Result	s Report.		s Report.		ig Results port.	Samplir Re	ng Results eport.
Total TPH⁴	TPH is petroleum and can contaminate drinking water through spills and other releases into the environment	ppb	211	ISP	-	-	0/1	-	0/2	-	1/1	55 - 55 (55)								
Total Organic Carbon (TOC)⁵	Naturally present in the environment, but also can be an indicator of contamination, including petroleum or other sources	ppb	4,000	ISP	1/1	1,660 – 1,660 (1,660)	1/1	510 - 510 (510)	2/2	260 - 530 (395)	0/1	-								
Free Chlorine (Field Test) ⁸	Water additive used to control microbes	ppb	4,000	ISP	-	-	1/1	490 - 490 (490)	1/1	280 - 280 (280)	1/1	200 - 200 (200)								
Metals		-																		
Antimony	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder	ppb	6.0	MCL	0/10	-	0/1	-	1/2	ND - 0.13 (0.13)	0/1	-	- These samples wi collected 9 mont after the health advisory was amended. Results be reported in a L Month 9 Sampli Results Report							
Arsenic	Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production wastes	ppb	10	MCL	5/10	ND - 0.3 (0.27)	0/1	-	0/2	-	0/1	-			These sar collected after th	nples will be 15 months ne health	These san collected after th	nples will be 21 months ne health	These sar collected after th	mples will be 24 months ne health
Barium	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits	ppb	2,000	MCL	1/1	2.5	1/1	6.5 - 6.5 (6.5)	2/2	3.6 - 3.8 (3.7)	1/1	3.8 - 3.8 (3.8)			advis amended. be reporte	ory was Results will ed in a LTM	nealthafter the healthwasadvisory was ameresults willResults will be repin a LTMin a LTM Month	e health after the h as amended. advisory was a be reported Results will be Month 21 in a LTM M ²	/ was amended. will be reported .TM Month 24	
Chromium	Discharge from steel and pulp mills; Erosion of natural deposits	ppb	100	MCL	1/1	2.1	0/1	-	2/2	1.1 - 1.2 (1.2)	0/1	-			- Month 9 Sampling - Results Report. Be reported in a L Month 15 Sampling Results Report.		5 Sampling s Report.	mpling Sampling Results Report.		sults Sampling Results Report.
Copper	Corrosion of household plumbing systems; Erosion of natural deposits	ppb	1,300	MCL	1/1	43	1/1	13 – 13 (13)	2/2	63 - 65 (64)	1/1	42 - 42 (42)		sults Report. Kesults Ke						



Lead	Corrosion of household plumbing systems; Erosion of natural deposits	ppb	15	MCL	1/1	1.4	1/1	0.42 - 0.42 (0.42)	2/2	0.85 - 0.87 (0.86)	1/1	0.42 - 0.42 (0.42)	These samples will be collected 9 months after the health	These samples will be collected 15 months after the health	These samples will be collected 21 months after the health	These samples will be collected 24 months after the health
Selenium	Discharge from petroleum and metal refineries; Erosion of natural deposits; Discharge from mines	ppb	50	MCL	5/10	ND - 1.3 (1.1)	0/1	-	2/2	0.61 - 0.69 (0.65)	1/1	0.62 - 0.62 (0.62)	advisory was amended. Results will be reported in a LTM Month 9 Sampling Results Report.	advisory was amended. Results will be reported in a LTM Month 15 Sampling Results Report.	advisory was amended. Results will be reported in a LTM Month 21 Sampling Results Report.	advisory was amended. Results will be reported in a LTM Month 24 Sampling Results Report.
Volatile Organic Compoun	platile Organic Compounds (VOCs)															
Total trihalomethanes (sum of chloroform, bromoform, bromodichloromethane, and di- bromochloromethane)	By-product of drinking water disinfection	ppb	80	MCL	-	-	0/1	-	0/2	-	1/1	0.52 - 0.52 (0.52)				
Synthetic Organic Compo	ynthetic Organic Compounds (SOCs) or Semi-Volatile Organic Compounds (SVOCs) – ND															

Notes:

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5. Total Organic Carbon (TOC) test results report any constituent containing carbon, many of which are naturally occurring and some of which may be man-made. The DOH selected a TOC project screening level of 2,000 ppb under Stage 4. Each exceedance was investigated by reviewing the associated water quality data (e.g., BTEX results, TPH) and the IDWST determined that all TOC exceedances were inconclusive in association with petroleum hydrocarbons. Under review during the LTM Month 3 report for Zone H2), DOH revised the TOC screening level to 4,000 ppb (previously 2,000 ppb).

