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Exceptional Dispatch Trends for April – June 2009

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Overview of Presentation

- The purpose of this analysis is to provide a
 - Detailed review of trends in Exceptional Dispatch (ED) over the first three months of market operation;
 - Detailed description of some of the primary reasons for ED; and
 - Assessment of the hourly energy volumes of ED – as an indication of relative market impact.
- Presentation will cover
 - Data limitations and interpretation
 - Summary of Exceptional Dispatch by reason
 - Detail on most prevalent Exceptional Dispatch reasons

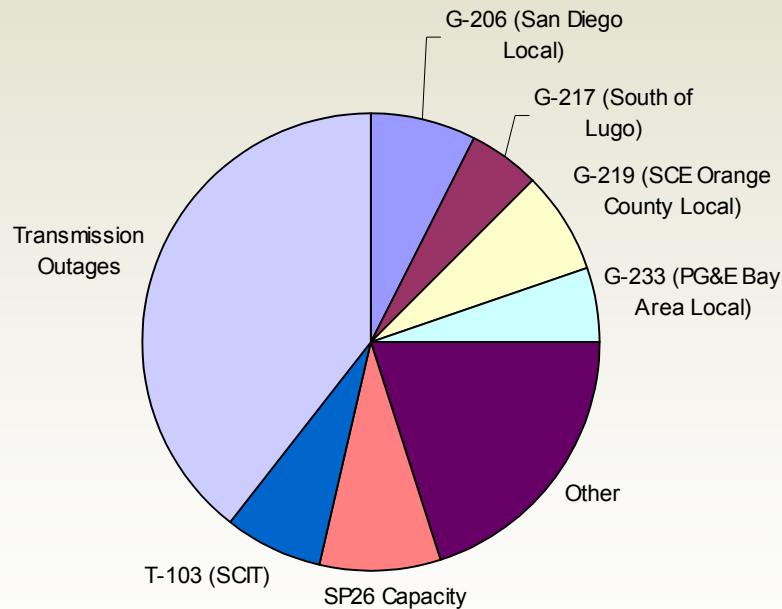
Data Limitations and Assumptions

- Data used in analysis are from ISO logging application
 - Provides information about reason for ED and whether ED was “manual dispatch”, “Pre-IFM day-ahead”, “Post-IFM day-ahead”, or “real time”.
 - Data are manually entered and not settlement quality
 - Some assumptions were required in cases where data were not complete
- Analysis focuses on internal resources
 - Dispatch of RMR resources via ED not considered
 - Dispatch of intertie resources not considered
- Charts capture gross energy from ED and do not distinguish between “in-market” and “Out-of-Sequence”
- Analysis does not address instruction codes or settlement issues

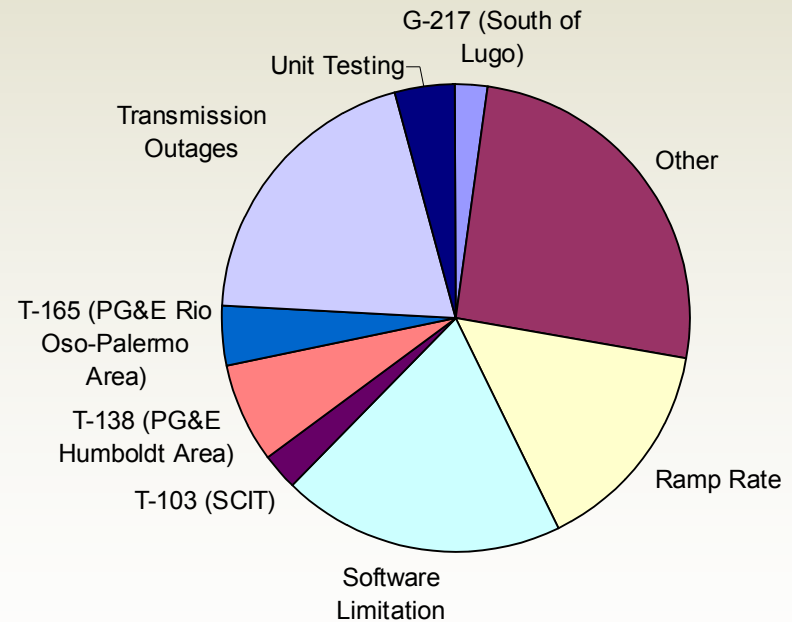
Transmission outages, modeling gaps, and market software issues are primary drivers of ED

Frequency (# of Unit Days) of ED by Reason for DA and RT (Apr - Jun 2009)

