



Interagency Drinking Water System Team

Drinking Water Distribution System Recovery Plan: *Stage 2 Sampling* *Results for Zone C1*

Joint Base Pearl-Hickam (JBPHH)
04 February 2022



Neighborhoods included in Zone C1: SUB BASE

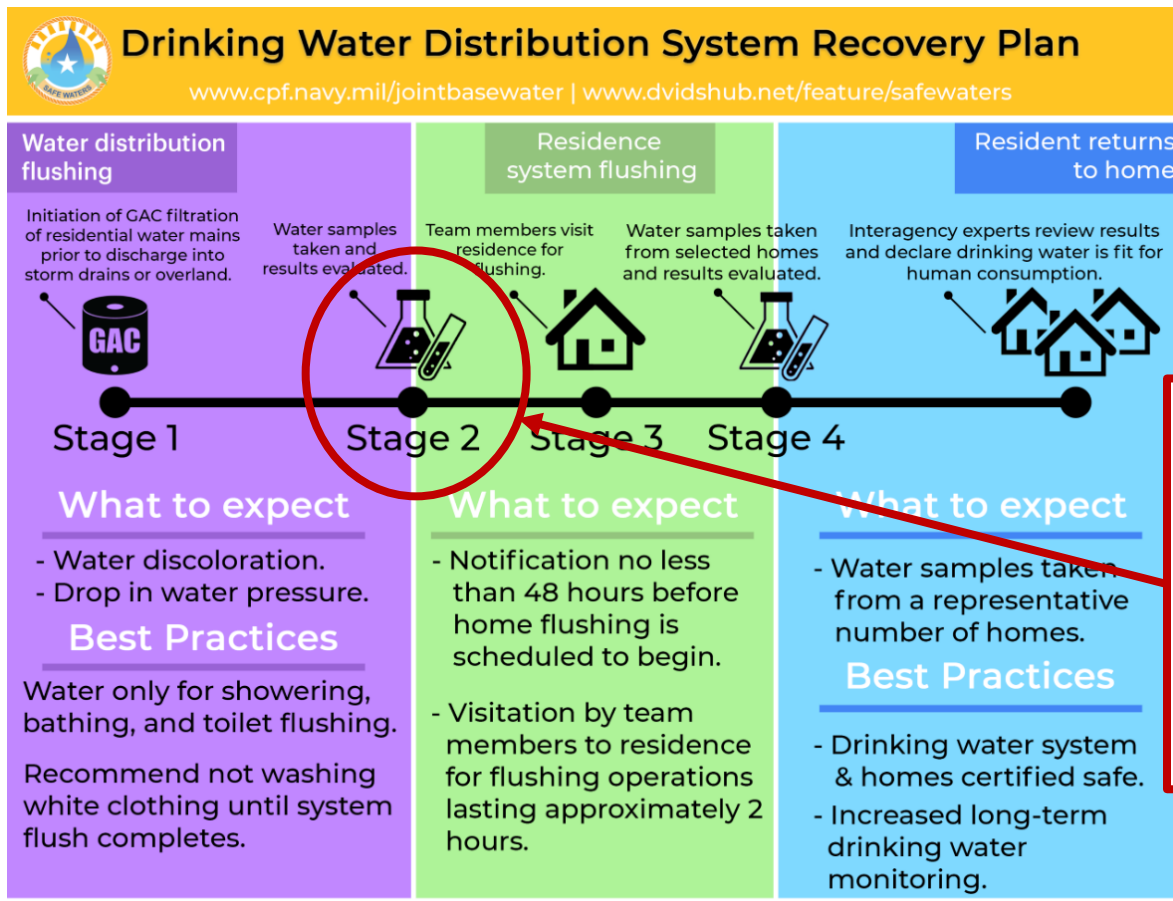


EXECUTIVE SUMMARY FOR ZONE C1

The State of Hawaii Department of Health’s (DOH) November 29, 2021 [Public Health Advisory for the JPBHH Public Water System](#) for Zone C1 remains in effect. DOH recommends all Navy water system users should avoid using the water for drinking, cooking, or oral hygiene. This includes consumption by pets. Navy water system users who detect a fuel-like odor from their water should also avoid using the water for bathing, dishwashing or laundry.

We have thoroughly flushed, sampled, and tested the water distribution system lines (Water Mains) in Zone C1. This Zone has moved to Stage 3–Building Flushing/Stage 4–Building Sampling, in the Drinking Water Distribution System Recovery Plan (see the Figure below). Based on the samples collected and tested, to date, this water meets all U.S. Environmental Protection Agency (EPA) and State of Hawaii Department of Health (DOH) standards that are applicable to the Navy Water System Incident.

