



California ISO  
Shaping a Renewed Future

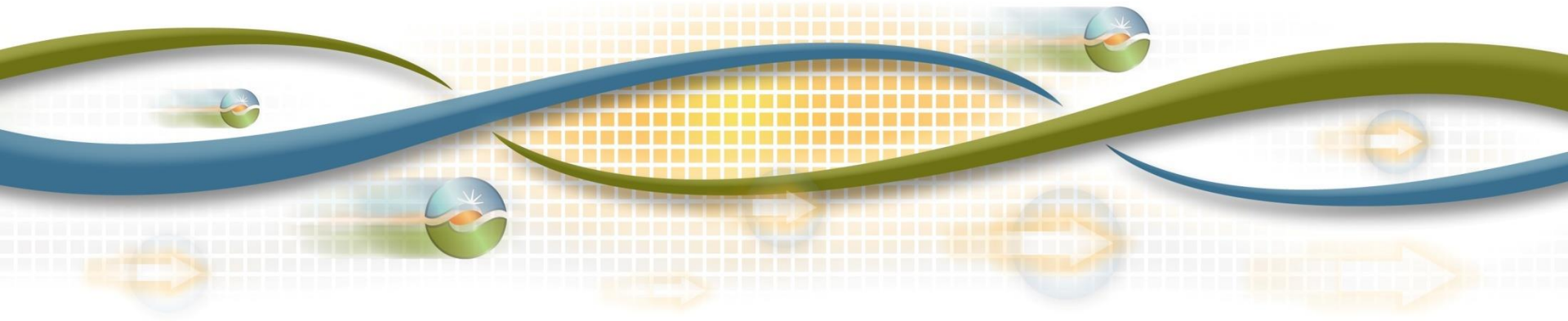
# 2015 and 2019 Final LCR Study Results - Fresno and Kern

Joseph E Meier, P.E.

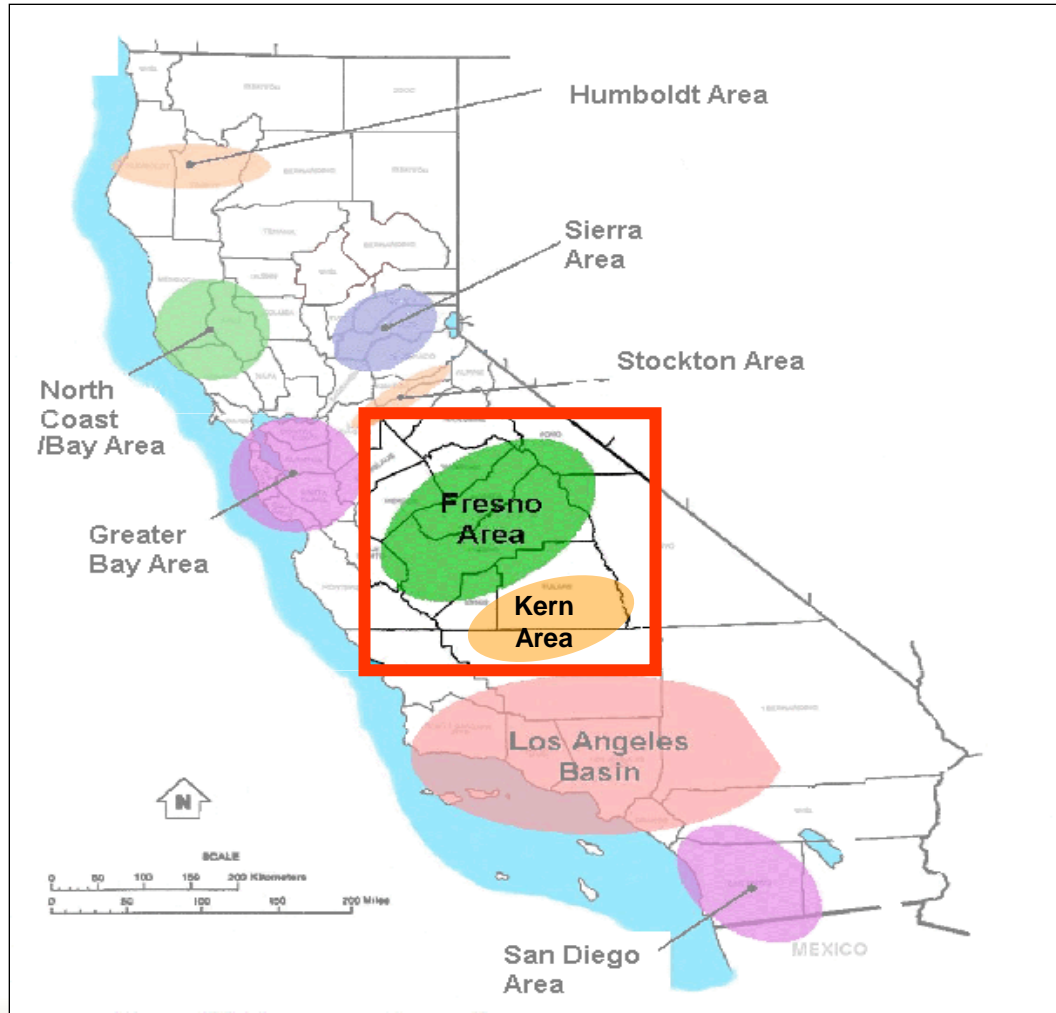
Senior Regional Transmission Engineer

Stakeholder Web Conference

April 10, 2014



# Fresno and Kern LCR Areas



# Kern Area Overview

## Area Generation, Load and Transmission

### Kern LCR Area

#### **Total Generation and Load for 2015:**

- **Generation (NQC plus new unit): 495 MW**
- **Load (1-in-10 Summer-Peak): 731 MW**

#### **Total Generation and Load for 2019:**

- **Generation (NQC plus new unit): 312 MW**
- **Load (1-in-10 Summer-Peak): 745 MW**

# Kern Area LCR

## 2015 West Park Sub-Area

### Limiting Contingencies:

#### Category B:

- G-1/L-1: Kern-West Park #1 OR #2 115 kV with PSE-Bear generation out of service
- Constraint: Remaining Kern-West Park 115 kV line

#### Category C:

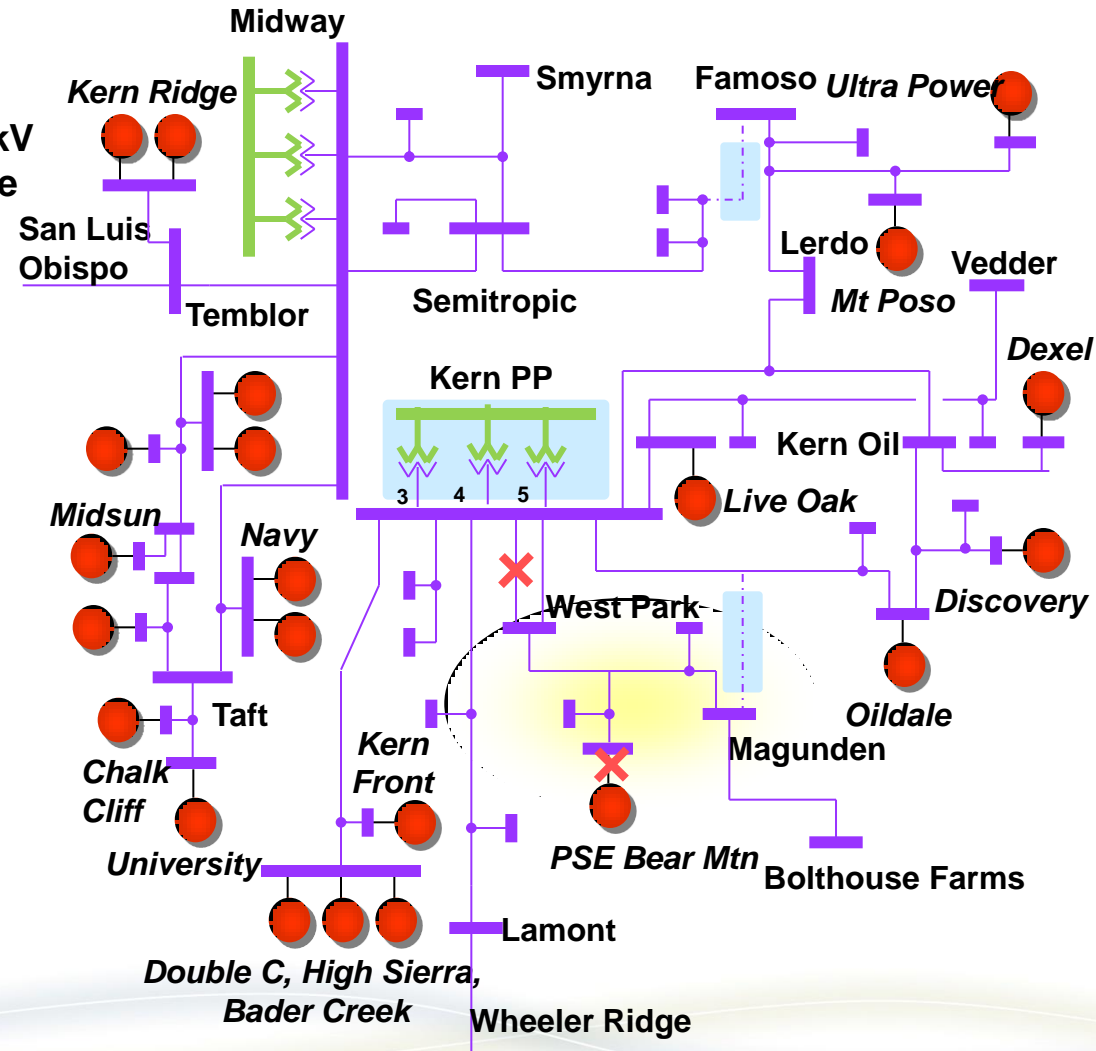
- Same as Category B

### LCR Results (MW):

Contingency	Cat. B	Cat. C
LCR	71	71

Including:

