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USACE / NAVFAC / AFCEC / NASA **UFGS-33 01 50.55 (February 2021)**

Preparing Activity: NAVFAC **Superseding without Revision**
UFGS-33 01 50.60 (November 2018)
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UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated January 2021
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DIVISION 33 - UTILITIES

SECTION 33 01 50.55

CLEANING OF PETROLEUM STORAGE TANKS

02/21

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SECTION 33 01 50.55

CLEANING OF PETROLEUM STORAGE TANKS
02/21

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NOTE: This guide specification covers the requirements for clean-up of the interior of concrete or steel tanks used for petroleum storage.

Adhere to UFC 1-300-02 Unified Facilities Guide Specifications (UFGS) Format Standard when editing this guide specification or preparing new project specification sections. Edit this guide specification for project specific requirements by adding, deleting, or revising text. For bracketed items, choose applicable item(s) or insert appropriate information.

Remove information and requirements not required in respective project, whether or not brackets are present.

Comments, suggestions and recommended changes for this guide specification are welcome and should be submitted as a Criteria Change Request (CCR).

****

****

NOTE: The following information must be shown on the project drawings:

1. Site plan of project area showing surrounding area with tanks and other construction which affect safety distances from the tank to be cleaned.

2. Plan and elevation of tank to be cleaned with associated piping and appurtenances.

****

PART 1 GENERAL

1.1 REFERENCES

****

NOTE: This paragraph is used to list the

publications cited in the text of the guide specification. The publications are referred to in the text by basic designation only and listed in this paragraph by organization, designation, date, and title.

Use the Reference Wizard's Check Reference feature when you add a Reference Identifier (RID) outside of the Section's Reference Article to automatically place the reference in the Reference Article. Also use the Reference Wizard's Check Reference feature to update the issue dates.

References not used in the text will automatically be deleted from this section of the project specification when you choose to reconcile references in the publish print process.

****

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN PETROLEUM INSTITUTE (API)

API RP 500	(2012; Errata 2014) Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Division and Division 2
API RP 2003	(2015; 8th Ed) Protection Against Ignitions Arising out of Static, Lightning, and Stray Currents
API RP 2027	(2002; R 2012; 3rd Ed) Ignition Hazards Involved in Abrasive Blasting of Atmospheric Storage Tanks in Hydrocarbon Service
API RP 2207	(2017; 7th Ed) Preparing Tank Bottoms for Hot Work
API Std 521	(2014; 6th Ed) Pressure-relieving and Depressuring Systems
API Std 2015	(2018) Requirements for Safe Entry and Cleaning of Petroleum Storage Tanks

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME B16.5	(2017) Pipe Flanges and Flanged Fittings NPS 1/2 Through NPS 24 Metric/Inch Standard
ASME B16.48	(2015) Line Blanks

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2020; ERTA 20-1 2020; ERTA 20-2 2020; TIA 20-1; TIA 20-2; TIA 20-3; TIA 20-4)

	National Electrical Code
NFPA 306	(2019) Standard for the Control of Gas Hazards on Vessels
NFPA 326	(2015) Standard for Safeguarding of Tanks and Containers for Entry, Cleaning, or Repair

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH)

NIOSH 99-109	(Latest) Certified Equipment List

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2014) Safety and Health Requirements Manual

U.S. DEPARTMENT OF DEFENSE (DOD)

MIL-A-22262	(1993; Rev B; Am 2 1996) Abrasive Blasting Media Ship Hull Blast Cleaning
MIL-PRF-680	(2010; Rev C; Notice 1 2015) Degreasing Solvent

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

FS O-D-1276	(Rev B; Notice 1) Disinfectant-Detergent, General Purpose (Pine Oil)

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910.120	Hazardous Waste Operations and Emergency Response
29 CFR 1910.134	Respiratory Protection
29 CFR 1910.146	Permit-required Confined Spaces
29 CFR 1910.1025	Lead
29 CFR 1910.1028	Benzene
29 CFR 1910.1200	Hazard Communication
29 CFR 1926.55	Gases, Vapors, Fumes, Dusts, and Mists
40 CFR 260	Hazardous Waste Management System: General
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 263	Standards Applicable to Transporters of Hazardous Waste

40 CFR 264	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 265	Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 266	Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities

UNDERWRITERS LABORATORIES (UL)

UL 844	(2012; Reprint Jul 2020) UL Standard for Safety Luminaires for Use in Hazardous (Classified) Locations

1.2 SUBMITTALS

****

NOTE: Review Submittal Description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list, and corresponding submittal items in the text, to reflect only the submittals required for the project. The Guide Specification technical editors have classified those items that require Government approval, due to their complexity or criticality, with a "G." Generally, other submittal items can be reviewed by the Contractor's Quality Control System. Only add a "G" to an item if the submittal is sufficiently important or complex in context of the project.

For Army projects, fill in the empty brackets following the "G" classification, with a code of up to three characters to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.

The "S" classification indicates submittals required as proof of compliance for sustainability Guiding Principles Validation or Third Party Certification and as described in Section 01 33 00 SUBMITTAL PROCEDURES.

Choose the first bracketed item for Navy, Air Force, and NASA projects, or choose the second bracketed item for Army projects.

****

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are

[for Contractor Quality Control approval.][for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government.] Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Cleaning Agents

Abrasive for Blasting

Gasoline-Oil-Resisting Rubber Gloves and Boots

Cotton Coveralls and Hard Hat

Respiratory Protective Equipment

Disinfectant

SD-06 Test Reports

Blasting Abrasive Test

Tank Contents Tests

Cleaning Test Panel Results

Monitoring Results; G[, [_____]]

SD-07 Certificates

Qualifications of Marine Chemist

Qualifications of Certified Industrial Hygienist (CIH)

Testing Laboratory

Safety Plan

Training Certification

Work Plan

Hazardous Waste Disposal Plan

Tank Certification of Safety

Tank Exhaust Blower

Respiratory Protective Equipment

Breathing-Air Supply Source

Combustible Gas Indicator

[Lead-In-Air Analyzer

][Hydrogen-Sulfide (H2S) Indicator

][Benzene Indicator

] Oxygen Meter

Velometers

Lighting

First Aid Kit

[Plan for Pretreatment of Discharge to Sewer; G[, [_____]]

] Tank Exhaust Blower

SD-08 Manufacturer's Instructions

Tank Cleaning Agents

SD-11 Closeout Submittals

****
NOTE: Delete if hazardous waste is to be disposed of by the Government. Designer must verify that Government disposal is practical and make all arrangements for Government disposal.
****

Safety Permits

1.3 DEFINITIONS

1.3.1 Certified Industrial Hygienist (CIH)

As used in this section, refers to an Industrial Hygienist employed by the Contractor and is certified by the American Board of Industrial Hygiene in comprehensive practice.

1.3.2 Marine Chemist

The holder of a valid Certificate issued by the National Fire Protection Association in accordance with the "Rules for Certification of Marine Chemists," establishing him as a person qualified to determine whether construction, alteration, repair, or shipbreaking of vessels, which may involve hazards covered by NFPA 306 can be undertaken with safety.

1.3.3 Hazardous Areas

Hazardous areas must be defined as any area within 30 meters 100 feet of active aboveground storage tanks, areas within 30 meters 100 feet of leaking sections of fuel pipelines or other vapor sources, areas within 60 meters 200 feet of the downwind side of potential vapor emission sources (i.e., pressure-vacuum vents or open vents on active tanks, leaking sections of pipelines), areas within existing tanks, and areas within a dike.

1.3.4 Hot Work Operations

Hot work, for work covered by this section, includes: flame heating, welding, torch cutting, brazing, carbon arc gouging, or any work which

produces heat, by any means, of 200 degrees C 400 degrees F or more; or in the presence of flammables or flammable atmospheres, other ignition sources such as spark or arc producing tools (except steel hand tools) or equipment, static discharges, friction, impact, open flames or embers, nonexplosion-proof lights, fixtures, motors or equipment. Prepare tank bottoms for hot work in accordance with API RP 2207.

