



An Exelon Company



SF₆ Emissions Reduction Strategy at ComEd Substations

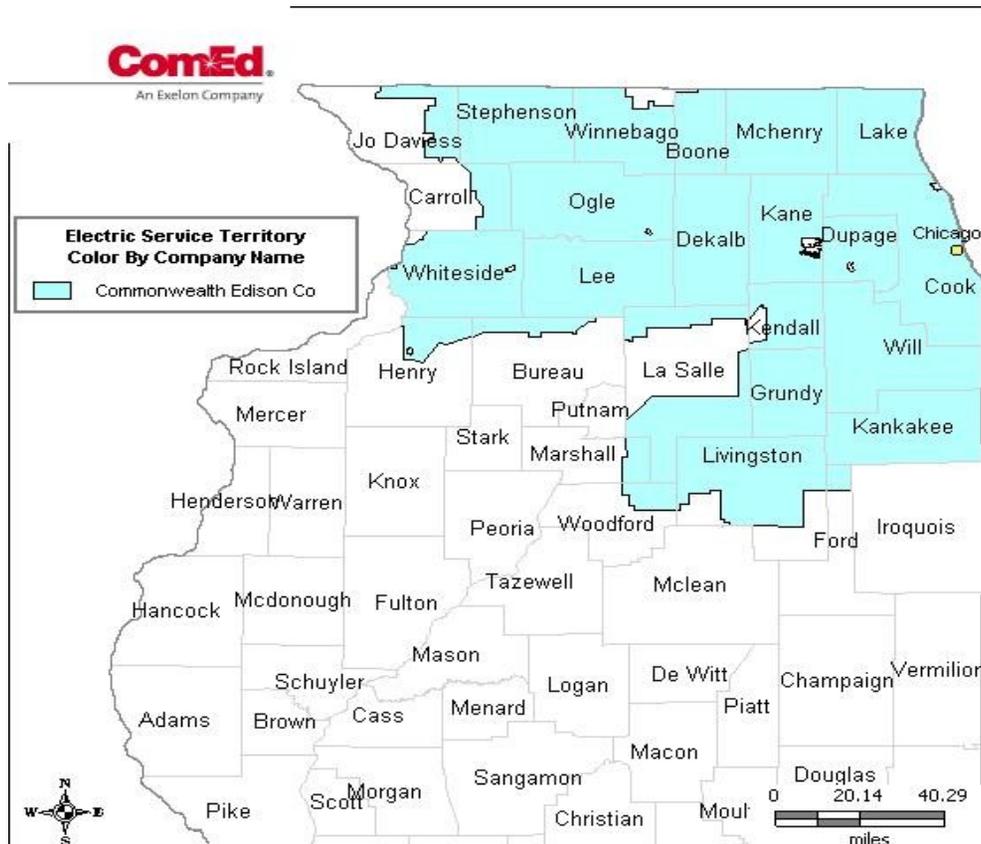
Partner Meeting

U.S. Climate Change Policy

Chicago, IL.

June 2009

ComEd Service Territory



Commonwealth Edison Company (ComEd) is a unit of Chicago-based Exelon Corporation (NYSE: EXC), one of the nation's largest electric utilities with approximately 5.4 million customers.

ComEd provides service to approximately 3.8 million customers across Northern Illinois, or 70 percent of the state's population.

ComEd Introduction

In 2006, T&S achieved ISO14001 certification which paved the way for all of ComEd. In 2008, ComEd achieved ISO14001 certification.

In addition, ComEd T&S has become a key player in achieving the Exelon goal of reducing its greenhouse gas emissions by more than 8% below 2001 levels in 2008 and further reductions in 2009 and beyond.

