

# BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU  
630 SOUTH BERETANIA STREET  
HONOLULU, HI 96843  
[www.boardofwatersupply.com](http://www.boardofwatersupply.com)



December 6, 2022

RICK BLANGIARDI, MAYOR

BRYAN P. ANDAYA, Chair  
KAPUA SPROAT, Vice Chair  
MAX J. SWORD  
NA'ALEHU ANTHONY  
JONATHAN KANESHIRO

DAWN B. SZEWCZYK, P.E., Ex-Officio  
EDWIN H. SNIFFEN, Ex-Officio

ERNEST Y. W. LAU, P.E.  
Manager and Chief Engineer

ERWIN M. KAWATA  
Deputy Manager

## NOTICE

The Board of Water Supply, City and County of Honolulu, Regular Meeting will be held on Monday, December 12, 2022, at 2:00 p.m. in the Boardroom, Public Service Building, 630 South Beretania Street, Honolulu, HI 96843.

Limited seating will be available for in-person testifiers in the Boardroom. The public may also view the livestream of the meeting from the lobby of the Board of Water Supply, Public Service Building, 630 S. Beretania St. Honolulu, HI 96843.

## TESTIMONY

Testimony may be submitted as follows:

- Written testimony should include the submitter's address, email address, and phone number. Testimony should be received by Monday, December 12, 2022, at noon. Submit written testimony by:
  - Email to [board@hbws.org](mailto:board@hbws.org)
  - Online at [boardofwatersupply.com/testimony](http://boardofwatersupply.com/testimony)
  - Mail to Board of Water Supply, 630 S. Beretania St., Honolulu, HI 96843
  - Fax to (808) 748-5079
- Oral testimony will be accepted remotely and in person during the meeting. Pre-registration is encouraged to facilitate as much remote and in-person testimony as reasonably possible during the time allotted. Testifiers should consider also submitting a written version of their oral testimony.
  - To testify remotely by phone or video using the Zoom videoconferencing platform, please submit your request by:
    - Email to [board@hbws.org](mailto:board@hbws.org)
    - Online at [boardofwatersupply.com/testimony](http://boardofwatersupply.com/testimony)Zoom registration instructions, as well as participant guidelines, will be sent to the contact information provided. Once confirmed as registered, testifiers will receive an email containing the links and instructions to join the Zoom session. Submit your request to testify remotely by Friday, December 9, 2022, at noon.
  - To testify in person at the Board of Water Supply, Public Service Building, 630 S. Beretania St., Honolulu, HI 96843, please pre-register by submitting your request by Monday, December 12, 2022:
    - Email to [board@hbws.org](mailto:board@hbws.org)
    - Online at [boardofwatersupply.com/testimony](http://boardofwatersupply.com/testimony)In-person testifiers should check-in with building security and then with testimony staff located in the lobby. Testifiers will be escorted to and from the Board Room. On-site registration will be available for walk-in requests.

Testimony is limited to two (2) minutes and shall be presented by the registered speaker only. Testimony submitted in writing or orally, electronically or in person, for use in the meeting process is public information. All testimony will be included as part of the approved meeting minutes at [boardofwatersupply.com/boardmeetings](http://boardofwatersupply.com/boardmeetings).

## **MATERIALS AVAILABLE FOR INSPECTION**

Meeting materials ("board packet" under HRS Section 92-7.5) are accessible at [www.boardofwatersupply.com/boardmeetings](http://www.boardofwatersupply.com/boardmeetings).

## **VIEWING THE MEETING**

The meeting will be viewable via live streaming on the BWS website: [www.boardofwatersupply.com/live](http://www.boardofwatersupply.com/live). Video will appear on screen. You may have to click the arrow on video to start it. You may have to unmute audio as muted audio tends to be the default setting.

## **SPECIAL REQUESTS AND ACCOMMODATIONS**

If you require special assistance, an auxiliary aid or service, and/or an accommodation due to a disability to participate in this meeting (i.e., sign language interpreter; interpreter for language other than English, or wheelchair accessibility), please call (808) 748-5172 or email your request to [board@hbws.org](mailto:board@hbws.org) **at least three business days prior to the meeting date**. If a response is received after the requested three business days before the meeting date deadline, we will try to obtain the auxiliary aid/service or accommodation, but we cannot guarantee that request will be filled.

Upon request, this notice is available in alternate formats such as large print, Braille, or electronic copy.

The agenda for December 12, 2022, Regular Meeting of the Board of Water Supply is as follows:

**ITEMS REQUIRING BOARD ACTION**

1. Approval of the Minutes of the Public Hearing Held on November 28, 2022
2. Approval of the Minutes of the Regular Meeting Held on November 28, 2022

**ITEMS FOR INFORMATION**

1. Status Update of Groundwater Levels at All Index Stations
2. Water Main Repair Report for November 2022
3. United States Environmental Protection Agency (EPA) and Hawaii Department of Health (DOH) Discussing the Setting of Environmental Action Levels (EALs) and the Aqueous Film Forming Foam (AFFF) Fire Suppressant Spill at the Red Hill Bulk Fuel Storage Facility

## MINUTES

### THE REGULAR MEETING OF THE BOARD OF WATER SUPPLY

December 12, 2022

At 2:02 PM on December 12, 2022, in the Board Room of the Public Service Building at 630 South Beretania Street, Honolulu, Hawaii, Board Chair Andaya called to order the Regular Meeting.

**Present:** Bryan P. Andaya, Chair  
Kapua Sproat, Vice Chair via Zoom  
Na'alehu Anthony, Board Member  
Jonathan Kaneshiro, Board Member  
Dawn B. Szewczyk., Board Member, Ex- Officio  
Edwin H. Sniffen, Board Member, Ex-Officio

**Also Present:** Ernest Lau, Manager and Chief Engineer  
Erwin Kawata, Deputy Manager  
Jadine Urasaki, Assistant Program Administrator,  
Capital Projects Division via Vimeo  
Jennifer Elflein, Program Administrator,  
Customer Care Division via Vimeo  
Kathleen Elliott-Pahinui, Information Officer,  
Communications Office  
Raelynn Nakabayashi, Executive Assistant I,  
Executive Support Office via Vimeo  
Jason Nikaido, Program Administrator,  
Field Operations Division  
Joseph Cooper, Waterworks Controller,  
Finance Division via Vimeo  
Michele Thomas, Executive Assistant I,  
Human Resources Office via Vimeo  
Henderson Nuuhiwa, Program Administrator,  
Program Administrator, Information  
Technology Division via Vimeo  
Michael Matsuo, Land Administrator, Land Division  
via Vimeo  
Barry Usagawa, Program Administrator,  
Water Resources Division  
Kevin Ihu, Program Administrator,  
Water System Operations Division  
via Vimeo  
Kathy Mitchell, Administrative Services Officer  
via Vimeo  
Deanna Thyssen, Manager Secretary  
Joy Cruz-Achiu, Board Secretary  
Steven Norstrom, Information Specialist II,  
Communications Office  
Stella Bernardo, Information Specialist II,  
Communications Office via Zoom

Michele Harman, Community Relations Specialist I,  
Communications Office via Zoom  
Wayne Maria, Information Specialist II,  
Communications Office via Zoom

Others Present: Jeff Lau, Deputy Corporation Counsel via Zoom  
Jessica Wong, Deputy Corporation Counsel  
via Zoom

Absent: Max J. Sword, Board Member

Chair Bryan Andaya welcomed everyone to the December 12, 2022, Regular Meeting of the Board of Water Supply (BWS).

Before beginning the meeting Chair Andaya went over a few meeting regulations required by law. Board Members attending the Board Meeting remotely must be visible to the public to be considered present and meet quorum guidelines. He also stated that during roll call, Board Members participating remotely must disclose their location and anyone that may be present at their location.

Chair Andaya announced that the public would be allowed to attend Board Meetings at the BWS Public Service Building, 630 S. Beretania Street, Honolulu, HI 96843, via interactive conference technology.

Chair Andaya requested a roll call and asked those participating remotely to keep their cameras on during the meeting to comply with quorum guidelines. In addition, Chair Andaya asked each Board Member to respond verbally and state who is present in the room if participating remotely when their names were called. Vice Chair Kapua Sproat, aye, and alone at her current location. Chair Andaya stated the following Board Members were present in the Board room with him: Board Member Na'alehu Anthony, Board Member Jonathan Kaneshiro, Board Member Dawn Szewczyk, and Board Member Edwin Sniffen.

Chair Andaya asked all attendees calling in or video conferencing to please mute their microphones when not speaking to the audience. When intending to speak, unmute their microphone and identify themselves before speaking.

Chair Andaya introduced those present in the Boardroom, Manager Ernest Lau, Deputy Manager Erwin Kawata, Board Secretary Joy L. Cruz-Achui, Manager Secretary Deanna Thyssen, and Information Specialist II Steven Norstrom. Joining via Zoom from the City and County Corporation Counsel were Deputy Jeff Lau and Deputy Jessica Wong, and Information Specialist II Wayne Maria.

Chair Andaya announced that all presenters were presenting in the Board room.

The following procedures are in effect for the meeting:

Chair Andaya shared the various ways to submit testimony: Written testimony may be submitted by email to [board@hbws.org](mailto:board@hbws.org), by fax to (808) 748-5079; mailed to Board of Water Supply, 630 S. Beretania St., Honolulu, HI 96843; or online at the [boardofwatersupply.com/testimony](https://boardofwatersupply.com/testimony), which were all due on Monday, December 12, 2022, at noon. However, late testimony will be accepted by email, fax, or mail. Videoconference testimony was accepted by registering at [boardofwatersupply.com/testimony](https://boardofwatersupply.com/testimony) by Friday, December 9, 2022. In-person testimony is being accepted at the Board of Water Supply, Public Service Building located at 630 S. Beretania St., Honolulu, HI 96843. Pursuant to HRS Section 92-7.5, Board Meeting materials are available to view on our website at [www.boardofwatersupply.com/boardmeeting](https://www.boardofwatersupply.com/boardmeeting).

Chair Andaya also announced the Board Meeting is broadcasted live on the BWS website at [www.boardofwatersupply.com/live](https://www.boardofwatersupply.com/live).

Chair Andaya stated the Board is dedicated to "providing a safe, dependable, and affordable supply of water now and into the future."

**APPROVAL OF  
MINUTES**

Approval of the Minutes of the Public Hearing Held on November 28, 2022.

**MOTION  
TO APPROVE**

Na'alehu Anthony and Jonathan Kaneshiro motioned and seconded, respectively, to approve the Minutes of the Public Hearing on November 28, 2022.

Chair Andaya requested Board Secretary Ms. Joy Cruz-Achiu to conduct the roll call vote.

Ms. Cruz-Achiu conducted a roll call vote: Vice Chair Kapua Sproat, aye; Board Member Na'alehu Anthony, aye; Board Member Jonathan Kaneshiro, aye; Board Member Dawn Szewczyk, abstain; and Board Member Edwin Sniffen, abstain; Chair Bryan Andaya, aye. Board Member Max Sword was absent.

Ms. Cruz-Achiu announced that the motion passed with four ayes and two abstentions.

THE MINUTES OF THE PUBLIC HEARING HELD ON NOVEMBER 28, 2022, WERE APPROVED AT THE DECEMBER 12, 2022, BOARD MEETING			
	AYE	NO	COMMENT
BRYAN P. ANDAYA	X		
KAPUA SPROAT	X		
MAX J. SWORD			ABSENT
NA'ALEHU ANTHONY	X		
JONATHAN KANESHIRO	X		
DAWN B. SZEWCZYK			ABSTAIN
EDWIN H. SNIFFEN			ABSTAIN

**APPROVAL OF MINUTES**

Approval of the Minutes of the Regular Meeting Held on November 28, 2022.

**MOTION TO APPROVE**

Dawn Szewczyk and Na'alehu Anthony motioned and seconded, respectively, to approve the Minutes of the Regular Meeting on November 28, 2022.

Chair Andaya requested Board Secretary Ms. Joy Cruz-Achiu to conduct the roll call vote.

Ms. Cruz-Achiu conducted a roll call vote: Vice Chair Kapua Sproat, aye; Board Member Na'alehu Anthony, aye; Board Member Jonathan Kaneshiro, aye; Board Member Dawn Szewczyk, aye; and Board Member Edwin Sniffen, abstain; Chair Bryan Andaya, aye. Board Member Max Sword was absent.

Ms. Cruz-Achiu announced that the motion passed with five ayes and one abstention.

THE MINUTES OF THE REGULAR MEETING HELD ON NOVEMBER 28, 2022, WERE APPROVED AT THE DECEMBER 12, 2022, BOARD MEETING			
	AYE	NO	COMMENT
BRYAN P. ANDAYA	X		
KAPUA SPROAT	X		
MAX J. SWORD			ABSENT
NA'ALEHU ANTHONY	X		
JONATHAN KANESHIRO	X		
EDWIN H. SNIFFEN			ABSTAIN
DAWN B. SZEWCZYK	X		



ITEM FOR INFORMATION NO. 1

"December 12, 2022

STATUS  
UPDATE OF  
GROUNDWATER  
LEVELS AT  
ALL INDEX  
STATIONS

Chair and Members  
Board of Water Supply  
City and County of Honolulu  
Honolulu, Hawaii 96843

Chair and Members:

Subject: Status Update of Groundwater Levels at All Index Stations

Five aquifer index stations were in low groundwater condition for the production month of November 2022. Kaimuki, Pearl City, Kaluanui, and Waialua are in Caution Status. Punaluu is in Alert Status. The monthly production average for November 2022 was 135.68 million gallons per day.

The Board of Water Supply rainfall index for the month of November 2022 was 51 percent of normal, with a 5-month moving average of 70 percent. As of November 29, 2022, the Hawaii Drought Monitor shows zero droughts to moderate drought conditions moving roughly southwest and northwest across Oahu. The National Weather Service is forecasting above-normal precipitation through February 2023.

Most monitoring wells exhibited stable to increasing head levels for the month of November, likely reflecting the lower overall groundwater production, combined with the lower rainfall compared to the prior month. Average monthly production for November 2022 was lower than in November 2021 but similar to the 5-year monthly average.

Respectfully Submitted,

/s/ ERNEST Y. W. LAU, P.E  
Manager and Chief Engineer

Attachment"

The foregoing was for information only.

DISCUSSION:

Barry Usagawa, Program Administrator, Water Resources Division, gave the report. There were no comments or discussion.

**PRODUCTION, HEAD AND RAINFALL REPORT  
MONTH OF NOVEMBER 2022**

**POTABLE**

STATION	MGD
HONOLULU (1)	
KULIOUOU	0.00
WAILUPE	0.13
AINA KOA	0.00
AINA KOA II	0.72
MANOA II	0.95
PALOLO	1.12
KAIMUKI HIGH	2.26
KAIMUKI LOW	1.16
WILDER	8.89
BERETANIA HIGH	2.58
BERETANIA LOW	0.78
KALIHI HIGH	0.00
KALIHI LOW	5.02
KAPALAMA	1.41
KALIHI SHAFT	8.38
MOANALUA	0.69
HALAWA SHAFT	0.00
KAAMILO	0.59
KALAUAO	9.10
PUNANANI	12.21
KAAHUMANU	0.23
HECO WAIJU	2.42
MANANA	0.20
WAIALAE IKI	0.25
WELLS SUBTOTAL:	59.09
MANOA TUNNEL	0.17
PALOLO TUNNEL	0.00
GRAVITY SUBTOTAL:	0.17
HONO. SUBTOTAL:	59.26

STATION	MGD
WINDWARD (2)	
WAIMANALO II	0.20
WAIMANALO III	0.00
KUOU I	1.00
KUOU II	0.67
KUOU III	0.71
LULUKU	0.82
HAIKU	0.35
IOLEKAA	0.00
KAHALUU	0.69
KAHANA	0.92
PUNALUU I	0.00
PUNALUU II	3.05
PUNALUU III	0.00
KALUANUI	1.33
MAAKUA	0.28
HAUULA	0.25
WELLS SUBTOTAL:	10.26
WAIM. TUNNELS I & II	0.00
WAIM. TUNNELS III&IV	0.19
WAIHEE INCL. WELLS	0.29
WAIHEE TUNNEL	4.01
LULUKU TUNNEL	0.17
HAIKU TUNNEL	0.28
KAHALUU TUNNEL	1.35
GRAVITY SUBTOTAL:	6.30
WIND. SUBTOTAL:	16.56

STATION	MGD
NORTH SHORE (3)	
KAHUKU	0.34
OPANA	0.98
WAIALEE I	0.24
WAIALEE II	0.02
HALEIWA	0.00
WAIALUA	1.85
N.SHORE SUBTOTAL:	3.43

STATION	MGD
MILILANI (4)	
MILILANI I	1.32
MILILANI II	0.00
MILILANI III	0.67
MILILANI IV	2.23
MILILANI SUBTOTAL:	4.22

STATION	MGD
WAHIAWA (5)	
WAHIAWA	1.33
WAHIAWA II	1.47
WAHIAWA SUBTOTAL:	2.80

STATION	MGD
PEARL CITY-HALAWA (6)	
HALAWA 277	0.00
HALAWA 550	0.00
AIEA	0.00
AIEA GULCH 497	0.01
AIEA GULCH 550	0.20
KAONOHI I	1.79
WAIMALU I	0.00
NEWTOWN	1.69
WAIJU	1.80
PEARL CITY I	0.84
PEARL CITY II	1.02
PEARL CITY III	0.23
PEARL CITY SHAFT	0.92
PEARL CITY-HALAWA SUBTOTAL:	8.50

STATION	MGD
WAIPAHU-EWA (7)	
WAIPIO HTS.	1.17
WAIPIO HTS. I	0.00
WAIPIO HTS. II	0.33
WAIPIO HTS. III	1.15
WAIPAHU	6.61
WAIPAHU II	1.88
WAIPAHU III	4.22
WAIPAHU IV	2.36
KUNIA I	3.67
KUNIA II	1.89
KUNIA III	0.91
HOAEAE	4.46
HONOULIULI I	0.00
HONOULIULI II	8.25
MAKAKILO	0.11
WAIPAHU-EWA SUBTOTAL:	37.00

STATION	MGD
WAIANAE (8)	
MAKAHA I	0.65
MAKAHA II	0.00
MAKAHA III	0.13
MAKAHA V	0.06
MAKAHA VI	0.00
MAKAHA SHAFT	0.00
KAMAILE	0.06
WAIANAE I	0.29
WAIANAE II	0.35
WAIANAE III	0.84
WELLS SUBTOTAL:	2.38
WAIJA. C&C TUNNEL	1.40
WAIJA. PLANT. TUNNELS	0.14
GRAVITY SUBTOTAL:	1.54
WAIANAE SUBTOTAL:	3.91

**NONPOTABLE**

NONPOTABLE	MGD
KALAUAO SPRINGS	0.47
BARBERS POINT WELL	1.11
GLOVER TUNNEL NP	0.29
NONPOTABLE TOTAL:	1.87

**RECYCLED WATER (OCTOBER 2022)**

RECYCLED WATER	MGD
HONOULIULI WRF R-1	6.13
HONOULIULI WRF RO	1.47
RECYCLED TOTAL:	7.60

**PRODUCTION, HEAD AND RAINFALL REPORT  
MONTH OF NOVEMBER 2022**

**PRODUCTION SUMMARIES**

TOTAL WATER	MGD
PUMPAGE	127.68
GRAVITY	8.00
POTABLE TOTAL:	135.68
NONPOTABLE	1.87
RECYCLED WATER	7.60
TOTAL WATER:	145.15

CWRM PERMITTED USE AND BWS ASSESSED YIELDS FOR BWS POTABLE SOURCES				
WATER USE DISTRICTS		A	B	C
		PERMITTED USE/ BWS YLDS	NOV 2022	DIFF. A-B
1	HONOLULU	83.32	59.09	24.23
2	WINDWARD	25.02	16.56	8.46
3	NORTH SHORE	4.70	3.43	1.27
4	MILILANI	7.53	4.22	3.31
5	WAHIAWA	4.27	2.80	1.47
6	PEARL CITY-HALAWA	12.25	8.50	3.75
7	WAIPAHAU-EWA	50.63	37.00	13.63
8	WAIANAIE	4.34	3.91	0.43
TOTAL:		192.06	135.51	56.55

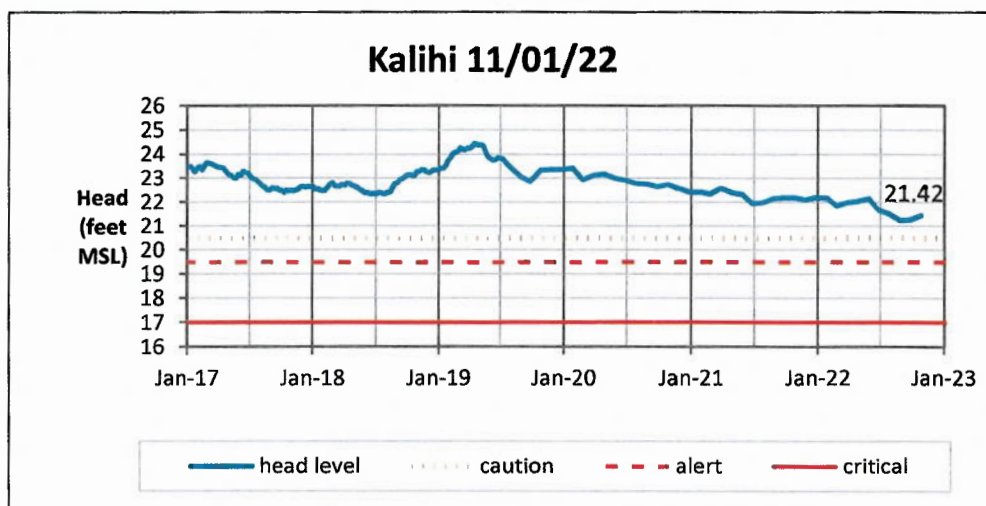
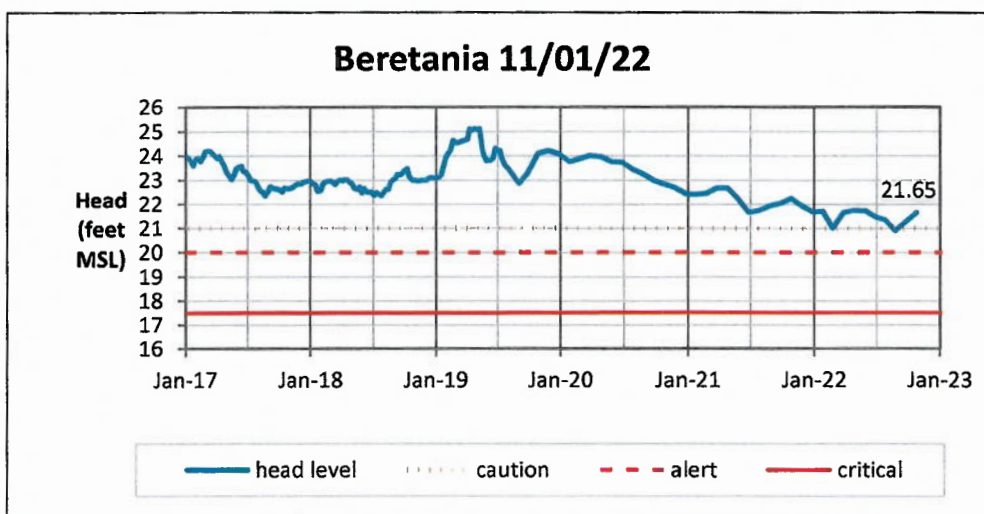
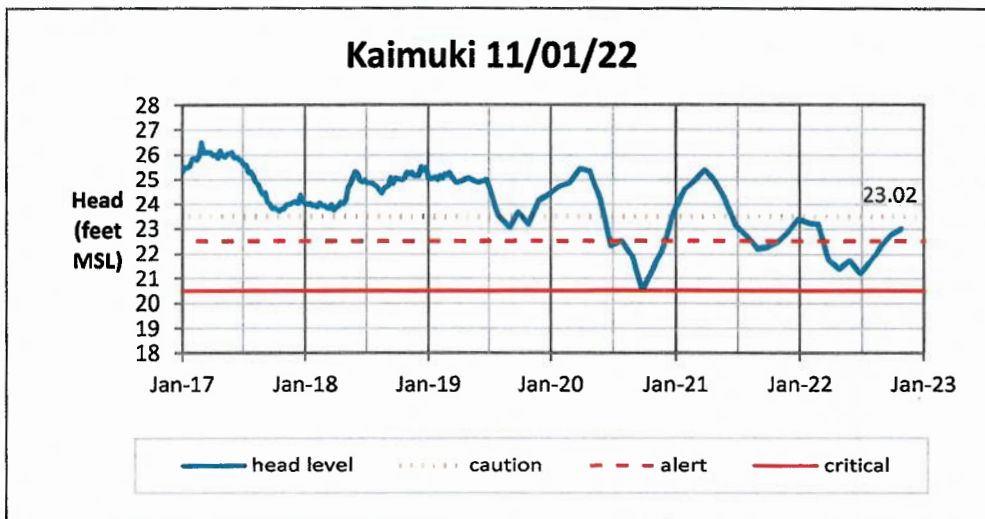
CWRM PERMITTED USE FOR BWS NONPOTABLE SOURCES				
WATER USE DISTRICTS		A	B	C
		PERMITTED USE	NOV 2022	DIFF. A-B
7	WAIPAHAU-EWA (BARBERS POINT WELL)	1.00	1.11	-0.11
TOTAL:		1.00	1.11	-0.11

**EFFECTIVE WATER DEMAND PER DISTRICT**

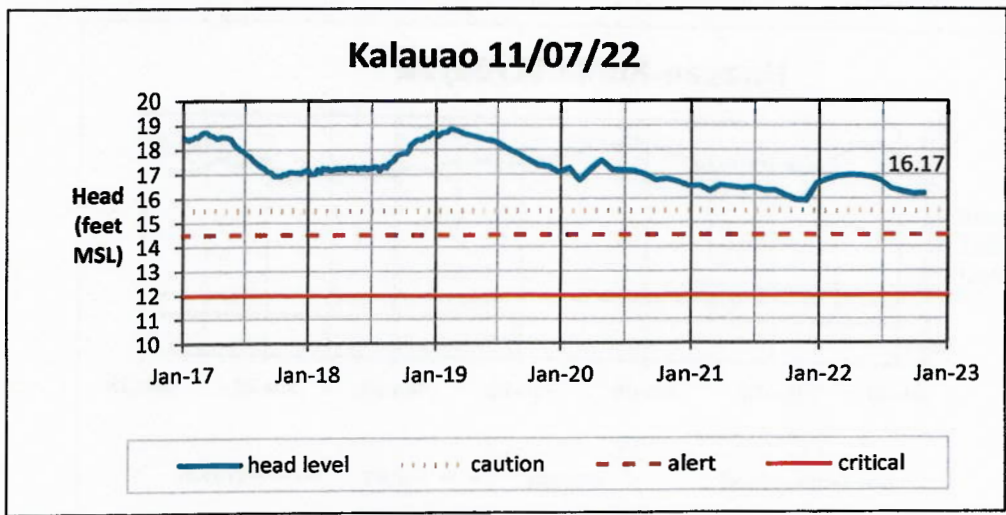
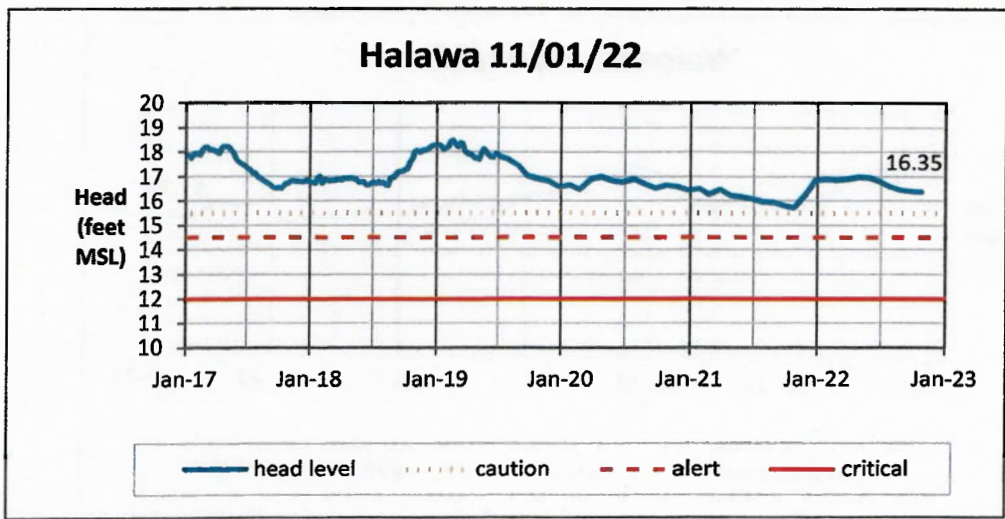
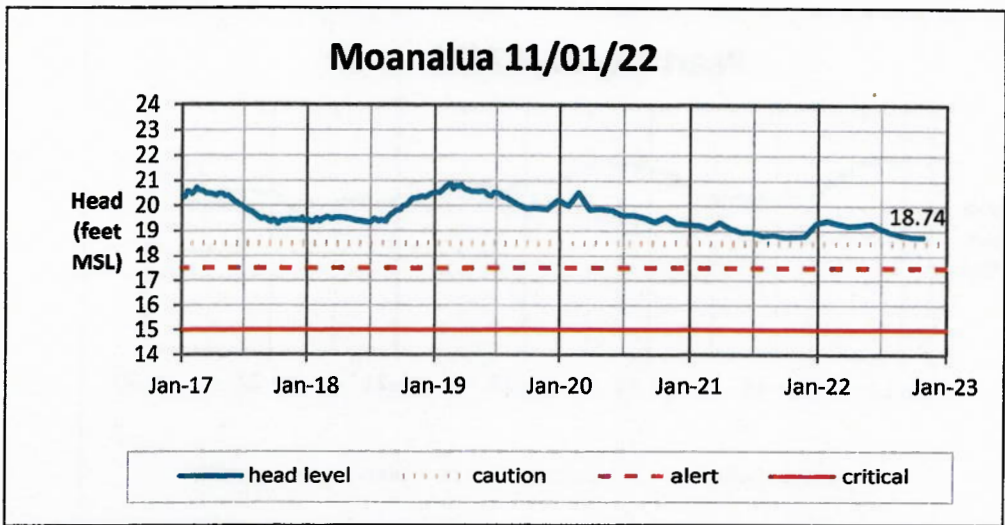
IMPORT/EXPORT BETWEEN WATER USE DISTRICTS			
FROM	TO		MGD
2	1	WINDWARD EXPORT	1.06
7	8	BARBERS PT LB	5.59

WATER USE DISTRICTS		SUBTOTAL	IMPORT	EXPORT	EFFECTIVE WATER DEMAND
1	HONOLULU	59.26	1.06	-	60.32
2	WINDWARD	16.56	-	1.06	15.50
3	NORTH SHORE	3.43	-	-	3.43
4	MILILANI	4.22	-	-	4.22
5	WAHIAWA	2.80	-	-	2.80
6	PEARL CITY-HALAWA	8.50	-	-	8.50
7	WAIPAHAU-EWA	37.00	-	5.59	31.42
8	WAIANAIE	3.91	5.59	-	9.50
TOTAL:		135.68	6.65	6.65	135.68

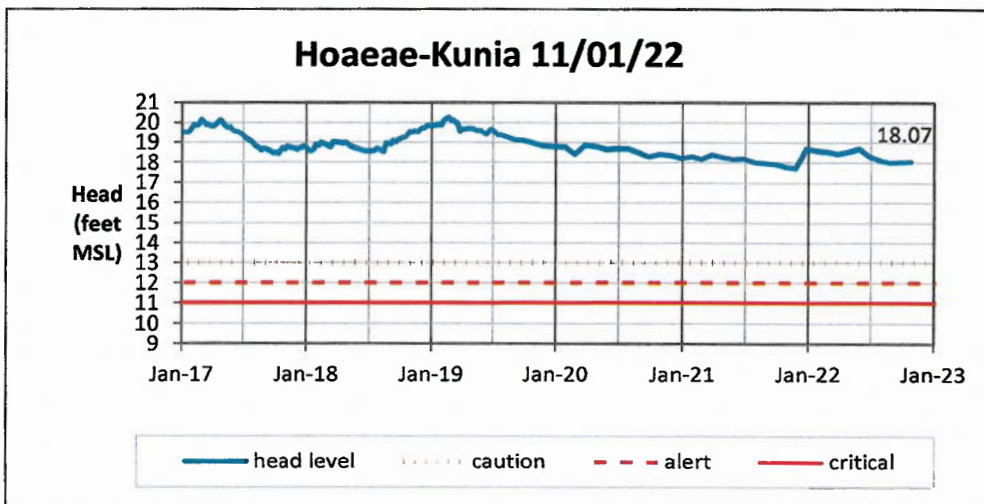
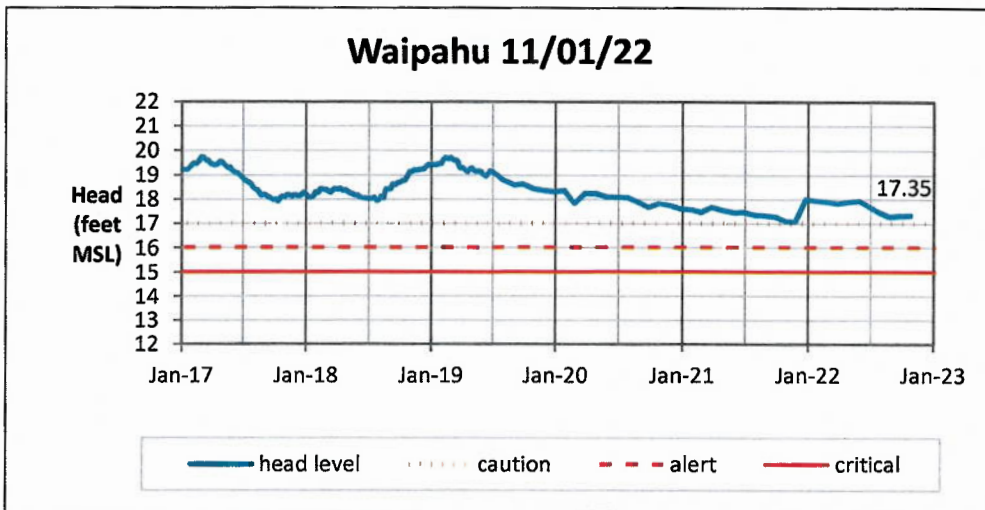
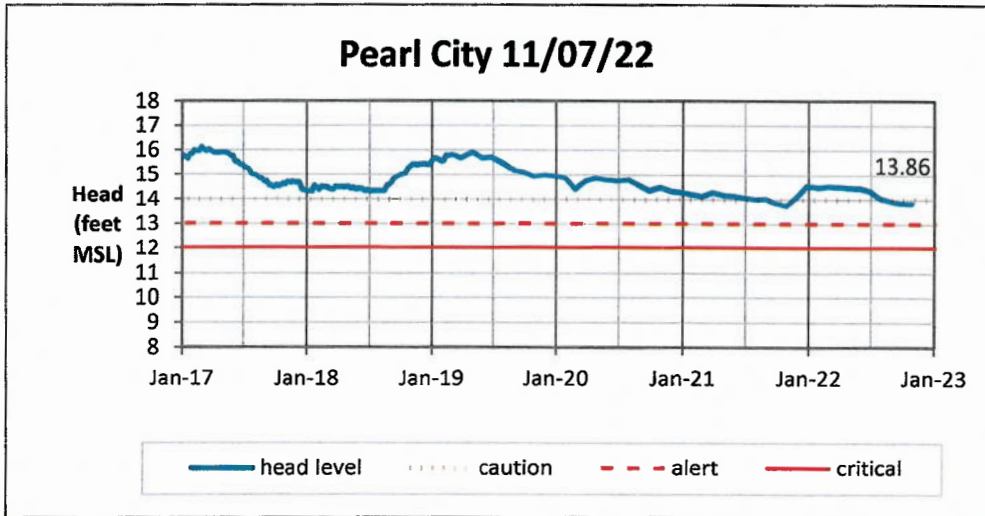
# Head Report



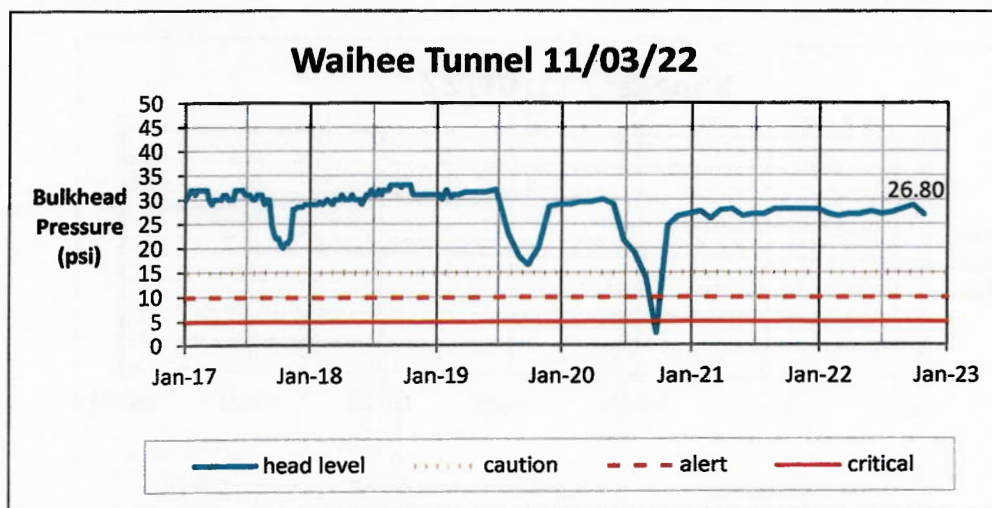
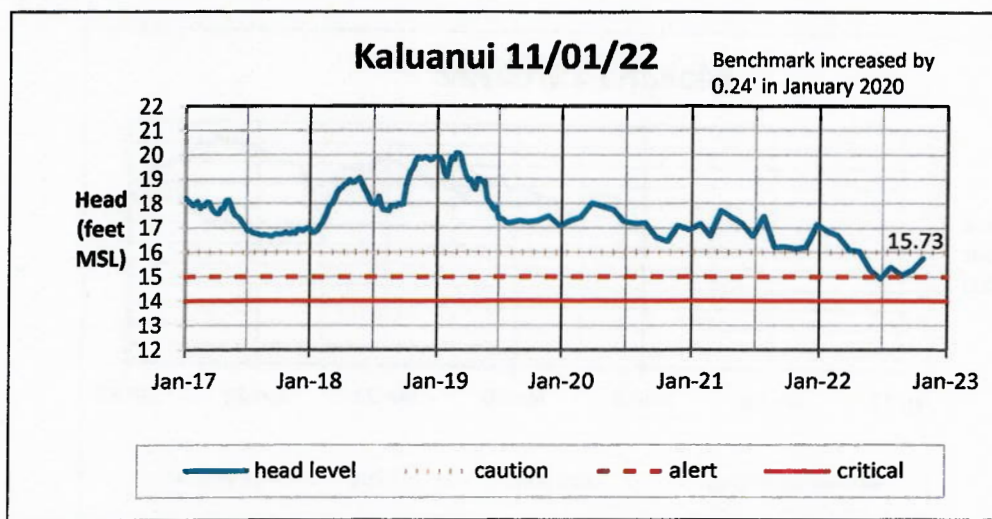
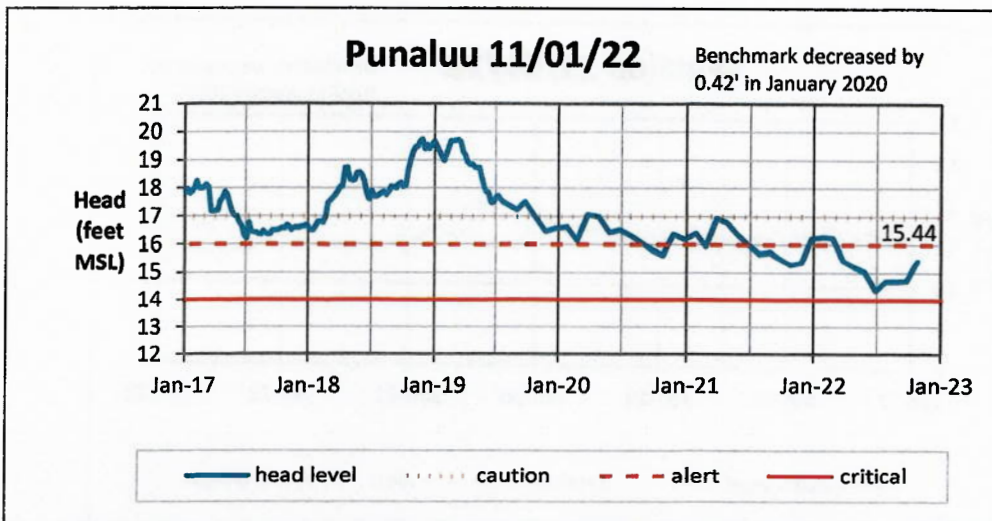
# Head Report