6. Parts per billion (ppb) refers to the amount (or concentration) of a contaminant in the water.

7. Cells highlighted in green indicate the water sample results were below DOH Screening Levels.



Table 1-5. Contam	inants Detected in Drink	king Wa	ater Samp	les Collect	ed from	Fire Hydr	ants in a	Zone H2	-							
					Stage 4 Sum	Sampling Imary	Stage Sampling Mo	e 5 LTM g Summary onth 1	Stage Sampling Mo	5 LTM J Summary nth 2	Stage Sampling Mor	5 LTM Summary nth 3	Stage 5 LTM Sampling Summary Month 9	Stage 5 LTM Sampling Summary Month 15	Stage 5 LTM Sampling Summary Month 21	Stage 5 LTM Sampling Summary Month 24
• • • •			DOH Project	Basis of DOH	01/11/22 -	- 02/04/22	03	/22/22	04/	15/22	05/2	24/22	December 2022	June 2023	December 2023	March 2023
Contaminant	Typical Source of Contaminant	Units	Screening Level	Screening Level ²	No. of Detects out of Samples	Minimum – Maximum (Average) ³	No. of Minimum Detects – out of Maximum Samples (Average) ³	No. of Detects out of Samples (Average) ³	No. of Detects out of Samples (Average) ³	No. of Detects out of Samples (Average) ³						
Contaminants of Concern	1												· · · · · ·			
Benzene	Discharge from factories; Leaching from gas storage tanks and landfills	ppb ⁶	5.0	MCL	0/3	-	0/3	-	0/4	-	0/4	-				
Ethylbenzene	Discharge from petroleum refineries	ppb	700	MCL	0/3	-	0/3	-	0/4	-	0/4	-				
Toluene	Discharge from petroleum factories	ppb	1,000	MCL	0/3	-	0/3	-	0/4	-	0/4	-				
Xylenes (Total)	Discharge from petroleum factories; Discharge from chemical factories	ppb	10,000	MCL	0/3	-	0/3	-	0/4	-	0/4	-				
1-Methylnaphthalene	Used to make other chemicals such as dyes, and resins; also, present in cigarette smoke, wood smoke, tar, asphalt, and at some hazardous waste sites.	ppb	10	EAL	0/3	-	0/3	-	0/4	-	0/4	-	These samples will be	These samples will be	These samples will be	These samples will be
2-Methylnaphthalene	Used to make other chemicals such as dyes, and resins; also used to make vitamin K; and is present in cigarette smoke, wood smoke, tar, asphalt, and at some hazardous waste sites	ppb	10	EAL	0/3	-	0/3	-	0/4	-	0/4	-	collected 9 months after the health advisory was amended. Results will be reported in a LTM Month 9 Sampling Results Report	collected 15 months after the health advisory was amended. Results will be reported in a LTM Month 15 Sampling	collected 21 months after the health advisory was amended. Results will be reported in a LTM Month 21 Sampling	collected 24 months after the health advisory was amended. Results will be reported in a LTM Month 24 Sampling
Naphthalene	Naphthalene is found in coal tar or crude oil and is used in the manufacture of plastics, resins, fuels, and dyes, and as a fumigant	ppb	17	EAL	1/12	ND - 0.012 (0.012)	0/3	-	0/4	-	0/4	-		Results Report.	Results Report.	Results Report.
Total TPH ⁴	TPH is petroleum and can contaminate drinking water through spills and other releases into the environment	ppb	211	ISP	0/6	-	0/3	-	0/4	-	0/4	-				
Total Organic Carbon (TOC) ⁵	Naturally present in the environment, but also can be an indicator of contamination, including petroleum or other sources	ppb	4,000	ISP	0/3	-	0/3	-	0/4	-	0/4	-				
Free Chlorine (Field Test) ⁹	Water additive used to control microbes	ppb	4,000	ISP	-	-	3/3	110 - 660 (370)	4/4	120 - 390 (290)	3/3	30 - 460 (310)				
Metals		1	1						1							
Arsenic	Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production wastes	ррb	10	MCL	3/3	0.21 - 0.24 (0.23)	0/3	-	0/4	-	0/4	-	These samples will be collected 9 months after the health	These samples will be collected 15 months	These samples will be collected 21 months	These samples will be collected 24 months
Barium	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits	ppb	2,000	MCL	3/3	2.5 - 3.1 (2.7)	3/3	5.1 - 12 (7.7)	4/4	5.1 - 8.1 (6.6)	4/4	4.8 - 7.1 (5.9)	(1) advisory was amended. Results will be reported in a LTM Month 9 Sampling		th after the health s advisory was ts will amended. Results will LTM be reported in a LTM	after the health advisory was will amended. Results will IM be reported in a LTM Month 24 Sempling
Chromium	Discharge from steel and pulp mills; Erosion of natural deposits	ppb	100	MCL	3/3	1.5 - 1.5 (1.5)	0/3	-	0/4	-	0/4	Month 9 Sampling Results Report.		Results Report.	Results Report.	Results Report.

