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CLEANING PETROLEUM STORAGE TANKS SPECIFICATION SHEET MILLINGTON  
SUPACT TN  
06/01/1995  
NAVFAC SOUTHERN

SECTION 13219

CLEANING PETROLEUM STORAGE TANKS  
06/95

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z88.2 (1992) Respiratory Protection

AMERICAN PETROLEUM INSTITUTE (API)

API RP 500 (1991) Classification of Locations for  
Electrical Installations at Petroleum  
Facilities

API RP 2003 (1991) Protection Against Ignitions  
Arising Out of Static, Lightning, and  
Stray Currents

API PUBL 2015 (1994) Safe Entry and Cleaning of  
Petroleum Storage Tanks

CODE OF FEDERAL REGULATIONS (CFR)

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 1910.1200 Hazard Communication

40 CFR 260 Hazardous Waste Management Systems: General

40 CFR 261 Identification and Listing of Hazardous  
Waste

40 CFR 262 Generators of Hazardous Waste

40 CFR 263 Transporters of Hazardous Waste

40 CFR 264 Owners and Operators of Hazardous Waste  
Treatment, Storage, and Disposal Facilities

40 CFR 265 Interim Status Standard for Owners and  
Operators of Hazardous Waste Treatment,  
Storage, and Disposal Facilities

40 CFR 266 Management of Specific Hazardous Wastes

and Specific Types of Hazardous Waste  
Management Facilities

CORPS OF ENGINEERS (COE)

COE EM-385-1-1 (1992) Safety and Health Requirements  
Manual

FEDERAL SPECIFICATIONS (FS)

FS TT-T-291 (Rev. F; Am. 2) Thinner, Paint, Mineral  
Spirits, Regular and Odorless

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

MILITARY SPECIFICATIONS (MIL)

MIL-A-22262 (Rev. B) Abrasive Blasting Media Ship Hull  
Blast Cleaning

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70 (1993) National Electrical Code

NFPA 306 (1993) Control of Gas Hazards in Vessels

NATIONAL INSTITUTE OF OCCUPATIONAL SAFETY AND HEALTH (NIOSH)

NIOSH 85-101 (1990) NIOSH Certified Personnel  
Protective Equipment List

UNDERWRITERS LABORATORIES INC. (UL)

UL 844 (1990; R 1990, Bul. 1993 and 1994)  
Electric Lighting Fixtures for Use in  
Hazardous (Classified) Locations

1.2 SUBMITTALS

Submit the following in accordance with section entitled "Submittal  
Procedures." *change*

1.2.1 SD-02, Manufacturer's Catalog Data

- a. Cleaning agents
- b. Gasoline-oil-resisting rubber gloves and boots
- c. Cotton coveralls and hard hat
- d. Respiratory protective equipment
- e. Disinfectant
- f. Abrasive for blasting

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

1.2.2 SD-06, Instructions

a. Tank cleaning agents

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

1.2.3 SD-08, Statements

- a. Qualifications of Marine Chemist
- b. Qualifications of Certified Industrial Hygienist (CIH)
- c. Testing laboratory
- d. Safety plan
- e. Work plan
- f. Hazardous waste disposal plan
- g. Tank certification of safety
- h. Training certification

1.2.3.1 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.

1.2.3.2 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.

1.2.3.3 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.

1.2.3.4 Safety Plan

Submit a health and safety plan within 45 calendar days after contract

award and 30 days prior to commencing work. The health and safety plan shall be reviewed and approved by the Contracting Officer. 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 COE 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).

#### 1.2.3.5 Work Plan

The shut down or interruption to normal operations or traffic shall be listed on the progress schedule and submitted to the Contracting Officer.

#### 1.2.3.6 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 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.

#### 1.2.3.7 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.

#### 1.2.3.8 Training Certification

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 toluene exposure and the work.

1.2.4 SD-10, Test Reports

- a. Blasting abrasive test
- b. Tank contents tests — CSG

1.2.4.1 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).

1.2.5 SD-12, Field Test Reports

- a. Monitoring Results

1.2.5.1 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.

1.2.6 SD-13, Certificates

- a. Respiratory protective equipment
- b. Breathing-air supply source
- c. Combustible gas indicator
- d. Hydrogen-sulfide (H<sub>2</sub>S) indicator
- e. Benzene indicator
- f. Oxygen meter
- g. Velometers
- h. Lighting
- i. First aid kit
- j. 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.

