Fuels Learning Centre
A new approach to training on the safe handling of fuels.

Standard Operating Procedures

May/Jun 2016

By David J. Stainrod, CET, CFEI.

This article first appeared in the 2016 May/Jun edition of Propane Canada Magazine.

Bill and I were quite surprised, when we received an inquiry at Fuels Learning Centre, from an established propane distributor, going through a government audit, inquiring if we had a "Standard Operating Procedure" (SOP) written for addressing what one must do with an overfilled propane cylinder.

The task of filling propane cylinders is a large part of the propane distribution network to the final user, the consumer, and one would have thought that this safety issue would have been addressed by having a written SOP in place. While the company did not have a written SOP in place, to satisfy the auditor, I am sure that the propane cylinder fillers had been instructed and new how to deal with an overfilled propane cylinder.

While it would appear that the task of dealing with overfilled propane cylinders was being done, there was no written procedure to ensure that all of the regulatory and safety items are addressed, no established written procedure to which an employee can refer to, just word of mouth instructions. As you know, based on the person's own experience and work habits, verbal instructions are readily changed from person to person which can easily lead to poor dangerous work habits being perpetually put in place.

What is an SOP?

A **S**tandard **O**perating **P**rocedure (SOP) is a compulsory instruction, a set of step-by-step specific procedure created to help workers carry out routine operations. If deviations from this instruction are allowed, the conditions for these should be documented including who can give permission for this and what exactly the complete procedure will be. The original should be maintained in a secure location while working copies should be authenticated with stamps and/or signatures of authorized persons.

Why do We Need an SOP?

Their purpose is to achieve efficiency, quality output and uniformity of performance while reducing miscommunication and failure to comply with industry regulations, provincial laws or even just your own standards for running your business. ***Any document that is a "how to" falls into the category of procedures.***

Ontario requires a Risk & Safety Management Plan (RSMP) for propane distribution centres and Environment Canada also requires an Emergency Response Plan for certain sized propane tank installations. Other than these two requirements the Regulations, Standards and Codes do not specifically have a requirement for an SOP. In these cases, the development of SOPs is a voluntary guideline that the company can identify as a ***best practice***. Organizations looking to become the best in their industry, demand SOPs as part of defining their standard of work.

SOPs Protect Workers

Workers who are following established SOPs have more confidence that their actions are supported by management, the underlying statutes or regulations, and that they are following industry best practices. Using Standard Operating Procedures regularly leads to fewer corrective actions. If there are legal ramifications to your work, then following your procedures ***reduces liabilities***.

SOPs Protect Customers

Customers are entitled to dependable product or safe service delivery based on established and accepted measures, not on any one worker's personal values, and not varying from one geographic area to another.

Good & Bad SOPs

The important task of writing policies and procedures rarely gets the respect it deserves. Most people recognize the need for having standard policies, but standard operating procedures often get viewed as a necessary evil.

Just because you have a written SOP does not mean that all is well. Written SOPs can fall into two categories, "good" and "bad". It's the bad procedures out there that are the problem - they give all procedures a bad name!

A poorly written SOP can create as much trouble as not having one at all and can, in fact, provide misleading information leading to an incident. It is, therefore, not only good enough to have a written SOP but one that is correct, addresses all of the safety and regulatory issues and falls into the "good" category as listed below.

Good procedures and work instructions provide a way to communicate and apply consistent standards and practices within your organization.

GOOD Standard Operating Procedures:

- save time and mistakes;
- reduce training costs;
- ensure consistent results;
- empower the workforce;
- get read and used; and
- support quality goals.

But, BAD procedures can be as disastrous as no procedures at all!

BAD Procedures:

- cause errors and frustration;
- increase training costs;
- waste time and money;
- detract from quality goals; and
- don't get read or used.

Writing an SOP

When writing an SOP, make sure to answer the following key questions:

1. Who does what? (role or person responsible)
2. Which tasks are to be completed? (what to do, how often and to which standard or criteria)?
3. What is the outcome when they do it? (deliverables, measures, objective results, desired behaviours)
4. Did you answer what needs to happen, clearly?

Work Instructions

Work Instructions define the "how to" information to complete steps in a task mentioned inside an SOP. Work Instructions are action-focused. They may include a "list" of steps, a checklist, or pictures of dials, switches, or computer screen shots with annotations. Make sure to label the information in a way that tells the user what to expect. Pictures may speak a 1,000 words but it's the annotations that clarify the meaning.

Work Instructions focus on "***how***" typically, the person is to perform the task. While Work Instructions usually assume the individual has the capability in the general area being addressed, SOPs and work instructions are NOT meant to be a substitute for training! Instead, they should be a companion to training and should reflect what is covered in the training.

Updating SOPs

Standard Operating Procedures are living documents that must be reviewed and updated on a regular basis. Regular reviews should address:

- changes to underlying standards, codes, regulations and interim orders from authorities having jurisdiction;
- changes to equipment used to complete tasks;
- changes to internal corporate policies and guidelines; and
- changes to how supporting training courses deal with specific procedures.

Sample SOP

We have provided an example of a typical SOP for handling overfilled propane cylinders by transferring the product into another propane cylinder of the following pages. Each company is responsible for writing the SOP to meet their specific requirements. How overfilled propane cylinders are handled will depend on the dispensing location and the specific equipment available.

About the Author

David Stainrod provides technical fuel and investigative consultation to the public and governments in both Canada and the United States. He is an active member of numerous provincial regulatory committees as well as CSA Codes and Strategic Steering committees. David is President of the Fuels Learning Centre and can be reached by email at david.stainrod@fuelslc.com.

