ENVIRONMENTAL IMPACTS OF CUSTOMER INSTALLATIONS

Doc 117/19

Revision of Doc 117/11

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Prepared by WG-5 Environment

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Amendments to 117/11

Section	Change
	Editorial to align style with EIGA style manual
4.12	New section on Commissioning and decommissioning added.

Note: Technical changes from the previous edition are underlined

1 Introduction

This publication details the environmental impacts of the operation and management of customer installations and gives guidelines on how to reduce the impacts.

2 Scope and purpose

2.1 Scope

This publication concentrates on the environmental impacts of customer installations. This publication does not give specific advice on health and safety issues, which shall be taken into account before undertaking any activity. On these issues the relevant EIGA publications, and / or national legislation should be consulted for advice.

2.2 Purpose

To serve as a guide for Industrial and Medical Gases customer engineering operations to assist in putting in place a formal environmental management system that can be certified by an accredited 3rd party verifier. It also aims to provide a guide for operating managers for identifying and reducing the environmental impacts of these operations.

3 Definitions

3.1 Publications terminology

3.1.1 Shall

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

3.1.2 Should

Indicates that a procedure is recommended.

3.1.3 May and need not

Indicate 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

These are elements of an organisation’s activities, products or services that can interact with the environment. For example, use of energy or transportation of products.

3.2.2 Environmental impact

Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects. (Source: ISO 14001 *Environmental management systems* --

Requirements with guidance for use) [1] [1]. For example: the contamination of water with hazardous substances.

4 Customer engineering environmental impacts

4.1 General environmental aspects and impacts and links to other EIGA Documents

This document covers the environmental impact of customer engineering operations. There are several linked EIGA publications that provide more details on general environmental issues, legislation for the gas industry and operational good environmental practices, e.g. EIGA Doc. 88 *Good Environmental Management Practices for the Industrial Gas Industry* [2] (GEMPs). A list of these linked documents and their links to the ISO 14001 environmental management systems standard is provided in Appendix 1.

4.2 Background

The installation, maintenance, de-commissioning and re-commissioning of customer installations are major activities for the Industrial Gas industry. Due to the specialist industry expertise the industrial gas companies often own and are responsible for the maintenance of tanks and equipment based on customer sites.

4.3 Planning and control

The key point in planning customer engineering activities is to make sure that the responsibilities are clearly defined between the customer who owns the site and the gas company operating or maintaining the equipment. The employees or contractors employed by the gas company shall be aware of the requirements of the customers permit so that they comply.

The key areas to consider for both parties are:

- Site safety procedures including permits to work, management of change procedures, management systems, PPE requirements.
- Site specific environmental hazards and permits.
- Use of equipment.
- Arrangements for site access and hours of operation.
- Emergency planning.
- Waste management.

Responsibility and information relating to these areas should be covered in writing, ideally as part of the agreement or contract between the parties. Site management shall ensure that employees and contractors have site-specific briefing information covering these areas.

4.4 Equipment and vehicles

All equipment, cranes and vehicles brought on to the site by the gas company and their contractors should be notified to the site management so that any specific environmental or safety considerations can be agreed.

4.5 Noise

The main sources of external noise at a customer installation's site are:

- Use of equipment as part of the gas company installation at the customer site.
- Stationary or mobile pumps on tank trailers for the liquid gases.
- Manual handling, use of vehicles such as cranes and fork lift trucks for transport of equipment.

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

- Operating of vent valves during normal operations, testing or non-routine operations.
- Compressors.

The EIGA Doc. 85 *Noise Management for the Industrial Gases Industry* [3] gives a comprehensive review of noise management and the actions which should be considered.

On a customer site it is important to know of any noise restrictions that the customer has in their permit, so that the gas company employees can comply. For example, are there restricted times of operation, specific noise level limits? This is particularly important for activities such as venting of the tank or delivery of product by tanker.