1.3.5 Personal Monitoring

****

NOTE: Consult with cognizant industrial hygienist regarding deletion if no lead hazard is present in tanks.

****

Sampling of lead concentrations within the breathing zone of an employee to determine the 8-hour time weighted average concentration in accordance with 29 CFR 1910.1025. Samples must be representative of the employee's work tasks. Breathing zone must be considered an area within a hemisphere, forward of the shoulders, with a radius of 150 to 225 mm 6 to 9 inches and the center at the nose or mouth of an employee.

1.3.6 Reproductive Hazard

A reproductive hazard is defined as any occupational stressor (biological, chemical, or physical) that has the potential to adversely affect the human reproductive process. For example, it is well known that central nervous system problems often occur in the offspring of mothers exposed to organic mercury during pregnancy. Therefore, based on the example cited, organic mercury can be classified as a reproductive stressor. Many reproductive hazards also cause other adverse health effects; for example, ethylene oxide is also known to be a carcinogen (i.e., produces cancer). Certain reproductive stressors can also have adverse effects on the male reproductive system. (If requested by the Contractor, the Contracting Officer will make available the Navy's standard on reproductive hazards.)

1.3.7 Flammable Liquid

Any liquid having a flash point below 38 degrees C 100 degrees F and a vapor pressure not exceeding 275 kPa 40 psia at 38 degrees C 100 degrees F.

1.3.8 Combustible Liquid

Any liquid having a flash point at or above 38 degrees C 100 degrees F.

1.4 QUALIFICATIONS

a. To Be Considered Qualified: Show proof of having completed work on three previous projects.

b. See certificate requirements for personnel as specified in paragraph CERTIFICATES.

1.5 QUALITY ASSURANCE

1.5.1 Modification of References

****

NOTE: Delete brackets and words within brackets if

there is no leaded fuel in any tank.
****

Except as modified herein, the work must conform with the recommendations of NFPA 326, API RP 500, API RP 2003, and API Std 2015. Where the word "should" appears in these publications, substitute "must."

1.5.2 Copies of Standards

****
NOTE: Delete brackets and words within brackets if there is no leaded fuel in any tank.
****

Furnish four copies of NFPA 326, API RP 500, API RP 2003, and API Std 2015.

1.5.3 Safety Permits and Equipment

Acquire safety permits (specified by the facility safety authorities) and necessary safety equipment.

1.5.4 Regulatory Requirements

a. Obtain permits required to comply with local, State, and Federal regulations.

b. Submit copies of permits required to comply with local, State, and Federal regulations.

c. Hazardous wastes, such as water, sediment, and sludge, must be packaged, labeled, stored, transported, treated and disposed of in accordance with 40 CFR 260 through 40 CFR 266 and State and local regulations. Transporters, sorters, treaters and disposers must be certified and have EPA ID numbers. Payment for disposal of hazardous waste will not be made until a completed hazardous waste manifest from the treatment or disposal facility is returned, and a copy furnished to the Government.[Deliver hazardous waste to the Government for disposal[as directed by the Contracting Officer].]

1.5.5 Medical Examinations

****
NOTE: Delete if there is no lead hazard.
****

Before exposure to lead-contaminated fuel tank and at the completion of the work, provide workers with a comprehensive medical examination as required by 29 CFR 1910.1025 and 29 CFR 1910.1200. The initial examination will not be required if adequate records show that employees have been examined as required by 29 CFR 1910.1025 within the last year and the blood lead levels did not exceed 30 micrograms per 100 grams of whole blood.

1.5.6 Medical Records

****
NOTE: Delete if there is no lead hazard.
****

Maintain complete and accurate medical records of employees for a period of at least 40-years or for the duration of employment plus 20-years, whichever is longer.

1.5.7 CIH Responsibilities

a. Certify training.

b. Review and approve safety plans and work plan for conformance to the applicable referenced standards.

c. Inspect tank cleaning work for conformance with the approved safety and work plans.

d. Direct monitoring.

e. Ensure work is performed in strict accordance with specifications at all times.

f. Ensure hazardous exposure to personnel and to the environment are adequately controlled at all times.

1.5.8 Training

****
NOTE: Delete 29 CFR 1910.1025 if there is no lead hazard.
****

Train each employee performing tank cleaning, waste disposal, and air sampling operations prior to the time of initial job assignment, in accordance with API Std 2015, 29 CFR 1910.120, 29 CFR 1910.134, [29 CFR 1910.1025,] and 29 CFR 1910.1200. The training must also include counseling of each employee on reproductive hazards involved in the work.

[1.5.9 Respiratory Protection Program

****
NOTE: Delete if there is no lead hazard.
****

a. Furnish each employee required to wear a negative pressure respirator or other appropriate type with a respirator fit test at the time of initial fitting and at least every 6 months thereafter as required by 29 CFR 1910.1025 where lead exposure is involved. Fit testing is not required for positive pressure respirators.

b. Establish and implement a respiratory protection program as required by 29 CFR 1910.134, and 29 CFR 1926.55. Also comply with 29 CFR 1910.1025 when exposure to lead is involved.

]1.5.10 Pre-Construction Conference

Along with the CIH, marine chemist, or gas-free engineer, meet with the Contracting Officer to discuss in detail the tank cleaning work plan, including work procedures and precautions for the work plan.

1.5.11 Certificates

Submit certificates for the items listed. Where equipment or materials are specified to conform with the standards of organizations, such as National Institute for Occupational Safety and Health (NIOSH), Underwriters Laboratories (UL), and American Petroleum Institute (API), include a label or listing indicating compliance. In lieu of the label or listing, the Contractor may submit a test report from an approved testing organization stating that the item has been tested in accordance with the specified organization's test methods and that the item conforms with the organization's standard or code.

1.5.11.1 Qualifications of Marine Chemist

Submit name, address, and telephone number of the marine chemist selected to perform the required duties. Submit documentation that the marine chemist is certified by the National Fire Protection Association, including the certificate number and date of certification or recertification. The NFPA certification will be acceptable for non-ship work on this contract. Refer to NFPA 306 to determine when a marine chemist is required, how a marine certificate is issued and maintained, and what to expect during an inspection.

1.5.11.2 Qualifications of Certified Industrial Hygienist (CIH)

Submit name, address, and telephone number of the CIH selected to perform responsibilities in paragraph CIH RESPONSIBILITIES. Provide previous experience of the CIH. Submit proper documentation that the Industrial Hygienist is certified by the American Board of Industrial Hygiene in comprehensive practice, including certification number and date of certification/recertification. The CIH must be familiar with the hazards involved in fuel systems work.

1.5.11.3 Testing Laboratory

Submit the name, address, and telephone number of the testing laboratory selected to perform the monitoring, testing, and reporting of airborne concentrations of lead and other contaminants. Provide proper documentation that persons performing the analysis have been judged proficient by successful participation within the last year in the National Institute for Occupational Safety and Health (NIOSH) Proficiency Analytical Testing (PAT) Program. The laboratory must be accredited by the American Industrial Hygiene Association (AIHA). Provide AIHA documentation along with date of accreditation/reaccreditation.