Day Ahead

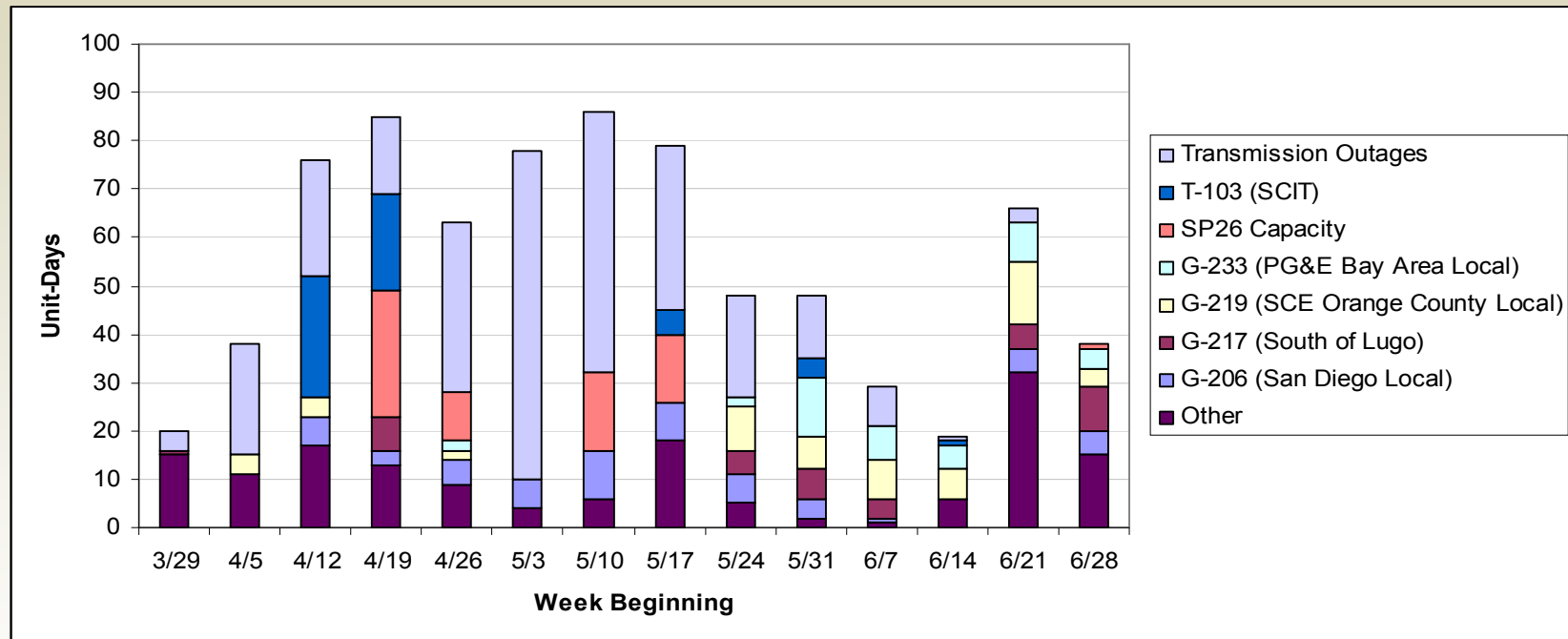


Real Time



Overall downward trend in frequency of day-ahead ED since May.

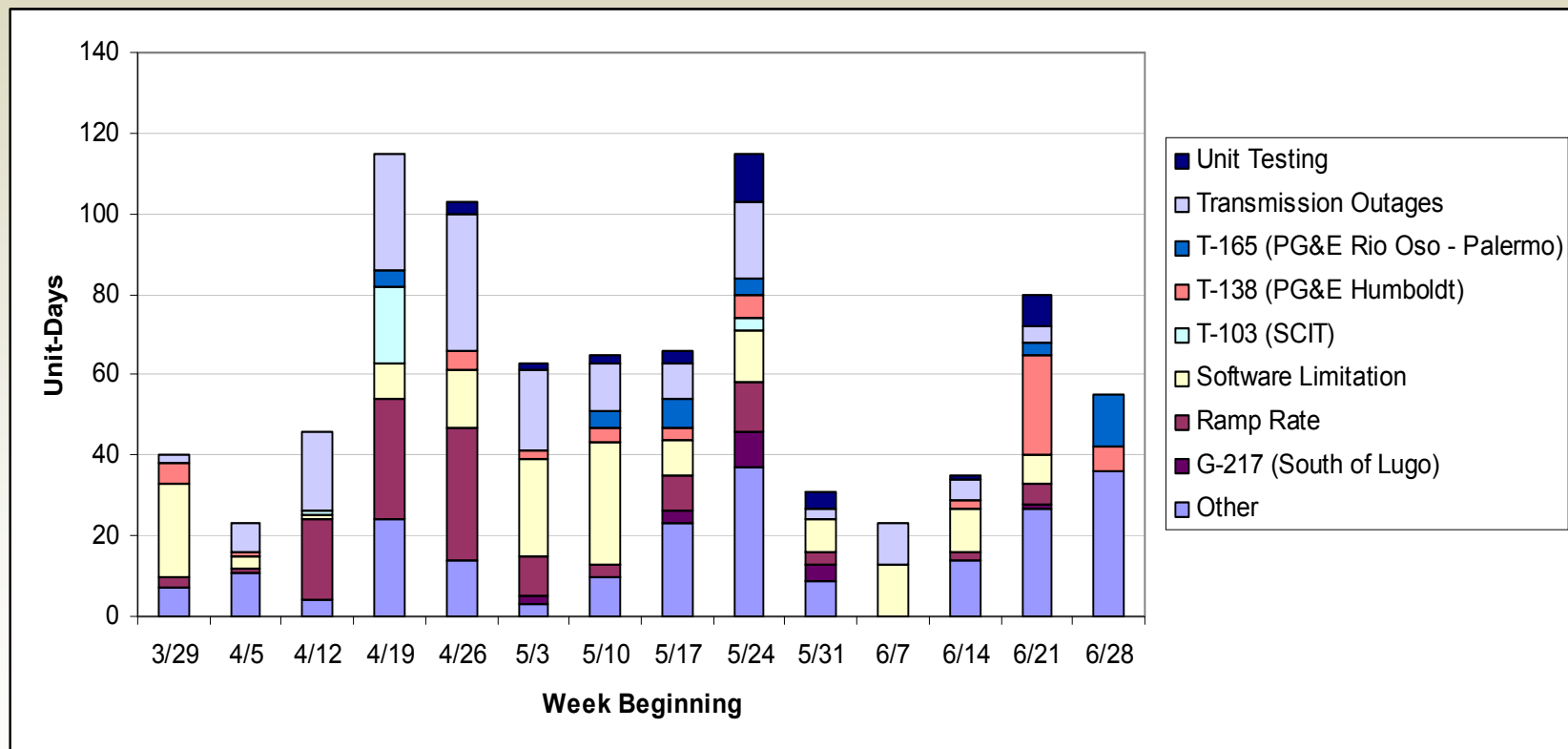
Weekly Frequency (Unit Days) by Reason – ED Day Ahead Unit Commitment



