

## Leaking Acetylene Cylinder Shutoff Valves

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### PURPOSE

This Safety Advisory is issued to warn sites about leaking shutoff valves on acetylene cylinders. Acetylene ( $C_2H_2$ ) is extremely dangerous because it is easily ignited and burns at a very fast rate.

### BACKGROUND

On January 11, 2010, while cutting rebar at the Savannah River Salt Waste Processing Facility (SWPF) with an acetylene torch, a small fire (3-inch flame) occurred at the cylinder shutoff valve. Although the acetylene rig was covered in fire retardant blankets, ricocheting sparks ignited the gas underneath the blankets. A fire watch extinguished the fire. Investigators determined that the cylinder shutoff valve was leaking at the valve stem when the valve was open to allow gas flow to the regulator.

### DISCUSSION

Following the determination that the cylinder shutoff valve was leaking, an extent of condition inspection was conducted on acetylene cylinders at the SWPF. Five out of eight cylinders were found to be leaking in the same location just below the top nut of the shutoff valve. The leaks occurred only when the valves were open. Each of the leaking cylinders had a shutoff valve with a double-nut configuration. Figure 1 shows a leaking shutoff valve that is similar to the one that was involved in the fire. The acetylene cylinders that did not leak used a shutoff valve with a single-nut configuration (figure 2).

The leaking cylinders were all removed by the gas vendor. Three days later, the vendor

provided seven new cylinders and three of them leaked at the same location. Each leaking cylinder was equipped with a double-nut shutoff valve. The gas vendor is conducting an investigation of the leaking valves.

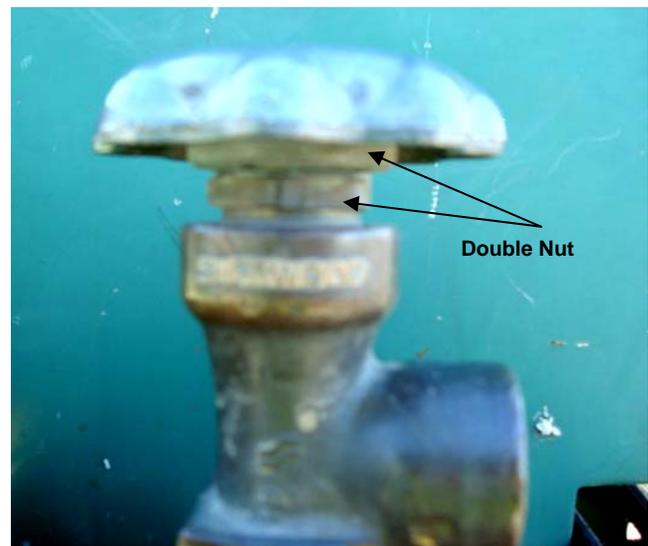


Figure 1. Leaking shutoff with a double-nut configuration

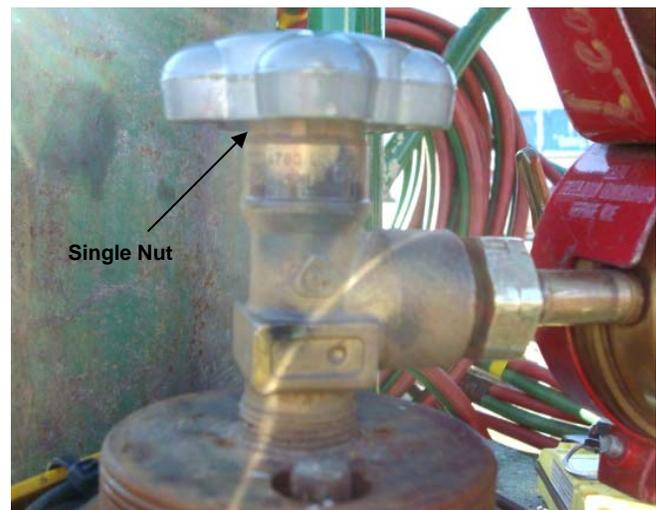


Figure 2. A non-leaking shutoff valve with a single-nut configuration

There are three different shutoff valves associated with the leaking cylinders. The gas vendor provided the following make and model numbers:

- Superior VSC CGA510
- Sherwood S-13 CGA510
- Sherwood TV CGA510

### **ACTIONS**

Because acetylene is widely used throughout the DOE Complex for oxyacetylene cutting, heat treating, and welding, sites should check to see if they have any acetylene cylinders that use a shutoff valve designed with a double nut at the valve stem seal. Valves should be checked for leaks. If the leaks can not be stopped, the cylinders should be returned to the supplier.

### **ACETYLENE SAFETY PRACTICES**

- Always store and use acetylene cylinders in an upright position to prevent the loss of acetone, which reduces the ability to hold dissolved acetylene.
- Always soap-test fittings and connections for leaks before placing the acetylene equipment in service. Never tighten fittings under pressure.
- Move leaking acetylene cylinders to an open area and tag them indicating the danger. Never attempt to stop a fuse plug leak. Notify your supplier immediately.
- Small fires at fitting connections can effectively be extinguished by applying a wet rag or similar types of material. In most cases, it is best to allow a large fire to burn itself out.
- Keep valves closed when cylinders are not in service or empty. Close the cylinder shutoff valve first and bleed the pressure off the regulator and torch equipment.

Keep cylinder caps on the cylinders when in storage or being moved.

- Keep cylinders away from sources of heat. Cylinders are not designed for temperatures in excess of 125°F.
- Always use regulators and pressure relief devices when connecting cylinders to circuits having lower pressure service ratings.
- Always store flammable gas cylinders separate from oxygen and other oxidizing gas cylinders.
- Do not use acetylene at pressures above 15 psig, the pressure where decomposition can begin, to avoid explosion and fire hazard.
- Do not handle cylinders roughly or carelessly to prevent damage to the cylinder or the filler.

### **ADDITIONAL SOURCES OF INFORMATION**

[OE Summary 2004-09](#): The last article in this OE Summary, *"Take Steps to Prevent Acetylene Leaks,"* discusses a similar event that occurred at the Idaho National Laboratory, in which a small flame was observed originating from the valve stem packing nut of an acetylene cylinder shutoff valve.

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Signed by

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