



TPL-001-5.1 NERC Reliability Standard Update for P5 Contingencies

Transmission Expansion Advisory
Committee
May 9th, 2023

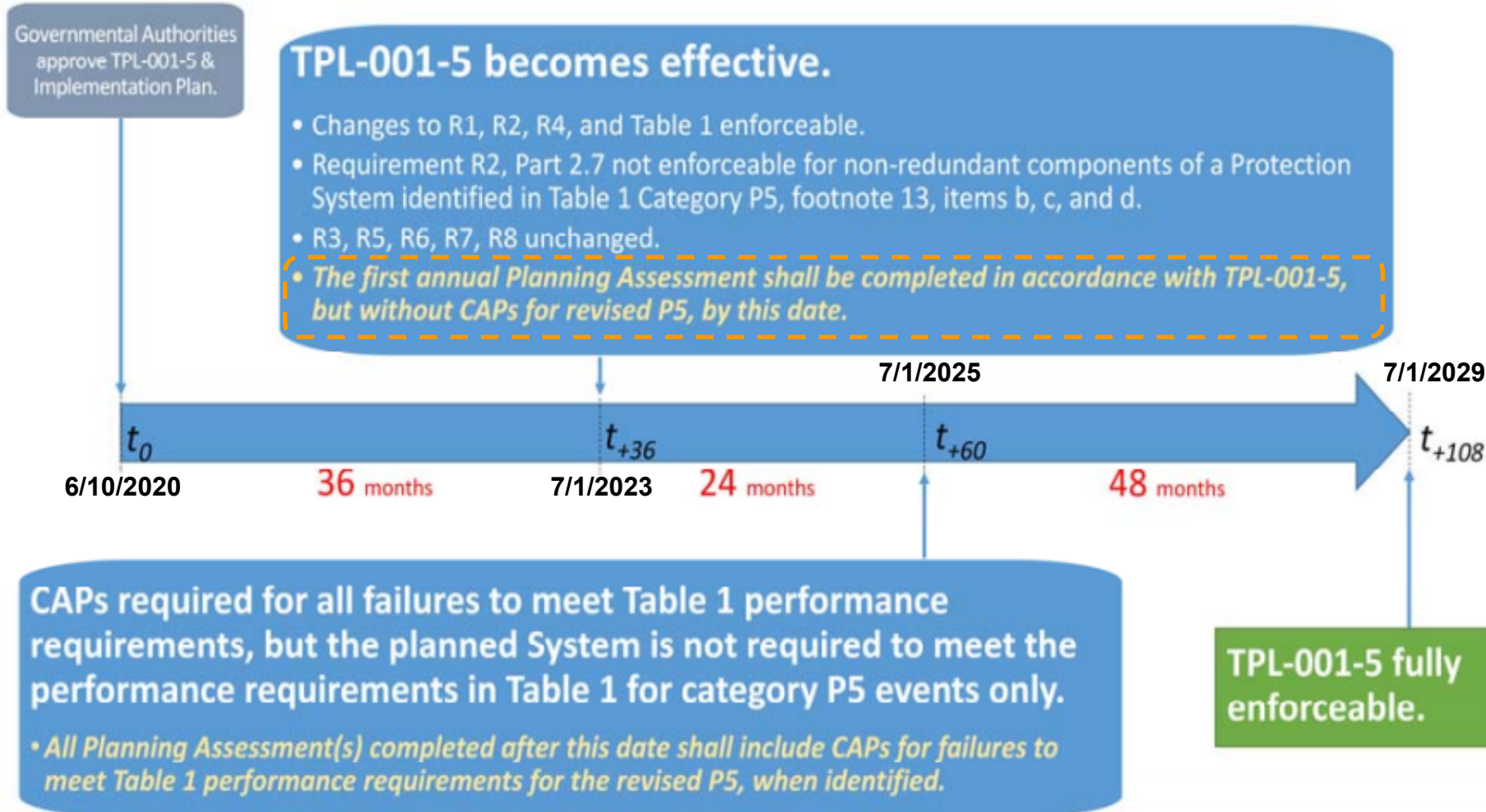
- **TPL-001-5**
 - FERC Order issued approving TPL-001-5
 - Docket No. RM19-10-000
 - January 23, 2020
- **TPL-001-5.1**
 - FERC Order issued approving TPL-001-5.1
 - Docket No. RD20-8-000
 - June 10, 2020
 - Errata: Updates incorrect references made in Requirement R2 Part 2.7.
- **Effective Date of Standard: 7/1/2023⁽¹⁾**
 - ⁽¹⁾Requirement R2 Part 2.7: 7/1/2025 – See Implementation Plan (slide 5)

Category	Initial Condition	Event ¹	Fault Type ²	BES Level ³	Interruption of Firm Transmission Service Allowed ⁴	Non-Consequential Load Loss Allowed
P5 Multiple Contingency (Fault plus <u>relay non-redundant component of a Protection System failure to operate</u>)	Normal System	Delayed Fault Clearing due to the failure of a non-redundant <u>relay component of a Protection System¹³</u> protecting the Faulted element to operate as designed, for one of the following: 1. Generator 2. Transmission Circuit 3. Transformer ⁵ 4. Shunt Device ⁶ 5. Bus Section	SLG	EHV	No ⁹	No
				HV	Yes	Yes

13. Applies For purposes of this standard, non-redundant components of a Protection System to the following consider are as follows:

- a. A single protective relay which responds to electrical quantities, without an alternative (which may or may not respond to electrical quantities) that provides comparable Normal Clearing times;
- b. A single communications system associated with protective functions or types: pilot (#85), distance (#21), differential (#87), current (#50, 51), necessary for correct operation of a communication-aided protection scheme required for Normal Clearing (an exception is a single communications system that is both monitored and 67), reported at a Control Center);
- c. A single station dc supply associated with protective functions required for Normal Clearing (an exception is a single station dc supply that is both monitored and reported at a Control Center for both low voltage (#27 & 59), directional (#32, & 67), and tripping (#86, & 94), and open circuit);
- d. A single control circuitry (including auxiliary relays and lockout relays) associated with protective functions, from the dc supply through and including the trip coil(s) of the circuit breakers or other interrupting devices, required for Normal Clearing (the trip coil may be excluded if it is both monitored and reported at a Control Center).

- TOs have identified protection system SPF in order for PJM to evaluate steady state & stability system performance
 - Scope of P5 events will now include non-redundant components of a Protection System, not just relays
 - New P5 contingencies that capture the non-redundant components have been developed
 - PJM has studied system performance with new P5 contingencies under steady state conditions based on the 2027 Summer, Winter and Light Load RTEP cases
 - Stability simulations underway with TO-provided fault clearing sequence and timing information
- PJM will provide an update on the number of valid violations at a future TEAC meeting



- V1 – 5/4/2023 – Original slides posted