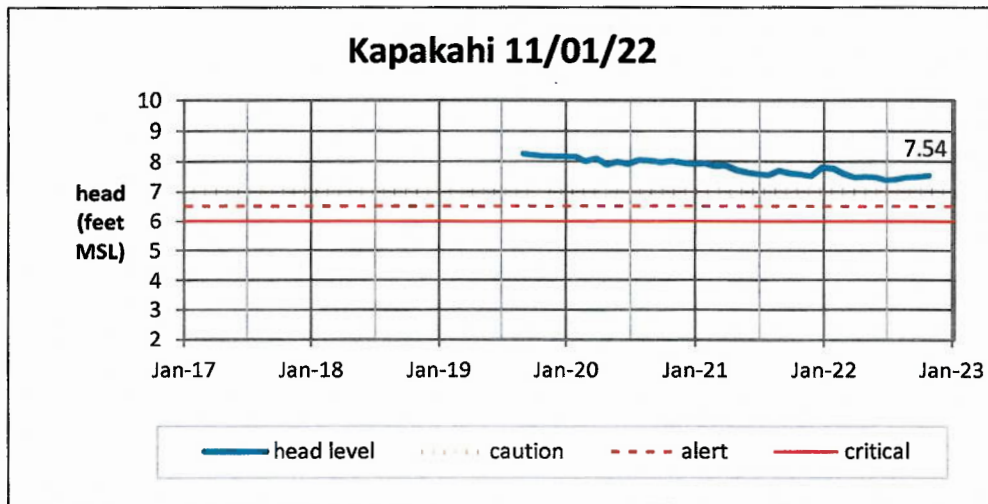
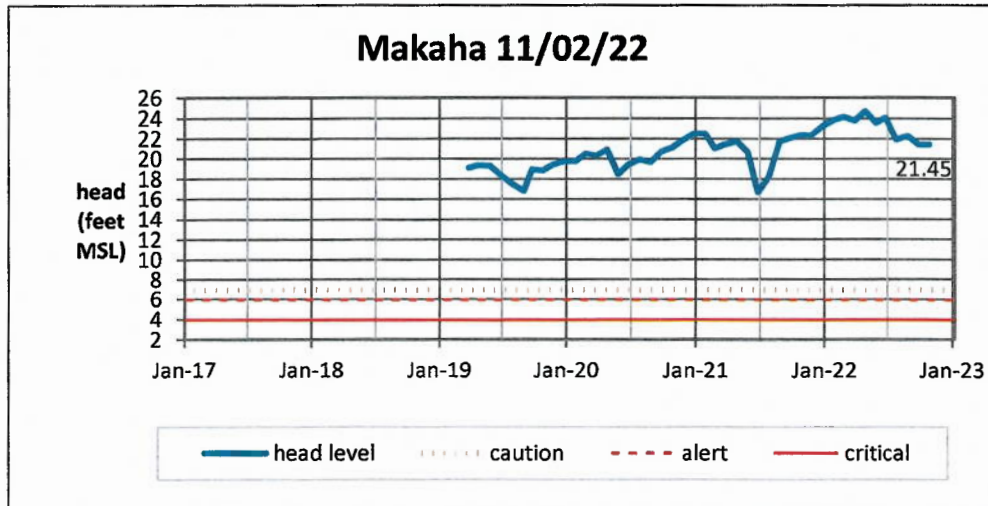
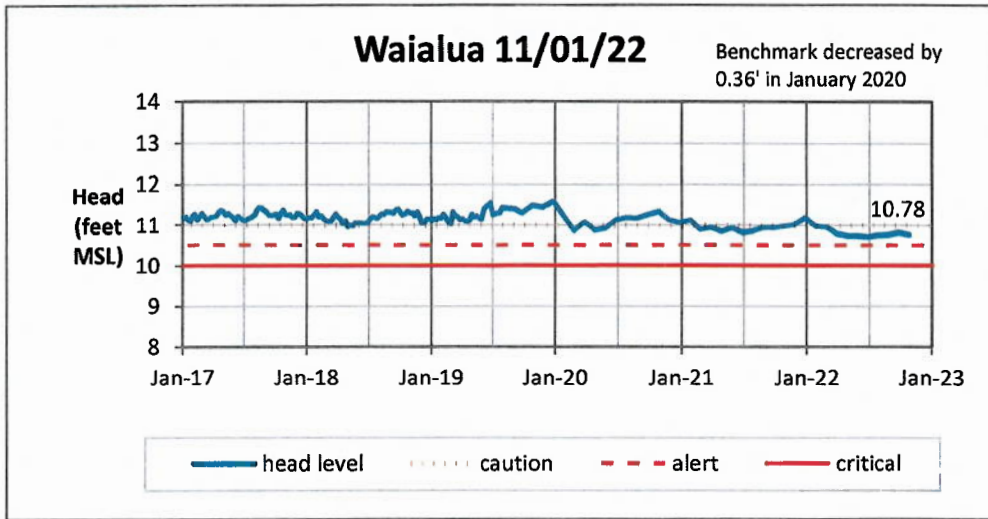
# Head Report



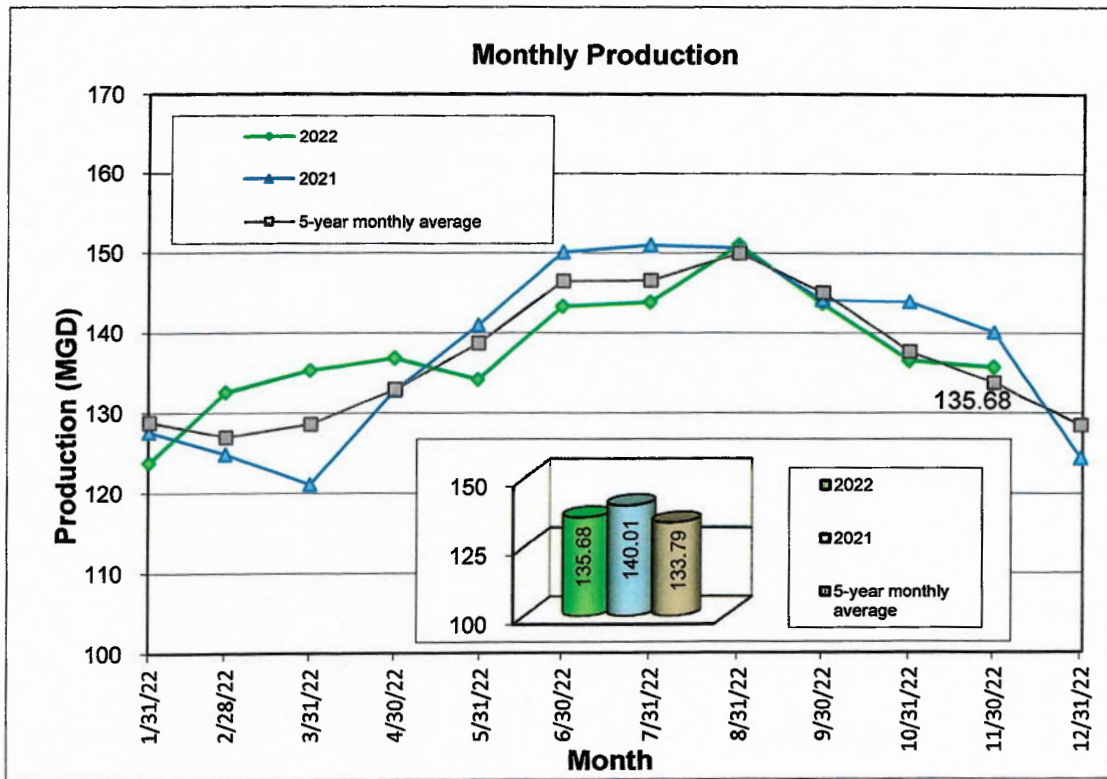
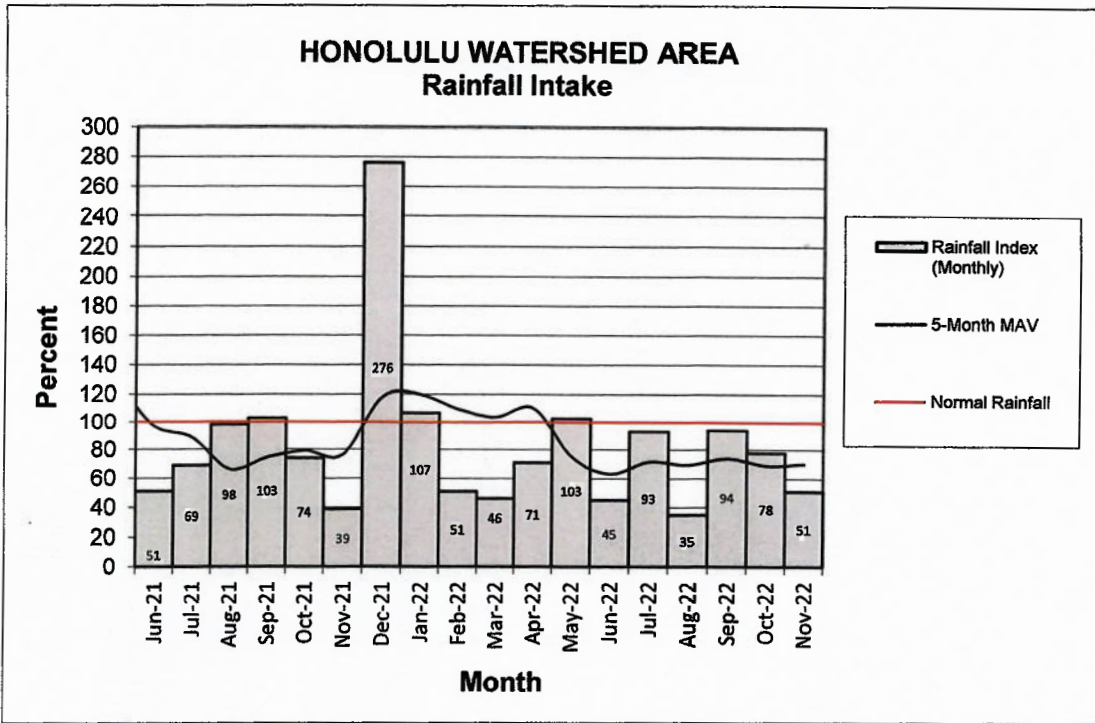
# Head Report



# Head Report







**ITEM FOR INFORMATION NO. 2**

"December 12, 2022

**WATER MAIN  
REPAIR  
REPORT FOR  
NOVEMBER  
2022**

**Chair and Members  
Board of Water Supply  
City and County of Honolulu  
Honolulu, Hawaii 96843**

**Chair and Members:**

**Subject: Water Main Repair Report for November 2022**

**Jason Nikaido, Program Administrator, Field Operations Division, will report on water main repair work for the month of November 2022.**

**Respectfully submitted,**

**/s/ ERNEST Y. W. LAU, P.E  
Manager and Chief Engineer**

**Attachment"**

**The foregoing was for information only.**

**DISCUSSION:**

**Jason Nikaido, Program Administrator, Field Operations Division, gave the report.**

**Manager Ernest Lau requested that Mr. Jason Nikaido explain to the newest BWS Board Member how Points of Interest (POI) are identified and the satellite technology used.**

**Mr. Nikaido shared that the BWS uses a third-party vendor that provides satellite information. The satellite detects leaks, including chlorinated water in groundwater and near the surface within a 300-foot radius, which then provides the BWS with points of interest (POI) that are investigated.**

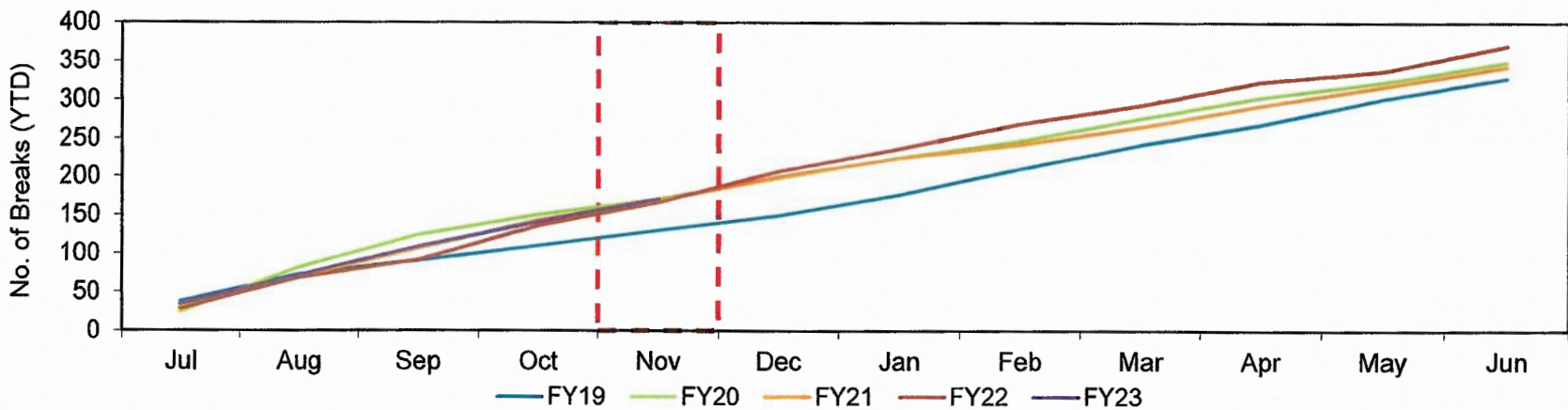
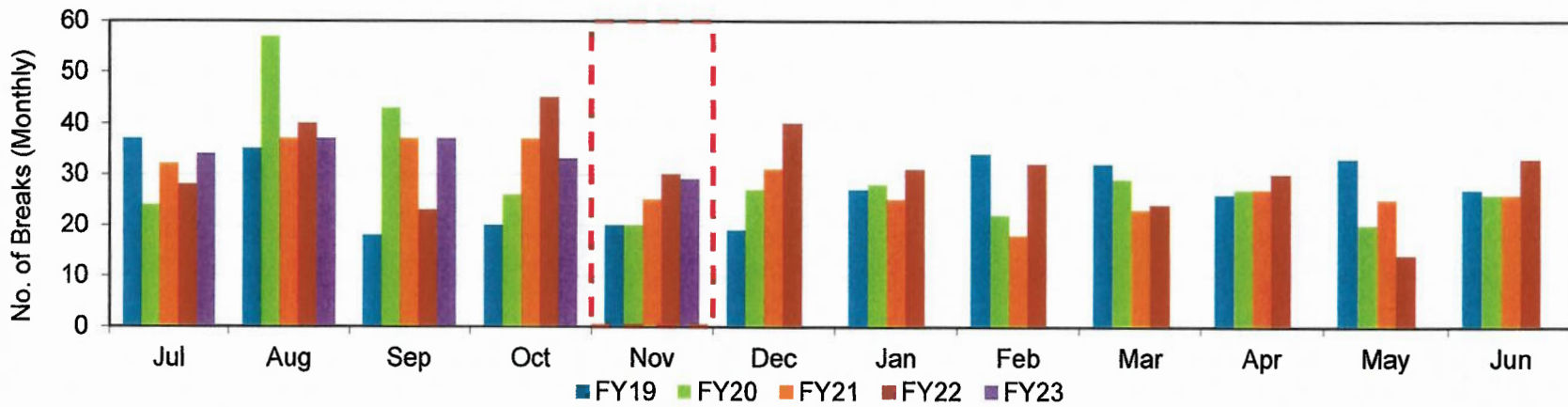
**Board Member Edwin Sniffen expressed his appreciation for the close coordination between state and city agencies wwhen repairing water main breaks.**

**Manager Lau responded that the appreciation is mutual.**

**WATER MAIN REPAIR REPORT  
for November 2022**

**Monthly Main Breaks**

FY	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
2023	34	37	37	33	29								170
2022	28	40	23	45	30	40	31	32	24	30	14	33	370
2021	32	37	37	37	25	31	25	18	23	27	25	26	343
2020	24	57	43	26	20	27	28	22	29	27	20	26	349
2019	37	35	18	20	20	19	27	34	32	26	33	27	328

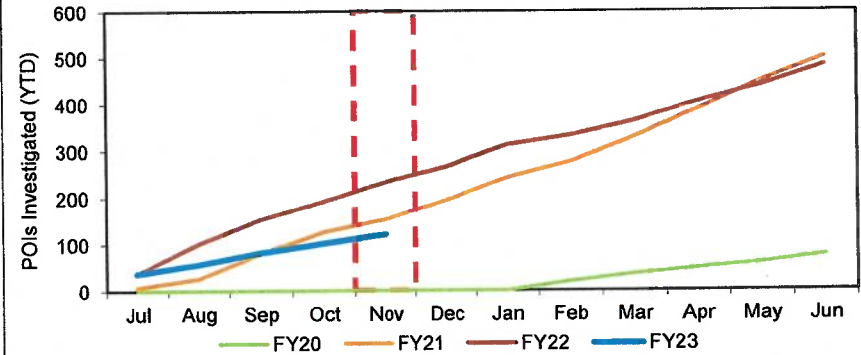
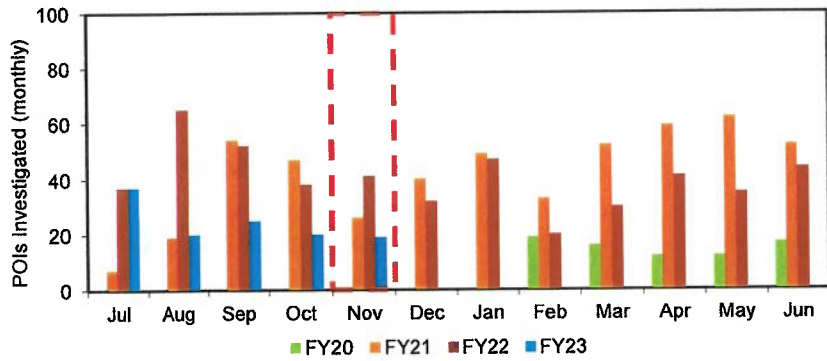


Date	Address	Size (In)	Pipe Type
11/2/2022	59-272 Pupukea Rd, Haleiwa,	12	CI
11/2/2022	5866 Haleola St, Honolulu	8	CI
11/3/2022	1458 Pule Pl, Honolulu	4	CI
11/4/2022	167 Kamehameha Hwy, Wahiawa	6	CI
11/5/2022	1020 Alewa Dr, Honolulu	8	PVC
11/5/2022	86002 Pokai Bay St, Waianae	8	CI
11/7/2022	61 Puiwa Rd, Honolulu	6	CI
11/7/2022	432 Haweo Pl, Honolulu	4	CI
11/10/2022	94-209 Kenola Pl, Waipahu	4	CI
11/11/2022	136 Hanohano Pl, Honolulu	4	DI
11/13/2022	2370 Kuhio Ave, Honolulu	8	PVC
11/13/2022	3108 Francis St, Honolulu,	8	CI
11/14/2022	207 Puiwa Rd, Honolulu	8	CI
11/15/2022	66-961 Kaukonahua Rd, Waiialua	6	CI
11/16/2022	158 Dowsett Ave, Honolulu	8	CI
11/17/2022	2714 Pulena Pl, Honolulu	4	CI
11/18/2022	47-438 Mapele Rd, Kaneohe,	8	CI
11/19/2022	87224 Kulaaupuni St, Waianae	8	PVC
11/20/2022	1173 Waiholo Pl, Honolulu,	4	CI
11/20/2022	1706 Hoolaulea St, Pearl City	12	PVC
11/20/2022	680 Queen St, Honolulu	6	DI
11/20/2022	1356 Komo Mai Dr, Pearl City	8	CI
11/20/2022	281 Puiwa Rd, Honolulu	8	CI
11/21/2022	1706 Hoolaulea St, Pearl City	12	PVC
11/24/2022	99-20 Kaamilo St, Aiea	8	PVC
11/25/2022	3414 Kaimuki Ave, Honolulu	8	CI
11/29/2022	84-314 Makau St, Waianae	8	PVC
11/30/2022	2422 California Ave, Wahiawa	12	CI
11/30/2022	99-963 Lalawai Dr, Aiea	6	CI

## LEAK DETECTION for November 2022

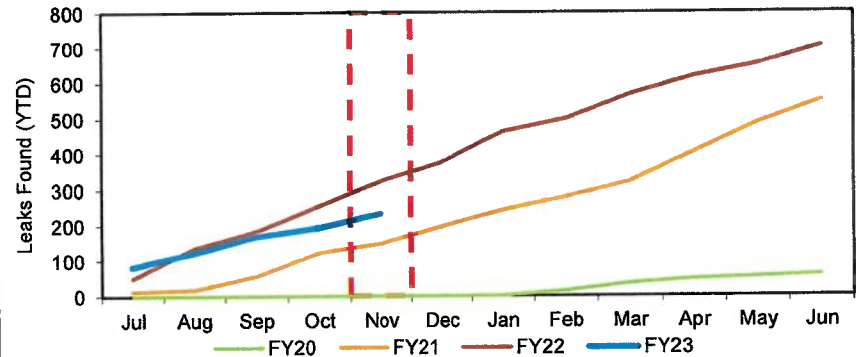
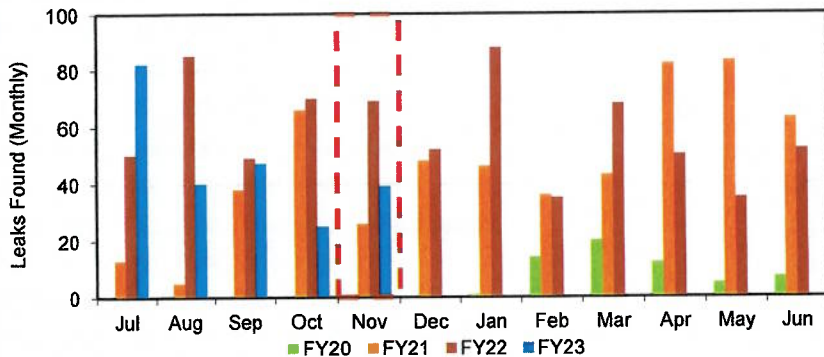
### POIs Investigated

FY	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
<b>2023</b>	37	20	25	20	19								<b>121</b>
2022	37	65	52	38	41	32	47	20	30	41	35	44	482
2021	7	19	54	47	26	40	49	33	52	59	62	52	500
2020							0	19	16	12	12	17	76



### Leaks Found

FY	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
<b>2023</b>	82	40	47	25	39								<b>233</b>
2022	50	85	49	70	69	52	88	35	68	50	35	52	703
2021	13	5	38	66	26	48	46	36	43	82	83	63	549
2020							1	14	20	12	5	7	59



ITEM FOR INFORMATION NO. 3

"December 12, 2022

UNITED STATES  
ENVIRONMENTAL  
AGENCY (EPA)  
AND HAWAII  
DEPARTMENT  
OF HEALTH (DOH)  
DISCUSSING THE  
SETTING OF  
ENVIRONMENTAL  
ACTION LEVELS  
(EALs) AND THE  
AQUEOUS FILM  
FORMING FOAM  
(AFFF) FIRE  
SUPPRESSANT  
SPILL AT THE  
RED HILL BULK  
FUEL STORAGE  
FACILITY

Chair and Members  
Board of Water Supply  
City and County of Honolulu  
Honolulu, Hawaii 96843  
Chair and Members:

Subject: United States Environmental Protection Agency (EPA) and Hawaii Department of Health (DOH) Discussing the Setting of Environmental Action Levels (EALs) and the Aqueous Film Forming Foam (AFFF) Fire Suppressant Spill at the Red Hill Bulk Fuel Storage Facility

We are pleased to have the EPA and Hawaii DOH present to discuss:

1. DOH's decision to raise the risk-based drinking water action levels for TPH associated with jet fuel releases from 211 micrograms per liter ( $\mu/L$ ) to 266  $\mu/L$  cited in their February 12, 2022, and April 20, 2022, technical memorandums on Risk-Based Drinking Water Action Levels for Total Petroleum Hydrocarbons (TPH) Associated with Releases of JP-5 Jet Fuel.
2. The EPA's and DOH's current drinking water health advisory levels for polycyclic aromatic hydrocarbons (PAHs).
3. The environmental and health impact of the polyfluorinated alkyl substance (PFAS) containing Aqueous Film Forming Foam (AFFF) fire suppressant spill at the Red Hill Bulk Fuel Storage Facility that occurred on November 29, 2022.

Respectfully Submitted,

/s/ ERNEST Y. W. LAU, P.E  
Manager and Chief Engineer

Attachment"

The foregoing was for information only.

DISCUSSION: Environmental Protection Agency (EPA) and the Hawaii Department of Health (DOH) gave the report.

After Roger Brewer, Toxicologist, DOH, presented his presentation, Chair Andaya opened the floor for the BWS and Board to ask questions.

Joanna Seto, Safe Drinking Water Branch, Department of Health, shared that the DOH would need to leave the meeting at 4:00 PM due to other arrangements that are scheduled and need to attend.

Deputy Manager Erwin Kawata shared that the BWS collected five samples after DH-43 well was purged at different volumes and replicated the samples submitted by the DOH. The BWS laboratory reports showed consistent concentrations of Polycyclic Aromatic Hydrocarbons (PAHs) throughout the different samples and purge rates. He asked if the concern is due to stagnancy or extraneous elements in the well, then how did it remain in the well after the well was purged to the point where the purge volumes met the EPA recommendations for groundwater sampling.

Dr. Roger Brewer responded, as presented in the video and pictures, that as there is sediment and algae in DH-43 well, purging the well completely would disturb what is attached to the rock and well.

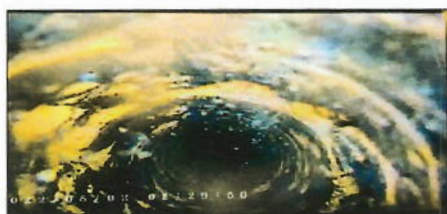
### Video Inside of DH43 Well



**Top of Well  
(galvanized pipe inside outer iron pipe)**



**Rust and Corrosion  
At Top of Water Table**



**Algae Growing on Rock  
in Open Borehole Below Water Table**



**Algae and Sediment  
in Bottom of Well**

Deputy Manager Kawata stated that the videos and pictures presented indicated that they were taken before the purge. He also stated that after the BWS purged the well, all sample results were clear, and the laboratory quality control (QC) confirmed the test results. Therefore, if there were a laboratory error, it would have been visible in the QC. However, the BWS replicated the tests several times but could not identify the error. Therefore, the notion that the water was contaminated due to laboratory contamination is suspect.

Dr. Brewer replied that the DOH is still analyzing the test results, but it was typical to blame the laboratory because samples are collected in the field.

Deputy Manager Kawata stated that Red Hill has several monitoring wells on the property and at Red Hill Shaft, that showed the presence of PAH,

which was also detected at the DH-43 well. Therefore, the PAH concentration is not always the same and not always present.

Dr. Brewer responded that he reviewed all the PAH data at Red Hill in the past and most recently on December 12, 2022, which indicated that PAHs were detected during January and March 2022, but, during other times, it was non-detect. He commented that he questions why the contamination tends to show only in one round of sampling and not in others but always blames it on laboratory error first. He shared he was present on one occasion when samples needed to be filtered at the location due to the amount of sediment in the sample collected. Dr. Brewer suggested that the Red Hill monitoring wells be cleaned before collecting samples to get accurate data.

Manager Lau asked Dr. Brewer to clarify if PAH was detected in the samples collected at Red Hill Shaft.

Dr. Brewer replied that he didn't look at the Red Hill data on the morning of December 12, 2022, but would look into the data collected and get back to the BWS.

Manager Lau pointed out that there have been multiple fuel leaks at Red Hill over the years; two of the most recent were the November 2022 fuel leak and the fuel leak at Tank 20, which is closest to the BWS Well DH-43 monitoring well. He inquired if any of the types of fuels stored at Red Hill Shaft over the past 80 years could have had PAH.

Dr. Brewer responded that he was unsure what types of heavy fuel were stored at Red Hill Shaft and would need to look at the data in more detail, but he didn't think benzo pyrene is present at significantly low levels

Manager Lau stated that the EPA recognizes Benzopyrene as a health risk to humans due to its maximum contaminant level (MCL) but asked about the other PAHs present.

Dr. Brewer confirmed that PAH was detected in one round of samples taken from groundwater. He stated that PAH is in some heavy fuels, such as benzopyrene, but not gasoline or diesel. Dr. Brewer stated that there was no visible widespread PAH as seen in DH-43 but mentioned that TPH, a degraded jet fuel, was detected under the Red Hill facility.

Manager Lau asked Dr. Brewer if there was any possibility that PAH detected in multiple samples from the DH-43 well could have been from Red Hill.

Dr. Brewer replied there's a 95% to 99% chance that the PAH detected is from the well from which the sample was drawn. He commented that the PAH found in the well could potentially be from the rainfall percolating on the street or the utility trenches.



After Diana Felton, Medical Toxicologist, DOH, presented, Patrick Wilson, Toxicologist, EPA, stated he had one slide to show, but if the BWS preferred to ask questions, he was open to discussion on the EPA's view on PAHs.

Manager Lau responded that due to the latest release of 1,300 gallons of firefighting foam concentrate containing poly-fluoroalkyl substances (PFAS), the BWS would prefer an explanation of what happened to get a better understanding. He shared that the BWS received a letter from the DOH on December 8, 2022, indicating positive test results for PFAS in the Navy's drinking water source at Red Hill Shaft dating back to December 2021. Additionally, in the Joint Base Pearl Harbor Hickam (JBPHH) water quality reports, PFAS was detected in the drinking water system in 2020 and 2021. He asked Dr. Wilson for any information or findings on the PFAS investigation.

Dr. Wilson stated that Allison Fong, Acting Assistant Director, Region 9, EPA is in a better position to address the BWS's questions regarding PFAS detection.

Ms. Allison Fong shared that on December 20<sup>th</sup> and 27<sup>th</sup>, 2021, PFAS was detected. The EPA and DOH received the final lab results in March 2022. However, the amount of PFAS detected was below the State of Hawaii Environmental Action Levels (EAL), but above the EPA's June 2022 revised health advisory levels. As a result, a letter was sent to the Navy from the EPA and DOH directing the Navy to conduct a preliminary investigation by sampling monitoring wells near the Red Hill Shaft following the AFFF release on November 29, 2022, followed by weekly groundwater sampling to determine the appropriate course of action. The EPA and DOH have not received any sample results since December 12, 2022.

Ms. Corine Li, Manager for Region 9, EPA, shared that the health advisory level for PFAS was lowered by a thousandfold in June 2022 from 70 parts per trillion to 0.004 parts per trillion which will significantly shift what is detected and reported.

Manager Lau asked Ms. Li why the EPA lowered the health advisory level.

Ms. Li explained that more data from peer-reviewed science indicated the adverse and harmful impacts of exposure to PFAS. Therefore, the EPA decided to lower the 2018 health advisory of 70 parts per trillion and came out with interim health advisories for PFOS and PFOA.

Manager Lau commented that the decision was not arbitrary but one to protect human health.

Ms. Li agreed with Manager Lau's comment. She stated that the EPA is currently working toward a proposed rule-making and a drinking water standard for PFOS and PFAS.

Manager Lau inquired about the data from the Navy's annual water quality reports, which are taken from their water systems and distributed to the drinking water customers. He asked what the law requires.

Ms. Li shared that from 2013 through 2015, all water utilities were required to have water system samples taken on half a dozen perfluorinated compounds. The law requires that if unregulated contaminants are being monitored and the results are above the minimum reporting limit for any specified contaminant, whether it's PFOS or PFAS, it must be included in a consumer confidence report and shared with the affected consumers. Therefore, the 2021 reports referenced do indicate that PFAS was detected.

Manager Lau stated that he was referencing the 2021 and 2022 reports, which samples were taken in the calendar year 2020 and 2021.

Ms. Li responded that under the federal requirements, the Navy was not required to do any monitoring. However, because the Navy performed unregulated monitoring, they were required to report their findings since it was above the minimum reporting limits.

Manager Lau asked what the timeline is to set the maximum contaminant level (MCL) of the drinking water standard for PFOA and PFOS.

Ms. Li replied that the EPA committed to releasing a proposed MCL by the end of 2022; however, it may be postponed to January 2023.

Manager Lau pointed out that the letter from the EPA and DOH, dated November 2, 2022, to the BWS, stated that the preliminary investigation of PFAS was comparable to what was reported in the calendar year 2020 and 2021 was well above the current health advisory.

Ms. Li replied that the levels reports were in the single-digit parts per trillion.

Deputy Manager Kawata asked Ms. Li had any comments on the current drinking water method for PFOA since the current minimum reporting limit is well above the interim health advisory level of 0.004 parts per trillion. If methods 533 and 537.1 will be used in 2023 Unregulated Contaminant Monitoring Rule 5 (UCMR 5), which can only test to two parts per trillion, how will the results be interpreted consistently if the interim health advisory is 0.004 parts per trillion?

Ms. Li replied that it's not unusual to have lower health advisories than the actual method of detection but are working to be more precise and move toward an MCL.

Deputy Manager Kawata inquired if the MCL could potentially be higher than the interim health advisory based on technology or limitations.

Ms. Li responded that Deputy Manager Kawata was correct.

Board Member Anthony stated that Oahu's aquifer was contaminated with harmful and hazardous materials that could potentially be detrimental to everyone's health. He inquired if the BWS, EPA, DOH, and Navy can agree to a set universal testing regimen of how often tests should be done and the sensitivity level requirements. Board Member Anthony commented that the BWS could not allow what happened to the Navy water system to happen to its municipal system.

Ms. Fong replied that the EPA shares the same concerns about the impacts the contamination had on the environment. Therefore, the EPA is working with the DOH to find sufficient information to understand the data.

Board Member Anthony explained that what he is asking for from the regulators is an agreement to set a precise data testing and reporting system that can be accessed and utilized for public scrutiny. He shared that the BWS has increased the sensitivity of testing due to the misunderstanding of the meaning of non-detect, which results from not testing at lower levels and leads the community to believe there is no contamination. Board Member Anthony asked for the purveyors and regulators to agree to set a test for the sensitivity threshold for all Red Hill sites to be in unison.

Ms. Seto responded that the DOH agreed to share data between all regulating agencies.

Board Member Anthony asked the EPA to respond since, at a previous meeting with the Navy, Rear Admiral Kilian agreed to test at lower levels than the legal action limits if the EPA regulated it.

Ms. Fong asked if Board Member Anthony was referring to PFAS samples.

Manager Lau replied that the BWS is requesting that all compounds, materials, and regulated chemicals be tested below the regulatory limits to determine when it begins to appear in groundwater and before it reaches the EAL. Therefore, the BWS asks that the regulators set the sensitivity for all tests equally across all agencies.

Dr. Wilson explained that when a toxicologist sets an MCL, various factors are considered, including the impact on health and cost. When the MCL is implemented, it is set at a higher concentration than the existing health advisories. He stated that before a new MCL is established, consideration of the ability to detect and analyze specific substances and the ability of water purveyors to remove these substances are feasible and economical.

Vice Chair Kapua Sproat reiterated Board Member Anthony's and Manager Lau's requests. The BWS is testing below the regulated limits. Therefore, the BWS is asking that all regulators agree to a standardized testing limit to provide accurate information on the contamination and how it is spreading.

Manager Lau explained that the BWS is proposing that all tests be performed at the lowest level to help identify what is happening in the underground aquifers to prepare and prevent any impact on the many drinking water wells in various locations.

Mr. Wilson inquired if the BWS has methods to achieve lower detection limits than the current EPA methods.

Board Member Anthony responded that the BWS does not have a different way of detecting lower limits than the EPA. He asked that since the BWS could increase the sensitivity on testing, as Deputy Manager Kawata did for TPH-d to understand where it was moving. Board Member Anthony asked if the regulators could lower the testing limit for all agencies to understand the contaminants' movement better.

Ms. Fong requests that the BWS share its testing methods with the EPA and DOH.

Manager Lau commented that he looks forward to the following roundtable discussion in January.

Ms. Fong responded that the meeting in January is on groundwater expert meeting and would be a perfect venue to discuss the BWS's proposal.

Board Member Anthony requested that the slide with the DOH Drinking Water "Total TPH" Action Level for JP-5 be displayed. He inquired if Mr. Brewer, who lives in Salt Lake, would drink the water that measures 266 TPH.

### DOH Drinking Water "Total TPH" Action Levels for JP-5

Basis	JP-5 TPH Action Level	Notes
Toxicity (February 2022)	211 µg/L	<ul style="list-style-type: none"> <li>• Specific to fresh JP-5 fuel and fuel composition provided by Navy</li> <li>• Error discovered in spreadsheet</li> </ul>
Toxicity (April 2022)	266 µg/L	<ul style="list-style-type: none"> <li>• Error corrected in DOH spreadsheet</li> <li>• Additional testing of JP-5 fuel from Red Hill facility underway</li> </ul>
Taste & Odors (February 2017)	*500 µg/L	<ul style="list-style-type: none"> <li>• Updated from previous 100 µg/L (USEPA 1980 document; based on mistranslation of Soviet Union study in 1940s)</li> </ul>
Final JP-5 EAL	266 µg/L	<ul style="list-style-type: none"> <li>• Lowest of toxicity and Taste &amp; Odor</li> </ul>

\*Residents impacted by November 2021 release of JP-5 fuel at Red Hill unable to initially identify contamination of tapwater at apparent concentrations much higher than 500 µg/L.

