
USACE / NAVFAC / AFCEA / NASA UFGS-33 65 00 (April 2006)

Preparing Activity: NAVFAC Replacing without change
UFGS-13219 (August 2004)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated 18 July 2006

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DIVISION 33 - UTILITIES

SECTION 33 65 00

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04/06

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SECTION 33 65 00

CLEANING PETROLEUM STORAGE TANKS

04/06

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

Comments and suggestions on this guide specification are welcome and should be directed to the technical proponent of the specification. A listing of technical proponents, including their organization designation and telephone number, is on the Internet.

Recommended changes to a UFGS should be submitted as a Criteria Change Request (CCR).

Use of electronic communication is encouraged.

Brackets are used in the text to indicate designer choices or locations where text must be supplied by the designer.

NOTE: The following information shall 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 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 NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z88.2 (1992) Respiratory Protection

AMERICAN PETROLEUM INSTITUTE (API)

API RP 2003 (1998) Protection Against Ignitions
Arising out of Static, Lightning, and
Stray Currents

API RP 500 (1997; R 2002) Recommended Practice for
Classification of Locations for Electrical
Installations at Petroleum Facilities
Classified as Class 1, Division 1 and
Division 2

API Std 2015 (2001) Requirements for Safe Entry and
Cleaning of Petroleum Storage Tanks

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 306 (2003) Control of Gas Hazards in Vessels

NFPA 70 (2005) National Electrical Code

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH)

NIOSH 85-101 (1991, R 1999) NIOSH Certified Equipment
List

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1 (2003) Safety -- Safety and Health
Requirements

U.S. DEPARTMENT OF DEFENSE (DOD)

MIL-A-22262 (Rev B; Am 2) Abrasive Blasting Media Ship
Hull Blast Cleaning

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

FS A-A-2904	(Basic) Thinner, Paint, Mineral Spirit, Regular and Odorless
FS O-D-1276	(Rev B) Disinfectant-Detergent, General Purpose (Pine Oil)

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

29 CFR 1910.1025	Lead
29 CFR 1910.1028	Benzene
29 CFR 1910.120	Hazardous Waste Operations and Emergency Response
29 CFR 1910.1200	Hazard Communication
29 CFR 1910.134	Respiratory Protection
29 CFR 1910.146	Permit-required Confined Spaces
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	(2006) Electric Lighting Fixtures for Use in Hazardous (Classified) Locations
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1.2 SUBMITTALS

**NOTE: Review submittal description (SD) definitions
in Section 01 33 00 SUBMITTAL PROCEDURES and edit**

the following list to reflect only the submittals required for the project. Submittals should be kept to the minimum required for adequate quality control.

A "G" following a submittal item indicates that the submittal requires Government approval. Some submittals are already marked with a "G". Only delete an existing "G" if the submittal item is not complex and can be reviewed through the Contractor's Quality Control system. Only add a "G" if the submittal is sufficiently important or complex in context of the project.

For submittals requiring Government approval on Army projects, a code of up to three characters within the submittal tags may be used following the "G" designation 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.

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" designation; submittals not having a "G" designation are [for Contractor Quality Control approval.][for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government.] The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Cleaning agents

Gasoline-oil-resisting rubber gloves and boots

Cotton coveralls and hard hat

Respiratory protective equipment

Disinfectant

Abrasive for blasting

Submit identification for the items by designated name, specification number, project contracting number, and intended use.

SD-06 Test Reports

Blasting abrasive test

Tank contents tests

Monitoring Results[; G][; G, [____]]

SD-07 Certificates

Qualifications of Marine Chemist

Qualifications of Certified Industrial Hygienist (CIH)

Testing laboratory

Safety plan

Work plan

Hazardous waste disposal plan

Tank certification of safety

[Plan for pretreatment of discharge to sewer[; G][; G, [____]]]

Training certification

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

Tank exhaust blower

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.

SD-08 Manufacturer's Instructions

Tank cleaning agents

Submit material safety data sheets for materials to be used at the job site, in accordance with 29 CFR 1910.1200.

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

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

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 shall 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.

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 shall be representative of the employee's work tasks. Breathing zone shall 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.)

1.4 QUALITY ASSURANCE

1.4.1 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 shall conform with the recommendations of API RP 500 and API RP 2003 and API Std 2015. Where the word "should" appears in these publications, substitute "shall."

1.4.2 Copies of Standards

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

Furnish four copies of API RP 500 AND API RP 2003 and API Std 2015.

1.4.3 Safety Permits and Equipment

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

1.4.4 Regulatory Requirements

- a. Obtain permits required to comply with local, State, and Federal regulations.
- b. Hazardous wastes, such as water, sediment, and sludge, shall 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].]

1.4.5 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.

1.4.6 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.