No final conclusions or recommendations can be made at this time for the drinking water in your zone because more drinking water samples are being collected and tested from Water Mains, residences, buildings, schools, and child development centers (after they have been flushed). We are sharing this information to keep you updated on our progress towards restoring the water supply being provided to your community.



We are sharing the data from Stage 2. More samples will be collected and tested during Stage 4 and that data will also be shared with you.



Table 1. Contaminants Detected in Drinking Water Samples Collected from Water Mains in Zone C1

Contaminant	Sampling Date	Units	DOH Project Screening Level	Basis of DOH Screening Level ²	Highest Level Detected	Meets DOH Screening Level? (Yes / No)	Typical Source of Contaminant
Contaminants of Concern¹							
Benzene	01/06/2022	ppb	5	MCL	ND	Yes	Discharge from factories; Leaching from gas storage tanks and landfills
Ethylbenzene	01/06/2022	ppb	700	MCL	ND	Yes	Discharge from petroleum refineries
Toluene	01/06/2022	ppb	1000	MCL	ND	Yes	Discharge from petroleum factories
m,p-Xylenes	01/06/2022	ppb	10000	MCL	ND	Yes	Discharge from petroleum factories; Discharge from chemical factories
o-Xylenes	01/06/2022	ppb	10000	MCL	ND	Yes	
1-Methylnaphthalene	01/06/2022	ppb	2.1	ISP	ND	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	01/06/2022	ppb	4.7	ISP	ND	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	01/06/2022	ppb	12	ISP	ND	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	01/06/2022	ppb	15	ISP	0.91	Yes	Corrosion of household plumbing systems; Erosion of natural deposits
Total Petroleum Hydrocarbons (TPH)-Gasoline	01/06/2022	ppb	200	ISP	ND	Yes	Gasoline is a petroleum product that can contaminate drinking water through spills and other releases into the environment
TPH-Diesel (C9-C25)	01/06/2022	ppb	200	ISP	ND	Yes	Diesel is a petroleum product that can contaminate drinking water through spills and other releases into the environment
TPH-Oil (C24-C40)	01/06/2022	ppb	200	ISP	ND	Yes	Oil is a petroleum product that can contaminate drinking water through spills and other releases into the environment
Total Organic Carbon (TOC)	01/06/2022	ppb	2000	ISP	310	Yes	Naturally present in the environment, but also can be an indicator of contamination, including petroleum or other sources

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Contaminant	Sampling Date	Units	DOH Project Screening Level	Basis of DOH Screening Level ²	Highest Level Detected	Meets DOH Screening Level? (Yes / No)	Typical Source of Contaminant
Metals							
Barium	01/06/2022	ppb	2000	MCL	4.0	Yes	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits
Chromium	01/06/2022	ppb	100	MCL	1.5	Yes	Corrosion of galvanized pipes; Erosion of natural deposits; Discharge from metal refineries; Runoff from waste batteries and paints
Copper	01/06/2022	ppb	1300	AL	2.6	Yes	Corrosion of household plumbing systems; Erosion of natural deposits
Volatile Organic Compounds							
Bromoform	01/05/2022	ppb	–	–	4.1	Yes	One of the trihalomethane compounds; see TTHM
Total Trihalomethanes (TTHM)	01/05/2022	ppb	80	MCL	4.1	Yes	By-product of drinking water disinfection
Synthetic Organic Compounds (SOCs) or Semi-Volatile Organic Compounds (SVOCs)							
3 & 4 Methylphenol (commonly referred to as meta-Cresol/para-Cresol)	01/05/2022	ppb	–	–	0.14	Yes	Cresols are used to dissolve other chemicals, to make other chemical compounds, and as disinfectants and deodorizers; enter the environment as the result of manufacture and use
Bis(2-Chloroethoxy)ether	01/05/2022	ppb	0.014	EAL	0.10	No ⁵	Man-made intermediate chemical used in other compounds or pesticides; It can also be used as a solvent, cleaner, component of paint and varnish, and rust inhibitor; Enters the environment as the result of manufacture and use
Di(2-ethylhexyl) adipate (aka Bis(2-ethylhexyl) adipate)	01/06/2022	ppb	400	MCL	0.063	Yes	Discharge from chemical factories

Notes:

