



**NASA Ames Research Center
Ames Environmental Procedural Requirements**

Chapter 24 - Aboveground Tanks

Effective Date: TBD Released: TBD

Table of Contents

24.1 [Applicability](#)

24.2 [Purpose](#)

24.3 [Policy](#)

24.4 [Authority](#)

24.5 [Responsibilities](#)

24.5.1 [Environmental Services Office, Code QE \(Environmental Office\)](#)

24.5.2 [Facilities Engineering Branch, Code FEF](#)

24.5.3 [Line Management](#)

24.5.4 [Protective Services Office, Code JP](#)

24.6 [Definitions](#)

24.6.1 [Underground Storage Tank \(UST\)](#)

24.7 [General Management Requirements](#)

24.7.1 [Permits](#)

24.7.2 [Training](#)

24.8 [Specific Management Requirements](#)

24.8.1 [Storage Conditions](#)

24.8.2 [Inspections](#)

24.8.3 [Integrity Program](#)

24.8.4 [Physical Attributes](#)

24.8.5 [Installation Activities](#)

24.8.6 [Closure Activities](#)

24.9 [Metrics](#)

24.10 [Sources of Additional Information or Resources](#)

24.1 Applicability

This chapter is applicable to all civil servants, contractor employees, resident agency personnel , and NASA Research Park Partners at Ames Research Center (Ames), Moffett Federal Airfield (MFA), and Crows Landing Flight Facility.

[\[Back to Table of Contents\]](#)

24.2 Purpose

This chapter sets forth Ames policies and environmental requirements for the design, construction, operation and maintenance, monitoring, and reporting, and closure for aboveground storage tanks (ASTs).

[\[Back to Table of Contents\]](#)

24.3 Policy

It is the policy of the Ames Research Center to:

1. Comply with all pertinent statutory and regulatory requirements and Executive Orders related to aboveground storage tank management. Ames recognizes and will comply with applicable Federal, state, and local regulations.
2. Consult about the best techniques and methods to manage aboveground storage tanks, as appropriate, with Federal, state, and local agencies, including:
 - U.S. Environmental Protection Agency (EPA)
 - California Office of Emergency Services (OES)
 - State Water Resources Control Board (SWRCB)
 - Regional Water Quality Control Board, San Francisco Bay Region
 - Santa Clara County Health Department
 - Bay Area Air Quality Management District (BAAQMD)
3. Promote employee awareness of aboveground storage tank management through training and active information dissemination.

[\[Back to Table of Contents\]](#)

24.4 Authority

All relevant Federal, state, and local environmental laws and regulations pertaining to the management, design,

construction, and operation of aboveground storage tanks, including but not limited to:

1. Federal Water Pollution Control Act, as amended by the Clean Water Act of 1977 and the Water Quality Act of 1987 (33 U.S.C. Section 311 et seq.)
2. Public Law 101-380, Oil Pollution Act 1990
3. Public Law 42 U.S.C. Section 6002, Resource Conservation and Recovery Act (RCRA)
4. Code of Federal Regulations, Title 40 (40 CFR):
 - Part 112 et seq. - Oil Pollution Prevention (40 CFR 112)
 - Part 260 et seq. - Hazardous waste management system: General (40 CFR 260)
 - Part 262 et seq. - Standards applicable to generators of hazardous waste (40 CFR 262)
 - Part 265 et seq. - Hazardous waste storage tanks (40 CFR 265)
 - Part 270 et seq. - EPA administered permit programs: The Hazardous Waste Permit Program (40 CFR 270)
5. California Code of Regulations, Title 22, Section 66265.195, Tank Inspections
6. California Health and Safety Code (H&SC), Division 20 (Miscellaneous Health and Safety Provisions):
 - H&SC, Chapter 6.67 - Aboveground Storage of Petroleum
 - H&SC, Chapter 6.95 - Hazardous Materials Release Response Plans and Inventory
7. Santa Clara County Department of Public Health:
 - Hazardous Materials Storage Permit Ordinance NS-517.31
 - Guidelines for Permanent Closure of Hazardous Materials Tanks
8. Bay Area Air Quality Management District (BAAQMD): Regulation 8--Organic Compounds, Rule 5--Storage of Organic Liquids
9. Uniform Fire Code, Article 79
10. National Fire Protection Association (NFPA) 30 - Flammability and Combustibility Code

[\[Back to Table of Contents\]](#)

