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July 14, 2017

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: Board of Water Supply (BWS) Comments to the Conditional Approval of Scope of Work for Destructive Testing Dated May 30, 2017 submitted to the Regulatory Agencies Pursuant to Section 5.3.2 of the Red Hill Administrative Order on Consent (AOC), dated July 7, 2017

The BWS has reviewed the subject document and offers the following comments. Further, we refer to our previous letter dated June 16, 2017 (Lau 2017) where comments were provided for the Destructive Testing (DT) Scope of Work (SOW) dated May 30, 2017. Even though the Conditional Approval addresses many of our comments, we still have concerns that some of our prior comments have not been fully considered as discussed below.

We understand that "[t]he primary objective of the destructive testing ("DE") work is to further validate in the field the performance of the non-destructive testing ("NDE") program designed to characterize the condition of the steel plate used to line the inside of the Red Hill tanks." We agree with the Conditional Approval that validation of the non-destructive testing is not the sole objective and that additional testing should be undertaken when the steel coupons are removed (Page 1 and 2). Some of this additional testing, such as removal of concrete core samples, has been explicitly listed in the Conditional Approval. However, the BWS believes that further testing not currently contemplated in the SOW would provide valuable information. For instance, after the steel coupons have been removed, there will be an opportunity to observe and inspect the steel-to-concrete interface. The inspection, at a minimum, should include an analysis of the backside of the steel plates and the surface of the concrete. If corrosion is present on the backside of the steel plates, samples of the corrosion product should be

collected and preserved for further testing. This testing could, at a minimum, include Energy Dispersive Spectroscopy (EDS) and other chemical analysis techniques. If there is moisture present on the backside of the steel plates, again, samples should be taken for further testing. This testing could, at a minimum, include chemical analysis and pH measurements. This sampling and inspection of the steel-to-concrete interface should occur prior to the concrete coring to minimize contamination from the coring process.

As stated in line item #2 on page 2 of the Conditional Approval, the BWS agrees that the regulatory agencies and the subject matter experts (SME)s should be provided the opportunity to participate in the review of the non-destructive evaluation (NDE) and the DT. Particular consideration should be given to the coupon locations selected for the DT. These locations should coincide with locations where detailed NDE inspections have occurred. These coupons should contain original welds, repair welds, and areas that contain the deepest defects, as well as a few coupons from areas that NDE indicates have small or no defects. This will provide critical information later in the analysis of the DT and for assessing the validity of the NDE results and methods.

Furthermore, the BWS recommends that sufficient testing be performed on test plates with manufactured defects that are consistent with general thinning, pitting, and crack-like weld defects. These tests should be performed by actual non-destructive testing inspectors using the actual techniques and probes used for the Red Hill tank inspections. As mentioned in the last AOC meeting in June 2017, the BWS believes that sufficient data can be collected from test plates with manufactured defects to develop the Probability of Detection (POD) and Relative Operating Characteristic (ROC) curves that are needed to verify the reliability of the inspection technique. This effort should not slow down the schedule for field testing as these specimens can be manufactured and tested in parallel with the ongoing field inspection efforts.

Again, the BWS refers to the comments provided in our previous letter dated June 16, 2017 (Lau 2017). These comments and considerations should be addressed and incorporated into the DT SOW.

If you have any questions, please feel free to contact me at 808-748-5061.

Very truly yours,

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

cc: Mr. Mark Manfredi
Red Hill Regional Program Director
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References Cited

Lau, E. Y. W. (2017). Letter to Mr. Bob Pallarino, United States Environmental Protection Agency (EPA) and Mr. Steven Y.K. Chang, State of Hawaii, Department of Health regarding: Board of Water Supply (BWS) Comments to the Work Plan Being Developed Under the Red Hill Bulk Fuel Storage Facility Administrative Order on Consent (AOC) Statement of Work (SOW) Section 5.3, May 30, 2017.