BOARD OF WATER SUPPLY

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August 20, 2018

Dr. Bruce S. Anderson
Director
State of Hawaii
Department of Health
1250 Punchbowl Street
Honolulu, Hawaii 96813

Dear Dr. Anderson:

Subject: Honolulu Board of Water Supply (BWS) Request to Hawaii Department of Health (DOH) for an Explanation of the Basis for the Increase in the Environmental Action Levels (EALs) for Total Petroleum Hydrocarbon Middle Distillate Fraction (TPH-d)

In November 2017, the DOH raised its groundwater EALs for TPH-d. The TPH-d EAL based on health protection was increased from 160 micrograms per liter (µg/L) to 400 µg/L and the EAL based on odor or taste was increased from 100 µg/L to 500 µg/L (DOH 2016, 2017).

These EALs are amounts of TPH-d in water that DOH considers to be "safe" for drinking water and household use of tap water. An increase in TPH-d EALs means that DOH is now allowing more TPH-d in tapwater at what it regards as a safe level.

The BWS considers these EALs for certain constituents that do not have drinking water standards to help ensure that the water we provide our customers is safe and free of objectionable qualities. Consequently, the BWS respectfully requests a detailed explanation of the scientific basis of these changes in TPH-d EALs. This will greatly assist us in responding to public comments and concerns regarding the safety and quality of our water.

The DOH (2017) report (Volume 2, Appendix 1, Section 6.6, p. 6-12, pdf page 66) states that the reason for the EAL increase is because:

> *...petroleum-related compounds reported in this range will be dominated by non-volatile, degradation compounds or "metabolites" of biogenic origin (Zemo*

et al. 2013, 2016). The resulting action level is therefore based on ingestion only and does not incorporate an inhalation pathway.

In other words, DOH is assuming that TPH-d in tapwater will be almost entirely changed into a form that will stay in the water such that it will not be released into the air nor will it be absorbed through the skin. DOH thus appears to assume TPH-d will not get into the human body by breathing it or by taking it up through the skin while showering, bathing, or washing dishes. By assuming less exposure from these sources, DOH is effectively allowing more TPH-d in drinking water at the higher EAL concentration. However, the studies used to support this assumption (Zemo et al. 2013, 2016) are studies of historical TPH release sites on the mainland.

The BWS has concerns about using TPH-d analyses from the mainland in the establishment of a TPH-d EAL for use in Hawaii. TPH-d in local groundwater may travel faster from a release to drinking water wells because of Hawaii's more hydraulically conductive volcanic soils and rock. As a result, there may also be less time for TPH-d to degrade into forms that stay in the water, particularly for sites with recent or ongoing releases.

The BWS would like to know whether the DOH considered in its evaluation the unique subsurface conditions in Hawaii that differ from those at petroleum release sites on the mainland. Please provide your data and analyses from sites in Hawaii, including those with recent or ongoing releases, that support DOH's key assumption of near 100% change of TPH-d into a form that results in less exposure.

Thank you for your assistance with this request. If you have any questions, please contact Mr. Erwin Kawata, Program Administrator of the 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
Mr. Mark Manfredi, NAVFAC Hawaii

References

Hawaii Department of Health (DOH). 2016. Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater. Summer.

2017. Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater. Fall.

Zemo D.A., O'Reilly K.T., Mohler R.E., Tiwary A.K., Magaw R.I. and K.A., Synowiec. 2013. Nature and estimated human toxicity of polar metabolite mixtures in groundwater quantified as TPHd/DRO at biodegrading fuel release sites. Groundwater Monitoring Remediation 33(4):44–56.

Zemo, D.A., O'Reilly, K.T., Mohler, R.M., Magaw, R.I., Espino Devine, C., Ahn, S. and A.K. Tiwary. 2016. Life Cycle of Petroleum Biodegradation Metabolite Plumes, and Implications for Risk Management at Fuel Release Sites. Integrated Environmental Assessment and Management. DOI: 10.1002/ieam. 1848.