Mr. Brewer responded, "I certainly think about that quite a bit. I don't want any jet fuel in my water to drink". But, he also mentioned from a toxicology standpoint, 266 TPH is not a health risk based on studies.

Board Member Anthony commented coming from a Native Hawaiian, hydrocarbons did not exist in Hawaii's waters for over 1000 years and would prefer to remain that way.

Due to the time constraints for the DOH and the EPA, Chair Andaya expressed his appreciation for their attendance and invited them to join the next Board meeting on January 23, 2023.

Ms. Seto requested that all public testimony be forwarded to the DOH so a response could be issued. At 4:04 PM, the DOH left the meeting.

At 4:05 PM, Ms. Fong announced that the EPA also had to leave and requested that all public testimony be forwarded to the EPA.

Vice Chair Sproat commented that it is crucial that the EPA and the DOH engage with the community members who have taken time to testify. Therefore, she requested that the EPA and the DOH join the BWS's January 23, 2023, Board meeting and offered to adjust the time of the Board meeting to accommodate the time difference and allow the public to ask questions.

There were 30 written testimonies submitted. Chair Bryan Andaya read into the record of the names who submitted written testimony:

Roslyn Cummings	Commented and submitted questions regarding EALs and AFFF.
Cheryl Burghardt D. Green	Commented on PFAS.
Dylan Ramos	Commented in support of BWS keeping up the pressure on accountability and justice regarding Red Hill. Please see that DOH and EPA are equally committed to those goals as they deal with the Navy.
Lorna Holmes	Commented to use all means necessary to get the Navy to move more rapidly on draining Red Hill and sharing information right away, and for the Department of Health to up standards for water pollution.
Shannon Rudolph	Commented about what is happening at Puuloa/Red Hill, PFAS, and other toxins and expressing concerns about the health of friends and troops/families in the affected areas

	going forward.
Patti Choy	Commented on DOH and EPA sharing of information with BWS.
Jennifer Valentine	Commented on EALs and AFFF and the need for transparency and sharing of information.
Mari Menell-Bell	Commented and asked for serious consideration to be given to 5 issues: notifying the public, risk to the larger environment and community, demanding transparency, concerns about deal-making, and updating EALs.
Shar Louis	Commented on BWS efforts to protect our water and hoping that DOH and EPA will do everything possible to do the same.
Katherine McClanahan	Shared the impact of jet fuel poisoning on her family and submitted questions.
Kristen Young	Commented and asked that serious consideration be given to 3 issues: notifying the public, demanding transparency, and updating EALs.
Maheshi Kloepfer	Commented that the State should have its own engineers go to Red Hill and make necessary changes now and then bill the Navy.
Sherry Pollack	Commented on using precautionary principle when environmental and human health hazards are uncertain and stakes are high. She requested the adoption of the threshold of less than 100 ppb for TPH, more transparency, and more community input and requested third-party to take over remediation efforts.
Noel Shaw	Providing comment on the DOH presentation. She also provided in-person testimony.
Tammie Evangelista	Supports setting guidelines for Red Hill & more transparency by the Navy on dangers to the aquifer and putting more rules in place to protect citizens and water resources

Allison Domenden	Opposes EPA and DOH increase change(s) in settings at Red Hill or anywhere in Hawaii
Amanda Feindt	Shared the impact of jet fuel poisoning on her family and submitted questions. She also provided in-person testimony.
Diane Fujimura	Commented on Red Hill, Navy efforts, PFAS, and AFFF's impact on groundwater.
Susan Pcola-Davis	Commented and submitted questions regarding EALs and AFFF. She also provided in-person testimony.
Choon James	Commented and submitted questions regarding EALs and AFFF.
Cassandra Chee	Commented and submitted questions regarding EALs and AAAF. She also provided remote testimony.
Pete Doktor	Commented on EALs and AFFF.
Meredith Wilson	Commented on EALs for TPH and submitted questions. She also provided remote testimony.
Brandon Bees	Commented on concerns regarding the health of the community and transparency of the Navy and voiced an opinion on the recent AFFF spill. He also provided remote testimony.
Dave Mulinex	Commented on behalf of Our Revolution Hawaii, requesting the turnover of Red Hill operations to an independent service provider. He also provided in-person testimony.
Susan Gorman-Chang	Asked Roger Brewer, DOH how the DOH arrived at the acceptable TPH level of 266 parts per billion when other states are lower. She also provided remote testimony.
Danielle Espiritu	Commented on BWS efforts regarding the PFAs and the recent AFFF spill.

Healani Sonoda-Pale	Provided comments to BWS, DOH, EPA, and Navy, as well as comments regarding the PFAs and the recent AFFF spill.
Lacey Quintero	Commented and submitted questions regarding EALs and AFFF. She also provided in-person testimony
Gina Hara	Commented and submitted questions regarding EALs and AFFF. She also provided remote testimony.

There were a total of 10 people who submitted in-person testimony:

Amanda Feindt	Shared the impact of jet fuel poisoning on her family and submitted questions. She also submitted written testimony.
Susan Pcola-Davis	Commented and had questions regarding EALs and AFFF. She also submitted written testimony with a PDF attachment.
Kimmer Horsen	Commented that there is neglect the people of Hawaii need people to fight for Hawaii.
Alfred Medeiros	Presented a visualization of PFAS, fuel, and water. Commented on protecting the people of Hawaii and the future generations of Hawaii. He requested transparency and accountability.
Keoni DeFranco	Requested the EPA and DOH demand the Navy provide full access to all records of all AFFF systems using PFAS in Hawaii, including the amount stored, amount discharged, and how much remains in the system.
Mialisa Otis	Stated that the people of Hawaii want transparency.
Kristina Baehr	Stated that she represents 800 and counting people affected by the Red Hill water contamination. She asked the regulators what is considered non-detect if all chemicals haven't been tested for.
Lacey Quintero	Provided comments on the DOH presentation. She also provided written



	testimony.
Dave Mulinex	Commented on behalf of Our Revolution Hawaii requesting the turnover of Red Hill operations to an independent service provider. He also provided written testimony.
Lyle Hosoda	Commented that he has chosen to be involved in this battle with all those affected.

Ms. Dominique Smith, Environmental Justice Community Engagement Coordinator, EPA, stated that it was important for her to attend the BWS's meeting in person and be allowed to hear from the public. She mentioned that she had made notes of the public's concerns and would be sharing them with the rest of the EPA.

At 4:33 PM, Chair Andaya stated the Board Meeting would sit in a brief recess.

At 4:45 PM, Chair Andaya called the Board Meeting back to order.

There were a total of nine people who testified remotely.

Susan Gorman-Chang	Asked Roger Brewer, DOH, how the DOH arrived at the acceptable TPH level of 266 parts per billion when other states are lower. She also provided written testimony.
Tara Rojas	Commented on the requirements to be part of a regulating agency.
Cassandra Chee	Commented and submitted questions regarding EALs and AFFF. She also provided written testimony.
Meredith Wilson	Commented on EALs for TPH and submitted questions. She also provided written testimony.
Brandon Bees	Commented on concerns regarding the health of the community and transparency of the Navy and voiced an opinion on the recent AFFF spill. He also provided written testimony.

Charde Garcia-Kaaia	Expressed her appreciation to the BWS for fighting for answers and keep Oahu's water pure.
Danielle Espiritu	Commented on the EALs and AFFF. She also provided written testimony.
Healani Sonoda-Pale	Commented on BWS efforts and the PFAs and that AFFF spill. She also provided written testimony.
Gina Hara	Commented and submitted questions regarding the EALs and AFFF. She also provided written testimony.

# **Tapwater Action Levels for JP-5 Jet Fuel and Detections of “PAHs” in BWS Well DH43**

**Roger Brewer, PhD  
Senior Environmental Scientist  
Hawai'i Department of Health (HEER)  
([roger.brewer@doh.hawaii.gov](mailto:roger.brewer@doh.hawaii.gov))**

**Honolulu Board of Water Supply  
December 12, 2022**

# **Topics**

**(BWS August 2022 Letter to HIDOH)**

- 1. Review increase in drinking water action level for TPH associated with JP-5 jet fuel from 211 micrograms per liter ( $\mu/L$ ) to 266  $\mu/L$ ;**
- 2. Discuss drinking water health action levels for “Polyaromatic Hydrocarbons” (PAHs); and**
- 3. Advise on the health significance of the PAH levels detected in DH-43.**

# References

**HIDOH Environmental Action Levels:**

***Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater (Fall 2017 and updates):***  
**<https://health.hawaii.gov/heer/guidance/ehe-and-eals/>**

**HIDOH JP-5 Drinking Water Action Levels:**

***Recommended Risk-Based Drinking Water Action Levels for Total Petroleum Hydrocarbons (TPH) Associated with Releases of JP-5 Jet Fuel (updated April 20, 2022).***  
**<https://health.hawaii.gov/heer/guidance/ehe-and-eals/>**

**TPH Action Levels (recorded presentation):**

**TPH and the Assessment of Petroleum Risk (September 2022)**  
**<https://health.hawaii.gov/heer/guidance/heer-webinars/>**

# Terminology

## Chemicals:

**BTEX:** Benzene, Toluene, Ethylbenzene, Xylenes

**PAH:** Polyaromatic Hydrocarbon

**TPH:** Total Petroleum Hydrocarbon (remaining combined hundreds of compounds plus degradation products)

## Drinking Water Levels:

**MCL:** USEPA/HDOH *Maximum Contaminant Level* (toxicity; promulgated standard in regulations)

**RSL:** USEPA Tapwater *Regional Screening Level* (toxicity; not a regulatory standard)

**EAL:** DOH *Environmental Action Level* (lowest of toxicity and Taste & Odor threshold; based on USEPA Tapwater RSLs)

# USEPA Tapwater Screening Level Equation (toxicity)

## Ingestion

- ingestion of water

$$SL_{res-wat-nc-ing-c} (\mu\text{g/L}) = \frac{THQ \times AT_{res-c} \left( \frac{365 \text{ days}}{\text{year}} \times ED_{res-c} (6 \text{ years}) \right) \times BW_{res-c} (15 \text{ kg}) \times \left( \frac{1000 \mu\text{g}}{\text{mg}} \right)}{EF_{res-c} \left( \frac{350 \text{ days}}{\text{year}} \right) \times ED_{res-c} (6 \text{ years}) \times \frac{1}{RfD_0 \left( \frac{\text{mg}}{\text{kg-d}} \right)} \times IRW_{res-c} \left( \frac{0.78 \text{ L}}{\text{day}} \right)}$$

## Dermal Absorption

- dermal

FOR INORGANICS:

$$SL_{res-wat-nc-der-c} (\mu\text{g/L}) = \frac{DA_{event} \left( \frac{\mu\text{g}}{\text{cm}^2 \cdot \text{event}} \right) \times \left( \frac{1000 \text{ cm}^3}{\text{L}} \right)}{K_p \left( \frac{\text{cm}}{\text{hour}} \right) \times ET_{event-res-c} \left( \frac{0.54 \text{ hours}}{\text{event}} \right)}$$

FOR ORGANICS:

$$\text{IF } ET_{event-res-c} \left( \frac{0.54 \text{ hours}}{\text{event}} \right) \leq t^* (\text{hours}), \text{ then } SL_{res-wat-nc-der} (\mu\text{g/L}) = \frac{DA_{event} \left( \frac{\mu\text{g}}{\text{cm}^2 \cdot \text{event}} \right) \times \left( \frac{1000 \text{ cm}^3}{\text{L}} \right)}{2 \times FA \times K_p \left( \frac{\text{cm}}{\text{hour}} \right) \times \left[ 6 \times t_{event} \left( \frac{\text{hours}}{\text{event}} \right) \times ET_{event-res-c} \left( \frac{0.54 \text{ hours}}{\text{event}} \right) \right]}$$

or,

$$\text{IF } ET_{event-res-c} \left( \frac{0.54 \text{ hours}}{\text{event}} \right) > t^* (\text{hours}), \text{ then } SL_{res-wat-nc-der} (\mu\text{g/L}) = \frac{DA_{event} \left( \frac{\mu\text{g}}{\text{cm}^2 \cdot \text{event}} \right) \times \left( \frac{1000 \text{ cm}^3}{\text{L}} \right)}{FA \times K_p \left( \frac{\text{cm}}{\text{hour}} \right) \times \left[ \frac{ET_{event-res-c} \left( \frac{0.54 \text{ hours}}{\text{event}} \right)}{1+B} + 2 \times t_{event} \left( \frac{\text{hours}}{\text{event}} \right) \times \left( \frac{1+3B+3B^2}{(1+B)^2} \right) \right]}$$

where,

$$DA_{event} \left( \frac{\mu\text{g}}{\text{cm}^2 \cdot \text{event}} \right) = \frac{THQ \times AT_{res-c} \left( \frac{365 \text{ days}}{\text{year}} \times ED_{res-c} (6 \text{ years}) \right) \times \left( \frac{1000 \mu\text{g}}{\text{mg}} \right) \times BW_{res-c} (15 \text{ kg})}{\left[ \frac{1}{RfD_0 \left( \frac{\text{mg}}{\text{kg-day}} \right)} \times GIABS \right] \times EV_{res-c} \left( \frac{1 \text{ events}}{\text{day}} \right) \times ED_{res-c} (6 \text{ years}) \times EF_{res-c} \left( \frac{350 \text{ days}}{\text{year}} \right) \times SA_{res-c} (6366 \text{ cm}^2)}$$

- inhalation of volatiles

$$SL_{res-wat-nc-inh-c} (\mu\text{g/L}) = \frac{THQ \times AT_{res-c} \left( \frac{365 \text{ days}}{\text{year}} \times ED_{res-c} (6 \text{ years}) \right) \times \left( \frac{1000 \mu\text{g}}{\text{mg}} \right)}{EF_{res-c} \left( \frac{350 \text{ days}}{\text{year}} \right) \times ED_{res-c} (6 \text{ years}) \times ET_{res-c} \left( \frac{24 \text{ hours}}{\text{day}} \right) \times \left( \frac{1 \text{ day}}{24 \text{ hours}} \right) \times \frac{1}{RIC \left( \frac{\text{mg}}{\text{m}^3} \right)} \times K \left( \frac{0.5 \text{ L}}{\text{m}^3} \right)}$$

- Total

$$SL_{res-wat-nc-tot-c} (\mu\text{g/L}) = \frac{1}{\frac{1}{SL_{res-wat-nc-ing-c}} + \frac{1}{SL_{res-wat-nc-der-c}} + \frac{1}{SL_{res-wat-nc-inh-c}}}$$

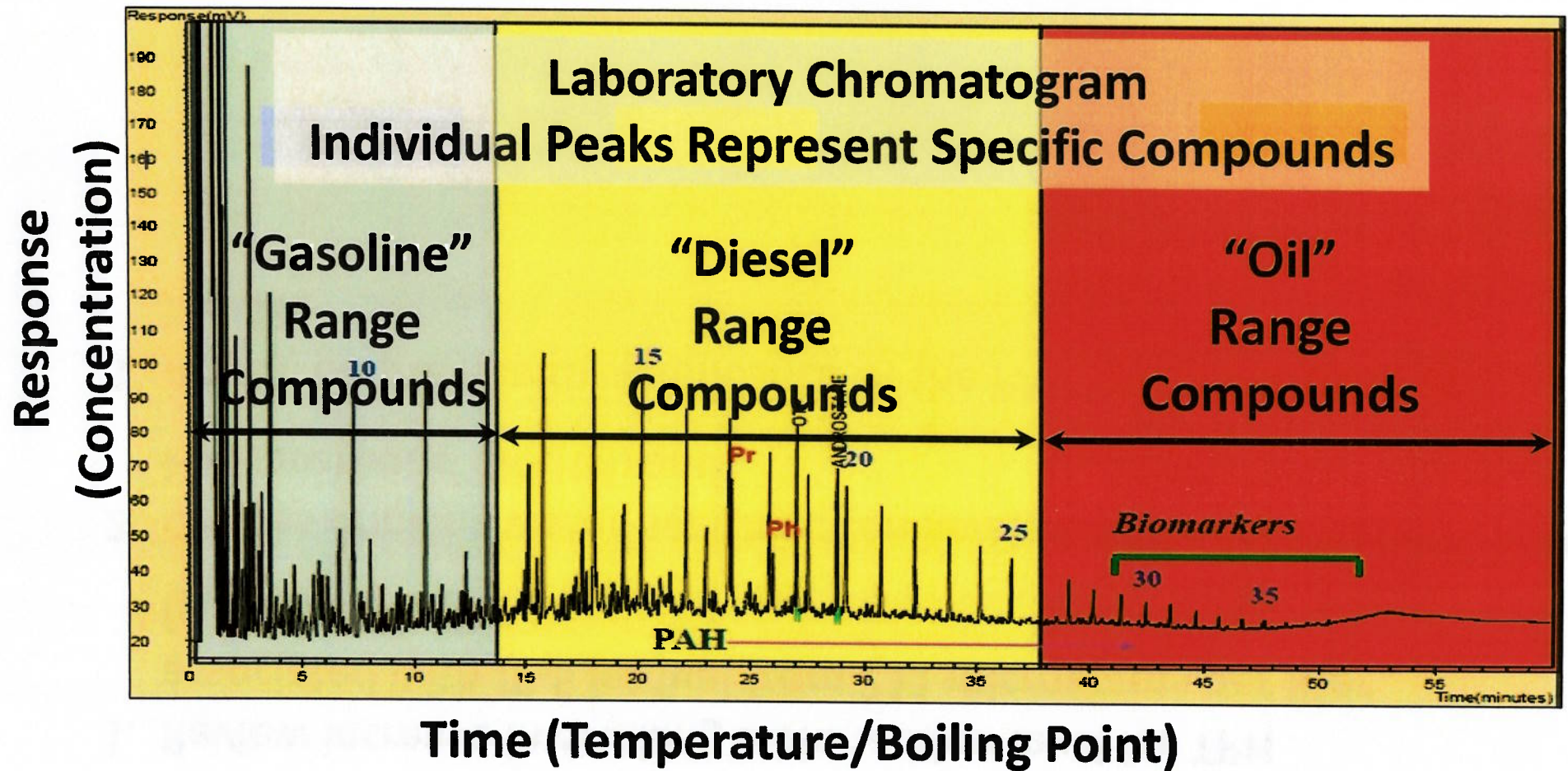
# DOH Drinking Water “Total TPH” Action Levels for JP-5

Basis	JP-5 TPH Action Level	Notes
Toxicity (February 2022)	211 µg/L	<ul style="list-style-type: none"> <li>• Specific to fresh JP-5 fuel and fuel composition provided by Navy</li> <li>• Error discovered in spreadsheet</li> </ul>
Toxicity (April 2022)	266 µg/L	<ul style="list-style-type: none"> <li>• Error corrected in DOH spreadsheet</li> <li>• Additional testing of JP-5 fuel from Red Hill facility underway</li> </ul>
Taste & Odors (February 2017)	*500 µg/L	<ul style="list-style-type: none"> <li>• Updated from previous 100 µg/L (USEPA 1980 document; based on mistranslation of Soviet Union study in 1940s)</li> </ul>
<b>Final JP-5 EAL</b>	<b>266 µg/L</b>	<b>• Lowest of toxicity and Taste &amp; Odor</b>

\*Residents impacted by November 2021 release of JP-5 fuel at Red Hill unable to initially identify contamination of tapwater at apparent concentrations much higher than 500 µg/L.



# Laboratory Measurement of "Total" TPH in Samples



**Total TPH Concentration for a Sample =**  
**Detected “Gasoline Range” + “Diesel Range” + “Residual Range”**

# Topics

(BWS August 2022 Letter to HIDOH)

1. Review increase in drinking water action level for TPH associated with JP-5 jet fuel from 211 micrograms per liter ( $\mu/L$ ) to 266  $\mu/L$ ;
2. Discuss drinking water health action levels for “Polycyclic Aromatic Hydrocarbons” (PAHs); and
3. Advise on the health significance of the PAH levels detected in DH-43.

## PAH Drinking Water Levels ( $\mu\text{g/L}$ , part-per-billion)

PAHs	Regulatory "MCL"	**HIDOH "EAL"	USEPA "RSLs"	
*Benzo(a)anthracene	-	0.029	0.032 to 3.2	
*Benzo(a)pyrene	0.20	0.20	0.025 to 6.0	
Benzo(e)pyrene	-	-	0.18 to 1.8	
Benzo(g,h,i)perylene	-	800	-	
Benzo[b]fluoranthene	-	0.22	0.25 to 25	
Benzo[k]fluoranthene	-	2.2	2.5 to 250	
Chrysene	-	22	25 to 2,500	
*Dibenzo(a,h)anthracene	-	0.022	0.025 to 2.5	
Fluoranthene	-	800	800	
Indeno[1,2,3-cd]pyrene	-	0.22	0.25 to 25	
*1-Methylnaphthalene	-	27	1.1 to 110	
*Naphthalene	-	17	0.12 to 6.1	
Phenanthrene	-	210	-	
Pyrene	-	180	120	
Motor Oil	-	500	-	

\*Only detected in one of five samples collected.

\*\*All DOH action levels based on toxicity except Motor Oil (taste and odor threshold).

# Detections of “TPH” & “PAHs” in BWS Well DH43 (“Polyaromatic Hydrocarbons”)



# PAH Drinking Water Levels ( $\mu\text{g/L}$ , part-per-billion)

PAHs	Regulatory "MCL"	**HIDOH "EAL"	USEPA "RSLs"	DH43 (highest)
*Benzo(a)anthracene	-	0.029	0.032 to 3.2	0.005
*Benzo(a)pyrene	0.20	0.20	0.025 to 6.0	0.019
Benzo(e)pyrene	-	-	0.18 to 1.8	0.213
Benzo(g,h,i)perylene	-	800	-	0.195
Benzo[b]fluoranthene	-	0.22	0.25 to 25	0.053
Benzo[k]fluoranthene	-	2.2	2.5 to 250	0.024
Chrysene	-	22	25 to 2,500	0.051
*Dibenzo(a,h)anthracene	-	0.022	0.025 to 2.5	0.016
Fluoranthene	-	800	800	0.019
Indeno[1,2,3-cd]pyrene	-	0.22	0.25 to 25	0.078
*1-Methylnaphthalene	-	27	1.1 to 110	0.011
*Naphthalene	-	17	0.12 to 6.1	0.007
Phenanthrene	-	210	-	0.021
Pyrene	-	180	120	0.027
TPH (Motor Oil)	-	500	-	430

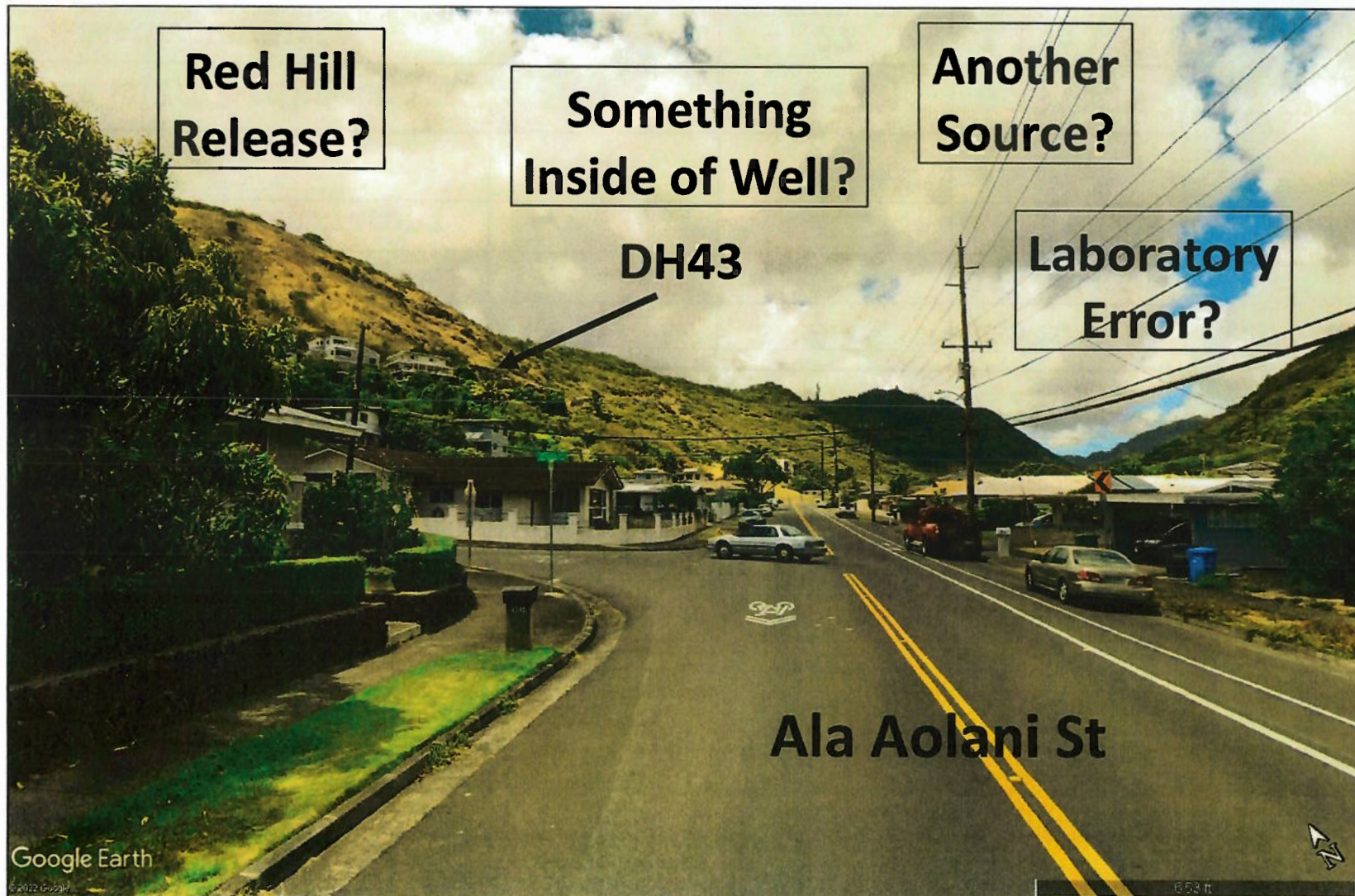
\*Only detected in one of five samples collected.

\*\*All DOH action levels based on toxicity except Motor Oil (taste and odor threshold).

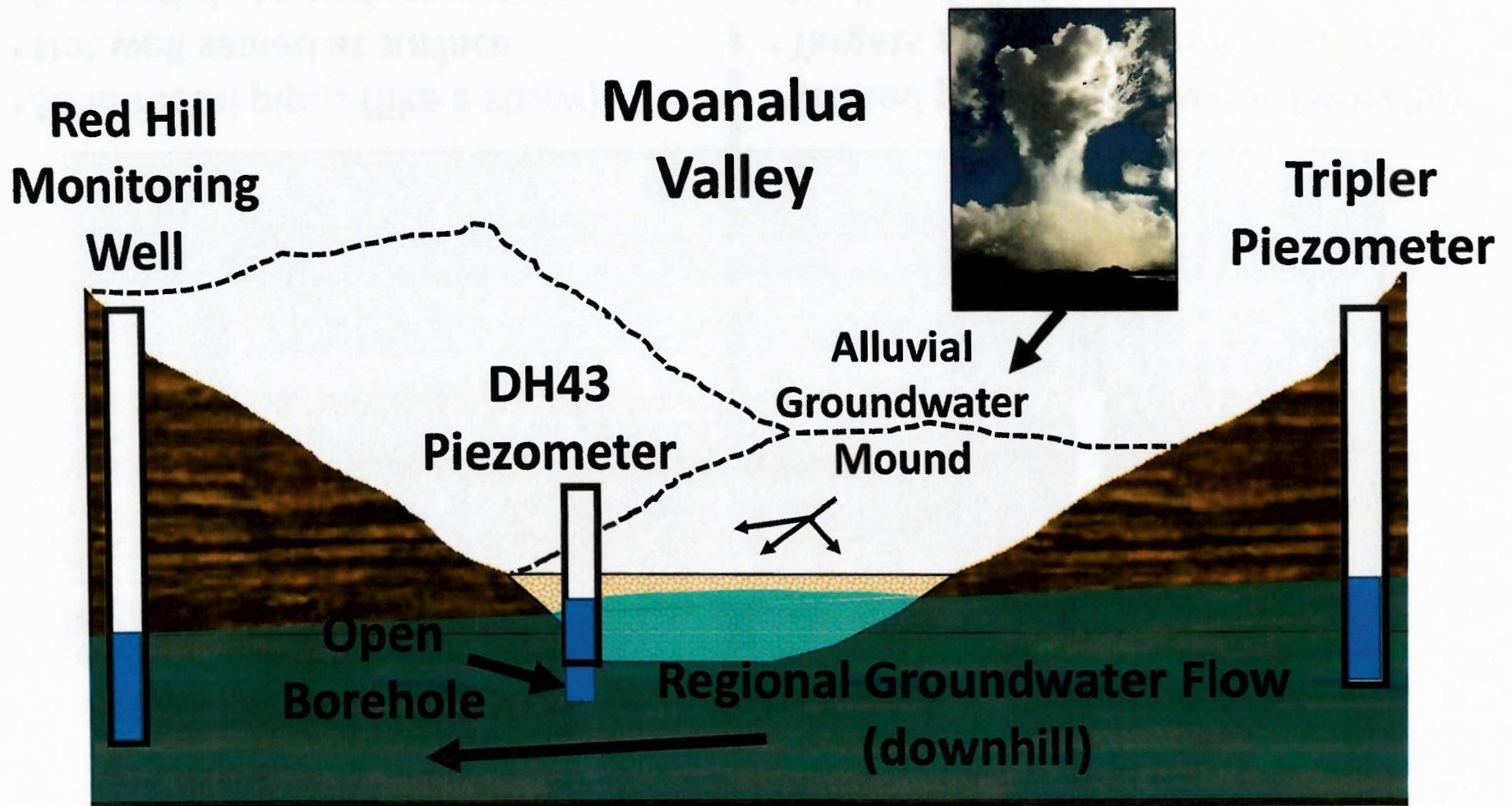
# Source of Trace Levels of PAHs and “Motor Oil” in DH43

## Initial Puzzle:

1. Most Identified PAHs not in jet fuel;
2. Most PAHs are very “sticky” and do not migrate far from source.



### 3. Groundwater Slopes Toward Red Hill (DH43 is “uphill” from Red Hill)



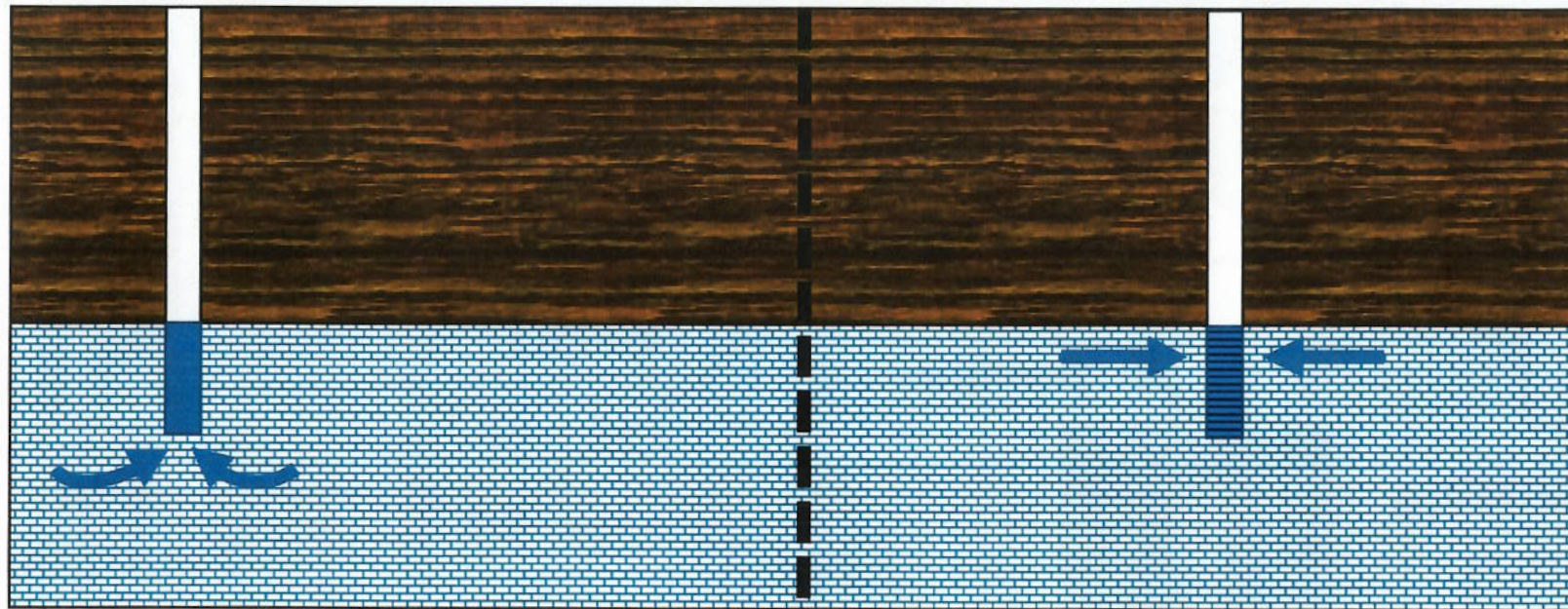
- Valley filled with alluvium
- Shallow groundwater mounded due to rainfall and runoff into valley;
- Natural groundwater flow direction is from DH43 toward Red Hill.

