



Apparent Performance Failure Causal Analysis Considerations

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Overview

- **Purpose**

- Provide a brief overview of ERCOT's Nodal Operating Guide (NOG) Requirements for performing Root Cause Analysis (RCA) after an Apparent Performance Failure (APF)
- Outline considerations to assist Resource Entities (REs) during RCA

ERCOT NOG 2.13

- 2.13(3): If an IBR, Type 1 WGR or Type 2 WGR does not ride-through in accordance with the applicable ride-through performance requirements, including its maximized capabilities (an “Apparent Performance Failure”), the Resource Entity shall, as soon as practicable:
 - Investigate the Apparent Performance Failure;
 - Report to ERCOT the cause of the Apparent Performance Failure; and
 - Perform model validation and report the results to ERCOT.
- 2.13(5): The Resource Entity for an IBR, Type 1 Wind Generation Resource (WGR) or Type 2 WGR that experiences an Apparent Performance Failure shall:
 - Develop a plan to ensure the IBR, Type 1 WGR, or Type 2 WGR meets the applicable ride-through performance requirements
 - Submit the plan to ERCOT for approval within 90 days
 - If ERCOT approves the plan, implement the plan within 180 days, unless ERCOT approves a longer timeline

NERC PRC-030 (Subject to Future Enforcement)

- R2.** Each applicable Generator Owner, within 90 calendar days of a Real Power change event pursuant to Requirement R1 or following a request from its associated Reliability Coordinator, Balancing Authority, or Transmission Operator that identified a Disturbance and a change in the Inverter-Based Resource(s) Real Power output, shall:
[Violation Risk Factor: Medium] [Time Horizon: Operations Planning]
- 2.1.** Analyze its Inverter-Based Resource facility performance during the event, including:
- 2.1.1.** Determine the root cause(s) of change(s) in Real Power output;
 - 2.1.2.** Document the facility's Ride-through performance including Reactive Power response during the event;
 - 2.1.3.** Assess any performance issues identified and if corrective actions are needed; and
 - 2.1.4.** Determine the applicability of the root cause(s) to the Generator Owner's other Inverter-Based Resource facilities.
- 2.2.** Upon request, provide the analysis results to the requesting associated Reliability Coordinator, Balancing Authority, or Transmission Operator.

ERCOT Process for APF

- If an Apparent Performance Failure (APF) is determined, then ERCOT will:
 - Notify the RE of the APF
 - Provide a date for compliance with the 90-day corrective action plan (CAP) requirement from NOG 2.13
 - Provide a reference document: Considerations for Root Cause Analysis (Upcoming)
 - NOTE: this is not a list of requirements but a list of considerations to assist the Resource Entity; ensures completeness and minimize the potential need for revisions
 - Review CAPs and provide approval/feedback
 - Document CAP implementation

Root Cause Analysis Considerations

- Thorough Root Cause Analysis is key to creating a CAP
- Preferred Root Cause Analysis methodologies as outlined by NERC in various Lessons Learned documents are provided
 - Five Whys
 - Barrier Analysis
 - Change Analysis
 - Event and Causal Factors Chart
- Defines Root Cause Analysis
 - The process of discovering the underlying factors or fundamental reasons for the occurrence of issues and is an important step in identifying appropriate solutions to a problem
- If Root Cause is unable to be determined, clearly explain why that is the case and provide actions being taken to ensure future RCAs will be able to be fully completed