QF	44	44
Muni	0	0
Deficiency	26	26



# Kern Area LCR

## 2015 South Kern PP Sub-Area

### Limiting Contingencies:

#### Category B:

- G-1/L-1: Kern-Magunden-Witco 115 kV with Mt Poso generation out of service
- Constraint: Kern-Live Oak 115kV

#### Category C:

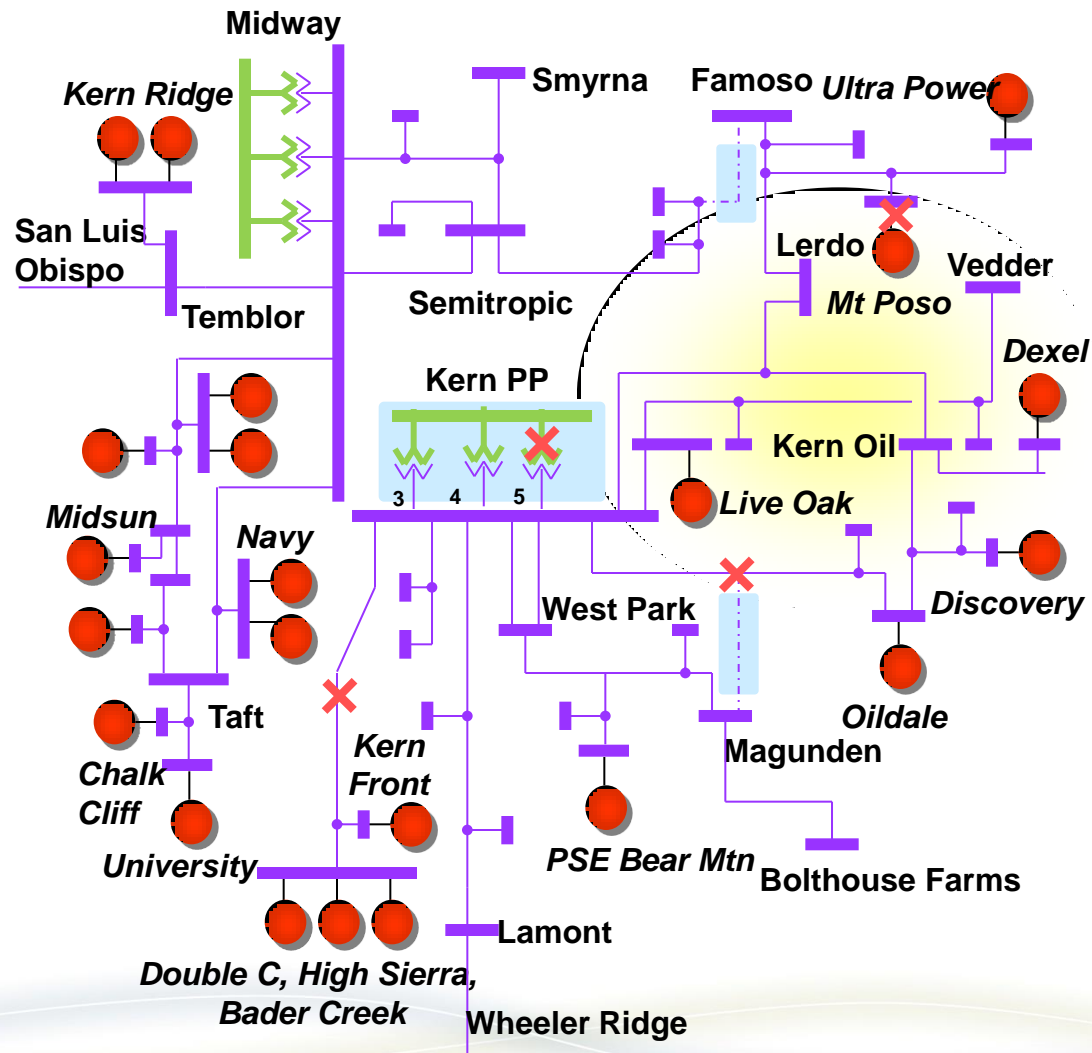
- Kern-Kern Front 115 kV & Kern #5 230/115 kV
- Constraint: Kern #4 230/115 kV

### LCR Results (MW):

Contingency	Cat. B	Cat. C
LCR	108	411

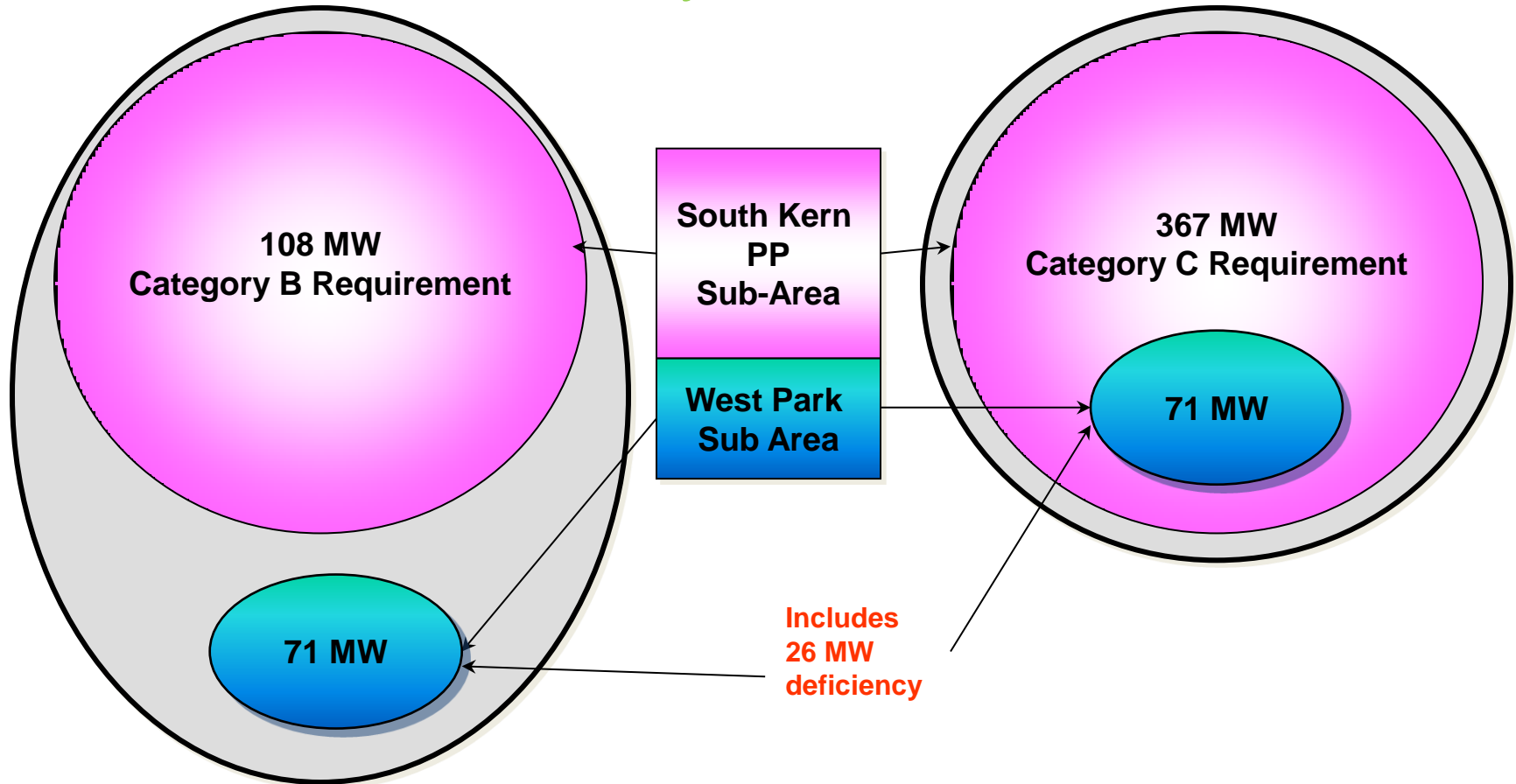
Including:

QF	408	408
Muni	0	0
Deficiency	0	0



# Kern Area LCR

## Summary of 2015 LCR



Note:

Category B sub-areas no longer overlap with the Kern-Magunden-Witco 115 kV open at Magunden for Category B. These sub-areas overlap for Category C until Kern #4 230/115 kV is upgraded

# Kern Area LCR

## 2019 West Park Sub-Area

### Limiting Contingencies:

#### Category B:

- G-1/L-1: Kern-West Park #1 OR #2 115 kV with PSE-Bear generation out of service
- Constraint: Remaining Kern-West Park 115 kV line

#### Category C:

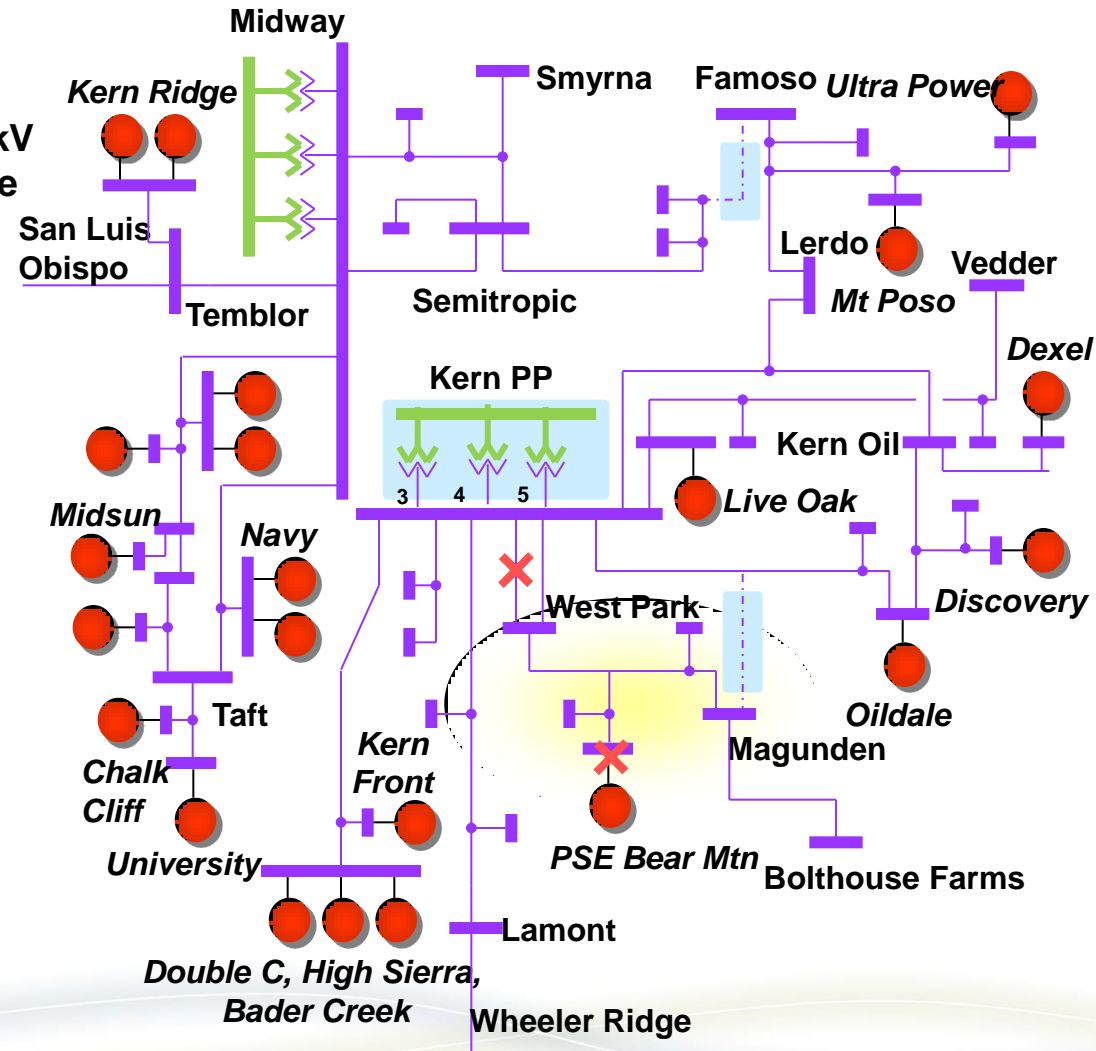
- Same as Category B

### LCR Results (MW):

Contingency	Cat. B	Cat. C
LCR	77	77

Including:

QF	45	45
Muni	0	0
Deficiency	32	32



# Kern Area LCR

## 2019 South Kern PP Sub-Area

### Limiting Contingencies:

#### Category B:

- G-1/L-1: Kern-Magunden-Witco 115 kV with Mt Poso generation out of service
- Constraint: Kern-Live Oak 115 kV line

#### Category C:

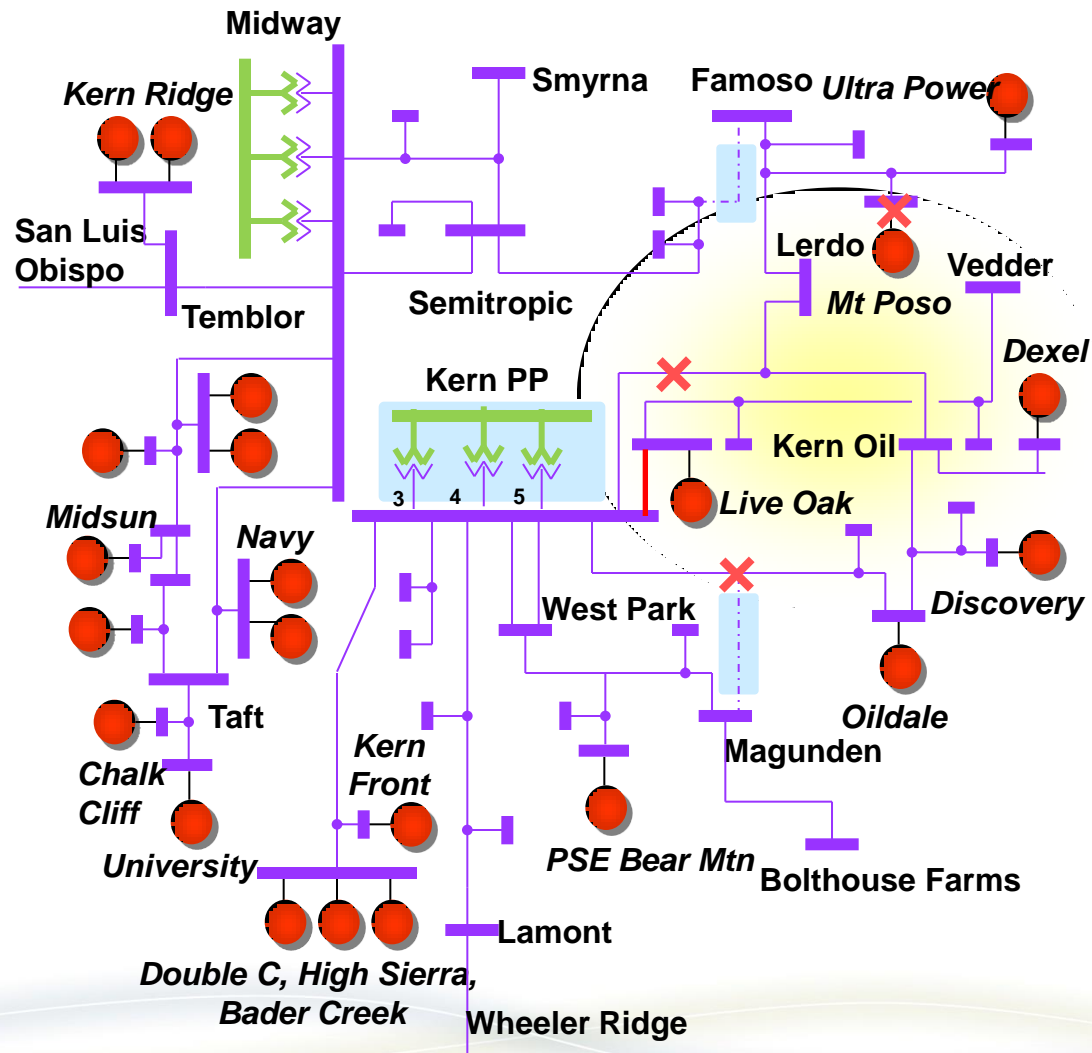
- Kern-Magunden-Witco & Kern-7<sup>th</sup> Standard 115 kV lines
- Constraint: Kern-Live Oak 115 kV line

### LCR Results (MW):

Contingency	Cat. B	Cat. C
LCR	111	116

Including:

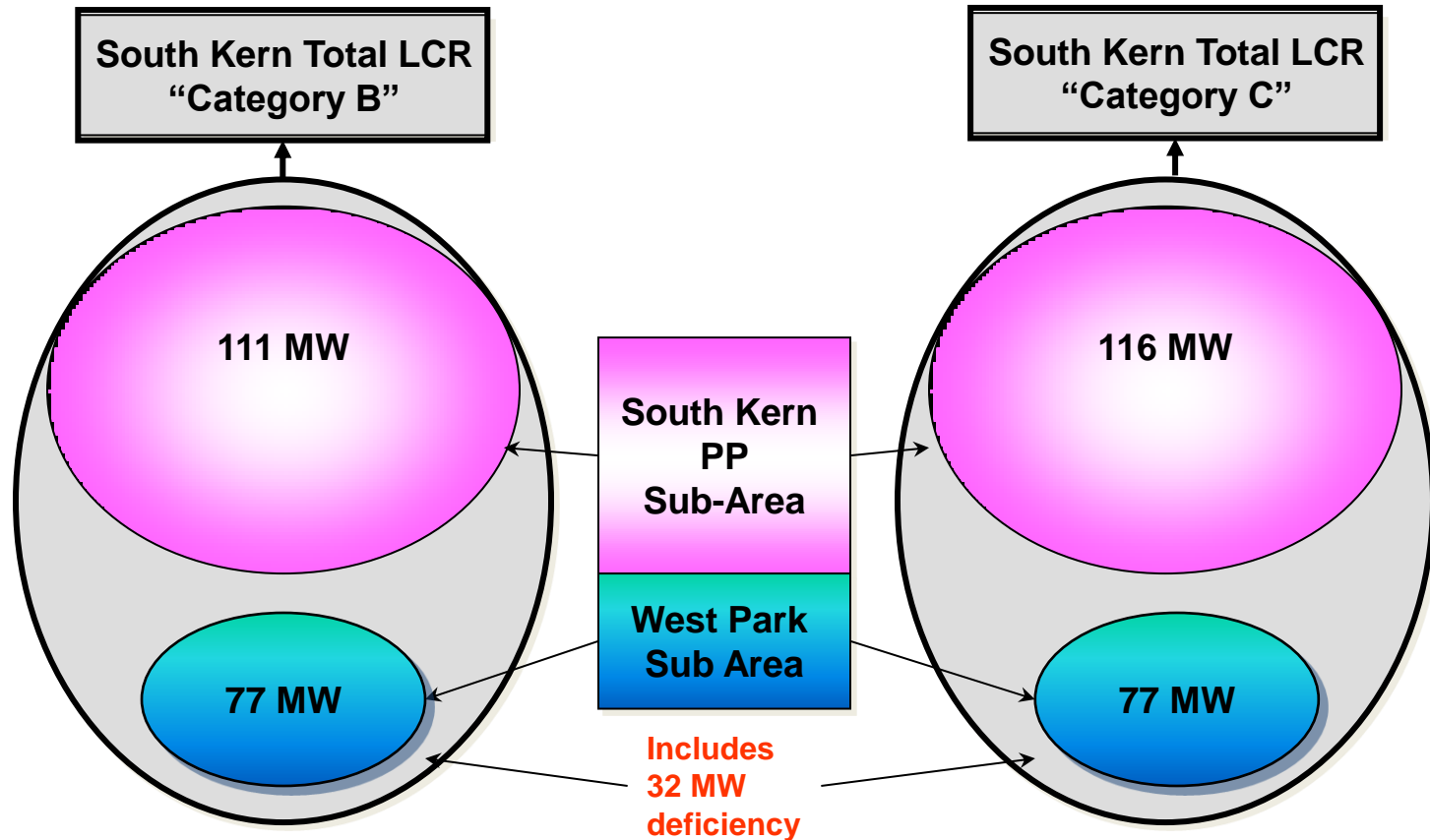
QF	225	225
Muni	0	0
Deficiency	0	0





# Kern Area LCR

## Summary of 2019 LCR



Note:

These sub-areas no longer overlap with the Kern-Magunden-Witco 115 kV open at Magunden and Kern PP #4 230/115 kV upgrade.

# Changes

## Since last year:

- 1) Famoso-Charca 115 kV normally opened
- 2) Kern-Magunden-Witco 115 kV normally opened at Magunden
- 3) LCR area split into three sub areas, Midway, West Park, & Kern South (Midway sub-area has no LCR requirement)
- 4) Local area needs redefinition
- 5) 2015 LCR has decreased by about 24 MW from 2014
- 6) Kern PP #4 230/115 kV no longer limiting in 2019 vs. 2015
- 7) 2019 LCR has decreased by about 281 MW from 2018 mostly due to Famoso-Charca 115 kV normally open

## Since last stakeholder call:

- 1) Updated NQC
- 2) Area re-definition for 2015 and another for 2019

**Your comments and questions are welcome.**

For written comments, please send to: [RegionalTransmission@caiso.com](mailto:RegionalTransmission@caiso.com)

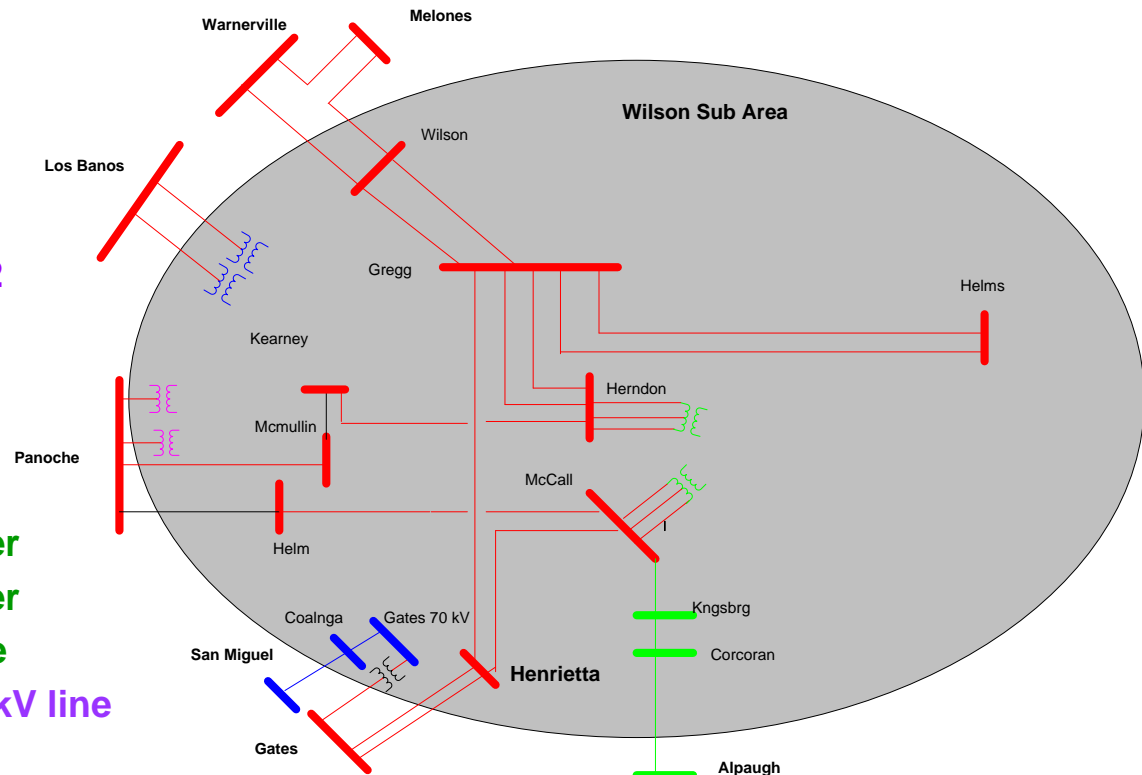
# Greater Fresno Area

## Electrical Boundaries and LCR Sub-Areas

### Electrical Boundaries:

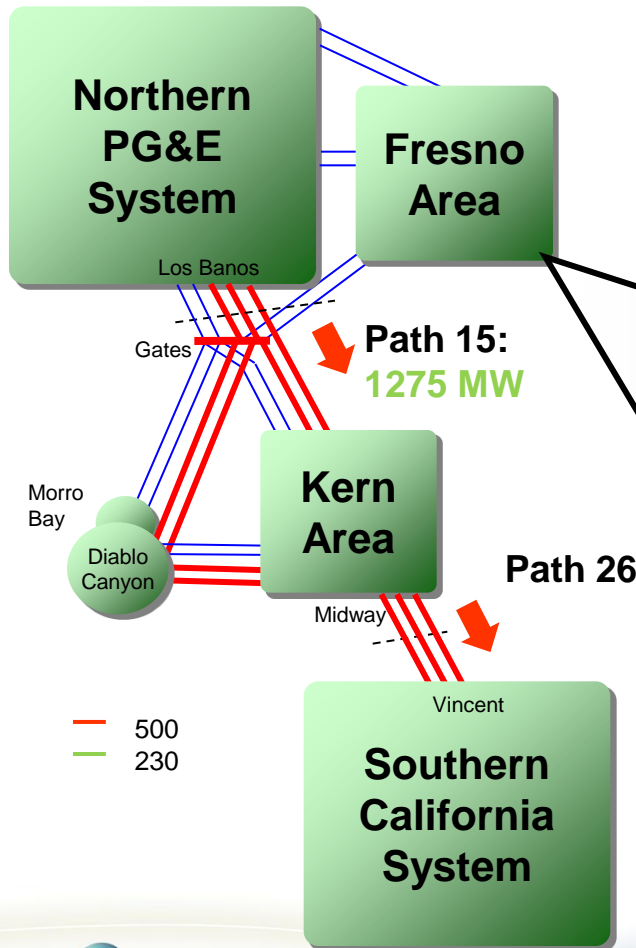
- Gates – McCall 230 kV line
- Gates – Gregg 230 kV line
- Gates 230/70 kV transformer #1
- Panoche 230/115 kV transformer #1
- Panoche 230/115 kV transformer #2
- Panoche – Kearney 230 kV line
- Panoche – Helm 230 kV line
- Warnerville – Wilson 230 kV line
- Melones – Wilson 230 kV line
- Los Banos #3 230/70 kV transformer
- Los Banos #4 230/70 kV transformer
- San Miguel – Coalinga #1 70 kV line
- Smyrna – Alpaugh – Corcoran 115 kV line