ComEd T&S has enhanced its SF₆ management and leak reporting & repair by:

- ✓ SF₆ Leak Reporting
- ✓ Employee Engagement
- ✓ SF₆ Leak Detection / Camera / PM Program
- ✓ SF₆ Handling Procedure / Training
- ✓ SF₆ Handling Equipment

With this enhanced SF₆ reduction strategy, ComEd T&S decreased it's leak rate every year



Featured SF₆ Substation Hands-on Training Equipment



Dilo SF₆ Reclaimer
Model D320-R006
(Front and Back)



ComEd Specific SF₆
Fittings and Adaptors Kit

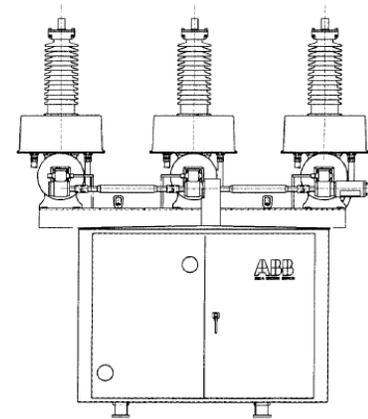


ABB Model 72PM
Circuit Breaker



Dilo Cart
D320-R006



ComEd Dilo
Fittings Kit

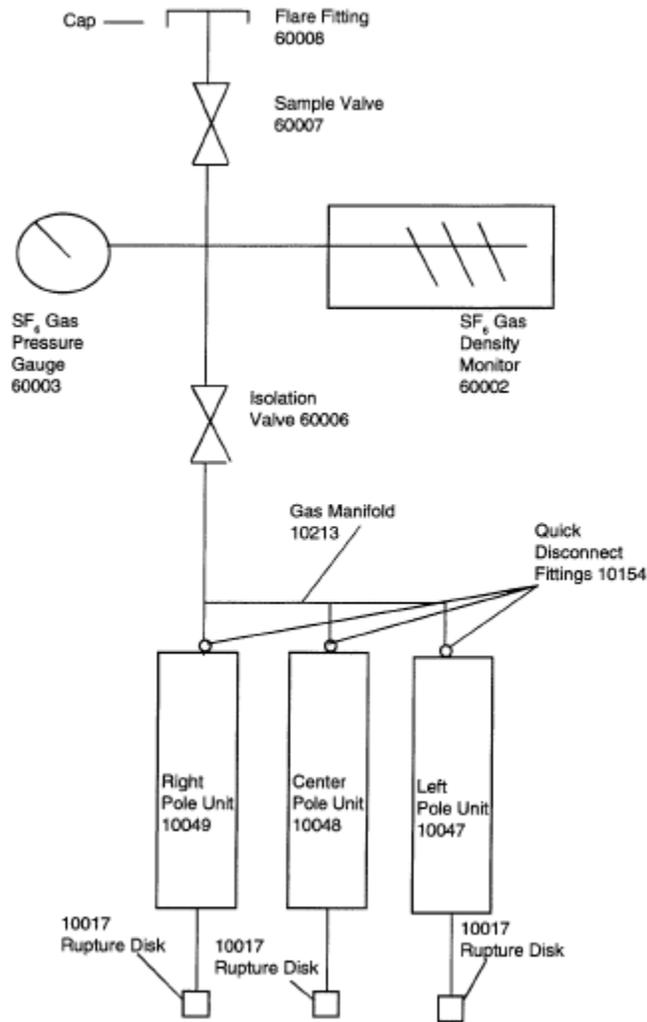
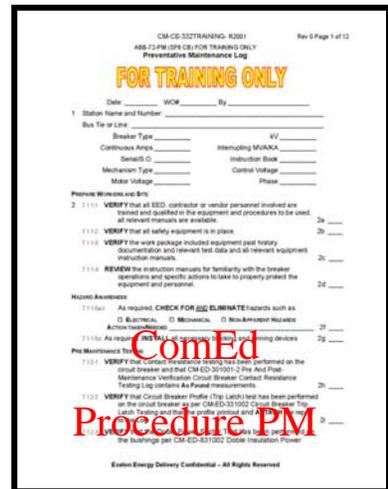
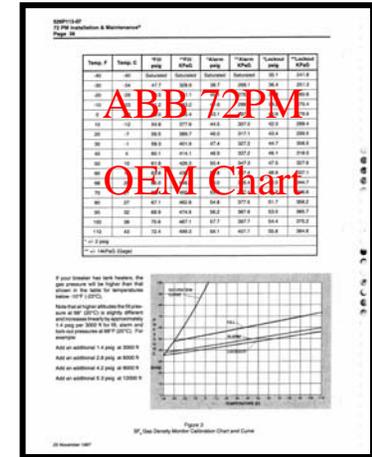