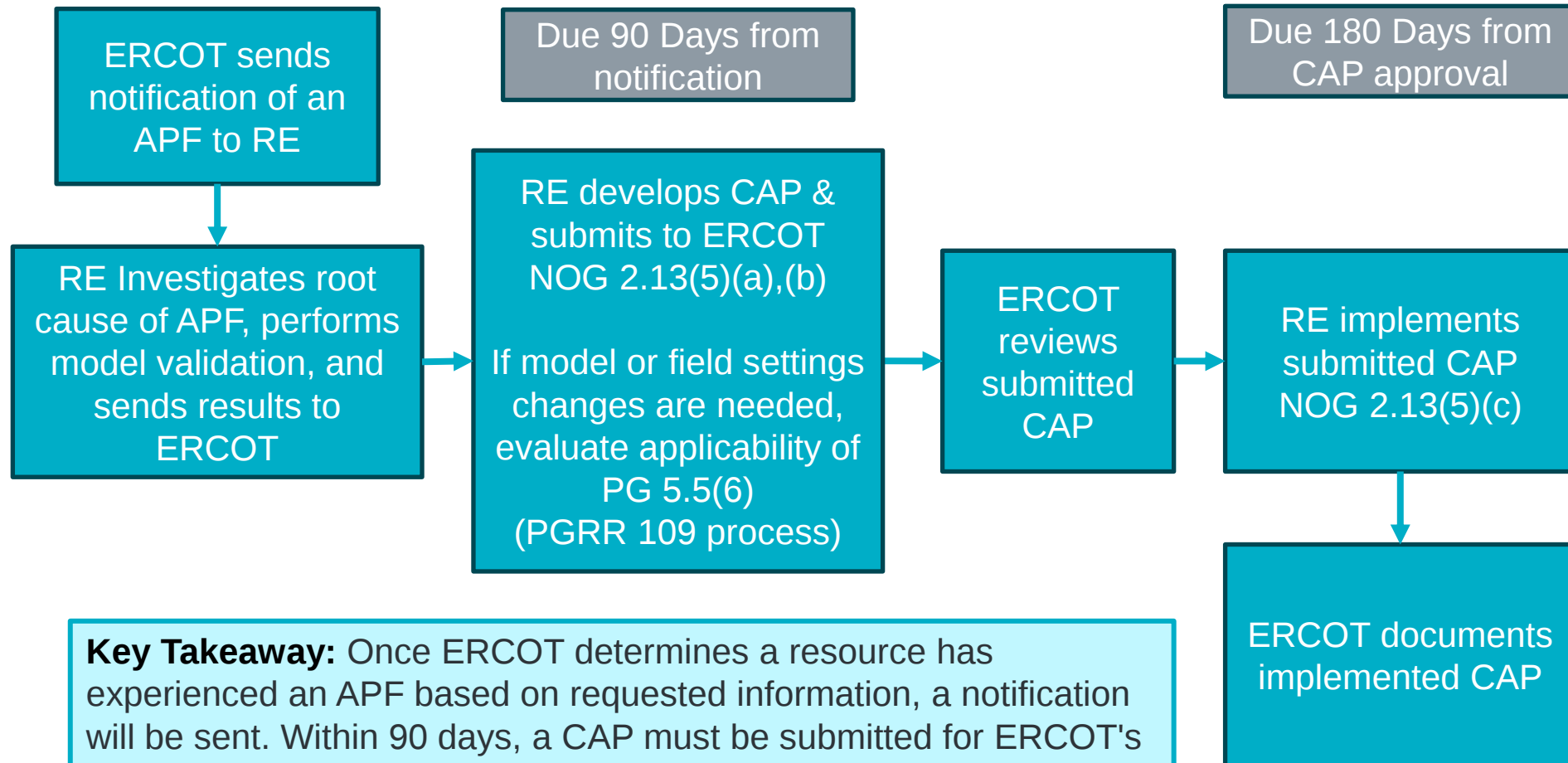
Root Cause Analysis Considerations

- If Corrective Action Plan requires field setting changes, consider whether it is necessary to request prior approval from ERCOT before implementing the change:
 - If the facility is fully operational (i.e., fully commissioned and Part 3 approved), then any changes affecting dynamic response require prior approval per Planning Guide (PG) Section 5.5(6)
 - If the facility is in the commissioning phase (i.e., not yet Part 3 approved) and fails to meet performance requirements (e.g., voltage ride-through) during a real-time event, re-evaluation of model performance and/or re-study may need to be reconducted
 - Note: model review process prior to Resource Commissioning is outlined in PG Section 5.5(4)
- If the OEM was utilized at other sites owned and/or operated by the Resource Entity of interest, consider investigating Extent of Condition and detailing the results in the RCA
- If the units at the site responded differently, are there any settings or physical differences between the units?

Questions?

APF High-Level Timeline

Apparent Performance Failure (APF)
Corrective Action Plan (CAP)



Key Takeaway: Once ERCOT determines a resource has experienced an APF based on requested information, a notification will be sent. Within 90 days, a CAP must be submitted for ERCOT's approval. Upon approval, the RE must implement the CAP and notify ERCOT within 180 days.