



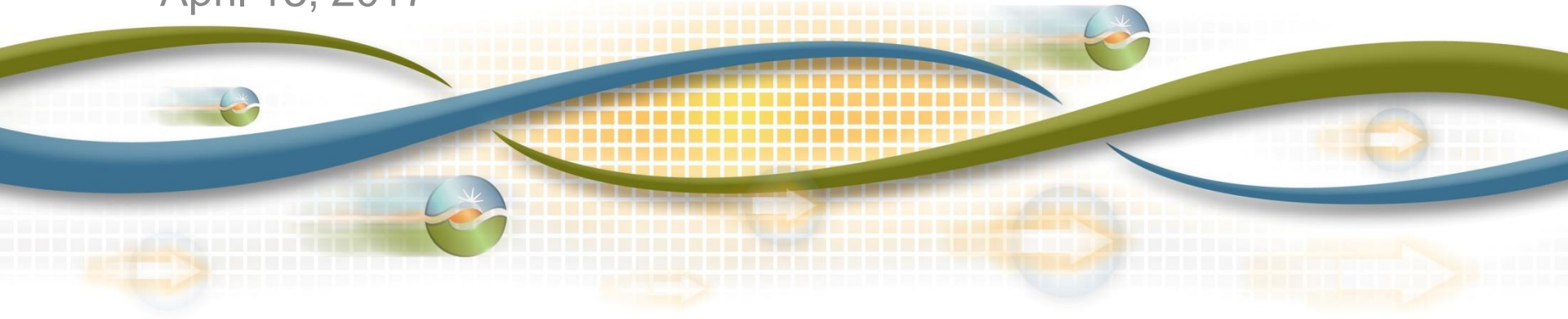
2018 & 22 Final LCR Study Results Fresno Area

