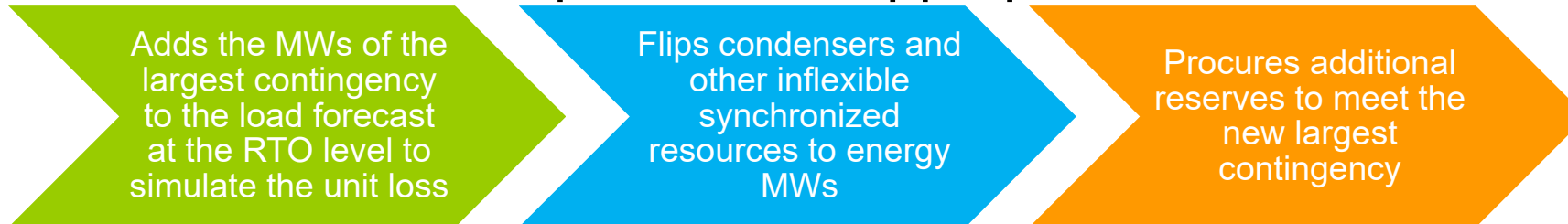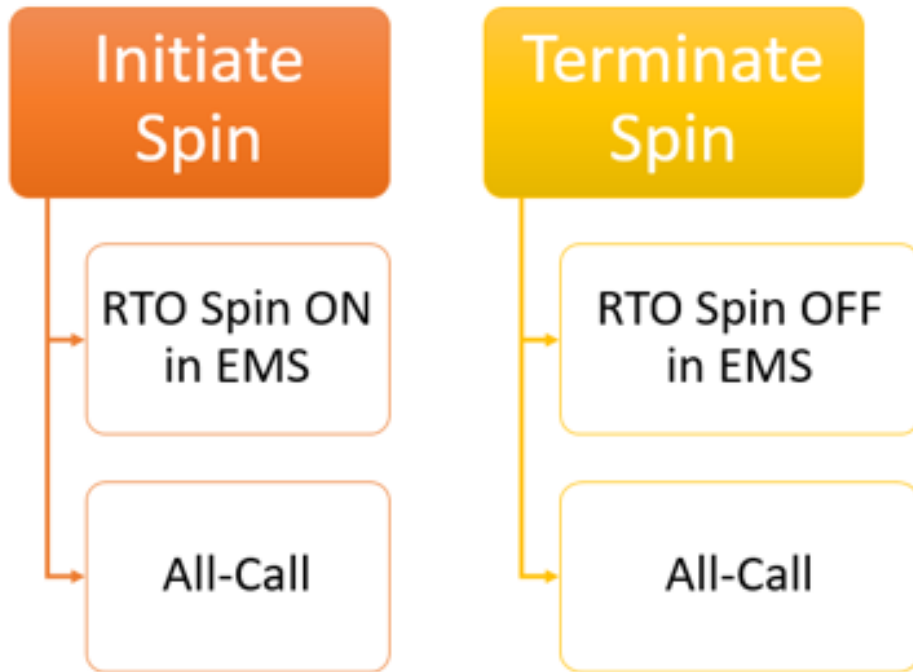# Intelligent Reserve Deployment
PJM Package – SRDTF
(Package A)

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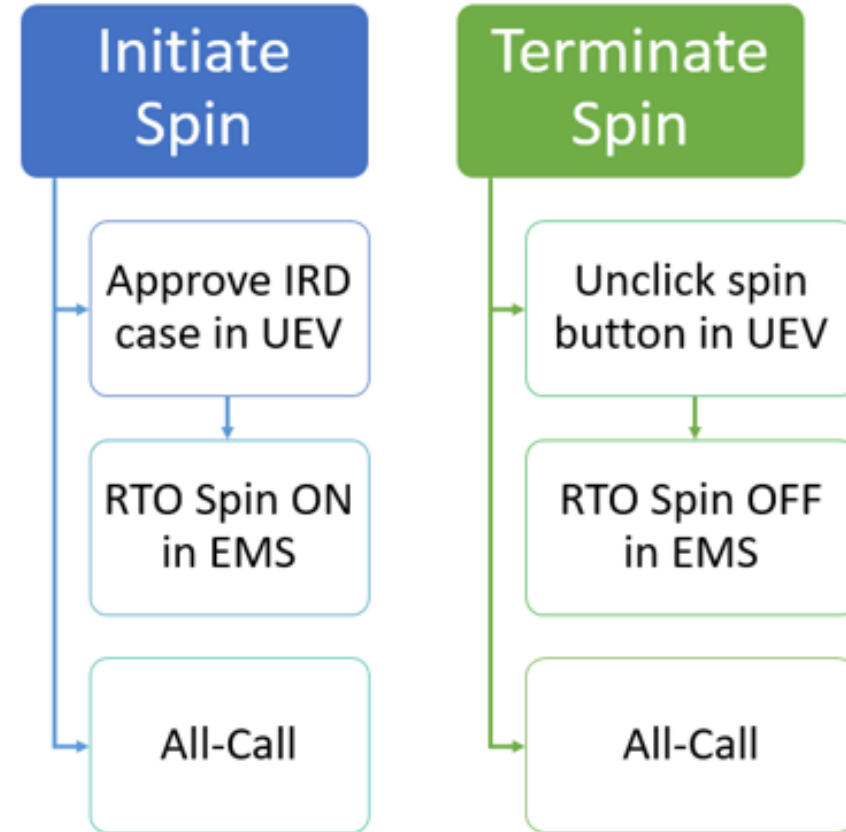
Operating Committee

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- Intelligent Reserve Deployment (IRD)

  - IRD is a SCED case that simulates the loss of the largest generation contingency. Approval of the case will trigger a spin event.

