



Interagency Drinking Water System Team

Drinking Water Distribution System Recovery Plan: *Stage 4 Sampling Results Report for Zone D2*

Joint Base Pearl Harbor-Hickam (JBPHH)

13 March 2022

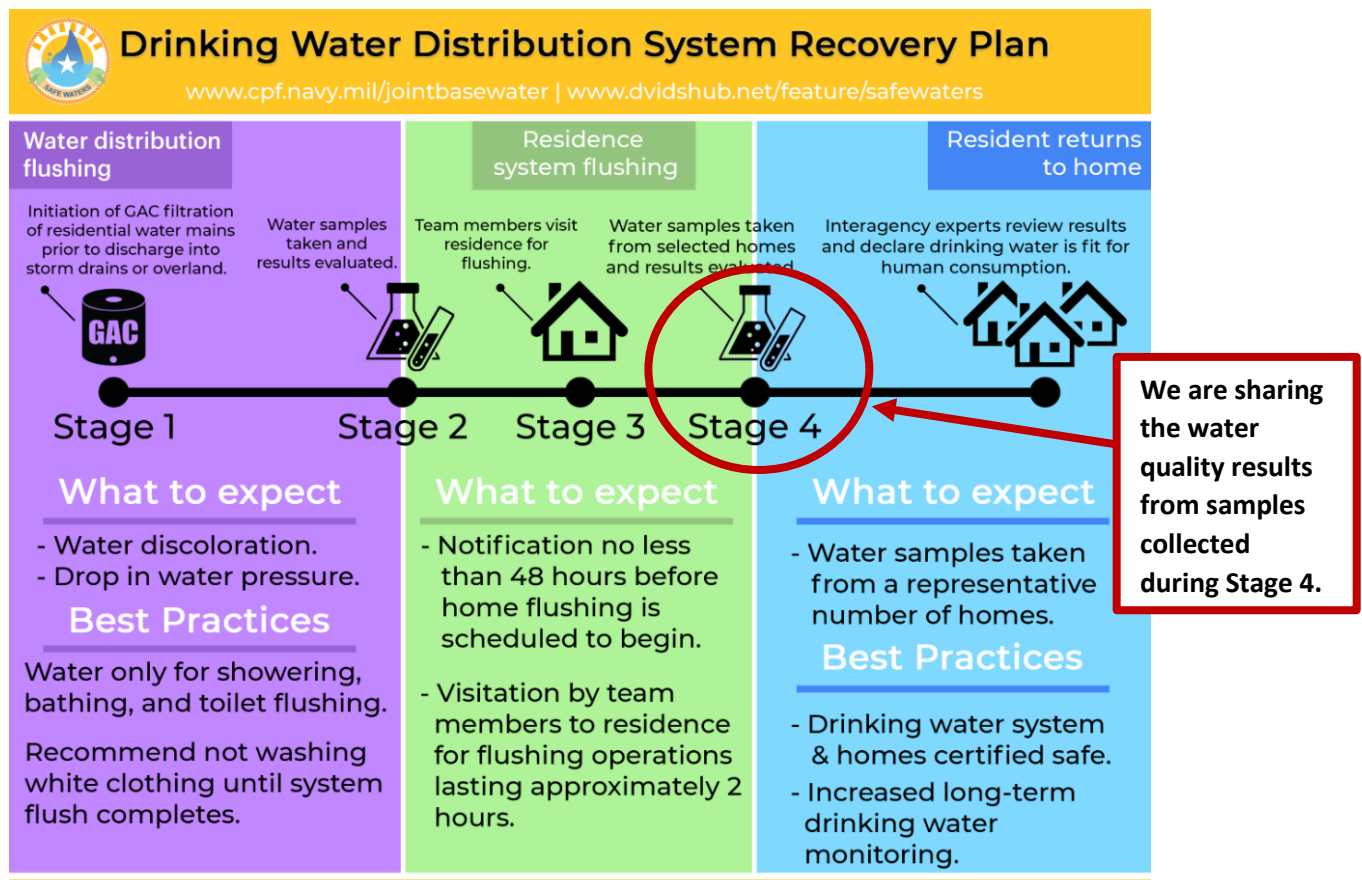


Neighborhoods included in Zone D2: Hickam, Hale Na Koa, Officer Field Area, Onizuka Village

EXECUTIVE SUMMARY FOR ZONE D2

The Interagency Drinking Water System Team (IDWST) has reviewed the following results of drinking water samples collected during Stage 4. The November 29, 2021 [Public Health Advisory for the JPBHH Public Water System](#) for Zone D2 remains in effect until amended by the Hawaii Department of Health (DOH). The Navy and DOH data in this Stage 4 Residential Sampling Report will be collectively used by the DOH to support amending the Public Health Advisory for your zone. We are sharing this information to keep you updated on our progress towards restoring the water supply being provided to your community.

