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Administrative Procedure

PRC-PRO-SH-40481

Storing, Using and Handling Compressed Gases

Revision 1, Change 0

Published: 10/30/2017

Effective: 10/30/2017

Program: Occupational Safety and Industrial Hygiene

Topic: Occupational Safety and Industrial Health

Technical Authority: Gallagher, Michael

Functional Manager: Robinson, Roby

Use Type: Administrative



- Solid Waste Operations Complex :

Screening Determination Performed: (GCX-7 (SWOC-17-026))

Screener: Jacobs, Orvil

- Canister Storage Building/Interim Storage Area :

Categorical Exclusion: GCX-8 (Not in Safety Basis Compliance Matrices)

Screener: Covey, Lori

- Central Plateau Surveillance and Maintenance :

Categorical Exclusion: GCX-7 (Minor Change)

Screener: Hicks, Jarrod

- Waste Encapsulation Storage Facility :

Categorical Exclusion: GCX-8 (Not in Safety Basis Compliance Matrices)

Screener: Covey, Lori

- 100 K Facility :

Categorical Exclusion: GCX-8 (Not in Safety Basis Compliance Matrices)

Screener: Williams, James

- Plutonium Finishing Plant :

Categorical Exclusion: GCX-8 (Not in Safety Basis Compliance Matrices)

Screener: Oberg, Brian

- Transportation :

Excluded from USQ

Exclusion Reason:

PRC-PRO-SH-40481, Rev. 1 Chg. 0, Storing, Using and Handling Compressed Gases, provides the basic safety requirements and practices for storing, handling, and using compressed gas cylinders related to CHPRC work scope. In Section 1.2, the procedure states: "Transportation of compressed gases is outside the scope of this procedure. All transportation shall be in accordance with 49 Code of Federal Regulations (CFR) and the applicable CHPRC Transportation and Packaging procedures." Therefore, the release of this procedure is excluded from further review by the Transportation Safety Organization under the USQ Process per Section 1.3 of PRC-PRO-NS-062 Rev. 3. Please mark the change form as "N/A per Section 1.3 – DOT".

- 324 Facility :

Categorical Exclusion: GCX-7 (Minor Change)

Screener: Enghusen, Mark

- 618-10 :

Excluded from USQ

Exclusion Reason:

DOE-RL Correspondence No.1704586; EDC#: ECR-17-001699 submitted 10-25-17; Cancel 618-10 DSA & ABmatrix submitted 10-26-17.

JHA: Administrative

Periodic Review Due Date:10/30/2022

Publication Correction:01/24/2021

Rev. 1, Chg. 0

Change Summary

Description of Change

Fire Protection requirements added into the procedure.

**Central Plateau Cleanup Company (CPCCo)
BLUE SHEET FORM**

Blue Sheet Reviewer: Andrew Minister

ID Number: BS-0341

Project/Functional Area: Safety & Health

Facility Name: CPCC

CPCCo Responsible Manager: Megan Proctor

Blue Sheet Classification:

- 1. Document adopted as is (except for terminology changes)
- 2. Document adopted with minor changes
- 3. Document not adopted, major changes required
 - Document needed at Contract Start
- 4. Document superseded Superseding Document Number:
- 5. Document retired

Needed Updates/Revisions:

- 1. 3.3.2 Step 2, revise text to read: "NEVER use acetylene at a pressure exceeding 15 psig."
- 2. 3.3.2 Step 3, revise text to read: "LIMIT acetylene cylinders stored inside a building to 1500 ft3 (42.4 m3) with fire sprinkler protection or 750 ft3 (21.2 m3) without fire sprinkler protection including cylinders in use or attached for use."