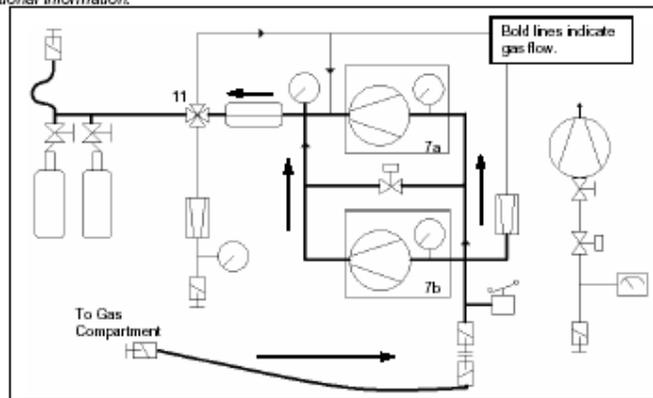
ABB72PM SF6 Schematic (Excerpt from OEM Manual)



Dilo SF₆ Reclaimer Model D320-R006

RECOVERY & STORAGE of SF₆

This procedure removes SF₆ from insulated equipment and stores it in the on-board (or external) cylinders. **NOTE: If it is suspected that the gas contains high levels of decomposition/by-products of SF₆, it is strongly recommended to use an optional pre-filter. Please contact DILo Company, Inc. for additional information.**



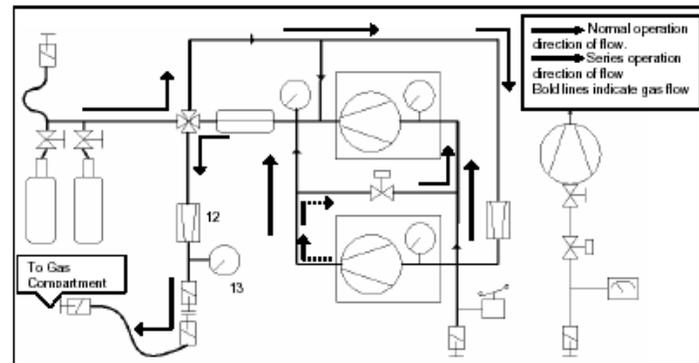
Follow these steps

- Place the 4-way valve (pos. 11) in the "RECOVERY AND STORING OF SF₆" position.
- If there is neither SF₆, nor a vacuum in the hose to be connected to the gas compartment, connect the hose to the "AIR EVACUATION" port, and pull vacuum on the hose.
- Connect the supplied DILo hose to "SF₆ RECOVERY" port; connect the other end to breaker, leaving the valve on the breaker closed (if the breaker doesn't have a valve, leave the hose disconnected).
- Ensure that the storage cylinder valves are opened. If filling external cylinders, make sure that the cylinders do not have check-valves. * Refer to IMPORTANT GENERAL SAFETY PROCEDURES for cylinder filling recommendations.*
- Start both compressors – one at a time (order does not matter).
- Open the valve on the gas circuit breaker (or connect the hose to the breaker where a valve is not present).
- Continue to monitor storage cylinder weights/pressures.
- When the inlet pressure gauge on the LEFT compressor unit (pos. 7b) shows -30"Hg, the recovery operation is complete.
- Close the valve on the breaker (if applicable).
- Turn both compressors off (order does not matter).
- Remove hose from D-320-R006.

Recovery of SF₆

Filling SF₆ back into equipment

This procedure is used to fill insulated equipment with SF₆ from either the on-board cylinders, or an external cylinder. SF₆ is passed through an adjustable regulator (pos. 12) in order to protect the equipment being charged from over pressurization.