We have thoroughly flushed, sampled, and tested Zone D2. This Zone has completed each stage (i.e., Stage 1–Distribution System Flushing through Stage 4–Building Sampling), in the Drinking Water Distribution System Recovery Plan (see the Figure below). Based on the samples collected and tested during Stage 2 from water mains, and Stage 4 from residences, buildings, schools, and Child Development Centers this water meets U.S. Environmental Protection Agency (EPA) and Hawaii DOH standards that are applicable to the Navy Water System Incident. For additional information on the post-system flushing drinking water sampling data by zone, please visit: <https://jbphh-safewaters.org>. For complete information on the interagency response, please visit: <https://www.cpf.navy.mil/JBPHH-Water-Updates/>.





Tables included in this Stage 4 Sampling Results Report for Zone D2

Table	Description	Page
Table 1-1.	Contaminants Detected in Drinking Water Samples Collected from Residences in Zone D2.....	1
Table 1-2.	Contaminants Detected in Drinking Water Samples Collected from Schools in Zone D2.....	4
Table 1-3.	Contaminants Detected in Drinking Water Samples Collected from Child Development Centers in Zone D2.....	6
Table 1-4.	Contaminants Detected in Drinking Water Samples Collected from Other Buildings in Zone D2.....	8
Table 1-5.	Contaminants Detected in Drinking Water Samples Collected from Fire Hydrants in Zone D2	10
Table 1-6.	Contaminants Detected in Drinking Water Samples Collected from JBPHH's Source Water (Waiawa Shaft – Post Chlorination)	12



Table 1-1. Contaminants Detected in Drinking Water Samples Collected from Residences in Zone D2

Contaminant	Sampling Period	Units	DOH Project Screening Level	Basis of DOH Screening Level ²	No. of Detects out of Samples	Minimum – Maximum (Average) ³	Meets DOH Screening Level? (Yes / No)	Typical Source of Contaminant
Contaminants of Concern¹								
Benzene	01/11/22 – 02/18/22	ppb ⁷	5.0	MCL	0/171	–	Yes	Discharge from factories; Leaching from gas storage tanks and landfills
Ethylbenzene	01/11/22 – 02/18/22	ppb	700	MCL	0/171	–	Yes	Discharge from petroleum refineries
Toluene	01/11/22 – 02/18/22	ppb	1,000	MCL	0/171	–	Yes	Discharge from petroleum factories
m,p,o-Xylenes	01/11/22 – 02/18/22	ppb	10,000	MCL	0/171	–	Yes	Discharge from petroleum factories; Discharge from chemical factories
1-Methylnaphthalene	01/11/22 – 02/18/22	ppb	10	EAL	0/170	–	Yes	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
2-Methylnaphthalene	01/11/22 – 02/18/22	ppb	10	EAL	1/170	ND – 0.0091 (0.0091)	Yes	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
Naphthalene	01/11/22 – 02/18/22	ppb	17	EAL	1/171	ND – 1.1 (1.1)	Yes	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
Lead	01/11/22 – 02/18/22	ppb	15	MCL	146/189	ND – 5.5 (0.34)	Yes	Corrosion of household plumbing systems; Erosion of natural deposits
Total TPH	01/11/22 – 02/18/22	ppb	211	ISP	5/171	ND – 191 (69)	Yes⁴	TPH is petroleum and can contaminate drinking water through spills and other releases into the environment
Total Organic Carbon (TOC)	01/11/22 – 02/18/22	ppb	2,000	ISP	72/173	ND – 7,720 (1,373)	No⁵	Naturally present in the environment, but also can be an indicator of contamination, including petroleum or other sources
Metals⁶								
Antimony	01/11/22 – 02/18/22	ppb	6.0	MCL	1/189	ND – 0.11 (0.11)	Yes	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder



Contaminant	Sampling Period	Units	DOH Project Screening Level	Basis of DOH Screening Level ²	No. of Detects out of Samples	Minimum – Maximum (Average) ³	Meets DOH Screening Level? (Yes / No)	Typical Source of Contaminant
Arsenic	01/11/22 – 02/18/22	ppb	10	MCL	46/189	ND – 1.5 (0.83)	Yes	Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production wastes
Barium	01/11/22 – 02/18/22	ppb	2,000	MCL	189/189	1.7 – 3.0 (2.0)	Yes	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits
Cadmium	01/11/22 – 02/18/22	ppb	5.0	MCL	3/189	ND – 0.14 (0.084)	Yes	By-product of drinking water disinfection
Chromium	01/11/22 – 02/18/22	ppb	100	MCL	188/189	ND – 2.5 (1.7)	Yes	Discharge from steel and pulp mills; Erosion of natural deposits
Copper	01/11/22 – 02/18/22	ppb	1,300	MCL	189/189	4 – 360 (49)	Yes	Corrosion of household plumbing systems; Erosion of natural deposits
Mercury	01/11/22 – 02/18/22	ppb	2.0	MCL	6/189	ND – 0.093 (0.074)	Yes	Erosion of natural deposits; Discharge from refineries and factories; Runoff from landfills; Runoff from cropland
Selenium	01/11/22 – 02/18/22	ppb	50	MCL	29/189	ND – 1.7 (0.83)	Yes	Discharge from petroleum and metal refineries; Erosion of natural deposits; Discharge from mines
Thallium	01/11/22 – 02/18/22	ppb	2.0	MCL	15/189	ND – 0.10 (0.081)	Yes	Leaching from ore-processing sites; Discharge from electronics, glass, and drug factories
Volatile Organic Compounds (VOCs)								
1,4-Dichlorobenzene	01/11/22 – 02/18/22	ppb	75	MCL	1/171	ND – 0.66 (0.66)	Yes	Discharge from industrial chemical factories
Synthetic Organic Compounds (SOCs) or Semi-Volatile Organic Compounds (SVOCs) – ND								

Notes:

- These contaminants are listed whether detected or non-detect (ND) because these are incident specific. All other contaminants are only listed if detected.
- 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).
- 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.
- 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 IDWST selected a TOC project screening level of 2,000 ppb. For each exceedance, the IDWST investigated by reviewing the associated water quality data (e.g., BTEX results, TPH) and determined that all TOC exceedances are not associated with petroleum hydrocarbons. The DOH is reviewing all of the lines of evidence, include the TOC result, and will make a final determination as to whether or not to amend the public health advisory for this zone.
6. This does not include the January 15, 2022 (initial) beryllium results from 504 Signer Boulevard (Field Sample Number: 220115-D2-IT04). This does include the resampled results from 504 Signer Boulevard as described below:
 - a) The sample result taken at 504 Signer Boulevard on January 15, 2022 was 8.4 parts per billion (ppb) for beryllium. This was in exceedance of the MCL of 4.0 ppb. This type of exceedance had been encountered before in other zones. 504 Signer Boulevard is an eight-unit complex. The IDWST reviewed the test results of all sample locations and determined that although it was likely to be a premise plumbing issue, further investigation was warranted through additional sampling and flushing. The entire complex was sampled, flushed and resampled. The re-samples were all non-detects.
7. Parts per billion (ppb) refers to the amount (or concentration) of a contaminant in the water.



Table 1-2. Contaminants Detected in Drinking Water Samples Collected from Schools in Zone D2

Contaminant	Sampling Period	Units	DOH Project Screening Level	Basis of DOH Screening Level ²	No. of Detects out of Samples	Minimum – Maximum (Average) ³	Meets DOH Screening Level? (Yes / No)	Typical Source of Contaminant
Contaminants of Concern¹								
Benzene	1/14/2022	ppb ⁶	5.0	MCL	0/5	–	Yes	Discharge from factories; Leaching from gas storage tanks and landfills
Ethylbenzene	1/14/2022	ppb	700	MCL	0/5	–	Yes	Discharge from petroleum refineries
Toluene	1/14/2022	ppb	1,000	MCL	0/5	–	Yes	Discharge from petroleum factories
m,p,o-Xylenes	1/14/2022	ppb	10,000	MCL	0/5	–	Yes	Discharge from petroleum factories; Discharge from chemical factories
1-Methylnaphthalene	1/14/2022	ppb	10	EAL	0/5	–	Yes	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
2-Methylnaphthalene	1/14/2022	ppb	10	EAL	0/5	–	Yes	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
Naphthalene	1/14/2022	ppb	17	EAL	0/5	–	Yes	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
Lead	1/14/2022	ppb	15	MCL	5/5	0.13 – 0.35 (0.22)	Yes	Corrosion of household plumbing systems; Erosion of natural deposits
Total TPH	1/14/2022	ppb	211	ISP	0/5	–	Yes ⁴	TPH is petroleum and can contaminate drinking water through spills and other releases into the environment
Total Organic Carbon (TOC)	1/14/2022	ppb	2,000	ISP	5/5	1,840 – 2,700 (2,380)	No ⁵	Naturally present in the environment, but also can be an indicator of contamination, including petroleum or other sources
Metals								
Barium	1/14/2022	ppb	2,000	MCL	5/5	2.0 – 2.3 (2.1)	Yes	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits
Beryllium	1/14/2022	ppb	4.0	MCL	1/5	ND – 0.17 (0.17)	Yes	Discharge from metal refineries and coal-burning factories; Discharge from electrical, aerospace, and defense industries



