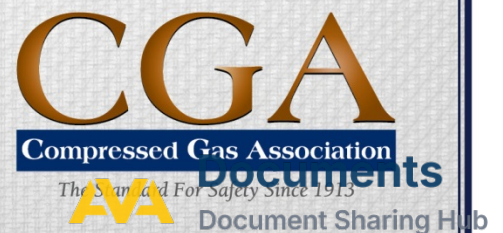


CGA P-37—2014

**GOOD ENVIRONMENTAL
MANAGEMENT PRACTICES
FOR THE COMPRESSED
GAS INDUSTRY**

THIRD EDITION



PREFACE

As part of a program of harmonization of industry standards, the Compressed Gas Association (CGA) has issued [CGA P-37](#), *Good Environmental Management Practices for the Compressed Gas Industry*, jointly produced by members of the International Harmonization Council and originally published by the European Industrial Gases Association (EIGA) as EIGA Doc 88, *Good Environmental Management Practices for the Industrial Gas Industry*.

This publication is intended as an international harmonized standard for the worldwide use and application of all members of the Asia Industrial Gases Association (AIGA), Compressed Gas Association (CGA), European Industrial Gases Association (EIGA), and Japan Industrial and Medical Gases Association (JIMGA). Each association's technical content is identical, except for regional regulatory requirements and minor changes in formatting and spelling.

PLEASE NOTE:

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This document is subject to periodic review, and users are cautioned to obtain the latest edition. The Association invites comments and suggestions for consideration. In connection with such review, any such comments or suggestions will be fully reviewed by the Association after giving the party, upon request, a reasonable opportunity to be heard. Proposed changes may be submitted via the Internet at our web site, www.cganet.com.

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Work Item 12-008
Environmental Committee

NOTE—Technical changes from the previous edition are underlined.

NOTE—Appendices A, B, C, D, E, F, G, H, and I (Informative) are for information only.

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SECOND EDITION: 2009
FIRST EDITION: 2003

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1 Introduction

This publication is a practical guide to good environmental management practices in the industrial gases industry and has been developed in conjunction with the European Industrial Gases Association (EIGA) who publishes this guidance as EIGA Doc 88. It can be used on its own or in conjunction with other CGA publications on environmental management.

The environmental management system standard ISO 14001, *Environmental management systems — Requirements with guidance for use*, requires organizations to review their environmental aspects and put in place practices to minimize and control their impacts. This publication provides a standardized list that can be used in any industrial gas company [1].¹

This publication has been prepared by member associations of the International Harmonization Council, under the lead of EIGA and is intended for the worldwide use and application by all members of the International Harmonization Council. The International Harmonization Council is composed of members from the Asia Industrial Gases Association (AIGA), Compressed Gas Association (CGA), European Industrial Gases Association (EIGA), and the Japanese Industrial and Medical Gases Association (JIMGA). Regional editions may use non SI units and refer to national, and/or regional legislation.

2 Scope and purpose

2.1 Scope

This publication provides guidance on good environmental management practices to industrial gas facility managers. It does not give specific advice on health and safety issues; however, consideration shall always be given to these issues when conducting operational risk assessments before undertaking any activity.

Industrial gas facilities have distinct activities and associated environmental aspects that can impact the environment. This publication provides good environmental practices at air separation and helium production facilities, hydrogen and carbon monoxide facilities, and carbon dioxide facilities. It also provides good environmental practices for truck maintenance and distribution, acetylene and nitrous oxide manufacturing, cylinder fill operations, specialty gases operations, and customer installation (bulk tanks) activities.

2.2 Purpose

This publication identifies typical industrial gas industry activities and associated environmental aspects that can have a negative impact on the environment, and it identifies corresponding practices that can minimize or eliminate those impacts.

Environmental aspects can include solid/hazardous waste, air emissions, wastewater discharges, stormwater discharges, noise, and releases generated at various industrial gas facilities.

For each activity, environmental aspects, potential environmental impacts, and good environmental management practices (GEMP) have been identified that can be used to prevent pollution, minimize the generation of wastes, discharges and releases, manage any residuals and use of energy, raw materials, water, and land.

3 Definitions

For the purpose of this publication, the following definitions apply.

3.1 Publication terminology

3.1.1 Shall

Indicates that the procedure is mandatory. Shall is used wherever the criterion for conformance to specific recommendations allows no deviation.

