Is WR1.4 Working as Intended? Case Study from TPL

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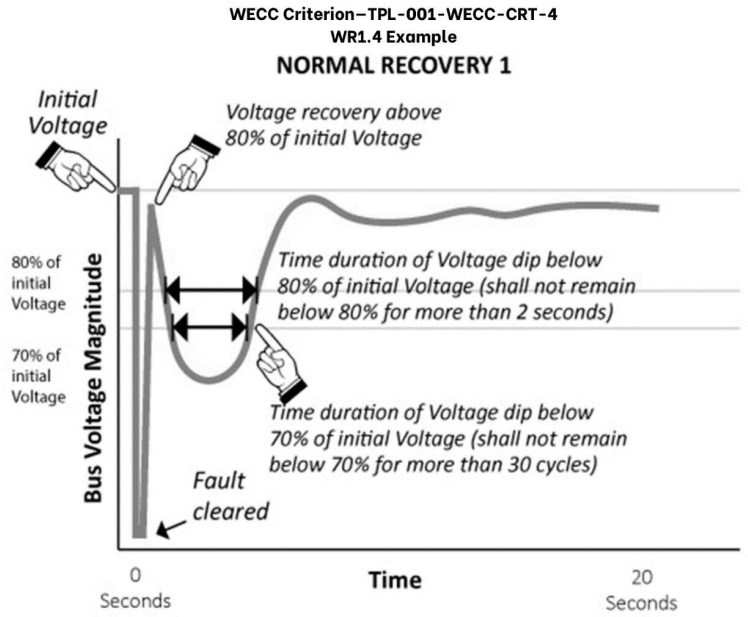
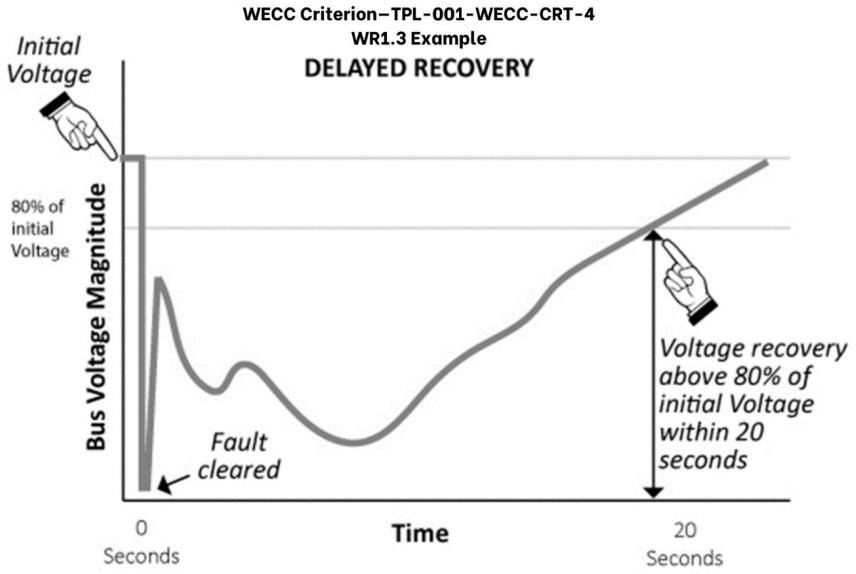
Background