Table 1.5. Contaminante Detected in Drinking Water Samples Collected from Fire Hydronte in Zone H2



Copper	Corrosion of household plumbing systems; Erosion of natural deposits	ppb	1,300	MCL	3/3	4.7 - 20 (10)	3/3	1.3 - 4.3 (2.8)	4/4	6.4 - 14 (11)	4/4	1.4 - 7.1 (4.3)	These samples will be collected 9 months	These samples will be collected 15 months	These samples will be collected 21 months	These samples will be collected 24 months
Lead	Corrosion of household plumbing systems; Erosion of natural deposits	ppb	15	MCL	3/3	0.60 - 1.9 (1.0)	3/3	0.84 - 1.2 (1.0)	4/4	1.2 - 3.4 (2.0)	4/4	0.53 - 0.98 (0.73)	advisory was amended. Results will be reported in a LTM	after the health advisory was amended. Results will be reported in a LTM	after the health advisory was amended. Results will be reported in a LTM	after the health advisory was amended. Results will be reported in a LTM
Selenium	Discharge from petroleum and metal refineries; Erosion of natural deposits; Discharge from mines	ppb	50	MCL	3/3	0.86 - 1.2 (1.0)	0/3	-	4/4	0.37 - 0.56 (0.49)	4/4	0.76 - 2 (1.5)	Results Report.	Month 15 Sampling Results Report.	Month 21 Sampling Results Report.	Month 24 Sampling Results Report.
Volatile Organic Compou	nds (VOCs)															
Total Haloacetic acids (sum of mono-, di-, trichloroacetic acids and mono- and dibromo acetic acids)	By-product of drinking water disinfection	ppb	60	MCL	-	-	1/3	ND - 4.5 (4.5)	1/4	ND - 3.3 (3.3)	2/4	ND - 1.4 (1.4)	These samples will be collected 9 months after the health advisory was	These samples will be collected 15 months after the health advisory was	These samples will be collected 21 months after the health advisory was	These samples will be collected 24 months after the health advisory was
Total trihalomethanes (sum of chloroform, bromoform, bromodichloromethane, and di- bromochloromethane)	By-product of drinking water disinfection	ppb	80	MCL	1/1	0.54	3/3	0.78 - 31 (11)	2/4	ND - 31 (16)	4/4	0.72 - 30 (15)	amended. Results will be reported in a LTM Month 9 Sampling Results Report.	amended. Results will be reported in a LTM Month 15 Sampling Results Report.	amended. Results will be reported in a LTM Month 21 Sampling Results Report.	amended. Results will be reported in a LTM Month 24 Sampling Results Report.
Synthetic Organic Compo	ounds (SOCs) or Semi-Volatile Organ	nic Compour	nds (SVOCs)													
2-Ethylhexyl adipate	Fly ash from municipal waste incineration, wastewater effluents from publicly-owned treatment works (POTW) and chemical manufacturing plants.	ppb	400	MCL	2/3	ND - 0.057 (0.056)	0/3	-	0/4	-	0/4	-	These samples will be collected 9 months	These samples will be collected 15 months	These samples will be collected 21 months	These samples will be collected 24 months
di-n-Octyl phthalate	Exposure to di-n-octyl phthalate occurs mainly from eating food or drinking water that is stored in plastic containers.	ppb	_7	_7	1/9	ND - 0.16 (0.16)	0/3	-	0/4	-	0/4	-	advisory was amended. Results will be reported in a LTM Month 9 Sampling Bosults Papert	advisory was amended. Results will be reported in a LTM Month 15 Sampling Peopults Peoport	advisory was amended. Results will be reported in a LTM Month 21 Sampling Pageitte Papert	advisory was amended. Results will be reported in a LTM Month 24 Sampling Bosults Papert
Nitrobenzene	Used to manufacturer dyes, pesticides, and synthetic rubbers; Discharge from chemical factories	ppb	_7	_7	1/9	ND - 0.053 (0.053)	0/3	-	0/4	-	0/4	-	Results Report.	Results Report.	Results Report.	Results Report.

