Performance Assessments:

- Resources expected performance will be calculated with the primary frequency control calculation
  - Frequency below governor deadband
    \[ MW_{Primary\ Control} = \left( \frac{H.Z_{actual} - 60 + DB}{60 \cdot Droop - DB} \right) \cdot (Frequency\ Responsive\ Capacity) \cdot (-1) \]
  - Frequency above governor deadband
    \[ MW_{Primary\ Control} = \left( \frac{H.Z_{actual} - 60 - DB}{60 \cdot Droop - DB} \right) \cdot (Frequency\ Responsive\ Capacity) \cdot (-1) \]
- Units will be measured on droop and deadband PJM has documented
  - Default parameters will be set to 5% droop and 36mHz dead band
  - Verification of droop and deadband settings should be performed by resource owner
- Ramp Rate will be calculated for a resource 10 minutes prior to the event start and the expected response will be adjusted for this ramp
  - Actual Response = (AvgMW_{20-52sec} – AvgMW_{-16-0sec}) - RampRate MW
- Events for which a resource is evaluated will be determined on the following exclusions
  - If the unit is offline, no available headroom, assigned regulation

Event Selection:

- Aim to select 2-3 frequency events per month for performance assessments
  - Events will be in both directions (high frequency events and low frequency events)
  - No set number of events per month, will be driven based on system conditions
- Event Criteria that needs to be met for selection:
  - Frequency goes outside +/- 40mHz deadband
  - Frequency stays outside 40mHz deadband for 60 continuous seconds
  - Minimum/Maximum frequency reach +/- 53mHz
- Event selection criteria will be reviewed periodically by the Operating Committee for continued applicability, based on system conditions.

Quarterly Performance Reviews

- Reviews to determine if resources are frequency response or frequency non-responsive
- Quarterly review will look at an average performance over 12 month window
  - PJM will require a minimum of 3 applicable events for a resource to perform the performance review (will go back further than 12 months if needed in this case)
- Each event will be evaluated separately and the performance will be averaged for responsive/non-responsive determination
  - 50% or greater average performance will be considered responsive
- Units without RT telemetry (per M-01) Performance Assessment will not be performed with RT data
  - Required to submit data from a selected event or test results to demonstrate frequency response capability at least 1x per year
• Performance Review criteria will be reviewed periodically by the Operating Committee for continued applicability, based on system conditions.

Process for Non-Responsive units

• If PJM determines a unit is not providing Primary Frequency response based on the performance review, PJM staff will engage in conversation with the resources owner.
  o Telemetry, Operating scenarios, etc. will be discussed

• Root cause of non-responsive performance should be determined and addressed or documented
  o Addressed: non-functioning governor, data/telemetry issues, etc.
  o Documented: mill point, outside PFR operating range, etc.