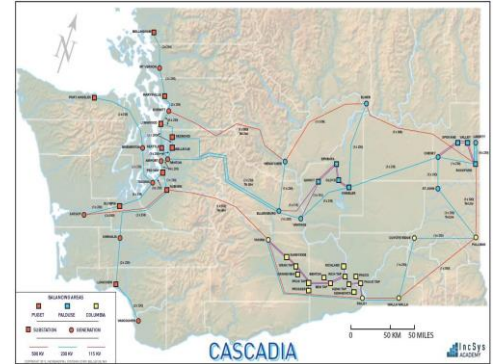


System Frequency Response

System Frequency Response is a computer-based training module which consists of a video lecture and a simulation exercise. Students view a video lecture covering system frequency response under various conditions on a network. Instructor describes the major interconnections in North America and how frequency response changes based on the size of network and how frequency responses are becoming lower over time. Instructor covers different generation plant control modes and how they affect system frequency. Students act as System Operators to simulate the loss of a generating unit. Using simulator displays, students observe and record frequency response, and differentiate measured frequency drop and steady state frequency drop. Students respond to the same loss of generation with LFC first disabled, then with LFC enabled.



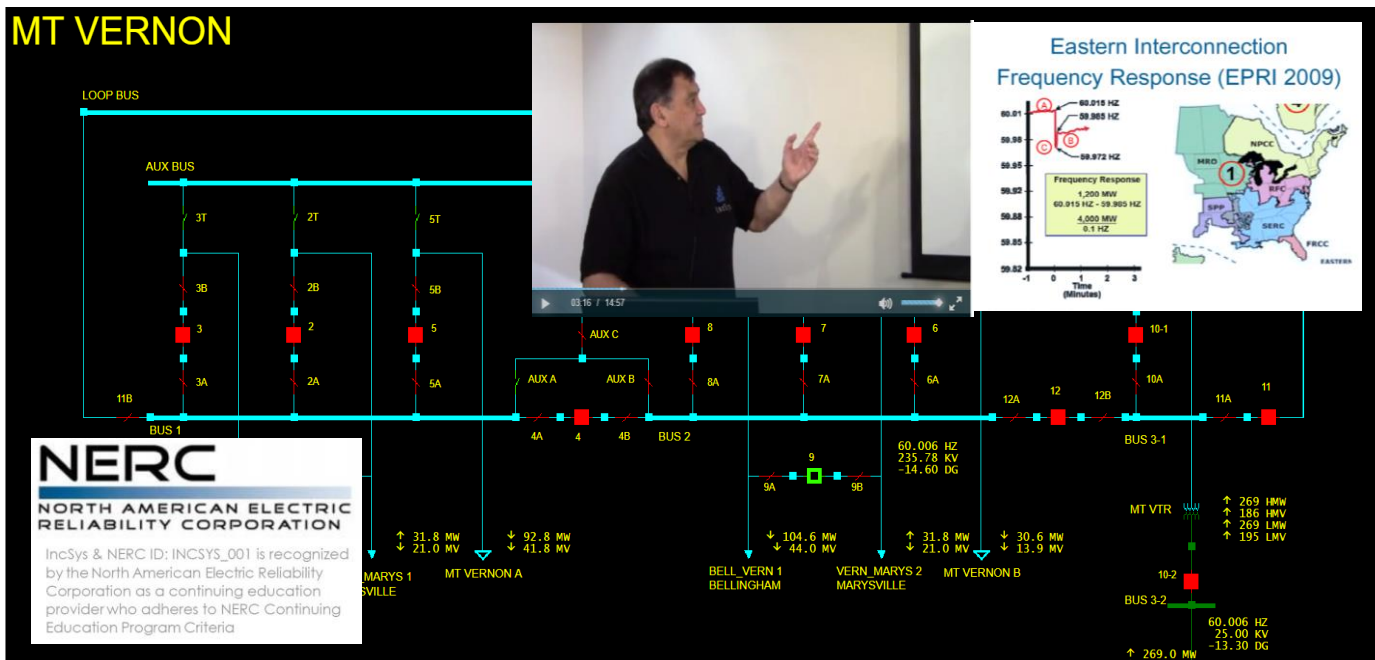
Cascadia 3030 Course Objectives

System Frequency Response

COURSE CE HOURS		
OT	STD	SIM
1.5	0	1

- Describe frequency response of the three major interconnections
- Describe factors that limit frequency response
- Describe impacts of different types of local plant control modes on frequency response
- Estimate the frequency drop in the system for the loss of a unit when LFC is disabled
- Experimentally simulate the System frequency transient response following a trip of a single system unit
- Observe and record the transient minimum frequency experienced during the transient from the simulation results
- Measure simulated steady state frequency drop in an island when a unit trip's
- Contrast and explain the difference between the estimated and simulated frequency drop
- Contrast and explain the difference between frequency response with LFC enabled and disabled
- Identify the need for AGC systems
- Distinguish the NERC Balancing Authorities
- Distinguish the characteristics of AGC systems
- Contrast the types of interchange

MT VERNON



The screenshot displays the MT Vernon simulation interface. On the left, a power system diagram shows a network of buses (BUS 1, BUS 2, BUS 3-1, BUS 3-2) and transmission lines (3T, 2T, 5T, 3B, 2B, 5B, 3A, 2A, 5A, 4A, 4B, 8A, 7A, 6A, 9A, 9B, 10-1, 10-2, 12A, 12B, 10A, 11A, 11). A video lecture window in the center shows an instructor pointing at a screen. On the right, a graph titled "Eastern Interconnection Frequency Response (EPRI 2009)" plots frequency (59.92 to 60.01 Hz) against time (0 to 3 minutes). The graph shows a transient frequency drop from 60.015 Hz to 59.972 Hz. A legend indicates: 1,200 MW at 60.015 Hz - 59.985 Hz, and 4,000 MW at 60.015 Hz - 59.972 Hz. A map of the Eastern Interconnection shows the location of the MT Vernon area. At the bottom, a NERC logo and text state: "IncSys & NERC ID: INCSYS_001 is recognized by the North American Electric Reliability Corporation as a continuing education provider who adheres to NERC Continuing Education Program Criteria".