Notes:

1. These contaminants are listed whether detected or non-detect (ND) because these are incident specific. All other contaminants are only listed if detected.

2. The DOH uses multiple criteria to assess the safety of the drinking water including maximum contaminant levels (MCLs), previously established environmental action levels (EALs) and incident specific parameters (ISPs).

3. These numbers are the minimum and maximum values from all the sample test results. The average (or mathematical mean) includes all sample test results with a detectable contaminant. An average is the sum of the results (excluding non-detects) divided by the total number results with detection only. Acronyms and explanation of terms used in this table are presented on the following pages.

4. For more information regarding Total Petroleum Hydrocarbons, refer to the FACT SHEET What Are Petroleum Hydrocarbons?, available online at: https://health.hawaii.gov/about/files/2021/12/21.12.16 What-Are-Petroleum-Hydrocarbons.pdf.

5. Total Organic Carbon (TOC) test results report any constituent containing carbon, many of which are naturally occurring and some of which may be man-made. The DOH selected a TOC project screening level of 2,000 ppb under Stage 4. Each exceedance was investigated by reviewing the associated water quality data (e.g., BTEX results, TPH) and the IDWST determined that all TOC exceedances were inconclusive in association with petroleum hydrocarbons. Under review during the LTM Month 3 report for Zone H2), DOH revised the TOC screening level to 4,000 ppb (previously 2,000 ppb).

6. Parts per billion (ppb) refers to the amount (or concentration) of a contaminant in the water.

7. This contaminant does not have a DOH Screening Level and was only detected at low concentrations. It is not associated with fuels and is not considered a risk to human health associated with the fuel release that occurred at Red Hill in November 2021.

8. Cells highlighted in green indicate the water sample results were below DOH Screening Levels.





Table 1-6. Contaminants Detected in Drinking Water Samples Collected from JBPHH's Source Water (Waiawa Shaft – Post Chlorination)