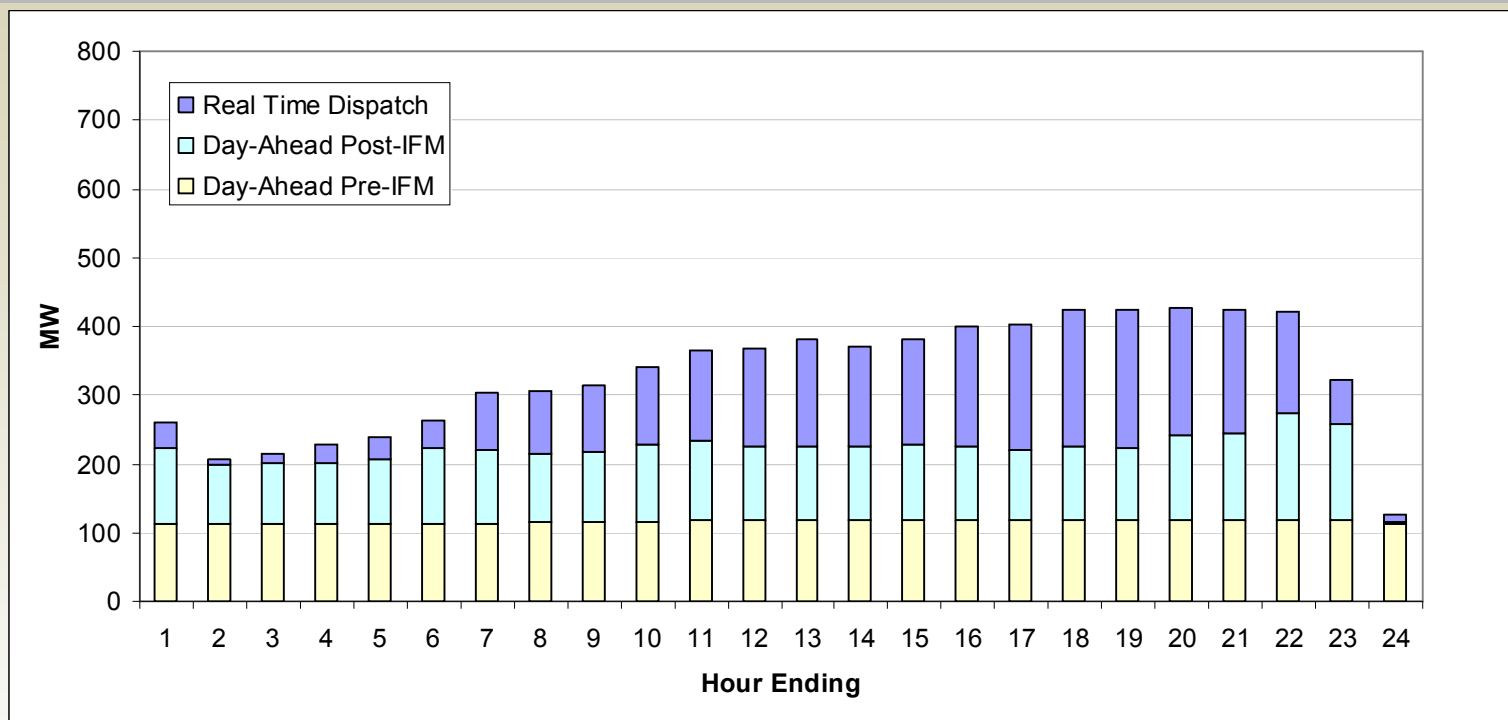
- Palo Verde-Devers and SWPL transmission outages was primary driver in May.
- Late June heat wave resulted in increased ED (“Other” category includes system capacity).

Overall downward trend in frequency of real-time ED since May.