# 4. DH43 Well Construction and Design (1942)

**DH43  
Piezometer**



**Monitoring  
Well**



- Solid metal pipes (like a straw)
- Not well sealed at surface
- Susceptible to surface runoff
- Not routinely cleaned (“developed”) of sediment and algae
- Not intended for monitoring plumes

- Slotted pipe (draws water laterally)
- Targets specific groundwater zone
- Well sealed at surface
- Less susceptible to surface runoff
- Routinely cleaned of algae, sediment
- Specific designed to monitor plumes



# Videos Inside of DH43 Well

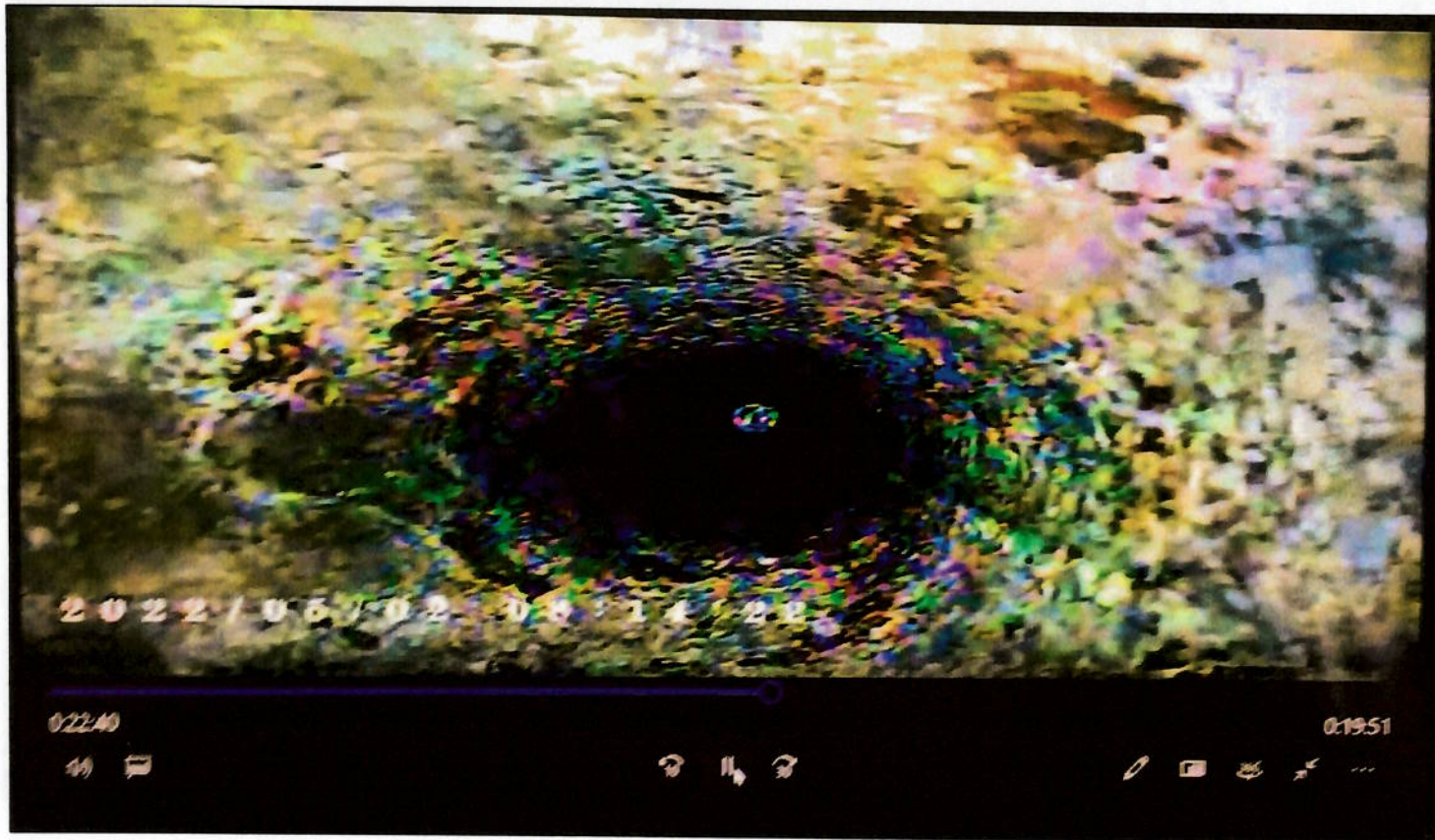


In Well Videos

# Video Inside of DH43 Well - Top of Well -



# Video Inside of DH43 Well - Top of Water -

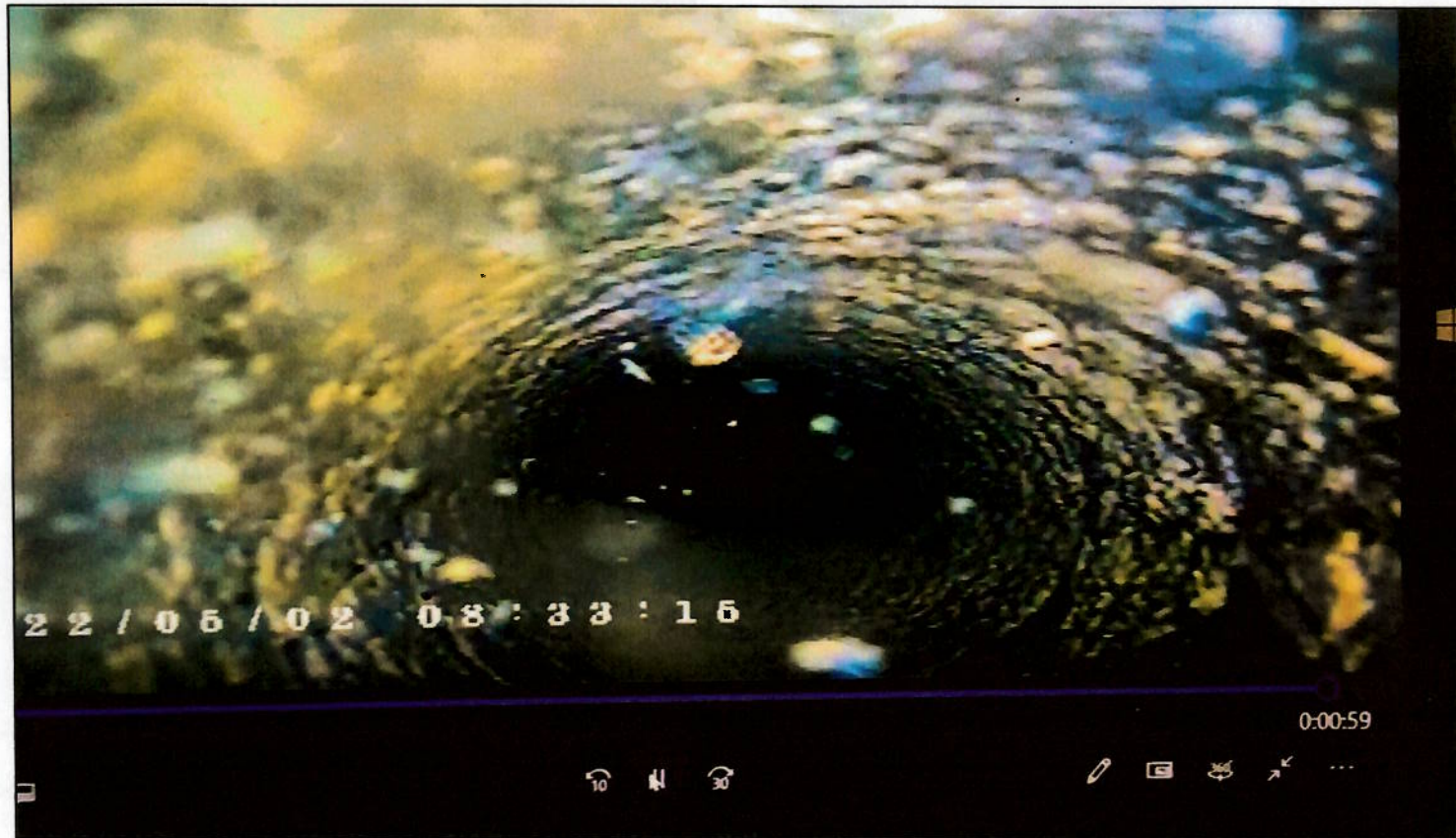


# Video Inside of DH43 Well

- Bottom of Casing/Top of Open Borehole in Rock -



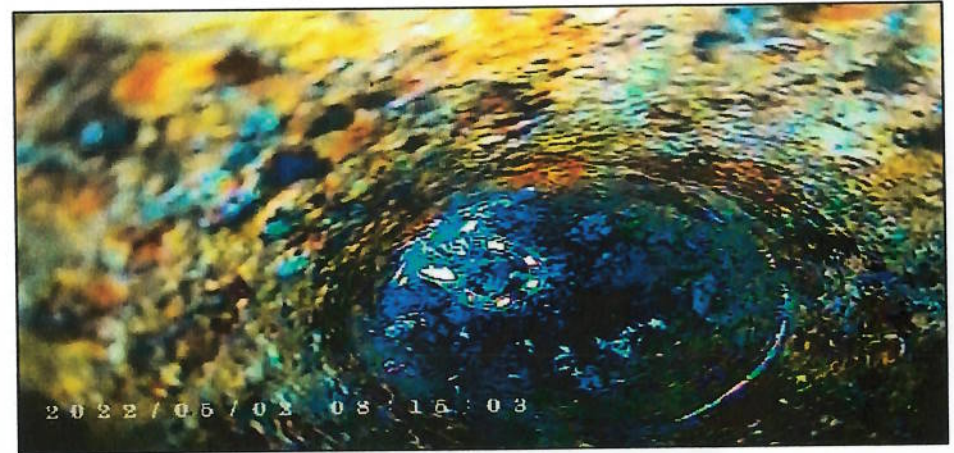
# Video Inside of DH43 Well - Bottom of Well -



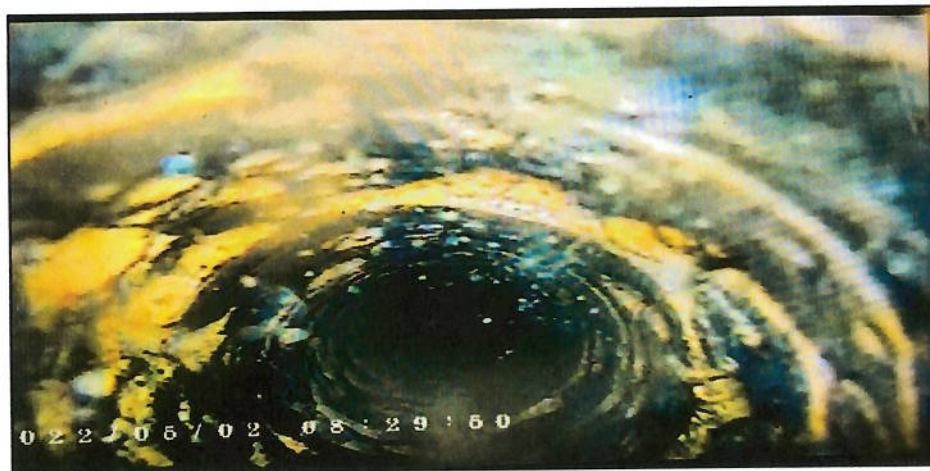
# Video Inside of DH43 Well



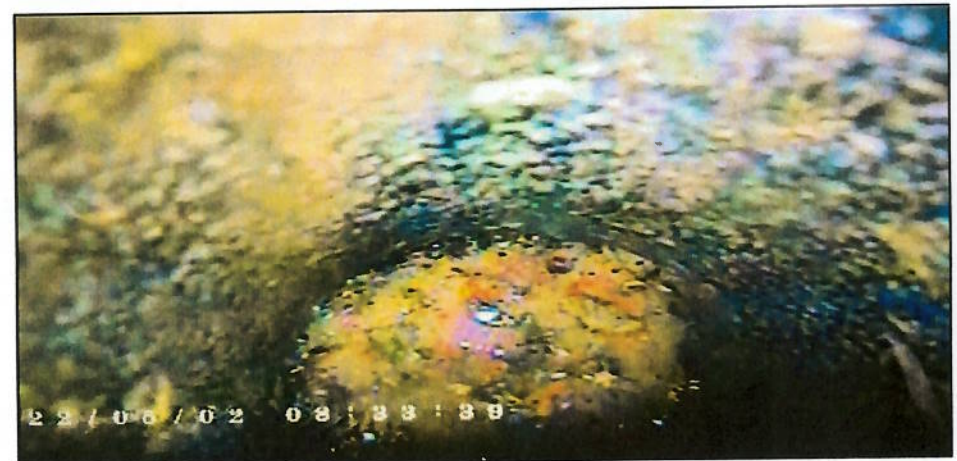
**Top of Well  
(galvanized pipe inside outer iron pipe)**



**Rust and Corrosion  
At Top of Water Table**



**Algae Growing on Rock  
in Open Borehole Below Water Table**



**Algae and Sediment  
in Bottom of Well**

# Multiple Lines of Evidence of Origin of PAHs in DH43 Water Sample

## Available Facts:

1. Contaminants clearly associated with jet fuel were *not identified* in samples;
2. The PAH compounds reported in May 2022 sample are *not significantly mobile* in groundwater (suggest nearby source);
3. Groundwater at the well is *upgradient (uphill)* of the Red Hill facility;
4. DH43 piezometer *not designed for sample collection* to test for groundwater contaminants;
5. Well *rusting* and contains *algae* and most likely *sediment*;
6. Similar trace levels of PAHs are common in *road runoff, stream sediments and even rainfall* due to auto exhaust, asphalt, road grime (e.g., USGS 2004);
7. Trace levels of PAHs are a *common laboratory contaminant*;
8. PAHs *not detected* in followup samples (August 2022).

# Most Likely Origin of PAHs in DH43 Water Sample

## Conclusions:

- Sample data from the DH43 well are *not reliably representative* of surrounding groundwater;
- The PAHs *do not pose a health risk* to residents;
- Ensure monitoring wells at Red Hill are routinely cleaned.

## Most Likely Source(s) of Trace Level “Oil” & PAHs:

- Algae and sediment in well;
- Surface runoff;
- Contamination in laboratory.



# Questions?

SUBSTANCES (BEV)

(BAN) AND BEV- AND POLYPROPYLENE  
POLYESTER AROMATIC HYDROCARBON

**POLYCYCLIC AROMATIC HYDROCARBONS  
(PAHS) AND PER- AND POLYFLUOROALKYL  
SUBSTANCES (PFAS)**

**Diana Felton, MD**

**Toxicologist**

**Hawai'i Department of Health (HEER)**

**Honolulu Board of Water Supply**

**December 12, 2022**

## WHAT ARE PAHS?



Group of more than 100 chemicals



Formed when coal, oil and gas, garbage or other organic substances are burned



Natural and manufactured



Almost always found as a mixture

## PAHS OF PRIMARY FOCUS

acenaphthene  
acenaphthylene  
anthracene  
benz[a]anthracene  
benzo[a]pyrene  
benzo[e]pyrene  
benzo[b]fluoranthene  
benzo[g,h,i]perylene  
benzo[j]fluoranthene

benzo[k]fluoranthene  
chrysene  
dibenz[a,h]anthracene  
fluoranthene  
fluorene  
indeno[1,2,3-c,d]pyrene  
phenanthrene  
pyrene



## SOURCES OF PAHS “UBIQUITOUS ENVIRONMENTAL CONTAMINANT”

Volcanic emissions

Vehicle exhaust

Coal tar

Petroleum  
products

Fires

Asphalt

Cigarette smoke

Food (charbroiled  
meats, cereals,  
flour, processed  
foods)

Medications,  
creosote, roofing  
tar, plastics,  
pesticides

## HOW ARE PEOPLE EXPOSED TO PAHS?

Breathing	Breathing air with PAHs (air pollution, vog, vehicle exhaust)
Smoking	Smoking and second-hand smoke
Eating	Eating food with PAHs (charbroiled meat, cereals, contaminated fruits/veggies/milk, processed foods)
Drinking	Drinking water with PAHs (background in US DW sources is 4-24 ppt per ATSDR)

## HEALTH EFFECTS OF PAHS



### IMMEDIATELY

- Low Acute Toxicity
- Skin Irritation (high-dose)
- Difficulty Breathing (high-dose inhaled)

### LONG-TERM EXPOSURE

- Increased Cancer Risk
- Kidney & Liver Problems
- Reproductive Problems (Animals)
- Immune System Problems (Animals)

Very challenging to assess human health effects of individual PAH's because they are almost always in mixtures.

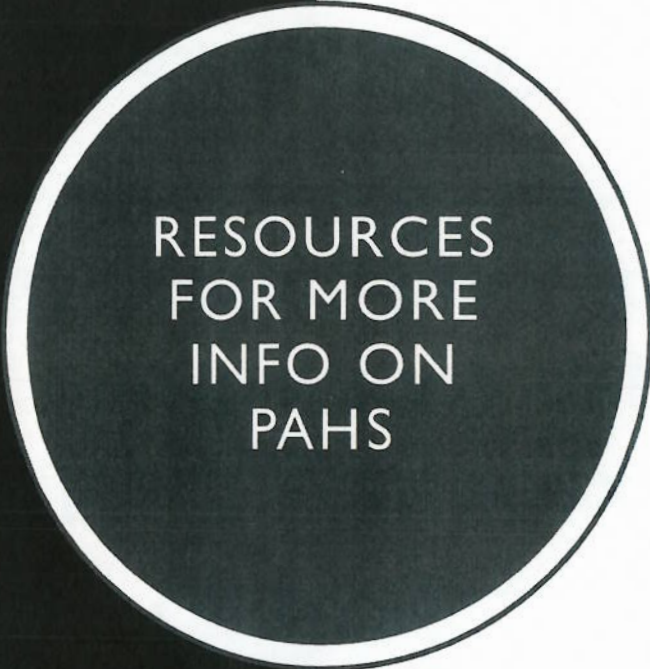
# CARCINOGENICITY

International Agency for Research on Cancer (IARC)	PAH	CARCINOGEN RATING
	benz(a)anthracene benzo(a)pyrene	<b>Probably</b> carcinogenic to humans
	benzo(a)fluoranthene benzo(k)fluoranthene, ideno(1,2,3-c,d)pyrene	<b>Possibly</b> carcinogenic to humans
	anthracene benzo(g,h,i)perylene benzo(e)pyrene chrysene fluoranthene fluorene phenanthrene pyrene	Not classifiable as to their carcinogenicity to humans



## NO HEALTH RISK ANTICIPATED

**The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.**



RESOURCES  
FOR MORE  
INFO ON  
PAHS

**ATSDR** Public Health Statement for Polycyclic Aromatic Hydrocarbons (PAHs)

<https://wwwn.cdc.gov/TSP/PHS/PHS.aspx?phsid=120&toxid=25>

**Illinois Dept of Public Health** Polycyclic Aromatic Hydrocarbons

[www.idph.state.il.us/cancer/factsheets/polycyclicaromatichydrocarbons.htm#:~:text=Long%2Dterm%20health%20effects%20of,breakdown%20of%20red%20blood%20cells](http://www.idph.state.il.us/cancer/factsheets/polycyclicaromatichydrocarbons.htm#:~:text=Long%2Dterm%20health%20effects%20of,breakdown%20of%20red%20blood%20cells)

**Wisconsin Department of Health Services** Human Health Hazards of PAHs

[www.dhs.wisconsin.gov/publications/p4/p44606a.pdf](http://www.dhs.wisconsin.gov/publications/p4/p44606a.pdf)

**EPA** Tox Review of benzo(a)pyrene

[https://cfpub.epa.gov/ncea/iris/iris\\_documents/documents/subst/0136\\_summary.pdf](https://cfpub.epa.gov/ncea/iris/iris_documents/documents/subst/0136_summary.pdf)

PER- AND  
POLYFLUOROALKYL  
SUBSTANCES (PFAS)

Human-made chemicals (>3000)  
Confusing organization and naming

**“FOREVER CHEMICALS”**

Very useful material for waterproofing,  
non-stick and stain resisting



# SOURCES OF PFASs

From DoD PFAS July 2011



Non-Stick Cookware



Takeout Containers



Building & Construction



Fuel Cells



Firefighting Foam



Sealants & Adhesives



Pesticides



Camping Equipment



Medical & Food Tubing



Breathable & Waterproof Apparel



Medical Equipment



Glass



Plastics & Rubber



Paints



Electronics



Electrical Insulation



Laboratory Equipment



Cleaning Products



Textiles



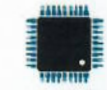
Stain- & Water-Resistant Treatments



Pharmaceuticals



Printing



Semiconductors & Circuit Boards



Photographic Film & Processing



Windshield Washer Fluid



Lubricants



Personal Care Products



Cement Additives



Oil & Gas Drilling



Paper & Packaging

## PFASs & HUMAN HEALTH

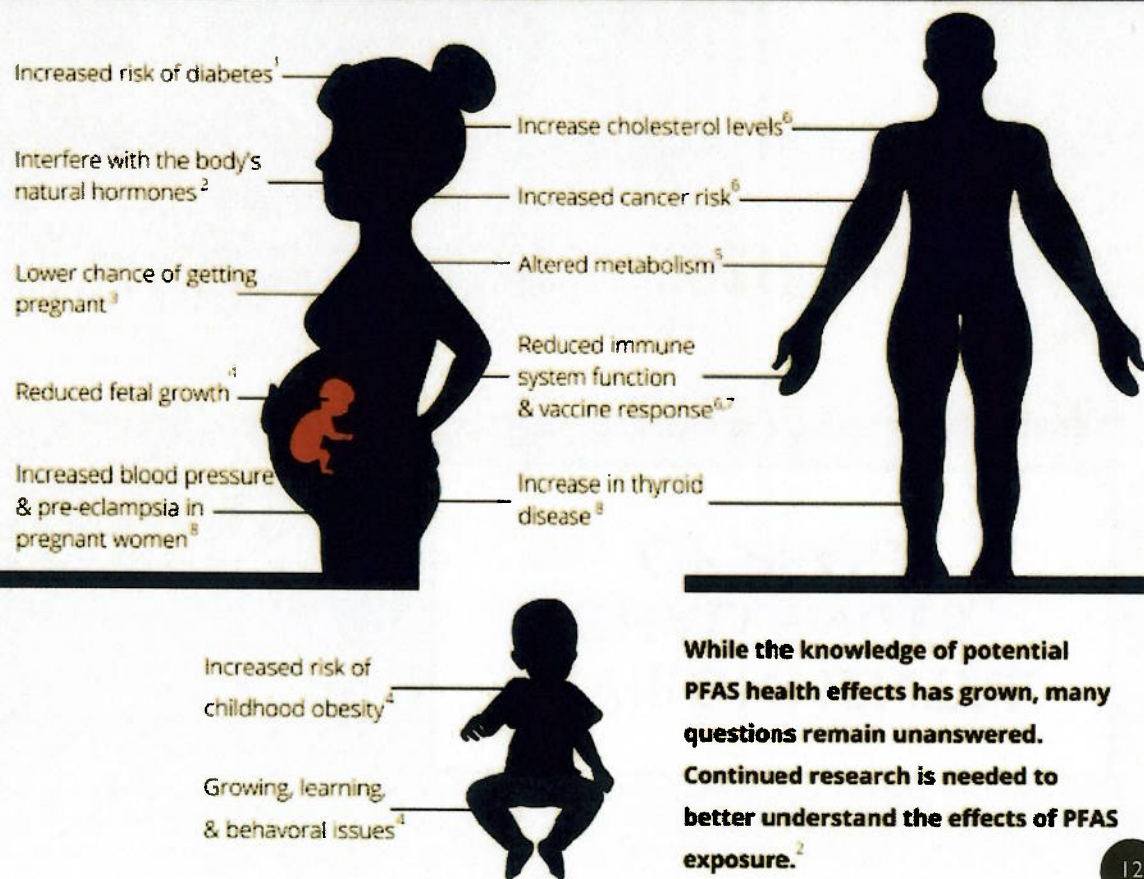
Universal Presence

Most research done with drinking water exposure

Health effects vary with chemistry

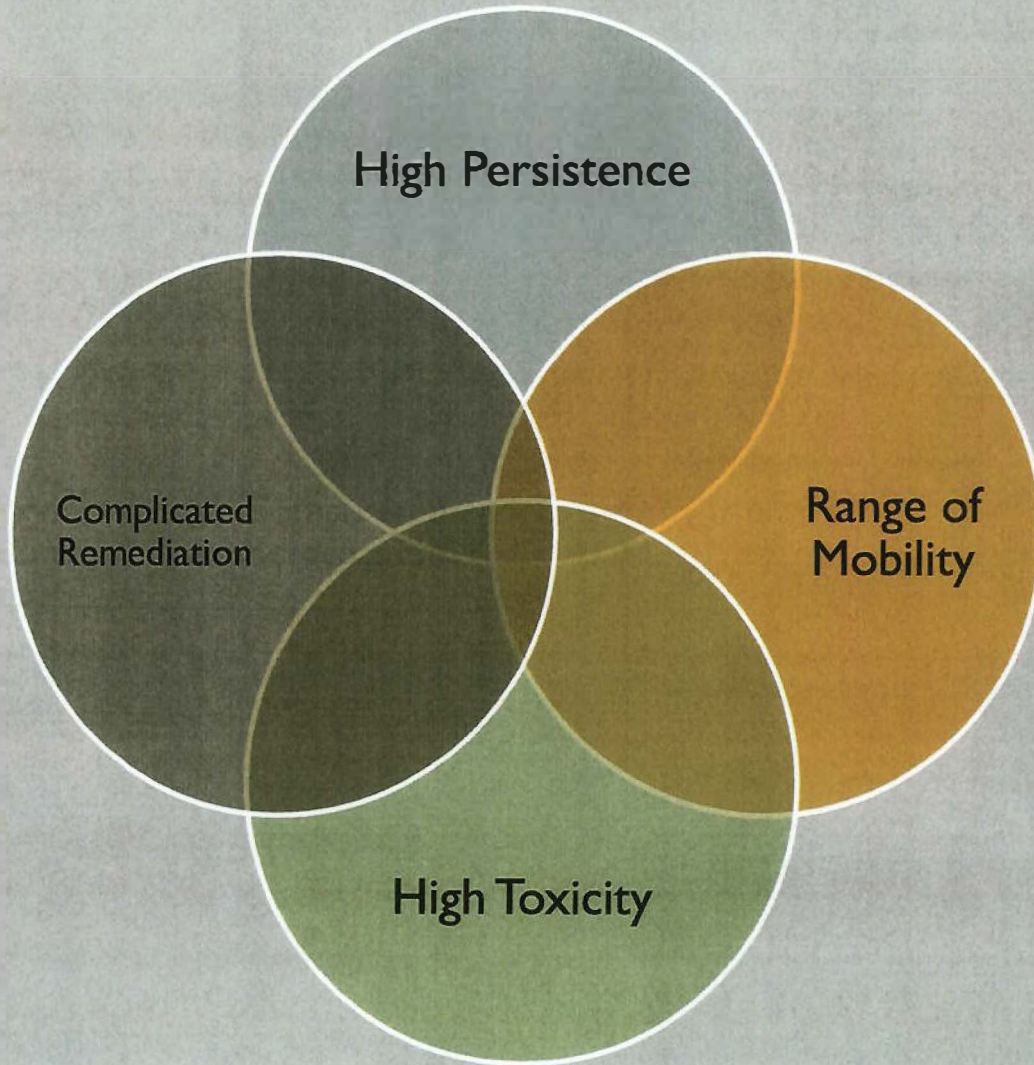
Image From Wisconsin Environmental Health Network [www.wehnonline.org/pfas](http://www.wehnonline.org/pfas)

## HOW DO PFAS AFFECT YOUR HEALTH?



While the knowledge of potential PFAS health effects has grown, many questions remain unanswered. Continued research is needed to better understand the effects of PFAS exposure.<sup>2</sup>

# ENVIRONMENTAL CHALLENGES OF PFAS<sub>s</sub>



Adapted from E. McWayne NEMA 2020

10/15/2021

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AFFF

Contain fluorosurfactants with PFASs as the active ingredients

Usually uncontrolled releases (fighting fires or spills)

Historically contained more toxic PFASs (PFOS)

“Modern” foams with shorter-chain PFASs, fluorotelomers

Movement towards fluorine-free foams but technology not there yet

## AFFF RELEASE AT RED HILL

Spill occurred November 29 – details and impacts under investigation

Impacted soil, asphalt and concrete culvert were excavated

No apparent release into Halawa Stream

DOH requested extensive sampling and is collecting independent samples

Soil sampling started on 12/2/22 and Groundwater sampling began on 12/5/22 (9 monitoring wells plus the Red Hill Shaft)

DOH continues to work with EPA and the Navy to delineate the extent of the contamination

DOH and EPA will continue to monitor





PFAS  
RESOURCES

**EPA PFAS** <https://www.epa.gov/pfas>

**CDC/ATSDR PFAS and Your Health**  
<https://www.atsdr.cdc.gov/pfas/>

**Green Science Policy PFAS Central**  
<https://pfascentral.org/>

**Environmental Working Group (EWG)**  
PFAS Chemicals <https://www.ewg.org/areas-focus/toxic-chemicals/pfas-chemicals>

**Interstate Technology Regulatory Council (ITRC) AFFF factsheet** [https://pfas-1.itrcweb.org/fact\\_sheets\\_page/pfas-fact-sheet-aff-10-3-18.pdf](https://pfas-1.itrcweb.org/fact_sheets_page/pfas-fact-sheet-aff-10-3-18.pdf)

# US EPA Regional Screening Levels (RSLs)

## Polynuclear Aromatic Hydrocarbons (PAHs)

Contaminant		Screening Levels										
Analyte	CAS No.	Resident Soil (mg/kg)	key	Industrial Soil (mg/kg)	key	Resident Air (ug/m <sup>3</sup> )	key	Industrial Air (ug/m <sup>3</sup> )	key	Tap Water (ug/L)	key	MCL (ug/L)
Polynuclear Aromatic Hydrocarbons (PAHs)												
-Acenaphthene	83-32-9	3.6E+03	n	4.5E+04	n					5.3E+02	n	
-Anthracene	120-12-7	1.8E+04	n	2.3E+05	nm					1.8E+03	n	
-Benz[a]anthracene	56-55-3	1.1E+00	c	2.1E+01	c	1.7E-02	c	2.0E-01	c	3.0E-02	c	
-Benzo(e)pyrene	192-97-2	5.7E+00	n	7.3E+01	n	2.1E-03	n	8.8E-03	n	1.8E+00	n	
-Benzo(j)fluoranthene	205-82-3	4.2E-01	c	1.8E+00	c	2.6E-02	c	1.1E-01	c	6.5E-02	c	
-Benzo[a]pyrene	50-32-8	1.1E-01	c	2.1E+00	c	1.7E-03	c**	8.8E-03	n	2.5E-02	c	2.0E-01
-Benzo[b]fluoranthene	205-99-2	1.1E+00	c	2.1E+01	c	1.7E-02	c	2.0E-01	c	2.5E-01	c	
-Benzo[k]fluoranthene	207-08-9	1.1E+01	c	2.1E+02	c	1.7E-01	c	2.0E+00	c	2.5E+00	c	
-Chloronaphthalene, Beta-	91-58-7	4.8E+03	n	6.0E+04	n					7.5E+02	n	
-Chrysene	218-01-9	1.1E+02	c	2.1E+03	c	1.7E+00	c	2.0E+01	c	2.5E+01	c	
-Dibenz[a,h]anthracene	53-70-3	1.1E-01	c	2.1E+00	c	1.7E-03	c	2.0E-02	c	2.5E-02	c	
-Dibenzo(a,e)pyrene	192-65-4	4.2E-02	c	1.8E-01	c	2.6E-03	c	1.1E-02	c	6.5E-03	c	
-Dimethylbenz(a)anthracene, 7,12-	57-97-6	4.6E-04	c	8.4E-03	c	1.4E-05	c	1.7E-04	c	1.0E-04	c	
-Fluoranthene	206-44-0	2.4E+03	n	3.0E+04	n					8.0E+02	n	
-Fluorene	86-73-7	2.4E+03	n	3.0E+04	n					2.9E+02	n	
-Indeno[1,2,3-cd]pyrene	193-39-5	1.1E+00	c	2.1E+01	c	1.7E-02	c	2.0E-01	c	2.5E-01	c	
-Methylnaphthalene, 1-	90-12-0	1.8E+01	c	7.3E+01	c					1.1E+00	c	
-Methylnaphthalene, 2-	91-57-6	2.4E+02	n	3.0E+03	n					3.6E+01	n	
-Naphthalene	91-20-3	2.0E+00	c*	8.6E+00	c*	8.3E-02	c*	3.6E-01	c*	1.2E-01	c*	
-Nitropyrene, 4-	57835-92-4	4.2E-01	c	1.8E+00	c	2.6E-02	c	1.1E-01	c	1.9E-02	c	
-Pyrene	129-00-0	1.8E+03	n	2.3E+04	n					1.2E+02	n	



**UNITED STATES ENVIRONMENTAL  
PROTECTION AGENCY  
REGION IX  
75 Hawthorne Street  
San Francisco, CA 94105**



**STATE OF HAWAII  
DEPARTMENT OF HEALTH  
KA 'OIHANA OLAKINO  
P. O. BOX 3378  
HONOLULU, HI 96801-3378**

December 8, 2022

Sent via Electronic Mail:

Mr. Ernest Y.W. Lau, P.E.  
Manager and Chief Engineer  
Board of Water Supply  
City and County of Honolulu  
630 South Beretania Street  
Honolulu, HI 96843  
[elau@hbws.org](mailto:elau@hbws.org)

**Subject: Response to Honolulu Board of Water Supply November 30, 2022, and  
December 5, 2022, letters, Red Hill Bulk Fuel Storage Facility**

Dear Mr. Lau:

Thank you for your November 30, 2022, and December 5, 2022, letters to U.S. Environmental Protection Agency (EPA) Regional Administrator Martha Guzman and to the Hawai'i Department of Health (DOH) Director Dr. Elizabeth Char and Interim Director Dr. Kenneth S. Fink, respectively, about the November 29, 2022, spill of aqueous film forming foam (AFFF) at the Red Hill Bulk Fuel Storage Facility in O'ahu, Hawai'i. We share your concern about the potential impacts of the spill on the environment and are prepared to discuss your concerns during our meeting next week.

Your letters ask that EPA and DOH: 1) require the Navy to immediately begin weekly testing of all Navy monitoring wells and the Red Hill Shaft for per- and polyfluoroalkyl substances (PFAS); 2) require the Navy to disclose all past AFFF uses and releases; and 3) require the Navy to provide copies of PFAS testing results. Your letters also ask that we provide a copy of the sampling and analysis plan for soil and groundwater testing related to the November 29, 2022, spill at next week's meeting.

In response to the November 29, 2022, spill, EPA and DOH have directed the Navy to immediately begin sampling impacted soil and groundwater monitoring wells in the vicinity of

Mr. Ernest Y.W. Lau, P.E.

December 8, 2022

Page 2 of 3

the spill. DOH issued a "Notice of Interest" (NOI) to the Navy on December 2, 2022, requesting a sampling plan to characterize the nature and extent of the November 29, 2022 spill, among other items (Enclosure 1). We expect the Navy to conduct weekly sampling of ten wells – nine wells closest to the November 29, 2022 spill and the Red Hill Shaft. The Navy began collecting samples the week of December 5, 2022, and the contracted mainland laboratory will analyze the samples with a rapid turnaround time. Ten percent of the results will be Level 4 validated before use by the Navy, while the remaining 90 percent will be Level 2B validated. The Sampling and Analysis Plan, dated November 30, 2022, and approved by the DOH on December 1, 2022, may be revised due to the changing situation (Enclosure 2).

After receipt and evaluation of results from the ten wells, EPA and DOH will determine whether additional wells should be sampled. We also expect to provide additional direction to the Navy to build on the direction in our November 2, 2022, letter directing the Navy to sample groundwater for PFAS (Enclosure 3).

EPA and DOH will encourage the Navy to release to the public the PFAS sampling data promptly after results are available. We will also encourage the Navy to release to the public the documents provided in response to the NOI, including AFFF safety data sheets and an inventory of any AFFF remaining at the Red Hill Bulk Fuel Storage Facility. Finally, we will examine our files and then consult with the Navy on the release any Navy-generated documents related to past AFFF uses and releases and PFAS.

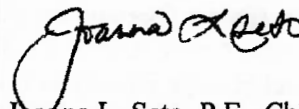
If you have any questions, please contact Ms. Gabriela Carvalho, EPA Red Hill Project Coordinator at (808) 541-2723 or Ms. Fenix Grange, Supervisor, DOH Hazard Evaluation and Emergency Response Office, Site Discovery, Assessment and Remediation Section at (808) 586-4248.

Sincerely,

**ALISON FONG**

Digitally signed by ALISON  
FONG  
Date: 2022.12.08 15:34:34  
-08'00'

Alison Fong, Acting Assistant Director  
RCRA Branch  
Land, Chemicals and Redevelopment Division  
U.S. Environmental Protection Agency, Region 9



Joanna L. Seto, P.E., Chief  
Environmental Management Division  
State of Hawai'i, Department of Health

- Enclosure: 1. DOH Notice of Interest Case No: 20221129-1438, dated December 2, 2022  
2. PFAS-Specific Sampling and Analysis plan, Red Hill Bulk Fuel Storage Facility, Adit 6, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i, dated November 30, 2022  
3. Preliminary Investigation of PFAS letter, dated November 2, 2022



Mr. Ernest Y.W. Lau, P.E.

December 8, 2022

Page 3 of 3

- cc: Rear Admiral Jeffrey Kilian, Commander, NAVFAC Pacific (w/encls.) [via email only]
- Rear Admiral Stephen Barnett, Commander, Navy Region Hawai'i (w/encls.)  
[via email only]
- Rear Admiral John Wade, Commander, Joint Task Force Red Hill (w/encls.)  
[via email only]
- Ms. Sherri R. Eng, Environmental Director, Navy Region Hawai'i (w/encls.)  
[via email only]



STATE OF HAWAII  
DEPARTMENT OF HEALTH  
P. O. BOX 3378  
HONOLULU, HI 96801-3378

In reply, please refer to:  
File:

NOTICE OF INTEREST IN A RELEASE OR THREATENED RELEASE OF  
HAZARDOUS SUBSTANCES

Certified Mail No.: \_\_\_\_\_ RETURN RECEIPT REQUESTED

Company: United States Navy

Name: RADM Stephen D. Barnett

Case No.: 20221129-1438

Address: 850 Ticonderoga Street, Suite 110, JBPHH, HI 96850

Date/Time: 12/02/2022 8:00 AM

Location (Facility) at or from which the release has occurred or is threatened to occur:

Red Hill Fuel Storage Facility, 99-902 Moanalua Road, Honolulu, HI

You are hereby notified that a release or threat of a release of a hazardous substance, as defined in Section 128D-1, Hawaii Revised Statutes (HRS), has occurred or is threatened to occur at the above described facility of which you are believed to be the owner, operator, transporter, or generator and that pursuant to Chapter 128D, HRS, the Director of Health for the State of Hawaii (Director) has an interest in the release or threatened release. This letter notifies you of your potential liability as defined by Section 128D-6 HRS, which you may have incurred with respect to the site.

Pursuant to Chapter 128D, HRS, the Director may take several actions that include issuing an order directing you to take appropriate response measures concerning the release. Failure to comply with such an order may subject you to penalties and an obligation to repay the State for any expenditures of its funds if the State conducts the response action.

However, if before such an order is issued you demonstrate to the satisfaction of the Director or her designee a willingness and the ability to undertake appropriate response actions and actually undertake such response actions within a reasonable period of time, the activity of the State may be limited to monitoring the progress of your actions and providing guidance as necessary.

Specific concerns include, but are not limited to:

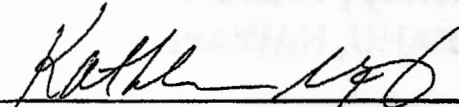
- Provide Safety Data Sheets of Aqueous Film Forming Foam (AFFF) released on 11/29/2022 to include proprietary information obtained from the manufacturer.
- Remove all materials impacted from release; provide written sampling plans to characterize the nature and extent of the spill in the ground material and groundwater; and provide waste management plan prior to disposal.
- Provide detailed description of the cause and events leading to the release.
- Provide an accurate inventory and locations of AFFF remaining at the Red Hill Bulk Storage Facility.
- Provide documentation (dates/quantities removed/disposition) for any fluid removal from the secondary containment piping for the primary AFFF concentrate line.
- Provide a workplan to assess and test the integrity of the secondary containment piping and the primary AFFF concentrate pipe from the pump house to Adit 6. At a minimum, the integrity tests must include visual (e.g. camera) and leak assessments. Depending on the results of the testing, additional site assessment and remediation may be necessary.
- Provide a narrative description, technical drawings, operating procedures, and any other materials that detail the changes made to the AFFF concentrate system in 2022.

You are advised that if the Director determines that your response actions, in whole or in part, are unsatisfactory, the Director may take over response activities.

You are also notified that the Director has designated Liz Galvez of the Office of Hazard Evaluation and Emergency Response (HEER) of the Department of Health as the State On-Scene Coordinator (SOSC). The SOSC may be contacted at the HEER, Hawaii Department of Health, 2385 Waimano Home Rd, #100, Pearl City, Hawaii 96782.

Phone: (808) 586-4249

Issued at Honolulu, Hawaii this 2nd day of December, 2022

  
\_\_\_\_\_  
Deputy Director of Environmental Health

Received and Acknowledged:

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_  
(Please Print)

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Witness Signature

Notice of Interest revised /DOH/HEER 10/21

**PFAS-Specific Sampling and Analysis plan,  
Red Hill Bulk Fuel Storage Facility, Adit 6  
JOINT BASE PEARL HARBOR-HICKAM, O'AHU, HAWAI'I**

**Date:** 30 NOV 2022

**Prepared for:** Red Hill OIC



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## Executive Summary

This PFAS Sampling and Analysis Plan outlines the Navy's sampling strategy at Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor Hickam, Hawai'i in response to the 29NOV2022 Aqueous Film Forming Foam (AFFF) release at Adit 6. This document is being prepared by the Department of the Navy, Naval Facilities Engineering Systems Command (NAVFAC), Red Hill OIC in accordance with the Navy's SAP policy guidance and USEPA guidance and regulations to help ensure that data collection and laboratory analyses follow proper scientific protocols and practices.

## Background

On 29NOV2022 at the Adit 6 location of Red Hill Bulk Storage Fuel Facility, approximately 1,300 gallons of AFFF concentrate was released. The investigation is on-going to determine the cause of the release. Impacted areas include a 100-foot section inside the tunnel, and immediate areas outside and adjacent to the Adit 6 entrance. The outside areas include a crushed-rock apron, soil, and a stormwater conveyance system that eventually empties into the Halawa Stream. Remedial actions were taken on the day of the spill and included collection of concentrate with appropriate spill-absorbing material, and soil excavation in areas the apron. Further remedial actions are pending based on sampling efforts for proper delineation of the contaminated areas.