					Sample Date: 01/11/2022		Samp)6/2022		
Contaminant	Typical Source of Contaminant	Units	DOH Project Screening Level	Basis of DOH Screening Level ²	No. of Detects out of Samples	Level Detected ³	Meets DOH Screening Level? (Yes / No) ⁷	No. of Detects out of Samples	Level Detected ³	Meets DOH Screening Level? (Yes / No) ⁷
Contaminants of Conce	rn ¹									
Benzene	Discharge from factories; Leaching from gas storage tanks and landfills	ppb ⁶	5.0	MCL	0/1	-	Yes	0/1	-	Yes
Ethylbenzene	Discharge from petroleum refineries	ppb	700	MCL	0/1	-	Yes	0/1		Yes
Toluene	Discharge from petroleum factories	ppb	1,000	MCL	0/1	-	Yes	0/1	-	Yes
m,p,o-Xylenes	Discharge from petroleum factories; Discharge from chemical factories	ppb	10,000	MCL	0/1	-	Yes	0/1	-	Yes
1-Methylnaphthalene	Used to make other chemicals such as dyes, and resins; also, present in cigarette smoke, wood smoke, tar, asphalt, and at some hazardous waste sites	ppb	10	ISP	0/1	-	Yes	0/1	-	Yes
2-Methylnaphthalene	Used to make other chemicals such as dyes, and resins; also used to make vitamin K; and is present in cigarette smoke, wood smoke, tar, asphalt, and at some hazardous waste sites	ppb	10	ISP	0/1	-	Yes	0/1	-	Yes
Naphthalene	Naphthalene is found in coal tar or crude oil and is used in the manufacture of plastics, resins, fuels, and dyes, and as a fumigant	ppb	17	ISP	0/1	-	Yes	0/1	-	Yes
Total Petroleum Hydrocarbons (TPHs) ⁴	TPH is petroleum and can contaminate drinking water through spills and other releases into the environment	ppb	211	ISP	0/1	-	Yes	0/1	-	Yes
Total Organic Carbon (TOC) ⁵	Naturally present in the environment, but also can be an indicator of contamination, including petroleum or other sources	ppb	4,000	ISP	0/1	-	Yes	0/1	-	Yes
Free Chlorine (Field Test) ⁸	Water Additive	ppb	4,000	MCL	-	-	-	1/1	670 – 670 (670)	Yes
Metals										
Antimony	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder	ppb	6.0	MCL	1/1	0.092 - 0.092 (0.92)	Yes	0/1	-	Yes
Arsenic	Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production waste	ppb	10	MCL	1/1	0.027 - 0.027 (0.027)	Yes	0/1	-	Yes
Barium	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits	ppb	2,000	MCL	1/1	1.7 - 1.7 (1.7)	Yes	1/1	1.7 - 1.7 (1.7)	Yes



					Samp	ble Date: 01/1	1/2022	Samp	ole Date: 05/	06/2022
Contaminant	Typical Source of Contaminant	Units	DOH Project Screening Level	Basis of DOH Screening Level ²	No. of Detects out of Samples	Level Detected ³	Meets DOH Screening Level? (Yes / No) ⁷	No. of Detects out of Samples	Level Detected ³	Meets DOH Screening Level? (Yes / No) ⁷
Chromium	Corrosion of galvanized pipes; Erosion of natural deposits; Discharge from metal refineries; Runoff from waste batteries and paints	ppb	100	MCL	1/1	1.5 - 1.5 (1.5)	Yes	1/1	0.55 - 0.55 (0.55)	Yes
Copper	Corrosion of household plumbing systems; Erosion of natural deposits	ppb	1,300	EAL	1/1	21 - 21 (21)	Yes	1/1	18.7 - 18.7 (18.7)	Yes
Lead	Corrosion of household plumbing systems; Erosion of natural deposits	ppb	15	EAL	1/1	0.27 - 0.27 (0.27)	Yes	1/1	0.23 - 0.23 (0.23)	Yes
Selenium	Discharge from petroleum and metal refineries; Erosion of natural deposits; Discharge from mines	ppb	50	MCL	1/1	0.70 - 0.70 (0.70)	Yes	1/1	1.3 - 1.3 (1.3)	Yes
Volatile Organic Compo	unds (VOCs) – ND									
Synthetic Organic Comp	oounds (SOCs) or Semi-Volatile Organic Compour	nds (SVOC	s)							
Bis(2- ethylhexyl)phthalate	Discharge from rubber and chemical factories	ppb	6.0	MCL	0/1	-	Yes	1/1	0.52 - 0.52 (0.52)	Yes

1. These contaminants are listed whether detected or non-detect (ND) because these are incident specific. All other contaminants are only listed if detected.

2. The DOH uses multiple criteria to assess the safety of the drinking water including maximum contaminant levels (MCLs), previously established environmental action levels (EALs) and incident specific parameters (ISPs).

3. These numbers are the minimum and maximum values from all the sample test results. The average (or mathematical mean) includes all sample test results with a detectable contaminant. An average is the sum of the results (excluding non-detects) divided by the total number results with detection only. Acronyms and explanation of terms used in this table are presented on the following pages.

