

SMUD Control Area and Control Area Operations

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System Operations and Reliability

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North American Electric Reliability Council (NERC)

- Organization founded in 1968
- Mission is to ensure the bulk electric system in North America is reliable, adequate, and secure.
- Eight regional councils within NERC



North American Electric Reliability Council (NERC)

- Fulfills mission by:
 - Settings standards for reliable operation and planning of bulk electric system.
 - Monitors, assesses, and enforces compliance with reliability standards
 - Training programs and certification of system operators/organizations
 - Organization founded in 1968
 - Assesses, analyzes, and reports on bulk electric system adequacy and performance
 - Information exchange
 - Investigation of bulk electric system disturbances

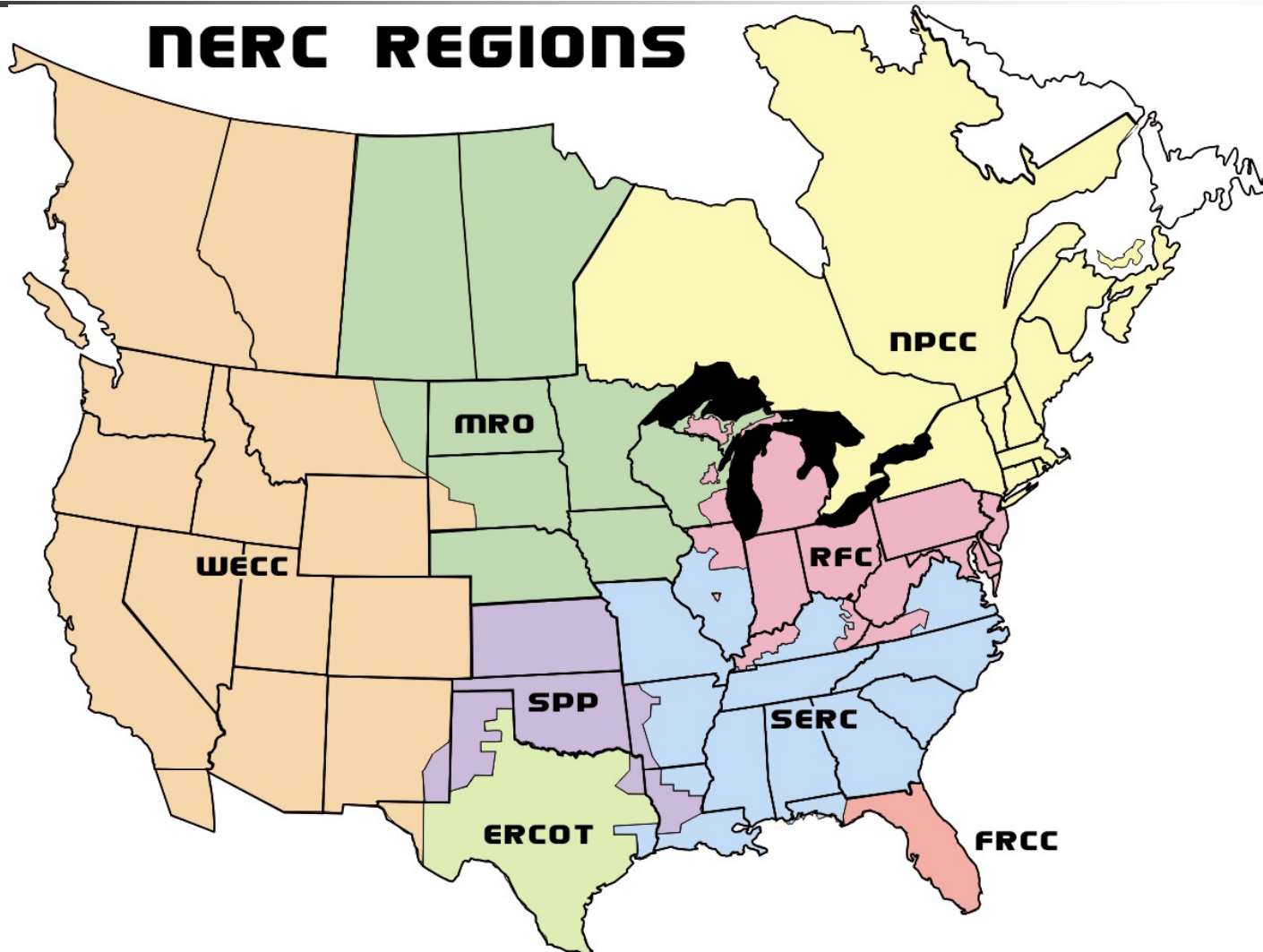


North American Electric Reliability Council (NERC)

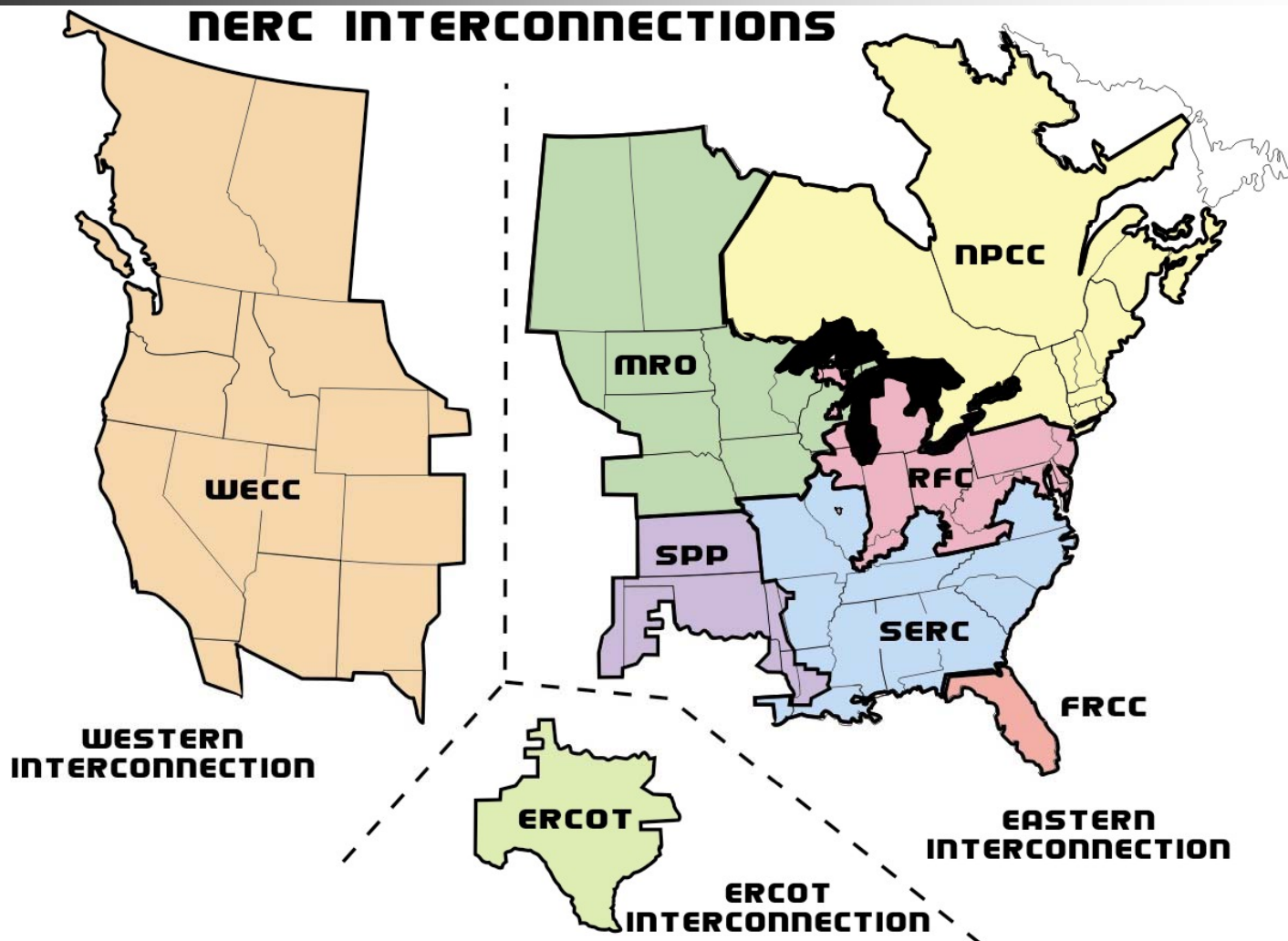
- Voluntary reliability organization
 - Soon to be Electric Reliability Organization (ERO) reporting to the Federal Energy Regulatory Commission (FERC) through *Energy Policy Act of 2005*
 - Mandatory reliability organization eventually
 - Operate as the ERO for United States and Canada