¹ References are shown by bracketed numbers and are listed in order of appearance in the reference section.

3.1.2 Should

Indicates that a procedure is recommended.

3.1.3 May

Indicates that the procedure is optional.

3.1.4 Will

Is used only to indicate the future, not a degree of requirement.

3.1.5 Can

Indicates a possibility or ability.

3.2 Technical definitions**3.2.1 Environmental aspect**

Element of an organization's activities, products, or services that can interact with the environment.

3.2.2 Environmental impact

Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's activities, products, or services.

3.2.3 Good environmental management practices (GEMP)

Suggested practices that can be used to minimize or eliminate potential environmental impacts.

4 Implementing good environmental management practices

Companies should periodically and systematically review processes and operating practices to identify waste, emissions, discharges, and release reduction opportunities, and to optimize the use of resources.

Conducting an inventory assists in targeting pollution prevention opportunities. When conducting an inventory, the following information should be gathered for each waste, emission, discharge, or release to assist in prioritizing opportunities:

- source of each major waste, emission, discharge, or release;
- rates of generation;
- toxicity or hazard characteristics; and
- disposal method and costs.

When implementing GEMP, preference should be given to the following waste minimization hierarchy:

- reduce at source (most preferred);
- reuse or recycle;
- treatment and/or energy recovery; and
- disposal (least preferred).

Objectives and targets for improvement should then be set for the priority items, and these targets should be monitored, measured, and reviewed on a regular basis.

When practical, companies should systematically identify and implement GEMP applicable to their operations. Where laws and regulations have requirements more stringent than those found in this publication, they should be followed.

Site managers should promote employee awareness and conduct training of GEMP that apply to their site. Periodic feedback and suggestions should be solicited from employees on ways to minimize wastes, emis-

sions, discharges, and releases. Employees should be recognized for significant ideas that improve environmental performance and reduce the generation of wastes, emissions, discharges, and releases.

5 How to use the appendices

The appendices identify GEMP applicable to pollution prevention opportunities at the following types of facilities, processes, and operations.

Not every facility or operation has every source, waste, emission, discharge, or release listed in each applicable appendix. Site managers should use the appendices as a library to identify those sources of potential pollution that apply to their facility and then implement the recommended, applicable GEMP to the extent practical.

Appendix A lists nonprocess-specific sources of wastes, emission, discharges, and releases common to many industrial gas facilities. One or more of the remaining appendices can apply depending on the specific processes at the site.

Appendix A—GEMP for all facilities

Appendix B—GEMP for air separation units (ASU) and helium production facilities

Appendix C—GEMP for hydrogen/carbon monoxide (HYCO) units

Appendix D—GEMP for carbon dioxide production and dry ice facilities

Appendix E—GEMP for truck maintenance and distribution terminals

Appendix F—GEMP for acetylene manufacturing operations

Appendix G—GEMP for cylinder fill and cylinder maintenance operations (including specialty gas operations)

Appendix H—GEMP for customer installations

Appendix I—GEMP for nitrous oxide manufacturing plants

6 References

Unless otherwise stated, the latest edition shall apply.

[1] ISO 14001, *Environmental management systems – Requirements with guidance for use*, National Standards Institute, 25 W. 43rd St., New York, NY 10036. www.ansi.org

[2] CGA G-4.1, *Cleaning Equipment for Oxygen Service*, Compressed Gas Association Inc., 14501 George Carter Way, Suite 103, Chantilly, VA 20151. www.cganet.com

[3] EIGA Doc 33, *Cleaning of equipment for oxygen service guideline*, Industrial Gases Committee, Avenue des Arts 3-5, B-1210 Brussels, Belgium. www.eiga.eu

[4] EIGA Doc 85, *Noise management for the industrial gases industry*, European Industrial Gases Association, Avenue des Arts 3-5, B-1210 Brussels, Belgium. www.eiga.eu

[5] CGA G-1.5, *Carbide Lime: Its Value and Uses*, Compressed Gas Association Inc., 14501 George Carter Way, Suite 103, Chantilly, VA 20151. www.cganet.com

[6] EIGA Doc 143, *Guide to lime applications*, European Industrial Gases Association, Avenue des Arts 3-5, B-1210 Brussels, Belgium. www.eiga.eu

[7] CGA P-22, *The Responsible Management and Disposition of Compressed Gases and their Cylinders*, Compressed Gas Association Inc., 14501 George Carter Way, Suite 103, Chantilly, VA 20151. www.cganet.com