Unreviewed Safety Question (USQ):

USQ Review Excluded Reason for Exclusion:
 Required Screening Number: GCX-8 except TS = N/A per Section 1.3

APPROVALS

Blue Sheet Reviewer:

Andrew Minister

Print First and Last Name

Andrew G. Minister

Signature / Date

Digitally signed by Andrew G. Minister
Date: 2020.12.01 09:52:03 -08'00'

Responsible Project/Functional Area Manager:

Megan Proctor

Print First and Last Name

Proctor, Megan

Signature / Date

Digitally signed by Proctor, Megan
Date: 2020.12.01 09:56:36 -08'00'

Documents Covered By This Blue Sheet (or indicate attachment with information)

Document Number	Document Title	Rev
PRC-PRO-SH-40481	Storing, Using and Handling Compressed Gases	1, Chg 0

Storing, Using and Handling Compressed Gases

Published Date: 10/30/17

Effective Date: 10/30/17

TABLE OF CONTENTS

1.0 INTRODUCTION 2

 1.1 Purpose 2

 1.2 Scope 2

 1.3 Applicability 2

 1.4 Implementation 2

2.0 RESPONSIBILITIES 2

3.0 PROCESS 3

 3.1 Safe Handling Requirements 3

 3.2 Storing Cylinders 4

 3.3 Welding, Cutting, and Brazing Gas Cylinders 6

 3.4 Training Requirements 8

4.0 FORMS 9

5.0 RECORD IDENTIFICATION 9

6.0 SOURCES 9

 6.1 Requirements 9

 6.2 References 9

List of Appendixes

Appendix A - Glossary 10

Storing, Using and Handling Compressed Gases

Published Date: 10/30/17

Effective Date: 10/30/17

1.0 INTRODUCTION

1.1 Purpose

This procedure provides the basic safety requirements and practices for storing, handling, and using compressed gas cylinders related to CH2M HILL Plateau Remediation Company (CHPRC) work scope. This procedure also covers the use of flammable-gas piping systems, high-pressure gas cylinders, and manifolded cylinders.

1.2 Scope

This procedure is applicable to the handling, use, and storage of compressed gas cylinders. This procedure does not cover compressed gas cylinders that are part of self-contained breathing apparatus (SCBA) units, general air receivers or pressure vessels, bulk gas systems; procuring, receiving, inspecting (except for visual inspection to determine safe condition, marking, or filling compressed gas cylinders.

Additional requirements may be applicable to specific situations. Where the safety basis requirements are different from those listed herein, the more conservative requirements **shall** apply.

Transportation of compressed gases is outside the scope of this procedure. All transportation shall be in accordance with 49 *Code of Federal Regulations* (CFR) and the applicable CHPRC Transportation and Packaging procedures.

1.3 Applicability

This procedure is applicable to CHPRC Team employees and subcontractor personnel involved with the CHPRC work scope.

1.4 Implementation

This procedure is effective upon publication.

2.0 RESPONSIBILITIES

Managers - Managers are responsible for identifying the employees affected by this procedure and ensuring required training is completed.

Supervisors - Supervisors shall ensure employees are properly trained prior to handling compressed gas cylinders. Supervisors will also note defective cylinders and tag them for repair.

Employees – Employees shall report any defective or damaged cylinders to their supervisor.

Cognizant Fire Protection Engineer (FPE) –The cognizant FPE will provide assistance to managers and supervisors.

Occupational Safety & Industrial Hygiene (OS&IH) – OS&IH will assist in developing the required training. Safety will also work with Purchasing to ensure that all newly purchased compressed gas cylinders equipment and supplies comply with current safety regulations and this safety policy and procedure.

Storing, Using and Handling Compressed Gases

Published Date: 10/30/17

Effective Date: 10/30/17

3.0 PROCESS

3.1 Safe Handling Requirements

3.1.1 Cylinder Movement

<i>Actionee</i>	<i>Step</i>	<i>Action</i>
All Personnel	1.	AVOID dragging, striking, dropping, or rolling cylinders in the horizontal position, or allowing them to violently strike each other or another surface.
	2.	USE a suitable hand truck, forklift truck, or similar handling device with the cylinder properly secured to the device when transporting cylinders.
	3.	AVOID lifting of cylinders using the protective cap or with a magnet.
	4.	ENSURE cylinder is maintained in an upright position.
	5.	<u>IF</u> cylinder has appropriate lifting attachments, <u>THEN</u> USE ropes, chains, or slings to suspend cylinders.
	a.	<u>IF</u> appropriate lifting attachments have not been provided, <u>THEN</u> USE suitable cradles or platforms to hold the cylinder for lifting.
	6.	AVOID using cylinders as rollers, supports, or for any purpose other than to contain and use the original contents.