1.5.11.4 Safety Plan

Submit a safety plan within 45 calendar days after contract award and 30-days prior to commencing work. [The safety program must be reviewed and approved by the safety/health officer of the facility.] The safety plan must meet requirements of EM 385-1-1, OSHA, and address the following:

a. Identification and evaluation of the hazards and risks associated with each site being studied, including reproductive hazards and precautionary measures to be followed by workers for all hazards.

b. Names and qualifications of each Contractor's representative in charge of the work and present at the job site when tank cleaning and repair work will be performed.

c. Identification of supervisory personnel and alternates responsible for site safety/response operations.

d. Determination of levels of personal protection to be worn for various site operations.

e. List of equipment with adequate nomenclature by item, that will be used at the job site and the date and location where this equipment can be inspected by the Contracting Officer.

f. Establishment of work zones (exclusion area, contamination area, and support area).

g. Establishment of a tank entry and work permit program in accordance with 29 CFR 1910.146, EM 385-1-1, and NFPA 326.

h. Establishment of decontamination methods and procedures.

i. Determination of the number of people required to enter the contamination zones during the initial entries and subsequent operations.

j. Establishment of emergency procedures, such as: escape routes, fire protection, signals for withdrawing work parties from site, emergency communications, wind indicators, including Navy notification.

k. Identification and arrangements with nearest medical facility for emergency medical care for both routine-type injuries and toxicological problems. Submit name, location, and telephone number of this medical facility.

l. Establishment of continual air and personnel monitoring procedures.

m. Establishment of procedures for obtaining and handling potentially contaminated samples.

n. Identification of medical monitoring program, including respirator medical qualification examination for each individual at the work site.

o. Identification of training plan to be instituted, including contents of 29 CFR 1910.1200 and 29 CFR 1910.134; its training contents; and instructor with appropriate training certification. Training plan must also include counseling to each employee on reproductive hazards.

p. Establishment of a respiratory protection program conforming to 29 CFR 1910.134.

q. Establishment of a hazard communication program (29 CFR 1910.1200).

1.5.11.5 Work Plan

****

NOTE: Data for these paragraphs should be obtained from the Commanding Officer of the individual Naval facility having tanks for cleaning.

****

The shut down or interruption to normal operations or traffic must be

listed on the progress schedule and submitted [to the Contracting Officer].

****

NOTE: Delete if there is no hazardous waste in the project. Edit if hazardous waste is to be disposed of by the Government. Designer must verify that Government disposal is practical and make all arrangements for Government disposal.

****

1.5.11.6 Hazardous Waste Disposal Plan

Prepare a Hazardous Waste Disposal Plan and submit within [45] [_____] calendar days after contract award for approval by the Contracting Officer, or if there are no hazardous wastes indicated by Government tests, submit the plan [21] [_____] days after the Contractor's tests indicate hazardous wastes. The Hazardous Waste Disposal Plan must comply with applicable requirements of Federal, State, and local hazardous waste regulations and must address the following:

a. Identification of hazardous wastes associated with the work, including a sampling and testing plan for each waste stream, the purpose of each test, and the rationale for evaluating the test results. Indicate the representative sampling and specific testing methods, number of samples, and the name and qualifications of the testing laboratory.

b. Estimated quantities of wastes to be disposed in the cleaning of each tank and a description of arrangements made for storage and disposal.

c. Names and qualifications of each Contractor that will be transporting, storing, treating, and disposing of the wastes. Include the facility location and a 24-hour point of contact. Furnish two copies of [EPA] [State] [and] [local] hazardous waste [permit applications] [permits] [and] [EPA Identification numbers].

d. Names and qualifications (experience and training) of personnel who will be working on-site with hazardous wastes.

e. List of waste handling equipment to be used in performing the work, to include cleaning, treatment, volume reduction, and transport equipment.

f. Spill prevention, containment, and cleanup contingency measures to be implemented.

g. Work plan and schedule for waste removal and disposal.

h. Cost for hazardous waste disposal according to this plan.

1.5.11.7 Tank Certification of Safety

****

NOTE: Designer must select either Marine Chemist or CIH.

****

Submit certification, in accordance with NFPA 326, from [an NFPA certified "Marine Chemist"] [a CIH] stating that tank is safe for hot work and that special precautionary measures have been taken for workers to enter the tank to perform the work.

1.5.11.8 Training Certification

****
NOTE: Delete words in bracket if there is no leaded gasoline hazard.
****

Submit certifications signed and dated by the CIH specified in the testing plan and by each employee stating that the employee has received training on work practices and received counseling on and fully understands the reproductive hazards involved with lead and toluene exposure and the work.

1.5.11.9 Hazardous Waste Permits

Submit copies of [EPA] [State] [and] [local] hazardous waste [permit applications] [permits] [and] [EPA Identification numbers] of the transporter, treatment, storage and disposal facility that will be accepting hazardous waste. Include the facility location and a 24-hour point of contact.

1.5.11.10 Non-Hazardous Waste Permits

Submit [EPA] [State] [local] permits for disposal site for non-hazardous residues and wastes.

1.5.12 Test Results

1.5.12.1 Required Test Reports

Submit test results required by MIL-A-22262, for blasting abrasive. Submit contractor's independent tests of tank contents (water, sediment, and sludge). Submit tank cleaning test panel results, including water pressure and temperature and nozzle distances used during tank washing procedure.

1.5.12.2 Air Monitoring

Submit monitoring results to the Contracting Officer within 2 working days after the samples are taken, signed by the testing laboratory employee performing the air monitoring, the employee that analyzed the sample, and the CIH.

1.6 DELIVERY AND STORAGE

Deliver equipment and materials to the site in an undamaged condition bearing the manufacturer's name and brand designation. Store equipment and materials off the ground to provide proper ventilation, drainage, and protection against dampness. Replace defective and damaged equipment and materials.

1.7 JOB CONDITIONS

1.7.1 Ventilation

Maintain a vapor-free condition throughout the course of the work inside the tank. The air movers must be non-sparking, explosion-proof, electrically operated or air-driven exhaust type. A rate of one air change per hour must be the lowest acceptable rate, for tanks under 3600 kL

30,000 BBL. For tanks greater than 3600 kL 30,000 BBL, use 4700 L/s 10,000 cfm. Air movers must be kept in operation whenever workers are in the tanks; except the air movers must be shut down 15 minutes before taking tests.

1.8 SCHEDULING AND SEQUENCING

1.8.1 Sequence of Primary Phases of the Cleaning Procedure

a. Planning the operations

b. Preparation for cleaning

c. Vapor-freeing of the tank

d. Cleaning the tank

e. Clean-up, residue disposal, inspection, and acceptance.

1.8.2 General Scheduling

Complete the work specified in this section before any other work in the tank is started. The work includes the complete interior cleaning of the storage tanks.

PART 2 PRODUCTS

2.1 MATERIALS

Submit identification for the items by designated name, specification number, project contracting number, and intended use. Submit Safety Data Sheets for materials to be used at the job site, in accordance with 29 CFR 1910.1200.

2.1.1 Cleaning Agents

****
NOTE: Coordinate listing of cleaning agents with paragraph WASHING on cleaning method.
****

a. Detergent: FS O-D-1276.

b. Solvent: MIL-PRF-680, Type II, minimum flashpoint of 60 degrees C 140 degrees F.

c. Approved commercial cleaning agent.

2.1.2 Abrasive

2.1.2.1 Abrasive for Blasting

Provide sharp, washed, salt-free [, angular] abrasive material, free from feldspar and other constituents that tend to break down and remain on the surface. Abrasive must not contain magnetic materials and must conform to MIL-A-22262, [except that Mohs' hardness must be 7 to 9] [and [_____]].

2.1.2.2 Recycled Abrasive

Screen and air wash abrasive that is recycled at the job site, to remove dirt and fines. Add new abrasive so that the combined new and recycled abrasive mixture meets specified abrasive requirements for chemical composition, moisture, friability, silica, anchor pattern and oil content. Do not recycle abrasive which has picked up toxic or hazardous material. Do not recycle nickel slag.