Weekly Frequency (Unit Days) by Reason – Real-Time ED energy dispatch

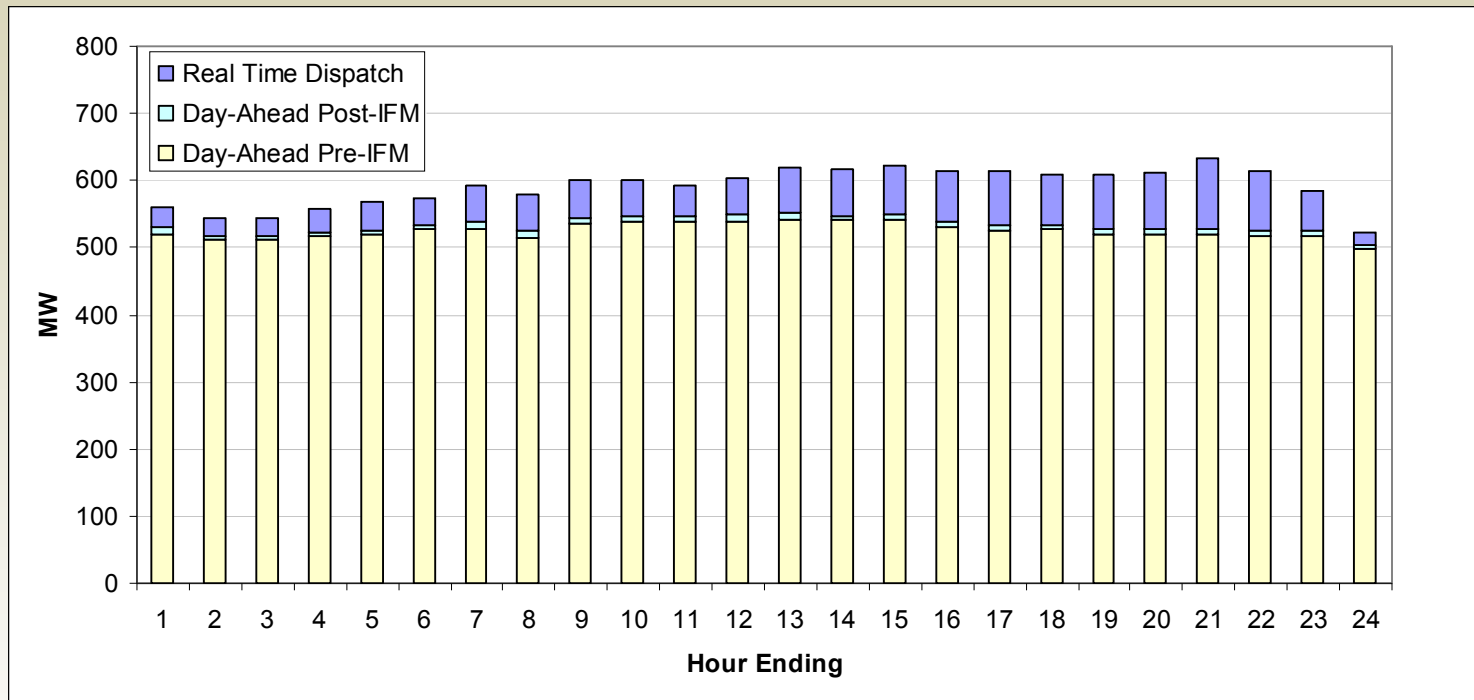


Hourly Profile of Energy from ED - April 2009



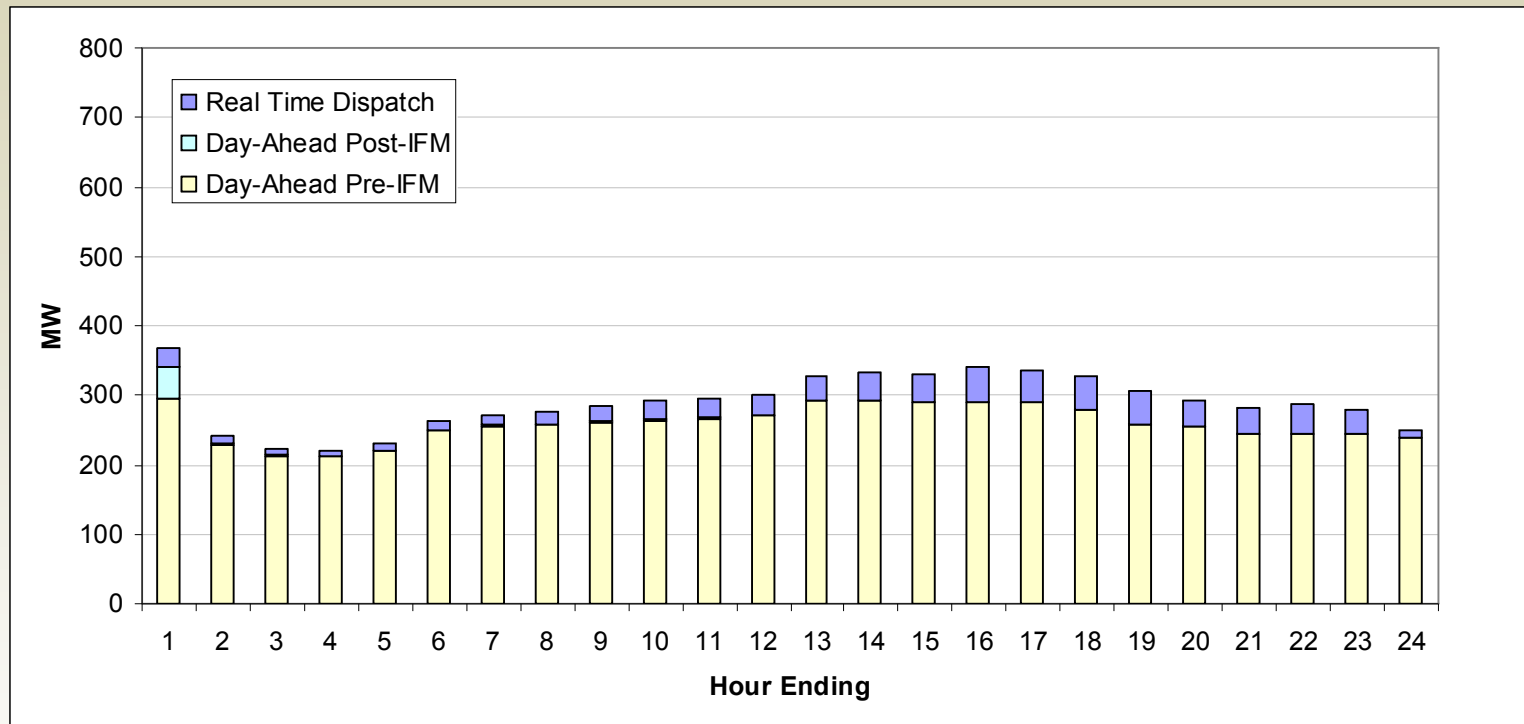
- Average ED energy evenly split between minimum load and energy above minimum load.
- Pre-IFM ED commitment began April 20