3.1.2 Pre-Use Inspection

<i>Actionee</i>	<i>Step</i>	<i>Action</i>
Line Management	1.	IDENTIFY physical and health hazards and precautions on compressed gas containers in accordance with CHPRC Hazard Communication standard.
All Personnel	2.	CONDUCT a visual inspection of cylinders prior to use. Inspection will include checking for dents, bulges, cracks, evidence of excess heat, etc. A cylinder shall not be used if damaged.
	3.	ENSURE all connecting devices are free of oil, grease, or other contaminants prior to use.
	4.	<u>IF</u> damage or contamination is apparent, <u>THEN</u> PLACE the container out of service <u>AND</u> CONTACT supplier for instruction.

Storing, Using and Handling Compressed Gases

Published Date: 10/30/17

Effective Date: 10/30/17

3.1.3 Caps and Valves

<i>Actionee</i>	<i>Step</i>	<i>Action</i>
All Personnel	1.	ENSURE all valve protection caps or valve outlet caps or plugs provided by the manufacturer remain on the cylinder at all times except when the cylinder is secured and connected to dispensing equipment.
	2.	CLOSE the cylinder valve when the cylinder is not in use.
	3.	SECURE the valve protection cap in place when the cylinder is not in use.
	4.	ENSURE regulators and pressure gauges used with a particular gas are designed for use with the cylinders and gas.

3.1.4 Cylinder Use

<i>Actionee</i>	<i>Step</i>	<i>Action</i>
All Personnel	1.	<u>IF</u> a foreign substance is known or suspected of entering the container or valve. <u>THEN IDENTIFY AND</u> clearly MARK the container <u>AND NOTIFY</u> the gas supplier of the details of the contamination.
	2.	ENSURE the cylinder is properly secured during use.

3.2 Storing Cylinders

3.2.1 General Requirements

<i>Actionee</i>	<i>Step</i>	<i>Action</i>
All Personnel	1.	PROTECT compressed gas containers from temperature extremes. <ul style="list-style-type: none"> • <u>IF</u> ice or snow accumulates on a container, <u>THEN THAW</u> at room temperature, or with water at a temperature not exceeding 125°F (50°C).
	2.	ENSURE flame or heat do not directly contact any part of a compressed gas container.
	3.	SEPARATE cylinders from electrical components where they might become part of an electrical circuit.
	4.	SECURE all gas cylinders, whether in service or storage, to prevent them from falling.
	5.	PROTECT cylinders from any object that will produce a harmful cut or other abrasion in the surface of the metal.

Storing, Using and Handling Compressed Gases

Published Date: 10/30/17

Effective Date: 10/30/17

3.2.2 Gas Compatibility

<i>Actionee</i>	<i>Step</i>	<i>Action</i>
All Employees	1.	CONSULT the Safety Data Sheets (SDS) for appropriate guidance on the storage and compatibility requirements of the materials in question <u>AND</u> CONSULT the gas supplier as necessary for requirements regarding specific gases such as acetylene, hydrogen, oxygen, or for toxic or corrosive gases.
	2.	STORE <u>AND</u> POST compressed gases according to their hazard class (flammable, asphyxiant, etc.) or name of gas to be stored.
	3.	STORE oxidizers separately from flammable gas containers or combustible materials (especially oil or grease) <u>AND</u> MAINTAIN a distance of 20 ft (6 m) between flammable gas containers and oxidizer. A noncombustible barrier at least 5 ft high having a fire resistance rating of at least one-half hour may be used in lieu of a 20-ft separation.

3.2.3 Storage Area

<i>Actionee</i>	<i>Step</i>	<i>Action</i>
All Employees	1.	PROTECT stored cylinders against accumulations of ice and snow.
	2.	PROTECT stored cylinders from direct exposure to sunlight.
	3.	PROTECT stored cylinders from vehicular traffic.
	4.	AVOID prolonged exposure of cylinders to the ground (earth) or to damp environment.
	5.	AVOID storing cylinders near elevators, walkways, unprotected platform edges, or in locations where heavy moving objects may strike or fall on them.
	6.	AVOID subsurface storage locations.
	7.	SEPARATE empty cylinders from full ones.
Line Management	8.	PLAN storage so cylinders are used in the order in which they are received from the supplier.

