



Ames Procedures Requirements

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COMPLIANCE IS MANDATORY

Ames Environmental Handbook

Chapter 23 - Toxic Gas Management Procedures

Table of Contents

23.1 [Applicability](#)

23.2 [Purpose](#)

23.3 [Policy](#)

23.4 [Authority](#)

23.5 [Responsibilities](#)

- 23.5.1 Environmental Services Division, Code QE (Environmental Division)
- 23.5.2 Safety Health and Medical Services Division, Code QH
- 23.5.3 Systems Safety and Mission Assurance Division, Code QS
- 23.5.4 Line Management
- 23.5.5 Toxic Gas Users
- 23.5.6 Facilities Engineering Branch, Code RCE
- 23.5.7 Plant Engineering Branch, Code RCM
- 23.5.8 Protective Services Office, Code JP
- 23.5.9 Toxic Gas Safety Committee
- 23.5.10 Logistics and Documentation Services Division, Code JS

23.6 [Definitions](#)

- 23.6.1 [Building Emergency Action Plan \(BEAP\)](#)
- 23.6.2 [Control Area](#)
- 23.6.3 [Immediately Dangerous to Life and Health \(IDLH\)](#)
- 23.6.4 [Permissible Exposure Limit \(PEL\)](#)
- 23.6.5 [Regulated Material](#)
- 23.6.6 [Restrictive Flow Orifice \(RFO\)](#)
- 23.6.7 [Toxic Gas Cabinet](#)
- 23.6.8 [Toxic Gas Ordinance \(TGO\)](#)
- 23.6.9 [Toxic Gas Use Permit](#)

23.7 [Toxic Gas Procedures](#)

- 23.7.1 [Ordering Procedure \(Purchaser Action\)](#)
- 23.7.2 [Leak Test Procedure at Delivery](#)
- 23.7.3 [Cylinder Return Procedure](#)

23.8 Contacts

23.9 Appendices

- 23.11.1 [Appendix A: New Project Information Fact Sheet](#)
 - 23.11.2 [Appendix B: Toxic Gas Leak Test Log Sheet](#)
 - 23.11.3 [Appendix C: Leak Test Record Label](#)
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23.1 Applicability

This instruction is applicable to all civil servant and contractor employees, and resident agency personnel at Ames Research Center (Ames), and Crows Landing Flight Facility.

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

23.2 Purpose

This chapter prescribes the roles and responsibilities and management procedures for toxic gas management. These management procedures must be followed in order to ensure workplace safety for operations with toxic gas, to prevent, control, and mitigate dangerous conditions, and to protect the public from acute exposure due to an accidental release of a toxic gas.

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

23.3 Policy

It is the policy of Ames to manage toxic gases safely, and in compliance with all applicable Federal, state, and local regulations, Executive Orders, and NASA policies and requirements

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

23.4 Authority

All relevant Federal, state, and local laws and regulations and NASA regulations pertaining to the management of toxic gas including, but not limited to:

1. Santa Clara County Hazardous Materials Storage Ordinance No. NS-517.31
2. Santa Clara County Toxic Gas Ordinance No. NS-517.44
3. Uniform Fire Code (2004)
4. OSHA Hazard Communication Standard, Code of Federal Regulations Title 29, Section 1910.120
5. OSHA Lab Standard, Code of Federal Regulations Title 29, Section 1910.1450
6. Executive Order 12898, Federal actions to address environmental justice in minority populations and low-income participants

7. Executive Order 13045, Protection of children from environmental health risks and safety risks

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

23.5 Responsibilities

23.5.1 Environmental Services Division, Code QE (Environmental Office)

1. Participate on Toxic Gas Safety Committee and provide specific permit conditions (administrative and engineering controls) for each permit. Provide consultation services to the committee, user, and line management.
2. Implement, maintain, and monitor the toxic gas program including issuance of Toxic Gas Use permit.
3. Maintain the official file of any permits and forward copies of any correspondence and permits, as appropriate.
4. Review plans and drawings related to storage and handling of toxic gas for new construction, maintenance, or remodeling to determine compliance with applicable regulations.
5. Obtain permits specific to TG from local agencies and pay permit fees to the County. Coordinate inspections by regulatory agencies as needed and prepare and submit updated hazardous materials business plans to local agencies.
6. Perform facility surveys annually to determine compliance with the Toxic Gas Use permit conditions. Assist users with maintaining compliant status.
7. Report suspected leaks to the applicable agencies.
8. Perform leak testing as requested of cylinders transported to and from Ames and maintain records of leak tests performed by QE.
9. Maintain records of leak test procedures, deliveries, regulatory inspections, and internal audits.
10. Transmit HMIS information to the Fire Department, Duty Office, DART Team, hazardous materials contractor, Emergency Response Team, hazardous waste contractor, and the Safety, Health, and Medical Services Division (Safety Office).
11. Maintain master key to the lock boxes located outside each laboratory.
12. Facilitate the disposal of cylinders offsite.
13. Ensure quantities are in compliance with Environmental Justice Implementation Plan.
14. Review the new project information fact sheet to determine TG permit requirements. Obtain additional information from user as needed.