2.2 EQUIPMENT

Furnish necessary clothing and equipment for the work and protection of people entering the tank. Electrical equipment and wiring must be in accordance with NFPA 70, Class 1, Group D, Division 1. Provide any item or items for the protection of these people including but not limited to the following:

a. Gasoline-Oil-Resisting Rubber Gloves and Boots: Gauntlet type and conductive type respectively (acid-proof rubber is an acceptable material); furnished for each person entering or working inside the tank or handling sludge materials on the exterior of the tank, plus one extra pair each for emergency use.

b. Cotton Coveralls and Hard Hat: Light colored; one change per person per day, and an adequate supply of chemical-resistant disposable coveralls to be worn over cotton coveralls.

c. Respiratory Protection: Provide one of the following types of NIOSH-approved respiratory protective equipment for each person working inside the tank, plus one extra for emergency use. NIOSH 99-109 listing constitutes NIOSH approval.

   (1) Self-contained breathing apparatus with a full facepiece operated in a positive pressure mode.

   (2) A combination respirator which includes a Type C supplied-air respirator with a full facepiece operated in a positive pressure mode and an auxiliary positive pressure self-contained breathing apparatus.[Provide and use two-way communication equipment when cleaning underground tanks [larger than 190 kL 50,000 gallons capacity] [or] [where manhole accesses are deeper than 3 meters 10 feet from the working level].]

   (3) The CIH may specify airline (Type C) respirator in place of those specified above; however, the decision must be based on the results of personal monitoring.

   (4) Use Type CE respirator for abrasive blasting inside the tank.

   (5) CIH must specify respiratory protection if required for personnel handling sludge material outside of the tank.

d. Safety Harness: For each person working inside tank, plus one extra for outside the tank.

e. 13 mm 1/2-inch Diameter Life Rope of Required Length: For each person working inside the tank.

f. Breathing-Air Supply Source: 29 CFR 1910.134.

g. Combustible Gas Indicator [,Lead-in-Air Analyzer] [, Hydrogen-Sulfide (H2S) Indicator] [, Benzene Indicator] and Oxygen Meter. [Recommend a portable gas chromatograph or other more accurate instrument for the benzene indicator.]

h. Shovels, Buckets, Brooms, Wrenches, Scrapers, Squeegees, Wire Brushes, Scrub-Brushes, Ladders, Staging, and Other Tools: Do not use brooms or brushes that have plastic or synthetic bristles.

i. Lighting: UL 844, explosion-proof, minimum 540 lx 50 footcandle, floodlight type, or Mining Enforcement and Safety Administration (MESA) approved, explosion-proof, portable battery-powered light.

j. Air Movers for Tank Ventilation: Explosion proof electrically operated or air driven. Nonferrous fan blades. Use velometers for measuring velocity.

k. Disinfectant for Cleaning Face Masks: Cleaner-sanitizer for cleaning and disinfecting respirator facepieces as specified in 29 CFR 1910.134, Appendix B-2.

l. Soap for Personnel Washing: Non-phosphate type.

m. A.B.C. Fire Extinguishers: UL listed 2A: 40B: C, 2A: 20B: C, or 4A: 30B: C; minimum 7 kg 15 pound capacity.

n. First Aid Kit: One 16-unit kit for each 25 persons.

PART 3 EXECUTION

3.1 PREPARATION FOR ENTRY

Prepare the tank for entry in accordance with NFPA 326. Isolate from sources of energy. Ensure vapors have been controlled or removed. Identify potential hazards and apply control measures to mitigate the hazards. Test and monitor atmospheric conditions to ensure conditions of the Marine Chemist Certificate safety designations have been met.

3.1.1 Isolation From Piping

For tank cleaning prior to out-of-service inspection and minor cold repairs, close the double block and bleed isolation valves and remove the body cavity plugs from the valves. Monitor the body cavity for fuel and maintain the valves in this condition for the duration of the cleaning, inspection, or minor cold repairs, not to exceed one month. Secure the valves in the closed position with mechanical means. Perform lockout tagout procedures on the valves.

For ordinary cleaning prior to out-of-service inspection and hot work or when nozzles are not equipped with double block and bleed valves, or for outages lasting longer than one month, disconnect piping connected to the tank. Provide a solid-plate line blank between two flanges near the tank in accordance with ASME B16.48, or remove a valve or piece of pipe and provide a blind flange compliant with ASME B16.5 to isolate tank.[For underground tanks where connected pipelines are buried, blind off the pipelines at the nearest valve box.] Isolation means must be of sufficient strength to withstand pressure which might be exerted by the product being blanked off, and must be gasketed on both sides if blind

flange is inserted between two flanges. Do not disconnect piping or valves until it is certain the line has been defueled.

Isolate all piping connected to the tank. Perform lockout tagout procedures on any valve remaining connected to the tank.

3.1.1.1 Thermal Relief

Evaluate thermal relief capability on active facility piping isolated from the tank. Should isolation means result in a segment of active piping unprotected from thermal overpressure, provide temporary means consistent with API Std 521 to relieve the overpressure. Consult with operators to determine existing relief pressures and set temporary relief means to ensure overpressure does not occur.

3.1.2 Lockout Tagout

Perform lockout tagout on all electrical circuits and sources of energy to the tank in accordance with EM 385-1-1 and NFPA 326.

3.1.3 Removal of Ignition Sources

Remove sources of ignition from the cleaning area. Do not permit ignition producing devices, including matches, lighters or cigarettes, within 30 m 100 feet upwind and 60 m 200 feet downwind of a tank, or inside the tank farm, or within the tank firewall, whichever is farther.

3.1.4 Survey of Hazardous Areas

Carefully survey the entire area around the tank to be cleaned to ensure that there are no vapors present in the pit, low places, or hazardous areas and that all unauthorized personnel are cleared from the area. Ensure that there is no possibility of anyone smoking in the immediate vicinity. Hazardous areas are defined as follows:

a. Interior of tanks.

b. Areas within 30 meters 100 feet from points having flammable vapor emissions which, for example, are from the exhaust manholes of tanks under repair, open vents or pressure vacuum vents (breather valves) of active tanks in the vicinity of tanks under repairs or cleaning. CAUTION: Allowance must be made for 4 or more miles per hour winds by increasing the size of the hazardous area to a minimum of 60 meters 200 feet on the downward side.

[c. For aboveground tanks, all areas within a common impoundment dike up to the height of the dike walls and within 3 meters 10 feet in all directions of the exterior surfaces of tank shell and roof.

]3.2 PROJECT CONDITIONS

3.2.1 Cutting Tank Access Holes

****

NOTE: Use for tanks without manholes that are going to be demolished. For tanks that are going to remain in service contact the Contracting Officer if the tanks do not have a manhole. It may be more cost effective to install a new tank than cut a

manhole in the shell.
****

Tanks in this project may not have manholes.

3.2.2 Permission for Each Entry Into a Tank

Obtain written permission from the Contracting Officer prior to each entry into a tank. Permission will be granted only under the following conditions:

a. The Contractor's qualified supervisor is present.

b. The Contractor's personnel have been briefed by the supervisor on the procedure and role of each employee in the event of an emergency.

c. Required equipment is approved and properly located.

d. Personnel are properly equipped with properly fitted protective equipment and have received adequate training from a qualified instructor.

e. The entire area adjacent to the tank is secured.

f. A minimum of two persons outside and two or more persons inside of each tank are provided at all times during cleaning operations.

****
NOTE: Lead limit of 50 micrograms per cubic meter is consistent with 29 CFR 1910.1025.
****

g. Tank air is monitored and corrective action is taken to ensure that the vapor concentration is less than 10 percent of the lower flammable limit (LFL) [, lead-in-air is less than 50 micrograms per cubic meter] [, hydrogen sulfide is less than 10 ppm permissible exposure level (PEL)] [, benzene is less than one ppm PEL] and oxygen content is a minimum of 19.5 percent.

h. An NFPA certified "Marine Chemist" or CIH has certified that the tank is safe for hot work, and that the required special precautionary measures have been taken due to the potential health hazard to the worker that still exists, even when the vapor concentration is well below the LFL. The Contractor must be responsible for reviewing the record drawing(s) of the tank to be cleaned.

i. People entering the area leave smoking materials such as cigarettes and flame-producing devices at a previously determined location.

j. When work involves handling and disposal of hazardous waste, the Contractor has a copy of 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 40 CFR 265, and 40 CFR 266 in his possession.

k. Permit only personnel authorized in the safety plan within 100 feet of the tank perimeter.