Storing, Using and Handling Compressed Gases

Published Date: 10/30/17

Effective Date: 10/30/17

Actionee	Step	Action
Line Management	9.	POST "NO SMOKING" signs at all flammable gas storage areas.

NOTE: *It is suggested that all empty cylinders be marked "empty", unused cylinders "full," and those in service "In Use." All empty cylinders should be treated as if full. For example, empty cylinders that held oxidizing gases and flammable gases should not be stored together.*

10. CLOSE AND CAP valves on empty cylinders.

3.2.4 Storage of Small Propane Cylinders

This section applies to propane cylinders that are approximately one pound in size and are typically used for propane torches and small gas grills.

Actionee	Step	Action
All Employees	1.	STORE small propane cylinders in an outdoor storage area where there is controlled access, ventilated storage, e.g., a lockable enclosure fabricated with expanded metal (a cage).

NOTE: *An example of an appropriate metal carrier for storage are the metal carriers used for the transport and storage of calibration gas or medical oxygen cylinders.*

2. STORE small propane cylinders in an upright, vertical position with a dust cap installed. A metal carrier or other means shall be used to ensure the cylinders are not capable of tipping during storage.

3. SEGREGATE empty containers from the non-empty containers (use separate carriers).

Line Management 4. ENSURE small propane cylinders are stored in an outdoor storage area and not inside in a facility or inside of a flammable cabinet.

3.3 Welding, Cutting, and Brazing Gas Cylinders

3.3.1 General Requirements

Actionee	Step	Action
All Employees	1.	KEEP cylinders, cylinder valves, couplings, regulators, hose, and other apparatuses free from oily or greasy substances.
	2.	ENSURE compressed gas cylinders are not used for grounding when used in conjunction with any welding or cutting that employs an electrical arc.
	3.	REMOVE regulators <u>AND</u> SECURE valve-protection caps in place, when provided for, in advance of cylinder movement, unless cylinders are secured on a special truck.

Storing, Using and Handling Compressed Gases

Published Date: 10/30/17

Effective Date: 10/30/17

3.3.2 Acetylene

<i>Actionee</i>	<i>Step</i>	<i>Action</i>
All Employees	1.	STORE <u>AND</u> USE acetylene cylinders in a vertical position with the valve end up.
	2.	AVOID using acetylene at a pressure exceeding 15 psig.
	3.	LIMIT acetylene cylinders stored inside a building to a total capacity of 2500 ft ³ (70.8m ³) of acetylene exclusive of cylinders in use or attached for use.
	4.	ENSURE ventilation is provided and no open flames for heating or lighting are permitted in buildings and rooms that house acetylene operations.
	5.	ENSURE the fusible metal pressure relief devices in valves or cylinders of acetylene are maintained in good condition.
	6.	KEEP sparks and flames away from acetylene cylinders and under no circumstances allow a torch flame to come in contact with fusible metal pressure relief devices.
	7.	USE only wrenches or other tools provided by the valve or cylinder manufacturer to open or close the cylinder valves.
	8.	OPEN the acetylene cylinder valve slowly. The minimum amount required to deliver acceptable flow should be used so that the valve can be closed as quickly as possible in an emergency situation. One and one-half turns is usually sufficient to provide adequate flow.

3.3.3 Oxygen

<i>Actionee</i>	<i>Step</i>	<i>Action</i>
All Employees	1.	STORE oxygen cylinders away from highly combustible material such as oil, grease, or fuel-gas cylinders.
	2.	ENSURE hands and gloves are free from grease before handling oxygen cylinders or apparatus.
	3.	ENSURE the oxygen flow is not allowed to strike oily surfaces, greasy clothes, or the entrance into a fuel oil or other storage tank.