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

23.5.2 Safety Health and Medical Services Division, Code QH

1. Participate on the TG Safety Committee.
2. Conduct industrial hygiene review of written standard operating procedures (SOPs), experiment plans, and worksites for operations with regulated gases, and issue project authorizations for regulated and exempt operations with TG and ensure administrative and

engineering controls are sufficient for each operation.

3. Conduct testing to ensure that the hoods and gas cabinets and other exhausted enclosures meet the minimum requirements for safe operations.
4. Perform calculations of TG to determine safe operations and worst-case release scenarios.

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

23.5.3 Systems Safety and Mission Assurance Division, Code QS

1. Participate on the TG Safety Committee.
2. Review and approve specifications, drawings, and plans for equipment with pressurized toxic gas.
3. Review and approve plans, specifications, and parts for pressurized systems using toxic gas.

23.5.4 Line Management

[REDACTED]

23.5.5 Toxic Gas Users

1. Participate on TG Safety Committee, if requested.
2. Submit a New Project Information Fact Sheet (Appendix A) and consult with the Environmental Division prior to (minimum two months) any new use of a toxic gas. Note: Any project using a regulated TG may be required to use a TG cabinet and if that project is not located in an existing toxic gas area may require a lead-time of two years.
3. Include all TG on the HMIS inventory and keep the inventory current.
4. Attend individual toxic gas training and all other training required for hazardous materials use. Refer to Chapter 7, Environmental Training, for more information.
5. Acquire, use, and store toxic gases as described in the Toxic Gas Use permit and in a safe manner with all prescribed administrative and engineering controls to reduce the risk to the Center. Only purchase toxic gases after issuance of the Toxic Gas permit and after meeting all permit conditions.
6. Maintain and use the appropriate personal protective equipment for the specific materials used. Refer to Chapter 6 of the Ames Health and Safety Procedural Requirements, APR 1700.1, Chapter 2, Safety and Health Responsibility and Chapter 28, Respiratory Protection, for more specific details regarding personal protective equipment and Chapter 44, Compressed Gas Cylinder Safety.
7. Conduct routine inspections of all hazardous materials, including toxic gases, and maintain records of the inspections.

8. Conduct leak tests of cylinders in accordance with Section 23.7.2 and maintain the results of each leak test performed, or request QE to conduct the leak test.
9. Maintain a secure environment in the work area in order to prevent unauthorized access.
10. Return unused toxic gases to the vendor on a bill of lading or request assistance from the Environmental Division to dispose of the toxic gases as hazardous waste when toxic gases are no longer required.
11. Off-site use of toxic gas must comply with all applicable regulations including the NEPA checklist.

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

23.5.6 Facilities Engineering Branch, Code RCE

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

23.5.7 Plant Engineering Branch, Code RCM

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23.5.8 Protective Services Office, Code JP

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

23.5.9 Toxic Gas Safety Committee

1. Provide an avenue of communication among toxic gas users and Environmental Division.
2. Provide technical expertise to toxic gas uses and Environmental Division.
3. Assist in maintaining compliance with all Toxic Gas Ordinance requirements.
4. Provide TGO information and compliance assistance to tenants and resident agencies.

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

23.5.10 Logistic and Documentation Services Division

1. Prepare shipping documents for shipment of gas cylinders back to manufacturer.
2. Notify Environmental Division when TG cylinders arrive at [REDACTED] facility so that leak test can be conducted.

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

23.6 Definitions

23.6.1 Building Emergency Action Plan (BEAP)

All facilities storing, handling, or dispensing hazardous materials at Ames have BEAPs that describe the chemicals stored and used, their locations, building hazards, and evacuation and emergency response procedures

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

23.6.2 Control Area

A space within a building (typically a room or floor) where the regulated materials may be stored, dispensed, used, or handled. A maximum of four control areas are permitted within a building, except for buildings or portions of buildings used for retail sales, which shall have a maximum of two control areas. A control area is an area formed by one or more of the following:

- An occupancy separation with a minimum of one-hour fire resistive rating.
- The exterior wall, roof, or foundation of the building.

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

23.6.3 Immediately Dangerous to Life and Health (IDLH)

An atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from a dangerous atmosphere.e.

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

23.6.4 Permissible Exposure Limit (PEL)

A time-weighted average concentration that must not be exceeded during any 8-hour work shift of a 40-hour work week. The PEL is intended to protect workers from having any adverse effects from chemical exposures.

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

23.6.5 Regulated Material

Regulated toxic gas materials with a lethal concentration (LC50) of less than or equal to 5,000 ppm. In addition to the LOC, regulated materials are those that are shipped in compressed gas cylinders, or are materials that become or act as a gas upon release at normal temperature and pressure or materials that are used or handled as a gas, whether or not the material meets the definition of a compressed gas, as defined in Article 9 of the Uniform Fire Code.

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

23.6.6 Restrictive Flow Orifice (RFO)

Used to limit the flow rate of gas that can escape from the cylinder.

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

23.6.7 Toxic Gas Cabinet

A toxic gas cabinet is one that is designed to provide secondary containment for the storage of a specific gas at a specific quantity. The gas cabinets must be designed to meet all SCC requirements and be approved by the Ames Construction Permit Board.