3.2.3 Traffic Control

Direct traffic minimum 60 meters 200 feet away from the tank cleaning

area. Set up road blocks and warning signs. Do not operate vehicles in hazardous areas.

3.2.4 Lavatory Facilities

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NOTE: Obtain data for these paragraphs from the Commanding Officer of the individual Naval facility having tanks for cleaning.
****

****
NOTE: Delete brackets and words within brackets if there is no leaded fuel in any tank.
****

Arrange for lavatory and toilet facilities [and, in the case of tanks for leaded fuel, provide showers for bathing].

3.2.5 Miscellaneous

Ensure that the manufacturers have labeled containers holding products involving hazards in use or storage, in accordance with 29 CFR 1910.1200. Label containers used to store, transport, or dispose of hazardous waste in accordance with 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 40 CFR 265, and 40 CFR 266 [and State Regulations]. Remove small objects of ferrous metal within the working areas to prevent the accidental striking of a spark. Place equipment upwind of tank openings at highest elevation possible; do not place in a spot lower than the surrounding terrain. Review drawings of the tank to be cleaned and brief workers on the location of pits, sumps, piping, or other tank appurtenances which could be hazardous to personnel. Provide floodlights to illuminate the work area without the need for battery operated handlights. Provide scaffolding, platforms, and ladders for secure, safe accessibility to tank surfaces. Install electrical equipment in accordance with API RP 500. Provide floodlights to illuminate the work area without the need for battery operated handlights. Do not use artificial lights inside tank until the tank is vapor-free.[Unless otherwise approved by the Contracting Officer, do not heat tanks during winter to provide personnel comfort or melt ice.]

3.2.5.1 Grounding and Bonding for Equipment

Provide grounding and bonding for equipment which may generate static electricity [, including air hose to sandblast nozzle]. Do not pass the air hose through an area where flammable vapors may exist.

3.2.5.2 Fire Extinguishers

****
NOTE: Coordinate with the local fire department to determine the minimum quantities of fire extinguishers for each specific job.
****

Furnish [two] [_____] carbon-dioxide fire extinguishers of minimum 7 kg 15 pounds capacity each, in the immediate vicinity of the work. Provide a continuous fire watch. CAUTION: Do not discharge high pressure carbon dioxide extinguishers where explosive vapors exist since the discharge can

cause a spark which will ignite the vapors.

3.2.5.3 Disconnection of Pipelines

For normal tank cleaning prior to out-of-service (internal) inspection and minor cold repairs, close the double block and bleed valves on the tank nozzles connected to piping and remove the body cavity plugs from the bottoms of the valves and bleed the valves for the duration of the cleaning, inspection or minor cold repairs. Perform lock-out/tag-out procedures on the valves.

For cleaning prior to hot work or when nozzles are not equipped with double block and bleed valves, or for extended outages lasting longer than one month, disconnect pipelines connected to the tank. Provide a solid-plate blind flange between two flanges near the tank, or remove a valve or piece of pipe and provide a blind flange to prevent flammable material from entering the tank.[For underground tanks where connected pipelines are buried, blind off the pipelines at the nearest valve box.] Blind flanges must be of sufficient strength to withstand pressure which might be exerted by the material being blanked off, and must be gasketed on both sides if blind flange is inserted between two flanges. CAUTION: Do not disconnect piping or valves until it is certain the line has been emptied of fuel.

3.2.5.4 Removal of Ignition Sources

Remove sources of ignition from the cleaning area. Do not permit ignition producing devices, including matches, lighters or cigarettes, within 30 meters 100 feet upwind and 60 meters 200 feet downwind of a tank, or inside the tank farm, or within the tank firewall, whichever is farther.

3.2.5.5 Survey of Hazardous Areas

Carefully survey the entire area around the tank to be cleaned to ensure that there are no vapors present in the pit, low places, or hazardous areas and that all unauthorized personnel are cleared from the area. Ensure that there is no possibility of anyone smoking in the immediate vicinity. Hazardous areas are defined as follows:

a. Interior of tanks.

b. Areas within 30 meters 100 feet from points having flammable vapor emissions which, for example, are from the exhaust manholes of tanks under repair, open vents or pressure vacuum vents (breather valves) of active tanks in the vicinity of tanks under repairs or cleaning. CAUTION: Allowance must be made for 6 or more km/h 4 or more miles per hour winds by increasing the size of the hazardous area to a minimum of 60 meters 200 feet on the downwind side.

[c. For aboveground tanks, all areas within a common impoundment dike up to the height of the dike walls and within 3 meters 10 feet in all directions of the exterior surfaces of tank shell and roof.

]3.2.5.6 Exit from a Tank During Emergencies

To permit quick, free exit from a tank during emergencies, keep the area around the tank openings and emergency routes clear of obstructions.

3.3 INSPECTION

3.3.1 Inspection of Equipment

3.3.1.1 Respirators

Respirator users must inspect their respirators in strict accordance with the instructions provided by the manufacturer.

3.3.1.2 Air Hose from Breathing-Air Supply

If air line respirators are used, ensure that:

a. There are no breaks in outside covering;

b. Condition of gaskets is good;

c. Connections are tight; and

d. There are no restrictions in the hose.

3.3.1.3 Safety Harness and Life Line

Ensure that:

a. There is no frayed or weak material; and

b. Condition of harness is good.

3.3.1.4 Breathing-Air Supply Source

Ensure:

a. Good working condition;

b. Location in vapor-free area;

c. Compliance with 29 CFR 1910.134 for breathing air quality, frequency of air analysis, and presence of safety devices; and

d. Backup air supply source.

3.3.1.5 Monitoring Equipment

Calibrate each day before use:

a. Combustible gas indicator

b. Oxygen meter

[c. H2S Indicator

][d. Lead-in-Air Analyzer

]#### 3.3.1.6 Other Equipment

Ensure:

a. Proper grounding and bonding;

b. Explosion-proof motors; and

c. Explosion-proof lighting.

3.3.2 Personnel Inspection

3.3.2.1 Clothing

Personnel for Proper Attire Commensurate with Hazards Involved: Check for:

a. Clean clothing in good condition (wear freshly laundered clothing at the beginning of the job and at the start of each workday thereafter).

b. Boots and gloves of approved type and in good condition.

3.3.2.2 Breathing-Air Supply

If air line respirators are used, ensure that air is supplied to the facepiece at a rate of 2 to 7 L/s 4 to 15 cfm. If self-contained breathing apparatus are used, ensure sufficient number of full replacement cylinders are available to last the duration of the job.

3.3.2.3 Harness and Lifeline

Harness and lifeline must be in good condition and properly attached.

3.3.2.4 Gum or Tobacco Chewing

Ensure that gum or tobacco chewing is prohibited.

3.3.2.5 Physical Defects or Injuries

Ensure that people have no physical defects or injuries which may prevent their wearing respirators or which may cause rescue to be difficult. No beards, sideburns, or large mustaches will be allowed on people who must wear respirators.

3.3.2.6 Alcoholic Beverages and Drugs

Ensure that people entering the tank are not under the influence of alcoholic beverages and drugs.

3.3.2.7 Counseling on Reproductive Hazards

Ensure that all employees have been counseled on and fully understand the reproductive hazards related to work in contaminated areas or in leaded gasoline or chemically contaminated tanks since they may be seriously affected by organic lead compounds or other chemical contaminants.

3.3.2.8 Hazardous Areas

Check hazardous areas as defined in paragraph SURVEY OF HAZARDOUS AREAS.