24.5 Responsibilities

24.5.1 Environmental Services Office, Code QE (Environmental Office)

1. Maintain the official file of any permits and forward copies of any correspondence and required permit applications to the appropriate regulatory agencies and onsite contractors performing work.
2. Review plans and drawings related to ASTs for new construction, maintenance, or remodeling to determine compliance with applicable regulations.
3. Submit construction specification plans to the appropriate agencies to obtain permits for AST installations, modifications, removals, and disposals.
4. Recommend facility modifications to achieve compliance with applicable regulations.
5. Submit biennial AST petroleum storage tank statements to the SWRCB and pay fees (every even numbered year).
6. Submit updated hazardous materials business plans (BEAPs) to the Santa Clara County Health Department.
7. Perform annual facility surveys to determine compliance with applicable regulations.
8. Coordinate regulatory agency inspections of AST sites.
9. Report tank and/or piping leaks to the applicable agency(ies).
10. Notify Public Affairs of any large tank spills. See Chapter 14, Emergency Planning and Community Right-to-Know, and Chapter 15, Emergency Response, for additional reporting requirements.
11. Provide SPCC training.

[\[Back to Table of Contents\]](#)

24.5.2 Facilities Engineering Branch, Code FEF

[REDACTED]

[\[Back to Table of Contents\]](#)

24.5.3 Line Management

[REDACTED]

[REDACTED]

[\[Back to Table of Contents\]](#)

24.5.4 Protective Services Office, Code JP

[REDACTED]

[\[Back to Table of Contents\]](#)

24.5.5 Plant Engineering, Code JFP

[REDACTED]

[\[Back to Table of Contents\]](#)

24.6 Definitions

24.6.1 Aboveground Storage Tank (AST)

Any stationary storage vessel or container used for the storage of hazardous materials. Some ASTs are constructed so that they may be relocated. ASTs that may be relocated based on their inherent construction are still considered an AST. An AST can be any size storage vessel/container so long as it is intended to be a stationary container.

[\[Back to Table of Contents\]](#)

24.7 General Management Requirements

24.7.1 Permits

- All ASTs must be registered with the State Water Resources Control Board. There is a fee associated with state registry.
- The storage of a hazardous material and/or hazardous waste requires a hazardous materials storage permit issued by the Santa Clara County Health Department, Hazardous Materials Compliance Division. Again, there is a fee associated with this permit. All operating permit conditions must be followed.
- ASTs must be included in the SPCC Plan.
- Outdoor ASTs must also be included in the SWPP.
- Tanks storing/dispensing volatile materials may require a permit from the BAAQMD.
- ASTs must be included in the Ames Hazardous Waste Site Inventory

[\[Back to Table of Contents\]](#)

24.7.2 Training

- All personnel who handle or store petroleum products must be trained in spill prevention procedures, as discussed in NASA's Spill Prevention Control and Countermeasures (SPCC) Plan, Chapter 7, Environmental Training, and Chapter 13, Spill Prevention Control and Countermeasures and Facility Response Plan.
- All personnel who handle or store petroleum products must be trained in accordance with Chapter 7, Environmental Training.
- All personnel who operate tank systems must be trained in filling, dispensing, and monitoring procedures. The tank/monitoring device manufacturer (or designee) typically trains onsite personnel on new tank systems. Personnel requiring training on existing tank systems may need to contact the tank manufacturer and arrange for a training session.

[\[Back to Table of Contents\]](#)

24.8 Specific Management Requirements

24.8.1 Storage Conditions for Hazardous Materials

1. The contents being stored in ASTs must be compatible with the construction material of the tank.
2. ASTs must be labeled with the contents being stored.
3. Tank contents must be stored at the proper temperature and pressure.
4. Storage areas must be secured to prevent unauthorized use and tampering with ASTs .

5. Tank areas must have access to a nearby lighting source in the event of nighttime emergency responses.
6. All storage tank areas must be equipped with spill response supplies.
7. Refer to Chapter 3, Hazardous Materials Management, and Chapter 4, Hazardous Waste Management, for additional storage requirements.
8. All tanks and associated piping must be secondarily contained. Secondary containment must be constructed as follows:
 - Secondary containment must be constructed of materials that are compatible with the materials stored inside the tank.
 - Secondary containment must be large enough to contain at least 110 percent of the volume of the primary tank. In the case of multiple tanks, the secondary containment volume must be large enough to contain 150 percent of the largest tank or 10 percent of the aggregate volume of all the tanks, whichever is greater.
 - If the tank containment is open to rainfall, the secondary containment must also be capable of holding the additional volume of a 24-hour rainfall as determined by a 100-year storm.
 - If the tank containment is open to sprinkler flow, it must be capable of containing a 20-minute sprinkler flow in addition to 110 percent of the primary tank volume.
9. All tanks must be posted with specific filling and monitoring procedures.