North American Electric Reliability Council (NERC)

NERC REGIONS



North American Electric Reliability Council (NERC)





Western Electricity Coordinating Council (WECC)

- Western Systems Coordinating Council (WSCC) – (now WECC) formed in 1967 by 40 electric power systems
- 1.8 million square miles
- 14 Western States, two Canadian Provinces, and Baja Norte, Mexico



Western Electricity Coordinating Council (WECC)

- Largest and most diverse of the regions of NERC
- 159 members – all voluntary
- 71 million people in WECC service territory
- ~141,000 MW / ~122,000 MW peak summer/winter load



WECC and SMUD

- SMUD participates in a number of WECC forums:
 - Marketing Committees
 - Operating Committees
 - Transmission Planning Committees
 - Policy Committees
 - Scheduling Committees



SMUD and WECC (cont.)

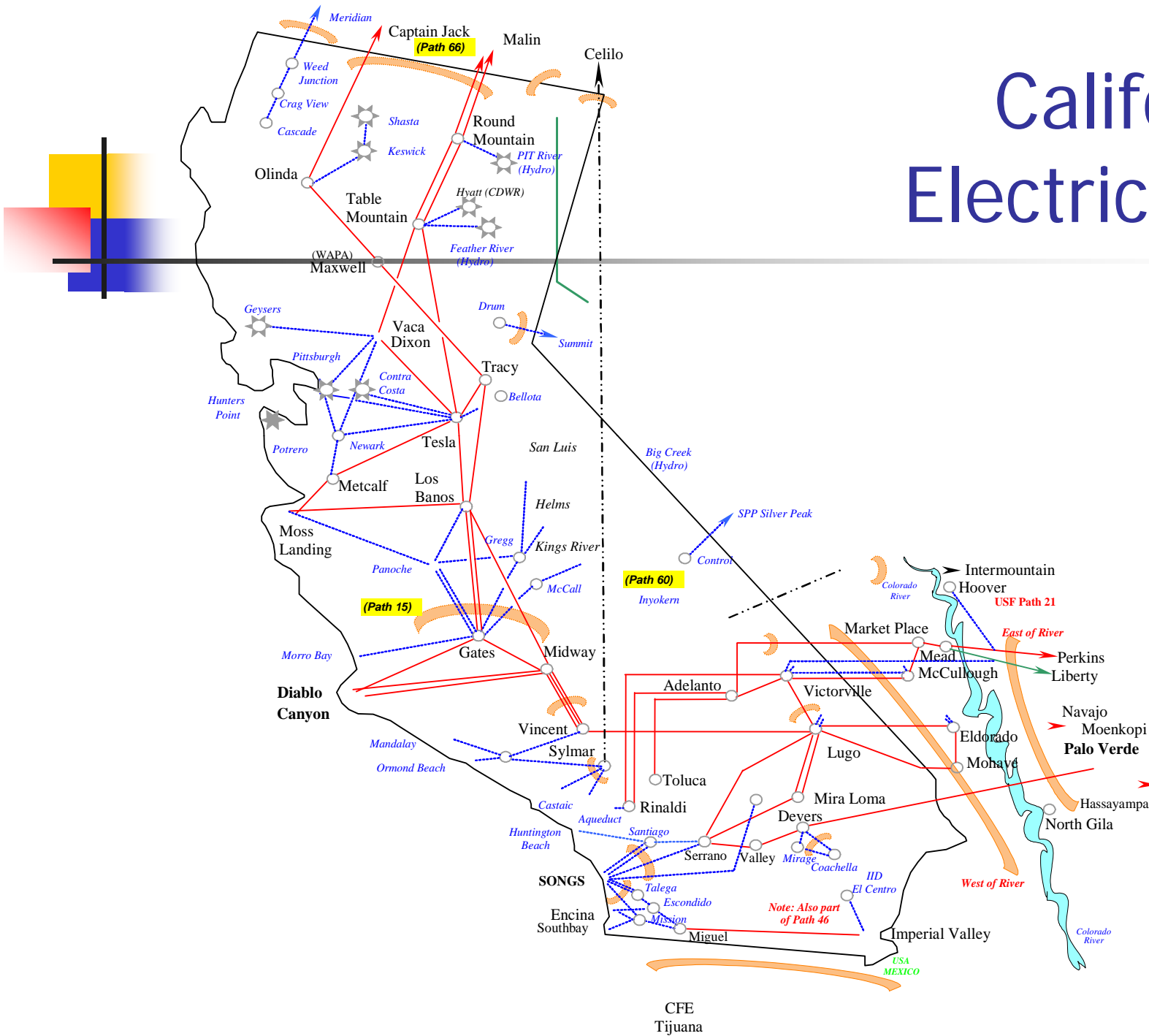
- Significant project participation:
 - Reliability Standards
developing/drafting/commenting
 - Operating Transfer Capability studies
(California-Oregon Intertie – major
transmission path into Northern California)
 - Technical Work Groups and Task Forces
 - Operating Practices and Disturbance
Reviews