3.4 TABLE OF TANK HISTORY

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NOTE: Data for these paragraphs should be obtained from the Commanding Officer of the individual

facility having tanks for cleaning.
****

Tank Number	Tank Location	Tank Capacity	Date Constructed	Type of Lining (If Applicable)	Type of Fuel	Remarks from the Last Inspection

3.5 FUEL REMOVAL

****
NOTE: Contact the fuel department of the nearest Naval Supply Center or Depot to determine if dirty residual fuel can be accepted by the Government for reclamation. If not reclaimed by the Government, consider the following. Depending on the amount of residual fuel remaining in the tank after pump down by the Government and the degree of fuel emulsification, the designer, in consultation with the activity, should decide on whether to require fuel/water separation under the scope of this Contract, dispose of the mixture as hazardous wastes if tests show presence of hazardous constituents, or use other options available to the Government.
****

All possible fuel will be pumped or otherwise removed from the tank by the Government. Consider remaining fuel contaminated or waste fuel; [pump into 55 gallon drums or other suitable containers for disposal in accordance with approved procedures meeting [host nation,] local, State, and Federal regulations] [provide oil/water separators for further recovery of fuels and turn over to the Government for use]. Dispose of remaining fuel emulsions in accordance with applicable [host nation,] local, State, and Federal regulations. Drums or tanks used for containerizing waste fuel will be furnished by the [Contractor] [Government]. Oil/water separator for fuel separation will be furnished by the [Contractor] [Government].

3.6 IDENTIFICATION OF TANKS WITH HAZARDOUS WASTE SLUDGES AND RESIDUES

****
NOTE: Information on the hazardous waste characteristics of the sludge in the tanks should be provided by the activity. If not, sampling and analysis must be conducted during the 0-35 percent design stage to properly define scope and costs.
****

The following [tank is][tanks are] known or suspected to contain hazardous wastes:

Tank No.	Product	Hazardous Waste, Status, Type and Basis-known [or suspect]
[1]	[MOGAS]	[Sludge and sandblast residue; ignitability and lead]

3.7 TANK CLEANING

For the interior of tanks [with floating roofs, the bottom and up the shell to the height of the floating roof][without floating roofs, the shell, bottom, columns, roof, rafters, and interior accessory system components such as pumps, piping, and ladders] must be cleaned [to bare metal][not to bare metal but only to the surface of sound lining or coating], free of rust, dirt, scale, loose material, fuel, oil, grease, sludge, and other deleterious substances.[Do not damage sound existing lining material. Remove unsound or loose lining or coating, and clean surfaces which became exposed to bare substrate.] Immediately notify the Contracting Officer if lining or coating is deteriorated or loose.[For tanks with floating roofs, provide general cleaning of the top of the roof by means such as sweeping or vacuuming.]

3.7.1 Monitoring

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NOTE: Use for tanks with leaded gasoline hazard. Consult cognizant industrial hygienist regarding deletion if there is not leaded gasoline hazard.

****

Monitoring of airborne concentrations of lead must be in accordance with 29 CFR 1910.1025 of benzene in accordance with 29 CFR 1910.1028, and as specified herein. Air monitoring, testing, and reporting must be performed by a CIH or an Industrial Hygiene (IH) Technician who is under the direction of the CIH.

a. The CIH or the IH Technician under the direction of the CIH must be on the jobsite directing the monitoring, and inspecting the work to ensure that the requirements of the Contract have been satisfied during the entire operation.[The CIH must be located [_____] during the entire tank cleaning operation.]

b. Take personal air monitoring samples on employees who are anticipated to have the greatest risk of exposure as determined by the CIH. In addition, take air monitoring samples on at least 25 percent of the work crew or a minimum of two employees, whichever is greater, during each work shift.

c. Submit results of air monitoring samples, signed by the CIH, within 2 working days after the air samples are taken. Notify the Contracting Officer immediately of exposure to lead at or in excess of the action level of 30 micrograms per cubic meter of air outside of the lead control area, and 0.5 ppm for benzene.

3.7.1.1 Monitoring During Tank Cleaning Work

Perform personal and area monitoring during the entire tank cleaning operation. Sufficient area monitoring must be conducted at the physical boundary to ensure unprotected personnel are not exposed above 30 micrograms per cubic meter of air for lead and 0.5 ppm for benzene at all times. If the outside boundary lead levels are at or exceed 30 micrograms per cubic meter of air or the benzene levels are at or exceed 0.5 ppm, work must be stopped and the CIH must immediately correct the condition(s) causing the increased levels and notify the Contracting Officer immediately. The CIH must review the sampling data collected on that day to determine if condition(s) requires any further change in work methods.

Tank cleaning work must resume when approval is given by the CIH. The Contractor must control the lead level outside of the work boundary to less than 30 micrograms per cubic meter of air and the benzene levels to less than 0.5 ppm at all times. As a minimum, conduct area monitoring daily on each shift in which tank cleaning operations are performed in areas immediately adjacent to the control area. For outdoor operations, at least one sample on each shift must be taken on the downwind side of the control area. If adjacent areas are contaminated, clean and visually inspect contaminated areas. The CIH must certify that the area has been cleaned of contamination.

[3.7.2 Lead Hazard Personnel Safety

****
NOTE: Delete brackets and words within brackets if there is no leaded fuel in any tank.
****

Due to the lead hazard (inorganic and organic (TEL)) associated with this tank, comply with API Std 2015, and the applicable rules and regulations of the State of [Hawaii] [_____] and Federal Occupational Safety and Health Standards. If there is conflict among the API Publications, State, and Federal regulations; the most stringent criteria must apply. Ensure that the requirements for protective clothing and equipment, monitoring to determine exposure levels, and all other relevant controls are complied with. Ensure that employees are counseled on the reproductive hazards associated with lead.

][3.7.3 Precautions for Airborne Lead

****
NOTE: Delete brackets and words within brackets if there is no leaded fuel in any tank.
****

****
NOTE: The following paragraphs can be inserted into the appropriate section (demolition, tank coating, or repair/modifications) for follow on work to the tank.
****

Since the tank is a known lead hazard, the Contractor must, in accordance with API Std 2015, ensure that the workers inside the tank wear the appropriate protective clothing and respiratory equipment as prescribed by API Std 2015 for the duration of the tank cleaning. Use only the types of respirators specified for "Respiratory Protection" under paragraph EQUIPMENT. After completion of the cleaning operation, the Contractor has the option of allowing people to enter the tank without respiratory protective equipment, only after lead-in-air analysis has been obtained in accordance with API Std 2015.

]3.7.4 Water, Sediment, and Sludge Analysis

****
NOTE: All wastes must be tested prior to tank cleaning, by the Government and by the Contractor, regardless of the tank's past history as to the storage of leaded fuel.

Use this paragraph if the Government has already tested the water, sediment, and sludge. If at all possible, the Government must perform the necessary tests to determine if the wastes are hazardous or nonhazardous prior to bid. The Government test results should be presented in the Specification and used as a basis for bidding. This does not preclude independent testing required of the Contractor to verify the Government analysis. For Air Force projects, check latest Air Force requirements for handling of hazardous waste materials.

40 CFR Part 261 is the EPA criteria for hazardous waste. The concern with leaded fuel or any other lead product is the characteristic of toxicity. If the sample contains 5 mg/liter or more of lead, then the sample is considered a hazardous waste. The test method to determine the lead concentration is specifically defined in 40 CFR Part 261 and does not distinguish between inorganic and organic (TEL) lead. The dangers associated with organic lead (TEL) is related to personnel safety (its absorption into the human body through the skin or respiratory system) and is of no concern to EPA with regards to the handling and disposal of hazardous wastes. The EPA test measures the concentration of total lead which leaches out into solution. Lead in its pure or stable forms, such as lead weights, that does not leach out into the test solution, is not a hazardous waste.