Hourly Profile of Energy from ED -May 2009



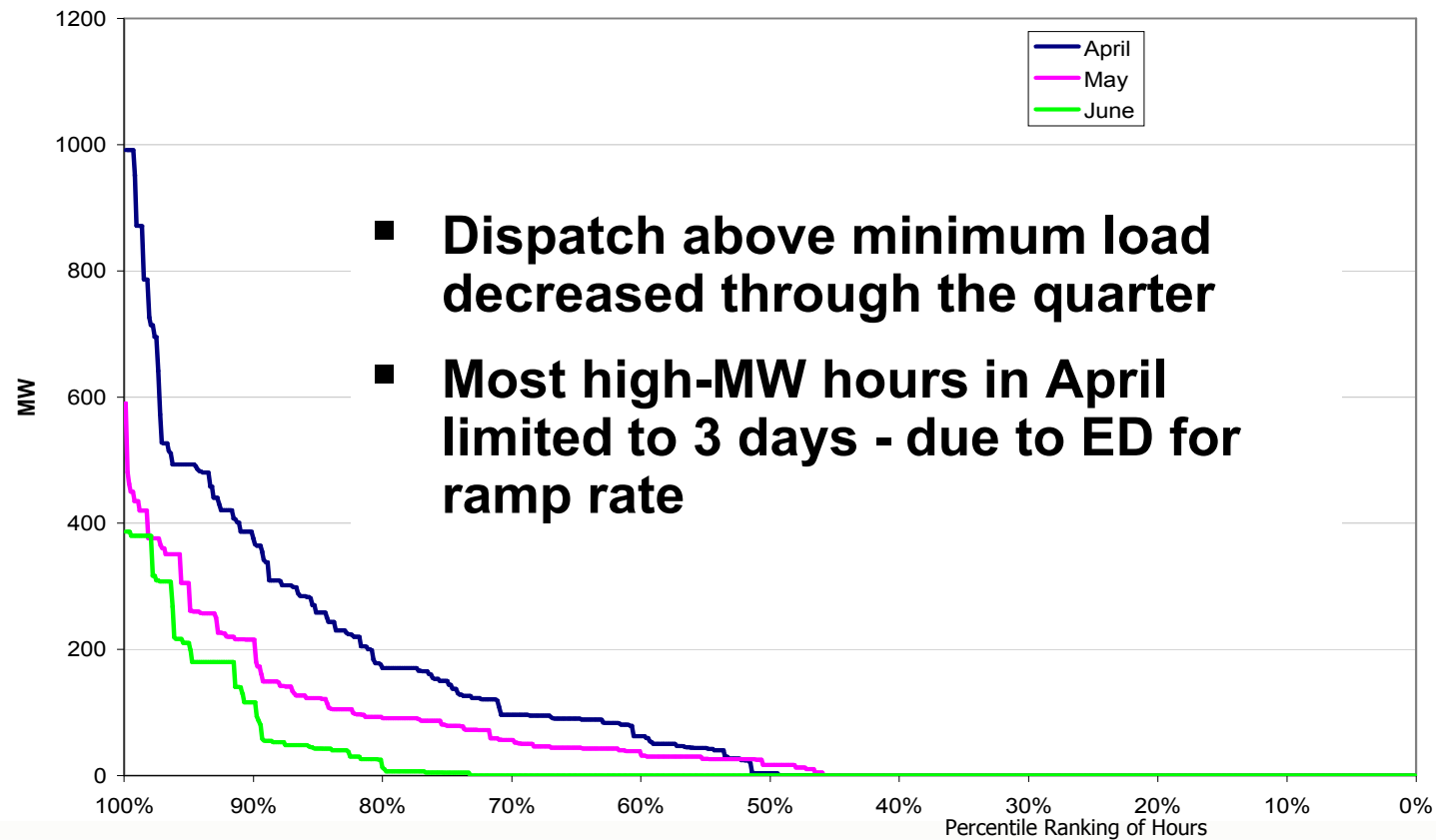
- Average hourly energy peaked in May - primarily from minimum load.
- Week of May 10 – most of ED commitment (PV-Devers and SWPL transmission outages).