1. These contaminants are listed whether detected or non-detected (ND) because these are incident specific. All other contaminants are only listed if detected.
2. 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. Acronyms and explanation of terms used in this table are presented on the following pages. For assistance in understanding and interpreting information in this table, refer to FACT SHEET, Understanding Your Water Quality Summary Table, available online at: <https://www.cpf.navy.mil/JBPHH-Water-Updates/>.
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. In addition to testing drinking water for contaminants regulated under the Safe Drinking Water Act, we also tested for some contaminants that are not regulated. Unregulated contaminants do not have legal limits for drinking water (i.e., they do not have MCLs) but may have a screening level (e.g., Tier 1 EAL). Tier 1 EALs are

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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 the Tier 1 EAL does not necessarily indicate that contamination at the site poses environmental hazards and may be set at levels that are impossible for water systems to meet (for example, large-scale treatment technology may not exist for a given contaminant). Per DOH's 12/30/2021 DOH's Guidance on the Approach to Amending the Drinking Water Health Advisory, if the Tier 1 EAL is exceeded, the Navy shall investigate the source(s) of the contamination under direction of the DOH. The DOH EAL is based on the EPA tapwater Regional Screening Level for Bis(2-Chloroethyl)ether (<https://semspub.epa.gov/src/document/HQ/401655>). Bis(2-Chloroethyl)ether (BCEE) was not detected in JP-5 product samples from the Red Hill Shaft. "In the past, BCEE has been used as a solvent for fats, waxes, greases, and esters (Schrenk et al. 1933). It has also been used as a constituent of paints and varnishes, as a cleaning fluid for textiles, in the purification of oils and gasoline, in the manufacture of medicines and pharmaceuticals, as an intermediate in the synthesis of other chemicals, and as an insecticide and a soil fumigant (Browning 1965; Hake and Rowe 1963; HSDB 1988; Verschueren 1977; Windholz 1983)." See the following link for more information: <https://www.atsdr.cdc.gov/toxprofiles/tp127.pdf>.



Drinking Water Distribution System Recovery Plan: Stage 2 Sampling Results for Zone C1

What is the purpose of this Stage 2 Sampling Results Report?

This is a progress report and presents the testing results from drinking water distribution system samples that have been collected, to date, from the water distribution system lines (Water Mains) in your Zone. These samples were collected after extensive flushing of the distribution system was performed using clean water from the Navy Waiawa Shaft. This is Stage 2 of the 4-Stage process described in the [Drinking Water Distribution System Recovery Plan](#).

No final conclusions or recommendations can be made at this time for the drinking water in your zone because more drinking water samples are being collected and tested from Water Mains, residences, buildings, schools, and child development centers. 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 table presented above (Table 1) presents all contaminants that were detected in drinking water samples that have been collected, to date, from the Water Mains in your Zone during Stage 2. Hawaii 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).

Based on these data, this Zone moved to Stage 3–Building/Home Flushing, in the [Drinking Water Distribution System Recovery Plan](#).

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. 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), Total Organic Carbon (TOC) chlorine and pH. 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 are



presented in the laboratory reports are located at: <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 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 are at Stage 2 of the 4-Stage process described in the Drinking Water System Recovery Plan and the Public Health Advisory will be re-evaluated by Hawaii DOH after Stage 4 in the process.

Where does our water come from?

The source of all water for all Navy Water System users now comes only 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 DOH confirmed that it meets all federal and state drinking water standards and it will continue to be sampled in accordance with EPHA and DOH requirements.

What is the IDWST doing 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 Water Main flushing conducted in Zone C1?

The final round of distribution water main flushing in Zone C1 was completed on January 04, 2022.



How much water was flushed through the water distribution system in Zone C1?

From January 02 – 04, 2022, a total of 0.8 million gallons was flushed through Zone C1.

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

See the FACT SHEET, Understanding Your Water Quality Summary Table, available online at: <https://www.cpf.navy.mil/JBPHH-Water-Updates/>.

Acronyms used in the Table

AL	Action Level (for Lead and Copper)
DOH	Hawaii Department of Health
EAL	Environmental Action Level
EPA	U.S. Environmental Protection Agency
ISP	Incident Specific Parameter
MCL	Maximum Contaminant Level
ND	Non-Detect
ppb	parts per billion (or ug/L)
SDWA	Safe Drinking Water Act
SOCs	Synthetic Organic Compounds (also known as SVOCs)
SVOCs	Semi-Volatile Organic Compounds (same as SOCs)
TPH	Total Petroleum Hydrocarbons
TOC	Total Organic Carbon
ug/L	micrograms per liter (or ppb)
VOCs	Volatile Organic Compounds

Explanation of Terms 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.



Incident Specific Parameters (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 ISP is 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 chemicals that 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.

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.

Tier 1 Environmental Action Level (EAL). Tier 1 Environmental Action Levels (Tier 1 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 the Tier 1 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 grouped by 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.

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	ug/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.