



California ISO
Shaping a Renewed Future

2016 and 2020 Draft LCR Study Results - Fresno

Abhishek Singh

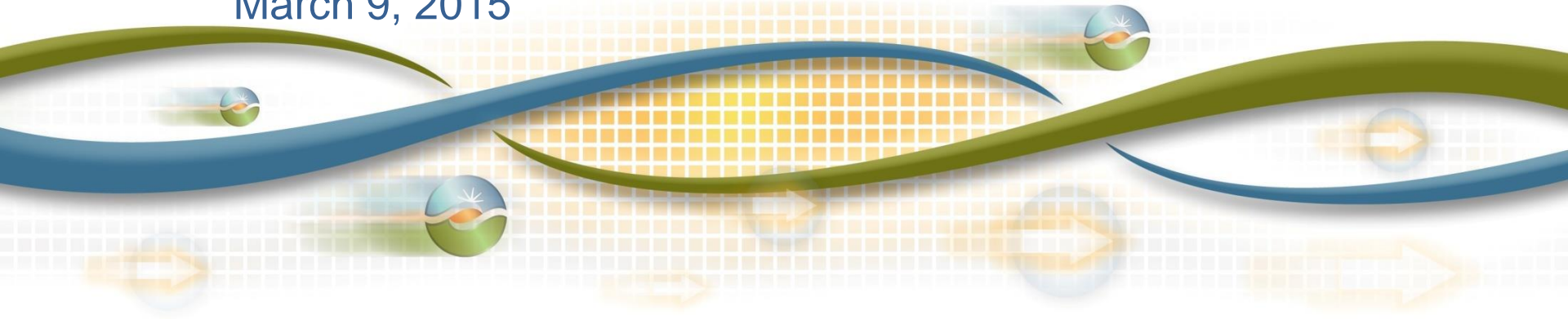
Senior Regional Transmission Engineer

Vera Hart

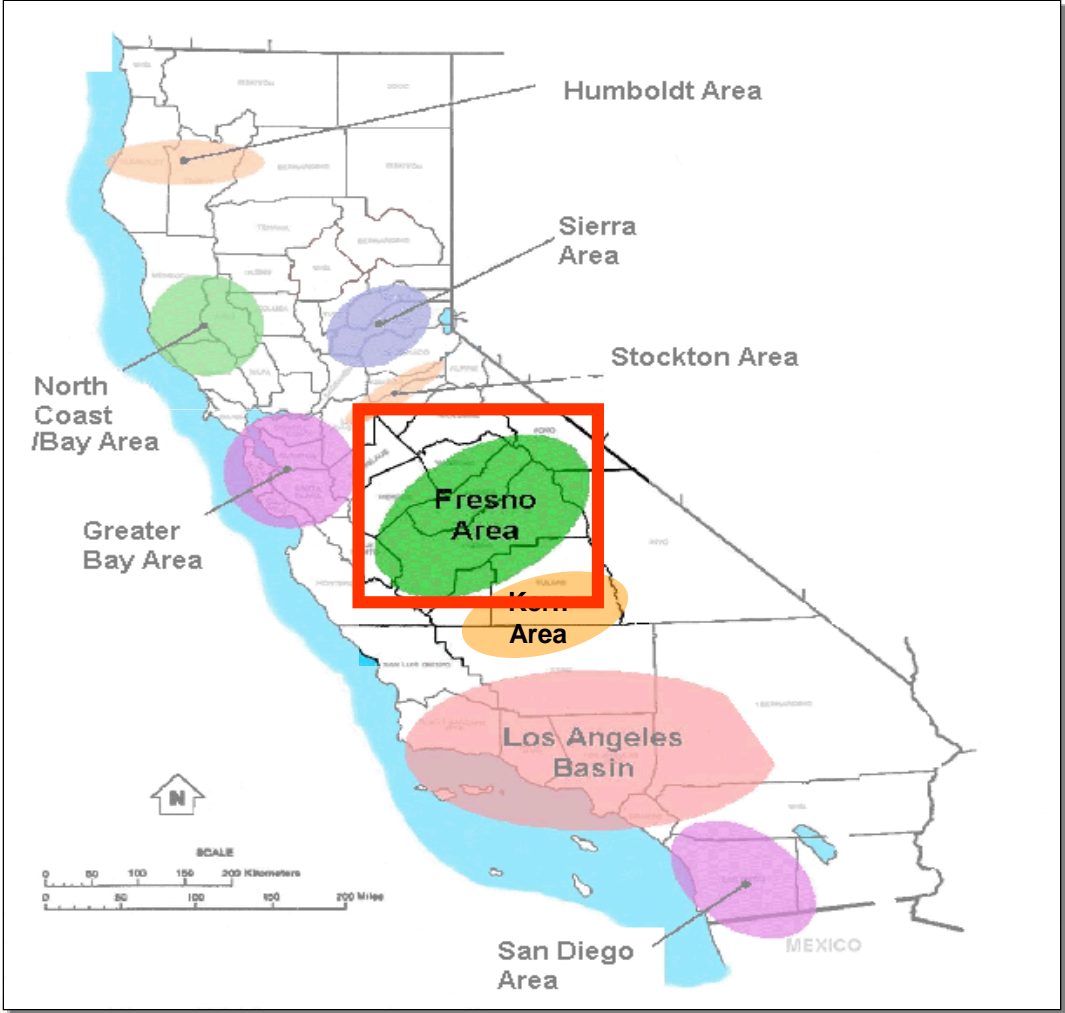
Regional Transmission Engineer

Stakeholder Conference

March 9, 2015



Fresno LCR Area



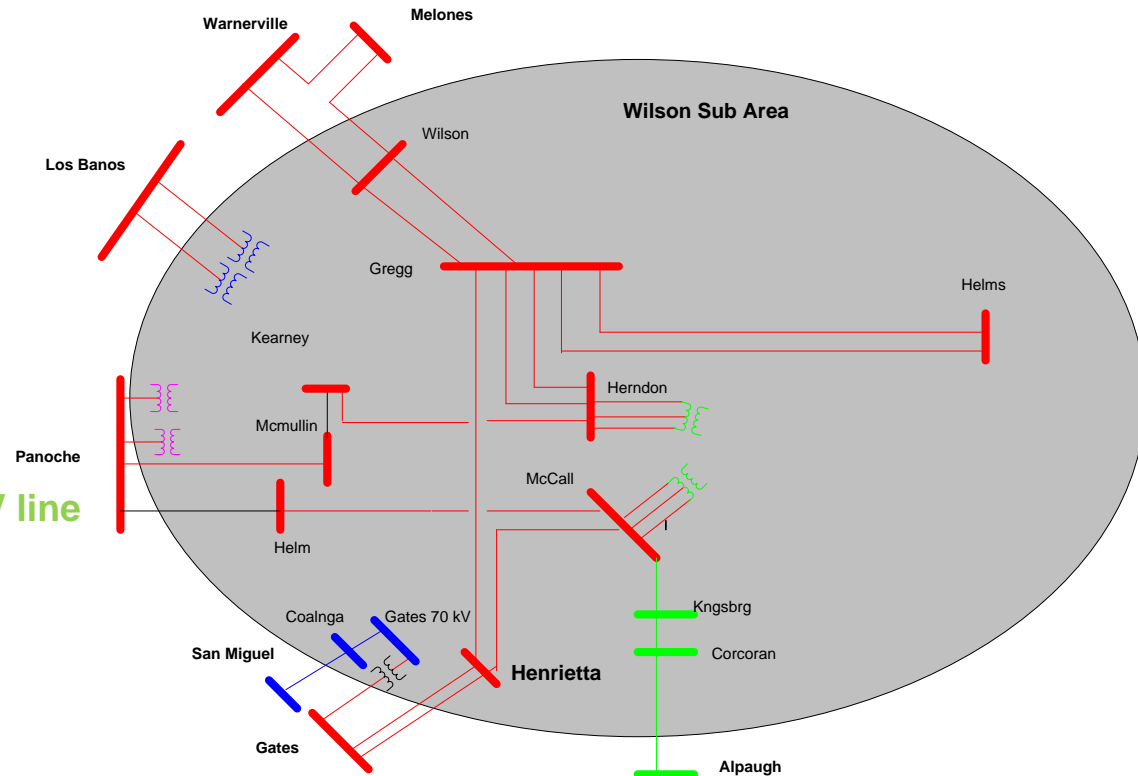
Greater Fresno Area

Electrical Boundaries and LCR Sub-Areas

Electrical Boundaries:

- Gates – McCall 230 kV line
- Gates – Gregg 230 kV line
- Panoche – Kearney 230 kV line
- Panoche – Helm 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)

		2016	2020
Load	=	3275	3515
AAEE	=	-35	-93
Transmission Losses	=	91	90
Total Load	=	3331	3512
Market Generation	=	2647	2647
Muni Generation	=	136	136
QF Generation	=	180	180
Total Qualifying Capacity	=	2963	2963

New transmission projects modeled:

1. Fresno Reliability (stages: 2014, 2015, 2016, 2016)
2. Cressey - Gallo 115 kV Line (2016)
3. Lemoore 70 kV Disconnect Switches Replacement (2016)
4. Kearney 230/70 kV Transformer Addition (2017)
5. Kearney - Caruthers 70 kV Line Reconductor (2017)
6. Caruthers - Kingsburg 70 kV Line Reconductor (2017)
7. Reedley-Dinuba 70 kV Line Reconductor (2017)
8. Reedley-Orosi 70 kV Line Reconductor (2017)
9. Helm - Kerman 70 kV Line Reconductor (2017)