### LCR Sub-Areas:



# Fresno Area Overview

## Area Generation, Load, Transmission and Path Flows



### Fresno LCR Area

#### Total Generation and Load:

- Generation (NQC): **2848 MW**
- Load (1-in-10 Summer-Peak): **3215 MW (2015)**
- Load (1-in-10 Summer-Peak): **3258 MW (2019)**

#### Transmission Upgrades:

- Wilson Area Reinforcement in 2019 model
- Le Grand-Chowchilla 115 kV line reconducted in 2019 model
- Loop Gregg-Helms #1 & #2 230 kV and Kerckhoff-Clovis-Sanger #1 & #2 through new "E2" substation

#### New Generation:

- 6 new small resources

# Fresno Area LCR

## 2015 Hanford Sub-Area

### Limiting Contingencies:

#### Category B:

- G-1/L-1: McCall-Kingsburg #2 115 kV with GWF Hanford unit #1 out of service
- Constraint: McCall-Kingsburg #1 115 kV

#### Category C:

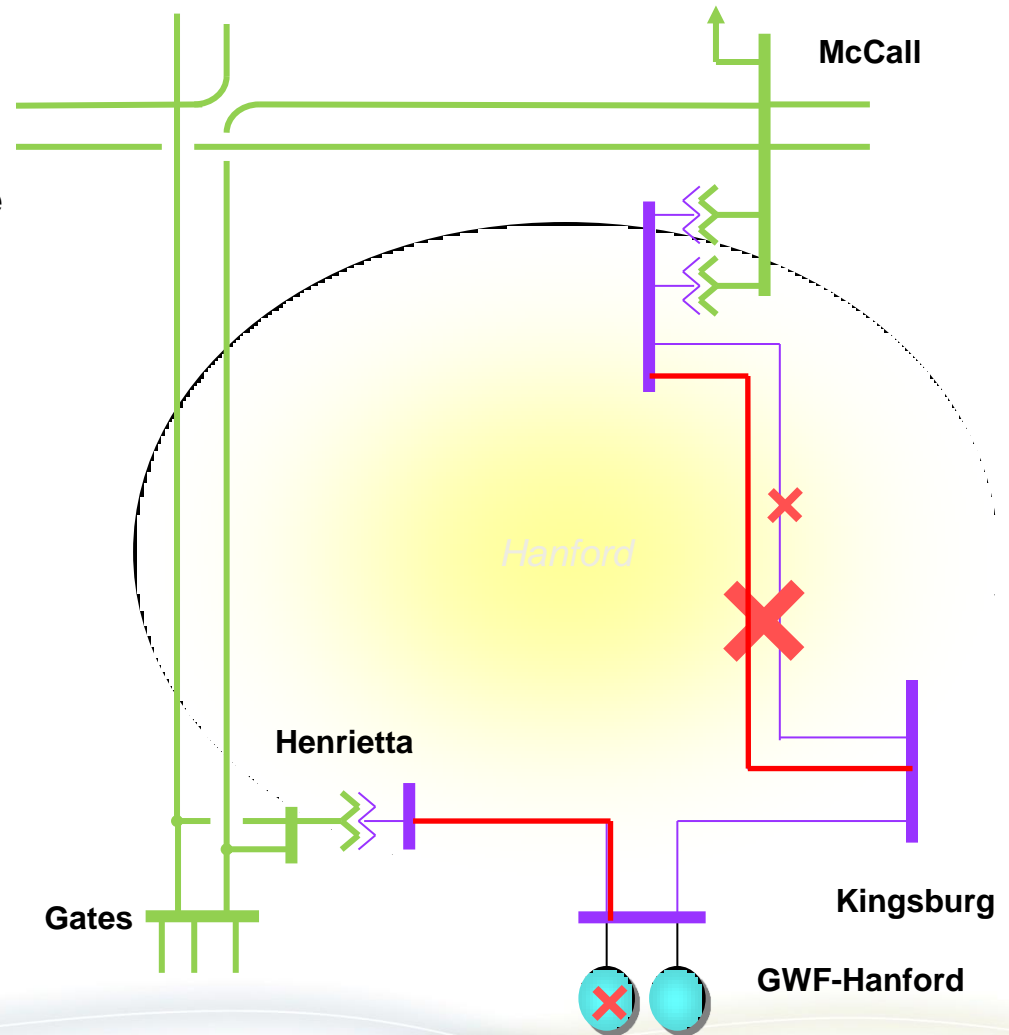
- L-2: McCall-Kingsburg #1 & #2 115 kV
- Constraint: Henrietta-GWF 115 kV

### LCR Results (MW):

Contingency	Cat. B	Cat. C
LCR	64	128

Including:

QF	28	28
Muni	0	0
Deficiency	0	0



# Fresno Area LCR

## 2015 Reedley Sub-Area

### Limiting Contingencies:

#### Category C:

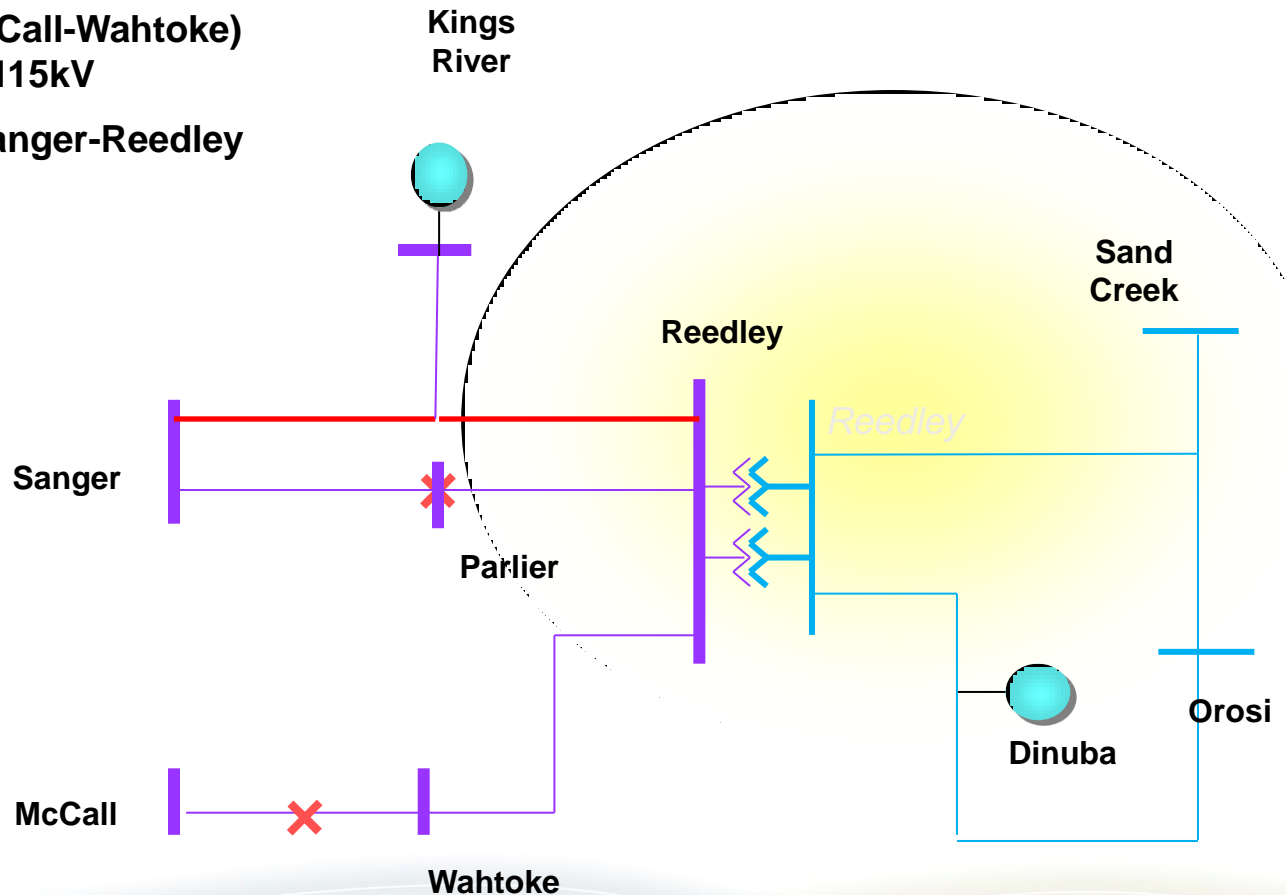
- L-1-1: McCall-Reedley (McCall-Wahtoke) 115 kV & Sanger-Reedley 115kV
- Constraint: Kings River-Sanger-Reedley 115 kV

