Tank Cleaning Quality Validation Plan Addendum

Tank Cleaning Verification Procedures

This document section outlines validation procedures for Tank Cleaning Verification at Red Hill Bulk Fuel Storage Facility, to accompany the Department of Navy's Red Hill Closure Plan (Nov 2022), Supplement #1 (Feb 2023) and Supplement #2 (May 2023).

The ensuing procedure presents a means of 1) setting a cleaning standard, 2) evaluating cleaned surfaces, and 3) progress tracking/reporting. The level of effort required will vary based on the product stored and tank-specific interior condition. Tanks 1, 13, 14, 17, 18 and 19 have been out of service and not in the queue for cleaning. Tanks 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16 and 20 are to be degassed, opened, cleaned, and effectively retired with an anticipated end state of "abandon in place." As such, the guiding principle is that if the tanks accumulate water there won't be a threat of petroleum release to the environment.

Contractor to follow cleaning sequence provided in Work Plan: 1) residual draining, 2) degassing, 3) detergent solution wash, 4) water wash, 5) drying, 6) inspection. Verification of cleanliness should occur in synchronization with the Contractor Quality Control process to minimize impact to production and prevent rework.

1. Cleaning Standard

Contractors provided and Government accepted definition of clean is *"The removal of all products, vapor, sludge, and residue from a tank, and washing, rinsing, and drying a tank so that no product or residue remains on any tank surfaces (shell, bottom, piping, appurtenances, etc.)."* Part 3 Project Program references 33 01 50.55 as the applicable specification for the tank cleaning, which does not establish a criterion. Part 3 Project Program also references API RP 1604 Closure of Underground Petroleum Storage Tanks (4th ed. Feb 2021); this also does not establish a level of cleanliness, only a process for rendering the tank for ultimate disposal. Typically, tanks are cleaned for the purpose of surface preparation and coating, which provides a baseline for cleanliness.

Reference: *NACE (now AMPP) SSPC-SP No. 1 – Solvent Cleaning*

This standard defines the end-condition of a metal surface from which visible deposits of oil, grease, and other visible contaminants have been removed in preparation for subsequent application of protective coatings or for the use of additional methods to prepare the surface for the application of coatings. The standard also includes requirements for materials and procedures necessary to achieve and verify the end condition.

When viewed without magnification, a solvent-cleaned surface shall be free of visible oil, grease, dust, dirt, drawing and cutting compounds, and other visible soluble contaminants. "Visible" means detectable with normal or corrected normal vision without the use of additional test equipment.

Wipe Test: *A clean dry white rag is wiped across the dry-cleaned area(s) and examined for visible residue.*

2. Evaluating Cleaned Surfaces

The Contractor will utilize the Three Phases of Quality Control (QC): Preparatory, Initial, and Follow Up-. The Preparatory Phase allows the Quality Validation (QV) Team to review approved submittals for products, qualifications, and plans. The Initial Phase will allow the QV Team to participate and document as the Government Quality Assurance (QA) Team 1) Check preliminary work, 2) Establish level of workmanship, 3) Resolve all differences. The Initial Phase shall be repeated for each new crew to work onsite, or any time established level of workmanship is not being met.

Government QA Team and Contractor QC Team will complete Follow-Up Phase inspections to assure continuing compliance with the level of workmanship set in the Initial Phase. As part of the Contractor QC effort, an independent Third-Party Association for Materials Protection and Performance (AMPP) Coating Inspector Program (CIP) Level II Inspector will evaluate and document the tank surface for cleanliness IAW the SSPC SP-1 procedure above. The QV Team will spot check Follow-Up Inspections, as described in Section 3 below. A Final Inspection will be attended by the QC, QA, and QV Teams.

At the Initial Phase and Follow-Up Final Inspection, The QV Team will conduct visual testing and a cloth rub test for oil and grease contamination IAW UFGS 09 97 13.15 Section 3.9.4.1, as referenced in paragraph a and d below. Cloth rub testing is not set at a frequency, but rather by visual indication of contamination. The AMPP Inspector will visually inspect the entire interior surface to guide rub tests. The Contractor will utilize visual inspection and water break testing as part of their operational quality checks.