10. Ashlan - Gregg and Ashlan - Herndon 230 kV Line Reconductor (2017)
11. Oakhurst/Coarsegold UVLS (2017)
12. Gregg - Herndon #2 230 kV Line Circuit Breaker Upgrade (2017)
13. Los Banos - Livingston Jct - Canal 70 kV Switch Replacement (2017)
14. Warnerville - Bellota 230 kV Line Reconductoring (2017)
15. Gates No. 2 500/230 kV Transformer (2018)

New transmission projects modeled: (cont.)

16. Series Reactor on Warnerville-Wilson 230 kV Line (2018)
17. Reedley 70 kV Reinforcement (2018)
18. Reedley 115/70 kV Transformer Capacity Increase (2018)
19. Cressey - North Merced 115 kV Line Addition (2018)
20. Kearney - Kerman 70 kV Line Reconductor (2018)
21. Kearney - Herndon 230kV Line Reconductor (2019)
22. McCall - Reedley #2 115 kV Line (2019)
23. Oro Loma - Mendota 115 kV Conversion Project (2019)
24. Wilson 115 kV Area Reinforcement (2019)
25. Borden 230 kV Voltage Support (2019)
26. Northern Fresno 115 kV Area Reinforcement (2019)
27. Kerchhoff PH #2 - Oakhurst 115 kV Line (2020)
28. Oro Loma 70 kV Area Reinforcement (2020)

Fresno Area LCR

2016 Hanford Sub-Area

Limiting Contingencies:

Category C:

- L-1/T-1: McCall-Kingsburg #2 115 kV & Henrietta 230/115kV TB #3
- Constraint McCall-Kingsburg #1

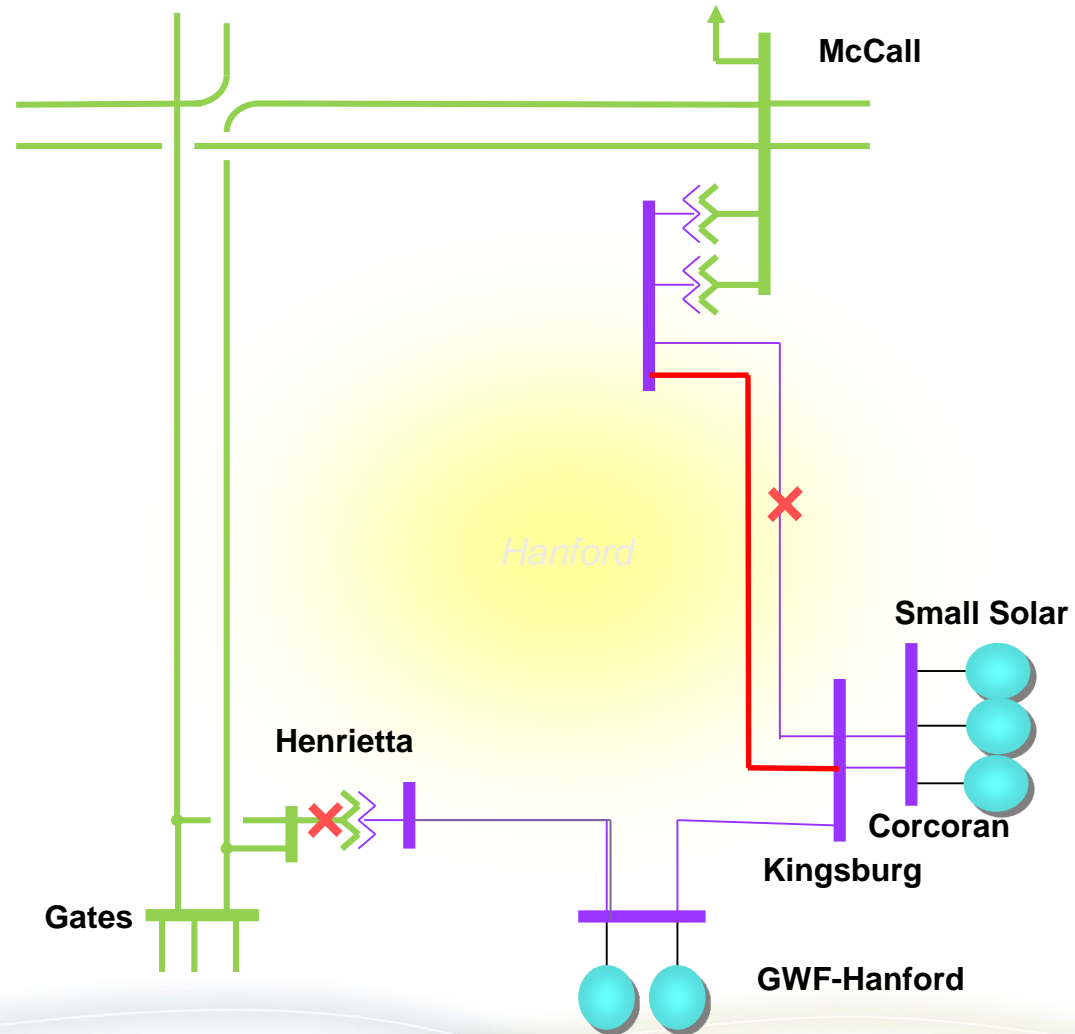
Category B: No LCR need

LCR Results (MW):