## Approach

Tasks identified in the plan shall include aqueous and soil sample collection protocols, mobilization, technical support, and laboratory analytical methods. The Contractor shall provide all necessary personnel, equipment and materials to adequately sample aqueous and soil samples from wells and areas to be determined by the Navy. At a minimum, work shall include but shall not be limited to, the following tasks and/or deliverables:

- Sample collection and transport, including tools for surficial and sub-slab drilling
- Analytical results/reports by an accredited laboratory
- Project Management
- Potential disposal of and AFFF concentrate, AFFF-contaminated liquid, and AFFF-contaminated soil samples

## Acronyms and Abbreviations

°C	degree Celsius
>	greater than
≥	greater than or equal
<	less than
≤	less than or equal
--	not applicable
µg/L	microgram(s) per liter
µg/kg	microgram(s) per kilogram
%	percent
APP	Accident Prevention Plan
AQM	Activity Quality Manager
bgs	below ground surface
BMT	Base Motor Transport
CA	corrective action
CAS	Chemical Abstracts Service
CCV	continuing calibration verification
CLEAN	Comprehensive Long-term Environmental Action—Navy
COPC	Chemicals of Potential Concern
CSM	conceptual site model
CTO	Contract Task Order
DL	detection limit
DO	dissolved oxygen
DoD	Department of Defense
DU	Decision Unit
DV	data validation
EB	equipment rinsate blank
EDS	Environmental Data Services
EIS	Extracted Internal Standard
ELAP	Environmental Laboratory Accreditation Program
FB	field blank
FBI	Federal Bureau of Investigation

FD	field duplicate
FTL	Field Team Leader
FTS	fluorotelomer sulfonate
g	gram(s)
H&S	health and safety
HDOH	Hawai'i Department of Health
HDPE	high-density polyethylene
HEER	Hazard Evaluation and Emergency Response Office
HFPO-DA	hexafluoropropylene oxide dimer acid
HHRS	human health risk screening
HI	hazard index
HQ	hazard quotient
HSM	Health and Safety Manager
IB	instrument blank
ICAL	initial calibration
ICC	initial calibration confirmation
ICV	initial calibration verification
ID	identification
IDW	investigation-derived waste
ISC	instrument sensitivity check
ISP	Incremental sampling plan
LCL	lower control limit
LC-MS/MS	liquid chromatography tandem mass spectrometry
LCS	laboratory control sample
LIMS	laboratory information management system
LOD	limit of detection
LOQ	limit of quantitation
MB	method blank
MD	matrix duplicate
mg/L	milligram(s) per liter
MILSPEC	military specification
mL	milliliter(s)
MS	matrix spike

MSD	matrix spike duplicate
N/A	not applicable
NAVFAC	Naval Facilities Engineering Systems Command
Navy	Department of the Navy
ng/L	nanogram(s) per liter
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid
NPDES	National Pollutant Discharge Elimination System
NTU	nephelometric turbidity unit
NTV/E	non-tactical vehicle and equipment
ORP	oxidation-reduction potential
PA	Preliminary Assessment
PAH	Polycyclic Aromatic Hydrocarbons
PAL	project action limit
PC	Project Chemist
PFAS	per- and polyfluoroalkyl substances
PFBA	perfluorobutanoic acid
PFBS	perfluorobutane sulfonate
PFDA	perfluorodecanoic acid
PFDoA	perfluorododecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexoanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonate
PFPeA	perfluoropentanoic acid
PFTA	perfluorotetradecanoic acid
PFTTrDA	perfluorotridecanoic acid
PFUnA	perfluoroundecanoic acid
PID	photoionization detector
PM	Project Manager
POC	point of contact

PVC	polyvinyl chloride
QA	quality assurance
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QC	quality control
QSM	Quality Systems Manual
RPD	relative percent difference
RPM	Remedial Project Manager
RSL	regional screening level
RT	retention time
S/N	Signal to Noise
SAP m	Sampling and Analysis Plan
SD	standard deviation
SI	Site Inspection
SL	Safety Liaison
SME	Subject Matter Expert
SOP	standard operating procedure
SPE	Solid Phase Extraction
TBD	to be determined
TGM	Technical Guidance Manual
TM	Task Manager
UCL	upper control limit
UCMR5	Unregulated Contaminant Monitoring Rule 5
UFP	Uniform Federal Policy
USEPA	United States Environmental Protection Agency
WQP	water quality parameter
Y/N	Yes/No

## Identifying Information

Site Name: JOINT BASE PEARL HARBOR-HICKAM, O'AHU, HAWAI'I, RED HILL BULK FUEL STORAGE FACILITY (RHBFSF)

1. This Sampling and Analysis Plan (SAP) was prepared in accordance with the requirements of the following:
  - Guidance for Quality Assurance Project Plans (USEPA, 2002)
  - Uniform Federal Policy for Quality Assurance Project Plans (USEPA, 2005)
  - Guidance on Systematic Planning Using the Data Quality Objectives Process (USEPA, 2006)
  - Interim Per- and Polyfluoroalkyl Substances (PFAS) Site Guidance for Naval Facilities Engineering Command (NAVFAC) Remedial Project Managers (RPMs) (NAVFAC, 2020)
  - HDOH, 2021, Interim Soil and Water Environmental Action Levels (EALs) for Perfluoroalkyl and Polyfluoroalkyl Substances (PFASs).
  - HDOH, 2021, Technical Guidance Manual.
  
2. List organizational partners (stakeholders) and connection with lead organization:
  - United States Environmental Protection Agency (USEPA) Region 9 – Regulatory Stakeholder
  - State of Hawai'i Department of Health (HDOH)
  
3. Lead organization:
  - Department of the Navy, NAVFAC Hawaii, Red Hill OIC

## Special Personnel Training Requirements Table

Project Function	Specialized Training By Title or Description of Course	Training Provider	Training Date	Personnel / Groups Receiving Training	Personnel Titles/ Organizational Affiliation	Location of Training Records / Certificates
Field Operations	PFAS-Specific Sampling	Protocols Defined in the standard operating procedures (SOPs) or in this plan.	Before arrival to site	All site workers	All site workers	N/A

## Project Action Limits

### Groundwater

- Groundwater data will be screened against residential scenario regional screening levels (RSLs) based on a hazard quotient (HQ) of 0.1 (DoD, 2022). RSLs for PFOS, PFOA, PFBS, PFHxS, PFNA, and HFPO-DA based on an HQ of 0.1 are presented in the November 2022 RSL Table (USEPA, 2022). Data will also be screened against HEER Office TGM Section 4.2.7 (HDOH 2021), interim

soil and water environmental action levels (EALs) Per- and Polyfluoroalkyl Substances (April 2021).

## **Soil**

- Soil data will be screened residential scenario RSLs based on an HQ of 0.1 (DoD, 2022). Residential soil RSLs for PFOS, PFOA, PFBS, PFHxS, PFNA, and HFPO-DA based on an HQ of 0.1 are presented in the November 2022 RSL Table (USEPA, 2022). Data will also be screened against HEER Office TGM Section 4.2.7 (HDOH 2021), interim soil and water environmental action levels (EALs) Per- and Polyfluoroalkyl Substances (April 2021).

### ***How will the data be used?***

- The data will be used to determine the extent of contamination related to the release event and used to inform any further delineation and/or remediation efforts to protect human health and the environment.

### ***Uncertainties to be considered in data use:***

- Scientific research and regulatory guidelines related to PFAS are rapidly evolving. As such, the information provided in this SAP presents the state of the science at the time of issuance of the SAP. The Navy will re-evaluate changing science and regulations at the time of reporting to ensure data evaluation and risk screening presented in the SI report reflect any changes to toxicology information, regulatory standards, and DoD and Navy policy and guidance. Updates to the proposed data evaluation and risk screening approaches will be discussed with stakeholders prior to issuance of the report.
- The sampling approach includes sampling of existing monitoring wells. While procedures for installation of new wells include requirements for avoidance of PFAS-containing materials, there is no way to confirm whether these materials might have been used during construction of existing wells. Based on sampling of numerous background wells at other facilities, impacts from past well construction are believed to be minimal; however, well construction will be considered if data indicate impacts are likely (for example, a group of wells installed concurrently have similar concentrations regardless of location relative to the likely release areas).

### ***What types of data are needed (matrix, target analytes, analytical groups, field screening, onsite analytical or offsite laboratory techniques, sampling techniques)?***

- The data to be collected during this investigation will include the following: laboratory analytical results for PFAS in groundwater and soil samples.

### ***Are there any special data quality needs, field or laboratory, to support environmental decisions?***

- There are no special data quality needs.

### ***Where, when, and how should the data be collected/generated?***

- All sampling locations are based on field investigations and samples will be collected in accordance with current sampling protocols and guidance from USEPA and the Navy.



- The data will be collected following the methodologies and standard operating procedures (SOPs) presented in this plan.

## Sampling Tasks

- Mobilization for the field effort includes procurement of necessary field equipment and initial transport to the site. Equipment and supplies will be brought to the site when the field team mobilizes for field activities. Field notes will be captured on loose leaf paper/forms or electronic devices each day. A location for the placement of IDW will be determined, and IDW will be stored in a manner consistent with the SOPs within. Before beginning any phase of work, Contractor and its subcontractors will have field meetings to discuss the work items and worker responsibilities, and to familiarize workers with the SAP.
- In general, work will be performed in Level D personal protective equipment, consisting of a hard hat, safety glasses, safety-toed boots, and hearing protection, with special precautions taken to avoid any clothing materials that could contain PFAS.
- Field activities will take place during normal daylight working hours.
- DOH and DOH contractors shall have the opportunity to be present, observe, and elect to collect independent samples. The Navy will provide a schedule of sampling once developed to help facilitate this.

Sampling will be conducted to determine PFAS concentrations in water and soil/sediment is similar to that for other chemical compounds, but with several additional specific considerations and protocols. Typical guidance and procedures, such as ASTM International D 4823-95 and D 4448-01, USEPA compendium EPA 540/P-87/001a, OSWER 9355.0-14, and USEPA SESDPROC-513-R2, remain the basis for a PFAS sampling protocol. Examples of special considerations for PFAS sampling include the types of sampling equipment or materials used; field and equipment blanks above and beyond what is normally required; the need for low laboratory quantitation limits; low state and federal screening levels, cleanup criteria; potential for background sources of PFAS in the environment; and modified decontamination measures.

## Groundwater Sampling

Collect groundwater samples for PFAS analyses using a bailer (this would allow sampling to start as soon as bottles are received from the lab). Figure 2 shows well locations distances from Adit 6.

The groundwater monitoring wells will be sampled using bailers free from PFAS containing materials (e.g., Teflon) to avoid introducing PFAS from outside sources. Groundwater samples for PFAS will be collected into 500-milliliter or larger, HDPE unpreserved bottles with non-Teflon lid liners and tested for PFAS constituents using Draft EPA Method 1633. The bottles will be placed into coolers with ice to maintain temperatures at 4 degrees Celsius  $\pm$  2°C until the samples are delivered to the laboratory. Use of glass sample containers will be avoided when collecting water samples due to the potential for adsorption of PFAS, specifically PFOS to the glass. Field duplicate PFAS groundwater samples will be collected at a rate of one per sampling event.

**Weekly PFAS samples will be collected from the following wells using Draft EPA Method 1633:**

- RHMW02
- RHMW03
- RHMW17
- RHMW13
- RHMW04
- RHMW11
- RHMW12A
- RHMW06
- HDMW2253-03
- RHMW2254-01

## Soil Sampling

**Four areas/Decision Units (DU) were identified based on visually impacted areas:**

- DU1 – Storm culvert running downhill adjacent to the Adit 6 entrance (est. 1,152 sq.ft.)
- DU2 - Soil areas situated in-between the road, storm culvert and apron (est. 616 sq.ft.)
- DU3 – 15.6' x 80' apron area outside the Adit 6 entrance (est. 1,252 sq.ft.)
- DU4 - A 5'x10' area around the Stormwater headwall/outfall (est. 50 sq.ft.)
- Additional DUs may be identified and included based on continued investigation and sampling efforts.
- Figure 1 shows currently designated DUs.

**Collect two (2) replicate samples from one (1) DU where the greatest contamination has occurred in accordance with Section 4.2.7 of the HEER Office TGM.** Use the resulting triplicate data (primary plus two replicates) in conjunction with the final sample collection and processing method to assess the precision and usability of the data in accordance with Section 4.2.8 of HEER TGM.

Each DU sample will be comprised of 30 soil increments which will be tested for PFAS constituents using Draft EPA Method 1633. Collect a minimum 1-2kg sample prepared by combining a minimum of 30 increments from the subject DU. Increments will be collected from exposed to a depth of approximately six (6) inches (DU depth/thickness). This will be used to estimate the soil volume associated with each DU and DU sample. Collected samples will be placed in a laboratory provided sample container or a new, clean, Ziploc bag or equivalent. Soil samples will be collected using a stainless steel or disposable HDPE scoop or trowel. Soil sample increments will be collected at a 6-inch depth in the over-excavated area (12 inches horizontally beyond the observed impacted areas, as marked in) as confirmation samples. To evaluate project performance, a field replicate sample will be collected from one decision unit. Thirty (30) additional soil increments will be collected per replicate sample as described above. Zip-top polyethylene plastic bags will be used for double-bagging samples prior to placing them in a cooler with ice for preservation until the samples are shipped to the laboratory. Because of potential interference from PAHs, asphalt will not be sampled for PFAS.

**Collect one (1) multi-increment sample of the excavated, contaminated soil**

The multi-increment samples (triplicates) will be collected from the drums containing the most contaminated soil. Contaminated areas were excavated to a depth of six (6) inches during the initial

response effort. That excavated soil is currently staged on site in a dump truck and drums. Because of potential interference from PAHs, asphalt will not be sampled for PFAS.

All multi-increment soil samples will be collected in accordance with Section 4.2.7 of the HEER Office TGM. The laboratory will follow accepted and approved practices and procedures for incremental sampling analysis. Upon laboratory selection, the Navy will request their ISM protocols and SOPs.

#### Decontamination

All non-disposable sampling equipment will be decontaminated immediately after each use in accordance with the SOP listed within. Non-disposable equipment will be decontaminated using the following solutions in this order:

1. Distilled water (laboratory-certified PFAS-free) and Liquinox solution
2. Distilled water (laboratory-certified PFAS-free) rinse 10 percent isopropanol and distilled water solution (laboratory-certified PFAS-free) and air-dried
3. Laboratory grade deionized water (laboratory-certified PFAS-free)

Decontamination fluids will be contained in a tank or 55-gallon drum and disposed of offsite as described herein.

#### Investigation-derived Waste Management

IDW is expected to consist of soil, purge water, groundwater sampling, and decontamination fluids. Aqueous IDW and solid IDW will be stored in separate roll-off containers, portable tanks or drums. IDW will be managed in accordance with the Interim PFAS Site Guidance for NAVFAC RPMs, November 2020 Update (NAVFAC, 2020), applicable SOPs contained in this plan. IDW will be properly sampled for characterization and disposed of in accordance with all federal, state, and local laws and disposal facility requirements. Disposable equipment, including personal protective equipment, will be disposed of with normal municipal waste.

#### Sample Shipment

All analytical samples and equipment will be shipped by FedEx. All samples will be shipped in accordance with the SOP identified within this plan.

#### Sample Analysis

The laboratory will maintain, test, inspect, and calibrate analytical instruments according to current EPA laboratory methods and standards. The laboratory will analyze aqueous and soil samples for PFAS. SOPs for all laboratory analytical tasks and will be conducted by a laboratory TBD by Contractor and the Navy. Aqueous and soil samples will be analyzed using Draft EPA Method 1633.

Samples will be processed (e.g., air dried and sieved to <2mm particle size), subsampled (minimum 30 increments) and tested by the laboratory using Multi-Increment methods in accordance with Section 4.2.6 of the HEER TGM. This will include the collection and testing of a minimum of 10 grams per sample. A summary of sample processing and subsampling methods in the will be included in the report.

## Data Validation, Review, and Management Tasks

Data from all media samples (groundwater and soil) obtained from the analytical laboratory will be validated. The PC is responsible for data tracking and storage. Definitive analytical laboratory data will be reported as a Stage 4 data package including Certificates of Analysis for traceability and 10 percent of the data will undergo Stage 4 validation before use by the Navy, while the remaining 90 percent will undergo Stage 2B validation. All WQP data will be checked by the PC before use. The FTL is responsible for ensuring the photoionization detector (PID) and WQP meter are calibrated prior to sample collection. The precision and usability of soil sample data will be evaluated in accordance with HEER Office TGM Section 4.2.8 and based on the final sample collection and processing methods used and the precision of the replicate (triplicate) sample data. All analytical data will be loaded into the Navy EDMS Red Hill Database for HDOH retrieval, and unvalidated sample results will be provided to HDOH as well. Validated data will also be furnished once the Navy receives confirmation of validated data TAT.

## Analytical and Validation Tasks

Projected turnaround times (TAT) for final (unvalidated) data from potential laboratories will be:

- Aqueous samples will have a five day TAT + 2 day transport time
- Soil samples will have a seven day TAT + 2 day transport time

All data will be uploaded into EDMS directly by the laboratories and be made available to the regulator authorities.

Additional laboratory tasks include:

- The laboratory will maintain, test, inspect, and calibrate analytical instruments.
- The laboratory will process and prepare samples for analysis.
- All analytical data to be used for chemical characterization of the site, excluding IDW characterization, will be validated.
- A data usability assessment will be performed on the SI data.

## Demobilization

Full demobilization will occur when the project is complete, and appropriate QA/QC checks have been performed. Personnel no longer needed during the course of field operations may be demobilized before the final project completion date. The following will occur before demobilization:

- Chain-of-custody records will be reviewed to verify that all samples were collected as planned and submitted for appropriate analysis.
- Restoration of the site to an appropriate level (for example, repair of deep ruts from drilling equipment) will be verified by the FTL.
- Any imported soil for backfill will be certified clean fill.
- All equipment will be inspected, packaged, and shipped to the appropriate location.

## Sampling Design and Rationale

PFAS are generally water-soluble and relatively mobile through soils to groundwater. Groundwater and soil sample locations are based on this rationale and access considerations. In addition, groundwater sample locations were chosen to refine the understanding of the hydrogeological characteristics at each area. Samples will be analyzed for all PFAS components delineated by Draft EPA Method 1633,

compliant with Quality Systems Manual Version 5.4 Table B-15 (or the latest version of the QSM for which the laboratory is certified at the time of sampling).

## Sample Handling System

<b>SAMPLE COLLECTION, PACKAGING, AND SHIPMENT</b>
<b>Sample Collection (Personnel/Organization):</b> AECOM
<b>Sample Packaging<sup>a</sup> (Personnel/Organization):</b> AECOM
<b>Coordination of Shipment (Personnel/Organization):</b> AECOM
<b>Type of Shipment/Carrier:</b> Overnight Carrier/FedEx
<b>SAMPLE RECEIPT AND ANALYSIS</b>
<b>Sample Receipt (Personnel/Organization):</b> TBD AECOM and Navy
<b>Sample Custody and Storage (Personnel/Organization):</b> TBD AECOM and Navy
<b>Sample Preparation (Personnel/Organization):</b> TBD AECOM and Navy
<b>Sample Determinative Analysis (Personnel/Organization):</b> TBD AECOM and Navy
<b>SAMPLE ARCHIVING</b>
<b>Field Sample Storage (No. of days from sample collection):</b> 45
<b>Sample Extract/Digestate Storage (No. of days from extraction/digestion):</b> 45
<b>SAMPLE DISPOSAL</b>
<b>Personnel/Organization:</b> TBD AECOM and Navy
<b>Number of Days from Analysis:</b> 45

<sup>a</sup> PFAS-free shipping materials will be used for shipping samples.

## Sample Custody Requirements

### Sample Labeling

Sample labels will include, at a minimum, client name, site, sample identification (ID), date/time collected, analysis group or method, preservative, and sampler's initials. Labels will be applied to the jar to ensure that they do not separate.

### Chain-of-Custody Procedures:

Chains of custody will include, at a minimum, laboratory contact information, client contact information, sample information, and relinquished by/received by information. Sample information will include sample ID, date/time collected, number and type of containers, preservative information, analysis

method, and comments. The chain of custody will also have the sampler's name and signature. The chain of custody will link location of the sample from the field logbook to the laboratory receipt of the sample.

Field Sample Custody Procedures (sample collection, packaging, shipment, and delivery to laboratory):

Samples will be collected by field team members under the supervision of the FTL. As samples are collected, they will be placed into containers and labeled, as outlined above. Samples will be cushioned with packaging material and placed into coolers containing enough ice to keep the samples than less than or equal to 10°C (storage in the laboratory will be less than or equal to 6°C) but not frozen. The chain of custody will also be placed into the cooler. Coolers will be shipped to the laboratory via appropriate methods, with the airbill number indicated on the chain of custody (to relinquish custody). Upon delivery, the laboratory will log in each cooler and report the status of the samples.

Laboratory Sample Custody Procedures:

All PFAS samples will be shipped to a laboratory TBD by AECOM and Navy.

The analytical laboratories will have established custody procedures, which include the following:

- Designate a sample custodian.
- Completion by the custodian of the chain-of-custody record, any sample tags, and laboratory request sheets, including documentation of sample condition upon receipt.
- Comply with laboratory sample tracking and documentation procedures.
- Secure sample storage with the appropriate environment (e.g., refrigerated, dry), consistent with analytical method requirements.
- Practice proper data logging and documentation procedures, including custody of original laboratory records.

Upon arrival of the samples at the analytical laboratory, a sample custodian will take custody of the samples, assess the integrity of sample containers, and verify that the information on the sample labels matches the information on the associated chain-of-custody record. The laboratory will restrict access to the storage areas to authorized laboratory personnel only, to prevent unauthorized contact with samples, extracts, or documentation. The sample custodian will maintain security of the samples in accordance with the analytical laboratory SOP.

Sample Identification Procedures:

Upon opening the cooler, the receiving clerk signs the chain of custody and then takes the temperature using the temperature blank (if absent, a sample container or infrared thermometer is used). The sample containers in the cooler are unpacked and checked against the client's chain of custody and any discrepancies or breakage is noted on the chain of custody. Next, if any water samples require preservative, the clerk will check the pH values to see if they are in the acceptable pH range. The clerk will deliver the chain of custody (and any other paperwork, such as temperature or pH QA notice) to the PM for LIMS entry and client contact (if needed).

The field logbook will identify the sample ID with the location, depth, date/time collected, and the parameters requested. The laboratory will assign each field sample a laboratory sample ID based on information in the chain of custody. The laboratory will send sample log-in forms to the project chemist to check sample IDs and parameters are correct.

## Assessment Findings and Corrective Action Responses

Assessment Type	Nature of Deficiencies Documentation	Individual(s) Notified of Findings (Name, Title, Organization)	Timeframe of Notification	Nature of CA Response Documentation	Individual(s) Receiving CA Response (Name, Title, Organization)	Time Frame for Response
Field Performance Audit	Checklist and Written Audit Report	TBD	Within 1 week of audit	Memorandum	TBD	Within 1 week of receipt of CA Form
Offsite Laboratory Technical Systems Audit	TBD AECOM	TBD	Within 2 months of audit	Memorandum	TBD	Within 2 months of receipt of initial notification

## STANDARD OPERATING PROCEDURES

### Chain-of-Custody

#### I. Purpose

The purpose of this SOP is to provide information on chain-of-custody procedures to be used under the CLEAN Program.

#### II. Scope

This procedure describes the steps necessary for transferring samples through the use of Chain-of-Custody Records. A Chain-of-Custody Record is required, without exception, for the tracking and recording of samples collected for on-site or off-site analysis (chemical or geotechnical) during program activities (except wellhead samples taken for measurement of field parameters). Use of the Chain-of-Custody Record Form creates an accurate written record that can be used to trace the possession and handling of the sample from the moment of its collection through analysis. This procedure identifies the necessary custody records and describes their completion. This procedure does not take precedence over region specific or site-specific requirements for chain-of-custody.

### III. Definitions

Chain-of-Custody Record Form - A Chain-of-Custody Record Form is a printed two- part form that accompanies a sample or group of samples as custody of the sample(s) is transferred from one custodian to another custodian. One copy of the form must be retained in the project file.

Custodian - The person responsible for the custody of samples at a particular time, until custody is transferred to another person (and so documented), who then becomes custodian. A sample is under one's custody if:

- It is in one's actual possession.
- It is in one's view, after being in one's physical possession.
- It was in one's physical possession and then he/she locked it up to prevent tampering.
- It is in a designated and identified secure area.

Sample - A sample is physical evidence collected from a facility or the environment, which is representative of conditions at the point and time that it was collected.

### IV. Procedures

The term "chain-of-custody" refers to procedures which ensure that evidence presented in a court of law is valid. The chain-of-custody procedures track the evidence from the time and place it is first obtained to the courtroom, as well as providing security for the evidence as it is moved and/or passed from the custody of one individual to another.

Chain-of-custody procedures, recordkeeping, and documentation are an important part of the management control of samples. Regulatory agencies must be able to provide the chain-of-possession and custody of any samples that are offered for evidence, or that form the basis of analytical test results introduced as evidence.

Written procedures must be available and followed whenever evidence samples are collected, transferred, stored, analyzed, or destroyed.

#### Sample Identification

The method of identification of a sample depends on the type of measurement or analysis performed. When *in situ* measurements are made, the data are recorded directly in bound logbooks or other field data records with identifying information.

Information which shall be recorded in the field logbook, when in-situ measurements or samples for laboratory analysis are collected, includes:

- Field Sampler(s),
- Contract Task Order (CTO) Number,
- Project Sample Number,
- Sample location or sampling station number,
- Date and time of sample collection and/or measurement,
- Field observations,
- Equipment used to collect samples and measurements, and
- Calibration data for equipment used



Measurements and observations shall be recorded using waterproof ink.

### Sample Label

Samples, other than for *in situ* measurements, are removed and transported from the sample location to a laboratory or other location for analysis. Before removal, however, a sample is often divided into portions, depending upon the analyses to be performed. Each portion is preserved in accordance with the Sampling and Analysis Plan. Each sample container is identified by a sample label (see Attachment A).

Sample labels are provided, along with sample containers, by the analytical laboratory. The information recorded on the sample label includes:

- Project – Name of project site.
- Sample Identification - The unique sample number identifying this sample.
- Date - A six-digit number indicating the day, month, and year of sample collection (e.g., 05/21/17).
- Time - A four-digit number indicating the 24-hour time of collection (for example: 0954 is 9:54 a.m., and 1629 is 4:29 p.m.).
- Medium - Water, soil, sediment, sludge, waste, etc.
- Sample Type - Grab or composite.
- Preservation - Type and quantity of preservation added.
- Analysis - VOA, BNAs, PCBs, pesticides, metals, cyanide, other.
- Sampled By - Printed name or initials of the sampler.
- Remarks - Any pertinent additional information.

The field team should always follow the sample ID system prepared by the Project Chemist and reviewed by the Project Manager.

### Chain-of-Custody Procedures

After collection, separation, identification, and preservation, the sample is maintained under chain-of-custody procedures until it is in the custody of the analytical laboratory and has been stored or disposed.

### Field Custody Procedures

- Samples are collected as described in the site Sampling and Analysis Plan. Care must be taken to record precisely the sample location and to ensure that the sample number on the label matches the Chain-of-Custody Record exactly.
- A Chain-of-Custody Record will be prepared for each individual cooler shipped and will include *only* the samples contained within that particular cooler. The Chain-of-Custody Record for that cooler will then be sealed in a zip-log bag and placed in the cooler prior to sealing. This ensures that the laboratory properly attributes trip blanks with the correct cooler and allows for easier tracking should a cooler become lost during transit.
- The person undertaking the actual sampling in the field is responsible for the care and custody of the samples collected until they are properly transferred or dispatched.

- When photographs are taken of the sampling as part of the documentation procedure, the name of the photographer, date, time, site location, and site description are entered sequentially in the site logbook as photos are taken. Once downloaded to the server or developed, the electronic files or photographic prints shall be serially numbered, corresponding to the logbook descriptions; photographic prints will be stored in the project files. To identify sample locations in photographs, an easily read sign with the appropriate sample location number should be included.
- Sample labels shall be completed for each sample, using waterproof ink unless prohibited by weather conditions (e.g., a logbook notation would explain that a pencil was used to fill out the sample label if the pen would not function in freezing weather.)

### Transfer of Custody and Shipment

Samples are accompanied by a Chain-of-Custody Record Form. **A Chain-of-Custody Record Form must be completed for each cooler and should include only the samples contained within that cooler.** A Chain-of-Custody Record Form example is shown in **Attachment B**. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the Record. This Record documents sample custody transfer from the sampler, often through another person, to the analyst in the laboratory. The Chain-of-Custody Record is filled out as given below:

- Enter header information (CTO number, samplers, and project name).
- Enter sample specific information (sample number, media, sample analysis required and analytical method grab or composite, number and type of sample containers, and date/time sample was collected).
- Sign, date, and enter the time under "Relinquished by" entry.
- Have the person receiving the sample sign the "Received by" entry. If shipping samples by a common carrier, print the carrier to be used and enter the airbill number under "Remarks," in the bottom right corner;
- Place the original (top, signed copy) of the Chain-of-Custody Record Form in a plastic zipper-type bag or other appropriate sample-shipping package. Retain the copy with field records.
- Sign and date the custody seal, a 1-inch by 3-inch white paper label with black lettering and an adhesive backing. **Attachment C** is an example of a custody seal. The custody seal is part of the chain-of-custody process and is used to prevent tampering with samples after they have been collected in the field. Custody seals shall be provided by the analytical laboratory.
- Place the seal across the shipping container opening (front and back) so that it would be broken if the container were to be opened.
- Complete other carrier-required shipping papers.

The custody record is completed using waterproof ink. Any corrections are made by drawing a line through and initialing and dating the change, then entering the correct information. Erasures are not permitted.

Common carriers will usually not accept responsibility for handling Chain-of-Custody Record Forms; this necessitates packing the record in the shipping container (enclosed with other documentation in a

plastic zipper-type bag). As long as custody forms are sealed inside the shipping container and the custody seals are intact, commercial carriers are not required to sign the custody form.

The laboratory representative who accepts the incoming sample shipment signs and dates the Chain-of-Custody Record, completing the sample transfer process. It is then the laboratory's responsibility to maintain internal logbooks and custody records throughout sample preparation and analysis.

#### **I. Quality Assurance Records**

Once samples have been packaged and shipped, the Chain-of-Custody copy and airbill receipt become part of the quality assurance record.

#### **II. Attachments**

- A. Sample Label
- B. Chain of Custody Form
- C. Custody Seal

#### **III. References**

USEPA. *User's Guide to the Contract Laboratory Program*. Office of Emergency and Remedial Response, Washington, D.C. (EPA/540/P-91/002), January 1991.

### **Equipment Blank and Field Blank Preparation**

#### **I. Purpose**

To prepare blanks to determine whether decontamination procedures are adequate and whether any cross-contamination is occurring during sampling due to contaminated air and dust.

#### **II. Scope**

The general protocols for preparing the blanks are outlined. The actual equipment to be rinsed will depend on the requirements of the specific sampling procedure.

#### **III. Equipment and Materials**

- Blank liquid (use ASTM Type II or lab grade water)
- Sample bottles as appropriate
- Gloves
- Preservatives as appropriate

#### **IV. Procedures and Guidelines**

- A. Decontaminate all sampling equipment that has come in contact with sample according to SOP *Decontamination of Personnel and Equipment*.
- B. To collect an equipment blank for volatile analysis from the surfaces of sampling equipment other than pumps, pour blank water over one piece of equipment and into two or three (lab dependent) 40-ml vials until there is a positive meniscus, then seal the vials. Note the sample number and associated piece of equipment in the field notes as well as the type and lot number of the water used.

For non-volatiles analyses, one aliquot is to be used for equipment. For example, if a pan and trowel are used, place trowel in pan and pour blank fluid in pan such that pan and trowel surfaces which contacted the sample are contacted by the blank fluid. Pour blank fluid from pan into appropriate sample bottles.

Do not let the blank fluid come in contact with any equipment that has not been decontaminated.

- C. When collecting an equipment blank from a pump, run an extra gallon of deionized water through the pump while collecting the pump outflow into appropriate containers. Make sure the flow rate is low when sampling VOCs. If a submersible pump with disposable tubing is used, remove the disposable tubing after sampling but before decon. When decon is complete, put a 3- to 5-foot segment of new tubing onto the pump to collect the equipment blank.
- D. To collect a field blank, slowly pour ASTM Type II or lab grade water directly into sample containers.
- E. Document and ship samples in accordance with the procedures for other samples.
- F. Collect next field sample.

**V. Key Checks and Items**

- Wear gloves.
- Do not use any non-decontaminated equipment to prepare blank.
- Use ASTM-Type II or lab grade water.

## Groundwater Sampling for Per- and Polyfluoroalkyl Substances (PFAS)

**I. Purpose and Scope**

This SOP provides guidelines for groundwater sample collection for samples that will be analyzed for per- and polyfluoroalkyl substances (PFAS) via LC/MS/MS Compliant with the most recent version of the Quality Systems Manual (QSM) for which the lab is certified. This SOP should be used in conjunction with approved region-specific groundwater sampling SOPs which provide methods for general and low-flow groundwater sampling. In cases in which information in this SOP conflicts with region-specific groundwater sampling SOPs, this SOP will supersede the information in the general SOPs.

Standard techniques for collecting representative samples are summarized. These procedures are specific to the Navy Comprehensive Long-term Environmental Action Navy (CLEAN) Program. Materials, equipment, and procedures may vary; refer to the Sampling and Analysis Plan and operator's manuals for specific details. Upon identification of the selected laboratory, the Navy will request their SOPs and protocols regarding Draft EPA Method 1633.

**II. Equipment and Materials**

**A. Equipment and Materials Required**

- Groundwater sampling equipment
  1. PFAS-free tubing (avoid Teflon, Viton, PTFE and other fluorinated compounds)
    - High density polyethylene tubing (unlined)
    - If Masterflex tubing is needed for peristaltic pumps, Cole Parmer C-Flex (06424 series) and Tygon E-3603 (06509 series) are suitable options
  2. PFAS-free Bailer (if using a bailer)
  3. PFAS-free Pump such as:
    - Geotech PFAS-free Portable Bladder Pump (note, most bladder pumps include a Teflon-lined bladder, but Geotech currently has one model which is Teflon-free).

- Panacea P120 or P125. The P200 Stainless Steel Pump may also be used, but the standard model contains Teflon at the tube connection. If you are using this Panacea model, you must request one with the “PTFE-free thread sealant option.”
  - Waterra stainless foot-valve
  - QED Sample Pro
  - Monsoon or Mega Monsoon submersible pump
  - Grundfos Rediflo2 (this pump contains small Teflon components, but has not been shown to leach, it is less preferable than the other options)
  - Peristaltic pump (may be suitable for shallow locations)
- Groundwater sample containers (high density polyethylene [HDPE] bottle with HDPE screwcap), sample bottles should not be glass as glass may sorb PFAS. Sample bottle caps should not contain Teflon. Notify your project manager (PM) if bottles provided by the lab are glass or contain Teflon parts.
  - Laboratory prepared deionized, certified PFAS-free water for field blank collection
  - PFAS-free shipping supplies (labels [if available]2, coolers, and ice)
  - Loose leaf paper without waterproof coating or a spiral-bound notebook (not waterproof) or tablet (see tablet use notes below)
  - Metal clip board (if using loose-leaf paper)
  - Pen (not Sharpie)
  - Nitrile or latex gloves
- B. Equipment and Materials to Avoid During Sampling**

Equipment and materials used to collect groundwater samples should not contain any fluorinated compounds, Teflon, or synthetic rubber with fluoropolymer elastomers (e.g., Viton).

**Specifically, the following material should be AVOIDED during sampling:**

- Gore-Tex brand or similar high-performance outdoor clothing, clothing treated with ScotchGuard brand or similar water repellent, fluoropolymer-coated Tyvek, wrinkle-resistant fabrics, and fire-resistant clothing with fluorochemical treatment or anything advertised as water repellent.
- Weather-proof log books with fluorochemical coatings.
- New clothing that has been washed fewer than six times.

Efforts will be made to obtain PFAS-free labels; however, information on labels is scarce and labels are frequently mounted on PFAS-coated paper to allow for easy removal.

The sample collection area should be clear of the following items:

- Pre-packaged food wrappers (e.g., fast food sandwich wrappers, pizza boxes, etc.)
- Microwave popcorn bags
- Blue ice containers
- Non-Stick aluminum foil
- Kim-Wipes
- Sunscreen, insect repellent and other personal hygiene products that may contain PFAS

The use of electronics (e.g., cell phones and tablets) should be avoided without the implementation of precautionary measures outlined below:

- All devices should be used with clean, ungloved hands and an approved stylus (if desired).

Following the use of a device, hands must be washed with soap and water and clean gloves should be used prior to contact with sampling equipment (bottleware, tubing, etc.).

### III. Procedures and Guidelines

Wash hands with dish detergent before sampling and don nitrile gloves. Do not use Kleen Guard powder free nitrile gloves which were shown in research to contain fluorine

Follow Navy CLEAN SOPs for low-flow or conventional groundwater sample collection, depending on site requirements.

#### A. Sample Collection

Once water quality parameters have stabilized for low-flow purging, samples can be collected. For conventional purging, if water quality parameters do not stabilize, a minimum of 3 well volumes must be purged prior to sample collection.

The steps to be followed for sample collection are as follows:

1. Ensure that the end of the tubing does not touch the ground or equipment. Remove the cap from the sample bottle. Position the sample bottle under the end of the tubing.
2. Fill the bottle. Do not fill the bottle past the middle of the bottle shoulder. Samples do not need to be collected headspace free.
3. Affix labels after bottles have been closed; collect only one sample at a time to avoid mislabeling. Pack the sample on ice immediately for shipment to the offsite laboratory. Avoid packing materials that may contain fluorine. Unpublished research has allowed us to generate a list of packing materials which do not contain fluorine. Please contact Bill Diguseppi or Laura Cook for recommendations (because the research is not ours, it cannot be released externally at this time).

#### B. Equipment Decontamination

Whenever possible, use disposable equipment when collecting groundwater samples. If reusable equipment must be used, the equipment must be cleaned/decontaminated between uses. Alconox and Liquinox soap are acceptable for cleaning/decontaminating reusable equipment at PFAS sites. Any water used for cleaning/decontamination must be certified PFAS-free by a laboratory. Consider triple-rinsing. Once decontaminated, wrap equipment in plastic bags (such as Ziploc) or un-coated aluminum foil, and store away from potential PFAS sources.

#### Use of Water Quality Equipment and Water Level Indicators

Water quality meters typically do not contain PFAS. However, consistent with general sampling SOPs, disconnect the water quality meter prior to sampling. Some water level indicators do contain small

polyvinylidene fluoride (a PFAS constituent for which we do not currently monitor) or less frequently, Teflon, components, but we have not noted cross contamination from water level indicators at any sites. The Durham Geoslope Water Level Indicators and the Solinst Model 101 with the P2 meter have been shown to be fluorine free.

#### IV. References

United States Environmental Protection Agency (USEPA), 2009. *Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS)*. September.

United States Navy, 2020. *Interim Per- and Polyfluoroalkyl Substances (PFAS) Site Guidance for NAVFAC Remedial Project Managers (RPMs)/November 2020 Update*. November.

United States Navy, 2015. *Navy Drinking Water Sampling Policy for Perfluorochemicals: Perfluorooctane Sulfonate and Perfluorooctanoic Acid*. September.

### Packaging and Shipping Procedures for Low-Concentration Samples

#### I. Purpose and Scope

The purpose of this guideline is to describe the packaging and shipping of low- concentration samples of various media to a laboratory for analysis.