Reference: *UFGS 09 97 13.15 Section 3.9.4.1 Pre-Preparation Testing for Oil and Grease Contamination*

a. *Inspect all surfaces for oil and grease contamination using two or more of the following inspection techniques: 1) Visual Inspection, 2) Water Break Test, 3) Black Light Test, and 4) Cloth Rub Test. Reject oil or grease contaminated surfaces, clean using a water-based pH neutral degreaser in accordance with SSPC SP 1 and recheck for Contamination until surfaces are free of oil and grease.*
b. *Water Break Test – Spray atomized mist of distilled water onto surface and observe for water beading. If water "wets" surface rather than beading up, surface can be considered free of oil or grease contamination. Beading of water (water forms droplets) is evidence of oil or grease contamination.*
c. *Black Light Test – Inspect surfaces for oil and grease contamination using the light specified in paragraph Black Light. Use light no more than 381 mm 15 inches from surface unless testing indicates that the specific oil or grease found in tank fluoresce at a greater distance. Use light in tank that is completely sealed from light infiltration, under a hood, or at night. Any fluorescing on steel surfaces*

is indication of petroleum oil/grease contamination. Use either Water Break Test or Cloth Rub Test to confirm both contaminated and non-contaminated areas detected by Black Light Test. The Black Light Test may not be used during inspection of prepared surfaces for oil and grease contamination unless proven to fluoresce the oil and grease found in the specific tank and documented during testing prior to abrasive blasting. Generally, only petroleum oil/grease will fluoresce, however, some may not fluoresce sufficiently to be recognized and other methods, such as the Water Break Test or Cloth Rub Test, must be used to confirm findings of the Black Light Test.

d. *Cloth Rub Test - Rub a clean, white, lint free, cotton cloth onto surface and observe for discoloration. To confirm oil or grease contamination in lightly stained areas, a non-staining solvent may be used to aid in oil or grease extraction.*

3. Progress Tracking & Reporting

As part of the Daily Reporting and QC process, the contractor will utilize a shell roll-out drawing to track plates that have been washed to ensure 100% of the tank interior is cleaned to the agreed standard. Locations and dates of QC actions or verification samples will be added to the roll-out drawing to track progress and facilitate reporting.

The Contractor conducts weekly QC meetings where the QA and QV Teams can engage with the QC Team for tracking progress, coordinating inspections and sampling. Third-Party AMPP CIP Inspection reports will be compiled and presented for each tank as supporting documentation for QV Reports. The Contractor will summarize data as part of a Final Report, but for purposes of Quality Validation the weekly QC meeting will be the primary means for gathering information on a timely basis to allow timely QV Report production as soon as possible following Final Inspection and Acceptance for each tank.

Quality Validation Procedures

QV procedures will be in accordance with the previously accepted *JTF-RH Red Hill Defuel Independent Third-Party Quality Validation Plan (November 1, 2022)* (QV Plan) and as described below.

1. Tank/Pipe Repair and Modification

If any tank/pipe repairs or modifications are performed as part of the retiring of the tanks, the process defined in the QV Plan will be utilized. QV reports will have the same format and content as the reports submitted for the Consolidated List of Repairs.

2. Cleaning of Tanks

Procedures used in the field to verify cleaning activities will be as described above. A QV Report will be submitted for each tank cleaned. A modified version of the QV Report form will be used for cleaning tasks, containing the following information:

a. Tank I.D.
b. Product Service
c. Cleaning Process
d. Recovery Process and Destination of Sludge Removed / Sludge Volume Removed
e. Interior Repairs or Modifications to Tank
f. Contract / Service Order
g. Description of QA Validation
h. Third-Party AMPP CIP Inspection Reports / Photos
i. Government Acceptance