Vera Hart

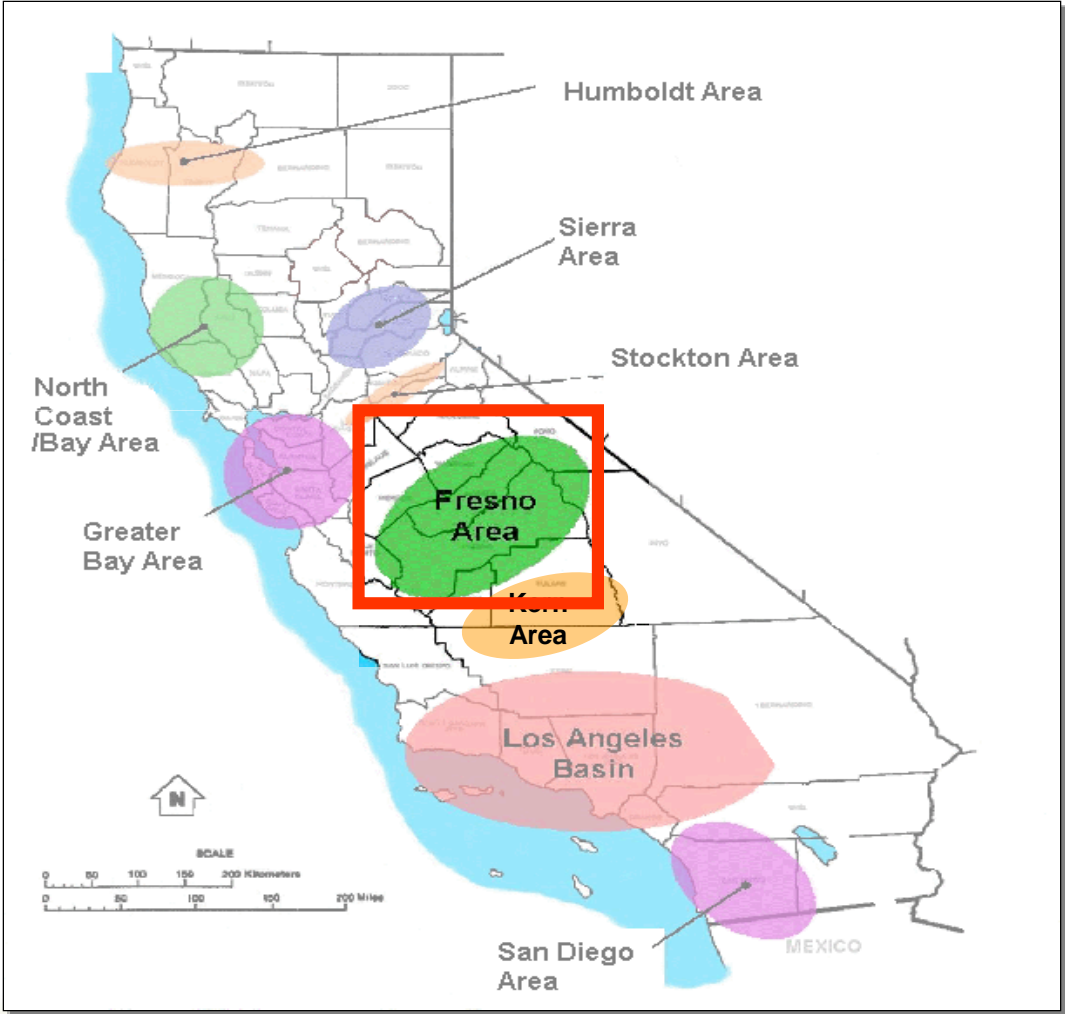
Sr. Regional Transmission Engineer

Stakeholder Call

April 13, 2017



Fresno LCR Area



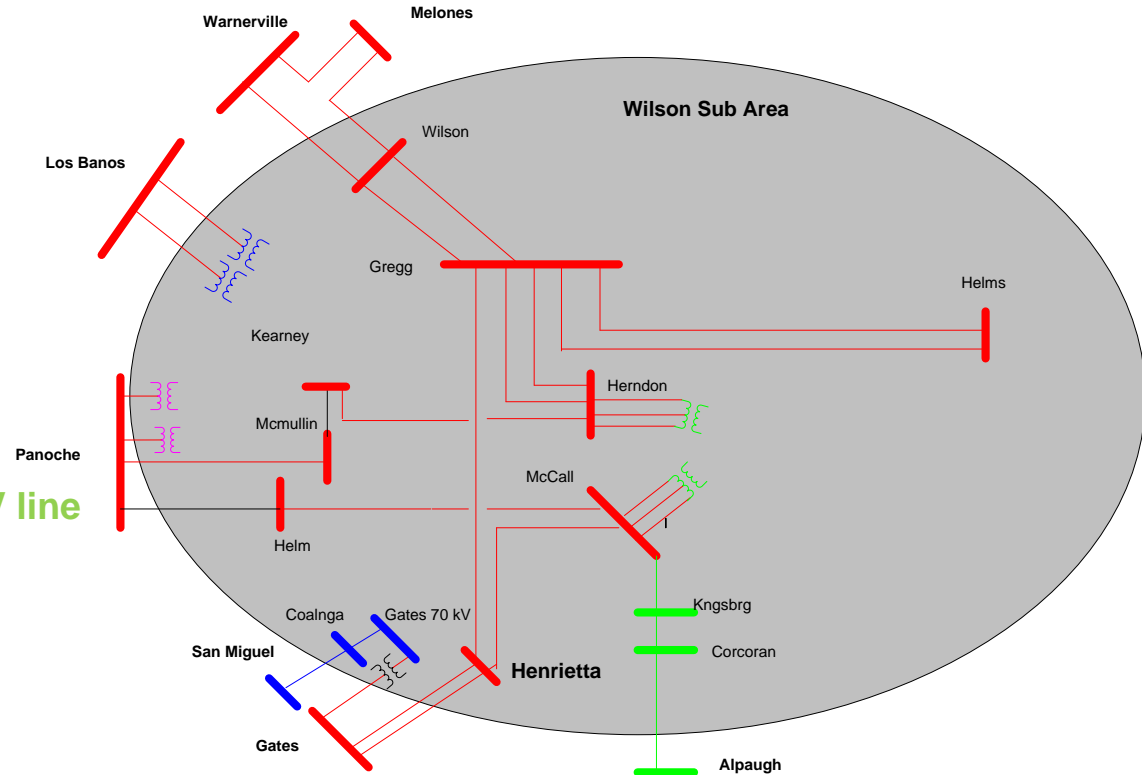
Greater Fresno Area

Electrical Boundaries and LCR Sub-Areas

Electrical Boundaries:

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

LCR Sub-Areas:



Fresno Area Load and Resources (MW)

		2018	2022
Gross Load	=	3374	3544
AAEE	=	-46	-99
DG	=	-139	-198
Net Load	=	3189	3247
Transmission Losses	=	101	105
Net Load + Losses	=	3290	3352
Market Generation	=	3215	3215
Muni Generation	=	316	316
QF Generation	=	48	48
Total Qualifying Capacity	=	3579	3579

New transmission projects modeled:

1. Series Reactor on Warnerville-Wilson 230 kV Line (Dec 2017)
2. Helm - Kerman 70 kV Line Reconductor (Dec 2017)
3. Reedley-Orosi 70 kV Line Reconductor (2018)
4. Gregg - Herndon #2 230 kV Line Circuit Breaker Upgrade (2018)
5. Los Banos - Livingston Jct - Canal 70 kV Switch Replacement (2018)
6. Gregg-Herndon #2 230 kV Line Circuit Breaker (2018)
7. Oro Loma 115 kV Breaker-and-a-Half Installation (2018)
8. Ashlan-Gregg and Ashlan-Herndon 230 kV Reconductor (2018)
9. Reedley-Dinuba 70 kV Line Reconductor (2019)
10. Kearney-Herndon 230 kV Line Reconductor (2019)
11. Helm-Stroud Switching Station 70 kV Line Reconductoring Project (2019)

New transmission projects modeled Continues

12. Kearney-Caruthers 70 kV Reconductoring (2019)
13. Kingsburg-Lemoore 70 kV Line Reconductoring (2019)
14. Caruthers - Kingsburg 70 kV Reconductoring (2019)
15. Wilson 115 kV Area Reinforcement (2019)
16. Oro Loma- Mendota 115 kV Conversion Project
17. Reedley 70 kV Reinforcement (2020)
18. Wilson-Legrand 115 kV Reconductoring (2020)
19. Panoche-Oro Loma 115 kV Reconductoring (2020)
20. Kearney-Kerman 70 kV Line Reconductor (2021)
21. McCall - Reedley 115 kV Line No. 2 Project (2022)

Fresno Area LCR

Hanford Sub-Area

Limiting Contingencies:

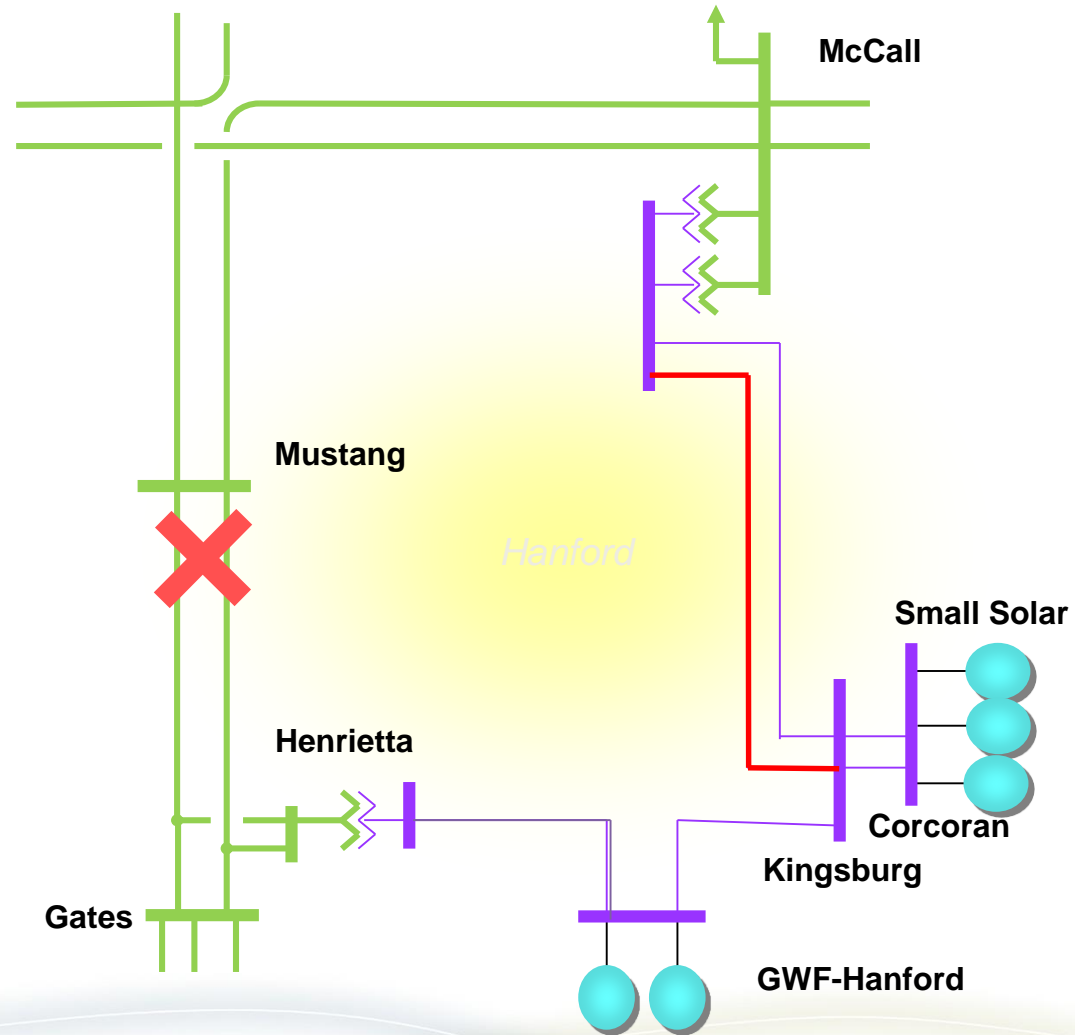
Category P7:

- L-2 Gates-Mustang #1 and Gates-Mustang #2 230kV Lines
- Constraint McCall-Kingsburg #1 115kV line

Category P1: No LCR need

LCR Results (MW):

Contingency	Cat. P7. P15 S-N
2018 LCR	150
2022 LCR	148



Fresno Area LCR

Coalinga Sub-Area

Limiting Contingencies:

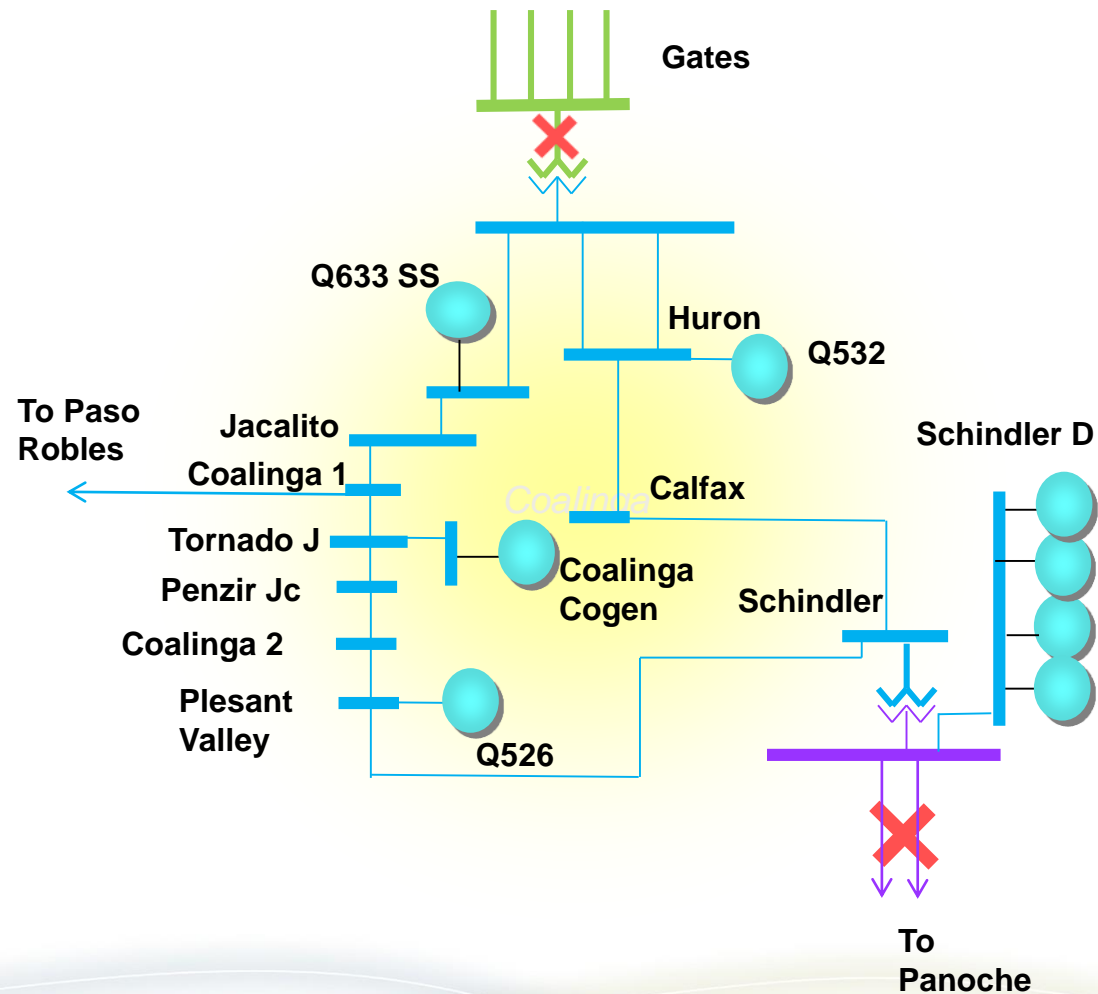
Category P1-P7:

- T-1/L-2: Gates 230/70kV TB #5 and Panoche-Schindler #1 & #2 115kV common tower lines
- Constraint: Voltage instability

Category P1: No LCR need

LCR Results (MW):

Contingency	Cat. P1-P7 N-S
2018 LCR	28
2022 LCR	32



Fresno Area LCR

Borden Sub-Area

Limiting Contingencies:

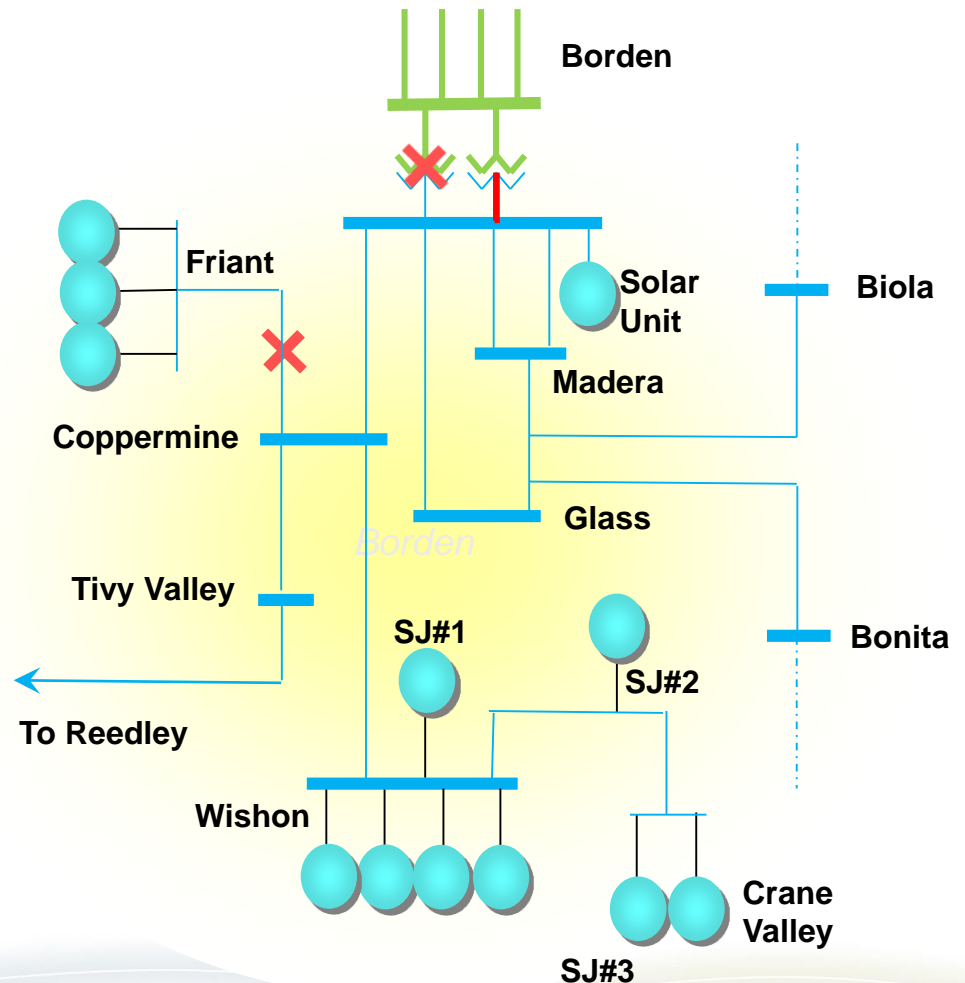
Category P1: No LCR need

Category P6:

- L-1/T-1: Friant - Coppermine 70 kV and Borden 230/70 kV # 2
- Constraint: Borden 230/70 kV # 1

LCR Results (MW):

Contingency	Cat. P6
2018 LCR	18
2022 LCR	19



Fresno Area LCR

Reedley Sub-Area

Limiting Contingencies:

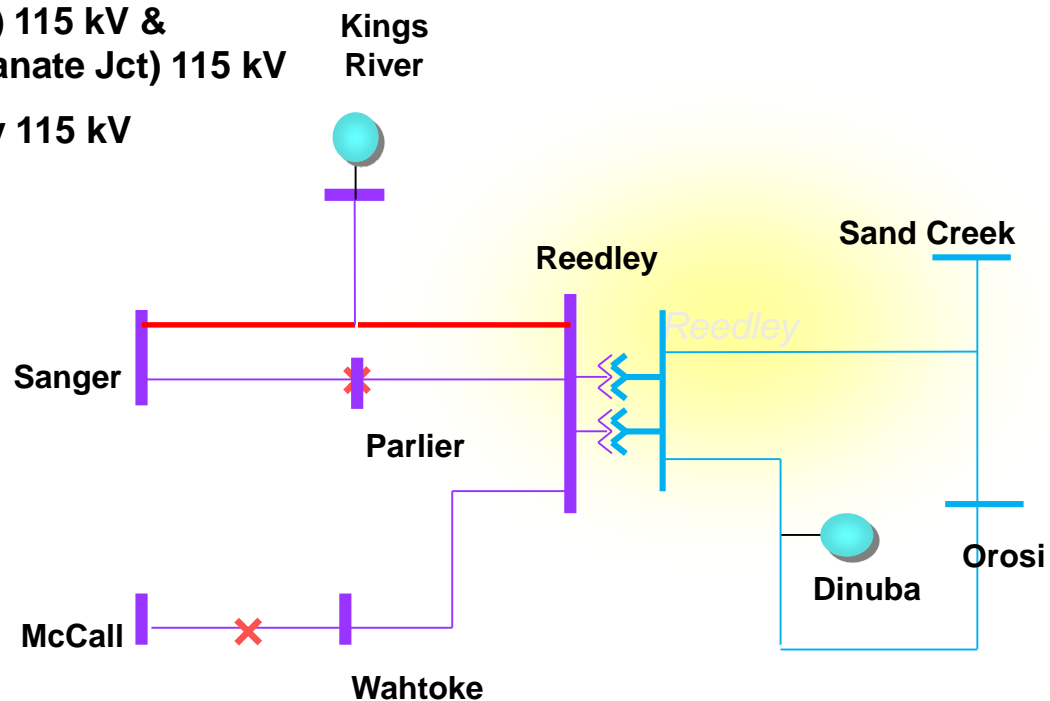
Category P6:

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

Category P1: No LCR need

LCR Results (MW):

Contingency	Cat. P6 S-N
2018 LCR	19
2022 LCR	0



In 2022 eliminated due to McCall-Reedley # 2 115 kV line project.

Fresno Area LCR

2018 Herndon Sub-Area

Limiting Contingency:

Category P3:

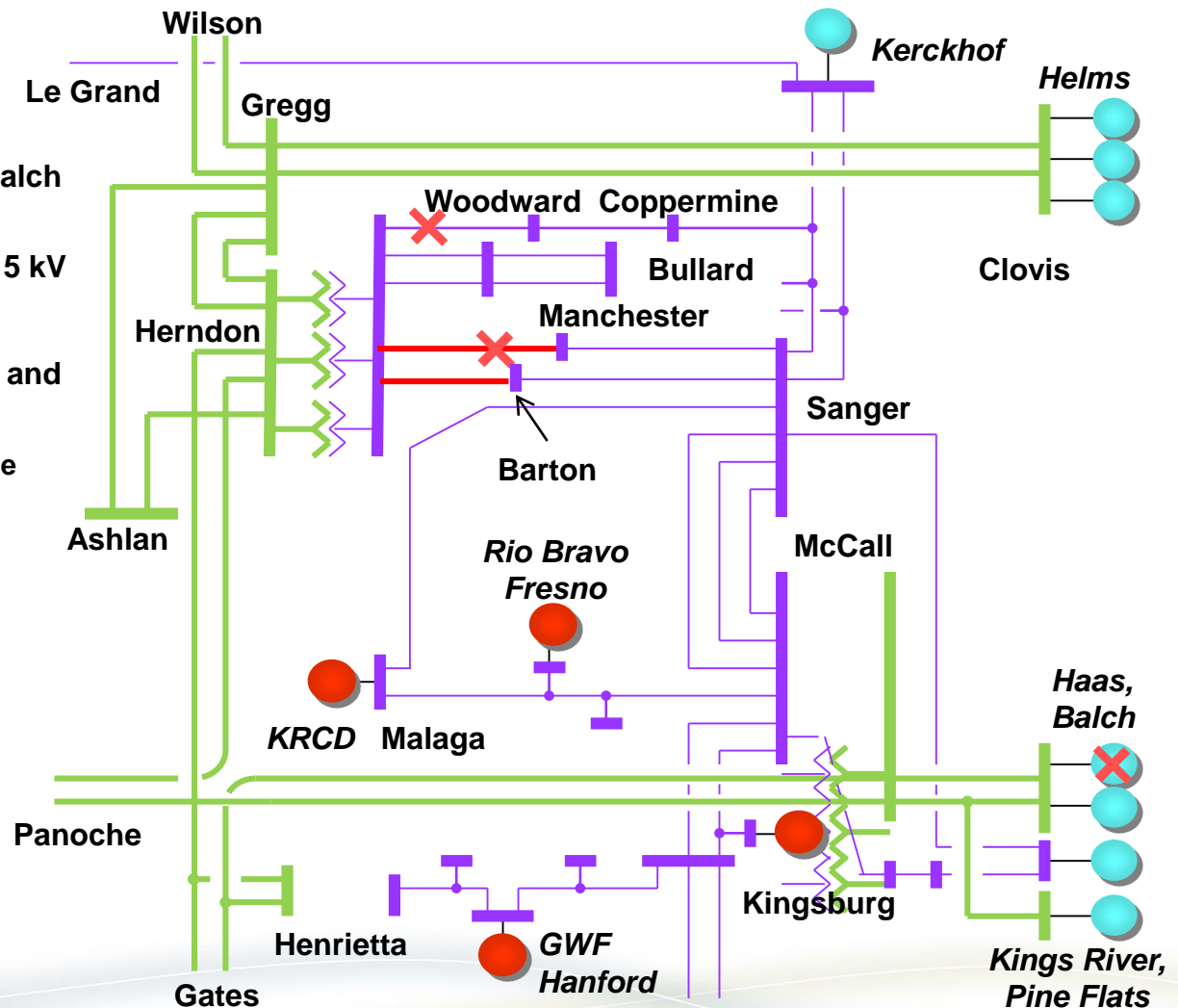
- G-1/L-1: Herndon-Barton 115kV & Balch 1
- Constraint: Herndon-Manchester 115 kV

Category P6:

- L-2: Herndon-Woodward 115kV line and Herndon-Manchester 115kV
- Constraint: Herndon-Barton 115kV line

LCR Results (MW):

Contingency	Cat. P3 N-S	Cat. P6 N-S
LCR	425	880



Fresno Area LCR

2022 Herndon Sub-Area

Limiting Contingency:

Category P3:

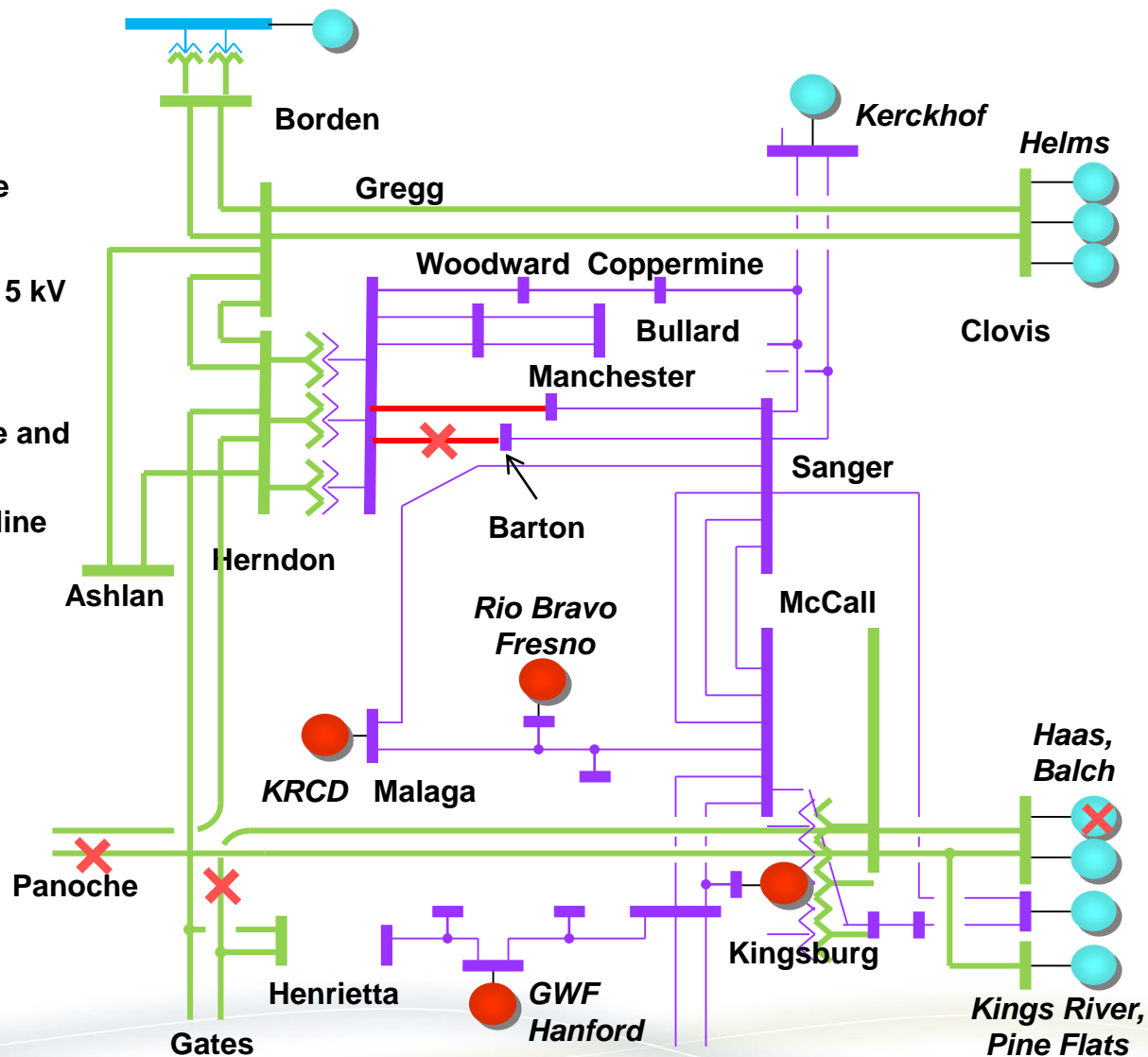
- G-1/L-1: Herndon-Barton 115 kV line and Balch 1 unit
- Constraint: Herndon-Manchester 115 kV line