#### II. Scope

The guideline only discusses the packaging and shipping of samples that are anticipated to have low concentrations of chemical constituents. Whether or not samples should be classified as low-concentration or otherwise will depend upon the site history, observation of the samples in the field, odor, and photoionization- detector readings.

If the site is known to have produced high-concentration samples in the past or the sampler suspects that high concentrations of contaminants might be present in the samples, then the sampler should conservatively assume that the samples cannot be classified as low-concentration. Samples that are anticipated to have medium to high concentrations of constituents should be packaged and shipped accordingly.

If warranted, procedures for dangerous-goods shipping may be implemented. Dangerous goods and hazardous materials pose an unreasonable risk to health, safety, or property during transportation without special handling.

#### Equipment and Materials

- Coolers
- Clear tape
- Strapping tape
- Contractor bags
- Absorbent pads or equivalent
- Resealable bags
- Bubble bags (for glass bottle ware)

- Bubble wrap (if needed)
- Ice
- Custody seals

### III. Procedures and Guidelines

#### Low-Concentration Samples

- A. Prepare coolers for shipment:
  - Tape drains shut.
  - Place mailing label with laboratory address on top of coolers.
  - Fill bottom of coolers with absorbent pads or similar material.
  - Place a contractor bag inside the cooler.
- B. Affix appropriate adhesive sample labels to each container. Protect with clear packing tape.
- C. Arrange decontaminated sample containers in groups by sample number. Consolidate VOC samples into one cooler to minimize the need for trip blanks. Cross check CoC to ensure all samples are present.
- D. Seal each glass sample bottle within a separate bubble bag (VOCs grouped per sample location). Sample labels should be visible through the bag. Whenever possible, group samples per location for all analytes and place in resealable bags. Make sure to release as much air as practicable from the bag before sealing.
- E. Arrange sample bottles in coolers so that they do not touch.
- F. If ice is required to preserve the samples, cubes should be repackaged in resealable bags and placed on and around the containers.
- G. Fill remaining spaces with bubble wrap if needed.
- H. Complete and sign chain-of-custody form (or obtain signature) and indicate the time and date it was relinquished to Federal Express or the courier.
- I. Close lid and latch.
- J. Carefully peel custody seals from backings and place intact over lid openings (right front and left back). Cover seals with clear packing tape.
- K. Tape cooler shut on both ends, making several complete revolutions with strapping tape. Cover custody seals with clear packing tape to avoid seals being able to be peeled from the cooler.
- L. Relinquish to Federal Express or to a courier arranged with the laboratory. Scan airbill receipt and CoC and send to the sample documentation coordinator along with the other documentation.

#### Medium- and High-Concentration Samples:

Medium- and high-concentration samples are packaged using the same techniques used to package low-concentration samples, with potential additional restrictions. If applicable, the sample handler must refer to instructions associated with the shipping of dangerous goods for the necessary procedures for shipping by Federal Express or other overnight carrier. If warranted, procedures for dangerous-goods shipping may be implemented. Dangerous goods and hazardous materials pose an unreasonable risk to health, safety, or property during transportation without special handling.



#### **IV. Key Checks and Items**

- Be sure laboratory address is correct on the mailing label
- Pack sample bottles carefully, with adequate packaging and without allowing bottles to touch
- Be sure there is adequate ice
- Include chain-of-custody form
- Include custody seals

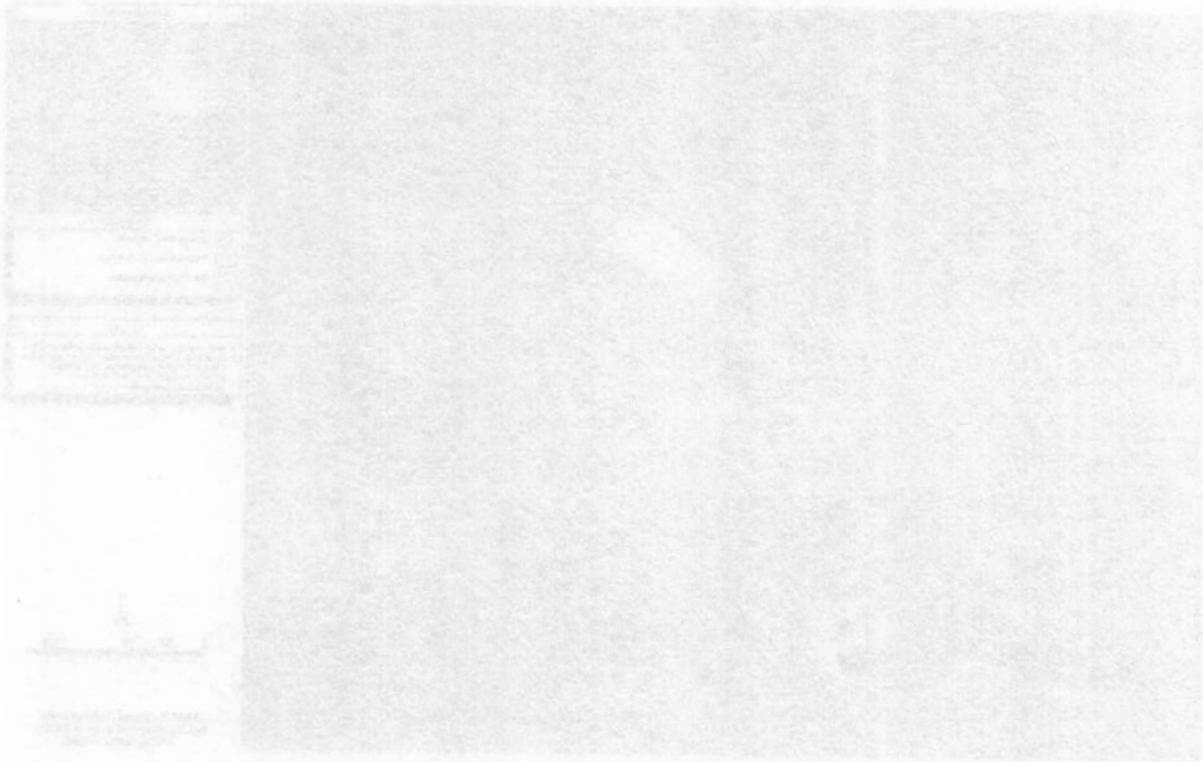


Figure 1. Decision Unit Locations



Figure 2. Adit 6 Distance to Well Locations

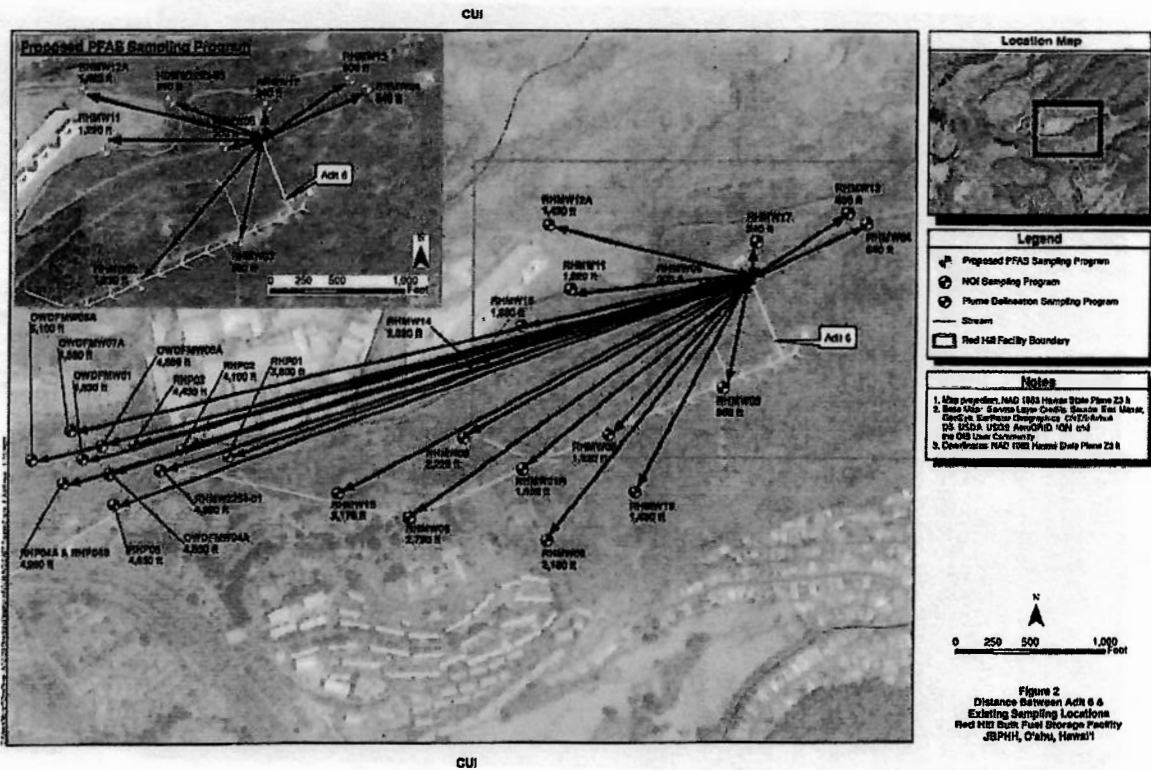
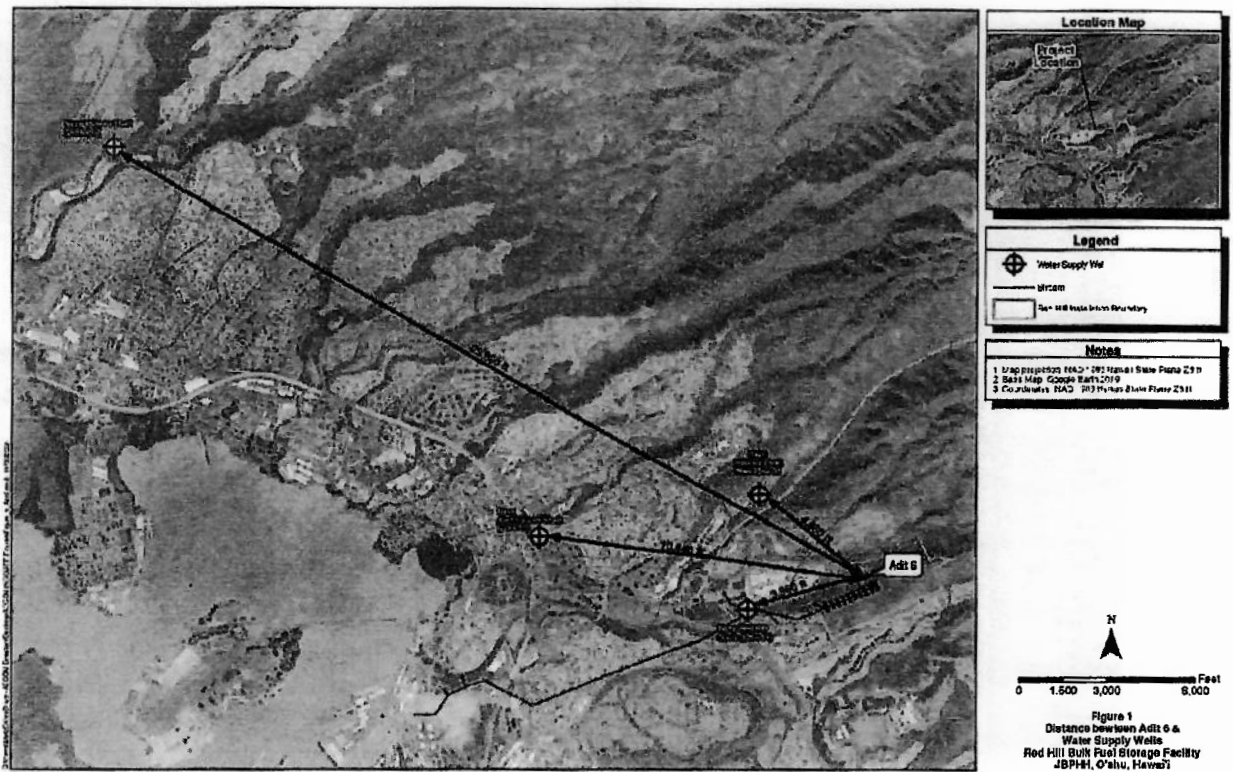


Figure 3. Adit 6 Distance to Drinking Water Wells





**UNITED STATES ENVIRONMENTAL  
PROTECTION AGENCY  
REGION IX  
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November 2, 2022

Captain Cameron J. Geertsema  
NAVFAC Hawai'i  
850 Ticonderoga Street, Suite 110  
Joint Base Pearl Harbor Hickam, Hawai'i 96860-5101  
(Sent via Electronic Mail)

**Subject: Preliminary Investigation of PFAS**

Dear Captain Geertsema:

The U.S. Environmental Protection Agency (EPA) and Hawai'i Department of Health (DOH), collectively the "Regulatory Agencies," have reviewed the per- and polyfluoroalkyl substances (PFAS) sampling results in the final laboratory report DPWG79713 dated January 17, 2022, that was submitted on March 31, 2022 to the Regulatory Agencies by the U.S. Department of the Navy (Navy) and the Defense Logistics Agency (DLA). The referenced laboratory report was required under the Red Hill Shaft Recovery and Monitoring Plan Appendix E Groundwater Sampling Plan associated with evaluating groundwater impacts as a result of the May 6 and November 20, 2021, release events at and from the Red Hill Bulk Fuel Storage Facility (Facility).

The DPWG79713 final laboratory report indicated PFAS were detected in groundwater samples collected from RHMW2254-01 on December 20 and 27, 2021, at low parts per trillion (ppt) concentrations that are below Hawai'i State Environmental Action Levels (EALs) but above EPA's interim health advisory levels. Specifically, perfluorooctanoic acid (PFOA) was detected at 2.76 ppt and 3.49 ppt, and perfluorooctanesulfonic acid (PFOS) was detected at 6.72 ppt and 4.35 ppt on the two sampling dates respectively. DOH collected two additional groundwater samples from RHMW2254-01 on December 20 and 27, 2021, and these samples did not detect PFAS.

Pursuant to Section 6 of the Statement of Work to the 2015 Administrative Order on Consent (USEPA Docket No. RCRA 7003-R9-2015-01) and to determine whether these PFAS detections were attributed to the November 20, 2021 release, the Navy and DLA shall perform a

preliminary investigation for PFAS as described below. The Navy and DLA shall test recovered LNAPL (light non-aqueous phase liquids, either freshly recovered or a previously frozen sample) from within Red Hill Shaft for PFAS. Additionally, the Navy and DLA shall conduct PFAS groundwater sampling from a subset of groundwater monitoring wells (RHMW2254-01, RHMW-1, RHMW-2, and RHMW-3) at the Facility. Samples shall be analyzed for a broad suite of PFAS analytes, including perfluorobutane sulfonic acid (PFBS) and GenX. Our research indicates commercial labs are capable of analyzing for the presence of more than 40 PFAS.

Additional groundwater sampling may be required based on the results of this preliminary investigation. The Navy and DLA shall submit tabulated results and laboratory reports, whether or not validated, within 30 calendar days after receipt of analytical results from the lab.

Within 45 days of receipt of this letter, the Navy and DLA shall submit a PFAS-specific sampling plan or an addendum to the Sampling and Analysis Plan Addendum 01 dated September 1, 2017 providing PFAS-specific information on planned sample collection and analysis, including the analytical laboratory standard operating procedure (SOP) for a fuel or oil matrix detection limits, validation results for a fuel or oil matrix, reporting limits, accuracy and precision goals, sample containers, sampling procedures designed to prevent environmental cross contamination of PFAS, equipment blanks, preservation and holding time, and planned matrix spike or other method quality control samples. In addition, please specify a plan for obtaining follow-up confirmatory samples with replicates if detections are found. On behalf of the Regulatory Agencies, EPA may submit one or more split samples to an EPA laboratory for analysis.

If you have any questions, please contact Gabriela Carvalho, EPA Red Hill Project Coordinator at (808) 541-2723 or Fenix Grange, Supervisor, DOH Site Discovery, Assessment and Remediation Section at (808) 586-4248.

Sincerely,

**GABRIELA  
CARVALHO**

Digitally signed by  
GABRIELA CARVALHO  
Date: 2022.11.02 10:14:24  
-10'00'



Gabriela Carvalho  
Red Hill Project Coordinator  
US Environmental Protection Agency Region 9

Kelly Ann Lee  
Red Hill Project Coordinator  
State of Hawai'i, Department of Health

cc: Sherri Eng, Environmental Director, Navy Region Hawai'i  
Donald Panthen, Red Hill Program Management Office Director, Navy Region Hawai'i  
CDR James Sullivan, Red Hill Officer in Charge, NAVFAC Hawai'i  
LCDR Travis Myers, Aquifer Recovery Team Lead

**Stella Bernardo**

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**I wish to provide** Advance written testimony + request to give in-person oral testimony at 630 S. Beretania Street

**TESTIFIER INFORMATION**

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**Full Name** Amanda Feindt

**Email** amandafeindt@gmail.com

**Phone (optional)** (757) 816-6073

**TESTIMONY DETAILS**

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**Agenda Item** Request: I would like to submit testimony on multiple items as noted in the written testimony field below

**Your Position on Matter** Oppose

**Representing** Self

**I wish to provide** Advance written testimony + request to give in-person oral testimony at 630 S. Beretania Street

**Written Testimony (if entered on the online form; otherwise see attached)** I would like to start by sharing the impact jet fuel poisoning has had on my family, including my two small children (ages 1 and 3 at the time). Q: How many children must die or suffer long term health impacts before EALs for jet fuel in our drinking water are set to ZERO? Q: When you say this is “unprecedented” are you aware of how many children died because of the water crisis at Camp Lejeune? What lessons were learned from Camp Lejeune and applied here?

## ACKNOWLEDGEMENTS

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**To:** [Stella Bernardo](#); [Board of Water Supply Board of Directors](#)  
**Subject:** Board Meeting Testimony Submittal or Request - Monday, December 12, 2022 - Susan Pcola-Davis  
**Date:** Saturday, December 10, 2022 2:35:15 PM  
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### TESTIFIER INFORMATION

**Full Name** Susan Pcola-Davis  
**Email** [susanp60@yahoo.com](mailto:susanp60@yahoo.com)  
**Phone (optional)** (808) 387-3061

### TESTIMONY DETAILS

**Agenda Item** Info #3: US EPA and Hawaii DOH Discussing the Setting of Environmental Action Levels (EALs) & the Aqueous Film Forming Foam (AFFF) Fire Suppressant Spill at the Red Hill Bulk Fuel Storage Facility

**Your Position on Matter** I wish to comment

**Representing** Self

**I wish to provide** Advance written testimony + request to give in-person oral testimony at 630 S. Beretania Street

**Written  
Testimony  
(if entered on  
the online  
form;  
otherwise  
see attached)**

## ACKNOWLEDGEMENTS

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Board of Water Supply

Director's Meeting: December 12, 2022

Written Testimony

DOH/EPA

**In 2017 the EALs were increased. Mr. Ernie Lau's requests to lower them back was refused by Bruce Anderson, Libby Char and now Kenneth Fink has a chance to make it right! Why isn't the HODOH even discussing and reconsidering the lowered EALs?**

**Ask every adult living on Oahu what the EAL should be? Right, there should not be any fuel in our water? So what is reasonable?**

Department of Health: Roger Brewer

Revised

April 20, 2022

Signed: K. Ho June 16, 2022

**Why so long to sign?**

*A summary of the updates is included in the introduction to the attachment. The updates resulted in a marginal change of the example TPH tapwater action levels presented in Table 1.*

*A more detailed study of the chemical makeup of JP 5 jet fuel and other petroleum fuels is currently underway. The results of that study and methods presented in this memorandum and will summarized in a separate document and used to formally update HODOH TPH guidance.*

**Is the summarized separate document available and when will the HODOH TPH guidance be formally updated?**

**Regardless of the calculation corrections, how can you feel confident that these numbers would support contamination early enough to prevent more contamination to the aquifer? These numbers do not seem to set off the alarms.**

**What is a number for non detect?**

**Does non detect mean anything lower than 266, 346 or 450 µg/L will not be identified?**

**Was the HODOE aware of the Navy discarding samples because they knew they would be doing flushing? Did HODOE know before and agree or not know until after?**

Subject: Recommended Risk-Based Drinking Water Action Levels for TPH Associated with Releases of JP5 Jet Fuel.

April 20, 2022, Updates

The February 12, 2022, version of this memorandum was updated to correct the following errors:

- Table 3. Calculation of dermal exposure parameters revised to exclude consideration of >EC8 aliphatic compounds and >EC16 aromatic compounds. Error in spreadsheet used to calculate values also corrected. Dermal parameter values for 1-methylnaphthalene added to table. Revised TPH parameter values used to update calculated TPH tapwater action levels.
- Table 4. Effective solubility values corrected (action levels not affected).
- Table 5. Proportion of xylenes in dissolved-phase, BTEXNM mixture revised to 74% from 75% (action levels not affected).
- Table 7. Oral and dermal weighted Reference Doses revised from 0.036 mg/kg day to 0.035 mg/kg-day (action levels not affected).
- Table 8. Calculated TPH tapwater action levels revised to reflect updates to dermal exposure parameter values. [\[See changes below; read footnotes related to ingestion, dermal and inhalation of vapors not just dermal\]](#)

**Table 1. Calculated action levels for TPH associated with JP-5 contaminated groundwater under different plume degradation scenarios.**

Plume Degradation Scenario	JP-5 TPH Action Level	Notes
<sup>1</sup> Non-Degraded	266 µg/L	Applies to groundwater impacted by releases of fresh product in immediate vicinity of a production well with minimal degradation of JP-5 related hydrocarbons before entering a drinking water system.

Plume Degradation Scenario	JP-5 TPH Action Level	Notes
<sup>2</sup> Mixed	346 µg/L	Applies to partially degraded plumes that include a mixture of degraded and non-degraded JP-5 related hydrocarbons (considered applicable to most aged releases of JP-5).
<sup>3</sup> Degraded	450 µg/L	Applies to plumes where all hydrocarbons have undergone some degree of degradation and are no longer significantly volatile (requires extensive monitoring to support degradation state and use).

**Notes**

1. Assumes no degradation of hydrocarbons or associated reduction in volatility; considers exposure via ingestion, dermal contact and inhalation of vapors.
2. Assumes 50:50 mixture of non-degraded and degraded hydrocarbons with volatility of non-degraded compounds preserved; considers exposure via ingestion and dermal contact with reduced but still significant exposure via inhalation of vapors.
3. Assumes at least partial degradation of all hydrocarbons to non-volatile compounds and exposure via ingestion and dermal contact.

APPROVED

*Kathleen Ho*

\_\_\_\_\_  
Kathleen S. Ho  
Deputy Director of Environmental Health

Jun 16, 2022

\_\_\_\_\_  
Date

## SECTION 9

### SUPPLEMENTAL GUIDANCE FOR SELECT CONTAMINANTS OF CONCERN INTERIM FINAL – APRIL 2014 LOG OF TGM UPDATES

TECHNICAL GUIDANCE MANUAL LOG OF UPDATES

This page updated: Aug 24, 2021

#### 9.3 PETROLEUM CONTAMINATED SITES

A discussion of target chemicals of potential concern and the evaluation of petroleum releases is included in Volume 1 and Appendix 1 of the EHE guidance document ([HDOH, 2016](#)). This guidance is summarized and expanded below.

Petroleum is a complex mixture of hundreds of different compounds composed of hydrogen and carbon or “hydrocarbon” compounds ([API 1994](#)). The chemistry and toxicity of petroleum releases depends in part on the type of fuel released and the media tested. The bulk of the compounds are evaluated collectively under the all-inclusive category of Total Petroleum Hydrocarbons (TPH). The concentration of TPH in soil and groundwater is typically reported in terms of “carbon ranges,” or the number of carbon molecules in individual hydrocarbon compounds based on the type of fuel released: 1) C5-C12 (“gasoline range” or “TPHg”), 2) C10-C24 (“diesel range” or “TPHd”) and 3) C24-C40+ (“residual fuels” or “TPHo”). A number of different terms are applied to these ranges. As discussed below, reference to these ranges is less useful for air and soil vapor data.

“Gasoline-range” TPH is defined as a mixture of petroleum compounds characterized by a predominance of branched alkanes and aromatic hydrocarbons with carbon ranges of C6 to C12 and lesser amounts of straight-chain alkanes, alkenes, and cycloalkanes of the same carbon range (see also [NEIWPC 2003](#)). Vapors from these fuels tend to be dominated by lighter-range, more volatile, C5-C8 aliphatics ([HDOH, 2016, 2012](#)). Although not studied in detail, dissolved-phase gasoline in groundwater is also likely to be biased towards more soluble, lighter-range compounds.

Petroleum compounds characterized by a wider variety of straight, branched, and cyclic alkanes, polynuclear aromatic hydrocarbons (PAHs, especially naphthalenes and methylnaphthalenes), and heterocyclic compounds with carbon ranges of approximately

C9 to C25 are referred to as “Diesel Range” TPH. These compounds dominate the makeup of diesel and other middle distillates fuels (e.g., kerosene, diesel fuel, home heating fuel, JP-8, etc.). These fuels also contain a small but important amount of lighter, aliphatic compounds. Vapors from the fuels can somewhat counterintuitively be dominated by these “gasoline range,” C5-C12, aliphatic compounds ([HDOH 2012](#)). As discussed in [Subsection 9.3.1.2](#) below and in [Section 7](#), it is important that these compounds be included in the analysis of TPH in air and soil vapor samples associated with releases of middle distillate fuels. Dissolved-phase, middle-distillate fuel in groundwater could also be biased towards more soluble, “gasoline-range” compounds. A dominance of “TPHg” in groundwater samples does not in itself indicate that the source of the contamination is associated with gasoline. A more detailed review of the chromatograph pattern and site history will be necessary to make this determination.

Residual fuels (e.g., Fuel Oil Nos. 4, 5, and 6, lubricating oils, mineral oil, used oils, and asphalts) are characterized by complex polar PAHs, naphthenoaromatics, asphaltenes, and other high-molecular-weight saturated hydrocarbon compounds with carbon ranges that in general fall between C24 and C40. Compounds associated with these fuels and related products are not considered to be volatile, although methane generated by degradation of the fuels could pose potential hazards at some sites.

Note that the breakdown of heavy petroleum can lead to an increase in volatile petroleum compounds ([Chaplin 2002](#)). This necessitates the collection of soil vapor samples at sites contaminated by heavier fuels, as well as gasolines and middle distillates.

Due to the number of sites with residual petroleum contamination, HDOH prepared a guidance document that outlines procedures for long-term management of residual petroleum contamination where full cleanup is not practicable. This guidance, Long-Term Management of Petroleum-Contaminated Soils and Groundwater ([HDOH, 2007c](#)) is included in TGM Section 19 as [Appendix 19-A](#). The document includes three, supporting decision trees for determining the need for continued, HDOH oversight. Self-implemented, long-term management by the property owner and closure of the case in the HDOH database is possible in scenarios where the area and volume of contaminated soil and/or groundwater is minimal.

### 9.3.1 RECOMMENDED TARGET ANALYTES

Recommended target analytes for petroleum contaminated soil and groundwater are provided in Table 9-5.

**Table 9-5 Target Analytes for Releases of Petroleum Products**

Petroleum Product	Media	Recommended Target Analytes
<b>Gasolines</b>	Soil	TPH, BTEX, naphthalene, MTBE and appropriate additives and breakdown products (e.g., TEA, lead, ethanol, etc.)
	Soil Vapor	TPH, BTEX, naphthalene and MTBE plus other volatile additives and methane
	Groundwater	Same as soil
<b>Middle Distillates</b> (diesel, kerosene, Stoddard solvent, heating fuels, jet fuel, etc.)	Soil	TPH, BTEX, naphthalene, and methyl naphthalenes (1- and 2-)
	Soil Vapor	TPH, BTEX, naphthalene, and methane
	Groundwater	Same as soil
<b>Residual Fuels</b> (ube oils, hydraulic oils, mineral oils, transformer oils, Fuel Oil #6/Bunker C, waste oil, etc.)	Soil	TPH, VOCs, naphthalene, methyl naphthalenes (1- and 2-), the remaining 16 priority pollutant PAHs, PCBs, and heavy metals unless otherwise justified
	Soil Vapor	TPH, VOCs, naphthalene, and methane
	Groundwater	same as soil

1. Include any additional volatile additives in soil vapor samples if suspected to be present.  
 2. VOCs includes BTEX and chlorinated solvent compounds.

Petroleum contamination in soil, water or air/soil vapors should be evaluated in terms of both TPH and a short list of target “indicator chemicals” that are specific to the type of petroleum product released. As discussed in the previous section, non-specific compounds collectively reported as TPH typically comprise the bulk of petroleum fuels. Target indicator chemicals typically make up only a small fraction of the total petroleum present but are also important players in the assessment of environmental hazards posed to human health and the environment. The toxicity and fate and transport of these chemicals in the environment has been studied in detail.



### 9.3.1.1 TARGET INDICATOR COMPOUNDS

Target, indicator compounds for petroleum fuels include benzene, toluene, ethylbenzene, xylenes (total), methyl-tert butyl ether (MTBE), naphthalene and number of individual, polyaromatic hydrocarbon compounds (see Table 9-5). Separate evaluation of these chemicals is based on the availability of adequate toxicity data and the potential for the chemicals to drive risk and the need for remedial actions at contaminated properties in conjunction with TPH. Separate environmental action levels for these compounds are presented in the HEER Office EHE guidance ([HDOH 2016](#)).

All other petroleum compounds are collectively reported and evaluated under "TPH," as described above. Volatile components of petroleum that are not specifically identified as target indicator compounds in Table 9-5 but reported as separate compounds by the laboratory using EPA Method 8260 or similar methods do not need to be separately evaluated. Examples include trimethylbenzenes and other aliphatics and aromatics not specifically identified as target indicator compounds (refer to [Subsection 2.11](#) in the EHE guidance document; [HDOH, 2016](#)). These compounds are included under the analysis and evaluation of the TPH component of petroleum.

Seventeen, semi-volatile PAHs are recommended as target, indicator compounds for releases of heavier petroleum fuels or waste oils:

Seventeen, semi-volatile PAHs are recommended as target, indicator compounds for releases of heavier petroleum fuels or waste oils:

▪ Acenaphthene	▪ dibenzo(a,h)anthracene
▪ Acenaphthylene	▪ fluoranthene
▪ Anthracene	▪ fluorine
▪ benzo(a)anthracene	▪ indeno(1,2,3)pyrene.
▪ benzo(b)fluoranthene	▪ methylnaphthalenes (1 & 2)
▪ benzo(g,h,i)perylene	▪ naphthalene
▪ benzo(a)pyrene	▪ phenanthrene
▪ benzo(k)fluoranthene	▪ pyrene
▪ chrysene	

In practice, the need for remedial actions at sites impacted with PAHs is typically driven by benzo(a)pyrene. Naphthalene can be reported with either semi-volatile or volatile

compounds (see [Section 7](#)). Separate Environmental Action Levels (EALs) for 1- and 2-methylnaphthalenes are presented in the EHE guidance document ([HDOH, 2016](#)).

The suite of PAHs that should be tested at a given site depends on the type of the petroleum product released (after [MADEP 2002](#)). As indicated in the Table 9-5, naphthalene is the only PAH that requires reporting for gasoline release sites. Both methylnaphthalenes and naphthalene should be reported at sites with releases of middle distillates (diesel, jet fuel, etc.). The full suite of PAHs should be considered at sites with releases of heavier petroleum fuels and waste oil, unless site-specific information on the product released justifies eliminating specific PAHs.

Methylnaphthalenes do not need to be reported for soil vapor samples as a default. Based on data reviewed by HDOH, these compounds are unlikely to drive potential vapor intrusion hazards at petroleum release sites over TPH or benzene due to their relatively low volatility and concentration in most middle distillates and residual fuels. Testing for these compounds in soil vapor also requires different sample collection and analytical methods (e.g., sorbent tubes and TO-1 analysis; see [Subsection 7.8.2](#)). Reporting of these compounds in soil vapor samples may, however, be required at sites impacted by Manufactured Gas Plant waste.

### **9.3.1.2 TOTAL PETROLEUM HYDROCARBONS**

Soil, groundwater, and soil vapor samples must always be tested for TPH (or equivalent) in addition to targeted, individual chemicals. Laboratory analysis for TPH as gasolines and middle distillates is generally carried out using gas chromatography, modified for “gasoline-range” organics (“Volatile Fuel Hydrocarbons”) and “diesel-range” organics (“Extractable Fuel Hydrocarbons”), respectively (e.g., EPA Method 8015). Analysis for TPH as residual fuels up to the C40 carbon range can be carried out by gas chromatography, infrared absorption, or gravimetric methods. The latter methods are rarely used, however, due to their inability to discriminate the type of the petroleum present and interference with organic material in the soil.

The concentration of TPH (or equivalent) in soil vapor should always be reported as the sum of C5-C12 compounds for whole air samples and C5-C18 for sorbent tube samples, regardless of the type of petroleum fuel involved. Refer to Appendix 1 of the HDOH EHE guidance for a detailed discussion on total volatile petroleum hydrocarbons (see

also [Brewer et al 2013](#)). As discussed above and in [Subsection 7.8.2](#), results from a petroleum vapor study carried out by HDOH study indicate that C5-C8 aliphatic compounds can make up a significant if not dominant fraction of the total TPH present in vapors associated with diesel and other middle distillate fuels ([HDOH, 2012, 2012c](#)). This is important, since current laboratory protocols typically require that they report “TPHdiesel” in any media as the sum of C10 to approximately C24 hydrocarbon compounds. Excluding the contribution of C5-C8 aliphatics to the total concentration of TPH reported in air or soil vapor samples associated with middle distillate fuels would be inappropriate, however.

To help address this issue, laboratories should be instructed to report TPH (or equivalent) in air or vapor samples as: 1) The sum of C5-C12 compounds for whole-air samples (e.g., summa canister samples and TO-15 lab methods, with the understanding that aromatics can only be confidently summed to C10) or 2) The sum of C5-C18 for samples collected using a sorbent media (e.g., sorbent tubes and TO-17 lab methods, with the understanding that aromatics can only be confidently summed to C16). This should be done regardless of whether the samples are associated with gasolines or middle distillates.

Laboratory methods for reporting of TPH in indoor air and soil gas are discussed in [Subsection 7.13](#). A combination of both TO-15 (Summa canister samples) and TO-17 (sorbent tube samples) is currently recommended for initial investigation of petroleum-contaminated sites (see [HDOH, 2012c](#)). The collection of concurrent, sorbent tube samples can be discontinued if initial data indicate that C12+ compounds make up less than 10% of the total TPH present in vapors.

Designation of chromatogram patterns as “gasoline range” (e.g., C5-C12) or “diesel range” (e.g., C10-C24) with respect to traditional, laboratory methods for TPH in soil or water is not applicable to air and vapor samples and can be misleading. The reported concentration of TPH can then be compared to HDOH soil gas action levels. The sum of concentrations of individual, target analytes such as BTEX and naphthalene that will be evaluated separate can be subtracted from the reported concentration of TPH in order to avoid double counting, although this is not likely to make a significant difference in the final concentration.

As discussed in TGM [Subsection 7.8](#), the initial collection of both Summa canister samples and sorbent tube samples is recommended for soil vapor investigations at diesel and middle distillate sites. This is due to limitations on the ability to extract >C12 compounds

from Summa canisters (see [Subsection 7.13.1.1](#)). A minimum Summa canister size of one-liter is recommended, in order to help collect a representative sample (tested for both TPH and target, indicator compounds such as BTEX and naphthalene). A maximum, 50ml vapor draw might be required for sorbent tube samples due to limitations of the sorbent material (tested only for TPH). Sorbent tube data are used to evaluate the relative proportion of >C12 compounds associated with TPH.

If the relative fraction of >C12 is less than 10% of the TPH then the concentration of TPH reported for the Summa canister can be used for comparison to action levels and Summa canisters can be relied upon for the collection of future samples. If >10% of the vapor-phase TPH is associated with >C12 compounds then a combined use of Summa data and sorbent tube data should be used to evaluate the site. For example, request that the laboratory report TPH for the sorbent tube sample as the sum of >C12 compounds. Add this to the concentration of TPH reported for the Summa sample (i.e., TPH as sum of C5-C12). The resulting, total TPH concentration can then be compared to soil gas action levels. This approach excludes the concentration of aromatic compounds greater than C10 but less than C12. Based on published information and data collected by the HEER Office, however, these compounds make up an insignificant (i.e., <10%) proportion of TPH vapors at typical, petroleum-release site.

Reported concentrations of unidentified hydrocarbons as gasoline, diesel or oil indicate that the chromatogram generated for the sample does not match standards used to quantify TPH. Reported concentrations of TPH should be considered approximate, but adequate for comparison to HDOH action levels. A more detailed evaluation through petroleum carbon range analysis can be carried out on a site-specific basis as warranted.

Silica gel cleanup of samples, in particular for surface water and groundwater, should not be carried out without consultation with HDOH. Two options are recommended: (1) Directly compare TPH data to HDOH EALs in the absence of silica gel cleanup, and/or (2) Report data both with and without silica gel cleanup. For the second option, compare the nonpolar, TPH fraction to HDOH EALs and evaluate potential hazards posed by TPH-derived, polar breakdown products to drinking water and aquatic habitats in a site-specific EHE (see [HDOH, 2016](#)).

Dissolved-phase TPH in water is composed of unaltered, nonpolar compounds originally in the parent fuel and polar compounds associated with the oxidation and biodegradation of

the former (e.g., [Zemo 1995, 2008](#), [Lang et al 2009](#), [Mohler et al. 2013](#)). Polar compounds can be removed by passing the sample through silica gel prior to analysis, referred to as "silica gel cleanup (SGC)." A column SGC lab method should be used rather than a shake or funnel method (e.g., Method 3630C, [USEPA 1996k](#)). If polar compounds are removed, both non-SGC and SGC data should be reported.

In many cases silica gel cleanup will significantly reduce the concentration of TPH reported for the sample. The polar compounds, which can dominate the overall mass of TPH in groundwater at aged-release sites, are primarily organic acids/esters and alcohols with variable amounts of ketones, phenols and aldehydes. These compounds must be taken into account as part of a site investigation. From an environmental hazard standpoint, the sum of the polar compounds and nonpolar compounds (i.e., the concentration of TPH reported in the absence of a silica gel cleanup) represents the concentration of TPH that should be directly compared to HDOH Environmental Action Levels (refer to HDOH EHE guidance; [HDOH, 2016](#)).

Methods for development of separate EALs for TPH-related, polar compounds or evaluation of these compounds in a site-specific EHE or human-health risk assessment have not been fully developed. The toxicity of the polar fraction of the TPH to both humans and aquatic organisms has only recently begun to be studied (e.g., [Zemo et al. 2013](#)). As a default, and for the purposes of this guidance, the health risk and other potential environmental concerns associated with these compounds (e.g., toxicity to aquatic organisms, taste and odors in drinking water, etc.) is assumed at an initial screening level to be identical to the parent, nonpolar TPH compounds.