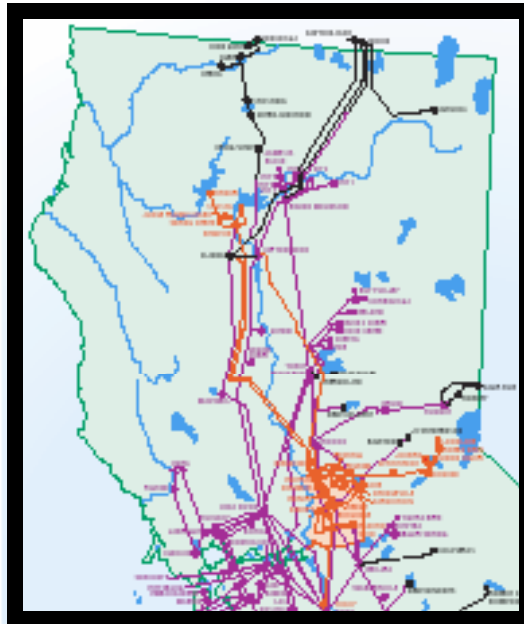
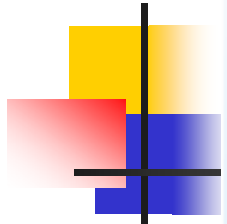
California Control Areas

- Within California, there are five control areas:
 - California ISO - ~50,000 MW peak load
 - LADWP – 6,000 MW
 - SMUD/WASN - ~4,900 MW peak load
 - IID - ~840 MW
 - TID - ~600 MW
- California load responsibility of ~62,000 MW

California Electric Grid



California Electric Grid



SMUD

SACRAMENTO MUNICIPAL UTILITY DISTRICT

The Power To Do More.®

- SMUD Control Area Lines - 115-230 kV
- PG&E Controlled Lines - 115-230 kV
- Other
- 500 kV

PACIFIC OCEAN



Control Areas

- NERC Definition:

“An area comprised of an electric system or systems, bounded by interconnection metering and telemetry, capable of controlling its generation to maintain its interchange schedule with other control areas, and contributing to frequency regulation of the Interconnection. A control area must be able to:

- Directly control its generation to continuously balance its actual interchange and scheduled interchange, and
- Help the entire Interconnection regulate and stabilize the Interconnection’s alternating current frequency.