Contaminant	Sampling Period	Units	DOH Project Screening Level	Basis of DOH Screening Level ²	No. of Detects out of Samples	Minimum – Maximum (Average) ³	Meets DOH Screening Level? (Yes / No)	Typical Source of Contaminant
Chromium	1/14/2022	ppb	100	MCL	5/5	0.91 – 1.9 (1.7)	Yes	Discharge from steel and pulp mills; Erosion of natural deposits
Copper	1/14/2022	ppb	1,300	MCL	5/5	50 – 570 (217)	Yes	Corrosion of household plumbing systems; Erosion of natural deposits
Selenium	1/14/2022	ppb	50	MCL	4/5	ND – 1.0 (0.57)	Yes	Discharge from petroleum and metal refineries; Erosion of natural deposits; Discharge from mines
Thallium	1/14/2022	ppb	2.0	MCL	2/5	ND – 0.099 (0.077)	Yes	Leaching from ore-processing sites; Discharge from electronics, glass, and drug factories
Volatile Organic Compounds (VOCs) – ND								
Synthetic Organic Compounds (SOCs) or Semi-Volatile Organic Compounds (SVOCs) – ND								

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 IDWST selected a TOC project screening level of 2,000 ppb. For each exceedance, the IDWST investigated by reviewing the associated water quality data (e.g., BTEX results, TPH) and determined that all TOC exceedances are not associated with petroleum hydrocarbons. The DOH is reviewing all of the lines of evidence, include the TOC result, and will make a final determination as to whether or not to amend the public health advisory for this zone.
6. Parts per billion (ppb) refers to the amount (or concentration) of a contaminant in the water.

**Table 1-3. Contaminants Detected in Drinking Water Samples Collected from Child Development Centers in Zone D2**

Contaminant	Sampling Period	Units	DOH Project Screening Level	Basis of DOH Screening Level ²	No. of Detects out of Samples	Minimum – Maximum (Average) ³	Meets DOH Screening Level? (Yes / No)	Typical Source of Contaminant
Contaminants of Concern¹								
Benzene	1/12/2022	ppb ⁵	5.0	MCL	0/2	–	Yes	Discharge from factories; Leaching from gas storage tanks and landfills
Ethylbenzene	1/12/2022	ppb	700	MCL	0/2	–	Yes	Discharge from petroleum refineries
Toluene	1/12/2022	ppb	1,000	MCL	0/2	–	Yes	Discharge from petroleum factories
m,p,o-Xylenes	1/12/2022	ppb	10,000	MCL	0/2	–	Yes	Discharge from petroleum factories; Discharge from chemical factories
1-Methylnaphthalene	1/12/2022	ppb	10	EAL	0/2	–	Yes	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
2-Methylnaphthalene	1/12/2022	ppb	10	EAL	0/2	–	Yes	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
Naphthalene	1/12/2022	ppb	17	EAL	0/2	–	Yes	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
Lead	1/12/2022	ppb	15	MCL	2/2	0.12 – 0.16 (0.14)	Yes	Corrosion of household plumbing systems; Erosion of natural deposits
Total TPH	1/12/2022	ppb	211	ISP	2/2	49 – 52 (51)	Yes ⁴	TPH is petroleum and can contaminate drinking water through spills and other releases into the environment
Total Organic Carbon (TOC)	1/12/2022	ppb	2,000	ISP	2/2	338 – 440 (389)	Yes	Naturally present in the environment, but also can be an indicator of contamination, including petroleum or other sources
Metals								
Barium	1/12/2022	ppb	2,000	MCL	2/2	1.8 – 2.3 (2.1)	Yes	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits
Chromium	1/12/2022	ppb	100	MCL	2/2	1.6 – 1.7 (1.7)	Yes	Discharge from steel and pulp mills; Erosion of natural deposits