If silica gel cleanup of samples for a site is still desired (e.g., evaluation of degradation, fingerprinting of fuel releases, site-specific risk assessment, etc.), then the objectives and methodology to be implemented should be presented to HDOH for review and approval. A quantitative evaluation of potential threats to human health and the environment should be carried out in accordance with the HDOH EHE guidance document for a site-specific EHE. This includes addressing potential aquatic ecotoxicity concerns as well as gross contamination concerns (e.g., drinking water taste and odors). Alternative action levels for each environmental hazard should be presented and supported for comparison to data. In most cases, it is anticipated that long-term management of groundwater contaminated primarily with polar, TPH breakdown compounds above HDOH action levels will still be

required due to potential nuisance and aquatic toxicity hazards, even in the absence of apparent risk to human health (e.g., via impacts to drinking water resources).

Comparison of data for groundwater samples tested with and without silica gel cleanup could be useful for assessing the state of natural biodegradation within a plume of petroleum-contaminated groundwater and optimizing remedial and monitoring actions. For example, no further active remediation may be appropriate for areas of the plume where the majority of dissolved-phase hydrocarbons have degraded into polar compounds (i.e., significant reduction of reported TPH concentration in samples processed with silica gel cleanup). Active remediation could focus on areas of the plume where a comparison of data indicates that significant, natural degradation is not occurring. Data can also be used as one line of evidence to support a recommendation for no further monitoring and site closure following the HEER office guidance for long-term monitoring of petroleum-contaminated sites ([HDOH, 2007c](#); see TGM Section 19, [Appendix 19-A](#)).

### **9.3.2 PETROLEUM CONTAMINATION ENCOUNTERED DURING SUBSURFACE SOIL EXCAVATION**

Unanticipated petroleum (free product) or petroleum-contaminated soil is sometimes encountered during construction work where subsurface soil is being excavated. The HEER Office has a Guidance Fact Sheet, consistent with the Hawai'i Environmental Response Law (HRS 128D [HDOH, 1990](#)), to assist project managers, contract workers, safety and health personnel or anyone involved in construction and excavation of soils when petroleum is encountered on a site. This document, "Guidance Fact Sheet for Use When Petroleum Contamination is Encountered During Subsurface Soil Excavation", is provided in [Appendix 9-D](#).

In rare cases the reported concentration of TPH in soil with strong petroleum odors could fall below HEER Office EALs for gross contamination (refer to [HDOH, 2016](#)). This could be due to sampling error in the field, laboratory sample processing error, or the inability of the laboratory method to accurately quantify the amount of TPH in the soil. Even so, soil with an obvious petroleum odor should be considered grossly contaminated and managed appropriately. Removal and/or treatment of vadose-zone soil that exceeds the HEER Office EAL for subsurface gross contamination (e.g. 5,000 mg/kg) is typically recommended at a minimum when complete cleanup cannot be achieved. The HEER Office should be

contacted regarding the on-site management or re-use of additional, petroleum contaminated soil. Refer also to the HEER Office Clean Fill Guidance for additional information ([HDOH 2017d](#))

Referencing the following enclosure:

UNITED STATES ENVIRONMENTAL  
PROTECTION AGENCY  
REGION IX  
75 Hawthorne Street  
San Francisco, CA 94105

STATE OF HAWAII  
DEPARTMENT OF HEALTH  
KA 'OIHANA OLAKINO  
P. O. BOX 3378  
HONOLULU, HI 96801-3378

December 8, 2022

Sent via Electronic Mail:

Mr. Ernest Y.W. Lau, P.E.  
Manager and Chief Engineer  
Board of Water Supply  
City and County of Honolulu  
630 South Beretania Street  
Honolulu, HI 96843  
elau@hbws.org

Subject: Response to Honolulu Board of Water Supply November 30, 2022, and  
December 5, 2022, letters, Red Hill Bulk Fuel Storage Facility

**What does this mean? Why the use of a passive verb, “encourage.” Why consult with Navy on the release of any Navy-generated documents related to past AFFF uses and releases and PFAs?**

EPA and DOH will encourage the Navy to release to the public the PFAS sampling data promptly after results are available. We will also encourage the Navy to release to the public the documents provided in response to the NOI including AFFF safety data sheets and an inventory of any AFFF remaining at the Red Hill Bulk Fuel Storage Facility. Finally, we will examine our files and then consult with the Navy on the release any Navy-generated documents related to past AFFF uses and releases and PFAS.

**PFAS-Specific Sampling and Analysis plan,  
Red Hill Bulk Fuel Storage Facility, Adit 6  
JOINT BASE PEARL HARBOR-HICKAM, O’AHU, HAWAII**

Date: 30 NOV 2022

Prepared for: Red Hill OIC

Project Action Limits ..... 8  
Sampling Tasks ..... 10



## Project Action Limits

### Groundwater

- Groundwater data will be screened against residential scenario regional screening levels (RSLs) based on a hazard quotient (HQ) of 0.1 (DoD, 2022). RSLs for PFOS, PFOA, PFBS, PFHxS, PFNA, and HFPO-DA based on an HQ of 0.1 are presented in the November 2022 RSL Table (USEPA, 2022). Data will also be screened against HEER Office TGM Section 4.2.7 (HDOH 2021), interim

8

soil and water environmental action levels (EALs) Per- and Polyfluoroalkyl Substances (April 2021).

### Soil

- Soil data will be screened residential scenario RSLs based on an HQ of 0.1 (DoD, 2022). Residential soil RSLs for PFOS, PFOA, PFBS, PFHxS, PFNA, and HFPO-DA based on an HQ of 0.1 are presented in the November 2022 RSL Table (USEPA, 2022). Data will also be screened against HEER Office TGM Section 4.2.7 (HDOH 2021), interim soil and water environmental action levels (EALs) Per- and Polyfluoroalkyl Substances (April 2021).

**In layman's terms, please explain the 2022 RSL Table for residential scenario regional screening levels based on hazard quotient of 0.1.**

**Present an example of exceedance of RSLs.**

-----Original Message-----

From: David Mulinix <ourrevolutionhawaii@yahoo.com>

Sent: Monday, December 12, 2022 11:58 AM

To: Board of Water Supply Board of Directors <board@hbws.org>

Subject: Requesting to provide oral and written testimony to Board of Water Supply meeting 12-12-22

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Aloha,

On behalf of Our Revolution Hawaii's 5,000 members statewide we ask that for the turning over of Red Hill operations to an independent service provider. The Navy has already proven that they are not up to the task of protecting our precious water.

Mahalo,

Dave Mulinix

Statewide Organizer

Our Revolution Hawaii

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**To:** [Stella Bernardo](#); [Board of Water Supply Board of Directors](#)  
**Subject:** Board Meeting Testimony Submittal or Request - Monday, December 12, 2022 - Susan Gorman-Chang  
**Date:** Sunday, December 11, 2022 3:46:32 PM

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## BWS TESTIMONY SUBMITTAL / REQUEST TO TESTIFY FORM

**Form Submitted on:** 12/11/2022 3:45:29 PM

**Meeting Date:** Monday, December 12, 2022

**I wish to provide:** Advance written testimony + request to give remote oral testimony by Zoom videoconference

### TESTIFIER INFORMATION

**Full Name** Susan Gorman-Chang

**Email** [sggc@dslextreme.com](mailto:sggc@dslextreme.com)

**Phone (optional)** (818) 723-0767

### TESTIMONY DETAILS

**Agenda Item** Info #3: US EPA and Hawaii DOH Discussing the Setting of Environmental Action Levels (EALs) & the Aqueous Film Forming Foam (AFFF) Fire Suppressant Spill at the Red Hill Bulk Fuel Storage Facility

**Your Position on Matter** I wish to comment

**Representing** Self

**I wish to provide** Advance written testimony + request to give remote oral testimony by Zoom videoconference

**Written  
Testimony  
(if entered on  
the online  
form;  
otherwise  
see attached)**

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### TESTIFIER INFORMATION

**Full Name** Susan Gorman-Chang

**Email** [sggc@dslextreme.com](mailto:sggc@dslextreme.com)

**Phone (optional)** (818) 723-0767

### TESTIMONY DETAILS

**Agenda Item** Info #3: US EPA and Hawaii DOH Discussing the Setting of Environmental Action Levels (EALs) & the Aqueous Film Forming Foam (AFFF) Fire Suppressant Spill at the Red Hill Bulk Fuel Storage Facility

**Your Position on Matter** I wish to comment

**Representing** Self

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**Written  
Testimony  
(if entered on  
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**To:** [Stella Bernardo](#); [Board of Water Supply Board of Directors](#)  
**Subject:** Board Meeting Testimony Submittal or Request - Monday, December 12, 2022 - Choon James  
**Date:** Monday, December 12, 2022 8:10:52 AM

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### TESTIFIER INFORMATION

**Full Name** Choon James

**Email** ChoonJamesHawaii@gmail.com

**Phone (optional)** (808) 293-9111

### TESTIMONY DETAILS

**Agenda Item** Info #3: US EPA and Hawaii DOH Discussing the Setting of Environmental Action Levels (EALs) & the Aqueous Film Forming Foam (AFFF) Fire Suppressant Spill at the Red Hill Bulk Fuel Storage Facility

**Your Position on Matter** I wish to comment

**Representing** Self

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**Written  
Testimony  
(if entered on  
the online  
form;  
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#3/ United States Environmental Protection Agency (EPA) and Hawaii Department of Health (DOH) Discussing the Setting of Environmental Action Levels (EALs) and the Aqueous Film Forming Foam (AFFF) Fire Suppressant Spill at the Red Hill Bulk Fuel Storage Facility ALOHA to all, We appreciate the Board of Water Supply and all related agencies in working on these very severe and grave Red Hill Bulk Fuel Storage Facility issues. We ask that top priority be given to these issues till we see a hopefully acceptable conclusion. We live on a very small island; our natural resources are finite and always vulnerable to human errors and neglect. We must protect these resources and human capital. That's fundamentally our best national security. After all the leaking of fuel into the aquifer, how could this Aqueous Film Forming Foam (AFFF) Fire Suppressant Spill even take place? What happened? How? How can it be prevented? We asked that the public be provided transparency and open records at all times. We're counting on all entities to do right to Oahu. Time is of the essence. Mahalo, Choon James ChoonJamesHawaii@gmail.com

## ACKNOWLEDGEMENTS

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**To:** [Stella Bernardo](#); [Board of Water Supply Board of Directors](#)  
**Subject:** Board Meeting Testimony Submittal or Request - Monday, December 12, 2022 - Cassandra Chee  
**Date:** Monday, December 12, 2022 10:14:17 AM

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### TESTIFIER INFORMATION

**Full Name** Cassandra Chee

**Email** [cassandralchee@gmail.com](mailto:cassandralchee@gmail.com)

**Phone (optional)** (425) 381-3868

### TESTIMONY DETAILS

**Agenda Item** Info #3: US EPA and Hawaii DOH Discussing the Setting of Environmental Action Levels (EALs) & the Aqueous Film Forming Foam (AFFF) Fire Suppressant Spill at the Red Hill Bulk Fuel Storage Facility

**Your Position on Matter** I wish to comment

**Representing** Self

**I wish to provide** Advance written testimony + request to give remote oral testimony by Zoom videoconference

**Written  
Testimony  
(if entered on  
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Aloha and mahalo for the opportunity to provide testimony. To the EPA and DOH: There is no level at which PFAS or jet fuel in our water feels safe to me. I have more anxiety about getting sick every time I turn on my tap than I do about catching covid. I am appalled at the lack of transparency and response by both departments when at least 1,300 gallons of PFAS have been spilled. As Ernie Lau has demanded we need all the information about how much AFFF has been stored at the Red Hill facility and where it is now. Your lack of response is putting us all in danger, but especially those who are dependent on the Navy's water system and at Kapilina Beach Homes. You need to immediately inform the larger public about the serious health risks they face while living around Kapukaki and Pu'u'loa. Last year at least 93,000 people already got sick on your watch. When will you test our water for PFAS and let the public know the results? What plans do you have to prevent more people from being poisoned and to protect and restore the poisoned 'āina and wai?

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**Meredith Wilson - 12/12/22 BWS Board Meeting Testimony**  
**Action Item #3 - Red Hill**

Aloha, my name is Meredith Wilson and I was forever changed by simply being a resident on Hickam AFB for 5 years. Using the water at my home made me very ill and I've spent the last year battling to become a normal person again.

There are many of us in the military and civilian communities that have either been reassigned or fled the island and now watch from afar the wellspring of support that showed up during this past weekend's Walk for Wai. Mahalo to Manager Lau for his steadfast leadership and for all those who continue to be the hands & feet of this movement.

I'm directing my (3) questions today to the HI DOH representatives:

The current EAL for TPH memo that was revised on April 20th states that, "The action levels are anticipated to be protective of human health under the normal use of tapwater in the absence of other contaminants in the water based on the chemical makeup of JP-5 jet fuel assumed in the models." A few things here:

1. The referenced document for "normal use" is from 2017 and only considers oral consumption. BWS wrote a letter in 2018 urging to include inhalation/vapors & absorption/dermal. This exact scenario played out for my family and thousands of others during last year when we showered in toxic water, bathed our children and pets in it, & so many other daily chores. **What should our safety factor be for toxic effects (EAL) when those routes of exposure are actually considered?** I urge this team to use the precautionary principle instead of a reactionary one. Just because something has degraded in groundwater. doesn't mean that it's still not harmful; it shouldn't be there.
2. Speaking of other contaminants, we have YET to hear from the Navy or from you what the chemical makeup, including additives, of that JP-5 was. Dr. Roger Brewer mentioned during a WRRRC seminar on April 1st that ANTIFREEZE or Fuel System Icing Inhibitor was confirmed to be in the Red Hill Shaft where our drinking water was being drawn from. **What is the carbon range breakdown, additives, and any cleanup materials like Simple Green or other surfactants found in the samples that DOH sent off to be analyzed?** This is now a year overdue.
3. Lastly, it is imperative that you and the Navy clearly communicate to the Navy water system users that "Non-Detect" and a reading of, for example, "110ppb" is NOT the same simply because the reading is below the state's current EAL. Each resident deserves to know the value detected and to make their own decisions on how best to protect their families. **What are your current Minimum Detection Levels and how are you & the Navy reporting back and forth if water users are reporting concerns?**

In closing, some short statements:

-On most EPA letters, I see the language "we *encourage* the Navy to release sampling data to the public"—We are way past encouraging and your institution must have a larger role here.

-Many times I've seen that DOH, DOH contractors, and/or EPA shall have the opportunity to collect independent samples (i.e. PFAS) DOH & EPA: **Will you be doing this?** Why not get a triplicate of each sample in order to get the most validated results.

Mahalo,  
-Meredith Wilson

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**To:** [Stella Bernardo](#); [Board of Water Supply Board of Directors](#)  
**Subject:** Board Meeting Testimony Submittal or Request - Monday, December 12, 2022 - Brandon Bees  
**Date:** Monday, December 12, 2022 10:56:51 AM  
**Attachments:** [Fire Suppressant Testimony.pdf](#)

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### TESTIFIER INFORMATION

**Full Name** Brandon Bees

**Email** brandontbees@gmail.com

**Phone (optional)** (714) 321-6319

### TESTIMONY DETAILS

**Agenda Item** Info #3: US EPA and Hawaii DOH Discussing the Setting of Environmental Action Levels (EALs) & the Aqueous Film Forming Foam (AFFF) Fire Suppressant Spill at the Red Hill Bulk Fuel Storage Facility

**Your Position on Matter** I wish to comment

**Representing** Self

**I wish to provide** Advance written testimony + request to give remote oral testimony by Zoom videoconference

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December 12, 2022

Fire Suppressant Spill

Brandon Bees

3031 Kamakini St., Honolulu, HI, 96816

[brandontbees@gmail.com](mailto:brandontbees@gmail.com)

(714) 321-6319

Comment

Aloha kākou,

My name is Brandon Bees. I am a graduate student at the University of Hawaii at Manoa with a focus on groundwater research, but I am here testifying as a private individual. I will talk about my concerns regarding the health of the community and the transparency of the Navy. I wish to voice my opinion on the recent fire suppressant spill of Red Hill.

I recently worked on an outreach project with a class of high school students from Radford High School where we created a website that offers background information to the public on Red Hill, tools to find where their water originates, who to contact if they have been exposed, health effects, and testimonials from the students. Understanding firsthand how these children and their families have been affected in their testimonies was horrible. They spoke about the burns and hair loss they and their families experienced. No one should have to experience that, especially the keiki.

This recent fire suppressant spill of Aqueous Film Forming Foam, also known as AFFF contained toxic perfluoroalkyl and polyfluoroalkyl substances, or PFAS, also known as “forever chemicals.” These chemicals received their name due to their resistance to breaking down in

natural environmental conditions. This is much worse than solely the jet fuel reaching our water supply since they have been mixed. I am very concerned about the short-term and long-term health effects in the community if it has entered the water supply. Some of the health effects of AFFF in the body include asthma, child development issues, cholesterol increases, fertility problems, and fetal damage to name a few.

Hawaii News Now reported that the Navy does not know what caused the spill and there is no evidence of the drinking water contamination. I am concerned about the Navy's transparency due to previous ways that they have handled these spills. People's health is and has been at stake for a very long time due to these spills. According to the State Department of Health, a plan was approved where sampling of groundwater and soil would be performed. The Department of Health is requiring a detailed report of the events that led to this spill and locations of remaining AFFF in the Red Hill Bulk Fuel Storage Facility. If the Navy provides this response, it will be a step in the right direction towards regaining the trust of the community. Although as I mentioned before, I am worried about the miscommunication of important information to the community. The knowledge of whether the fire suppressant foam has entered the groundwater or not is vital to how we will move forward to address the situation.

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**To:** [Stella Bernardo](#); [Board of Water Supply Board of Directors](#)  
**Subject:** Board Meeting Testimony Submittal or Request - Monday, December 12, 2022 - Tammie Evangelista  
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### TESTIFIER INFORMATION

**Full Name** Tammie Evangelista

**Email** [tammieevangelista@gmail.com](mailto:tammieevangelista@gmail.com)

**Phone (optional)** (808) 209-9713

### TESTIMONY DETAILS

**Agenda Item** Info #3: US EPA and Hawaii DOH Discussing the Setting of Environmental Action Levels (EALs) & the Aqueous Film Forming Foam (AFFF) Fire Suppressant Spill at the Red Hill Bulk Fuel Storage Facility

**Your Position on Matter** Support

**Representing** Self

**I wish to provide** Advance written testimony



**Written  
Testimony  
(if entered on  
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see attached)**

Aloha my name is Tammie Evangelista and I support the board in setting guidelines for Redhill and that there needs to be more transparency in the Navy's part to not only advise of dangers to our aquifer but also have more rules put in place to protect us as citizens and our water resources. Mahalo

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**Cc:** [Deanna Thyssen](#)  
**Subject:** FW: Meeting Testimony 12/12/2022  
**Date:** Monday, December 12, 2022 11:26:11 AM

---

Hi Stella,

Please see below Allison Domenden's written testimony.

*Mahalo,*

*Joy L. Cruz-Achiu*

Board Secretary  
Office of the Manager and Chief Engineer  
[Board of Water Supply](#)  
630 South Beretania Street  
Honolulu, Hawaii 96843  
808-748-5068  
Email: [jcruz-achiu@hbws.org](mailto:jcruz-achiu@hbws.org)

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**Sent:** Monday, December 12, 2022 11:11 AM  
**To:** Board of Water Supply Board of Directors <[board@hbws.org](mailto:board@hbws.org)>  
**Cc:** Allison Domenden <[allisonkauai@gmail.com](mailto:allisonkauai@gmail.com)>  
**Subject:** Meeting Testimony 12/12/2022

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## Testimony

Meeting date:  
December 12, 2022

Agenda item:  
EPA & DOH increase settings of EALs and AFFF at Red Hill Kapukaki

Position: Oppose

Testimony:

Aloha Kakou,

I am Allison Napuananiokawailele Domenden and I strongly oppose the EPA and DOH increase change(s) in settings at Red Hill (or anywhere in Hawai'i for that matter). It should be set at zero, and the people who live on this 'Āina (this land) should not be put through torment and health issues by the choice of corporations. It is we the people, specifically Kanaka Maoli who are suffering at the hands of our oppressors.

Water— is life, it is our elder, it is our mana (energy), it is what flows through our veins (like blood). Water, is the life force that allows us people to thrive. Continuing to change its properties and diverting it causes the life force to be changed and causes illnesses within our people; our future is forever being lost as we continue to allow changes to what water is truly supposed to be— Free! Free from chemicals, free from poison, free from “extra enhancement,” free from the very hands that constitute greed!

E Ola I ka wai Ola Hawai'i!

Allison Napua Domenden  
Lihue, Kauai  
(808)652-4143

Sent from my iPhone

**Stella Bernardo**

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**Sent:** Friday, December 9, 2022 2:55 PM  
**To:** Stella Bernardo; Board of Water Supply Board of Directors  
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**TESTIFIER INFORMATION**

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**Full Name** Diane Fujimura

**Email** diyimnida1@gmail.com

**Phone (optional)** (808) 351-0787

**TESTIMONY DETAILS**

---

**Agenda Item** Request: I would like to submit testimony on multiple items as noted in the written testimony field below

**Your Position on Matter** I wish to comment

**Representing**

Organization

**I wish to provide**

Advance written testimony

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the online form;  
otherwise see  
attached)**

My name is Diane Choy Fujimura, and I am a member of Sierra Club Hawaii and the Shut Down Red Hill Coalition (SDRHC). As the Red Hill disaster has continued to evolve and has exponentially escalated to a future death knell for all of our keiki for generations to come, it appears that the bottom line resolution is the message on a sign I made for a recent event: "FUEL OUT NAVY OUT SHUT DOWN RED HILL" The Navy has consistently proven to all of us that they are incapable of any stewardship having to do with Kapukaki/Red Hill. They have lied countless times, they cannot be trusted, and they do not CARE about the safety and well-being of our aina and our people. Maybe a year ago, any call to get the Navy out of Hawaii would've fallen on deaf ears, and even appalled many. But after more than a year of their sham conduct and bold-faced lying, it is time to oust them from our islands, and engage a reliable, competent third party to carry out the defueling and decommissioning of Red Hill. We cannot waste any more time on trying to deal with them. They do not want the community at the table. Now, with the leak of "forever chemicals" (PFAS) in the Aqueous Film Forming Foam (AFFF) into the ground at Red Hill, the stakes of survival for O'ahu, and all of Hawaii, have reached a point of no return. Once those PFAS get into our water supply via our sole-source aquifer and the pipes that carry water to virtually all of urban Honolulu, there will be no way to mitigate, remediate, or get them safely out of the aquifer, and the water pipes. What then?? The AFFFs and the PFAS are there because there's still fuel in Red Hill. Get the fuel out and there will be no need for AFFFs/PFAS. I applaud the leadership and commitment of Ernie Lau and Erwin Kawata of the BWS. They have stood up to the Navy beast, but we need even MORE ammunition to get what we want. The Hawaii Department of Health must explain why they have caved to whatever misguided information they have received and increased the allowable presence of TPH-d in our water to 266. The DOH must work closely with the BWS to protect our water. We need concerted action NOW. The ticking time bomb of fuel remaining in the Red Hill Tanks, and now with the spill of AFFFs/PFAS, means a very bleak and dark future for all . . . . Think of YOUR keiki, and THEIR KEIKI!! Ola i ka wai. Shut Down Red Hill NOW! (P.S. Aloha Bryan! Since retiring from REB/DCCA, I've been busy with the Red Hill issue. Please do all you can to help this important and life-threatening fight.)

## ACKNOWLEDGEMENTS

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-----Original Message-----

From: Roslyn Cummings <[roslyncummings@ymail.com](mailto:roslyncummings@ymail.com)>

Sent: Monday, December 12, 2022 8:31 AM

To: Board of Water Supply Board of Directors <[board@hbws.org](mailto:board@hbws.org)>

Subject: Board Meeting, Testimony On the Record

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Meeting Date: December 12, 2022

Agenda: Status update for Groundwater levels at All Index Stations, United States Environmental Report Protection Agency (EPA) and Hawaii Department of Health discussing the setting of Environmental Action Levels (EALS) and the Aqueous Film Forming Foam (AFFF) Fire Suppressant Spill at The Red Hill Bulk Fuel Facility

Ola I Ka Wai Ola,  
Long Live, The Living Waters

Section 3-302

The subject of surface waters shall be governed by the appropriate and applicable Federal and State statutes, rules, regulations, directives and standards as currently exist and as may, from time to time hereafter be amended. [Eff 5/10/76; am, renum and comp BWS Res. No. 427, 1976]

Within this Agency please provide referenda

Sec. 3-304 Protection of Water Resources 1. Pursuant to the applicable provisions of the Revised Charter of the City and County of Honolulu, any proposed amendments to the "General Plan" and "Development Plan" of the City and County of Honolulu shall be reviewed by the Manager. 2. Whenever applications for any land use activity within the Conservation District in the City, whether permitted or not by State or City agencies, are submitted to the Manager for his review, the Manager shall investigate the effects the proposed use may have on water resources. 3. The Manager may recommend disapproval, within 30 days, if he finds any reason that the proposed activity could affect water resources and may be a detriment to the water resources used or expected to be used for domestic water. 4. If the Manager recommends disapproval, he shall inform the applicant of those facts and reasons upon which his disapproval is based, and shall afford the applicant an opportunity for informal hearing before the Manager prior to making a final decision.

§174C-2 Declaration of policy. (a) It is recognized that the waters of the State are held for the benefit of the citizens of the State. It is declared that the people of the State are beneficiaries and have a right to have the waters protected for their use. (b) There is a need for a program of comprehensive water resources planning to address the problems of supply and conservation of water. The Hawaii water plan, with such future amendments, supplements, and additions as may be necessary, is accepted as the guide for developing and implementing this policy. (c) The state water code shall be liberally interpreted to obtain maximum beneficial use of the waters of the State for purposes such as domestic uses, aquaculture uses, irrigation and other agricultural uses, power development, and commercial and industrial uses. However, adequate provision shall be made for the protection of traditional and

customary Hawaiian rights, the protection and procreation of fish and wildlife, the maintenance of proper ecological balance and scenic beauty, and the preservation and enhancement of waters of the State for municipal uses, public recreation, public water supply, agriculture, and navigation. Such objectives are declared to be in the public interest. (d) The state water code shall be liberally interpreted to protect and improve the quality of waters of the State and to provide that no substance be discharged into such waters without first receiving the necessary treatment or other corrective action. The people of Hawaii have a substantial interest in the prevention, abatement, and control of both new and existing water pollution and in the maintenance of high standards of water quality.

I, Roslyn Nicole Manawaiakea: Malama a Spiritual Human Being of Sound Mind and Rightful Body State my Claim as a Kanaka Maoli, Wahine Maoli direct Descendent to Kamehameha I Paiea, Kaumualii I, Kaumualii II George Humehume, Kaumualii III Kealiihonui, Lunalilo, and many of the Hawaiian Monarchy since Wao Kahiko. My declaration is to Help stop the depletion, desecration, and blatant use of our (Kanaka Maoli, Kanaka) Wai (Waters) which includes Muliwai (Rivers), Kahawai (Streams), Waialele (Waterfalls), Waipuna (Aqueducts), Auwai (irrigation), Punawai (Springs), and Wai Momona (Sweet Waters)

With Department of Health and Environmental Protection Agency. My question is:

1. What are each agency's and agents fiduciary duties? Along with, within this agency what are the judiciary boundaries? Limitations to action plan against The United States of America Navy
2. Being that The Commander in Chief is the executive why has no one within the above agencies contacted the Executive also known as The President of the United States of America Joe Biden. A letter, email, and Visit should be made (ASAP) as soon as possible in regards to the health and wealth of the people of Hawaii. Starting with Oahu Mokupuni. Red Hill is a Water Crisis that should be set as a national emergency. What is being done to Legally address the US Navy especially after Vice President Kamala Harris recent Visit to Hawaii and given public notice.
3. Each agency shall provide data for public viewing and updates because of the worry and fear of what if? Where? How? Why? These questions shall have answers per each agencies Kuleana (responsibility)
4. What is your superiority over water right(s) in Ko Hawaii Pae Aina? Hawaii Nei (All of Hawaii) When Permits are submitted can it not be revoked? Is there no fine per day? How can your agency address this issue so that way no further injurious harm can be made? What can be done to prevent future disasters from Red Hill and throughout Hawaii? Is there a monitor from the agency as a "guard" the can be at watch at the facility?

Ola I Ka Wai Ola "Long Live Our Living Waters" for the health of the people is dependent on the health of our wai

Again, please provide a action plan for the Public

Aloha No, Roslyn Cummings e Ku Kakou Makemake No Ka Aina From thousand generations before me to a thousand generations after, He Aina Hawaii

**From:** Cheryl B <burgharc@gmail.com>

**Sent:** Monday, December 12, 2022 8:40 AM

**To:** Board of Water Supply Board of Directors <board@hbws.org>

**Subject:** Testimony for today's 2pm

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Aloha

Simply and strongly, it is past time to **take a stand.** The EPA and DOH are agencies that are supposed to protect the people, land and water.

We know that PFAS is harmful. We know that it is in our water just like we know the petroleum leaked and impacted our community. The ships in the harbor daily leak into our water. There are no excuses for not dealing with this issue with full transparency. The US Navy and govt. is a system that only has one response, to cover up, lie and move on to the next place to pollute. The US Navy has no reason to do anything else UNLESS we force them to do so. IT is that time, now.

For too long the US Military has had carte blanche to do as they please on these islands. The military budget for war and maintaining the war machine has enough \$\$\$ to solve these issues. They choose to not do so. IT is again TIME NOW to force them to act.

Our water, our islands are vulnerable and we need to act NOW.

C. Burghar

D. Gre

Kou, O`ahu



**From:** [contactus=notify2.boardofwatersupply.com@mg.boardofwatersupply.com](mailto:contactus=notify2.boardofwatersupply.com@mg.boardofwatersupply.com) on behalf of [contactus@notify2.boardofwatersupply.com](mailto:contactus@notify2.boardofwatersupply.com)  
**To:** Stella Bernardo; [Board of Water Supply Board of Directors](#)  
**Subject:** Board Meeting Testimony Submittal or Request - Monday, December 12, 2022 - Pete Doktor  
**Date:** Monday, December 12, 2022 10:50:46 AM

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## BWS TESTIMONY SUBMITTAL / REQUEST TO TESTIFY FORM

**Form Submitted on:** 12/12/2022 10:50:23 AM

**Meeting Date:** Monday, December 12, 2022

**I wish to provide** Advance written testimony

### TESTIFIER INFORMATION

**Full Name** Pete Doktor

**Email** dok@riseup.net

**Phone (optional)** (808) 782-0023

### TESTIMONY DETAILS

**Agenda Item** (select from list)

**Your Position on Matter** I wish to comment

**Representing** Organization

**I wish to provide** Advance written testimony

Aloha To Whom It May Concern, Mahalo nui to the BWS for defending our water from military devastation. I write you as a member of the local chapter (Ch. 113) of

**Written  
Testimony  
(if entered on  
the online  
form;  
otherwise  
see attached)**

Veterans for Peace, a non-profit of military veterans and supporters opposed to systematic militarism, as well as concerned `ohana member in Moanalua that have been stressing since the 2014 leak has been threatening our water integrity. We deserve clean and safe water and soil. The Navy is poisoning both, with the release of PFAS as just the latest example throughout its history on ka pae `āina. We demand the Navy clean all parts of the AFFF spill and continue to remove all fuel and petroleum from the Red Hill Storage facility as soon as safely possible -- July 2024 is too long! The community along with fuel tank experts should set the Navy's timeline for cleanup. Their delay strategy only keeps us threatened longer. We demand that state and federal regulators exercise their powers to the fullest extent, as the military is currently are greatest threat to public health, safety and economy. Water is a true wealth and security. We demand that the Navy cleans its mess and return our `āina. The military and its mission are incompetent in terms of aloha `āina which is counter to their mission or priorities and demands that those sharing our precious island resources for future generations. My experience as a military servicemember informs my conclusions and position that the military cannot be entrusted and community oversight is necessary, Thank you for your commitment to defend our precious waiwai. Pete Doktor Moanalua

## ACKNOWLEDGEMENTS

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**From:** [contactus=notify2.boardofwatersupply.com@mq.boardofwatersupply.com](mailto:contactus=notify2.boardofwatersupply.com@mq.boardofwatersupply.com) on behalf of [contactus@notify2.boardofwatersupply.com](mailto:contactus@notify2.boardofwatersupply.com)  
**To:** Stella Bernardo; Board of Water Supply Board of Directors  
**Subject:** Board Meeting Testimony Submittal or Request - Monday, December 12, 2022 - Dylan Ramos  
**Date:** Monday, December 12, 2022 11:12:23 AM

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## BWS TESTIMONY SUBMITTAL / REQUEST TO TESTIFY FORM

**Form Submitted on:** 12/12/2022 11:11:16 AM

**Meeting Date:** Monday, December 12, 2022

**I wish to provide** Advance written testimony

### TESTIFIER INFORMATION

**Full Name** Dylan Ramos  
**Email** [dylanpk.ramos@gmail.com](mailto:dylanpk.ramos@gmail.com)  
**Phone (optional)** (808) 551-6999

### TESTIMONY DETAILS

**Agenda Item** Info #3: US EPA and Hawaii DOH Discussing the Setting of Environmental Action Levels (EALs) & the Aqueous Film Forming Foam (AFFF) Fire Suppressant Spill at the Red Hill Bulk Fuel Storage Facility

**Your Position on Matter** I wish to comment

**Representing** Self

**I wish to provide** Advance written testimony

**Written  
Testimony  
(if entered on  
the online  
form;  
otherwise  
see attached)**

Aloha, Thank you to the Board of Water Supply for keeping up the pressure for accountability and justice regarding Red Hill. Please see to it that the DOH and EPA are equally committed to these goals as they deal with the Navy. Mahalo, Dylan Ramos Honolulu

#### ACKNOWLEDGEMENTS

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**From:** Lorna Holmes <lholmes@hillsdale.edu>

**Sent:** Monday, December 12, 2022 10:19 AM

**To:** Board of Water Supply Board of Directors <board@hbws.org>

**Subject:** written testimony for meeting 12-12-22

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Aloha Board of Water Supply Members,

This is to encourage you to use all means available to you to get the Navy to move rapidly on draining Red Hill, on being honest about sharing information right away, and also to get the Board of Health to up its standards for water pollution.

The EPA has established updated advisory guidelines for the two most well-studied PFAS – PFOA and PFOS – yet the DOH’s environmental action levels for these particular “forever chemicals” still remain thousands of times higher. We need the DOH to provide greater protection for the people of Hawai‘i than the EPA, not less, since the EPA has failed time and again to protect communities here and across the continent from environmental contaminants.

Mahalo for your work,  
Lorna Holmes  
Honolulu 96817

**From:** Shannon Rudolph <shannonkona@gmail.com>

**Sent:** Monday, December 12, 2022 10:29 AM

**Subject:** Comment/ Dec. 12th Board Meeting

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Aloha!

Residents (& visitors) on every island are horrified by what's happening at Pu'uloa/Red Hill, PFAS & other military toxins.

Many of us are worried about our friends & troops/families health in the affected areas going forward.

The HBWS is the ONLY agency we trust to do the right thing.

Please don't let up on this terrible situation. Please hold their feet to the fire to fix this asap!!!

Mahalo,  
Shannon Rudolph - Kona

--

How wonderful it is that nobody need wait a single moment before starting to improve the world. ~  
Anne Frank

**From:** [contactus=notify2.boardofwatersupply.com@mq.boardofwatersupply.com](mailto:contactus=notify2.boardofwatersupply.com@mq.boardofwatersupply.com) on behalf of [contactus@notify2.boardofwatersupply.com](mailto:contactus@notify2.boardofwatersupply.com)  
**To:** [Stella Bernardo](#); [Board of Water Supply Board of Directors](#)  
**Subject:** Board Meeting Testimony Submittal or Request - Monday, December 12, 2022 - Patti Choy  
**Date:** Monday, December 12, 2022 11:28:07 AM

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## BWS TESTIMONY SUBMITTAL / REQUEST TO TESTIFY FORM

**Form Submitted on:** 12/12/2022 11:27:06 AM

**Meeting Date:** Monday, December 12, 2022

**I wish to provide** Advance written testimony

### TESTIFIER INFORMATION

**Full Name** Patti Choy

**Email** [halamango@gmail.com](mailto:halamango@gmail.com)

**Phone (optional)** (917) 575-4103

### TESTIMONY DETAILS

**Agenda Item** Info #3: US EPA and Hawaii DOH Discussing the Setting of Environmental Action Levels (EALs) & the Aqueous Film Forming Foam (AFFF) Fire Suppressant Spill at the Red Hill Bulk Fuel Storage Facility

**Your Position on Matter** I wish to comment

**Representing** Organization

**I wish to provide** Advance written testimony

**Written  
Testimony  
(if entered on  
the online  
form;  
otherwise  
see attached)**

It is with disappointment, disgust and anger that I address the Dept. of Health (DOH) and Environmental Protection Agency (EPA) representatives on the Red Hill nightmare. Why do you refuse to share information with the Board of Water Supply (BWS)? It's pathetic to hear Ernie Lau pleading publicly for information from your departments when your missions are supposedly to protect the community and the environment. It is imperative to communicate openly with the BWS, as it is the only entity that has established communication with the public. The BWS is literally our lifeline for wai and information during this crisis. It is shameful we cannot rely on the DOH and EPA as our protectors. Your lack of action and concern on behalf of the people and 'aina, all living beings, begs the question: Who do you work for? Through your lack of transparency and inability to tackle the Navy, we know your answer: The Navy. Outside of your bubbles this is the impression of your departments. The public's trust with the DOH and EPA is at stake. You need to investigate the latest AFFF spill and assess the damage to the aquifer and environment, and inform people of the risks involved when PFAS start quickly moving into the soil and water. What have we heard from you? What action have we seen you take with the Navy? Nothing.

## ACKNOWLEDGEMENTS

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-----Original Message-----

From: Jennifer Valentine <faboo1028@yahoo.com>

Sent: Monday, December 12, 2022 11:29 AM

To: Board of Water Supply Board of Directors <board@hbws.org>

Subject: please get the Dept of Health & the EPA to protect the environment and public health.

CAUTION: This email originated from outside of the organization. Do not follow guidance, click links, or open attachments unless you recognize the sender and know the content is safe.

People right now are being potentially poisoned by Navy water, yet no one is warning them. Pearl Harbor water system consumer confidence reports have indicated detections of PFOA and PFOS hundreds of times above the current EPA advisory limits when they were sampled in 2020 and 2021. Families - including babies and children - child development centers, and businesses on the Navy's water system all need to be notified that they may be exposed to unsafe levels of "forever chemicals" in their drinking water. Visitors to the Arizona Memorial, civilian families at Kapilina Beach Homes - everyone drinking this water needs to be warned. The fact that the Navy has not taken these steps is unconscionable and the fact that EPA and the DOH are not forcing them to do so is a failure of the public trust and their very purpose for existing - protecting our environment and our health.