Hourly Profile of Energy from ED - June 2009



- Energy from ED in June was half of May volume.
- Minimal energy over minimum load.

Monthly Duration Curves of Real-Time ED energy instructions above Minimum Load



Exceptional Dispatch

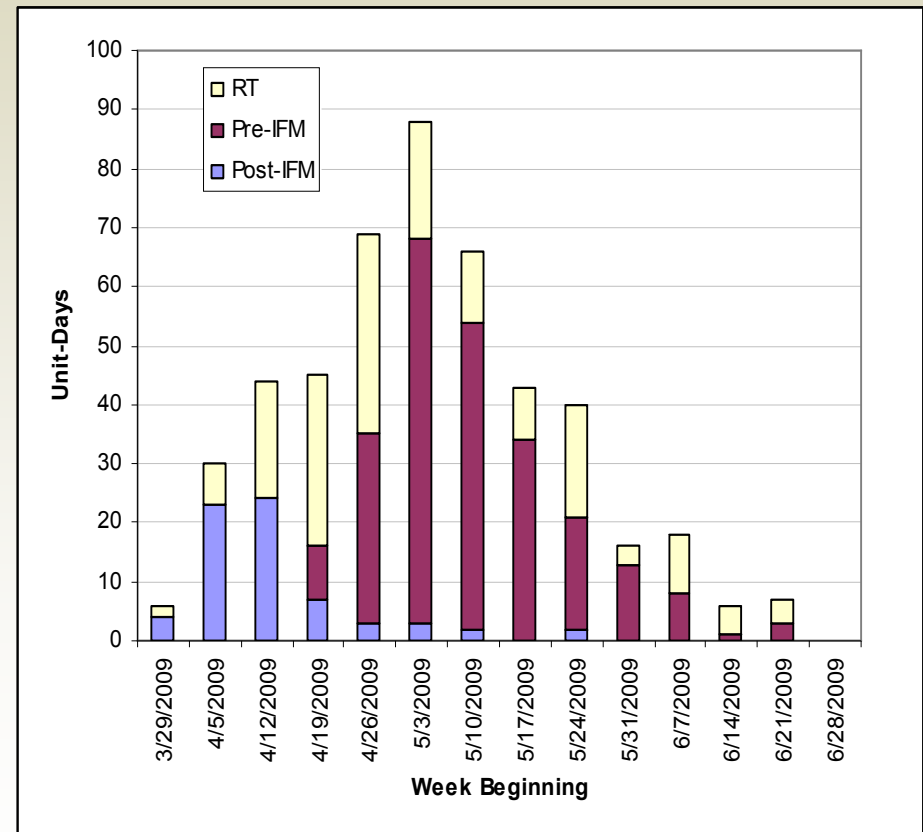
Profiles of Select Dispatch Reasons

Exceptional Dispatch for Transmission Outages – Frequency and Reasons

Reasons

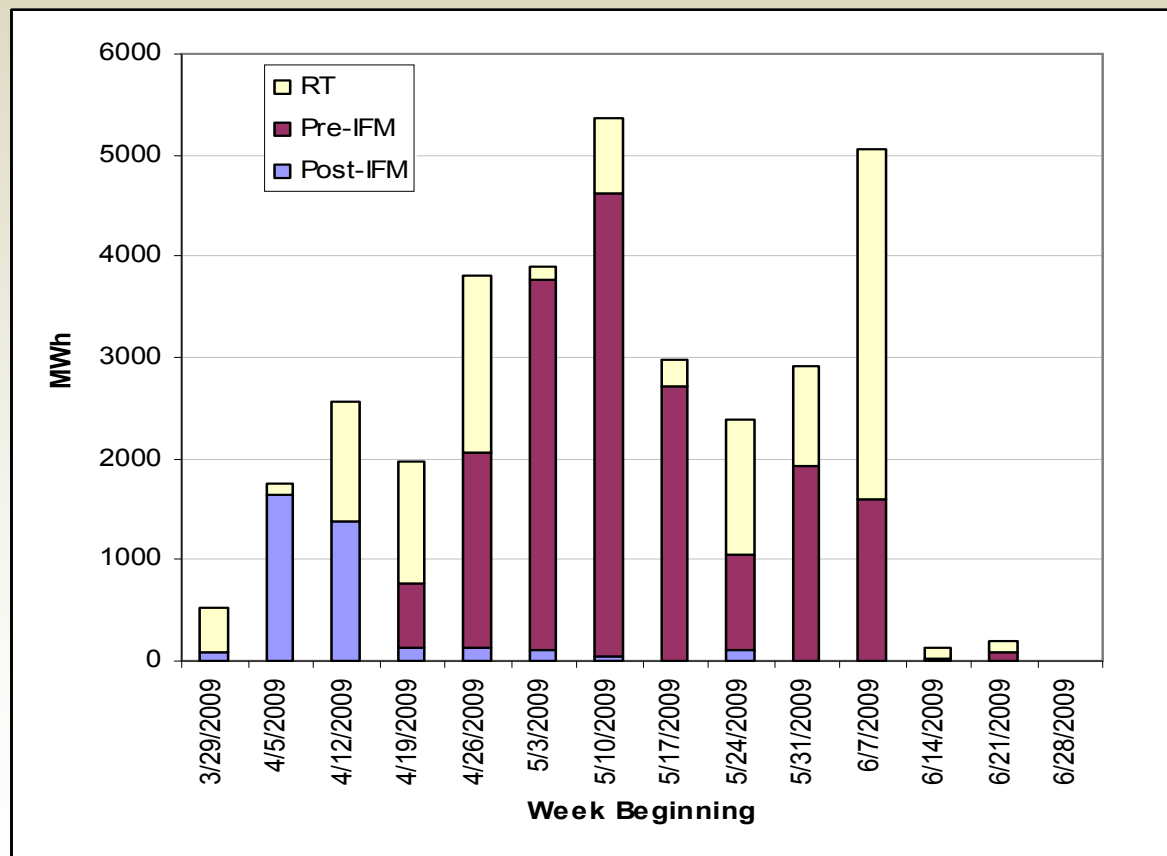
- Devers-Valley 500kv
 - out April 6-29
 - up to 8 commitments/day
- Devers-Palo Verde 500kv
 - out May 2-6
 - up to 12 commitments/day
- SWPL
 - out May 8-18
 - up to 11 commitments/day
- Pittsburg 230kv bus
 - out May 18-21
 - 1 commitment/day
- Contra Costa-Lone Tree (East Bay)
 - out May 23-June 10
 - up to 3 commitments/day
- Ignacio-Sobrante 230kv (East Bay)
 - out May 30-June 6
 - up to 2 commitments/day

Weekly Frequency



Exceptional Dispatch for Transmission Outages – Energy Volumes

Weekly Energy (Gross MWh)