Follow these steps

- Confirm that NO hoses are attached to the three fittings on the front of the D-320-R006. You will need to have a cylinder(s) hooked to any of the storage connections on the left side of the unit.
- Open the storage cylinder valves (if closed).
- Switch the main valve on the control panel to "FILLING OF SF₆".
- Adjust the set point on the regulator by turning the handle clockwise until the REGULATOR OUTPUT PRESSURE gauge (pos. 13) reads the desired pressure.
- Connect the hose to the "SF₆ OUTPUT" port.
- Open valve on breaker (if applicable).
- Start each compressor. *
- When the pressure in the breaker reaches the correct fill pressure, the regulator will stop the flow of gas to the equipment, at which point the D-320-R006 must be turned off. The compressors will continue to run, even though the breaker has reached its correct fill pressure. Do not leave the compressors running after filling is complete.

Note: During the filling process it is likely that the temperature in the storage cylinders will drop significantly. To prevent excessive loss of heat, and therefore, loss of pressure, it is recommended that additional, external heat be added to each of the storage cylinders. This can be accomplished using standard cylinder heating blankets (HB-120, HB-220). Please contact DILo Company, Inc. for more information.

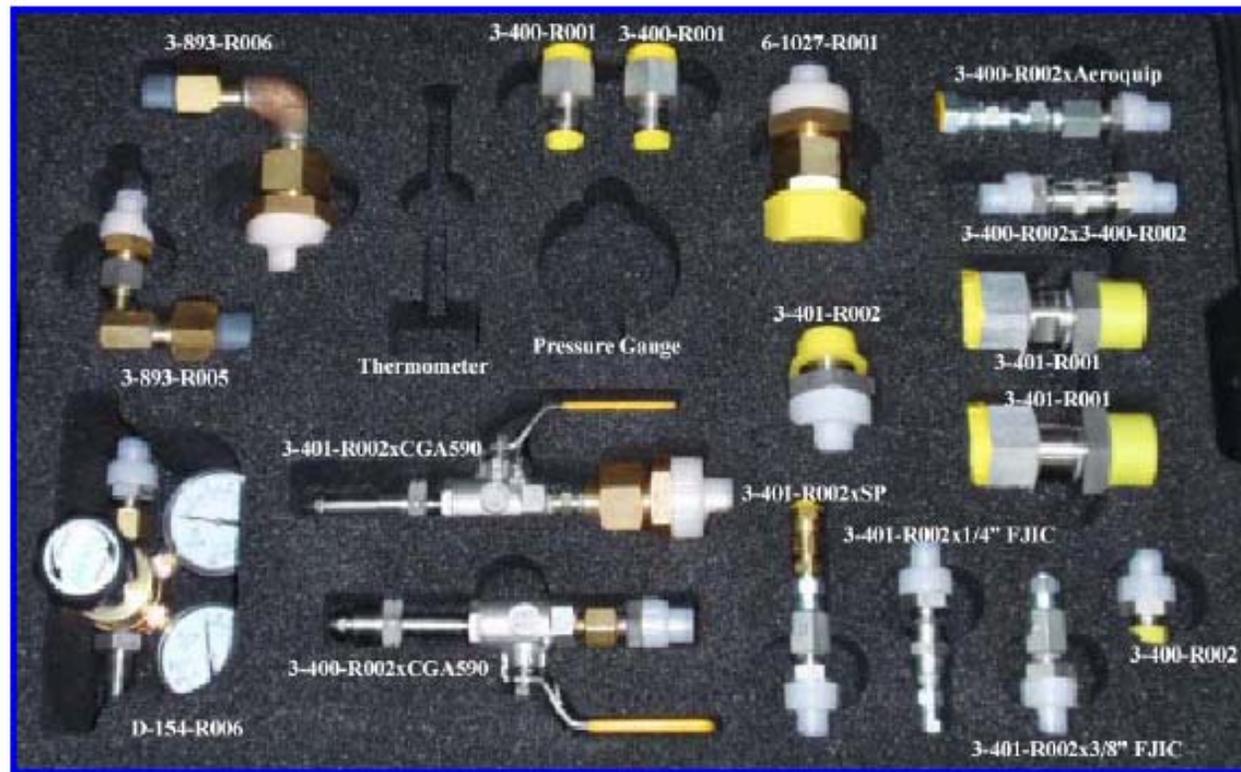
* The compressors may be turned on just prior to equalization between the storage cylinder(s) and the breaker. If the pressures in the storage cylinder(s) is/are significantly higher than the pressure in the breaker (which should be at a vacuum at this point), the gas will automatically bypass the compressors, and fill the breaker.

