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# Reinforcement Guidelines

## Preliminary Needs - Update

Stakeholder and Customer Presentation – May 7, 2013

# Outline

- Traditional Guidelines
- Revised Goal of Initiative
- Approach
- Preliminary Needs
- Next Steps

# ATC Traditional Guidelines

- A. Intact: reinforce if out of criteria for likely dispatch
- B. Singles
  - Peak Load dispatch: reinforce if out of criteria
  - Sensitivity dispatches: reinforce if economic benefits
- C. Select Multiples: rely on system adjustments and load shedding

How much load shed might be needed for C?

What potential projects would avoid load shed?

What guidelines do we need to reinforce for C?

# Revised Goal of Initiative

- A. Provide planners with guides for when to reinforce
- B. Management Input on concepts
- C. Stakeholder input on needs and concepts
- D. Develop recommendations for guidelines

# Approach

- A. Prioritize outage categories for guideline development
  - A. Risk of event occurring
  - B. Focus on single initiating event
- B. Gather data to support risk assessments
- C. Determine impact of guidelines
  - A. Equipment
  - B. Customer
    - A. Numbers
    - B. MW
    - C. Duration
    - D. Customer outage cost?
  - C. Reinforcement cost to avoid impact

# 2022 Peak: Outages & Load Shed

| <b>Outage type</b> | <b>&gt; 300 MW<br/>Load Shed</b> | <b>100-300 MW<br/>Load Shed</b> | <b>&lt; 100 MW<br/>Load Shed</b> |
|--------------------|----------------------------------|---------------------------------|----------------------------------|
| A and B            | 0                                | 0                               | 0                                |
| C1 and C2          | 0                                | 0                               | 18                               |
| C3                 | 5                                | 24                              | 152                              |
| C5                 | 1                                | 0                               | 3                                |
| <b>Total</b>       | <b>6</b>                         | <b>24</b>                       | <b>173</b>                       |

# 2022 Off-Peak: Outages & Load Shed

| Outage type     | > 300 MW Load Shed | 100-300 MW Load shed | < 100 MW Load Shed |
|-----------------|--------------------|----------------------|--------------------|
| A and B         | 0                  | 0                    | 0                  |
| Prior + B       | 0                  | 15                   | 117                |
| Prior + C1 & C2 | 2                  | 19                   | 106                |
| Prior + C5      | 2                  | 6                    | 102                |
| <b>Total</b>    | <b>4</b>           | <b>40</b>            | <b>325</b>         |

# Examples of Potential Projects to Address >300 MW Load Shed

| Potential Project                         | Outage combination addressed  | Outage type | Cost Estimate (M) |
|---|---|-------------|-------------------|
| Rebuild Y-54 Paddock-Shaw 69 kV line      | Paddock-Blackhawk 138 kV line plus Rock River bus #1 or #3                                      | Maint+C1    | \$10              |
| Rebuild Y-153 Colley Road-Shaw 69 kV line | Paddock-Blackhawk 138 kV line plus Rock River bus #1 or #3                                      | Maint+C1    | \$10              |
| Uprate Maple-Saukville 138 kV line        | Sussex-Tamarack 138 kV line plus Arcadian-Waukesha 138 kV tower                                 | Maint+C5    | \$5               |
| New Hilltop-Pine 115 kV line              | Gardner Park-Aurora Street 115 kV line + Maine-Hilltop 115 kV or Gardner Park-Kelly 115 kV line | C3          | \$40              |
| <b>Total</b>                              |   |             | <b>\$65</b>       |



# Next Steps

- **Phase 1 (2013 Assessment): within Emergency Limits**
  - Needs compiled by end Q4 2012 **DONE**
  - Preliminary solutions developed for those needs > 300 MW load shed by end Q1 2013 **DONE**
  - Cost Impact of potential solutions >300 MW by Q2 2013 **DONE**
- **Phase 2 (2014 Assessment) within Normal Limits**
  - Incorporate single initiating events analysis
  - Assess additional Needs to stay within normal limits, Q4 2013
  - Preliminary solutions developed for needs exceeding 300 MW load loss end Q1 2014
- **Phase 3 (2015 assessment) Planning Criteria**
  - Assess need for Reinforcement Criteria or Guidelines, Q3 2014
  - Implement appropriate actions to codify recommendations

# Questions?

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# Analysis Assumptions - Models

- Peak: 2012 TYA, 2022 Summer
- Off-Peak: 2012 TYA, 2022 70% Load
  - West-to-East Flow bias
  - Adjusted for maintenance load level

# Analysis Assumptions - Outages

- **Peak**
  - bus section (C1 and 69 kV)
  - breaker failure (C2 and 69 kV)
  - More severe doubles (C3 some 69 kV)
  - Doubles on common tower (C5 and 69 kV)
- **Off-Peak**
  - All of peak outages
  - More severe Prior Maintenance +
    - B, C1, C2, more severe C3, C5 and some 69 kV