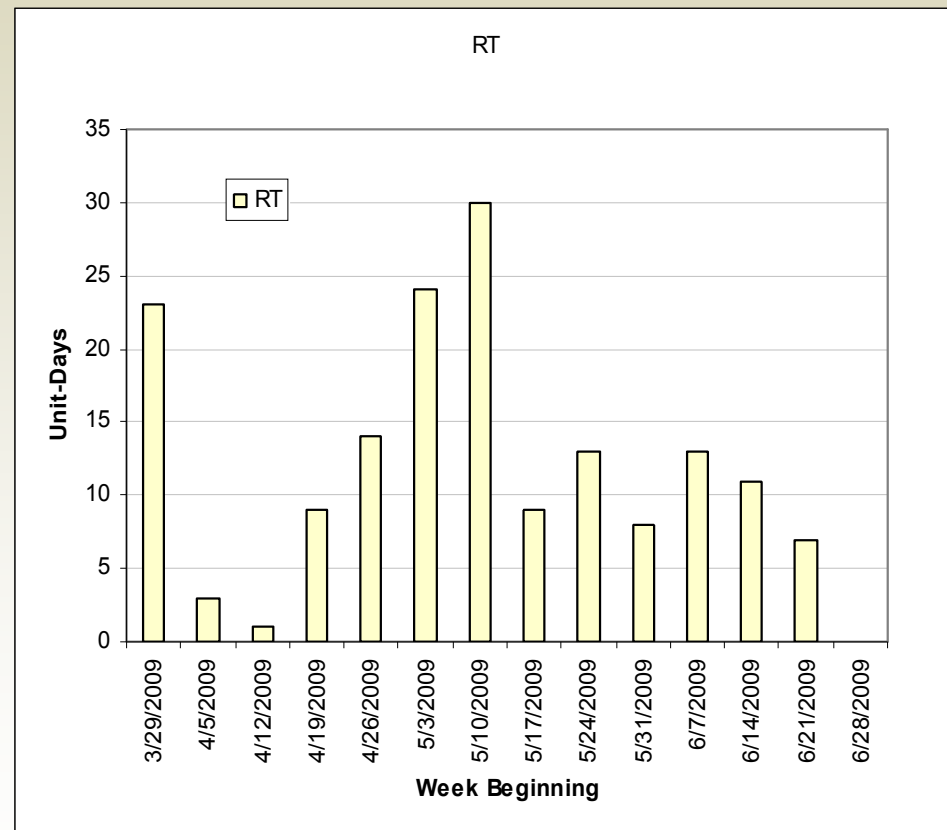


Exceptional Dispatch for Software Limitations – Frequency & Reasons

Reasons

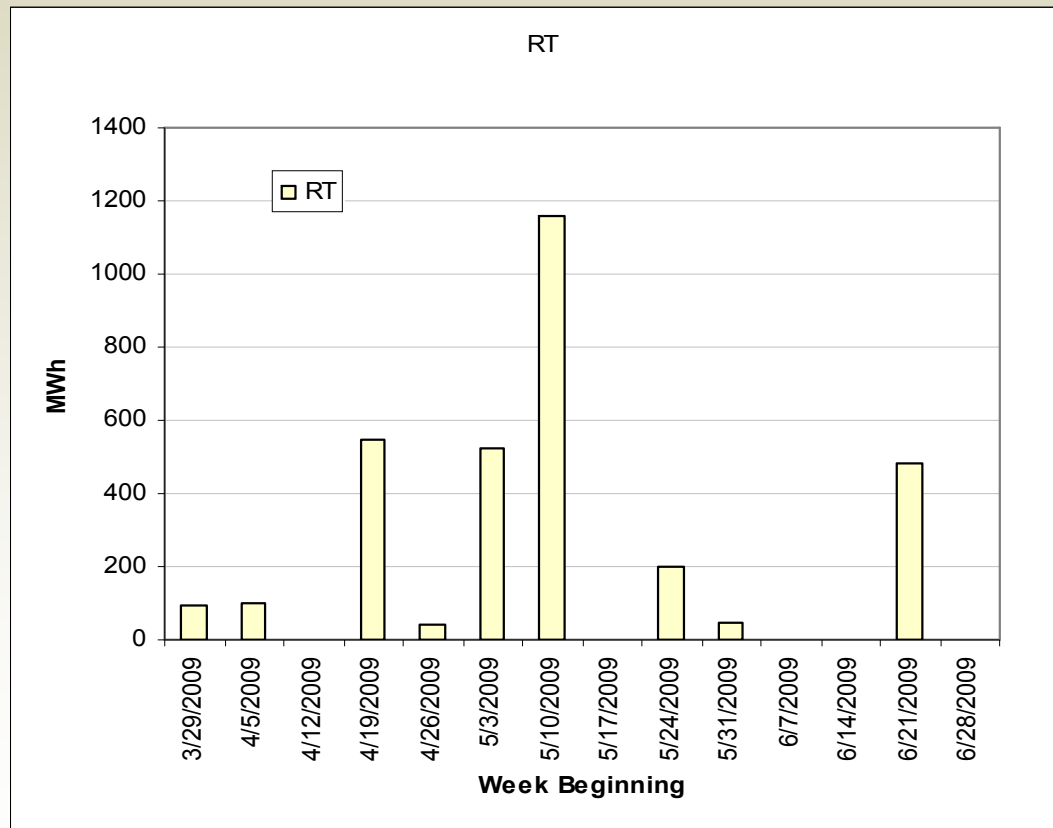
- Real-time reason only
- Used to override erroneous software-generated startup and shutdown instructions.