STANDARD OPERATING PROCEDURE

Title: Handling of Overfilled Propane Cylinders

SOP#: FLC-104 **Rev #:** 3 **Rev Date:** 2016-May-25 **Page:** 1 of 2

Introduction

The following Standard Operating Procedure shall be utilized by employees when dealing with overfilled propane cylinders to ensure that the liquid propane within the cylinder is safely evacuated and the correct fill level achieved.

Regulatory References

1. CSA-B149.2 Propane Storage & Handling Code

Clause 5.2.6	The person filling any container shall be responsible for ensuring that the maximum permitted filling density is not exceeded.
Clause 5.2.9	When a container is repaired, requalified, or scrapped, its liquid contents shall only be removed by flaring or by transferring to another container.
Note:	While Clause 5.2.9 does not mention evacuating liquid propane from an overfilled propane cylinder, it does establish a safe work practice and standard to be followed when one is removing liquid propane from a propane cylinder.

2. CSA- B340 Selection and Use of Cylinders, Spheres, and Tubes and other Containers for the Transportation of Dangerous Goods Class 2

Clause 5.3.1.3	Filling a liquefied gas shall be by mass measurement using an approved scale or by volume measurement of liquid.
Clause 5.3.1.4	After being disconnected from the filling line, filled containers shall have their mass verified. Any overfill shall be removed in a safe manner.

Training Requirements

Prior to handling or evacuating an overfilled propane cylinder, an employee must complete all required safety training related to the handling of an overfilled propane cylinder, hold the appropriate provincial Record of Training (ROT) or certificate, and have been approved by their manager for the task being performed. Refresher training is required every three years.

General Guidelines

- When handling overfilled propane cylinders, employees are required to wear appropriate personal protective equipment;
- Always handle propane cylinders with caution to prevent impacts to the valve and stem assembly. Even though the propane cylinder is overfilled, it must be kept in the upright position;
- Propane cylinders are not to be Offered for Transport or given back to the customer when in an overfilled state;
- Overfilled propane cylinders shall not be vented to atmosphere;
- The area where the transfer is to take place shall be outdoors, away from all sources of ignition.

Equipment Required

- An empty purged or vacuum-purged propane cylinder;
- Certified propane hose with end fittings to connect to both propane cylinders;
- An accurate weight scale. For cylinders filled by weight, it is used to verify the overfilled propane cylinder liquid level has been drawn down to the maximum permitted filling density. The weigh scale is also used to determine the quantity of propane liquid transferred to the receiving cylinder is within its permitted filling density. Cylinders filled by volume are to be either weighed ***or*** by use of the fixed liquid level gauge to determine that the cylinder in question is no longer overfilled.

NOTE: While we have attempted make this document as complete as possible, the step by step "how to" may include more or less steps which dependent on the particular circumstance of the overfill and your company's operating procedures.

Procedures

The following are the step-by-step procedures for evacuating an overfilled propane cylinder into another propane cylinder:

1. Conduct a prefill inspection of the receiving propane cylinder to ensure that it meets the criteria for filling;
2. Ensure the service valves on both propane cylinders are in the closed position by turning the valve wheel in a clockwise turn until the valve stem seats;
3. Connect the transfer hose to each propane cylinder service valve by turning the hose end fitting clockwise for QCC1 style and forklift cylinders, ***OR*** counter-clockwise for a standard POL service valve equipped with internal threads, to tighten the hose end fittings.
4. Place the overfilled propane cylinder on a weigh scale and set the balance weight to the appropriate weight for the cylinder's maximum filled density;
5. Slowly open the service valve by turning the hand wheel counter-clockwise on the receiving propane cylinder;
6. Slowly open the service valve by turning the hand wheel counter-clockwise on the cylinder being evacuated. You should hear the propane liquid and vapour being transferred into the receiving propane cylinder. Depending on temperatures and quantity of overfill, this may take time, be patient;
7. Centering of the balance beam will indicate that the overfilled propane cylinder is now filled to its maximum permitted filling density;
8. Close the service valve on the evacuated propane cylinder clockwise until the valve stem seats, tighten by hand only.
9. Close the service valve on the receiving propane cylinder clockwise until the valve stem seats, tighten by hand only
10. When using the fixed liquid level gauge to determine that the liquid propane level in the overfilled cylinder is at the appropriate level, wait for 15 minutes, and then slowly open the fixed liquid level gauge to allow for the liquid and vapour propane to settle. If liquid propane does not vent from the fixed liquid level gauge, then the liquid propane within the cylinder has been drawn down to safe level. If liquid propane vents, then close and wait an additional 15 minutes before opening the fixed liquid level gauge. Once the liquid level is correct, follow steps 8 & 9 to close the service valves on each propane cylinder;
11. Cautiously and slowly disconnect the transfer hose from each of the service valves, slowly bleeding off any liquid or vapour propane trapped within the hose;
12. The overfilled propane cylinder may now be put back into service;
13. Replace the receiving propane cylinder with another empty purged cylinder, fill the receiving cylinder to its maximum filling density and put into service.

Follow-Up Procedure

To prevent further overfills the reason for the overfill must be determined and corrective action taken:

- If caused by human error, the person responsible for the overfill must take a refresher training course and successfully pass a hands on Skills Evaluation to demonstrate their ability to correctly fill a propane cylinder.
- If caused by equipment calibration or equipment failure, equipment-related issues must be repaired prior to the filling of propane cylinders at the dispenser site.

SOP Document Control		
Document Name: Handling of Over-Filled Propane Cylinders		**Document#** FLC-104
Controlled by: Safety Department	**Effective Date:** 2014-Jan-01	**Expiry Date:** 2016-Jun-30
Approved by:	**Revision #** 3	**Next Revision Date:** 2016-May-01