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

23.6.8 Toxic Gas Ordinance (TGO)

Santa Clara County Toxic Gas Ordinance, Number NS-517.44, which regulates the use of Toxic Gases in the County.

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

23.6.9 Toxic Gas Use Permit

A permit issued by the Toxic Gas Safety Committee that allows the use of a Toxic Gas under strict permit conditions at Ames.

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

23.7 Acquisition Procedures

Project approval is required from the Environmental Division for toxic gas use. Approval (issuance of a permit) of the TG is based on specific parameters and if those change then a new permit is required.

23.7.1 Ordering Procedure (Purchaser Action)

1. Prepare the New Project Information Fact Sheet in accordance with the checklist in Appendix A.
2. Submit the New Project Information Fact Sheet to the Environmental Division for review.
3. Ensure that vendors will accept their cylinder returns in either empty or partially empty state.
4. Inform vendor to mark shipping papers with:
 - Requester name and phone number
 - Toxic gas cabinet location (include building, room number, and cabinet number)
 - Purchase order number
5. Obtain a current Material Safety Data Sheet (MSDS) from the vendor with every order of gases delivered.
6. Inform the Environmental Division of the date and time of delivery per vendor arrangement. The purchaser or designated alternate MUST be present to receive the gas.

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

23.7.2 Leak Test Procedure at Delivery

In accordance with the Santa Clara County Toxic Gas Ordinance Number NS-517.44, all toxic gas cylinders must be leak tested upon delivery and immediately prior to departure. The Environmental Division (QE) or toxic gas user shall:

1. Record receipt of toxic gases in the toxic gas user's log book or Toxic Gas Leak Test Log Sheet (Appendix B), with the following information:
 - Date received/Date Returned
 - Vendor/manufacturer name and phone number
 - Purchase order number (PO#)
 - Condition of cylinder
 - Cylinder identification number (engraved into cylinder)
 - RFO size (state units)
 - Number of cylinders
 - Quantity per cylinder (state units)
 - Trade name and chemical name of gas
 - Leak test results (Pass/Fail)
 - Hydrostatic Test Date
 - Person who conducted the leak test
 - Toxic Gas user and phone number
 - Toxic Gas user Building and Room number
2. Inform driver that the delivery vehicle will be boarded to inspect the cylinder.
3. Inspect cylinder, verifying that the cylinder label matches shipping papers and/or bill of lading, and that cylinder appears to be in good condition. Mark condition (Acceptable/Not Acceptable) on cylinder log.

4. Perform leak test using SNOOP (no substitute).
5. Apply the SNOOP to all areas of the valve stem.
6. Inspect the cylinder for signs of leakage (bubbles) over the course of one minute.
7. Enter leak test results (Pass/Fail) and inspector name on cylinder log.
8. If bubbles **are not present**, the gas cylinder condition is acceptable.
9. Attach a leak test record label (see Appendix C) to cylinder, with documentation that the cylinder has passed the leak test.
10. Verify that the toxic gas user (or alternate) is prepared to accept delivery.
11. Direct the vendor (driver) to the delivery location.
12. If bubbles **are present**, the cylinder is leaking. This cylinder has failed the SNOOP test. Refuse delivery. Instruct driver to contact vendor's supervisor for instructions.

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

23.7.3 Cylinder Return Procedure

1. Arrange for cylinder return to vendor by submitting a funded shipping request (ARC 66, Ames Shipping Request), or follow vendor's instructions. Toxic gas cylinders must be leak tested prior to departure from Ames. Gas purchase orders shall include provision for cylinder return. If the cylinder is to be disposed of complete the proper paperwork (Form A) for disposal. The toxic gas user or Environmental Division personnel shall perform leak test prior to departure from Ames.
2. The shipping of toxic gases off site (return to vendor or disposal) will be recorded on the Toxic Gas Leak Test Log Sheet.
3. The user shall update the chemical inventory in the HMIS data base (<http://q/qe/>) and submit to the Environmental Division.

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

23.8 Contacts

1. Ames Duty Office [REDACTED]
2. Ames Duty Office [REDACTED]
3. The Environmental Division [REDACTED]

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

23.9 Appendices

23.9.1 Appendix A: New Project Information Fact Sheet

Building and room	
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location:	
Gas/chemical name:	
Quantity of gas per cylinder:	
Number of cylinders:	
Gas cabinet present:	
Hood type:	
Start date of project:	
Length of project:	

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

23.9.2 Appendix B: Toxic Gas Leak Test Log Sheet

Date Received/Date Returned: Select One:

Vendor/Manufacturer Name and Phone:

Purchase Order Number (PO#):

Conditioning of Cylinder: Circle One Acceptable/Unacceptable

Cylinder Identification Number (engrave into cylinder):

RFO Size (state units) (Reduce Flow Orifices), if applicable:

Number of Cylinder(s):

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

23.11.3 Appendix C: Test Leak Record Label

LEAK TEST RECORD	
Date of Test:	
Time of Test:	
Signature:	_____

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

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THIS DOCUMENT IS UNCONTROLLED WHEN PRINTED