UNITED STATES ENVIRONMENTAL
PROTECTION AGENCY
REGION IX
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STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HI 96801-3378

July 7, 2017

Mark Manfredi
Red Hill Regional Program Director
Naval Facilities Hawaii
400 Marshall Road
Joint Base Pearl Harbor Hickam, Hawaii 96860

Re: 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 .

Dear Mr. Manfredi:

The U.S. Environmental Protection Agency ("EPA") and Hawaii Department of Health ("DOH"), collectively the "Regulatory Agencies", have reviewed the document titled "Red Hill Bulk Fuel Storage Facility Scope of Work for Destructive Testing" dated May 30, 2017. The 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. This testing is not meant to be an independent performance calibration of the NDE techniques but rather a validation of the NDE technology which performance characteristics has already established by the users and vendor communities elsewhere.

The condition of this steel plate is critical because it acts as a liquid tight membrane between the fuel and the concrete structure of the tank. The Regulatory Agencies have no information indicating the outer concrete portion of the tanks was engineered to contain liquid. To maximize the effectiveness of this validation, the Regulatory Agencies seek full transparency in the testing planning, design and implementation, and suggest the Navy and DLA provide transparency to external subject matter experts as well. The Regulatory Agencies vision of the process to be used for a successful program is including in the attached flowchart.

In addition to the primary goal of this NDE validation effort, the removal of the steel plate will create an opportunity to collect additional data related to the condition of the concrete and presence of water and/or fuel behind the steel plate at the coupon locations. Although this data is not necessary to meet the objectives of this NDE validation, this data may prove valuable for other AOC requirements such as data supporting Risk Assessment assumptions and/or data

supporting migration pathway assumptions. For example, carbonation of the concrete could result in the lowering of the pH at the concrete / steel plate interface which could result in accelerated corrosion. Testing carbonation depth on concrete cores is a straightforward test that may provide useful data for prediction of future corrosion rates. And depassivation of at the steel / concrete interface due to elevated chloride can result in corrosion initiation. Therefore, gathering data on the concrete condition may help narrow assumptions in the risk and vulnerability assessment. Collection of a few cores in different locations for petrographic tests and other testing may provide extremely valuable information. Note that this data will help to make the case for or against the tell-tale systems as well should they be contemplated for installation since one of their purposes is to drain standing water from the backside of the steel liners.

The Regulatory Agencies approve this document pursuant to AOC section 7b with the following conditions:

1. The Navy and DLA shall seek concurrence from the Regulatory Agencies on the specific plan for NDE of each tank that will be part of the NDE verification described in the AOC 5.3.2 SOW. This plan should include the probability of detection ("POD") data for the tools to be used for the NDE.

2. The process for coupon selection shall jointly involve the Regulatory Agencies and SMEs. The Regulatory Agencies and external subject matter experts shall be given an opportunity to participate in the review of the NDE strategy, plans, data acquisition and the selection of locations and configuration for coupon sampling.

3. The Navy and DLA shall seek concurrence from the Regulatory Agencies for a detailed plan describing coupon collection and evaluation. This should be included in the contractors destructive testing plan.

4. The Navy and DLA shall seek concurrence from the Regulatory Agencies for a detailed plan describing the laboratory testing protocol for coupon testing. This should be included in the destructive testing plan.

5. The Navy and DLA shall seek concurrence from the Regulatory Agencies on the implementation plan that describes how discrepancies between destructive testing samples and the NDE will be evaluated to establish whether the NDE is considered validated. This plan should also describe process for addressing mismatching of results such as changing the NDE methodology or procedures. The statistical significance of the comparison of the two data sets should also be described in the plan. The utility of utilizing Receiver Operator Characteristic ("ROC") analysis may be limited due to the size of the datasets collected but the design of the testing plan must discuss this issue and the rationale for either performing or not performing these tests. This plan should be developed prior to the destructive testing and should be included in the destructive testing plan.

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6. The Navy and DLA shall provide a report describing the results of the destructive testing including a comparison of the NDE and destructive testing results. The format and content of this report shall be included in the destructive testing plan.

7. The Navy and DLA shall seek concurrence from the Regulatory Agencies for the detailed plan describing how the concrete exposed during destructive testing will be characterized / sampled.

8. The decision criteria for expansion of destructive testing should be developed prior to NDE implementation and the Navy and DLA shall seek concurrence from the Regulatory Agencies on this decision criteria.

9. Although the current SOW describes a limited destructive testing program, the Navy and DLA shall consider expansion of the tank inspection, repair, and maintenance ("TIRM") procedures to include routine destructive testing based on the results of the work under this SOW. Data obtained during the destructive testing program may provide substantial benefit, therefore the Navy and DLA shall evaluate pros and cons to expansion of destructive testing and provide their findings to the Regulatory Agencies.

10. The absence of metal fatigue issues in the tanks and piping requires further documentation. As stated on page 9 of the SOW, no inspection data suggests metal fatigue issues, but indicates that rare operational circumstances could subject the steel plate to cyclic loads or stresses. The Navy and DLA shall provide further documentation regarding their analysis of the relevance of metal fatigue on the tanks and piping.

11. Handling and documentation procedures for samples and data should be planned thoroughly to avoid data validity challenges.

Sincerely,

Bob Pallarino
EPA Red Hill Project Coordinator

Steven Chang, P.E.
DOH Red Hill Project Coordinator

Enclosure

cc: Captain Richard D. Hayes III (via email)
John Montgomery, Navy (via email)

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