Control Areas (cont.)

- Basic Functions of a Control Area Operator:
 - Meet NERC/WECC Reliability Criteria
 - Operate “Reliably”
 - Serve customer load – “keep the lights on”
 - Safely operate the electric grid
 - Balance load and generation
 - Operate within equipment limitations (transmission lines, transformer banks, generators, etc.)
 - Maintain frequency (60 Hz)
 - Maintain interchange with other control areas
 - Recover from contingencies
 - NERC Certification of all real-time operators



Formation of SMUD Control Area

- WECC certified SMUD to become a control area on June 18th, 2002.
 - Local control for the benefit of the customers.
 - Financial benefit to SMUD due to CAISO incurred costs.
 - Certainty and durability (not subject to a constantly changing Tariff).
 - Not shed load for CAISO's reserve deficiencies.
- Coordinated with CAISO as neighboring control area.



Expansion of the SMUD Control Area

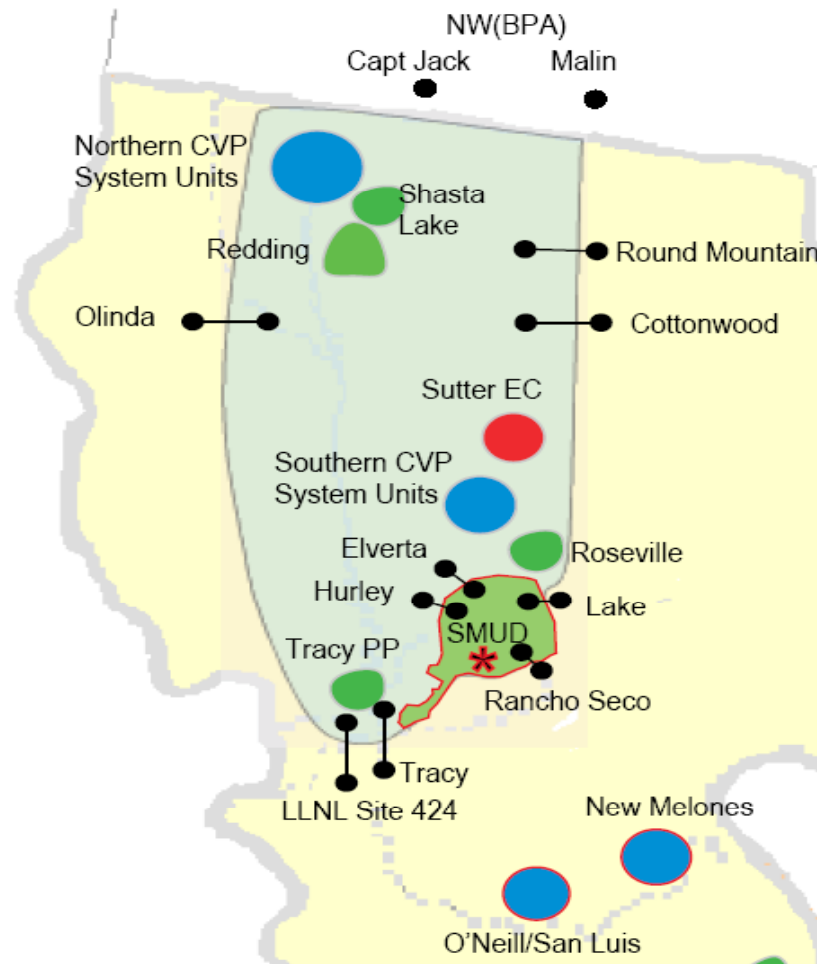
- Western – Sierra Nevada Region (WASN) requested to become part of the SMUD Control Area as a Sub-Control Area.
 - WASN's reasons were similar to SMUD's
- Again, WECC certified the footprint change of adding WASN.
- WASN joined the SMUD Control Area on January 1st, 2005.



Expansion of the SMUD Control Area (cont.)