Filling of SF₆ ComEd.

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ComEd Dilo Fittings and Adaptors Kit

Description: Custom Pelican Case to include: (Pelican 1650 Series Case) Custom Cut-outs for each fitting PLUS: Cutouts for additional fittings deemed necessary in future or specific to each ComEd Region. (Facsimile Below – Individual Parts List is on subsequent page of this documnet)



FACSIMILE OF TRAY SECTION

ComEd Dilo Fittings and Adaptors Kit



FACSIMILE OF BASE INSERT

ComEd Dilo Fittings and Adaptors Kit

Cutouts for the following items supplied by Com Ed:

COMPONENT	GRAPHIC
<p>Digital Thermometer</p> <p>(Extech Model 1BP95)</p> <p>ComEd Cat ID 1612004</p>	 <p>Will fit in "Tray Insert" Cutout shown on the previous page of this document.</p>
<p>Digital Pressure Gauge</p> <p>(Cecomp Electronics)</p> <p>0-300 psig - ComEd Cat ID 1605183</p> <p>NOTE: There are two other Pressure Gauge Ranges not to include in the kit: 0-500 psig – ComEd Cat ID 1606388 0-5000 psig – ComEd Cat ID 160????</p>	 <p>(For Illustration Only)</p> <p>Will fit in "Tray Insert" Cutout shown on the previous page of this document.</p>
<p>Plastic Parts Box</p> <p>Number of Compartments 4 to 20, Number of Dividers 16, Overall Length 8 3/8 Inches, Overall Width 13 Inches, Depth 1 7/8 Inches</p> <p>Grainger Part Number 3KN88</p> <p>Not Coded in ComEd PassPort</p>	 <p>Will fit in "Base Insert" Cutout shown on the previous page of this document.</p> <p>SEE NEXT PAGE FOR SUGGESTED CONTENTS</p>



