

U.S. DOE-NERC Workshop on Fault-Induced Delayed Voltage Recovery (FIDVR) & Dynamic Load Modeling

Overview

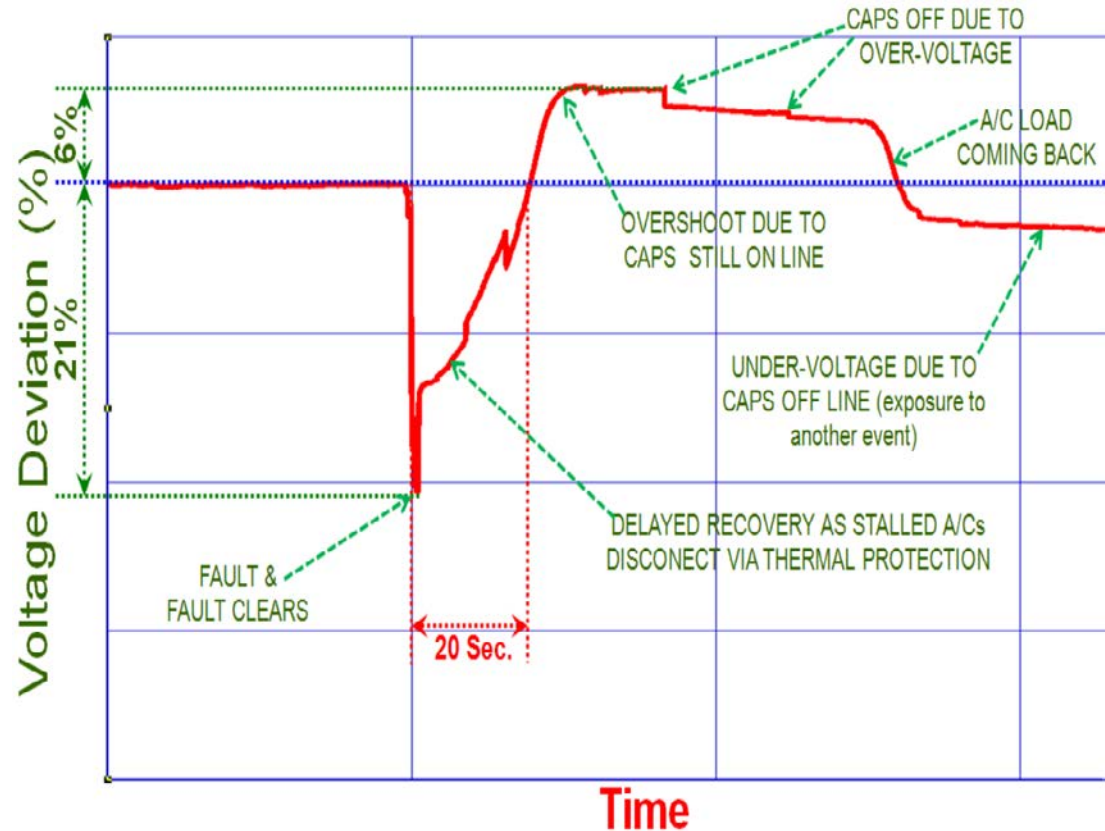
Joe Eto, Lawrence Berkeley National Lab
September 30, 2015
Alexandria, VA



What is FIDVR ?

Fault-Induced Delayed Voltage Recovery — a voltage condition initiated by a fault and characterized by:

- 1) Stalling of induction motors;
- 2) Initial voltage recovery after the clearing of a fault to less than 90 percent of pre-contingency voltage; and
- 3) Slow voltage recovery of more than two seconds to expected post-contingency steady-state voltage levels



Source: A Technical Reference Paper: Fault-Induced Delayed Voltage Recovery. Version 1.2. Prepared by: NERC Transmission Issues Subcommittee and System Protection and Control Subcommittee. June 2009



Agenda

Wednesday, September 30, 2015

8:30-9:00 Welcome & Opening Remarks

David Meyer, *U.S. Department of Energy, Office of Electricity Delivery and Energy Reliability*

David Till, *North American Electric Reliability Corporation*

9:00-9:15 Workshop Overview & Objectives

Joe Eto, *Lawrence Berkeley National Laboratory*

9:15-9:45 Current State of Load Modeling

A landscape overview of dynamic load modeling and FIDVR – where we are today, how we got here, and where we're going.

Dmitry Kosterev, *Bonneville Power Administration*

9:45-10:00 Break

10:00-12:00 Fundamentals, Testing & Modelings of Air-Conditioners

A deep dive into the fundamentals of motors, laboratory testing of end-use loads, and modeling efforts. Development of single-phase and equivalent models using field testing and detailed modeling.

John Undrill, *Independent Consultant*

Dmitry Kosterev, *Bonneville Power Administration*

Steven Robles, *Southern California Edison*

Bernie Leseiutre, *University of Wisconsin*

12:00-1:00 Lunch – provided



Agenda

Wednesday, September 30, 2015 (continued)

1:00-2:30 Manufacturing Perspective, Future Trends & Technologies (Panel Session)

Perspectives from the manufacturing community focusing on current and future trends in control design and engineering, end-use requirements, and future technologies.

John Halliwell, *Electric Power Research Institute*

John Berdner, *Enphase Energy*

Tim Hawkins, *Rheem*

Hung Pham, *Emerson Climate Technologies*

2:30-2:45 Break

2:45 – 4:30 Load Model Data

The composite load model for transmission planning studies – development, parameter selection, model structure, and data management.

Ryan Quint, *North American Electric Reliability Corporation*

John Kueck, *Independent Consultant*

Donald Davies, *Western Electricity Coordinating Council*

Dmitry Kosterev, *Bonneville Power Administration*

4:30-5:30 Field Measurements

Gathering data at the distribution level to better understand the phenomena of FIDVR and load dynamics.

Kyle Thomas, *Dominion Virginia Power*

Richard Bravo, *Southern California Edison*

John Undrill, *Independent Consultant*

5:30 Adjourn



Agenda

Thursday, October 1, 2015

8:30-10:00 Composite Load Modeling & System Studies (Panel Session)

Experience using the composite load model for bulk transmission planning studies – lessons learned, technical challenges, identified problems, and solutions. A focus on the development of the model, utilization of the model, and planning around a more detailed load model.

Noah Badayos, *Southern California Edison*

Dmitry Kosterev, *Bonneville Power Administration*

Rob O’Keefe, *American Electric Power*

Dean LaTulipe, *National Grid*

Scott Ghiocel, *Mitsubishi Electric Power Products, Inc.*

10:00-

Break

10:15

10:15-

Reliability Focus (Panel Session)

11:30

A broad look at reliability aspects related to load modeling and FIDVR, including regulations and policies, system level impacts, history in planning around load-related issues, and fundamental drivers behind reliability of end-use technology changes.

Bob Cummings, *North American Reliability Corporation* Dmitry Kosterev, *Bonneville Power Administration*

John Undrill, *Independent Consultant*

David Till, *North American Electric Reliability Corporation*

11:30-

Roundtable Discussion, Summary & Next Steps

12:30

Joe Eto, *Lawrence Berkeley National Laboratory* – Moderator

12:30 Adjourn



Contacts for Follow-Up

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