[8] [CGA P-63](#), Disposal of Gases, Compressed Gas Association Inc., 14501 George Carter Way, Suite 103, Chantilly, VA 20151. www.cganet.com

[9] EIGA Doc 05, *Guidelines for the management of waste acetylene cylinders*, European Industrial Gases Association, Avenue des Arts 3-5, B-1210 Brussels, Belgium. www.eiga.eu

Appendix A—GEMP for all facilities (Informative)

Activity/source	Environmental aspect	Potential impact(s)	Good environmental management practices
Batteries	Heavy metals	Waste disposal	Segregate and recycle to the extent feasible.
Boilers, hot water heaters, emergency generators (fossil fuel-fired)	Particulate matter, carbon monoxide, hydrocarbons, nitrogen oxides, sulfur dioxide	Air Energy	Operate in accordance with air permit, where applicable. Operate and maintain equipment to be efficient. Use fuel with low sulfur and solids content.
Boiler blow down	Wastewater, corrosion inhibitors, acids, caustics, oxygen scavenger	Surface water	Discharge through a permitted outfall or sewer connection. Avoid excessive chemical feed through tight control of water chemistry. Run boiler at optimum concentration cycles to minimize chemical loss, wastewater discharges, and makeup water consumption. Purchase water treatment chemicals in returnable/recyclable containers, where practical.
Boiler water softener regeneration	Wastewater, salts	Surface water	Discharge through a permitted outfall or sewer connection. Reuse wastewater, if feasible.
Building	Heating, lighting, air conditioning	Energy use	Monitor energy use. Set improvement targets. Use energy efficient lighting and equipment. Conduct energy audits. Train employees to conserve energy.
Building, floor drains	Solvents, oils, detergents, chemicals	Surface water Soil Groundwater	Keep solvents, oils, and other hazardous materials out of floor drains through proper storage and handling. Use floor drain plugs in areas of high spill potential or seal drains that are not needed. Maintain an adequate supply of spill kits in areas of high spill potential. Avoid hosing down areas. Use dry clean-up techniques.
Building and insulation materials	Asbestos	Air Waste disposal	Notify the appropriate agency in advance, as required, of any asbestos demolition or renovation. Use only qualified asbestos removal contractors when removing or repairing asbestos. Contractors shall remove asbestos materials according to regulatory requirements. Place waste in double-lined plastic bags or in drums with proper labels. Wet down asbestos during removal, handling, and disposal. Dispose of asbestos through an approved disposal contractor.

Activity/source	Environmental aspect	Potential impact(s)	Good environmental management practices
Chemical and waste loading/unloading areas	<u>Fuel and fuel additives</u> , heating oil, acetone, lubricating oils, solvents, bleach, sulfuric acid, biocides, ethylene glycol, propylene glycol, water treatment corrosion inhibitors, caustics, used oil, and similar chemical or waste-like materials	Soil Surface water Groundwater Air	Avoid positioning transport vehicles near or over storm drains. <u>Attend loading/unloading activities where safe and practical.</u> Have spill kits, absorbent booms, sewer block mats readily available. Check integrity of transfer hoses, fittings, and connections. Ensure the correct fill lines and containers/tanks are identified before loading/ unloading. Illuminate unloading areas if material transfer occurs at night. Use drip pans and buckets to catch small leaks from transfer hoses and fittings. Prevent overfilling of storage tanks during deliveries through procedural or engineering controls. Report and clean up any spills or leaks immediately. Develop and implement a site emergency/spill plan.
Chemical and waste storage areas	<u>Fuel and fuel additives</u> , heating oil, acetone, lubricating oils, solvents, bleach, sulfuric acid, biocides, ethylene glycol, propylene glycol, water treatment corrosion inhibitors, used oil, and similar <u>chemical or</u> waste-like materials	Soil Surface water Groundwater Air	Store liquid chemicals in proper containers, preferably on an impervious surface with secondary containment. Periodically check container integrity for signs of deterioration or damage. Document if required. Periodically check containment areas for leaks. Document if required. Keep containment valves closed except to drain uncontaminated rainwater. Keep containers closed when not in use. Prevent exposure to rainfall, use drum rain caps for drums stored outside. Store outdoor containers off the ground (e.g., on pallets) to prevent bottom corrosion, possible leakage, and assist in visual inspection. Minimize and consolidate chemical inventories. Do not buy larger quantities than needed simply to get a lower price. Disposal costs will often exceed savings. Use existing chemical inventories before switching to another supplier. Redistribute excess chemicals for use at another facility. Place drip pans beneath drum dispensing valves. Report and clean up any spills or leaks immediately. Prevent overfilling of storage tanks during deliveries through procedural or engineering controls. Develop and implement a site emergency/spill plan. Designate separate areas for waste storage and chemical storage. <u>Ensure that all chemical and waste containers have proper labels.</u> Do not mix hazardous and nonhazardous wastes. Post signs for designated hazardous waste storage areas.