4. For more information regarding Total Petroleum Hydrocarbons, refer to the FACT SHEET What Are Petroleum Hydrocarbons?, available online at: https://health.hawaii.gov/about/files/2021/12/21.12.16 What-Are-Petroleum-Hydrocarbons.pdf.

5. Total Organic Carbon (TOC) test results report any constituent containing carbon, many of which are naturally occurring and some of which may be man-made. The DOH selected a TOC project screening level of 2,000 ppb under Stage 4. Each exceedance was investigated by reviewing the associated water quality data (e.g., BTEX results, TPH) and the IDWST determined that all TOC exceedances were inconclusive in association with petroleum hydrocarbons. Under the Drinking Water Long Term Monitoring Plan (under review during the LTM Month 3 report for Zone H2), DOH revised the TOC screening level to 4,000 ppb (previously 2,000 ppb).

6. Parts per billion (ppb) refers to the amount (or concentration) of a contaminant in the water.

7. Cells highlighted in green indicate the water sample results were below DOH Screening Levels.



Drinking Water Distribution System Recovery Plan: Stage 5 LTM Month 3 Sampling Results Report for Zone H2

What is the purpose of this Stage 5 LTM Month 3 Sampling Results Report?

This progress report presents the testing results from drinking water samples that have been collected from residences, other buildings, and fire hydrants. These samples were collected after the health advisory had been amended and DOH determined drinking water was safe for human consumption. The health advisory was amended after the first four stages of the <u>Drinking Water Distribution System Recovery Plan</u> were completed in your zone. The JBPHH PWS #HI0000360 & AMR PWS #HI0000337 are committed to ensuring tap water is safe for human consumption after residents have returned home.

We are sharing this information with you to keep you updated on your community's water quality.

What was found?

The tables on the previous pages present all contaminants that were detected in drinking water samples that have been collected from residences, other buildings, and fire hydrants in your zone during Stage 5 LTM Month 1, LTM Month 2, and LTM Month 3. The DOH used multiple standards/criteria (called DOH Project Screening Levels) to assess the safety of the drinking water to include:

- EPA and Hawaii DOH Maximum Contaminant Levels (MCLs) standards for drinking water;
- Previously established Environmental Action Levels (EALs); and
- Incident Specific Parameters (ISPs).

This report together with the data demonstrates that the drinking water in your area (Zone H2) meets U.S. EPA and DOH standards that are applicable to the Navy Water System Incident.

All exceedances of DOH Project Screening Levels are thoroughly reviewed and investigated by the Navy, Army, and DOH, to (1) determine if the exceedance is associated with the JBPHH water distribution system or if it is associated with premise plumbing (i.e., it is localized to a specific faucet) and (2) determine the appropriate course of action to address the exceedance (e.g., re-flushing, replacing a faucet).

There were no exceedances of screening levels in drinking water samples collected from residences, other buildings, and fire hydrants during LTM Month 3 for Zone H2.

Total Organic Carbon (TOC) test results report any constituent containing carbon, many of which are naturally occurring and some of which may be man-made. The DOH



selected a TOC project screening level of 4,000 parts per billion (ppb) for long term monitoring. Each potential exceedance is investigated by reviewing the associated water quality data (e.g., Disinfection Byproducts and TPH results) for association with petroleum hydrocarbons. No TOC exceedances occurred in LTM Month 1, LTM Month 2, or LTM Month 3 for Zone H2.

What contaminants were tested?

Drinking water, including bottled water, can contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants tested can be obtained by calling the Hawaii DOH Safe Drinking Water Branch at 808-586-4258.

In order to ensure that drinking water is safe to drink, EPA and Hawaii DOH regulate the amount of certain contaminants in water provided by public water systems. For this incident, the primary categories of monitored contaminants include volatile organic compounds (VOCs), synthetic organic chemicals (SOCs)/semi-volatile organic compounds (SVOCs), metals, Total Petroleum Hydrocarbons (TPH), and Total Organic Carbon (TOC). A description of these contaminant categories can be found under *Explanation of Terms* located at the end of this report. The full list of contaminants that were tested for this zone are presented in the laboratory reports that are located at: https://jbphh-safewaters.org. For complete information on the interagency response, please visit: https://www.cpf.navy.mil/JBPHH-Water-Updates/.