1.2.7 SD-18, Records

a. Safety permits

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

1.2.7.1 Hazardous Waste Permits

Submit copies of EPA, State, and local hazardous waste 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.

1.2.7.2 Non-Hazardous Waste Permits

Submit local permits for disposal site for non-hazardous residues and wastes.

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, 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 100 feet of active aboveground storage tanks, areas within 100 feet of leaking sections of fuel pipelines or other vapor sources, areas within 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 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 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

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

##### 1.4.2 Copies of Standards

Furnish four copies of API RP 500 AND API RP 2003 and API PUBL 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.

##### 1.4.5 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.

1.4.6 Training

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

X 1.4.7 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 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 30,000 BBL. For tanks greater than 30,000 BBL, use 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

- a. Detergent: FS O-D-1276.
- b. Solvent: FS TT-T-291, 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.

### 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 50,000 gallons capacity or where manhole accesses are deeper than 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. 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, Hydrogen-Sulfide (H<sub>2</sub>S) 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 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 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

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.
- 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), 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 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

Arrange for lavatory and toilet facilities.

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

Furnish two carbon-dioxide fire extinguishers of minimum 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 100 feet upwind and 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 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 4 or more miles per hour winds by increasing the size of the hazardous area to a minimum of 200 feet on the downward side.

#### 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:

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- a. Combustible gas indicator
- b. Oxygen meter
- c. H2S Indicator

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 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.

3.2.2.3 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

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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

| Tank Number | Tank Location      | Tank Capacity (gal) | Date Constructed | Type of Lining (If Applicable) | Type of Fuel | Remarks from the Last Inspection |
|-------------|--------------------|---------------------|------------------|--------------------------------|--------------|----------------------------------|
| 336         | Near bldg 336      | 420,000             | 1958             | --                             | JP-8         | Underground                      |
| 337         | Near bldg 337      | 420,000             | 1958             | --                             | JP-5         | Underground                      |
| 1717        | West of bldg N-932 | 10,000              | 1990             | Steel                          | JP-5         | Aboveground                      |
| 1718        | West of bldg N-932 | 10,000              | 1990             | Stainless Steel                | AFFF         | Aboveground                      |
| 1719        | West of bldg 1721  | 50,000              | 1990             | Stainless Steel                | JP-5         | Aboveground                      |
| 1720        | West of bldg N-932 | 2,000               | 1990             | Steel                          | JP-5         | Aboveground                      |
| 1722        | West of bldg N-932 | 20,000              | 1990             | Concrete                       | Water        | Aboveground                      |

### 3.4 FUEL REMOVAL

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. 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.

### 3.5 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, free of rust, dirt, scale, loose materials, fuel, oil, grease, sludge, and other deleterious materials.

#### 3.5.1 Water, Sediment, and Sludge Analysis

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. Nonhazardous or hazardous wastes shall be handled and disposed of as described below.

### 3.5.2 Water Removal and Disposal

Pump or otherwise remove water from the tank. Ensure that the sludge and sediment are not pumped out or mixed with the water.

### 3.5.3 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.

#### 3.5.3.1 Removal of Sludge

There are approximately 4,200 gallons of hazardous sediment and sludge in each tank 336 and 337 and about 1% of tank volume in AST 1717, 1718, 1719, 1720 and 1722 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.

### 3.5.4 Washing

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:

- 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 TT-T-291 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.
- c. Rinse the surfaces thoroughly with fresh water.
- d. Brush-off blast clean.

### 3.5.5 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.

3.5.6 Removal of Scale and Other Tenaciously Adhering Materials

Perform sandblast cleaning. After sandblasting, clean the entire tank interior surfaces by brushing, blowing with dry compressed air, and vacuuming. Remove loose materials from the tank interior.

3.5.7 Disposal of Used Blasting Abrasive

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.

3.5.8 Special Precautions

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 FINAL CLEAN-UP

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

3.6.1 Stenciling Tank

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

Date Cleaned - \_\_\_\_\_  
Contractor Name - \_\_\_\_\_  
Address - \_\_\_\_\_

3.6.2 Restoration of Site to Original Condition

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 --