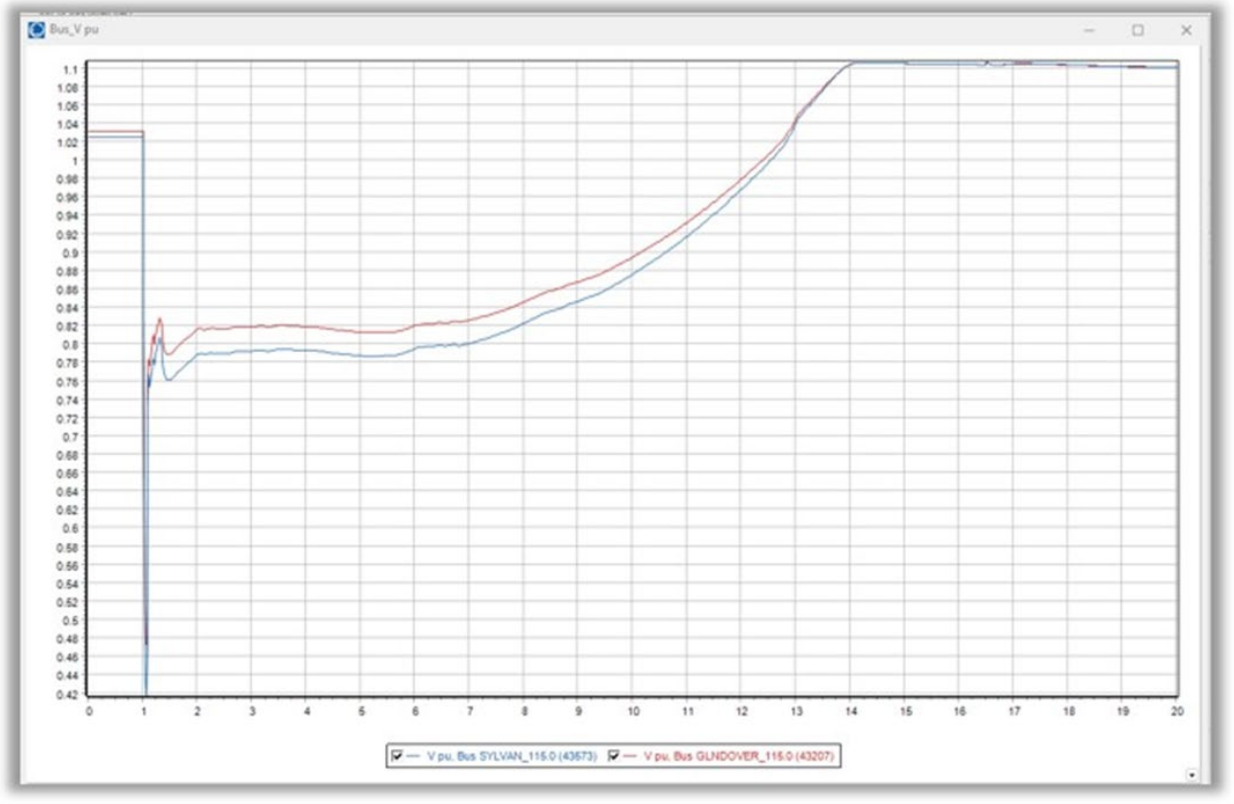
- WECC TPL-001-WECC-CRT-4, WR1.4 Part 2 requires:
  - "*Following recovery above 80% of pre-contingency voltage, voltage must not dip below 80% for more than 2 seconds.*"
- This is meant to screen for post-fault instability or secondary dips





Observed Issue

- During a P1-2 fault on a 500kV line in Northwest, two nearby buses behaved differently:
  - One 115kV (Red):
    - Recovered above 0.8 pu, then dipped again below for >2 sec → Violation triggered
  - Another 115kV (Blue):
    - Never recovered to 0.8 pu (only ~0.78 pu) → No violation triggered



Takeaway

- The issue isn’t just waveform quality—it's how the WR1.4 logic structure fails to capture certain problematic behaviors
- “Red” Voltage looks better but is flagged
- “Blue” Voltage looks worse but is not flagged

Why This is a Problem

- The logic activates the 2-second timer after recovery >80%
- Therefore, worse performance (never recovering) avoids violation
- This creates a loophole: inferior dynamics pass, while better dynamics get flagged

Request to MVS

- Recommend WECC review WR1.4 Part 2 logic
  - Should voltages that never recover be flagged more strictly?
  - Could new logic or guidance better capture intended outcomes?
- We seek input on whether the criteria can be improved to better reflect true system performance