What happened leading up to the public health advisory being issued?

The Red Hill Bulk Fuel Storage Facility jet fuel spill event was reported to have taken place on November 20, 2021. Subsequent reporting of fuel-like smell or visual sheen in addition to complaints of health issues from ingestion or dermal contact with the Navy and Army system water were received by the Navy and DOH. On November 28, 2021, the Navy reported that a chemical release of petroleum, which is a hazardous substance, entered the JBPHH drinking water distribution system from the Red Hill Shaft source. This release triggered an emergency response and DOH issuance of a public health advisory on November 29, 2021, for the entire JBPHH Public Water System No. HI0000360 (JBPHH System) and the consecutive Aliamanu Military Reservation Public Water System No. HI0000337 (AMR System).

The Hawaii DOH, EPA, Navy, and Army formed the Interagency Drinking Water System Team (IDWST) to work on a coordinated effort to restore safe drinking water to all Navy Water System users.

Has the public health advisory been amended or lifted?

The health advisory for Zone H2 was amended on March 11, 2022 but has not been lifted for the entire JBPHH System. The amendment to the health advisory was based on the results of extensive flushing, sampling (10% of buildings), and testing activities



performed in Zone H2. The IDWST evaluated multiple lines of evidence to determine whether or not drinking water was safe for consumption. DOH determine that the water in Zone H2 was safe and residents/occupants could use their tap water for all purposes include drinking, cooking, oral hygiene, and consumption by pets. LTM of drinking water will be performed to ensure drinking water remains safe for all residents and occupants of JBPHH. If new information becomes available that indicates contaminants are present in the drinking water that poses a threat to public health, additional investigation may be required.

Where does our water come from?

The source of water for the Navy Water System now comes from the Navy Waiawa Shaft, which was not impacted by the release of Jet Fuel (JP-5) that occurred at Red Hill in late November 2021. The Waiawa Shaft has been sampled, and EPA and the DOH confirmed that it meets all federal and state drinking water standards. The Waiawa Shaft will be sampled (in subsequent months during LTM) in accordance with EPA and the DOH requirements.

What has the IDWST done to clean the drinking water distribution system?

The IDWST evaluated multiple options for cleaning the Navy drinking water distribution system and determined that high-volume flushing of the Navy drinking water distribution system (all water mains/laterals/buildings) with 3 to 5 volumes of clean water from the Waiawa Shaft, followed by extensive testing to confirm that flushing worked, would restore safe drinking water to all Navy Water System users.

When was Long-Term Monitoring (LTM) water quality sampling conducted in Zone H2?

Between March 22, 2022 and March 31, 2022, drinking water samples were collected from residences, other buildings, and fire hydrants in Zone H2 for LTM Month 1.

Between April 15, 2022 and April 29, 2022, drinking water samples were collected from residences, other buildings, and fire hydrants in Zone H2 for LTM Month 2.

Between May 24, 2022 and June 15, 2022, drinking water samples were collected from residences, other buildings, and fire hydrants in Zone H2 for LTM Month 3.

Where were samples taken?

Per the IDWST approved sampling plan, five percent (5%) of all homes and buildings within Zone H2 were sampled with a minimum of 5 homes/buildings sampled. There are no schools in this zone. There are no Child Development Centers in this zone. These houses/buildings will be geographically distributed throughout the area to provide spatial coverage along the water supply line. In addition, the list of houses/buildings may be augmented based on additional information (e.g., houses/buildings where occupants



reported specific health impacts, houses/buildings that are referred to the team by medical providers) may also be sampled.

Where can I get more information about the potential health effects associated with these contaminants?