Contaminant	Sampling Period	Units	DOH Project Screening Level	Basis of DOH Screening Level ²	No. of Detects out of Samples	Minimum – Maximum (Average) ³	Meets DOH Screening Level? (Yes / No)	Typical Source of Contaminant
Copper	1/12/2022	ppb	1,300	MCL	2/2	22 – 26 (24)	Yes	Corrosion of household plumbing systems; Erosion of natural deposits
Volatile Organic Compounds (VOCs) – ND								
Synthetic Organic Compounds (SOCs) or Semi-Volatile Organic Compounds (SVOCs) – ND								

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

**Table 1-4. Contaminants Detected in Drinking Water Samples Collected from Other Buildings in Zone D2**

Contaminant	Sampling Period	Units	DOH Project Screening Level	Basis of DOH Screening Level ²	No. of Detects out of Samples	Minimum – Maximum (Average) ³	Meets DOH Screening Level? (Yes / No)	Typical Source of Contaminant
Contaminants of Concern¹								
Benzene	01/16/22 – 01/18/22	ppb ⁷	5.0	MCL	0/31	–	Yes	Discharge from factories; Leaching from gas storage tanks and landfills
Ethylbenzene	01/16/22 – 01/18/22	ppb	700	MCL	0/31	–	Yes	Discharge from petroleum refineries
Toluene	01/16/22 – 01/18/22	ppb	1,000	MCL	0/31	–	Yes	Discharge from petroleum factories
m,p,o-Xylenes	01/16/22 – 01/18/22	ppb	10,000	MCL	0/31	–	Yes	Discharge from petroleum factories; Discharge from chemical factories
1-Methylnaphthalene	01/16/22 – 01/18/22	ppb	10	EAL	0/31	–	Yes	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
2-Methylnaphthalene	01/16/22 – 01/18/22	ppb	10	EAL	0/31	–	Yes	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
Naphthalene	01/16/22 – 01/18/22	ppb	17	EAL	0/31	–	Yes	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
Lead	01/16/22 – 01/18/22	ppb	15	MCL	22/31	ND – 1.3 (0.39)	Yes	Corrosion of household plumbing systems; Erosion of natural deposits
Total TPH	01/16/22 – 01/18/22	ppb	211	ISP	0/31	–	Yes⁴	TPH is petroleum and can contaminate drinking water through spills and other releases into the environment
Total Organic Carbon (TOC)	01/16/22 – 01/18/22	ppb	2,000	ISP	9/31	ND – 3,220 (2,274)	No⁵	Naturally present in the environment, but also can be an indicator of contamination, including petroleum or other sources
Metals								
Antimony	01/16/22 – 01/18/22	ppb	6.0	MCL	2/31	ND – 0.30 (0.28)	Yes	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder
Arsenic	01/16/22 – 01/18/22	ppb	10	MCL	1/31	ND – 0.52 (0.52)	Yes	Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production wastes



Contaminant	Sampling Period	Units	DOH Project Screening Level	Basis of DOH Screening Level ²	No. of Detects out of Samples	Minimum – Maximum (Average) ³	Meets DOH Screening Level? (Yes / No)	Typical Source of Contaminant
Barium	01/16/22 – 01/18/22	ppb	2,000	MCL	30/31	ND – 2.7 (2.1)	Yes	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits
Chromium	01/16/22 – 01/18/22	ppb	100	MCL	31/31	0.99 – 2.4 (1.6)	Yes	Discharge from steel and pulp mills; Erosion of natural deposits
Copper	01/16/22 – 01/18/22	ppb	1,300	MCL	31/31	2.4 – 210 (84)	Yes	Corrosion of household plumbing systems; Erosion of natural deposits
Selenium	01/16/22 – 01/18/22	ppb	50	MCL	4/31	ND – 1.2 (0.56)	Yes	Discharge from petroleum and metal refineries; Erosion of natural deposits; Discharge from mines
Thallium	01/16/22 – 01/18/22	ppb	2.0	MCL	4/31	ND – 0.10 (0.072)	Yes	Leaching from ore-processing sites; Discharge from electronics, glass, and drug factories
Volatile Organic Compounds (VOCs) - ND								
Chlorobenzene	01/16/22 – 01/18/22	ppb	100	MCL	1/31	ND – 0.75 (0.75)	Yes	Discharge from chemical and agricultural chemical factories
Methylene Chloride	01/16/22 – 01/18/22	ppb	5.0	MCL	2/31	ND – 186 (108)	No ⁶	Discharge from pharmaceutical and chemical factories
Synthetic Organic Compounds (SOCs) or Semi-Volatile Organic Compounds (SVOCs) – ND								
Bis(2-ethylhexyl)phthalate	01/16/22 – 01/18/22	ppb	6.0	MCL	1/31	ND - 0.97 (0.97)	Yes	Discharge from rubber and chemical factories