Contingency	Cat. C
LCR	91

Including:

QF	0
Muni	0
Deficiency	0



Fresno Area LCR

2016 Coalinga Sub-Area

Limiting Contingencies:

Category C:

- T-1/L-2: Gates 230/70kV TB #5 and Panoche-Schindler #1 & #2 115kV common tower lines
- Constraint:
 - Low voltage in the pocket

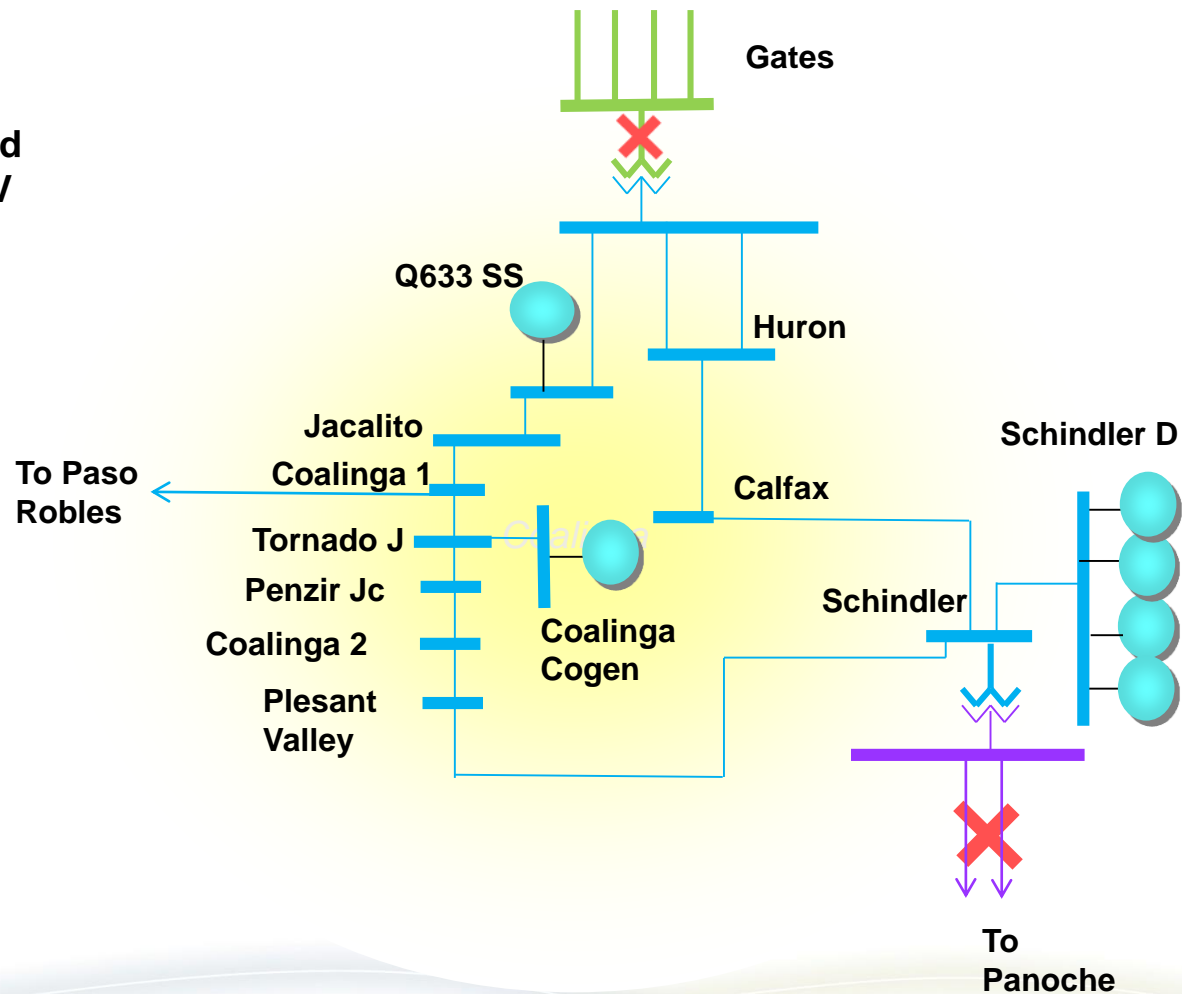
Category B: No LCR need

LCR Results (MW):

Contingency	Cat. C
LCR	70

Including:

QF	36
Muni	0
Deficiency	0



Fresno Area LCR

2016 Borden Sub-Area

Limiting Contingencies:

Category B: No LCR need

Category C:

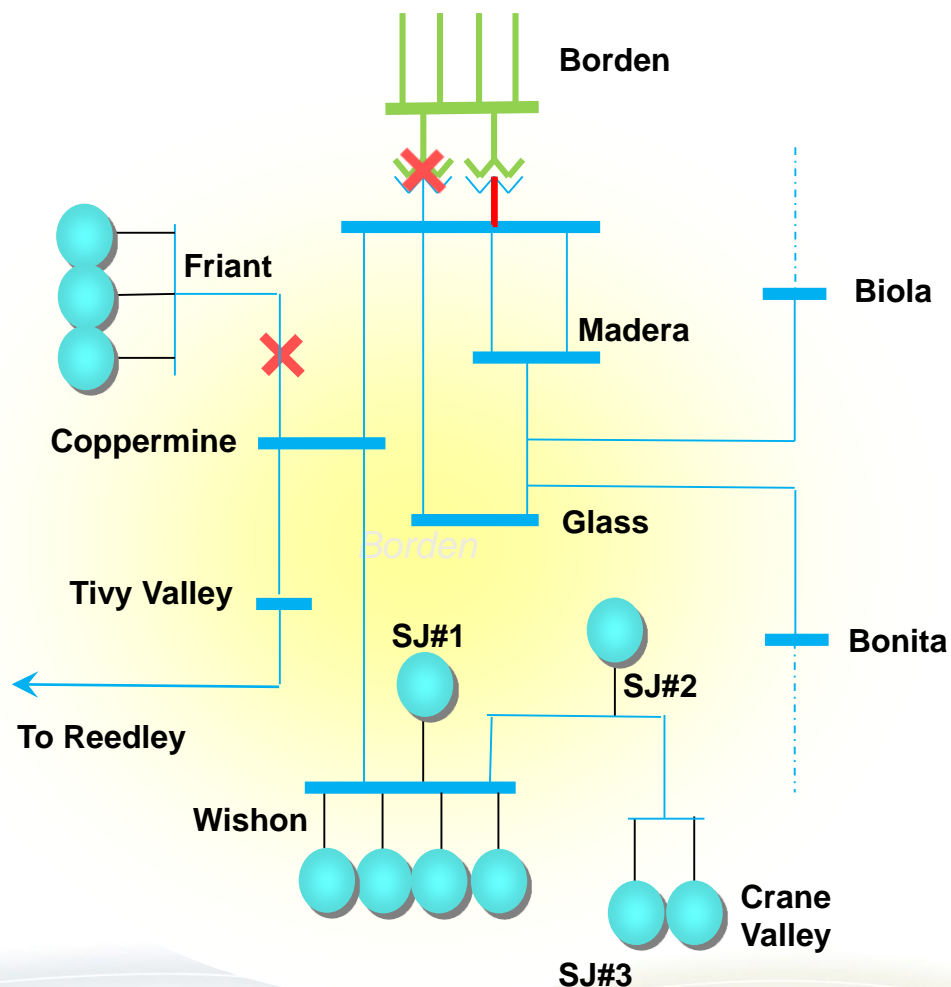
- L-1/T-1: Friant - Coppermine 70 kV and Borden 230/70 kV # 4
- Constraint: Borden 230/70 kV # 1

LCR Results (MW):

Contingency	Cat. B	Cat. C
LCR	0	23

Including:

QF	0	0
Muni	0	0
Deficiency	0	0



Fresno Area LCR

2016 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

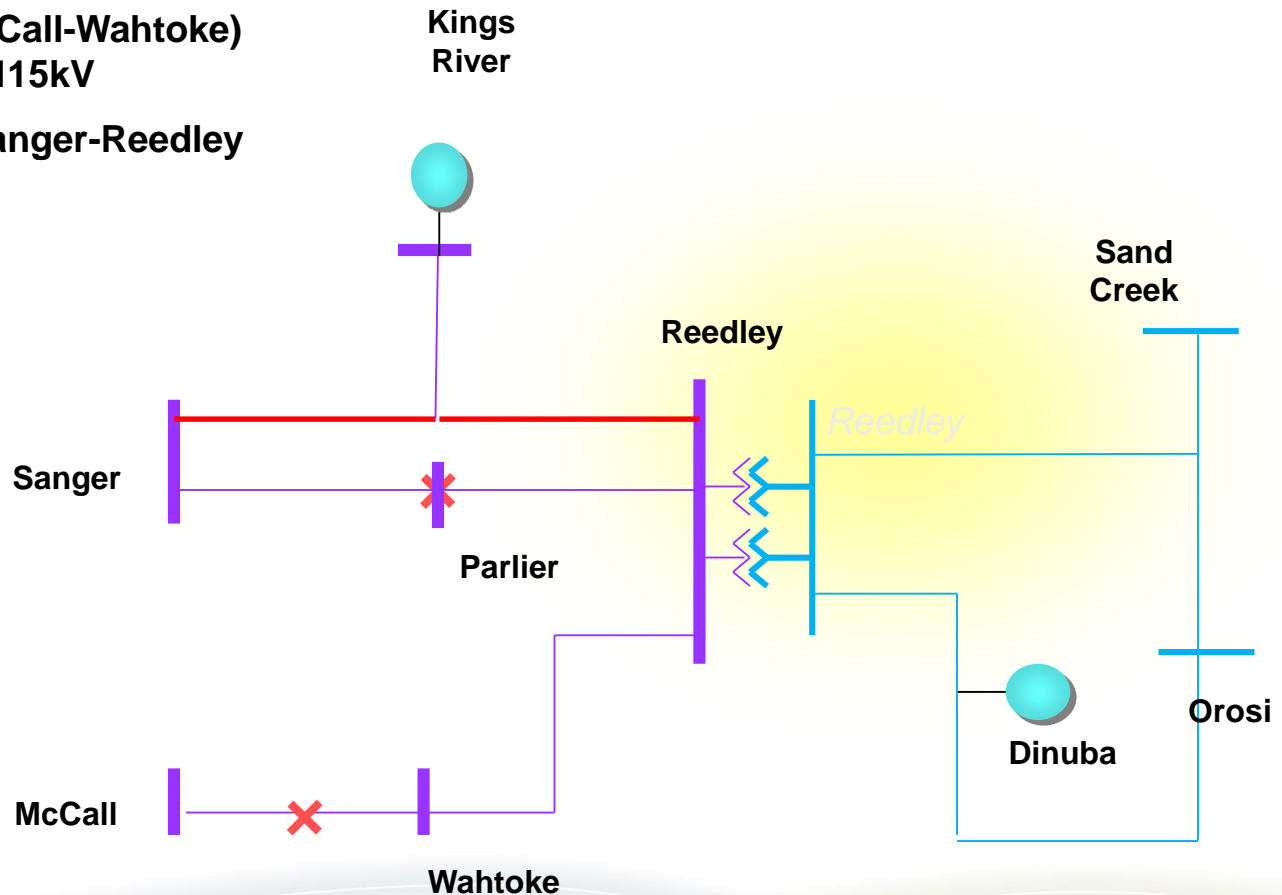
Category B: No LCR need

LCR Results (MW):

Contingency	Cat. C
LCR	60

Including:

QF	10
Muni	0
Deficiency	50



Fresno Area LCR

2016 Herndon Sub-Area

Limiting Contingency:

Category B:

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

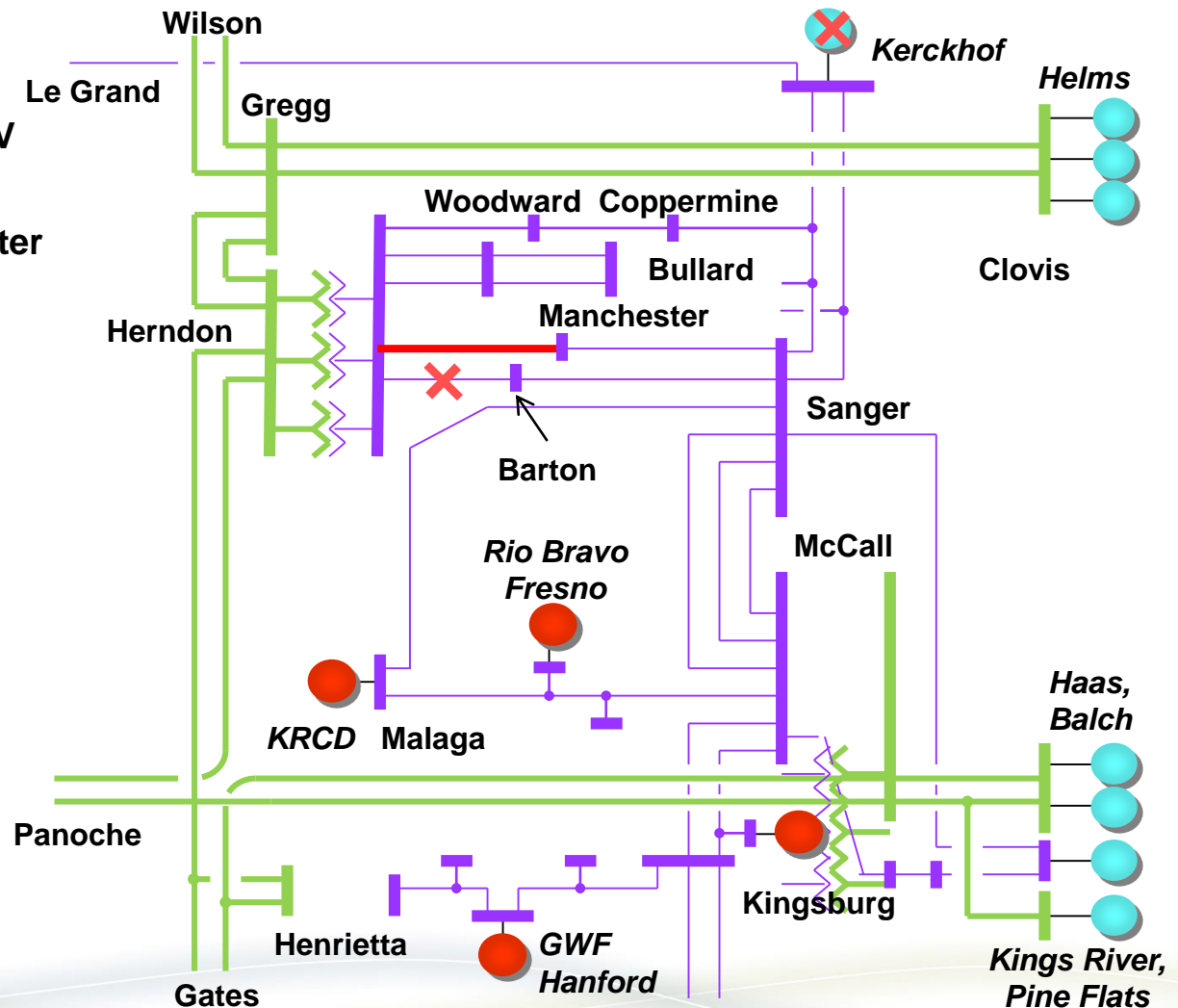
Category C: Same as Category B

LCR Results (MW):

Contingency	Cat. B
LCR	503

Including:

QF	51
Muni	65
Deficiency	0



Fresno Area LCR

2016 Wilson Sub-Area

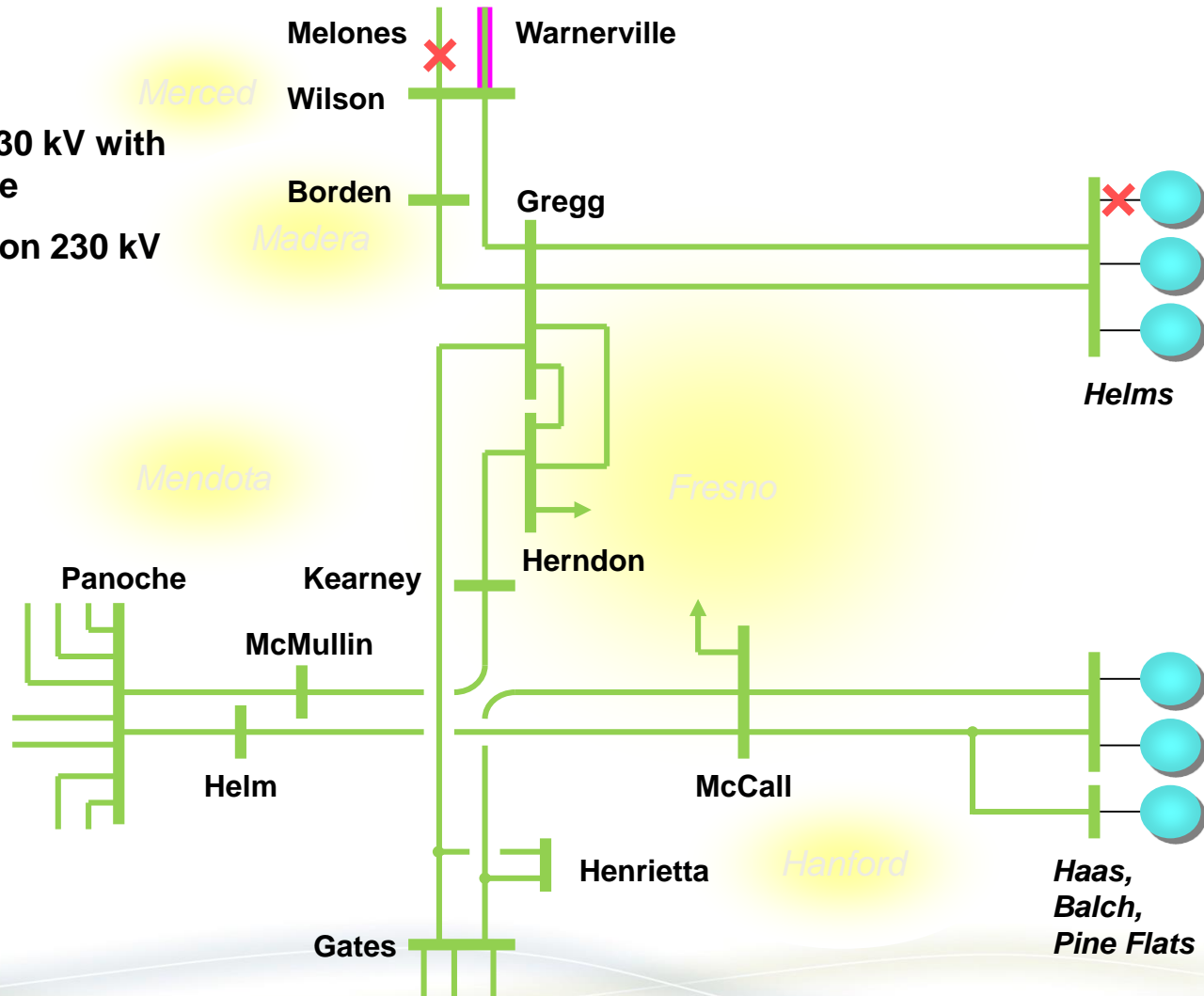
Limiting Contingencies:

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	2445

Including:

QF	180
Muni	136
Deficiency	0

Fresno Area LCR

2016 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: 2445 MW

Category C: - Contingency 2

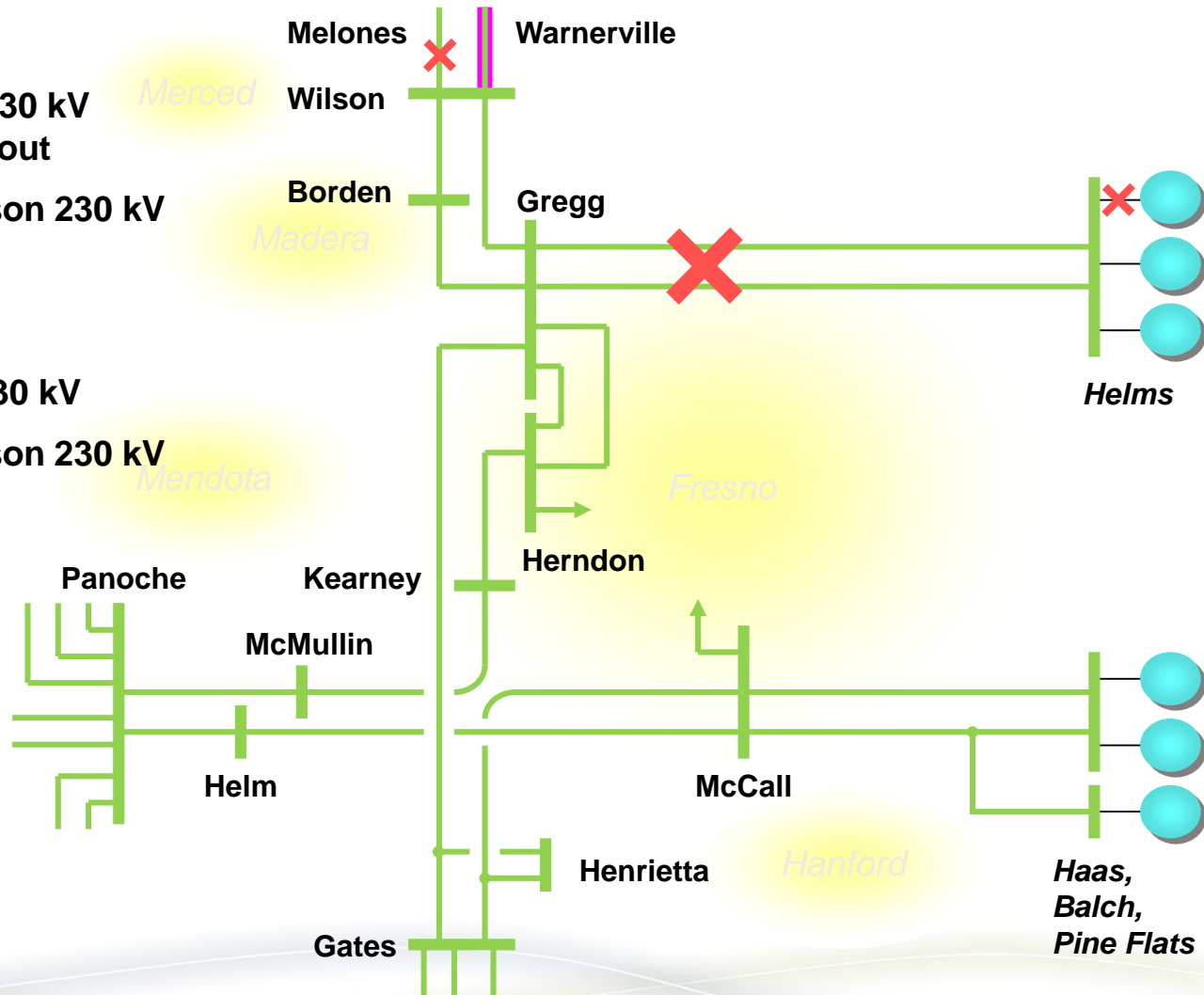
- L-2: Gregg-Helms #1 & #2 230 kV
- Constraint: Warnerville-Wilson 230 kV
- LCR: 2445 MW

LCR Results (MW):

Contingency	Cat. C
LCR	2445

Including:

QF	180
Muni	136
Deficiency	0



Fresno Area LCR

2020 Hanford Sub-Area

Limiting Contingencies:

Category B: No LCR need

Category C:

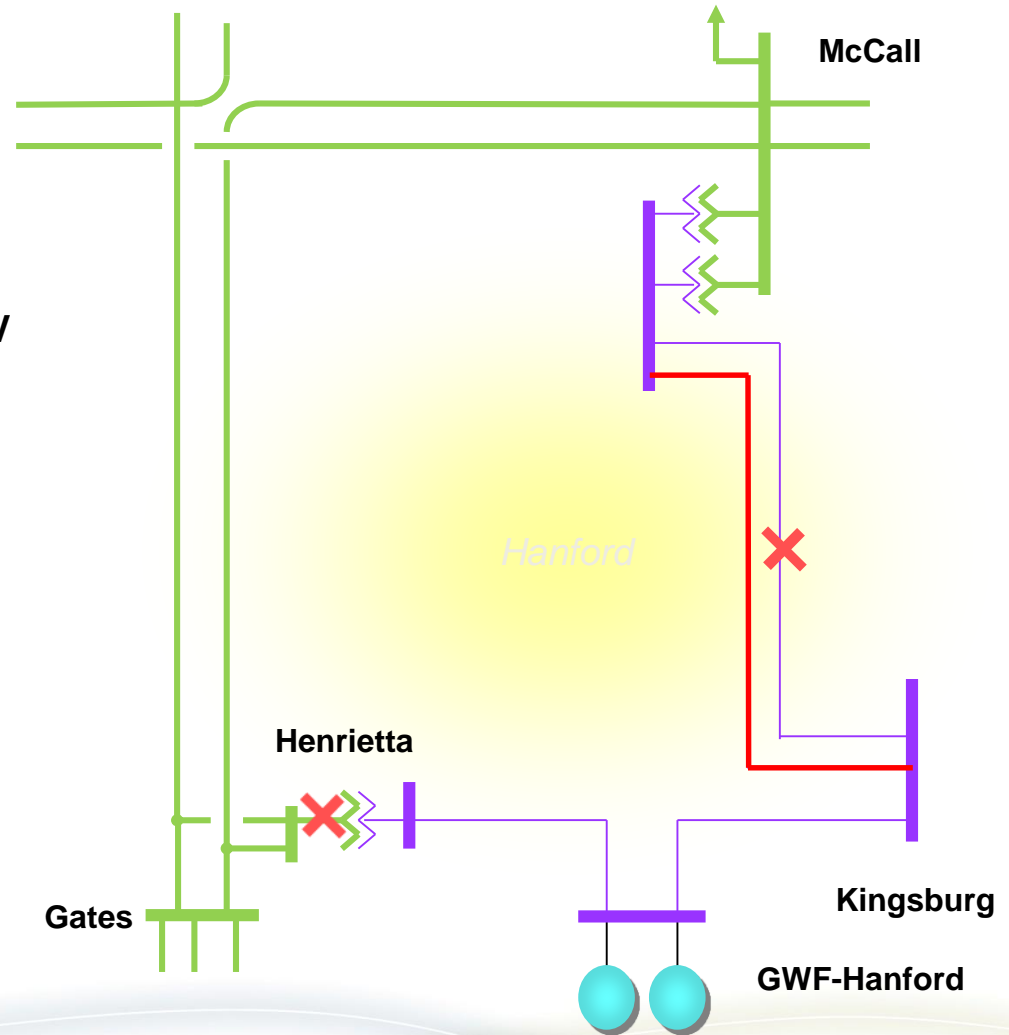
- L-1/T-1: McCall-Kingsburg #2 115 kV & Henrietta 230/115 kV T/F
- Constraint: McCall-Kingsburg # 1 115 kV