- The addition of WASN added the following to the SMUD Control Area:
 - WASN transmission
 - WASN load (Federal entities)
 - Shasta Lake load
 - Roseville load
 - Redding load / generation
 - USBR load (pumps) / generation
 - Calpine's Sutter Power Plant

Expansion of SMUD Control Area (cont.)





Further expansion of the SMUD Control Area

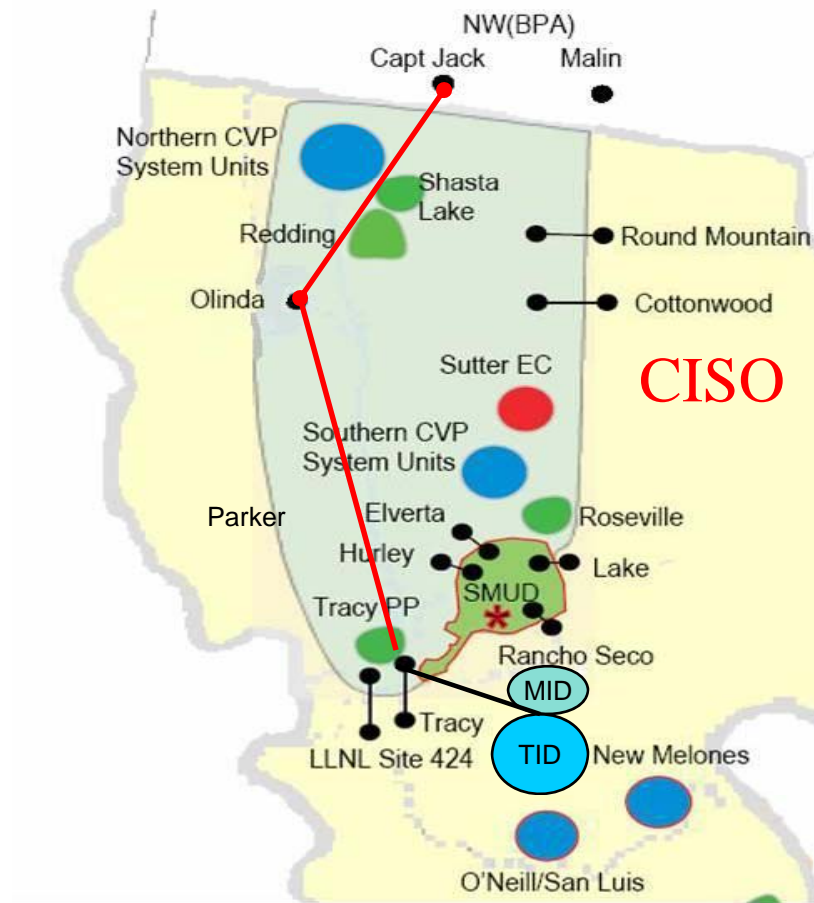
- Following WASN's request, the California-Oregon Transmission Project (COTP) Participants requested to become part of the SMUD/WASN Control Area.
- In addition, the Modesto Irrigation District (MID) also requested to become part of the WASN Sub-Control Area.
- Again, WECC certified the footprint change of adding WASN.
- The COTP and MID joined the SMUD/WASN Control Area on December 1st, 2005.
 - TID also became a Control Area on December 1st, 2005.
 - SEC pseudo-tied to CAISO at the same time.



Further expansion of the SMUD Control Area

- The addition of the COTP and MID changed/added the following:
 - Increased geographical size
 - Added transmission elements
 - Added generating facilities
 - New neighboring Control Areas (BPA and TID)
 - Reliability responsibilities – COTP 500 kV line operation
 - Open Access Same Time Information System (OASIS) Posting

Further expansion of the SMUD Control Area (cont.)





SMUD Control Area Customers

- Internal Customers:
 - SMUD (~3,300 MW)
 - WASN (and Federal entities) – (~1,650 MW)
 - USBR (~80 MW - Pump load)
 - MID (~700 MW)
 - Roseville (~345 MW)
 - Redding (~245 MW)
 - Shasta Lake (~31 MW)

Questions?