Hawaii Department of Health (DOH) <u>https://health.hawaii.gov/about/navy-water-system-quality-updates/</u>. Call the DOH Safe Drinking Water Branch at 808-586-4258

US Environmental Protection Agency (EPA) <u>https://www.epa.gov/ground-water-and-drinking-water/forms/online-form-epas-office-ground-water-and-drinking-water</u>. Call EPA Region 9's Environmental Information Center at 1-866-372-9378



Explanation of Terms and Acronyms used in this Report

Action Level (AL). This AL is for Lead and Copper. The AL is a measure of the effectiveness of the corrosion control treatment in water systems. The AL is not a standard for establishing a safe level of lead or copper. The AL is the point at which certain provisions of the proposed standards must be initiated.

Contaminant. Contaminant is any physical, chemical, biological, or radiological substance or matter in water, and can be either healthy or unhealthy, depending on the particular substance and concentration. It could also be a physical parameter monitored such as pH or temperature.

DOH. Hawaii Department of Health

EPA. U.S. Environmental Protection Agency

Incident Specific Parameter (ISP). To more comprehensively monitor and respond to this specific petroleum contamination of drinking water, the DOH identified contaminants that require additional action prior to amending the Health Advisory. The ISPs are used as a line of evidence to evaluate the data generated in each zone during the investigation conducted by the IDWST.

Maximum Contaminant Level (MCL). An MCL is the maximum permissible level of a contaminant in water which is delivered to any user of a public water system. The MCL is set to protect the public from acute and chronic health risks associated with consuming water containing these contaminants.

Metals. Metals are not derived from living sources and in general do not contain carbon. Metals include antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, copper, cyanide, fluoride, lead, mercury, nitrate, nitrite, selenium, and thallium. These contaminants get into drinking water supplies through industrial discharge or spills, erosion of natural deposits, corrosion, sewage discharge, fertilizer runoff, and other sources.

ND. Non-Detect

Project Specific Screening Level. DOH uses multiple criteria to assess the safety of the drinking water including maximum contaminant levels (MCLs) previously established environmental action levels (EALs) and incident specific parameters (ISPs).

Synthetic Organic Compounds (SOCs)/Semi-Volatile Organic Compounds (SVOCs). SOCs and SVOCs may be used interchangeably and are man-made, organic



(carbon-based) chemicals that are less volatile than Volatile Organic Contaminants (VOCs). They are used as pesticides, defoliants, fuel additives, and as ingredients for other organic chemicals.

DOH Environmental Action Level (EAL). The DOH Environmental Action Levels (EALs) are concentrations of contaminants in drinking water and other media (e.g., soil, soil gas, and groundwater) below which the contaminants are assumed to not pose a significant threat to human health or the environment. Exceeding these EAL does not necessarily indicate that contamination at the site poses environmental hazards but generally warrants additional investigation.

Total Petroleum Hydrocarbons (TPH). TPH is a term used to describe a large family of several hundred chemical compounds that come from crude oil. Crude oil is used to make petroleum products, which can contaminate the environment. TPH is comprised of detected results from TPH-Gasoline, TPH-Diesel, and TPH-Oil.

Total Organic Carbon (TOC). TOC is naturally present in the environment, but also can be an indicator of contamination, including petroleum or other sources.

Free Chlorine. Chlorine is added to drinking water as part of the treatment process. Adding chlorine is the most common way to disinfect drinking water. Disinfection kills bacteria, viruses, and other microorganisms that could cause disease or illness. Chlorine is effective and continues to keep the water safe as it travels from the treatment plant to the consumer's tap. Chlorine measurements provide another line-of-evidence for evaluating drinking water quality.

Total Trihalomethanes (TTHM). TTHM is the sum of the concentration in milligrams per liter of the trihalomethane compounds (trichloromethane [chloroform], dibromochloromethane, bromodichloromethane and tribromomethane [bromoform]).

Units. A unit is the concentration of contaminant found in the water. For this report, the units are expressed in U.S. Standard Units.

U.S. Standard Unit (Name)	Acronym	Equivalent International System of Units (Name)	Acronym
parts per billion	ppb	micrograms per Liter	μg/L

Volatile Organic Compounds (VOCs). VOCs are a class of chemicals that contain carbon and evaporate, or volatilize, easily into air at room temperature. VOCs are found in a variety of commercial, industrial, and residential products, including gasoline, solvents, cleaners and degreasers, paints, inks and dyes, and pesticides.