LCR Results (MW):

Contingency	Cat. B	Cat. C
2020 LCR	0	67

Including:

QF	0	0
Muni	0	0
Deficiency	0	0



Fresno Area LCR

2020 Coalinga Sub-Area

Limiting Contingencies:

Category C:

- T-1/L-2: Gates 230/70kV TB #5 and Panoche-Schindler #1 & #2 115kV common tower lines
- Constraint:
 - Low voltage in the pocket

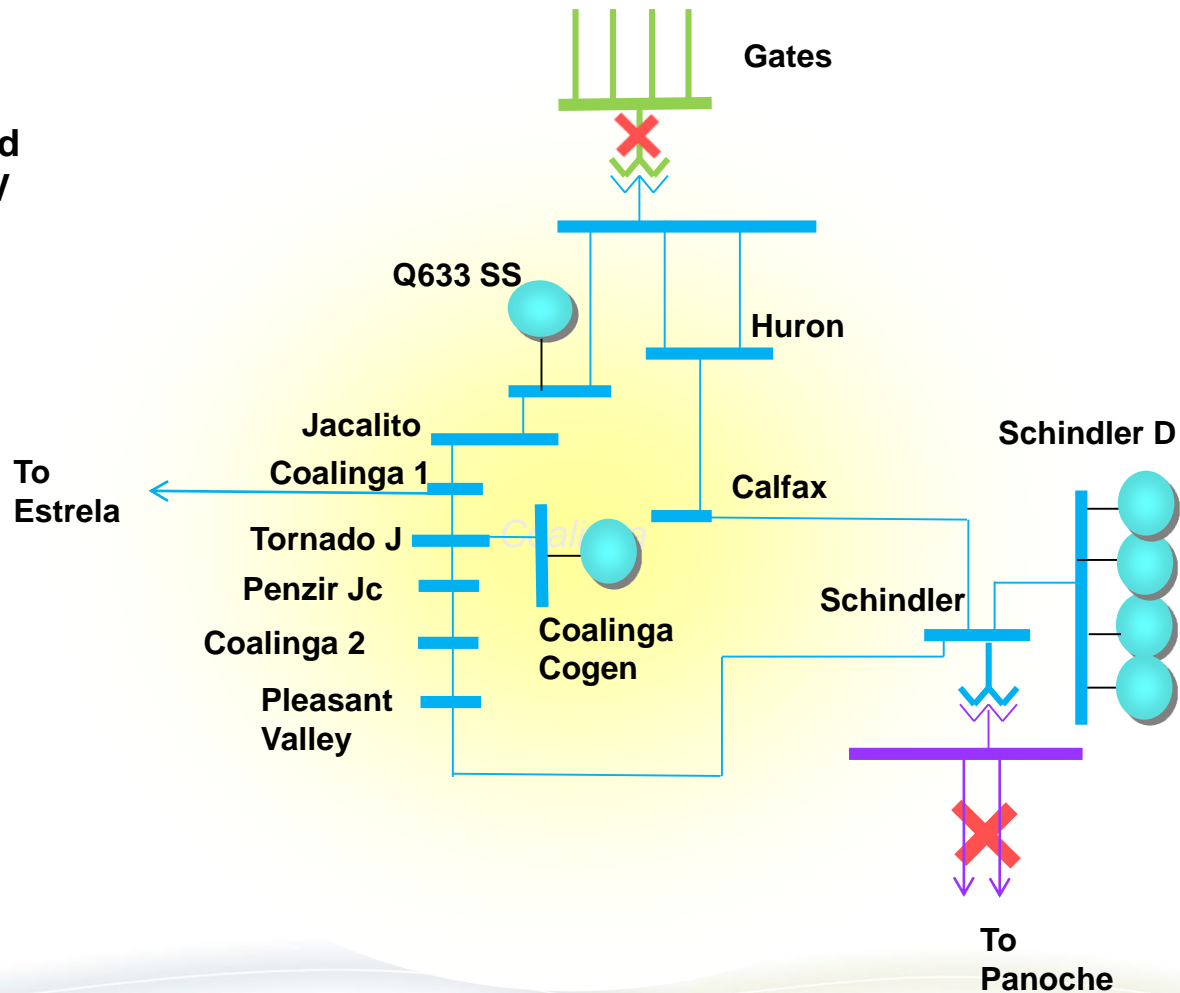
Category B: No LCR need

LCR Results (MW):

Contingency	Cat. C
2020 LCR	67

Including:

QF	36
Muni	0
Deficiency	0



Fresno Area LCR

2020 Borden Sub-Area

Limiting Contingencies:

Category B: No LCR need

Category C:

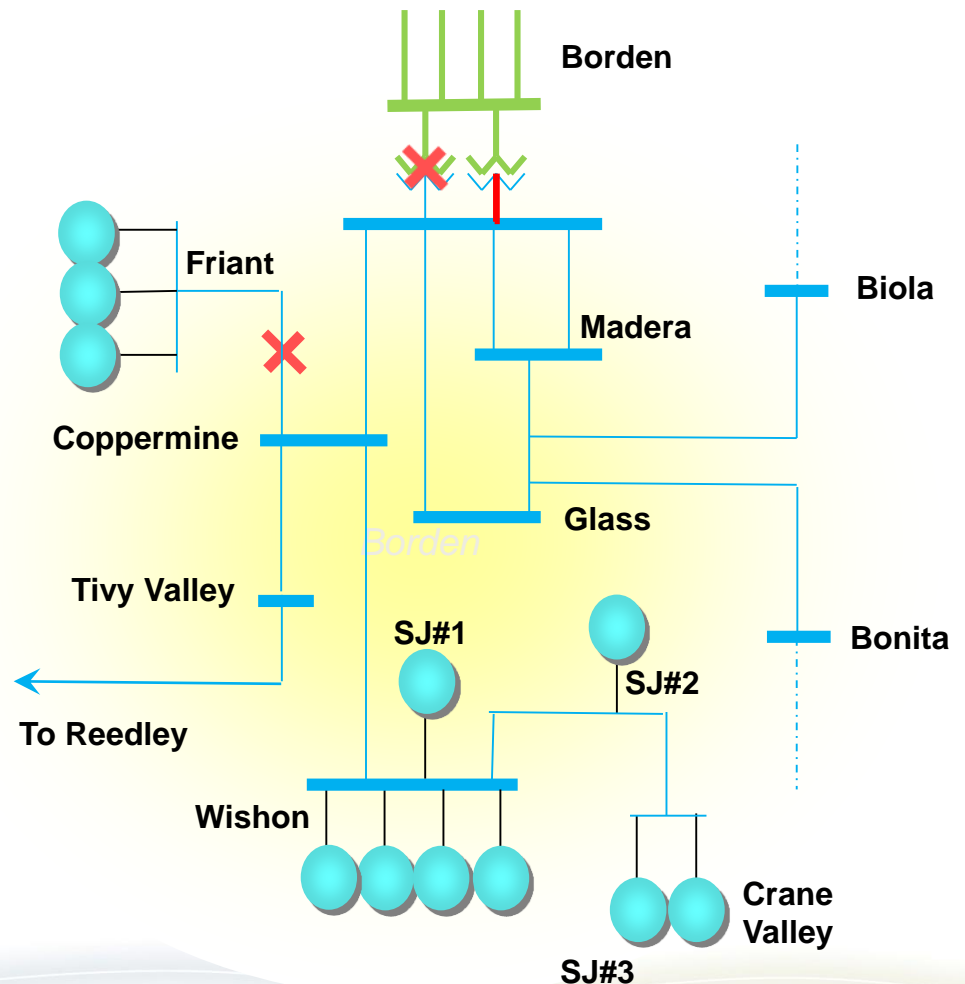
- L-1/T-1: Friant - Coppermine 70 kV and Borden 230/70 kV # 4
- Constraint: Borden 230/70 kV # 1

LCR Results (MW):

Contingency	Cat. B	Cat. C
2020 LCR	0	34

Including:

QF	0	0
Muni	0	0
Deficiency	0	7



Fresno Area LCR

2020 Reedley Sub-Area

Eliminated due to McCall-Reedley # 2 115 kV line project.

Fresno Area LCR

2020 Herndon Sub-Area

Eliminated due to Northern Fresno 115 kV area reinforcement project.

Fresno Area LCR

2020 Wilson Sub-Area

Limiting Contingencies:

Category B:

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

Category C:

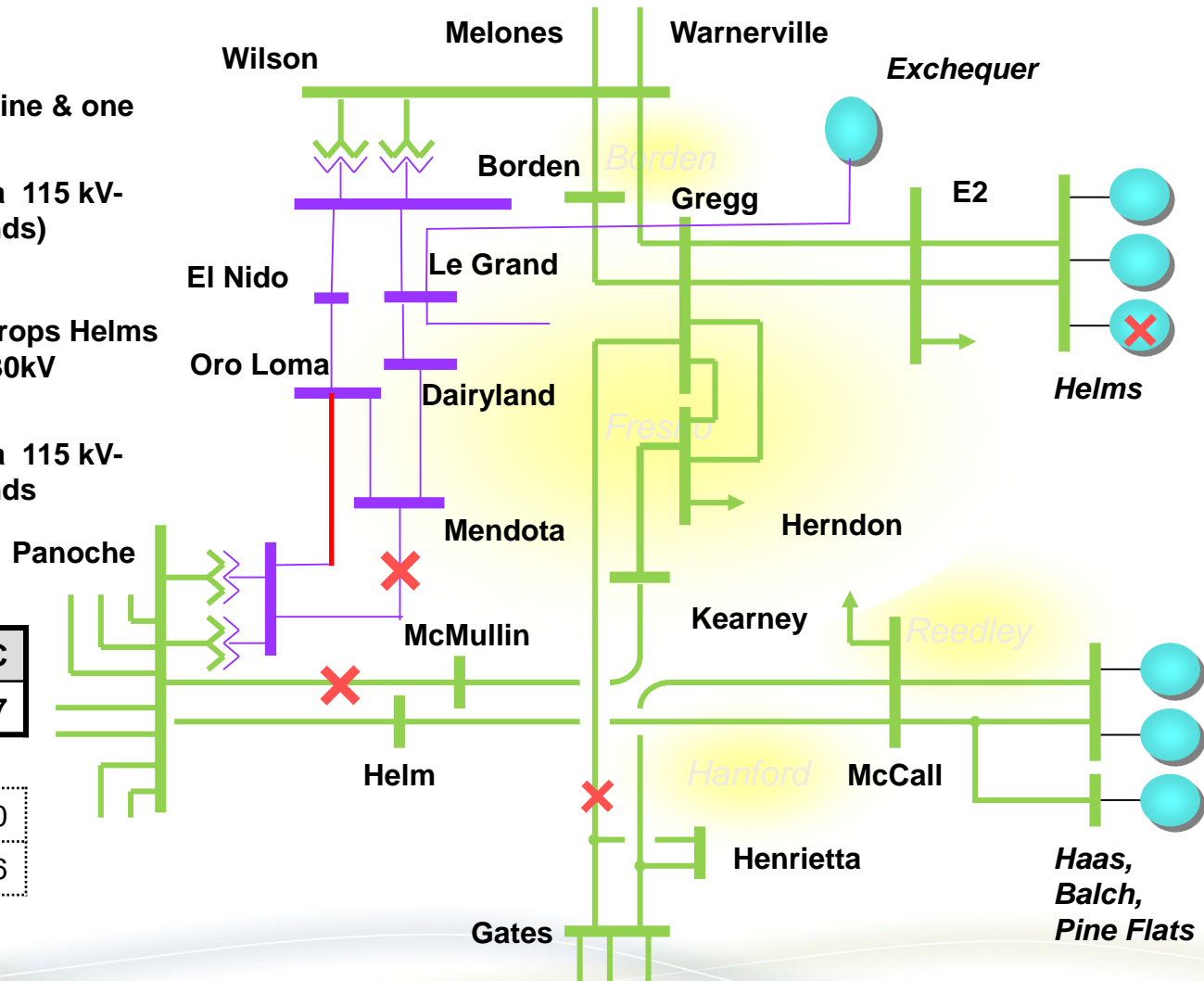
- L-2: Gates-Gregg 230kV line(drops Helms Unit #3) & Panoche-Kearney 230kV common tower lines
- Constraint: Panoche-Oro Loma 115 kV- (From Panoche Jn To Hammonds)

LCR Results (MW):

Contingency	Cat. B	Cat. C
2020 LCR	1471	1867

Including:

QF	180	180
Muni	136	136



Changes

Since last year:

- 1) 2016 load increased by 116 MW vs. 2015
- 2) LCR has increased by 56 MW due to load increase
- 3) 2020 load increased by 253 MW vs. 2019
- 4) LCR has increased by 286 MW mostly due to load increase and new identified worse contingency

Your comments and questions are welcome.

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