To reduce the noise the following should be considered:

- The customer site plant layout should be considered with the possibility to minimise the sound generation and the sound level at the site boundary, especially adjacent to sensitive areas.
- When planning activities consider, if appropriate, that the public is more sensitive to sound disturbance during nights or weekends than during daytime. However, industrial neighbours could be more sensitive to noise during daytime when more people are present. The maximum allowed sound levels at boundaries are often different for day and night time activities.
- Drive the vehicles and operate equipment to minimise the sound generation.

4.6 Discharges to water

4.6.1 Cleaning and washing

Cleaning and washing equipment may be necessary.

- Check the site permit before making any discharges to ensure it is permitted, if not arrange for the water to be collected by tanker by an authorised waste contractor.
- Ensure that the used wash water (e.g. from tank surface cleaning) is treated before release to the public sewage system, for example by using oil traps or sand filters.
- Use biodegradable detergents and, if needed, degreasing compounds which are not harmful to the environment or the person using it.
- Avoid excessive use of water.
- Do not dispose of the washing detergents into oil interceptors, but into the foul water sewer.
- To clean equipment for oxygen service, follow EIGA Doc 33 *Cleaning of equipment for oxygen service, Guidelines* [4].

4.6.2 Other discharges to water

No other material shall be discharged to the site drainage system without specific written permission from the site owner and first checking the site permissions.

4.7 Consumables

The storage of consumables should be reviewed to minimise the quantity of substances, spare parts, etc. used and stored at the site. This will not only avoid excessive use of the earth's resources but also reduce the cost. Furthermore, it is recommended to:

- Have Material Safety Data Sheets available for all hazardous chemical substances at the site and ensure that storage areas and vessels are properly labelled.
- Storage of large volumes of oil, organic solvents or other hazardous substances should have a secondary containment and suitable weather protection such as a rain cover.

4.8 Waste

Waste is defined in EU Directive 2008/98. Waste has the potential to cause air, soil or groundwater pollution if not recycled or disposed of properly. The following should be considered:

- Establish who is responsible for waste disposal (gas company or customer). Normally the gas company will arrange for any wastes generated by them to be managed correctly (recycled or disposed of) by authorised companies.
- Make sure employees and contractors are aware of waste management procedures and arrangements.
- Batteries often contain hazardous materials such as sulphuric acid and lead. They should be returned to the supplier for recycling or proper disposal.
- Oil and solvent waste from maintenance activities shall be stored in a proper way as described above. The different types of oil waste, oil emulsions, organic solvents, etc. should be kept separate by type to facilitate the recycling.
- When servicing cooling circuits remember to recycle the antifreeze if possible or dispose of it at approved facilities. Do not pour onto the ground or into waterways.

4.9 Air emissions

Venting of air gases is not usually environmentally significant, apart from the potential for noise generation (see section 4.5) and fogging. For fogging a careful consideration of wind and weather conditions needs to be done so that nuisance or fogging hazards are avoided.

Product should be recovered and reused whenever possible, e.g. when taking a tank out of service.

Venting of products such as carbon dioxide, nitrous oxide, hydrocarbons or speciality gases shall only be done with prior agreement with the customer and / or the authorities.

A check of local and national legislation needs to be made to see if such venting is permissible. In any event the EIGA Doc 30 *Disposal of Gases* [5], can be consulted for advice on disposal methods.

Leakage of refrigerant will be a source of air emissions (See EIGA Doc 192 *Fluorinated Gases Management (under revised Regulation 517/2014* [6]). Control routines should be in place for weld and leak tests during installation and in maintenance programs for the cooling system of the refrigeration unit.

4.10 Contractors

Maintenance work may be performed by contractors. The gas company shall ensure that these contractors are selected and managed so that they operate to the equivalent environmental standards and are aware of the customer's environmental requirements. The gas company should make regular audits of the outsourced process (See EIGA Doc 118 *Safe Management of Contractors* [7]).

4.11 Emergency plan

The gas company employees and contractors shall be aware of the site emergency plans and also have emergency plans in place for their own site activities, for example.