    - Economic dispatch based on real-time input including constraints

    - Converts inflexible reserve MWs to energy

    - Readily available for use, no lag time

    - Initiates faster response until appropriate RTSCED case available

Adds the MWs of the largest contingency to the load forecast at the RTO level to simulate the unit loss	Flips condensers and other inflexible synchronized resources to energy MWs	Procures additional reserves to meet the new largest contingency

Current Process

Initiate Spin
- RTO Spin ON in EMS
- All-Call

Terminate Spin
- RTO Spin OFF in EMS
- All-Call

IRD Process

Initiate Spin
- Approve IRD case in UEV
- RTO Spin ON in EMS
- All-Call

Terminate Spin
- Unclick spin button in UEV
- RTO Spin OFF in EMS
- All-Call

- Updated economic basepoints to replace all-call instructions.
    - All-call will still go out for communication purposes
- Active constraints will be controlled by IRD.
    - Target resources that do not adversely impact constraints
- IRD instructions will be priced in the subsequent interval.
    - Supersedes approved RTSCED cases for the same interval
- Dynamic performance evaluations based on event dispatch.
    - Status quo for Demand Response
- Smooth transition in and out of events with continued SCED usage
    - Updated basepoints to reduce manual actions required

- Upcoming changes should bring overall improvements but could introduce unexpected challenges.

- Existing resource performance during events varies greatly between events and is far from ideal.

- IRD solution addresses key interests and is flexible enough for changing conditions and needs.

- Level of uncertainty should be accounted for through a larger margin for issues that may come up.

- Largest contingency is basis for reserve requirement.

- MW value of largest resource can fluctuate by hundreds of MWs.

  – Less than status quo of deploying all available reserves

- Amount of available reserve MWs can vary by thousands of MWs.

  – Usage of a static percentage based approach may fall short

- Majority of events not triggered by loss of largest contingency.

  – Ability to modify MW value used based on event experience

- Synchronized Reserve events are emergencies governed by NERC and PJM standards.

  – NERC required 15 minute recovery, PJM policy is 10 minutes

- Goal to make process more streamlined than status quo.

  – Ready to initiate event at any time without needing to wait

  – Not having to switch tools and visuals during the event

  – Smooth transition and consistent control for constraints

- IRD effort initiated based on operator input and needs.

- ## In spirit of FERC Order 825 – Transient Shortage

  – "We also require that each regional transmission organization and independent system operator trigger shortage pricing for any interval in which a shortage of energy or operating reserves is indicated during the pricing of resources for that interval. Adopting these reforms will align prices with resource dispatch instructions and operating needs, providing appropriate incentives for resource performance."

- ## Adheres to NERC BAL-002 – Reserve Requirements

  – R2. Each Responsible Entity shall develop, review and maintain annually, and implement an Operating Process as part of its Operating Plan to determine its Most Severe Single Contingency and make preparations to have Contingency Reserve equal to, or greater than the Responsible Entity's Most Severe Single Contingency available for maintaining system reliability.

  – R3. Each Responsible Entity, following a Reportable Balancing Contingency Event, shall restore its Contingency Reserve to at least its Most Severe Single Contingency, before the end of the Contingency Reserve Restoration Period (90 mins), but any Balancing Contingency Event that occurs before the end of a Contingency Reserve Restoration Period resets the beginning of the Contingency Event Recovery Period.

  – R2 establishes and maintains the reserve requirement while R3 allows for deployment and replenishment of reserves.

- IRD designed to function under status quo and with Reserve Price Formation/ORDC changes.

- Existing penalty factors used during transient shortage conditions.

- Tier 1 and Tier 2 resources are IRD eligible.

  – Updated performance evaluation for Tier 2 cleared resources.

- Static reserve zones for MAD/RTO.

  – IRD deploys reserves with resource specific basepoints that account for active constraints.

- Initial phase of 6 to 12 months to start in early 2022.

  - IRD initiated deployments with updated basepoints

  - New performance evaluation

  - Ensure proper event recovery is achieved

  - Adjust inputs and parameters based on performance

  - Collect data on results to make informed decisions on path forward

- Necessary governing document and manual changes.

- Reconvene SRDTF towards the conclusion of initial phase.

  – Review performance metrics

  – Solicit feedback on IRD experience

  – Adjust and finalize deployment approach and adapt to upcoming Market changes

  – Reflect updates in governing documents and manuals

- Timing dependent on number of SR deployment events and recovery performance.

- IRD is an out of the box solution that seamlessly integrates into PJM's existing dispatch applications.

  – Highly customizable based on changing conditions and needs

  – Fully optimized SCED solution geared towards deploying reserves

  – Better align dispatch instructions and pricing

- PJM package compatible with existing market constructs and has flexibility to handle market evolutions.

  – Phased implementation and ease of tuning allows for smooth integration with Reserve Market changes

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