SAMPLE PLASTIC PARTS BOX CONTENTS

SF₆ Gas Reclaimer

Mega Plus Series



High Speed SF₆ Recycling without Compromises

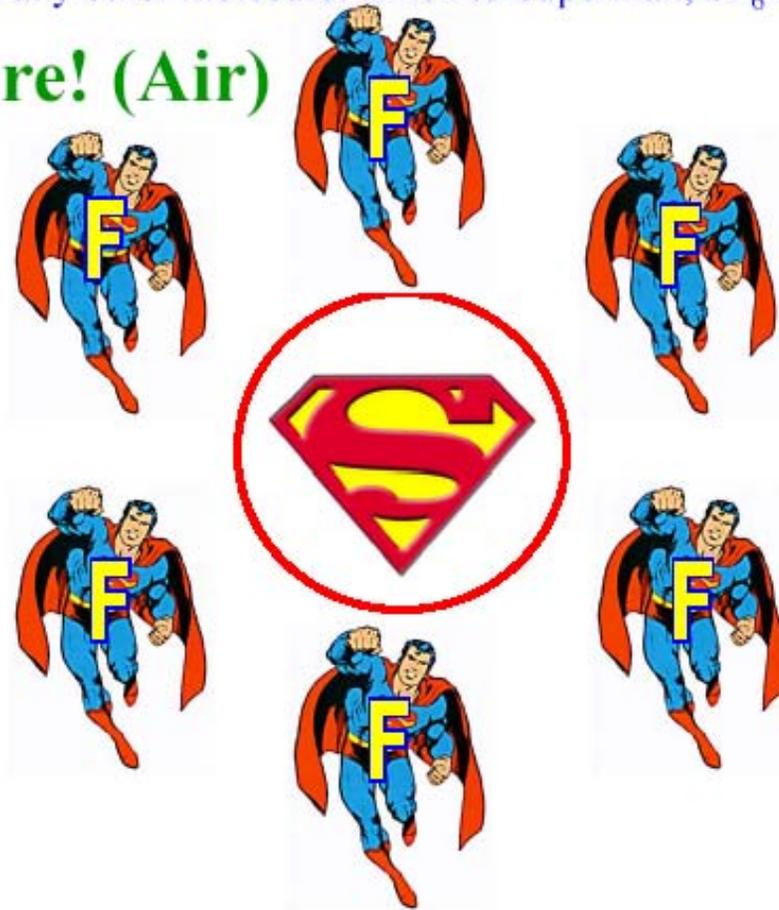
- Up to 450 lbs. Per Hour Recovery
- Fully Automated Operation
- No SF₆ Gas Losses
- DOT Approved Storage
- No Contamination of SF₆
- Safe and CFC free Liquefaction allows for Flexible Gas Storage Capacities
- Simultaneous Recovery & Vacuum
- Unequalled Protection Features
- 99.99% Recovery – Highest Available



SF₆ – The SUPER Insulator!

The Six Fluorine Atoms bonded to the Sulfur Atom: HOLDS ELECTRONS
Stronger than any other molecule! Likened to Superman, SF₆ has a weakness –

Moisture! (Air)



Its all about “canning” our
old SF₆ Handling Practices

...
and change.

Change we can believe in!



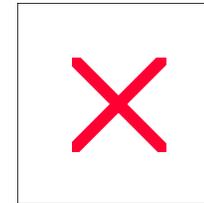
**Old
Practices**

Can we “can” our old SF₆
Handling Practices?

Can we Change?



SF₆ Camera



The SF₆ camera, plus a preventive maintenance program has helped us identify SF₆ leaks quicker and reduce the amount of SF₆ released in the atmosphere. In 2009 T&S has identified and started the process for a PM program on our first generation gas breakers to be scanned twice a year during our cold season.



Removal of Potential Environmental Impact

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765kV Bus-Tie Breaker removal

May 2008 – Nov 2008

SF₆ gas evacuated

Parts removed used for repair of leaking Bus-Tie

Successful removal of a breaker position that was unneeded

Eliminated of Environmental risk of 1800 lbs of SF₆ (43 million pounds of CO₂)

Additional 765kv breaker removal in the work plan for fall of 2009. This will also eliminate 1800lbs of SF₆ gas from a potential risk and release.



Before



After

SF₆ Repair vs. Replacement

ComEd has taken an approach in the challenging economy on it's stance for leak repairs. Example - \$ 38k for the collars to be installed vs \$ 150k to send the heads into the the manufacture for rebuilding. Replacement of the breaker could potentially reach a cost of \$ 500k plus



Before



After

First Generation Gas Breaker Leak Repairs



Summary ComEd SF₆ Reduction Strategy

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- ✓ Engaging employees to take ownership for reducing the carbon footprint through hands on training and regional forums scheduled for second half of 2009
- ✓ Formalized the reporting of SF₆ leaks internal to ComEd.
- ✓ Developed SF₆ handling procedure to shift from reactive to proactively preventing issues
- ✓ Improved SF₆ filling, recovery, evacuation through purchase of updated and standardized equipment for the ComEd system
- ✓ Added rigor around leak identification through use of SF₆ camera
- ✓ Formalized a SF₆ preventative maintenance program for first generation breakers.
- ✓ Identified and Removed SF₆ equipment no longer needed for system configuration and repairs for working down our “Top 10 Worst Leaker List”.



Comments

Questions