- Absorption material should be available to clean spills on the floor.
- Include response to environmental events such as major leakage of oil or product in the emergency plan.

4.12 Commissioning and decommissioning

There are environmental hazards and methods of control that are more relevant to commissioning and decommissioning of small installations on customer sites such as tanks, pipework, vessels, compressors, pumps, filling stations and PSA equipment rather than larger on-site gas plants.

The key aspects to be aware of during installation are listed below, some of these requirements are driven by legislation or by contractual requirements; others represent good operating or construction site practices to minimise environmental impact and prevent pollution incidents.

These activities can be more difficult to control as these are not on main operating sites and less supervision and oversight is available and the activities may rely on contractors who are less familiar with good environmental practices

During installation and commissioning:

- Customers permit conditions (e.g. noise, emissions).
- Access arrangements – traffic movements and delivery of large items.
- Noise protection measures during construction and commissioning:
    - Night time working, noise monitoring requirements.
- Buildings design considerations:
    - Heating or cooling, diesel generators, oil storage, sewer connections, waste water connections.
- Landscaping and restoration:
    - Trees, grass, other ecological issues.
- Phasing the work so as not to disturb birds, mammals, reptiles etc.
- Soil report - what is there:
    - Hazards and environmental baseline of any existing chemical contamination.
    - Soil protection:
- Oil leaks from vehicles.
    - Temporary facilities:
- Waste, sanitary water.
    - Water disposal, according to relevant permits where necessary:
- E.g. storage tanks for water from pressure tests, or equipment cleaning.
    - Water runoff measures to prevent soil running off:
- Use of catch pits or lagoons.
    - Use of solvents or detergent for cleaning and degreasing equipment
    - For electronics gases - temporary venting or treatment of gases used for passivating lines.
    - Dust control from vehicles and construction activities, for example routing on to made roads or water sprays or road sweepers.
    - Storage of chemicals and oil:
- Control of location, segregation and volumes of what is allowed on site.
- Lighting:
    - Minimising light pollution, using activation sensors and low level lighting.
- Asbestos presence:
    - Undertaking surveys and implementing asbestos control.
- Waste disposal:
    - Identifying waste streams, selection of waste contractor or agreement with customer, looking to minimise waste and maximise recycling.
- Use of temporary equipment such as generators, tools:
    - Minimisation of noise and emissions.
    - Fire prevention for hot work (e.g. wooden cooling towers or packing).

- Emergency response:
    - Location of spill kits, planning and training in their use.
- Temporary installations for protection of materials to minimise damage:
- Containment measures for paints, degreasers, perlite etc.
- Training of employees and contractors, including use of 'safe contractors' certification schemes.
- Permanent and temporary communication and signage.

During decommissioning:

Similar issues to those during installation and commissioning should be considered, in addition to the following:

- Soil report close out and restoration / remediation of soil.
- Demolition control.
- Safe and legal handling of asbestos insulation, PCBs in transformers, lighting ballasts.
- Equipment reuse, recycling or disposal.

5 References

Unless otherwise stated the latest edition shall apply.

[1] ISO 14001 *Environmental management systems -- Requirements with guidance for use*. International Organization for Standardization. www.iso.org

[2] EIGA Doc. 88 *Good Environmental Management Practices for the Industrial Gas Industry.* www.eiga.eu

[3] EIGA Doc. 85 *Noise Management for the Industrial Gases Industry*. www.eiga.eu

[4] EIGA Doc 33 *Cleaning of equipment for oxygen service, Guidelines*. www.eiga.eu

[5] EIGA Doc 30 *Disposal of Gases.* www.eiga.eu

[6] EIGA Doc 192 *Fluorinated Gases Management (under revised Regulation 517/2014.* www.eiga.eu

[7] EIGA Doc 118 *Safe Management of Contractors.* www.eiga.eu

[8] EIGA Training Package TP 20 *Customer Installations Environmental Issues.* www.eiga.eu