[\[Back to Table of Contents\]](#)

24.8.2 Inspections

1. ASTs that are not secondarily contained must be inspected daily. A record of all inspections, including inspector's name, date of inspection, deficiencies observed, and corrective actions taken, must be maintained by the operator.
2. All petroleum containing ASTs that are secondarily contained must be inspected at least weekly, except as noted in item 3. A record of all inspections, including inspector's name, date of inspection, deficiencies observed, and corrective actions taken, must be maintained by the operator.
3. In an agreement with the Regional Water Quality Control Board (RWQCB), petroleum containing tanks maintained and operated by Code JFP, Plant Engineering, must be inspected every two weeks. A record of all inspections, including inspector's name, date of inspection, deficiencies observed, and corrective actions taken, must be maintained.
4. Storm water from tank secondary containment structure(s) must be

visually inspected or tested prior to discharging into the sanitary sewer or into the landscaping.

5. ASTs must be certified for integrity by an independent professional engineer
6. ASTs containing hazardous waste must also meet Federal and state hazardous waste management requirements (see Chapter 4 of this handbook, Hazardous Waste Management). Specific tank inspection requirements are listed as follows (see 22 CCR 66265.195 and 40 CFR part 265, parts 265.174 and 265.195):
 - Where present, the following must be inspected at least once each day:
 - Overfill/spill control equipment (e.g., waste-feed cutoff systems, bypass systems, and drainage systems) to ensure that it is in good working order;
 - The aboveground portions of the tank system, to detect corrosion or releases of waste;
 - Data gathered from monitoring equipment and leak-detection equipment (e.g., pressure and temperature gauges, monitoring wells) to ensure that the tank system is being operated according to its design; and
 - The construction materials and the area immediately surrounding the externally accessible portion of the tank system, including secondary containment structures (e.g., dikes) to detect erosion or signs of releases of hazardous waste (e.g., wet spots, dead vegetation).

NOTE: 40 CFR Section 265.15 (c) requires the remedy of any deterioration or malfunction found. 40 CFR Section 265.196 requires notification to the DTSC within 24 hours of confirming a release. Also, 40 CFR Part 302, Federal Emergency Planning and Community Right-to-Know regulations, may require notification of a release to the National Response Center. Notifications to these regulatory agencies are made only by the Environmental Office.

- Where present, the cathodic protection systems must be inspected according to, at a minimum, the following schedule to ensure that they are functioning properly:
- Proper operation of the cathodic protection systems must be confirmed within six months after initial installation, and annually thereafter;
- All sources of impressed current must be inspected and/or tested, as appropriate, at least bimonthly.

NOTE: The practices described in the National Association of Corrosion Engineers (NACE) standard, "Recommended Practice (RP-02-85)--Control of External Corrosion on Metallic Buried, Partially Buried, or Submerged Liquid Storage Systems," and the American Petroleum Institute (API)

Publication 1632, "Cathodic Protection of Underground Petroleum Storage Tanks and Piping Systems," may be used, where applicable, as guidelines in maintaining and inspecting cathodic protection systems.

- Documentation of the items listed must be kept in the operating record of the facility.

[\[Back to Table of Contents\]](#)

24.8.3 Integrity Program

1. Aboveground Storage Tanks

- Documentation of inspections discussed in the previous section is required for implementation of the AST Integrity Program.
- A schedule for implementation of any needed AST upgrades must be developed with facility personnel and monitored for implementation.
- For suspect or previously verified leaking ASTs, tank integrity certification (i.e., hydrostatic testing, nondestructive examination of shell thickness, etc.) and biannual independent review of suspect systems (e.g., those systems that note areas of concern during routine self-inspections) may be required. Requirement of tank integrity certification and biannual independent review will be evaluated on a tank-by-tank basis.

2. Hazardous Waste Tanks

Existing tanks that do not have secondary containment systems must have a written assessment reviewed and certified by an independent, qualified, professional engineer, registered in California, who attests to the tank system's integrity. This assessment shall determine that the tank system is adequately designed and has sufficient structural strength and compatibility with the waste(s) to be transferred, stored, or treated to ensure that it will not collapse, rupture, or fail.

[\[Back to Table of Contents\]](#)

24.8.4 Physical Attributes

1. Secondary Containment

- Secondary containment is required for all new ASTs and

associated piping. In the case of a single AST, the secondary containment system must be designed to contain at least 110 percent of the primary containment's volume. In the case of multiple tanks, the secondary containment must be large enough to capture 150 percent of the volume of the largest tank or 10 percent of the aggregate volume, whichever is greater.

- For existing tanks without secondary containment systems, a schedule of completion of system upgrades shall be developed with facility personnel and periodically monitored for implementation.