Category P6:

- L-2: Herndon-Woodward 115kV line and Herndon-Manchester 115kV
- Constraint: Herndon-Barton 115kV line

LCR Results (MW):

Contingency	Cat. P3	Cat. P6
LCR	327	852



Fresno Area LCR

2018 Overall (Wilson Sub-Area)

Limiting Contingencies:

Category P3:

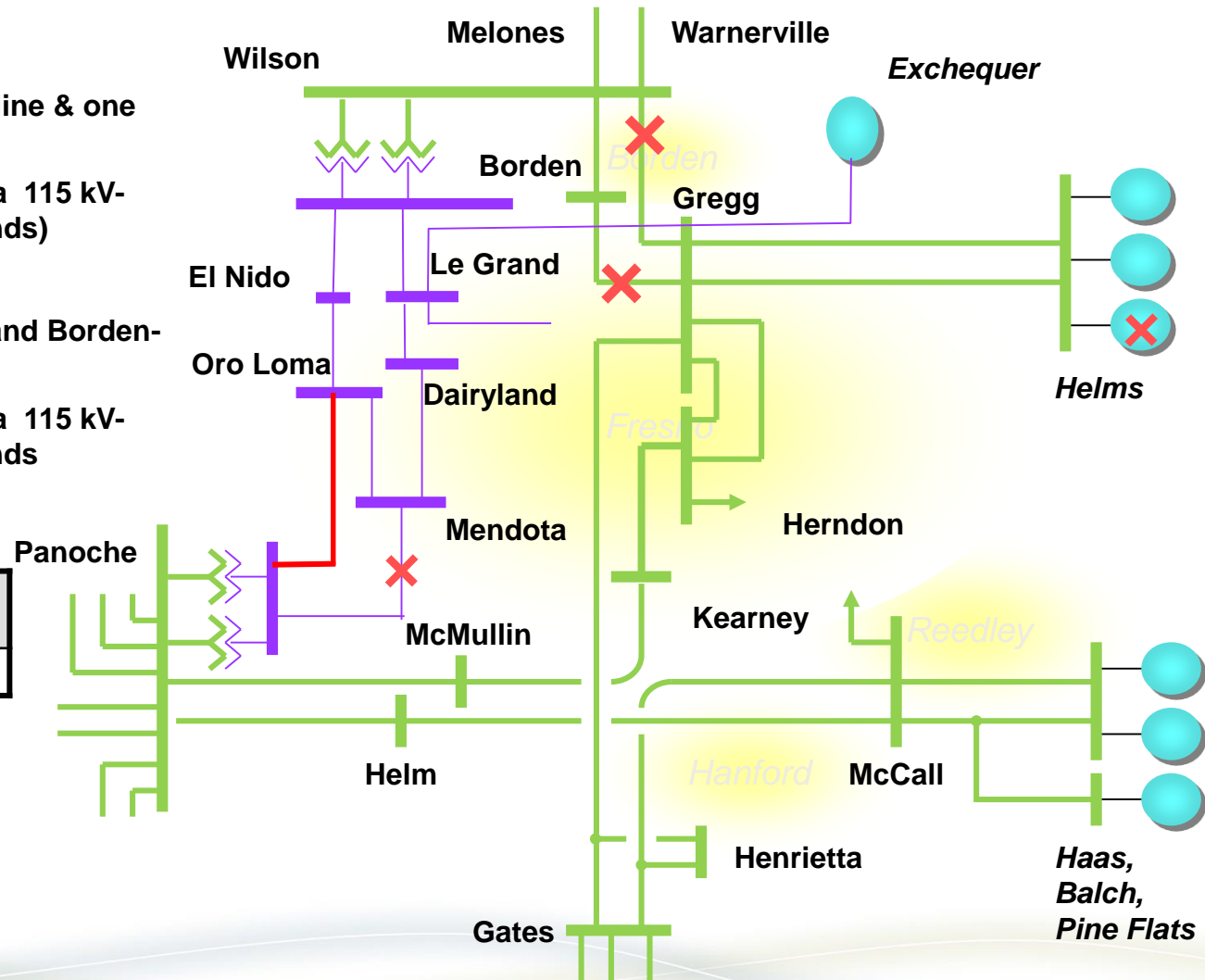
- L-1: Panoche-Mendota 115 kV line & one Helms unit out
- Constraint: Panoche-Oro Loma 115 kV- (From Panoche Jn To Hammonds)