The larger environment and the larger community are also at risk. In addition to continuous monitoring of the Navy's drinking water system and associated groundwater sources, water being discharged from the Pearl Harbor wastewater treatment plant and water from Hālawā stream need to be checked for PFAS, given the potential and likely sources of these contaminants. If the other week's spill of PFAS was not the first, fishers eating fish from Pu'uloa, hunters harvesting pigs from the area, and people using water from Hālawā stream for gardening or other purposes need to be informed now about the health risks they potentially have been and may be currently exposed to. Until we have confirmation otherwise, the EPA and DOH MUST immediately inform the larger public about the health risks - including cancers, reproductive issues, and serious long term illnesses - that may be associated with the water, soil, and aquatic and terrestrial life in the region surrounding Kapūkakāi and the Navy's other wells.

The Navy needs to come clean so we know the full financial, environmental, and human harms that must now be managed. As Ernie Lau demanded - we must have full access to all records for every single AFFF system using PFAS within range of the Navy's drinking water wells, including an accounting of how much AFFF has been stored and discharged (intentionally and unintentionally) along with how much AFFF remains within these systems. None of this information is in any way relevant to "national security" and must be disclosed FULLY and IMMEDIATELY for the health and lives of community members - including future generations that could be impacted by "forever chemicals" currently in the environment. The EPA and DOH must demand that the Navy provide us with this information and if necessary, force it to do so - so that we can respond appropriately to and adequately manage these serious threats to our aquifer, our environment, and our health.

The EPA and DOH need to stop cutting deals with the Navy behind the public's back. The EPA has already been working on an "agreement in principle" with the Navy regarding last year's fuel spill, without any public disclosure of the EPA's priorities, concerns, or demands. This reeks of the politically-driven process behind the 2015 Administrative Order on Consent, which allowed the Navy to do almost nothing for over six years even after it spilled 27,000 gallons of fuel directly above our groundwater aquifer. The EPA and DOH failed us for the better part of a decade by letting the Navy make promises it never fulfilled - and the EPA appears to be doing it all over again. Shielding the Navy and denying Hawai'i's threatened communities the right to determine what measures will really keep us safe exacerbates the Navy's violations of our 'āina, wai, people, and human dignity - and flies in the face of the White House's supposed commitment to "environmental justice."

The DOH must update its environmental action levels to protect our people. The EPA has established updated advisory guidelines for the two most well-studied PFAS - PFOA and PFOS - yet the DOH's environmental action levels for these particular "forever chemicals" still remain thousands of times higher. The DOH must provide greater protection for the people of Hawai'i than the EPA, which has failed time and again to protect communities here and across the continent from environmental contaminants - literally resulting in deaths, life-changing illnesses, and financial ruin to too many people and communities, among many other impacts. However, the DOH's EALs for PFAS is providing us with even less protection than the EPA. The DOH must employ the precautionary principle - otherwise known as common sense - and do its job to protect what we now know may be at serious risk: the 'āina, wai, and present and future generations of Hawai'i nei.

thank you, Jennifer Valentine

**From:** Mari Mennel-Bell <mari471@aol.com>  
**Sent:** Monday, December 12, 2022 9:21 AM  
**To:** Board of Water Supply Board of Directors <board@hbws.org>  
**Subject:** Please protect the environment and public health!!

**CAUTION:** This email originated from outside of the organization. Do not follow guidance, click links, or open attachments unless you recognize the sender and know the content is safe.

Hello!

I urge you to give serious consideration to all of the following issues:

- 1. People right now are being potentially poisoned by Navy water, yet no one is warning them.** Pearl Harbor [water system consumer confidence reports](#) have indicated detections of PFOA and PFOS *hundreds of times* above the [current EPA advisory limits](#) when they were sampled in 2020 and 2021. Families - including babies and children - child development centers, and businesses on the Navy's water system all need to be notified that they may be exposed to unsafe levels of "forever chemicals" in their drinking water. Visitors to the Arizona Memorial, civilian families at Kapilina Beach Homes - everyone drinking this water needs to be warned. **The fact that the Navy has not taken these steps is unconscionable and the fact that EPA and the DOH are not forcing them to do so is a failure of the public trust and their very purpose for existing - protecting our environment and our health.**
- 2. The larger environment and the larger community are also at risk.** In addition to continuous monitoring of the Navy's drinking water system and associated groundwater sources, water being discharged from the Pearl Harbor wastewater treatment plant and water from Hālawā stream need to be checked for PFAS, given the potential and likely sources of these contaminants. If the other week's spill of PFAS was not the first, fishers eating fish from Pu'uloa, hunters harvesting pigs from the area, and people using water from Hālawā stream for gardening or other purposes need to be informed now about the health risks they potentially have been and may be currently exposed to. **Until we have confirmation otherwise, the EPA and DOH MUST immediately inform the larger public about the health risks – including cancers, reproductive issues, and serious long term illnesses – that may be associated with the water, soil, and aquatic and terrestrial life in the region surrounding Kapūkakī and the Navy's other wells.**
- 3. The Navy needs to come clean so we know the full financial, environmental, and human harms that must now be managed.** As Ernie Lau demanded - we must have full access to all records for every single AFFF system using PFAS within range of the Navy's drinking water wells, including an accounting of how much AFFF has been stored and discharged (intentionally and unintentionally) along with how much AFFF remains within these systems. None of this information is in any way relevant to "national security" and must be disclosed FULLY and IMMEDIATELY for the health and lives of community members – including future generations that could be impacted by "forever chemicals" currently in the environment. **The EPA and DOH must demand that the Navy provide us with this information and if necessary, force it to do so – so that we can respond appropriately to and adequately manage these serious threats to our aquifer, our environment, and our health.**

2. **The EPA and DOH need to stop cutting deals with the Navy behind the public's back.** The EPA has already been working on an "agreement in principle" with the Navy regarding last year's fuel spill, without any public disclosure of the EPA's priorities, concerns, or demands. This reeks of the politically-driven process behind the 2015 Administrative Order on Consent, which allowed the Navy to do almost nothing for over six years even after it spilled 27,000 gallons of fuel directly above our groundwater aquifer. The EPA and DOH failed us for the better part of a decade by letting the Navy make promises it never fulfilled – and the EPA appears to be doing it all over again. **Shielding the Navy and denying Hawai'i's threatened communities the right to determine what measures will really keep us safe exacerbates the Navy's violations of our 'āina, wai, people, and human dignity – and flies in the face of the White House's supposed commitment to "environmental justice."**
3. **The DOH must update its environmental action levels to protect our people.** The EPA has established updated advisory guidelines for the two most well-studied PFAS – PFOA and PFOS – yet the DOH's environmental action levels for these particular "forever chemicals" still remain thousands of times higher. The DOH must provide greater protection for the people of Hawai'i than the EPA, which has failed time and again to protect communities here and across the continent from environmental contaminants – literally resulting in deaths, life-changing illnesses, and financial ruin to too many people and communities, among many other impacts. However, the DOH's EALs for PFAS is providing us with even less protection than the EPA. **The DOH must employ the precautionary principle – otherwise known as common sense – and do its job to protect what we now know may be at serious risk: the 'āina, wai, and present and future generations of Hawai'i nei.**

**Very, sincerely,  
Mari Mennel-Bell  
1440 South Ocean Blvd., 12D  
Pompano Beach Florida 33062**

-----Original Message-----

From: Shar Louis <sha8000@gmail.com>

Sent: Monday, December 12, 2022 11:51 AM

To: Board of Water Supply Board of Directors <board@hbws.org>

Subject: Protecting our water

**CAUTION:** This email originated from outside of the organization. Do not follow guidance, click links, or open attachments unless you recognize the sender and know the content is safe.

Mahalo for all the work you are doing. I would hope the DOH and the EPA would honor your work as well and do everything that is possible to protect Hawai'i drinking water.

Our water is poisoned now from the Navy. There has been little real action on their part to cooperate and move the fuel and in the meantime the situation has become seriously tragic.

Why is this not being fixed. We need answers and actions.

This will only get worse.

Please do what you can to foster immediate intervention.

Mahalo,  
Shar Louis

Sent from my iPad

**From:** Katherine McClanahan <kmac101197@gmail.com>  
**Sent:** Monday, December 12, 2022 11:51 AM  
**To:** Board of Water Supply Board of Directors <board@hbws.org>  
**Subject:** Public Comment for 12/12/22 meeting

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Comments/questions attached in a word document for the presenters at today's meeting:

For BWS Meeting Date: 12/12/22  
Katherine McClanahan  
[kmac101197@gmail.com](mailto:kmac101197@gmail.com)  
318-393-6438

Position on issue: Comment/Ask questions

Testifying as myself

Attached are my comments/questions for the meeting 12/12/22.

Thank you,  
Katherine McClanahan

Sent from my iPad

My name is Katherine McClanahan and my family and I were sickened during the Red Hill toxic exposure last year. As our family continues struggling with new and never before experienced physical & neurological issues since last year's exposure, symptoms that began months before the 2<sup>nd</sup> leak of 2021. Symptoms that for every person I have met and questioned, symptoms that also began for before the 2<sup>nd</sup> leak of 2021. I have several questions I am hoping you can shed light on in order to aid our families and prevent Hawaii's aquifer and their families from suffering like ours has:

- 1) To the EPA/HDOH/NAVY/Honolulu BWS: For each month last year (2021), what were the exact levels of TPH-d and TPH-o for **each month** last year for Navy water testing?  
1A) Were those test results pulled from drinking water samples? The wells? Where were those samples drawn from?  
This data along with maps of the location of where in the water distribution system should be provided to all medical providers and all families.
- 2) To the EPA/HDOH/NAVY: **When will any entity who is supposed to be protecting human health provide a complete LIST for the families and medical providers of ALL known or SUSPECTED contaminants that were in or suspected to be in the water, pipes, & storage tanks last year? What contaminants have been found in water sampling data from years prior? Please for our families' best chances of a healthy future provide that list! With the AFFF spill this month, families were potentially exposed to much more last year than originally thought.**
- 3) To Hawaii DOH: Please site the **exact human health research reports that demonstrate how 400ppb for TPH is not detrimental to Human Health and was used to elevate the TPH EAL from 160 ppb to 400ppb? If you cannot provide said human health research, how is it you claim that 400ppb is protective of human health? EALs historically are based on the level of risk, i.e. only 1 in 10,000 will get sick or get cancer. It is clear to anyone watching the news this past year that many more than 10 people (93,000 water users) have had negative health effects.**
- 4) To Hawaii DOH/EPA: How many people in the Hawaii DOH must approve of and sign their professional credentials certifying they believe the EALs were safe to raise between 160ppb to 400ppb? Were there any dissenters in the HDOH who felt the level of more than 2 ½ times the current limit was too high? For those expressing concern over raising the EAL, what was their reasoning? Who is the final authority in raising EALs?

Thank you for your time and our families look forward to hearing answers for these questions.

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**To:** [Stella Bernardo](#); [Board of Water Supply Board of Directors](#)  
**Subject:** Board Meeting Testimony Submittal or Request - Monday, December 12, 2022 - Kristen Young  
**Date:** Monday, December 12, 2022 12:06:05 PM  
**Attachments:** [Kristen Young testimony BWS meeting 12.12.22.pdf](#)

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**Form Submitted on:** 12/12/2022 12:05:49 PM

**Meeting Date:** Monday, December 12, 2022

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### TESTIFIER INFORMATION

**Full Name** Kristen Young  
**Email** [kyoung@hcucc.org](mailto:kyoung@hcucc.org)  
**Phone (optional)** (808) 927-0741

### TESTIMONY DETAILS

**Agenda Item** Info #3: US EPA and Hawaii DOH Discussing the Setting of Environmental Action Levels (EALs) & the Aqueous Film Forming Foam (AFFF) Fire Suppressant Spill at the Red Hill Bulk Fuel Storage Facility

**Your Position on Matter** I wish to comment

**Representing** Self

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**Written  
Testimony  
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Personal testimony  
Kristen Young  
[kyoung@hcucc.org](mailto:kyoung@hcucc.org)

**Board of Water Supply - Board Meeting**  
**Meeting Date: Monday, December 12, 2022, 2:00 p.m.**  
**Agenda Item: Info #3: US EPA and Hawaii DOH Discussing the Setting of Environmental Action Levels (EALs) & the Aqueous Film Forming Foam (AFFF) Fire Suppressant Spill at the Red Hill Bulk Fuel Storage Facility**

Like many others, I am deeply concerned about Red Hill and equally horrified at the inaction of agencies that I believed were supposed to protect us. I don't believe that the military's purpose is to protect Hawai'i, but the Environmental *Protection* Agency and Department of *Health* are supposed to prioritize our protection and health. Please remind these agencies of their kuleana and duty. They should be doing everything in their power to help the public understand the situation we are facing so we can protect ourselves, including the following:

**1. Notify the public**

Right now, people are potentially being poisoned by the Navy's drinking water system, and no one is warning them. Pearl Harbor water system consumer confidence reports have indicated detections of PFOA and PFOS (when they were sampled in 2020 and 2021) hundreds of times above the current EPA advisory limits. Families, child development centers, businesses on the Navy's water system, visitors to the Arizona Memorial, civilians at Kapilina Beach Homes... **everyone using this water must be meaningfully notified that they may be exposed to unsafe levels of "forever chemicals" in their water.**

Until we have confirmation otherwise, **the EPA and DOH must immediately inform the wider public about the health risks associated with the water, soil, aquatic and terrestrial life in the region surrounding Kapūkakī and the Navy's wells.** It is unconscionable that the Navy has not taken these steps, and that the EPA and DOH are not forcing them to do so, going against public trust and their very purpose—to protect our environment and health.

**2. Demand transparency**

It is imperative for us that the Navy be transparent so we know the full financial, environmental, and human harms that must be managed. As Ernie Lau demanded - **we must have full access to all records for every single AFFF system using PFAS within range of the Navy's drinking water wells**, including an accounting of how much AFFF has been stored and discharged along with how much AFFF remains within these systems.

Withholding this information is a threat to our security. **The EPA and DOH must join the public in demanding (forcing, if necessary) that the Navy provide us with this information immediately** so that we can respond appropriately to and adequately manage these serious threats to our aquifer, our environment, our health, and future generations.

**3. Update environmental action levels**

While the EPA, which does not have the best record of protecting communities, has established updated advisory guidelines for the two most well-studied PFAS (PFOA and PFOS), the DOH's environmental action levels for these particular "forever chemicals" still remain thousands of times higher. **The DOH must update its environmental action levels to protect our people.**

Mahalo nui,

Kristen Young  
Honolulu resident

-----Original Message-----

From: maheshi kloepfer <maheshihawaii@yahoo.com>  
Sent: Monday, December 12, 2022 12:06 PM  
To: Board of Water Supply Board of Directors <board@hbws.org>  
Subject: Red hill

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Aloha. The state of Hawaii owns the land red hill is on. The state of Hawaii needs to have their own engineers go into red hill and make the necessary changes now. The state of Hawaii needs to take charge of this as we have a vested interest, the navy does not and they prove over and over what a terrible tenant they are. The state of Hawaii does the necessary work and bills the navy. Period. Aloha. Irene Kloepfer Sent from my iPad

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**To:** [Stella Bernardo](#); [Board of Water Supply Board of Directors](#)  
**Subject:** Board Meeting Testimony Submittal or Request - Monday, December 12, 2022 - Sherry Pollack  
**Date:** Monday, December 12, 2022 12:11:35 PM

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**Meeting Date:** Monday, December 12, 2022

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### TESTIFIER INFORMATION

**Full Name** Sherry Pollack  
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### TESTIMONY DETAILS

**Agenda Item** Info #3: US EPA and Hawaii DOH Discussing the Setting of Environmental Action Levels (EALs) & the Aqueous Film Forming Foam (AFFF) Fire Suppressant Spill at the Red Hill Bulk Fuel Storage Facility

**Your Position on Matter** I wish to comment

**Representing** Self

**I wish to provide** Advance written testimony

**Written  
Testimony  
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Aloha We must use the precautionary principle when environmental and human health hazard is uncertain and the stakes are high. That goes for jet fuel and especially PFAS (forever chemicals) contamination. I urge you to adopt a threshold of less than 100 ppb for TPH. I am also urging you to ensure more transparency from the Navy and the ability for more community involvement in these decisions. In addition, we must have ground water studies immediately to assess the full nature of the problem and prevent more from getting to the environment. We also need a third part to take over remediation efforts before something else happens to threaten or completely destroy our precious aquifer. Our groundwater is already contaminated and we need to defuel quickly. The Navy's current timeline is too long. Mahalo!

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**To:** Stella Bernardo; Board of Water Supply Board of Directors  
**Subject:** Board Meeting Testimony Submittal or Request - Monday, December 12, 2022 - Danielle Espiritu  
**Date:** Monday, December 12, 2022 1:40:20 PM

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**Meeting Date:** Monday, December 12, 2022

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### TESTIFIER INFORMATION

**Full Name** Danielle Espiritu

**Email** dani.espiritu.intervarsity@gmail.com

**Phone (optional)** (808) 358-5011

### TESTIMONY DETAILS

**Agenda Item** Info #3: US EPA and Hawaii DOH Discussing the Setting of Environmental Action Levels (EALs) & the Aqueous Film Forming Foam (AFFF) Fire Suppressant Spill at the Red Hill Bulk Fuel Storage Facility

**Your Position on Matter** I wish to comment

**Representing** Self

**I wish to provide** Advance written testimony + request to give remote oral testimony by Zoom videoconference

**Written  
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Aloha kākou, My name is Danielle Espiritu, and I am a resident of Waimalu in the moku (district) of 'Ewa. I am writing to express serious concerns tied to the EPA and Hawai'i Department of Health environmental action levels, especially considering the recent release of approximately 1,300 gallons of AFFF and the detection of these "forever chemicals" in the groundwater at Kapūkakī. As we know, the moku of 'Ewa, as well as many of our island's valleys, are filled with freshwater springs that bring water up from the aquifer, into our streams, out to the surrounding environment, and eventually into the ocean. It is not a matter of if these chemicals will surface, but when. The EPA and the Department of Health NEED to begin regular monitoring of groundwater sources surrounding the Red Hill facility, including water from Hālawā Stream as well as water being discharged from the Pearl Harbor wastewater treatment plant. These sources MUST be checked regularly for PFAS and the data MUST be made publicly available. In addition, the EPA and the DOH must begin an educational campaign to inform the public of the health risks of these chemicals. We are talking about cancer exposure, long term illnesses, and reproductive issues that will last centuries! People have no idea! The 93,000 people on the Joint Base Pearl Harbor Hickam water line were not informed by the Navy when they were first poisoned last year. Samples from 2020 and 2021 show detections of PFOA and PFOS that are hundreds of times above the current EPA advisory limits. People drinking from this water system are potentially still being poisoned and no one is warning them. The Navy has chosen not to be forthright with information, at the expense of their own families and civilians relying on their water system, and yet, the EPA and DOH is allowing it to happen. These departments exist to protect the health of our people and 'āina. Why are they not forcing the Navy to inform the public and these families about this risk? The Navy has failed to come clean about things as basic as disclosing to the public the chemicals held in its underground facility at Kapūkakī. This is critical to our survival. Families who have been poisoned need this information in order to seek proper treatment, and entities, like the Board of Water Supply, must know what they are looking for in order to track and mitigate the spread of fuel and harmful chemicals in our groundwater and ensure they do not enter our public water distribution systems. The EPA and the DOH exist to protect us. It is NOT time to be afraid or to shield the Navy with your silence. The health and future of our islands literally depends on your boldness and the decisions you make right now. With this, the Department of Health MUST update its environmental action levels. Their kuleana is to protect the health of our people both now and into the future. In spite of newly updated EPA guidelines, current DOH environmental action levels for PFOA and PFOS "forever chemicals" are still thousands of times higher. The DOH should be taking a much more cautious approach, especially considering that these chemicals bioaccumulate and pose serious and at times fatal risks to 'āina, wai, and people. As someone whose family once fished and gathered from Pu'uloa and the streams that fed into her and whose livelihood and community depends on the springs in valleys surrounding Kapūkakī, I implore you. Do not wait. Act now. A failure to do so is nothing short of being complicit to genocide. Mahalo.

## ACKNOWLEDGEMENTS

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**To:** Stella Bernardo; Board of Water Supply Board of Directors  
**Subject:** Board Meeting Testimony Submittal or Request - Monday, December 12, 2022 - Healani Sonoda-Pale  
**Date:** Monday, December 12, 2022 2:26:14 PM

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**Meeting Date:** Monday, December 12, 2022

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### TESTIFIER INFORMATION

**Full Name** Healani Sonoda-Pale

**Email** [healanipale@gmail.com](mailto:healanipale@gmail.com)

**Phone (optional)** (808) 372-2512

### TESTIMONY DETAILS

**Agenda Item** Info #3: US EPA and Hawaii DOH Discussing the Setting of Environmental Action Levels (EALs) & the Aqueous Film Forming Foam (AFFF) Fire Suppressant Spill at the Red Hill Bulk Fuel Storage Facility

**Your Position on Matter** I wish to comment

**Representing** Self

**I wish to provide** Advance written testimony + request to give remote oral testimony by Zoom videoconference



Aloha Board of Water Supply Chair Andaya, Vice Chair Sproat, and Members, Mahalo nui for all you have done so far for the protection of our drinking water. The US Navy needs to shut down the Red Hill Bulk Fuel Storage Facility permanently and defuel the tanks immediately. The latest spill of PFAS speaks to the fact that we have no idea what is being stored there and what the true condition of facility is. The US Navy also needs to release the video of the most recent spill. This year of pushing the Navy to do the right thing, has taught us that the US Navy will not respond to letters of encouragement or even pleas to do the right thing they will not put the health and safety of the people of O'ahu first unless leveraged to do so. The only leverage the Board of Water Supply has is access to clean water. Access to clean water needs to be cut off until such time as they: 1. Defuel the Red Hill Tanks, 2. Release all well testing data and video of the recent spill and past spills we were never notified about, 3. Provide sufficient help to all affected families including non military families, 4. They start the clean up of the Red Hill Facility and the surrounding areas and reduce operations. The US Navy and the Department of Defense will only listen do the right thing if pressured. No amount of encouragement and pleas to do the right thing will make the US Navy budge. In addition to the points above I want to submit these points as well: 1. People right now are being potentially poisoned by Navy water, yet no one is warning them. As this letter indicates, Pearl Harbor water system consumer confidence reports have reported detections of PFOA and PFOS hundreds of times above the current EPA advisory limits when they were sampled in 2020 and 2021 (both before and after the latest Red Hill crises). Families including babies and children, child development centers, businesses all on the Navy's water system need to be notified that they may be exposed to unsafe levels of "forever chemicals" in their drinking water. Visitors to the Arizona Memorial need to be warned. The fact that the Navy has not taken these steps is unconscionable and the fact that EPA and the DOH are not forcing them to do so is a failure of the public trust and their very purpose for existing - protecting our environment and our health. 2. The larger environment and the larger community are also at risk. In addition to continuous monitoring of the drinking water system, water being discharged from the Pearl Harbor wastewater system and water from Hālawā stream need to be checked for PFAS, given the likely sources of these contaminants (i.e. Red Hill). If the other week's spill of PFAS was not the first, fishers eating fish from Pu'uloa, hunters harvesting pigs from the area, and people using water from Hālawā stream for gardening or other purposes need to be informed now about the health risks they have been and are being potentially exposed to. Until we have confirmation otherwise, the EPA and DOH MUST immediately inform the larger public about the health risks - including cancers, reproductive issues, and serious long term illnesses - that may be associated with the water, soil, and aquatic and terrestrial life in the region surrounding Kapūkakā and the Navy's other wells. 3. The Navy needs to come clean so we know the full financial, environmental, and human costs of Navy PFAS use. As Ernie Lau demanded - we must have full access to all records for every single AFFF system using PFAS within range of the Navy's drinking water wells, including an accounting of how much AFFF has been stored and discharged (intentionally and unintentionally) along with how much AFFF remains within these systems. None of this information is in any way relevant to "national security" and must be disclosed FULLY and IMMEDIATELY for the health and lives of the community - including future generations that could be impacted by "forever chemicals" currently in the environment. The EPA and DOH must demand that the Navy provide us with this information and if necessary, force them to do so - so that we can respond appropriately to these serious threats to our aquifer and our health. 4. The EPA and DOH need to stop cutting deals with the Navy behind the public's back. EPA has already been working on an "agreement in principle"

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with the Navy without any public knowledge of the EPA's priorities, concerns, or demands. This reeks of the political process behind the 2015 Administrative Order on Consent, which allowed the Navy to do almost nothing for over six years even after they spilled 27,000 gallons of fuel directly above our groundwater aquifer. The EPA and DOH failed us for the better part of a decade by letting the Navy make promises it never fulfilled – and the EPA appears to be doing it again. Shielding the Navy and denying Hawai'i's threatened communities the right to determine what measures will really keep us safe exacerbates the Navy's violations of our 'āina, wai, people, and human dignity – and flies in the face of the White House's supposed commitment to "environmental justice." 5. The DOH must update its environmental action levels to protect our people. The EPA has established updated advisory guidelines for the two most well-studied PFAS – PFOA and PFOS – yet the DOH's environmental action levels for these particular "forever chemicals" still remain thousands of times higher. The DOH must provide greater protection for the people of Hawai'i than the EPA, which has failed time and again to protect communities here and across the continent from environmental contaminants – literally resulting in deaths, life-changing illnesses, and financial ruin. However, the DOH is providing us with even less protection than the EPA. The DOH must employ the precautionary principle – otherwise known as common sense – and do its job to protect what we now know may be at serious risk: the 'āina, wai, and present and future generations of Hawai'i nei.

Sincerely, Healani Sonoda-Pale

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**From:** Noel Shaw <[noelkshaw@gmail.com](mailto:noelkshaw@gmail.com)>  
**Date:** December 12, 2022 at 2:12:15 PM HST  
**To:** Board of Water Supply Board of Directors <[board@hbws.org](mailto:board@hbws.org)>  
**Cc:** Ernest Lau <[elau@hbws.org](mailto:elau@hbws.org)>, "Kathleen M. Elliott-Pahinui" <[kelliott-pahinui@hbws.org](mailto:kelliott-pahinui@hbws.org)>, Kenny Shaw <[krs296@gmail.com](mailto:krs296@gmail.com)>  
**Subject:** Board of Water Supply Board Meeting- Testimony

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Aloha,

My name is Noel Shaw. I am a mother and 4th generation Hawaiian homesteader. Our family currently resides on O'ahu and until November 2021, got our water from the Halawa Shaft. After the US Navy's continued negligence in the care of the Red Hill Bulk Storage Facility over the past 80 years- it's time they are forced to clean up and get out.

Department of Health- you are in a position to force them to do this. Your Follow Up Survey regarding the Navy Water contamination indicates that you are highly aware of how dangerous it is for them to continue to be entrusted with any of our O'ahu's resources- including the care of people who reside here. We have no trust in their ability to keep us or generations still coming safe. It is unethical and blasphemous that you would adjust any water quality standards to keep them safe and able to continue to do business as they wish. They are not good neighbors and must go. The health our whole island is dependent upon it especially those who are most socially economically disadvantaged.

I am urging you Department of Health to do much much better. To stop playing into any false economic expectations about what military presence here on O'ahu provides and focus on what you're supposed to be focusing on, the health of our people. Without us well, without the 'āina and water we subsist off of being well, we are not well. Without clean water, all other health dwindles. Water is our first and most important medicine and you all know this- from mental to emotional to physical health- pure clean water is necessary.

Environmental Protection Agency- your mission is to protect people and the environment from significant health risks. We on O'ahu, an island in the middle of the ocean, have a significant health risk- the US Navy. And you know this too. Since December of last year you've known that there are highly toxic PFAS in our waters and yet you've continue to allow us to carry on. You've failed to pull the trigger on safe guards that should be in place. You've failed to keep us safe and informed and you've failed to hold your brother agency the Department of Defense accountable for allowing the poisoning that is multiple thousands of jet fuel to leak into our water ways, millions of gallons of jet fuel to sit 100 feet above our soul serving aquifer, and now 1,300 of PFAS/ AFFF- forever chemical to spill on to our 'āina. You've also allowed spaces to use mass amounts of water to "clean up" despite it being finite and limited- knowing Hawai'i is dependent upon conservation of water to ensure we have enough. You are required to do much much better. Our continued existence depends upon it and we are worthy of existing well- especially us kānaka 'Ōiwi, Native Hawaiians who have genealogical ties to Hawai'i.

I am urging you to replace the US Navy with another agency that can more efficiently get the tanks drained as soon as possible. I am urging you to remove all unnecessary military personal from O'ahu as

they extract from our already finite resource that is clean water. I am urging you to be transparent, honest, and real about what we as O'ahu residents have to deal with.

I write you this letter as I try to put our three year down for a nap and our 1 year old eats lunch. There is mess everywhere and yet I'm here. Without clean water I cannot do the job I am asked to do as a mother.

Mahalo nui to the hard working team at Board of Water Supply for maintaining their focus on our most vital resource. Mahalo nui for their continued leadership and transparency. Mahalo nui to all the water protectors of O'ahu and across Hawai'i and beyond who continue to stand. We will keep fighting to get what we need because we are worthy of clean water for generations unseen.

Ola I Ka Wai!

Noel Shaw

--

*Noel Kaleikalaunuoka'oia'i'o Shaw*

619-261-5894

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**To:** [Stella Bernardo](#); [Board of Water Supply Board of Directors](#)  
**Subject:** Board Meeting Testimony Submittal or Request - Monday, December 12, 2022 - Lacey Quintero  
**Date:** Monday, December 12, 2022 2:37:05 PM

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**Meeting Date:** Monday, December 12, 2022

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### TESTIFIER INFORMATION

**Full Name** Lacey Quintero

**Email** [quintero.lacey@gmail.com](mailto:quintero.lacey@gmail.com)

**Phone (optional)** (361) 877-2365

### TESTIMONY DETAILS

**Agenda Item** Info #3: US EPA and Hawaii DOH Discussing the Setting of Environmental Action Levels (EALs) & the Aqueous Film Forming Foam (AFFF) Fire Suppressant Spill at the Red Hill Bulk Fuel Storage Facility

**Your Position on Matter** I wish to comment

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otherwise  
see attached)**

Diana Felton from DOH has said that there are limited studies for jet fuel exposure. If this is true, then how can DOH justify raising their EAL's? Where are the studies to show us that it is safe to raise these limits and to back up your unethical actions of raising the EAL's in an already affected community? Why does Diana Felton continue to say that the affected community suffered from a short-to-medium term exposure? We know this is just not true! We all had long-term exposure. Perhaps Diana Felton would like to clarify what her exact definition of "short-to-medium" versus "long" term exposure is? Exactly how many days of drinking jet fuel equals long-term exposure in the Diana Felton & DOH playbook? Is DOH considering how contaminants are inhaled after they come out of the tap? How about how they are absorbed by women doing laundry and dishes? And I'd like to know, how long can a baby take a bath in that higher level? Richard Brewer has said that the dose makes the poison. So, I'd like the DOH to use their "magic math" and tell me how much the dosage for the jet fuel-contaminated water increases when babies and toddlers take long baths and drink their bathwater? What about pregnant women? And how about breastfeeding women? And the babies that are breastfeeding? How do your raised EAL's protect them? Or are we just basing these magically safe raised EAL numbers on 20 year old men? I'd also like to know who is overseeing the DOH's actions? Exactly how does raising these EAL's help DOH to accomplish its own mission of protecting human health? There is NO way that raising levels of contaminants is PROTECTIVE of human health. Shouldn't they be here advocating for lowering the levels to protect human health? The long-term effects of jet fuel exposure are real. And it is really happening whether DOH wants to admit it or not. Open up your eyes DOH, and SEE! I'd also like to ask how it is possible for Diana Felton to be so quick to state that there are absolutely real long-term mental health effects of this exposure? How is it possible for DOH to know that if there are no studies? Is it because that is what we "affected community" tell you, and you believe us? And yet, DOH cannot admit that there are long-term physical health effects of this exposure when we are telling them (and our health care providers) every single day? My entire family's physical health continues to be negatively affected by this jet fuel exposure. I am sick and tired of seeing all our babies having to deal with the aftermath of the poisoning. Please LOWER the EAL's to protect our children and their future!

## ACKNOWLEDGEMENTS

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**To:** [Stella Bernardo](#); [Board of Water Supply Board of Directors](#)  
**Subject:** Board Meeting Testimony Submittal or Request - Monday, December 12, 2022 - Gina Hara  
**Date:** Monday, December 12, 2022 2:57:13 PM

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## BWS TESTIMONY SUBMITTAL / REQUEST TO TESTIFY FORM

**Form Submitted on:** 12/12/2022 2:57:07 PM

**Meeting Date:** Monday, December 12, 2022

**I wish to provide** Advance written testimony + request to give remote oral testimony by Zoom videoconference

### TESTIFIER INFORMATION

**Full Name** Gina Hara

**Email** [ginahara@gmail.com](mailto:ginahara@gmail.com)

**Phone (optional)** (808) 941-2154

### TESTIMONY DETAILS

**Agenda Item** Info #3: US EPA and Hawaii DOH Discussing the Setting of Environmental Action Levels (EALs) & the Aqueous Film Forming Foam (AFFF) Fire Suppressant Spill at the Red Hill Bulk Fuel Storage Facility

**Your Position on Matter** I wish to comment

**Representing** Organization

**I wish to provide** Advance written testimony + request to give remote oral testimony by Zoom videoconference

**Written  
Testimony  
(if entered on  
the online  
form;  
otherwise  
see attached)**

12/12/2022 WRITTEN TESTIMONY from Gina Hara, HALAWA VALLEY 1) Why is only Roger Brewer and another person from DOH the only people to be able to determine the EAL for thousands of people when there is so much opposition as to the smell and taste level? 2) Shouldn't there be an investigation as to why the DOH proposed 400ppb from 100ppb? 3) Shouldn't there be an investigation as to the bias with the DOH's position, responsibility and their practice and association with the AOC – there seems to be a conflict of interest. 4) Isn't this conflict of interest compounded with the fact that Roger Brewer is ex-Navy retired? 5) What rights do the people of HALAWA VALLEY and Oahu have to dispute the DOH's decision to only rely on Roger Brewer. Can there be other experts to be consulted to comment on why there was no problem with 100ppb as the EAL for decades? 6) Why was there in 2016 the sudden request to make 100ppb be raised to 400ppb. This was because the RED HILL WELL spiked at 1600ppb – simultaneously there was a request to lower the toxin samples to be lessened from 68 to 10 toxins and disrupt a great body of comparative data when the Navy should have been increasing the toxicity. 7) Why does Hawaii allow the testing to be reliant on the Navy, when it should have independent testing and have the Navy pay for this to address the conflict of interest. 8) Please do a comprehensive investigation into the history of the DOH stance changing from 100ppb and 400ppb which seemed like a playbook of what happened in the movie DARK WATERS where the Dept of Health in the small community next to DuPont raised the EALS immediately after contamination levels spiked. REGARDING AFFF PFAS / PFOS 1) The DOD has poisoned according to 2858 locations with PFAS highly toxic fluorinated compounds known as PFAS continues EWG [https://www.ewg.org/interactive-maps/pfas\\_contamination/](https://www.ewg.org/interactive-maps/pfas_contamination/) 2) Halawa Well has PFAS/ PFOS in our drinking water. We need to get a NSF certified water filter to take out PFAS/ PFOS 3) All these forever chemicals – please account for all of these chemicals that enter Hawaii and find out which supplies are missing. BOW please demand to know what is the concrete removal plan upon discovery of the missing AFFF chemicals. Can we get a commitment to this? 4) The 8 chain carbon as described by the movie DARK WATERS shows that genetic defects and cancer are the result of inaction. Please take action and account for all of the PFOA /PFAS immediately and remove and have a protocol in place. 5) Please ack with or without the DOH as they DOH does not seem to have the pure interest of the water at the forefront. 6) Initiate the immediate, mandatory high risk inspections of all AFFF / PFAS /PFOA lines a) Mandatory accounting of where the chemicals are located and stored b) What is missing? c) When will it leave and how will it leave Hawaii 7) Be sure to demand funds for the necessary LONGTERM Microorganism Remediation project what will be needed in the long-run and do not take on the responsibility of it like Kahoolawe. 8) Make sure there is a minimum revolving emergency fund with the end use to remediate the water based on AFFF and the 180,000 + gallons of fuel over the years in the ground. 9) The Department of Health and the Board of Water may not have enough staff to handle what needs to be done. Please ask for funding for this in addition and simultaneously as asking for water wells.

ACKNOWLEDGEMENTS

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**To:** [Stella Bernardo](#); [Board of Water Supply Board of Directors](#)  
**Subject:** Board Meeting Testimony Submittal or Request - Monday, December 12, 2022 - Kristina Baehr  
**Date:** Monday, December 12, 2022 3:23:37 PM

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**BWS TESTIMONY SUBMITTAL / REQUEST TO TESTIFY FORM**

**Form Submitted on:** 12/12/2022 3:23:30 PM

**Meeting Date:** Monday, December 12, 2022

**I wish to provide:** Advance written testimony + request to give in-person oral testimony at 630 S. Beretania Street

**TESTIFIER INFORMATION**

**Full Name:** Kristina Baehr

**Email:** Kristina@well.law

**Phone (optional):** (512) 994-6241

**TESTIMONY DETAILS**

**Agenda Item:** Info #3: US EPA and Hawaii DOH Discussing the Setting of Environmental Action Levels (EALs) & the Aqueous Film Forming Foam (AFFF) Fire Suppressant Spill at the Red Hill Bulk Fuel Storage Facility

**Your Position on Matter:** I wish to comment

**Representing Organization:**

**I wish to provide:** Advance written testimony + request to give in-person oral testimony at 630 S. Beretania Street

**Written  
Testimony  
(if entered on  
the online  
form;  
otherwise  
see attached)**

I'm going to recount the illnesses that my clients have experienced after Red Hill water contamination.

#### ACKNOWLEDGEMENTS

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MOTION TO  
ADJOURN

There being no further business Chair Andaya at 5:22 PM, called for a motion to adjourn the Regular Session. Na'alehu Anthony so moved, seconded by Dawn Szewczyk, and unanimously carried.

The minutes of the Regular Meeting held on December 12, 2022, are respectfully submitted,

  
 \_\_\_\_\_  
 JOY CRUZ-ACHIU

APPROVED:

  
 \_\_\_\_\_  
 BRYAN P. ANDAYA  
 Chair of the Board  
**FEB 27 2023**  
 \_\_\_\_\_  
 Date

THE MINUTES OF THE REGULAR MEETING HELD ON DECEMBER 12, 2022, WERE APPROVED AT THE FEBRUARY 27, 2023, BOARD MEETING			
	AYE	NO	COMMENT
BRYAN P. ANDAYA	X		
KAPUA SPROAT	X		
MAX J. SWORD			ABSTAIN
NA'ALEHU ANTHONY	X		
JONATHAN KANESHIRO	X		
DAWN B. SZEWCZYK	X		
EDWIN H. SNIFFEN	X		