Storing, Using and Handling Compressed Gases

Published Date: 10/30/17

Effective Date: 10/30/17

3.4 Training Requirements

<i>Actionee</i>	<i>Step</i>	<i>Action</i>
NOTE:	<ul style="list-style-type: none"> • <i>CGA P-1 defines "handling" as "Moving, connecting or disconnecting a compressed or liquefied gas container under normal conditions of use."</i> • <i>Training course #020049, Compressed Gas Cylinder Safety, or equivalent, meets this requirement for employees who handle standard size cylinders.</i> • <i>For forklift operators exclusively performing propane bottle change-out, training course #044674, Propane Bottle Change-Out, meets this requirement.</i> 	

- Line Management
1. ENSURE only properly trained employees handle and use compressed gases. Required training elements for standard size cylinders include:
 - Regulations and Standards
 - Safe Handling Rules
 - Cylinder content identification
 - User responsibilities
 - Valve protection
 - Transfilling
 - Cylinder storage
 - Connecting cylinders
 - Transportation
 - Emergency Response
 - Special handling procedures by Hazard Class
 2. ENSURE employees who handle small cylinders such as calibration gas cylinders and small, disposable propane cylinders are familiar with:
 - Hazards of the cylinder contents
 - Proper storage of the cylinders
 - Disposal of empty cylinders

Storing, Using and Handling Compressed Gases

Published Date: 10/30/17

Effective Date: 10/30/17

4.0 FORMS

None

5.0 RECORD IDENTIFICATION

All records are required to be managed in accordance with PRC-PRO-IRM-10588, *Records Management Processes*. OCRWM records are also managed in accordance with PRC-PRO-QA-19579, *OCRWM Records Management*.

Records Capture Table

Name of Record	Submittal Responsibility	Retention Responsibility	OCRWM Retention Schedule (If OCRWM Related)
N/A	N/A	N/A	N/A

6.0 SOURCES**6.1 Requirements**

29 CFR 1910 Sections:

- 1910.101, "Compressed Gases (general requirements)"
- 1910.102, "Acetylene"
- 1910.104, "Oxygen"
- 1910.253, "Oxygen-Fuel Gas Welding and Cutting"

6.2 References

29 CFR 1910.1200, "Hazard communication"

49 CFR *Transportation*ANSI/ASTM D 323. *American National Standard Test Method for Vapor Pressure of Petroleum Products (Reid Method)*Compressed Gas Association Pamphlet P-1, *Safe Handling of Compressed Gases* (2008)PRC-PRO-IRM-10588, *Records Management Processes*PRC-PRO-QA-19579, *OCRWM Records Management*PRC-PRO-SH-40410, *Hazard Communication*

Storing, Using and Handling Compressed Gases

Published Date: 10/30/17

Effective Date: 10/30/17

Appendix A - Glossary

Term	Definition
Compressed Gas	Any gas or mixture of gases exerting in a container, a pressure exceeding 40.6 psia (280 kPa Abs) at 68°F (20°C). Also, any flammable liquid having an absolute vapor pressure exceeding 40.6 psia (280 kPa. abs) at 100°F (37.8°C) as determined by ANSI/ASTM D 323. <i>American National Standard Test Method for Vapor Pressure of Petroleum Products (Reid Method)</i> [30]. Unless specifically stated otherwise in [the Compressed Gas Association P-1 Document], the term “compressed gas” also refers to liquefied and dissolved gases meeting these criteria.
Corrosive Gas	A gas that in contact with living tissue causes destruction of the tissue by chemical action. This term shall not refer to action on inanimate surfaces.
Flammable Gas	A gas is considered flammable when either a mixture of 13% or less (by volume) with air is ignitable at 14.7 psia (101.3 kPa) or has a flammable range with air of at least 12% regardless of the lower limit. These limits shall be determined at 14.7 psia (101.3 kPa) of pressure and a temperature of 68°F (20°C).
Handling	Moving, connecting, or disconnecting a compressed or liquefied gas container under normal conditions of use.
Material Safety Data Sheet / Safety Data Sheet (SDS)	Written or printed information concerning a hazardous material prepared in accordance with the provisions of 29 CFR 1910.1200, “Hazard communication.”
Oxidizing Gas	A gas that, in the presence of an ignition source and a fuel, supports and may vigorously accelerate combustion.
Toxic Gas	A compressed gas that has a medial lethal concentration (LC50) in air of less than or equal to 5000 parts per million (ppm) by volume of gas or vapor when administered by continuous inhalation for an hour (or less if death occurs within 1 hour) to albino rats weighing between 200 and 300 grams each.
Use	The act of withdrawing and using the product gas in a nonrecoverable manner for applications other than manufacturing/repackaging of compressed gases.
Valve Protection Cap	A rigid removable cover provided for container valve protection during handling, transportation, and storage.