Category P7:

- L-2: Wilson-Gregg 230kV line and Borden-Gregg 230kV line
- Constraint: Panoche-Oro Loma 115 kV- (From Panoche Jn To Hammonds)

LCR Results (MW):

Contingency	Cat. P3 S-N	Cat. P7 S-N
LCR	1949	2081



Fresno Area LCR

2022 Overall

Limiting Contingencies:

Category P3:

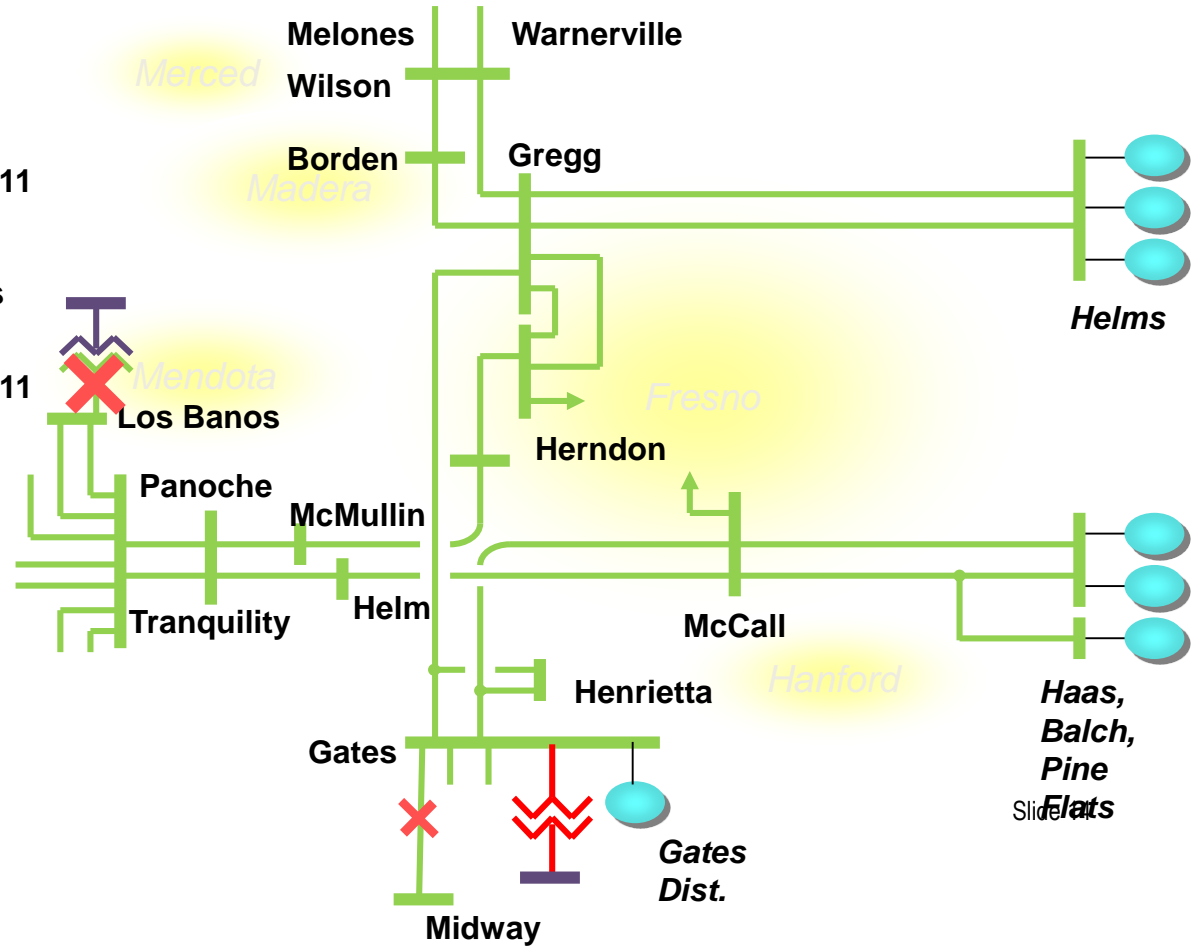
- T-1: Los Banos 500/230kV TB
Constraint: Gates 500/230kV TB #11

Category P6:

- L-2: Gates-Midway 230kV and Los Banos 500/230kV TB 1
- Constraint: Gates 500/230kV TB #11

LCR Results (MW):

Contingency	Cat. P3 S-N	Cat. P6; S-N
LCR	1478	1860



Changes

Since last year:

- 1) 2018 load increased by 326 MW vs. 2017
- 2) LCR has increased by 322 MW due to load increase.
- 3) 2022 Load increased by 112 MW vs 2021
- 4) LCR has increased by 700 MW (vs. the under-reported 2021 need) due to: load increase, Path 15 being studied from S-N which helped us identify new Limiting Contingency and Limiting element, as well as the delay in the Northern Fresno 115 kV Reinforcement project.

Since last stakeholder meeting:

- 1) Updated NQC.

Your comments and questions are welcome.

For written comments, please send to: RegionalTransmission@caiso.com