Activity/source	Environmental aspect	Potential impact(s)	Good environmental management practices
Demolition and construction debris	Concrete, asphalt, metal, miscellaneous	Waste disposal	Identify and remove any asbestos materials before demolition. Recycle concrete, asphalt, and scrap metal where outlets are available. Dispose of through an approved disposal contractor. Reuse surplus soil to landscape site if feasible <u>and acceptable</u> .
Drums (empty)	Recyclable materials	Use of natural resource Waste disposal	Purchase chemicals in bulk form or use recyclable/returnable containers, where practical. Remove chemical residuals to the extent possible. Return empty drums to original supplier or recycle through an approved drum reconditioner.
Equipment and parts cleaning	Solvents and detergents	Soil Surface water Groundwater Air	Advice on cleaning for oxygen service can be found in CGA G-4.1, Cleaning Equipment for Oxygen Service , and EIGA Doc 33, <i>Cleaning equipment for oxygen service</i> [2, 3]. Minimize solvent/chemical purchases and use. Do not buy and use more than needed. <u>Ensure that all solvent chemical containers have proper labels.</u> Keep containers and parts cleaners closed when not in use. Use drip pans to collect solvents. Collect spent solvents for recycling or disposal through a licensed vendor. Do not pour solvents down any drains or on the ground. Do not mix spent solvents with used oil or other chemicals. Report and clean up any spills immediately and follow emergency procedures. Determine if spent detergents can be discharged to sanitary sewer.
Fluorescent light fixtures	Mercury, polychlorinated biphenyls (PCB) ballast <u>in older fixtures</u>	Waste disposal	Recycle/dispose lamps and ballast via approved recycling/disposal contractor. <u>Pack suitable for transport to prevent breakage when transporting for recycle/disposal (e.g., keep original packaging).</u> Replace with <u>energy efficient and</u> mercury-free or low-mercury lamps.

Activity/source	Environmental aspect	Potential impact(s)	Good environmental management practices
Fueling island/ <u>station</u>	Diesel fuel, gasoline, <u>and</u> <u>additives</u>	Soil Surface water Groundwater Air	Check fuel dispenser sump routinely for leaks and product/water accumulation. Maintain adequate supply of spill absorbent at fueling station. Where present, periodically check oil/water separator. Check housekeeping. Remove any oil-stained gravel. Avoid topping off vehicle fuel tanks. Avoid unattended filling of vehicles. Avoid hosing down area. Use dry clean-up techniques. Minimize rain/storm water run-on into fuel island area. Install canopy, where practical, to keep rainfall off fueling island. <u>Report and clean up spills immediately.</u>
Halon fire suppression systems	Halon	Depletion of ozone layer	Maintain system to avoid leaks. As suitable halon replacements are identified, recover halon and place in halon banks. New systems shall be designed without halon.
Mercury switches and other mercury-containing devices	Mercury	Waste disposal	Recycle <u>or dispose</u> by approved <u>contractor</u> . Have mercury spill kits available.
Oil contaminated soil/debris	Oily rags, leak/spill clean-up materials, oily soils	Soil Surface water Waste disposal	Dispose of through an approved disposal contractor. Recycle through an approved asphalt batching <u>or other appropriate recycling facility</u> plant when available. Clean up oil stained soil/gravel promptly.
Oil/water separators	Oil, oily water, oily sludge	Surface water Soil Groundwater	Minimize solids from going into drains routed to an oil/water separator. Periodically clean out separator to maintain optimum oil removal efficiency. Routinely remove accumulated oil and sludge and recycle through an approved oil recycler. Test sludge for hazardous constituents. Do not mix solvents or other chemicals with used oil. Periodically inspect integrity of separator.