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- 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 IDWST selected a TOC project screening level of 2,000 ppb. For each exceedance, the IDWST investigated by reviewing the associated water quality data (e.g., BTEX results, TPH) and determined that all TOC exceedances are not associated with petroleum hydrocarbons. The DOH is reviewing all of the lines of evidence, include the TOC result, and will make a final determination as to whether or not to amend the public health advisory for this zone.
- Methylene chloride (also referred to as dichloromethane) was detected from Building B901H (Hickam Officer's Club). The sample results were 29.4 parts per billion (ppb) and 186 ppm (Field Sample Numbers: 220116-D2-HT05, 220118-D2-LT01). This is an exceedance of the MCL of 5.0 ppb. The building is closed for future renovations. The IDWST reviewed the information and determined that isolation of the facility from the distribution system through a backflow preventer or by securing a valve was needed to ensure that the source of contamination could not impact the rest of the public water system. The building's water will be sampled and the test results provided to DOH prior to removing any restrictions on the use of water at this facility.



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



Table 1-5. Contaminants Detected in Drinking Water Samples Collected from Fire Hydrants in Zone D2

Contaminant	Sampling Period	Units	DOH Project Screening Level	Basis of DOH Screening Level ²	No. of Detects out of Samples	Minimum – Maximum (Average) ³	Meets DOH Screening Level? (Yes / No)	Typical Source of Contaminant
Contaminants of Concern¹								
Benzene	01/01/22 – 02/16/22	ppb ⁷	5.0	MCL	0/12	–	Yes	Discharge from factories; Leaching from gas storage tanks and landfills
Ethylbenzene	01/01/22 – 02/16/22	ppb	700	MCL	0/12	–	Yes	Discharge from petroleum refineries
Toluene	01/01/22 – 02/16/22	ppb	1,000	MCL	0/12	–	Yes	Discharge from petroleum factories
m,p,o-Xylenes	01/01/22 – 02/16/22	ppb	10,000	MCL	0/12	–	Yes	Discharge from petroleum factories; Discharge from chemical factories
1-Methylnaphthalene	01/01/22 – 02/16/22	ppb	10	EAL	0/11	–	Yes	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
2-Methylnaphthalene	01/01/22 – 02/16/22	ppb	10	EAL	0/11	–	Yes	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
Naphthalene	01/01/22 – 02/16/22	ppb	17	EAL	0/11	–	Yes	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
Lead	01/01/22 – 02/16/22	ppb	15	MCL	12/12	0.15 – 6.1 (0.99)	Yes	Corrosion of household plumbing systems; Erosion of natural deposits
Total TPH	01/01/22 – 02/16/22	ppb	211	ISP	0/14	–	Yes ^{4,6}	TPH is petroleum and can contaminate drinking water through spills and other releases into the environment
Total Organic Carbon (TOC)	01/01/22 – 02/16/22	ppb	2,000	ISP	7/11	ND – 3,690 (2,260)	No ⁵	Naturally present in the environment, but also can be an indicator of contamination, including petroleum or other sources
Metals								
Arsenic	01/01/22 – 02/16/22	ppb	10	MCL	7/12	ND – 0.45 (0.37)	Yes	Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production wastes