6 Other References

EIGA Doc 40 *Work Permit Systems.* www.eiga.eu

EIGA Doc 51 *Management of Change.* www.eiga.eu

EIGA Doc 136 *Selection of Personal Protective Equipment*. www.eiga.eu

Appendix 1 - EIGA Document Links to ISO 14001 2015

Doc No	Title of EIGA Document	ISO 14001:2015 SECTIONS	Clause
107	Guidelines on Environmental Management Systems [1)]	Context of the organization	4
		Understanding the organization and its context	4.1
		Understanding the needs and expectations of interested parties	4.2
		Determining the scope of the environmental management	4.3
		Environmental management system	4.4
		Leadership	5
		Leadership and commitment	5.1
		Policy	5.2
		Organization roles, responsibilities and authorities	5.3
		Planning	6
		Actions to address risks and opportunities	6.1
		General	6.1.1
106	Environmental Issues Guide [1)]	Environmental aspects	6.1.2
108	Environmental Legislation Applicable to Industrial Gases Operations within the EU [1)]	Legal requirements and voluntary obligations	6.1.3
		Environmental objectives and planning to achieve them	6.2
		Environmental objectives	6.2.1
		Environmental improvement programmes	6.2.2
		Support	7
		Resources	7.1
		Competence	7.2
		Awareness	7.3
		Communication	7.4
		General	7.4.1
		Internal communication	7..4.2
		External communication and reporting	7.4.3
		Documented information	7.5
		General	7.5.1
		Creating and updating	7.5.2
		Control of documented information	7.5.3
88	Good Environmental Management Practices for the Industrial Gas Industry [1 and 2)]	Operation	8
30	Disposal of Gases		
85	Noise Management for The Industrial Gases Industry [1)]		
109	Environmental Impacts of Acetylene Plants		

Doc No	Title of EIGA Document	ISO 14001:2015 SECTIONS	Clause
84	Calculation of Air Emissions from Acetylene Plants		
05	Guidelines for the Management of Waste Acetylene Cylinders		
166	Guidelines on Management of Gas Cylinders		
94	Environmental Impacts of Air Separation Units		
110	Environmental Impacts of Cylinder Filling Plants	Operational planning and control	8.1
117	Environmental Impacts of Customer Installations		
101	The Carbon Dioxide Industry and the Environment		
106	Environmental Issues Guide		
111	Environmental Impacts of Carbon Dioxide and Dry Ice Production [2)]		
122	Environ. Impacts of Hydrogen Plants		
112	Environ. Impacts of Nitrous Oxide Plants		
113	Environmental Impacts of Transportation of Gases		
137	Environmental Aspects of Decommissioning		
		Value chain planning and control	8.2
		Emergency preparedness and response	8.3
		Performance evaluation	9
		Monitoring, measurement, analysis and evaluation	9.1
		General	9.1.1
		Evaluation of compliance	9.1.2
135	Environmental Auditing Guide [1)]	Internal audit	9.2
		Management review	9.3
		Improvement	10
		Nonconformity and corrective action	10.1
		Continual improvement	10.2
NOTES			

For Customer Installations the relevant specific documents are highlighted in bold and useful general document in italics. There is an EIGA Training Package TP 20 *Customer Installations Environmental Issues* [8].

Appendix 2: Environmental Impact – Customer Installations

INPUTS			OUTPUTS
PRODUCT, VEHICLES, EQUIPMENT PEOPLE FUEL	→	USE	→ AIR EMISSIONS ■ HYDROCARBONS Δ USE OF FUEL ■ USED FILTERS ■ NOISE Δ
CONSUMABLES	→	MAINTENANCE	→ CHEMICALS ■ USED FILTERS ■ NOISE ● OIL ■ ABSORBENTS ■
CONSUMABLES	→	CLEANING	→ CHEMICALS ■ SOLVENTS ■
		DISPOSAL	→ NOISE Δ WATER EMISSIONS Δ

PERSISTENT ●
PERIODIC Δ
OCCASIONAL
OR ACCIDENTAL ■