

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843
www.boardofwatersupply.com



October 26, 2017

RECEIVED NOV 21 2017

Handwritten initials: S, ROK

KIRK CALDWELL, MAYOR
BRYAN P. ANDAYA, Chair
KAPUA SPROAT, Vice Chair
DAVID C. HULIHEE
KAY C. MATSUI
RAY C. SOON

ROSS S. SASAMURA, Ex-Officio
FORD N. FUCHIGAMI, Ex-Officio

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

ELLEN E. KITAMURA, P.E.
Deputy Manager and Chief Engineer *EW*

Mr. Bob Pallarino
EPA Red Hill Project Coordinator
United States Environmental Protection Agency
Region IX
75 Hawthorne Street
San Francisco, California 94105

and

Mr. Steven Chang, P.E.
DOH Red Hill Project Coordinator
State of Hawaii
Department of Health
P.O. Box 3378
Honolulu, Hawaii 96801-3378

Dear Messrs. Pallarino and Chang:

Subject: Review Comments – Monitoring Well Installation Work Plan Addendum 02, Red Hill Bulk Fuel Storage Facility, Dated August 25, 2017

The Honolulu Board of Water Supply (BWS) offers the following comments to the Navy's Monitoring Well Installation Work Plan Addendum 02, Red Hill Bulk Fuel Storage Facility submitted to the United States Environmental Protection Agency (EPA) and Department of Health (DOH) on August 25, 2017 (Navy, 2017).

General Comment

Section 2, page 2-1, lines 20-25. The subject Addendum 02 is making an overall assumption that Oahu basalt are similar to Snake River Plain basalts. This is inappropriate. The Snake River Plain basalt flows are largely pahoehoe-type lava flows, that significantly differ from Hawaiian pahoehoe flows in that many of the basalt flows are vastly larger in both size (areal extent – cover 50 to >100 square miles) and thickness (often 80 to >150 ft-thick). The Snake River Plain basalt flows are considered to have more in common with the Columbia River flood-basalt flows than Hawaiian basalt flows. A review of United States Geological Survey (USGS) publications that describes the use of the Westbay system to measure/sample head differences

encountered within the Snake River Plain aquifer (Fisher and Twining 2011; Twining and Fisher 2012, 2015) indicate that the differences in the head profiles are attributed to the great lateral extent of the basalt flows and their dense flow interiors that form a thick confining layer. The Ko'olau basalt flows do not possess thick, aerially extensive dense flow interiors. The absence of aerially extensive, thick dense flow interiors is due to the fact that individual Ko'olau basalt flows were low-volume compound, shoestring lava flows and flow fields which have relatively thin dense flow interiors without significant lateral extents. The Snake River Plain basalts also contain a significant number of sedimentary interbeds that, combined with the basalt flow dense interiors, formed confining layers. The Ko'olau Basalt is not noted for containing sedimentary interbeds. It appears very likely that the Navy will have particular difficulty finding enough dense flow interior locations within the Ko'olau Basalt for packer set points, and, if found, these dense flow interiors will likely be open to the same interconnected interval.

Specific Comments

Section 2.2, page 2-6, lines 31-34 (setting packers in the Ko'olau Basalt). BWS is seriously concerned that below the surface of the basal aquifer, the Navy will encounter mostly pahoehoe flows that are devoid of "dense interiors" and likely what will be encountered are a series of thin vesicular flow lobes (e.g., Stearns, 1940; Macdonald, 1941; Wentworth, 1942; TEC (Appendix A), 2007; Battelle and Parsons, 2015). This will limit the areas for packer set points and therefore potentially make the use of Westbay wells limited at best.

Section 2.4, page 2-13, lines 22-24 "Testing rock types". The Work Plan does not specifically mention attempting to test primary cooling joints (fractures) as a "rock type". The BWS believes that overlooking cooling joint features would be a serious mistake and the presence of such should be studied, evaluated, measured, and documented.

Section 3.3.1, Page 3-5 line 1. The BWS believes this statement should read "coring will commence when auger boring reaches point of refusal". The term "competent bedrock" isn't specific enough in this context.

Appendix D, Page D-3, lines 7-8. The Work Plan states that the Navy will use magnetometers on the geophysical tools (within the borehole) to correct the data to magnetic north. Since all basalts are highly magnetic due to their mineralogy, this will not work.

Appendix D, Page D-3, line 16. The Work Plan states that the Navy will use the compass in the televiwer tool (in the borehole) to determine magnetic north. The Navy should use a gyroscopic tool in the borehole to determine magnetic north.

Messrs. Pallarino and Chang
October 26, 2017
Page 3

Thank you for the opportunity to comment. If you have any questions, please feel free to call Erwin Kawata, Program Administrator of our Water Quality Division at 808-748-5080.

Very truly yours,


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

cc: Mr. Steve Linder
United States Environmental Protection Agency
Region IX
75 Hawthorne Street
San Francisco, California 94105

Mr. Mark Manfredi
Red Hill Regional Program Director/Project Coordinator
NAVFAC Hawaii
850 Ticonderoga Street, Suite 110
JBPHH, Hawaii 96860

References Cited

Navy. 2017. Monitoring Well Installation Work Plan Addendum 02, JOINT BASE PEARL HARBOR-HICKAM, O'AHU, HAWAI'I. August 25.

Fisher, J. C., and B. V. Twining. 2011. Multilevel Groundwater Monitoring of Hydraulic Head and Temperature in the Eastern Snake River Plain Aquifer, Idaho National Laboratory, Idaho, 2007–08. Scientific Investigations Report 2010–5253. Prepared in Cooperation with the U.S. Department of Energy, DOE/ID-22213. U.S. Geological Survey.

Twining, B. V., and J. C. Fisher. 2012. Multilevel Groundwater Monitoring of Hydraulic Head and Temperature in the Eastern Snake River Plain Aquifer, Idaho National Laboratory, Idaho, 2009–10. Scientific Investigations Report 2012–5259. Prepared in Cooperation with the U.S. Department of Energy, DOE/ID-22221. U.S. Geological Survey.

———. 2015. Multilevel Groundwater Monitoring of Hydraulic Head and Temperature in the Eastern Snake River Plain Aquifer, Idaho National Laboratory, Idaho, 2011–13. Scientific 5042. Prepared in Cooperation with the U.S. Department of Energy, 235. U.S. Geological Survey.

Messrs. Pallarino and Chang
October 26, 2017
Page 4

Stearns, H.T., 1940. Supplement to the geology and ground-water resources of the Island of Oahu, Hawaii: U.S. Geological Survey Bulletin 5, 164 p.

Macdonald, G.A., 1941. Geology of the Red Hill and Waimalu areas, Oahu, in relation to the underground fuel storage project of the U.S. Navy: U.S. Geological Survey letter report to the U.S. Navy Public Works Office, Pearl Harbor, 76 p.

Wentworth, C.K., 1942. Geology and ground-water resources of the Moanalua-Halawa District: Report prepared for the Board of Water Supply, Honolulu, Hawaii, 156 p.

TEC, 2007. Red Hill Bulk Fuel Storage Facility final technical report: prepared for the Department of the Navy, NAVFAC, Pearl Harbor, Hawaii, by TEC, Inc., 174 p.

Battelle and Parsons, 2015. Monitoring well installation report (Draft) Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, Hawaii: prepared for the Department of the Navy, NAVFAC, Pearl Harbor, Hawaii, by Battelle, Columbus, Ohio, and Parsons, South Jordan, Utah, 1874 p.