

# Western launches plan to identify, stop SF<sub>6</sub> leaks

A few years ago, sulfur hexafluoride or, SF<sub>6</sub>, was seen as a solution for insulating circuit breakers, switches and other electrical equipment found throughout the power grid. But now some experts view the gas not as a solution, but a threat. Meeting this issue head on, Western recently launched an aggressive campaign to track down SF<sub>6</sub> gas leaks across its nearly 17,000-mile transmission system.

SF<sub>6</sub> is cleaner, lighter and more compact than oils used to insulate equipment. Even better, it eliminates the risk of oil spills and the expense of clean-ups. However, the Environmental Protection Agency recently identified SF<sub>6</sub> as a

greenhouse gas, with heat-absorbing properties nearly 25,000 times that of carbon dioxide. EPA now encourages utilities to inventory SF<sub>6</sub>-filled equipment and track emissions. But, Western is taking even further steps.

The agency has developed a plan to detect and repair leaks as well as examine and modify maintenance practices to reduce SF<sub>6</sub> releases to an absolute minimum.

## Sniffing out gas leaks

As a first step, Western joined forces with EPRI, the research arm of the electric power industry, and began a fast-track program to "sniff" out gas leaks. At the heart of the program is a state-of-the-art back-scanner laser. SF<sub>6</sub> absorbs the laser's beam, resulting in a visual image of "black smoke" on the laser's viewing camera.

"We estimate that Western has nearly 750 pieces of SF<sub>6</sub>-filled equipment with approximately 200,000 pounds of the gas in place," explained **Dave Pearson**, Western environmental protection specialist and environmental SF<sub>6</sub> program manager. "Finding a cost-effective way to locate leaks was critical to the program's success."



Above: Don Daly, EPRI technician specialist, uses the back-scanner laser to check a circuit breaker control box at Tracy Substation as Rich Perry, SN foreman III electrician, scouts ahead. Inspection of substation equipment revealed no leaks.

## SF<sub>6</sub> emission reduction program

Some of the immediate and long-term goals of Western's SF<sub>6</sub> plan include:

- ◆ developing an SF<sub>6</sub> emission reduction policy,
- ◆ designing and implementing tracking procedures,
- ◆ incorporating emission reduction training into routine maintenance training,
- ◆ using leak-detection equipment to locate leaks (e.g., back-scanner lasers),
- ◆ characterizing equipment by age, actual SF<sub>6</sub> measurements and "reputation,"
- ◆ sealing equipment on a priority basis using predictive equipment characterizations, and
- ◆ preparing annual SF<sub>6</sub> reports

***Western's program also incorporates emissions training into routine maintenance training to quickly get the program up and running.***

### Scanning live equipment

In the field, the laser system has proved its worth. Traditional methods for detecting leaks—halogen detectors and soapy water—require equipment to be de-energized. The back-scanner laser works on “live” equipment. “It’s an effective maintenance tool because it quickly and accurately locates SF<sub>6</sub> leaks, sometimes as little as two pounds per year, on energized equipment at distances up to 60 feet from the viewing camera,” noted Western Electrical Engineer **Larry Romero** and maintenance SF<sub>6</sub> program manager.

Western’s program also incorporates emissions training into routine maintenance training to quickly get the program up and running. It stresses using data from emissions tracking to characterize different types of equipment and their likelihood of developing leaks. This will help predict when and where leaks will occur so that maintenance schedules can be adjusted. Other goals of Western’s SF<sub>6</sub> emissions reduction program include reducing equipment failures, decreasing SF<sub>6</sub>-gas replacement costs and improving worker safety.

### Good business

Western estimates the program’s start-up costs will range from \$60,000 to \$85,000 (depending on how much SF<sub>6</sub> replacement costs are reduced). After that, annual program costs are estimated at \$40,000. “That’s roughly 80 percent less than costs estimated using EPA guidelines,” commented Pearson. “We think that’s good business.”

So far SF<sub>6</sub> gas inspections, conducted in eight substations located in California, Colorado, Nebraska and Wyoming, have revealed minimal leaks.

“This indicates that Western’s current maintenance practices on SF<sub>6</sub>-filled equipment are effective,” Romero said. “However, as the cost of SF<sub>6</sub> increases and the emphasis on greenhouse gas emission reduction continues, the need to improve how we manage this gas will become more critical.”

The plan’s next phase calls for just that. By reviewing maintenance and gas-handling practices and implementing procedures to further reduce emissions, Western believes it can significantly limit emissions and lower maintenance costs. “That’s good for the environment, us and our customers,” Pearson said. 