Contaminant	Sampling Period	Units	DOH Project Screening Level	Basis of DOH Screening Level ²	No. of Detects out of Samples	Minimum – Maximum (Average) ³	Meets DOH Screening Level? (Yes / No)	Typical Source of Contaminant
Barium	01/01/22 – 02/16/22	ppb	2,000	MCL	12/12	1.8 – 4.3 (2.2)	Yes	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits
Chromium	01/01/22 – 02/16/22	ppb	100	MCL	12/12	0.83 – 1.9 (1.3)	Yes	Discharge from steel and pulp mills; Erosion of natural deposits
Copper	01/01/22 – 02/16/22	ppb	1,300	MCL	12/12	1.3 – 7.1 (3.3)	Yes	Corrosion of household plumbing systems; Erosion of natural deposits
Selenium	01/01/22 – 02/16/22	ppb	50	MCL	12/12	ND – 1.8 (1.2)	Yes	Discharge from petroleum and metal refineries; Erosion of natural deposits; Discharge from mines
Thallium	01/01/22 – 02/16/22	ppb	2.0	MCL	1/12	ND – 0.047 (0.047)	Yes	Leaching from ore-processing sites; Discharge from electronics, glass, and drug factories
Volatile Organic Compounds (VOCs) – ND								
Synthetic Organic Compounds (SOCs) or Semi-Volatile Organic Compounds (SVOCs)								
Benzo(a)pyrene	01/01/22 – 02/16/22	ppb	0.20	MCL	1/10	ND – 0.02 (0.02)	Yes	Leaching from linings of water storage tanks and distribution lines

Notes:

- These contaminants are listed whether detected or non-detect (ND) because these are incident specific. All other contaminants are only listed if detected.
- 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).
- 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.
- 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.
- 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 IDWST selected a TOC project screening level of 2,000 ppb. For each exceedance, the IDWST investigated by reviewing the associated water quality data (e.g., BTEX results, TPH) and determined that all TOC exceedances are not associated with petroleum hydrocarbons. The DOH is reviewing all of the lines of evidence, include the TOC result, and will make a final determination as to whether or not to amend the public health advisory for this zone.
- This does not include the January 14, 2022 (initial) TPH results collected from Fire Hydrant 509 and Fire Hydrants 519 (Field Sample Numbers: 220114-D2-WT03, 220114-D2-WT04). This does include the resampled results from Fire Hydrant 509 and Fire Hydrant 519 as described below:
 - The sample result take from Fire Hydrant 509 and Fire Hydrant 519 on January 14, 2022 were 120 parts per billion (ppb) and 260 ppb, respectively, for TPH. This was an exceedance of the ISP of 211 ppb. Investigation into this matter determined this exceedance was a localized issue that was most likely attributable to premise plumbing. The IDWST members directed that the hydrants be sampled again to confirm the exceedance was localized and not a widespread issue. All TPH results from the re-sampling were non-detects. This investigation is documented in detail in the Removal Action Report for Zone D2.
- Parts per billion (ppb) refers to the amount (or concentration) of a contaminant in the water.

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

Contaminant	Sampling Period	Units	DOH Project Screening Level	Basis of DOH Screening Level ²	No. of Detects out of No. of Samples	Level Detected	Meets DOH Screening Level? (Yes / No)	Typical Source of Contaminant
Contaminants of Concern¹								
Benzene	01/11/2022	ppb ⁴	5.0	MCL	0/1	--	Yes	Discharge from factories; Leaching from gas storage tanks and landfills
Ethylbenzene	01/11/2022	ppb	700	MCL	0/1	--	Yes	Discharge from petroleum refineries
Toluene	01/11/2022	ppb	1,000	MCL	0/1	--	Yes	Discharge from petroleum factories
m,p,o-Xylenes	01/11/2022	ppb	10,000	MCL	0/1	--	Yes	Discharge from petroleum factories; Discharge from chemical factories
1-Methylnaphthalene	01/11/2022	ppb	10	ISP	0/1	--	Yes	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
2-Methylnaphthalene	01/11/2022	ppb	10	ISP	0/1	--	Yes	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
Naphthalene	01/11/2022	ppb	17	ISP	0/1	--	Yes	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
Lead	01/11/2022	ppb	15	EAL	1/1	0.27	Yes	Corrosion of household plumbing systems; Erosion of natural deposits
Total Petroleum Hydrocarbons (TPHs)	01/11/2022	ppb	211	ISP	0/1	--	Yes ³	TPH is petroleum and can contaminate drinking water through spills and other releases into the environment
Total Organic Carbon (TOC)	01/11/2022	ppb	2,000	ISP	0/1	--	Yes	Naturally present in the environment, but also can be an indicator of contamination, including petroleum or other sources
Metals								
Antimony	01/11/2022	ppb	6.0	MCL	1/1	0.092	Yes	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder
Arsenic	01/11/2022	ppb	10	MCL	1/1	0.027	Yes	Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production waste
Barium	01/11/2022	ppb	2,000	MCL	1/1	1.7	Yes	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits



