

U.S. DOE-NERC Workshop on Fault-Induced Delayed Voltage Recovery

Workshop Summary

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NERC TIS White Paper on FIDVR

FIDVR definition: Fault clears in normal clearing time, yet V remains depressed $< 90\%$ PU and recovers slowly > 2 sec.

System Protection and Control Subcom pursuing more integrated assessment of generation and transmission protection (incl gen aux) – FIDVR is one foot in the door toward addressing these and related modeling issues

Tripping lots of A/C simultaneously may be problematic – enabling ride-through is an alternative – costs are unknown – scroll-compressors have more “FIDVR-friendly” properties compared to recip

Very high SEER A/C units with inverters units will trip unit on low voltage



Recent Efforts to Improve Our Understanding of FIDVR

Improved single-phase induction motor models are now available for PSS/E and PSLF – Composite load models are in process of being approved by WECC - On-going monitoring will be critical for improving load composition modeling over time – will need to determine how to respond to new model findings from a mgmt perspective

No fast voltage collapse observed in simulations - UVR (unit-level) is effective but must be carefully applied to avoid excessive overvoltage – SVC (system-level) can contain (but not prevent) FIDVR and in combination with UVR can moderate overvoltage (best to trip only stalled A/Cs) – and there are other system level solutions (close-in gen/synchronous condensers; STATCON)

If events last longer than a second or two, it will be critical to understand what takes place within the generating plant because they may not be able to support the grid through entire recovery period – future generator modeling should focus on performance expectations rather than on modeling detailed subcomponents. Any new std should be accompanied by practical means of verification



Roundtable Discussion

FIDVR is only the first example of type of load-grid interaction issues that need to be examined jointly – need to think long-term (roadmap) – Future stds for load performance (and DG) or the LSE, more generally?

Firm load with exception of consequential load, cannot be shed following a first contingency; therefore, must be defined carefully – Load shedding is a method of last resort

Clear articulation of transmission system performance requirements is needed to enable comprehensive economic assessment of trade-offs among supply and demand side options (including costs over time)

Both A/C tripping and/or ride-through appear feasible, but at what cost? Do not disadvantage individual manufacturers (or un-intentionally drive consumers to purchase window units). There are unresolved issues w.r.t. rate of and locations for deployment

Workshop should next focus on communication to executives



Summary of Closing Workshop Discussions

- Avoid unintended consequences