#### LCR Results (MW):

Contingency	Cat. C
LCR	56

Including:

QF	10
Muni	0
Deficiency	46



# Fresno Area LCR

## 2015 Herndon Sub-Area

### Limiting Contingency:

#### Category B:

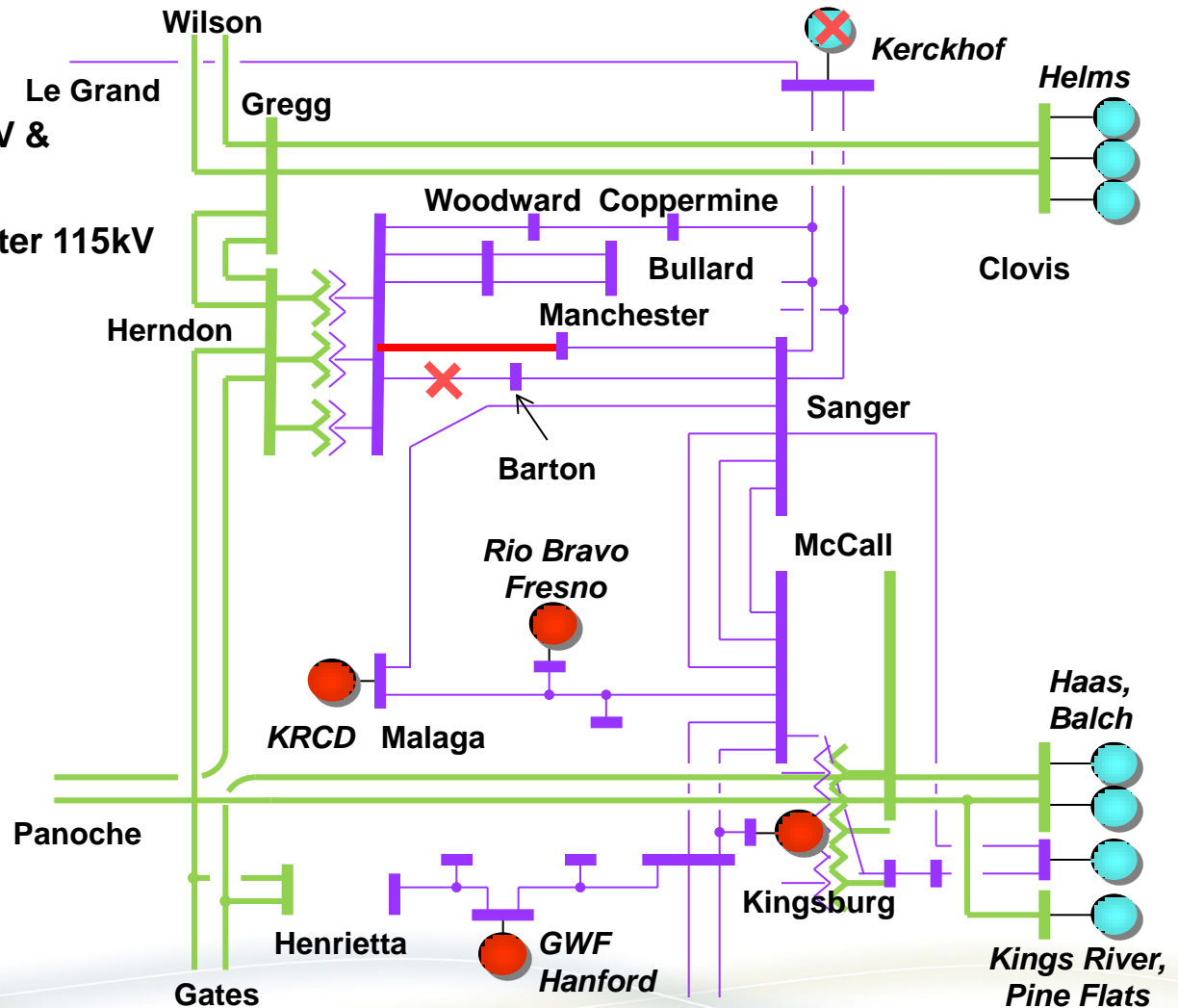
- L-1/G-1: Herndon-Barton 115kV & Kerckhoff 2 PH
- Constraint: Herndon-Manchester 115kV

### LCR Results (MW):

Contingency	Cat. B
LCR	439

Including:

QF	51
Muni	65
Deficiency	0



# Fresno Area LCR

## 2015 Wilson Sub-Area

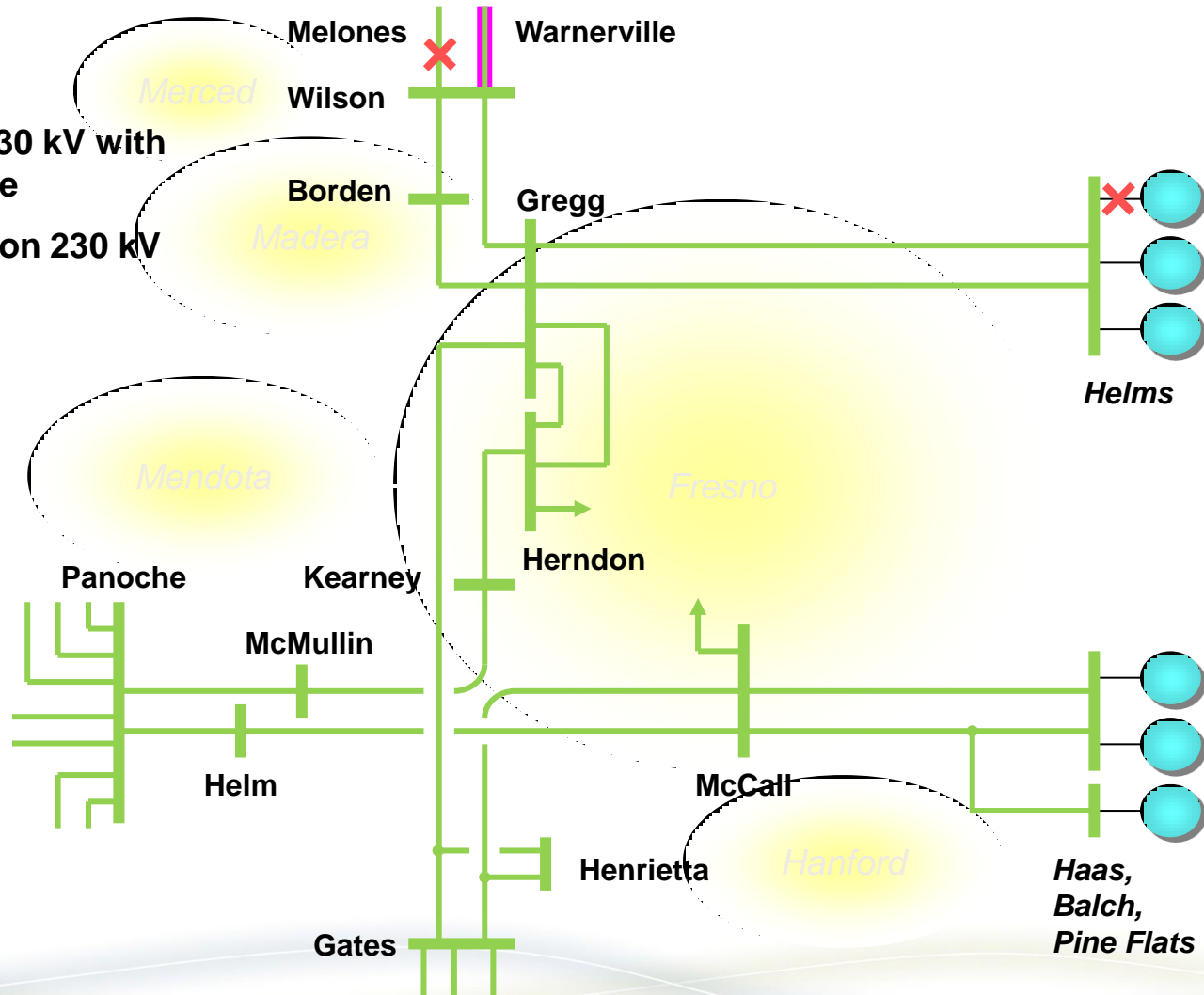
### Limiting Contingencies:

#### Category B:

- G-1/L-1: Melones – Wilson 230 kV with one Helms unit out of service
- Constraint: Warnerville-Wilson 230 kV

#### Category C:

- See next page



### LCR Results (MW):

Contingency	Cat. B
LCR	2393

Including:

QF	180
Muni	136
Deficiency	0



# Fresno Area LCR

## 2015 Wilson Sub-Area

### Limiting Contingencies:

#### Category C: - Contingency 1

- L-1/G-1: Melones – Wilson 230 kV followed by one Helms unit out
- Constraint: Warnerville-Wilson 230 kV
- LCR: 2393 MW

#### Category C: - Contingency 2

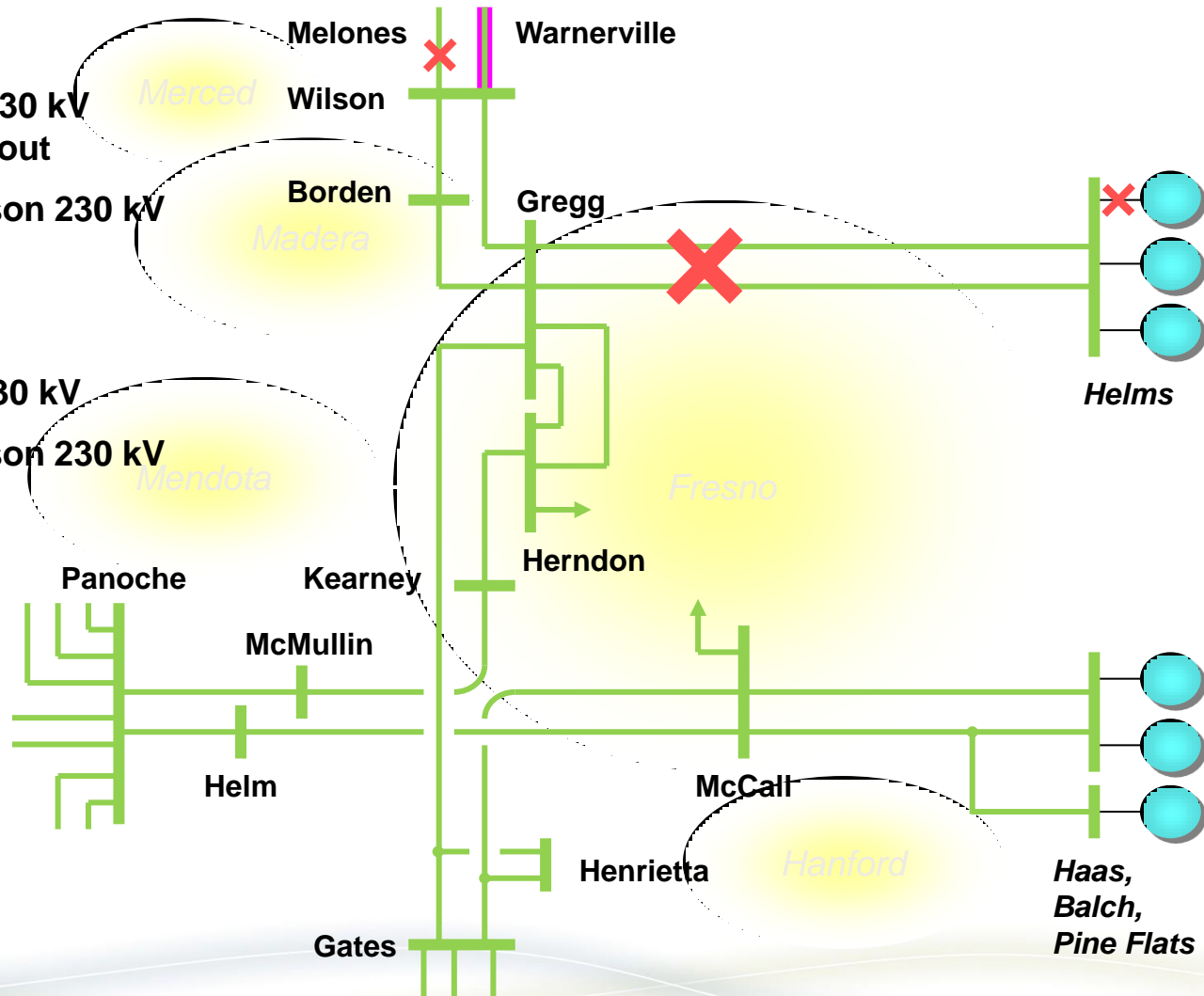
- L-2: Gregg-Helms #1 & #2 230 kV
- Constraint: Warnerville-Wilson 230 kV
- LCR: 1615 MW

#### LCR Results (MW):

Contingency	Cat. C
LCR	2393

Including:

QF	180
Muni	136
Deficiency	0



# Fresno Area LCR

## 2019 Hanford Sub-Area

### Limiting Contingencies:

#### Category B:

- L-1/G-1: McCall-Kingsburg #2 115 kV with GWF Hanford unit #1 out of service
- Constraint: McCall-Kingsburg #1 115 kV

#### Category C:

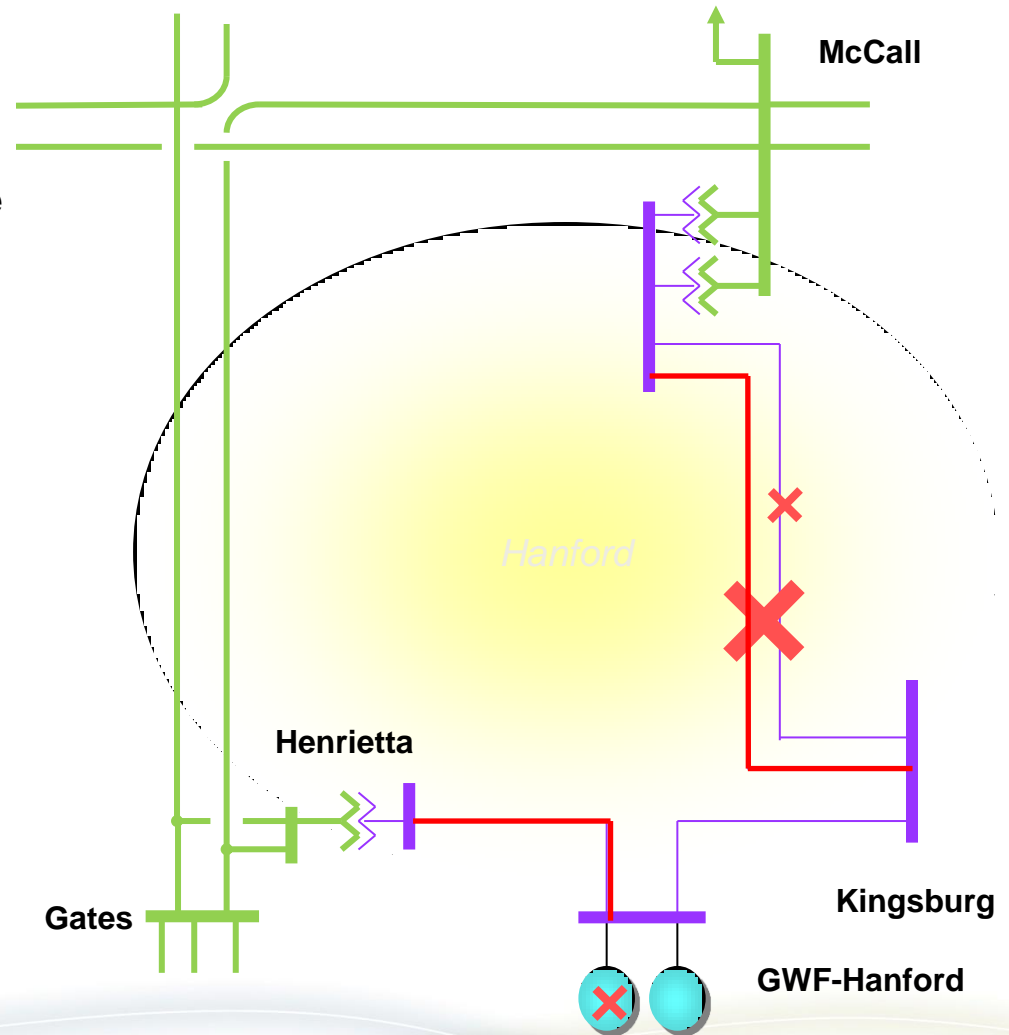
- L-2: McCall-Kingsburg #1 & #2 115 kV
- Constraint: Henrietta-GWF 115 kV

### LCR Results (MW):

Contingency	Cat. B	Cat. C
LCR	51	124

Including:

QF	28	28
Muni	0	0
Deficiency	0	0



# Fresno Area LCR

## 2019 Reedley Sub-Area

### Limiting Contingencies:

#### Category C:

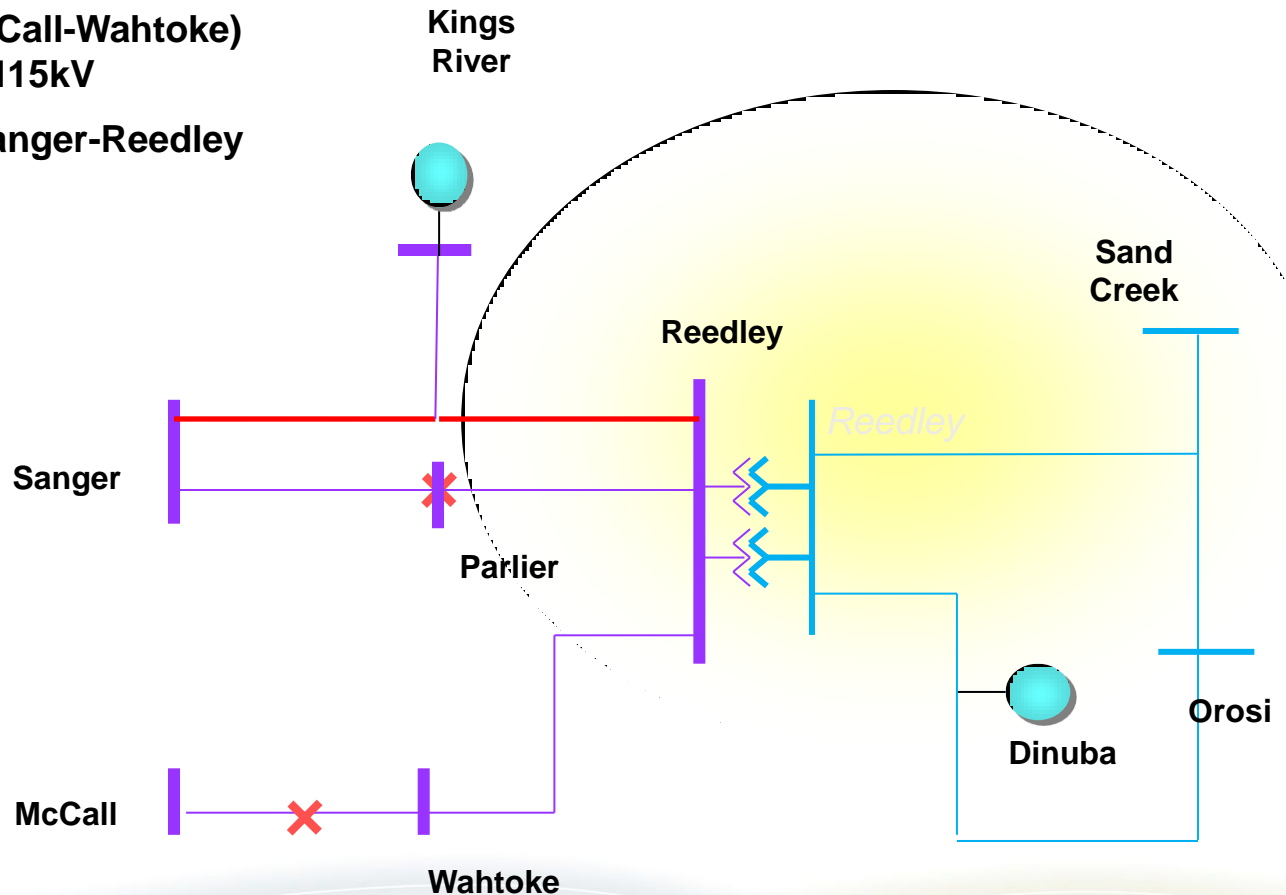
- L-1-1: McCall-Reedley (McCall-Wahtoke) 115 kV & Sanger-Reedley 115kV
- Constraint: Kings River-Sanger-Reedley 115 kV

#### LCR Results (MW):

Contingency	Cat. C
LCR	54

Including:

QF	10
Muni	0
Deficiency	44



# Fresno Area LCR

## 2019 Wilson Sub-Area

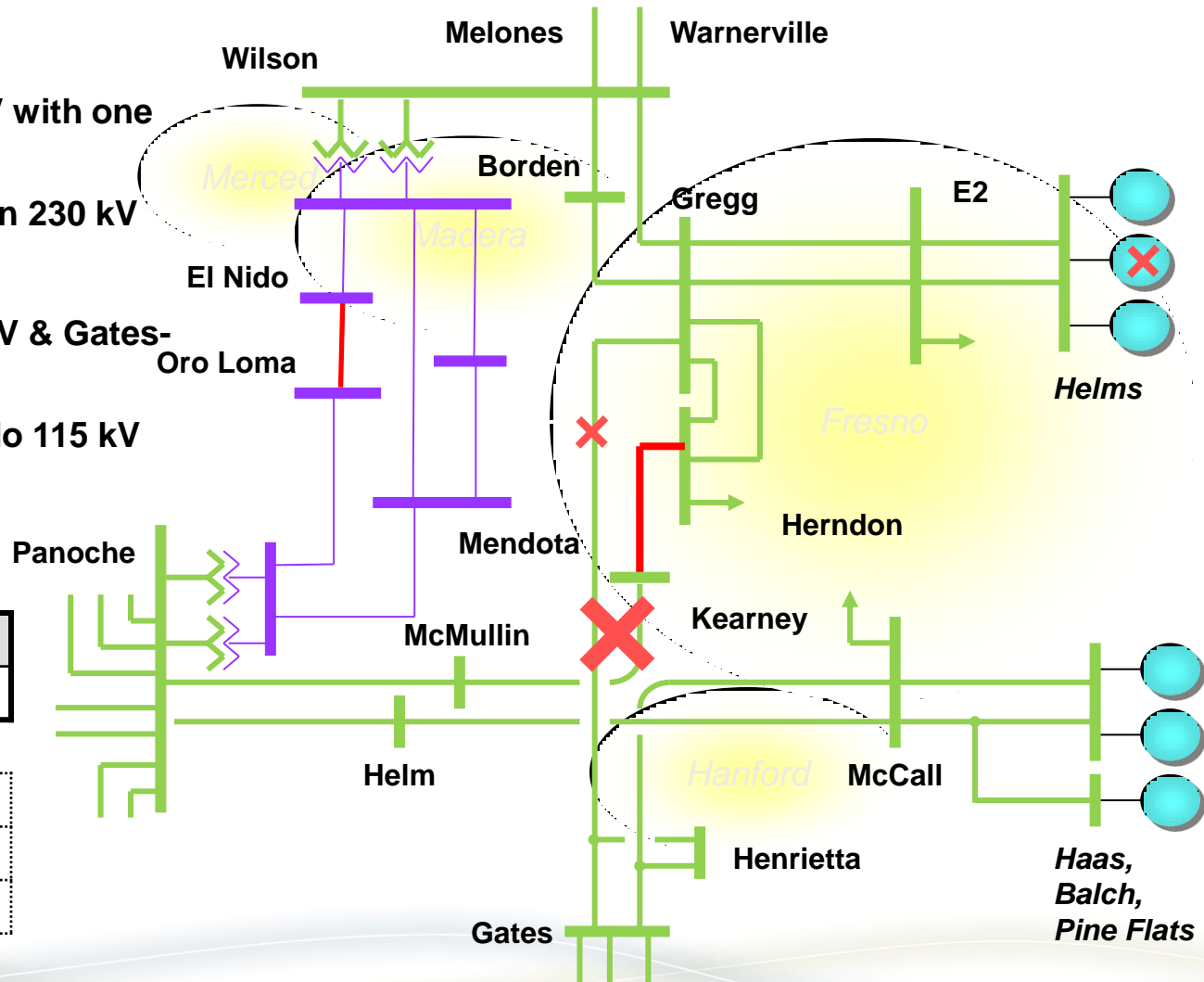
### Limiting Contingencies:

#### Category B:

- G-1/L-1: Gates-Gregg 230 kV with one Helms unit out of service
- Constraint: Kearney-Herndon 230 kV

#### Category C:

- L-2: Panoche-Kearney 230 kV & Gates-Gregg 230 kV
- Constraint: Oro Loma-El Nido 115 kV



### LCR Results (MW):

Contingency	Cat. B	Cat. C
LCR	1463	1545

Including:

QF	180	180
Muni	136	136
Deficiency	0	0

# Changes

## Since last year:

- 1) 2015 load decreased by 31 MW vs. 2014
- 2) LCR has increased by 665 MW of which 130 MW is deficiency due to effectiveness factors of resources required for the second most stringent contingency
- 3) 2019 series reactor at Wilson end of Warnerville-Wilson 230 kV
- 4) 2019 new “E2” sub station that loops Helms-Gregg #1 & #2 230 kV and Kerckhoff-Clovis-Sanger #1 & #2 115 kV lines and 2 new 420 MVA transformers
- 5) 2019 load decreased by 143 MW vs. 2018
- 6) LCR has decreased by 545 MW, mostly due to new reactor at Wilson.

## Since last stakeholder call:

- 1) Updated NQC

**Your comments and questions are welcome.**

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