Contaminant	Sampling Period	Units	DOH Project Screening Level	Basis of DOH Screening Level ²	No. of Detects out of No. of Samples	Level Detected	Meets DOH Screening Level? (Yes / No)	Typical Source of Contaminant
Chromium	01/11/2022	ppb	100	MCL	1/1	1.5	Yes	Corrosion of galvanized pipes; Erosion of natural deposits; Discharge from metal refineries; Runoff from waste batteries and paints
Copper	01/11/2022	ppb	1,300	EAL	1/1	21	Yes	Corrosion of household plumbing systems; Erosion of natural deposits
Selenium	01/11/2022	ppb	50	MCL	1/1	0.70	Yes	Discharge from petroleum and metal refineries; Erosion of natural deposits; Discharge from mines
Volatile Organic Compounds – ND								
Synthetic Organic Compounds (SOCs) or Semi-Volatile Organic Compounds (SVOCs) – ND								

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



Drinking Water Distribution System Recovery Plan: **Stage 4 Sampling Results Report for Zone D2**

What is the purpose of this Stage 4 Sampling Results Report?

This progress report presents the testing results from drinking water samples that have been collected from residences, buildings, schools, and Child Development Centers. These samples were collected after extensive flushing of residences, buildings, schools and childcare centers in Stage 3 was performed using clean water from the Navy Waiawa Shaft. This report summarizes results from Stage 4 of the 4-Stage process described in the IDWST [Drinking Water Distribution System Recovery Plan](#).

The Navy and DOH data in this report will be collectively used by the DOH to support amending the public health advisory for your zone. We are sharing this information to keep you updated on our progress towards restoring the water supply being provided to your community.

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, schools, Child Development Centers, and other buildings in your zone during Stage 4. 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 D2) meets U.S. Environmental Protection Agency (EPA) and State of Hawaii Department of Health (DOH) standards that are applicable to the Navy Water System Incident.

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 IDWST selected a TOC project screening level of 2,000 parts per billion (ppb). For each exceedance, the IDWST investigated by reviewing the associated water quality data (e.g., BTEX results and TPH results) and determined that all TOC exceedances are not associated with petroleum hydrocarbons. The DOH is reviewing all of the lines of evidence, including the TOC result, and will make a final determination as to whether or not to amend the public health advisory for this zone.



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 public health advisory being issued?

After receiving reports of a fuel-like smell or visual sheen in the drinking water from residents of Joint Base Pearl Harbor – Hickam (JBPHH) on November 28, 2021, the Navy immediately stopped using water from the Red Hill Shaft. Out of abundance of caution, the Navy also stopped using water from the Navy Aiea Halawa Shaft. The Navy's water system provides drinking water to JBPHH, including the Army, Air Force, Marine Corps, and Hawaii residents in some neighborhoods close to JBPHH. The Hawaii DOH issued a public health advisory on November 29, 2021. The Hawaii DOH, the United States Environmental Protection Agency (EPA), Navy, and Marine Corps Public Health Center, 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?

No. Please continue to follow the DOH public health advisory for Navy Water System users and only use your drinking water for non-consumptive purposes as long as your water does not have a visible sheen and remains odor free. Your service may have provided more restrictive guidance. As stated above, we completed Stage 4 of the 4-Stage process described in the Drinking Water System Recovery Plan and the DOH will re-evaluate its public health advisory. Once the public health advisory has been amended for all zones, the DOH will lift the public health advisory for the entire Navy Water System.



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 continue to be sampled 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 were homes and other buildings flushing and water quality sampling conducted in Zone D2?

Flushing of homes and buildings in Zone D2 was completed on January 10, 2022. From January 11, 2022 to February 18, 2022, drinking water samples were collected from residences, schools, and other buildings.

Where were samples taken?

Per the IDWST approved sampling plan, ten percent (10%) of all homes and buildings were sampled with the exception of schools and Child Development Centers. A minimum of five (5) samples were collected from each school and two (2) samples at Child Development Centers.

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

Hawaii Department of Health (DOH)

<https://health.hawaii.gov/about/navy-water-system-quality-updates/>.

Call the DOH Safe Drinking Water Branch at 808-586-4258

US Environmental Protection Agency (EPA)

<https://www.epa.gov/ground-water-and-drinking-water/forms/online-form-epas-office-ground-water-and-drinking-water>.

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 like 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.

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 million	ppm*	milligrams per Liter	mg/L
parts per billion	ppb*	micrograms per Liter	µg/L

*One (1) part per million (ppm) is 1,000 parts per billion (ppb).

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.