The EPA has a test procedure called Toxicity Characteristic Leaching Procedure (TCLP). Changes may be required to specifications and cost estimates because of expanded testing requirements.

****

****

NOTE: When Government disposal of hazardous waste has been determined to be the most practical method of disposal, include the option for delivery of waste to the Government. Add details if necessary.

****

The water, sediment, and sludge remaining in the tank contain the following quantities of leachable metals as analyzed by the Government in accordance with 40 CFR 261.

a. Water: [_____]

b. Sediment: [_____]

c. Sludge: [_____]

The Government analysis indicates that the water, sediment, and sludge are [nonhazardous] [hazardous]. The Contractor will be responsible for independently testing the water, sediment, and sludge in accordance with 40 CFR 261 to verify the above. Submit laboratory reports to the

Contracting Officer describing sampling and testing procedures used, test results, and findings. If the results differ such that the Contractor must handle the waste differently from the method specified, notify the Contracting Officer, and the Contractor will be subject to an equitable adjustment to the Contract under the Changes clause of the Contract Clauses. If the Contractor's tests determine that the water, sediment, and sludge are hazardous, then the hazardous wastes must be packaged, labeled, stored, transported, treated and disposed of in accordance with 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 40 CFR 265, and 40 CFR 266. Transporters, storers, treaters and disposers must be certified and have EPA ID numbers. Payment for disposal of hazardous waste will not be made until a completed hazardous waste manifest from the treatment or disposal facility is returned, and a copy furnished to the Government.[Deliver hazardous waste to the Government for disposal [as directed by the Contracting Officer.] [_____.]] Nonhazardous or hazardous wastes must be handled and disposed of as described below.

3.7.5 Water Removal and Disposal

****
NOTE: The Government should estimate and indicate the quantity of water, sludge, sediment, and fuel, if any, remaining in the tank so that the Contractor can be more responsive in his bidding. Verify availability of Government disposal facilities.
****

****
NOTE: When Government disposal of hazardous waste has been determined to be the most practical method of disposal, include the option for delivery of waste to the Government. Add details if necessary.
****

****
NOTE: Land application of non-hazardous wastes such as onto surrounding grounds or inside the berm may be subject to local, State, and Federal groundwater protection regulations. Designer must check for site-specific regulatory restrictions. Based on tests to determine the character of the wastewater, an assessment should be made for any need to pretreat the nonhazardous wastes through oil-water separators or filters prior to land application, when such disposal is allowed.
****

Pump or otherwise remove water from the tank. Ensure that the sludge and sediment are not pumped out or mixed with the water. There are [_____] gallons of [nonhazardous] [hazardous] water that [can be disposed of into the berm area.] [must be packaged, labeled, stored, transported, treated, and disposed of in accordance with 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 40 CFR 265, and 40 CFR 266.][Deliver hazardous waste to the Government for disposal [as directed by the Contracting Officer] [_____].]

3.7.6 Sludge and Sediment Removal and Disposal

Squeegee or brush any sludge, sediment, or other loose material into

piles, shovel into buckets or other suitable containers, and remove from the tank.

3.7.6.1 Sludge Disposal Using [Landfill] [Berm]

****
NOTE: Select the applicable paragraph(s) from the following:
****

****
NOTE: The Government should estimate and indicate the quantity of water, sludge, sediment, and fuel, if any, remaining in the tank so that the Contractor can be more responsive in his bidding. Verify availability of Government disposal facilities.
****

****
NOTE: Disposal of sludge and sediment in the berm area may interfere with the Contractor's operations if storage or lay down of materials within the berm is planned. State permit may be required for disposal in the berm area and should be obtained by the Government prior to advertising for bids.
****

There are [_____] barrels of nonhazardous sediment and sludge in the tank that can be disposed of in [the berm area] [sanitary landfill].[Spread nonhazardous sludge as uniformly as possible over the area in a maximum 3-inch thick layer for weathering in the berm area. Fence the area temporarily and mark with a wood or metal sign. When the ambient temperatures are above zero degrees C 32 degrees F, the weathering period must be a minimum of 4 weeks. For colder temperatures, the weathering period must be extended by the number of days the temperature falls below zero degrees C 32 degrees F. After the required time elapses, remove the signs and fences.]

[Sludge Disposal Using Reclamation Plant

****
NOTE: The Government should estimate and indicate the quantity of water, sludge, sediment, and fuel, if any, remaining in the tank so that the Contractor can be more responsive in his bidding. Verify availability of Government disposal facilities.
****

There are [_____] barrels of nonhazardous sediment and sludge in the tank that must be delivered to the Government for disposal in the Government operated oily waste reclamation plant.

][Removal of Sludge

****
NOTE: The Government should estimate and indicate the quantity of water, sludge, sediment, and fuel, if any, remaining in the tank so that the Contractor can be more responsive in his bidding. Verify

availability of Government disposal facilities.
****

There are [_____] barrels of hazardous sediment and sludge in the tank that must be disposed of by the Contractor. Package, label, store, transport, treat, and dispose of hazardous sludge and sediment in accordance with 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 40 CFR 265, and 40 CFR 266.

][Delivery of Sludge to the Government

****
NOTE: When Government disposal of hazardous waste has been determined to be the most practical method of disposal, include the option for delivery of waste to the Government. Add details if necessary.
****

****
NOTE: The Government should estimate and indicate the quantity of water, sludge, sediment, and fuel, if any, remaining in the tank so that the Contractor can be more responsive in his bidding. Verify availability of Government disposal facilities.
****

There are [_____] barrels of hazardous sediment and sludge in the tank that must be delivered to the Government for disposal. Package, label, accumulate, transport, treat, and dispose of hazardous sludge and sediment in accordance with 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 40 CFR 265, and 40 CFR 266.

]3.7.7 Washing

****
NOTE: This paragraph is applicable to concrete or steel tanks. Only water must be used as the first preference. Steel tanks which have contained light products can normally be cleaned by washing down with fresh water under pressure. Detergent must be considered, if water by itself will be inadequate to remove all fuel residue. Use detergent, if the tank service will be changed from leaded fuel to unleaded fuel. The detergent and solvent solution should be specified only if the tank is expected to be heavily coated with fuel residue. The choice of cleaning agent must be based on the type of fuel stored in the tank and the conditions expected. Consider brush blasting to minimize the use of water.
****

After water, fuel, and sludge have been removed, thoroughly wash the tank interior. Contractor must limit the water pressure during washing so that it does not cause damage to the existing coating. Contractor must clean a representative test panel with their planned washing procedure. Test panel access must be provided to and examined by the Contracting Officer to determine whether coating damage is occurring as a result as a result of the Contractor's washing procedure. Contractor must modify water temperature and pressures based on cleaning test panel results. Maximum

allowable pressure on coated surfaces must be [1380 Kpa] [200 psig] [_____] and maximum allowable temperature of wash water must be [57 degree C] [135 degrees F] [_____]. Prior to cleaning the tank, tests must be conducted to determine the minimum distance of the nozzle to the steel to prevent damage to the tank coating. Perform Quality Control to inspect the cleaning during the process to ensure the coating is not being removed. Minimize the use of water; substitute brush blasting when practical. Start washing at the top of the walls and columns and work down to the floor. Wash the floor last starting from the sides and working towards the sump. Wash to remove oil, sludge, wax, tar, and other fuel residue adhering to the surface. Wash by any one or a combination of the following methods:

****
NOTE: Select the applicable paragraph(s) from the following:
****

[a. Use only fresh water under pressure.

][a. Apply a detergent conforming to FS O-D-1276 by spray or brush and soak approximately 30 minutes.

][a. Apply a detergent cleaning solution by spray or brush and allow to soak approximately 30 minutes. The cleaning solution must be either a one-to-one ratio of detergent conforming to FS O-D-1276 and solvent conforming to MIL-PRF-680 or an equivalent commercial cleaning agent as approved by the Contracting Officer.