1.4.7 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.

1.4.8 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 shall also include counseling of each employee on reproductive hazards involved in the work.

1.4.9 [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 [ANSI Z88.2](#), [29 CFR 1910.134](#), and [29 CFR 1926.55](#). Also comply with [29 CFR 1910.1025](#) when exposure to lead is involved.]

1.4.10 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.

1.4.11 Certificates

1.4.11.1 [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.

1.4.11.2 [Qualifications of Certified Industrial Hygienist \(CIH\)](#)

Submit name, address, and telephone number of the CIH selected to perform responsibilities in paragraph entitled "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 shall be familiar with the hazards involved in fuel systems work.

1.4.11.3 [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 shall be accredited by the American Industrial Hygiene Association (AIHA). Provide AIHA documentation along with date of accreditation/reaccreditation.

1.4.11.4 Safety Plan

Submit a safety plan within 45 calendar days after contract award and 30 days prior to commencing work. [The safety program shall be reviewed and approved by the safety/health officer of the facility.] The safety plan shall meet OSHA requirements 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 and EM 385-1-1.
- 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 shall also include counseling to each employee on reproductive hazards.

- p. Establishment of a respiratory protection program conforming to 29 CFR 1910.134 and ANSI Z88.2.
- q. Establishment of a hazard communication program (29 CFR 1910.1200).

1.4.11.5 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 shall 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.

1.4.11.6 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 shall comply with applicable requirements of Federal, State, and local hazardous waste regulations and shall 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.

1.4.11.7 Tank Certification of Safety

Submit certification, from an NFPA certified "Marine Chemist" or 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.

1.4.11.8 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.

1.4.11.9 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.

1.4.11.10 Non-Hazardous Waste Permits

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

1.4.12 Test Results

1.4.12.1 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).

1.4.12.2 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.

1.5 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.

1.6 JOB CONDITIONS

1.6.1 Ventilation

Maintain a vapor-free condition throughout the course of the work inside the tank. The air movers shall be non-sparking, explosion-proof, electrically operated or air-driven **exhaust** type. A rate of one air change per hour shall 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 shall be kept in operation whenever workers are in the tanks; except the air movers shall be shut down 15 minutes before taking tests.

1.7 SCHEDULING AND SEQUENCING

1.7.1 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.

1.7.2 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

2.1.1 Cleaning Agents

**NOTE: Coordinate listing of cleaning agents with
paragraph entitled "Washing" on cleaning method.**

- a. Detergent: **FS O-D-1276**.
- b. Solvent: **FS A-A-2904**, Type II, minimum flashpoint of 60 degrees C.
- 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 shall not contain magnetic materials and shall conform to MIL-A-22262, [except that Mohs' hardness shall 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 shall 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 85-101 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 which 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 shall be based on the results of personal monitoring.
 - (4) Use Type CE respirator for abrasive blasting inside the tank.
 - (5) CIH shall 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 One half 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 ANSI Z88.2.
- 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 PROJECT CONDITIONS

3.1.1 Cutting Tank Access Holes

NOTE: Use for tanks without manholes. Modify a appropriate, but ensure vapor-freeing and cold cutting.

Tanks in this project may not have manholes. A hole of suitable size may be cut in the tank to gain access to the tank interior. Vapor-free tank and perform preliminary cleaning before cutting tank. Perform tank cutting using cold processes. No hot work in cutting shall be permitted.

3.1.2 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 0.050 milligram 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 0.050 milligrams 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 shall 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.

3.1.3 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.

3.1.4 Lavatory Facilities

**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].

3.1.5 Miscellaneous

Ensure that the manufacturers have labelled 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.]

3.1.5.1 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.

3.1.5.2 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.

3.1.5.3 Disconnection Pipelines

Disconnect pipelines connected to the tank. Insert a solid-plate blind flange between two flanges near the tank, or remove a valve or piece of pipe and install 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 shall be of sufficient strength to withstand pressure which might be exerted by the material being blanked off, and shall 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.

3.1.5.4 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.

3.1.5.5 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 shall 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 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].

3.1.5.6 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.

3.2 INSPECTION

3.2.1 Inspection of Equipment

3.2.1.1 Respirators

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

3.2.1.2 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.

3.2.1.3 Safety Harness and Life Line

Ensure that:

- a. There is no frayed or weak material; and
- b. Condition of harness is good.

3.2.1.4 Breathing-Air Supply Source

Ensure:

- a. Good working condition; and
- 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.
- d. Backup air supply source.

3.2.1.5 Monitoring Equipment

Calibrate each day before use:

- a. Combustible gas indicator
- b. Oxygen meter
- [c. H2S Indicator]
- [d. Lead-in-Air Analyzer]

3.2.1.6 Other Equipment

Ensure:

- a. Proper grounding and bonding;
- b. Explosion-proof motors; and
- c. Explosion-proof lighting.

