Technology Innovation Project

Project Brief

TIP 25a: EPRI P37 Supplemental: Substation Seismic Studies

Context

The Institute of Electrical and Electronics Engineers (IEEE) Standard 693, Recommended Practice for Seismic Design of Substations, is used by electric power utilities to qualify substation equipment for seismic events.

Deficiencies exist in the present standard, and information is unavailable that may be used to improve seismic qualification procedures in the IEEE 693 Standard. Representatives from utilities that had participated in the IEEE 693 Working Group, as well as several other utilities, formed a consortium under EPRI to collaborative in projects to address these deficiencies.

Description

EPRI conducts testing under the governing standard, IEEE 693, and research to validate and improve the seismic qualification procedures in the Standard.

Representatives from each participating utility form the governing body (under the direction of EPRI) of the consortium. The consortium is managed by an EPRI manager. Technical services are provided by the EPRI Technical Manager. The consortium addresses the deficiencies in the present standard, especially those related to seismic criteria left unspecified.

EPRI selects the item(s) of equipment that is (are) to be tested for each year. EPRI establishes equipment support structure specifications and vibration test requirements, electrical equipment specifications, and test specifications. EPRI also will select a vibration testing facility (and electrical testing laboratory, if required) to perform tests and contracts for laboratory services.

The EPRI Technical Manager prepares a Request for Proposal and issues it to equipment manufacturers. Equipment manufacturer(s) are then selected to participate in the project. The Technical Manager prepares a test plan in conjunction with the testing laboratory and the equipment manufacturer. The testing laboratory performs qualification tests on one or more items of equipment under the overview of the Technical Manager. The manufacturer and testing laboratory prepares qualification documentation for the equipment per IEEE 693 requirements. The Technical Manager prepares a project report documenting the results of the test and recommendations for improving the qualification procedures in IEEE 693.

Why It Matters

Among the benefits this project offers are:

- Data for Utilities/IEEE 693 to improve the seismic requirements for substation equipment;
- Provide seismic qualification procedures to Utilities/IEEE 693 to qualify substation equipment;
- Provide a better understanding of the seismic performance and vulnerability of high voltage substation equipment;
- Improve survivability of substation equipment and minimize damages during earthquakes.

Goals and Objectives

An important part of the project is to determine what deficiencies exist in the present standard, especially those related to seismic criteria left unspecified. Tests are performed by a laboratory to gather information that may be used to improve the seismic qualification procedures in the IEEE 693 Standard, IEEE Recommended Practice for Seismic Design of Substations

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Project Start Date: January 1, 2012

Project End Date: December 31, 2020

Funding

Included in BPA Membership

Reports, References, Links

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Participating Organizations

Electric Power Research Institute (EPRI)
Pacific Gas and Electric Co. (PG&E)
San Diego Gas and Electric (SDG&E)
Western Area Power Administration (WAPA)
Transpower
Southern California Edison (SCE)
BC Hyrdo
Pacificorp