2. Monitoring Devices

- Double-wall tanks shall be fail-safe engineered or updated to a fail-safe engineering status by providing one or more of the following monitoring devices to quickly determine the liquid level in the tank and to prevent overflow:
 - High-liquid-level alarm with an audible and visual signal. Liquid-level sensing devices should be serviced following manufacturer's specifications to ensure proper operation.
 - High-liquid-level pump cutoff device to stop flow at a predetermined level within the tank.
 - Direct audible or code signal communication between the tank gauge and the pumping station.
 - A fast response system for determining the liquid level in the tank.

3. Corrosion Protection for All Tanks

- All buried metallic piping must be provided with corrosion protection.
- Metallic storage tanks that are partially buried in soils must be protected against corrosion for the site-specific soil conditions.
- Field-installed cathodic protection systems shall be designed and certified as adequate by a corrosion specialist. The cathodic protection system shall be tested by a certified tester within six months of installation and at least once every three years thereafter.
- Impressed-current cathodic protection systems shall also be inspected no less than every 60-calendar days to ensure that they are in proper working order.

[\[Back to Table of Contents\]](#)

24.8.5 Installation Activities

1. Installation plans must be approved by the Ames Permit Review

- Board prior to installation.
2. All tank installations require a permit issued by the Santa Clara County Health Department, Hazardous Materials Compliance Division, prior to installation. See more details regarding construction projects in Chapter 17, Environmental Requirements for Construction Projects.
 3. Installation activities for tanks must follow applicable Santa Clara County Hazardous Materials Compliance Division guidelines for tank installation and, if applicable, CCR Title 26 regulations for hazardous waste tanks.
 4. The Santa Clara County Health Department requires integrity testing of tanks and associated piping prior to installation and service, following manufacturer's specifications. Often a representative of the tank manufacturer is present to conduct the tank testing. The Santa Clara County Health Department requires at least a 48-hour notification prior to integrity testing so that a county inspector can witness the test.
 5. Aboveground tanks must rest on a foundation of concrete, masonry, piling, or steel, to minimize the potential of uneven settling and to minimize corrosion to any part of the tank resting on the foundation. The tank must also be provided with seismic bracing.
 6. The secondary containment structure for ASTs must provide a method for drainage control to prevent the accidental discharge of any liquid present within the secondary containment. If the drainage control area is diked, it must be liquid tight and withstand full hydrostatic head, and have provisions to remove any excess liquid.
 7. All new tanks and their associated piping must be secondarily contained.
 8. Fire protection must be provided in accordance with nationally recognized standards. The method of fire protection used depends on the size and type of tank, location of the tank (i.e., distances from buildings, property lines, and public ways) and the class of liquid in the tank. Refer to the UFC 79.510 for details.
 9. When needed, tank shall be protected from impacts by bollards or retaining wall similar structure.
 10. Permits may be required from BAAQMD for storage and/or dispensing of volatile materials

[\[Back to Table of Contents\]](#)

24.8.6 Closure Activities

1. All tank closure activities require a permit issued by the Santa Clara County Health Department, Hazardous Materials Compliance Division.
2. Tank closure activities must follow applicable Santa Clara County Hazardous Material Compliance Division guidelines.
3. All hazardous materials tanks, their associated piping, and

- equipment must be disposed of as hazardous waste and transported by a licensed hazardous waste hauler.
4. The soils beneath and surrounding the tank require soil sampling as specified by the Santa Clara County Health Department Guidelines. Soil samples are analyzed for contaminants, as directed by either the Santa Clara County Health Department Guidelines. Analyses required depend on the contents of the tank. For illustration, if the tank contained a diesel fuel, the typical analysis is TPH (total petroleum hydrocarbons) for diesel.
 5. Sampling must be witnessed by a representative of the Santa Clara County Health Department. A 48-hour notification is required.
 6. See Chapter 11, Closure Requirements, for additional guidance.

[\[Back to Table of Contents\]](#)

24.9 Metrics

- a. Percent compliance with federal, state, and local AST regulations
Goal: number of violations / inspection = 0
- b. Personnel working with tanks who have received SPCC training
Goal: training is kept current for 100% of employees working with tanks
- c. Percent of releases properly reported and cleaned up within 24 hrs
Goal: 100% releases cleaned up within 24 hours

[\[Back to Table of Contents\]](#)

24.10 Sources of Additional Information or Assistance

1. Environmental Office [REDACTED]
2. SPCC Plan available at the Ames Library

[\[Back to Table of Contents\]](#)

END OF DOCUMENT

THIS DOCUMENT IS UNCONTROLLED WHEN PRINTED