3.2.2 Personnel Inspection

3.2.2.1 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.

3.2.2.2 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 use, ensure sufficient number of full replacement cylinders are available to last the duration of the job.

3.2.2.3 Harness and Lifeline

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

3.2.2.4 Gum or Tobacco Chewing

Ensure that gum or tobacco chewing is prohibited.

3.2.2.5 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 shall be allowed on people who must wear respirators.

3.2.2.6 Alcoholic Beverages and Drugs

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

3.2.2.7 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.

3.2.2.8 Hazardous Areas

Check hazardous areas as defined in paragraph entitled "Survey of Hazardous Areas."

3.3 TABLE OF TANK HISTORY

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

Tank Number	Tank Location	Tank Capacity	Date Con- structed	Type of Lining (If Ap- plicable	Type of Fuel	Remarks from the Last In- spection

3.4 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 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 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].

3.5 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 define properly 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]

3.6 TANK CLEANING

For the interior of the tanks, the shell, bottom, columns, roof, roof beams, and interior accessory equipment such as pumps, piping, and ladders, shall be cleaned [to bare metal] [not to bare metal but only to the sound surface of the lining or coating], free of rust, dirt, scale, loose materials, fuel, oil, grease, sludge, and other deleterious materials. [Do not damage sound existing lining material. Remove unsound or loose lining or coating and clean the surfaces exposed thereby to bare metal or concrete as applicable. Immediately notify the Contracting Officer if the lining or coating is deteriorated or loose.]

3.6.1 Monitoring

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 shall 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 shall 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 shall 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 shall 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.

3.6.1.1 Monitoring During Tank Cleaning Work

Perform personal and area monitoring during the entire tank cleaning operation. Sufficient area monitoring shall 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 shall be stopped and the CIH shall immediately correct the condition(s) causing the increased levels and notify the Contracting Officer immediately. The CIH shall review the sampling data collected on that day to determine if condition(s) requires any further change in work methods. Tank cleaning work shall resume when approval is given by the CIH. The Contractor shall 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 shall be taken on the downwind side of the control area. If adjacent areas are contaminated, clean and visually inspect contaminated areas. The CIH shall certify that the area has been cleaned of contamination.

3.6.2 [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 shall 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.]

3.6.3 [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 shall, 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 entitled "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 in lead-in-air analysis has been obtained in accordance with [API Std 2015](#).]

3.6.4 Water, Sediment, and Sludge Analysis

NOTE: All wastes shall 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 shall 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, etc., that does not leach out into the test solution, is not a hazardous waste.

The EPA has a new 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 shall 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 shall 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 shall be handled and disposed of as described below.

3.6.5 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.] [shall 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.] [_____.]]

3.6.6 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.

3.6.6.1 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 shall be a minimum of 4 weeks. For colder temperatures, the weathering period shall 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 shall 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 shall 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 shall 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.]

3.6.7 Washing

NOTE: This paragraph is applicable to concrete or steel tanks. Only water shall 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 shall 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 shall 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. 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 shall be either a one-to-one ratio of detergent conforming to FS O-D-1276 and solvent conforming to FS A-A-2904 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.

3.6.8 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 entitled "Water, Sediment, and Sludge Analysis." The Contractor shall 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 shall be handled in accordance with paragraph entitled "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 shall 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

<u>Item</u>	<u>Limits</u>
(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.
(6) Benzene and Derivatives	[2.0] [_____] mg/l Max.
(7) Organic Solvents	[2.5] [_____] mg/l 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 scheduling 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 entitled "Sludge and Sediment Removal and Disposal."].

3.6.9 Removal of Scale and Other Tenaciously Adhering Materials

Perform [sandblast cleaning] [or] [power wire brushing]. [The brush shall 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.

3.6.10 Disposal of Used Blasting Abrasive

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].]

3.6.11 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, the combustible gas indicator will not ordinarily indicate any vapors present in the tank, at any time during the entire tank cleaning work. But this does not mean that hazardous flammable fuel vapors are not present.

- b. Use respiratory equipment specified for "Respiratory Protection" under paragraph entitled "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.]

3.6.12 Special Precautions

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 shall take readings at least every half hour when working in tanks after they have been cleaned and each floating roof or pan pontoon shall 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 shall be thoroughly cleaned of fuel, rust, water, and debris.

3.6.13 [Lead-Hazard-Free Tests

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

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

3.7 FINAL CLEAN-UP

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

3.7.1 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 - [_____]

3.7.2 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. Pressure check valves and piping. Remove, from the site, debris and equipment and materials used for the cleaning operations. Restore the site to its original condition.

-- End of Section --