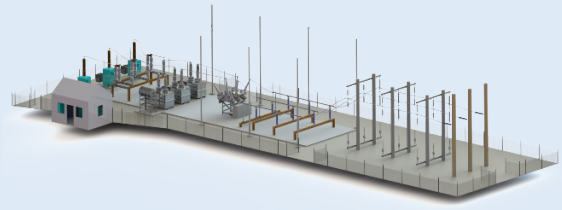
Supplemental Project Notice

SF_6-FREE BREAKER PILOTS



EPRI's 138kV Research substation will host the SF_6-free breaker pilots and allow utilities to reduce the risk in adoption of these new technologies.

PROJECT HIGHLIGHTS

- The project aims to reduce the risk for the specification and application of new SF_6-free circuit breaker technologies.
- The EPRI research substation allows for rapid learning in a safe but realistic environment.
- SF_6-Free circuit breaker technologies will be subject to a wide range of accelerated-aging factors over a 12-month period.
- The participating members will be able to gain early and valuable insights into the adoption of these new technologies.

Background, Objectives, and New Learnings

Utilities are faced with an increasing array of new SF_6-free circuit breaker options. There is an industry need to de-risk the widespread adoption through effective accelerated aging testing in a realistic research substation. The intention of this collaborative research project is to perform these research tests against a well-developed test protocol – allowing rapid and valuable insights into specification and application of new SF_6-free circuit breaker options.

Sulfur hexafluoride (SF_6) has been used for decades in utility applications due to its excellent insulating and arc quenching capabilities. A drawback for SF_6 is that it has an extremely high global warming potential (GWP) and there is growing pressure to phase it out. This has led to the emergence of a range of new SF_6-free circuit breaker technologies that use either a Fluoronitrile gas mixture or vacuum and clean air as the interruption and dielectric medium. These new technologies are seeing early adoption in the field but there is a parallel and important need to collaboratively learn in a research setting - since it provides the ability to control many variables that would not be possible to vary once the circuit breaker is installed in a customer-serving substation.

Objective

The research objective is to rapidly de-risk the application of new SF_6-free technologies. This is an important and timely objective due to the ever-increasing pressure to reduce emissions of SF_6. These pressures come from various directions including regulatory pressures and pressures from internal utility goals to reduce net CO_2 emissions to zero.

Applications of new SF_6-Free circuit breaker technologies provide an opportunity to respond to these pressures – and this project provides the opportunity to rapidly and effectively learn about the technologies and associated gas handling in a safe yet realistic research substation environment.

Approach

- Deploy a range of SF_6-free circuit-breaker technologies in the EPRI research substation.
  - Technologies plan to include (but may not be limited to) Fluoronitrile-based solutions and solutions that use vacuum and clean-air.
- EPRI plans to develop and execute test protocols tailored to each technology that accelerate the aging of the circuit breakers.
- The test protocols will be designed to maximize the learning on commissioning, operation, gas handling, off-line testing, maintenance and end-of-life assessment and disposal.
- The approach will be hands-on in the EPRI research substation in Lenox, MA. Participating utilities will be encouraged to send staff to the substation to learn about the new technologies directly.

Benefits

- Reduced utility risk in adopting new SF_6-free circuit-breaker technologies.
- Rapid hands-on learning on a range of SF_6-free technologies including vacuum/clean-air and Fluoronitrile-mixture technologies.
- Full-scale deployment of new circuit breaker technologies in the EPRI research substation
- Insights on circuit breaker performance in response to multiple stressors including:
  - Wide weather extremes from hot humid summers and cold snowy winters.
  - Rain spray for 5min every hour to replicate extremely wet environments.
  - AC and lightning impulse voltage extremes.
  - The full lifetime of circuit breaker mechanical operations performed within a 12-month period.
  - Introduction of intentional gas leaks to understand detection and performance.
  - Regular batteries of off-line testing to monitor degradation.

Deliverables

The project deliverables will be as follows:

- Monthly insights on laboratory findings
- Monthly webcast slides
- Final published report
- Hands-on utility visits to the research substation

Project Status and Schedule

The cost is $462k per participant and is contingent on a minimum of 5 funders. The project schedule is estimated at 24 months.

Who Should Join

Owners and operators of equipment using SF_6 gas today and are considering transition to alternative technologies.

Contact Information

For more information, contact the EPRI Customer Assistance Center at 800.313.3774 (askepri@epri.com).

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