] b. Hand-scrub the surfaces vigorously with long-handled stiff-bristle brushes. Wet the brushes intermittently with fresh [cleaning agent] during scrubbing process. For heavily oil-soaked areas which still appear to retain some residue after first scrubbing, [give a second application of cleaning agent and repeat the scrub process a second time.] [scrub until clean.]

c. Rinse the surfaces thoroughly with fresh water.

d. Brush-off blast clean.

3.7.8 Wash Water, [Detergent Solution,] and Sediment Removal

During the washing process, operate a portable pump continuously with suction hose extended to the tank bottom to remove water, [detergent,] dirt, oil, or other loose materials washed off. Following the final rinse, pump, squeegee, and mop the tank dry.

a. Prior to discharge or disposal, test the wash water, sediment, and sludge in accordance with paragraph WATER, SEDIMENT, AND SLUDGE ANALYSIS. The Contractor must furnish temporary tanks to hold water and detergent solution until testing is completed.

****
NOTE: Select the applicable paragraph(s) from the following:
****

****
NOTE: Use the first paragraph if only fresh water

is used for washing.
****

[b. The wash water is [nonhazardous and can be disposed of in the berm area.] [hazardous and must be handled in accordance with paragraph WATER, SEDIMENT, AND SLUDGE ANALYSIS.]
]

****
NOTE: Use the second paragraph if detergent or solvent is used for washing or if wash water only is to be discharged to a sanitary sewer. Verify existence of industrial waste treatment and oil reclamation plants; if not available, revise wording and include list of pollutants and discharge limits for which discharge into local sanitary sewerage system is permissible.
****

****
NOTE: Designer should check with owner/operator of Navy or municipal sewer system if dumping waste water into sewers will be allowed and describe special conditions which Contractor must follow. Obtain necessary permits and permission to discharge to sanitary sewers prior to advertising for bids.
****

[b. The water and detergent solution is nonhazardous and can be disposed of into the [Navy] [municipal] sewer system. The Contractor must ensure that the wash water does not exceed the discharge limitations listed below. Notify the Contracting Officer and the [Navy] [municipal] sewage treatment plant operator at least 24-hours prior to discharge into the sanitary sewer at Phone No. [_____].

****
NOTE: Items and limits are given as an example only. The project designer must develop a list of items and limits which are specific for the project site.
****

TABLE 2. WASTE WATER DISCHARGE LIMITS TO SEWERS

Item	Limits
(1) pH	[5.5-9.5] [_____]
(2) Oil and Grease (Hydrocarbon)	[50] [_____] mg/l Max.
(3) Surfactant (MBAS)	[30] [_____] mg/l Max.
(4) Lead	[0.6] [_____] mg/l Max.
(5) Total Identifiable Chlorinated Hydrocarbons	[0.04] [_____] mg/l Max.

TABLE 2. WASTE WATER DISCHARGE LIMITS TO SEWERS	
Item	Limits
(6) Benzene and Derivatives	[2.0] [_____] mg/l Max.
(7) Organic Solvents	[2.5] [_____] mg/1 Max.
(8) [_____]	[_____] mg/l Max.

If the discharge limits are exceeded for any of the above items, dispose of the water and detergent solution as directed by the Contracting Officer, at either the Navy's [Industrial Waste Treatment Plant] [or] [the Oil Reclamation Plant]. The Contractor may pretreat the wash water to make it suitable for discharge to the sanitary sewer system if approved by the Contracting Officer. Submit the plan for pretreatment to the Contracting Officer for approval [21] [_____] days prior to scheduled pretreated discharges.

] c. For bidding purposes, assume that the sediment is [nonhazardous and can be disposed of [in the berm area] [in a sanitary landfill]] [hazardous and must be handled in accordance with paragraph SLUDGE AND SEDIMENT REMOVAL AND DISPOSAL].

3.7.9 Removal of Scale and Other Tenaciously Adhering Materials

Perform [sandblast cleaning][or][power wire brushing].[The brush must be made of spark resistant bronze wire.] After [sandblasting][or][power wire brushing], clean the entire tank interior surfaces by brushing, blowing with dry compressed air, and vacuuming. Remove loose materials from the tank interior.[Perform abrasive blasting in accordance with API RP 2027.]

3.7.10 Disposal of Used Blasting Abrasive

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NOTE: When Government disposal of hazardous waste has been determined to be the most practical method of disposal, include the option for delivery of waste to the Government. Add details if necessary.

****

Test used abrasive in accordance with 40 CFR 261 to determine if it is a hazardous waste using the EP toxicity test for metals. Handle and dispose of abrasive determined to be hazardous waste in accordance with 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 40 CFR 265, and 40 CFR 266. Dispose of abrasive which is not hazardous waste at a landfill off Government property in accordance with applicable regulations. The contract price will be adjusted if the used abrasive is determined to be hazardous waste.[However, payment for disposal of hazardous waste will not be made until a completed manifest from the treatment or disposal facility is returned, and a copy furnished to the Government.][Deliver hazardous waste to the Government for disposal [as directed by the Contracting Officer].]

3.7.11 Special Instructions for Cleaning Tank Storage JP-5 Fuel

a. Comply with the precautions and procedures outlined above for cleaning

petroleum storage tanks.

****

NOTE: JP-5 has a relatively low Reid vapor pressure, and the combustible gas indicator will not ordinarily indicate any vapors present in the tank, at any time during the entire tank cleaning work. This does not mean that hazardous flammable fuel vapors are not present.

****

b. Use respiratory equipment specified for "Respiratory Protection" under paragraph EQUIPMENT, in this section, at all times, regardless whether or not combustible gas indicator indicates any vapors present in the tank. Wear the respiratory protective equipment continuously until the tank side and bottom has been thoroughly cleaned, washed and dried.

****

NOTE: Delete the paragraph, if there is no floating-roof tank.

****

[c. Thoroughly clean of fuel, rust and debris in the interior of each pontoon of the floating tanks.

]3.7.12 Special Precautions

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NOTE: Delete, if not applicable.

****

Special Precautions for Tanks with Pipe Columns and Braces, Pontoons, and Leaking Bottoms:

a. Pipes used for columns and braces, pontoons and leaking bottoms are a potential source of explosive vapors even after the tank is cleaned. The tank may be determined to be vapor free below 4 percent of lower explosive limit; but after one or two hours, explosive readings must again be obtained from these sources. The Contractor must take readings at least every half hour when working in tanks after they have been cleaned and each floating roof or pan pontoon must be checked individually with a combustible gas indicator.

b. If the repair work is to be performed on floating roof tanks, the interior of each pontoon on the roof must be thoroughly cleaned of fuel, rust, water, and debris.

[3.7.13 Lead-Hazard-Free Tests

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NOTE: Delete brackets and words within brackets if there is no leaded fuel in any tank.

****

In accordance with API Std 2015, perform lead-in-air tests to make sure that the tank is lead-hazard-free (CAUTION: Never perform lead-hazard-free tests before or during cleaning, only after).

]3.8 FINAL CLEAN-UP

After the Contracting Officer has inspected and accepted the tank cleaning and before final inspection, accomplish the following work:

3.8.1 Stenciling Tank

Stencil on the tank in 20 mm 3/4-inch letters adjacent to the manhole openings the following data:

Date Cleaned - [_____]

Contractor Name - [_____]

Address - [_____]

3.8.2 Restoration of Site to Original Condition

[Do not reconnect pipelines until application of interior and exterior coatings specified in other sections of this specification, have been completed.]Replace valves, piping, manhole covers, and similar items which were removed at the start of the job with new gasket material resistant to fuel not less than the thickness of the gasket removed. Pressure check valves and piping. Remove, from the site, debris, equipment and materials used for the cleaning operations. Restore the site to its original condition.

-- End of Section --