- NOT due to failures in automated dispatch system communicating instructions.

Weekly Frequency



Exceptional Dispatch for Software Limitations – Energy Volume

Weekly Energy (Gross MWh)

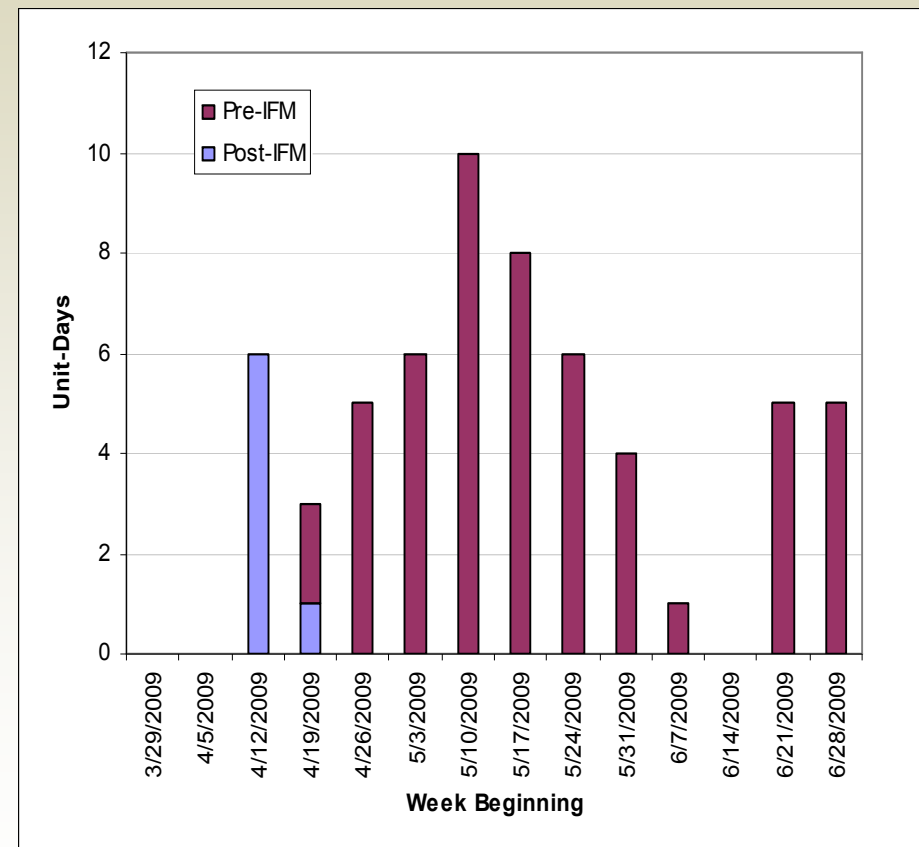


Exceptional Dispatch for G-206 (San Diego Local) - Frequency & Reasons

Reasons

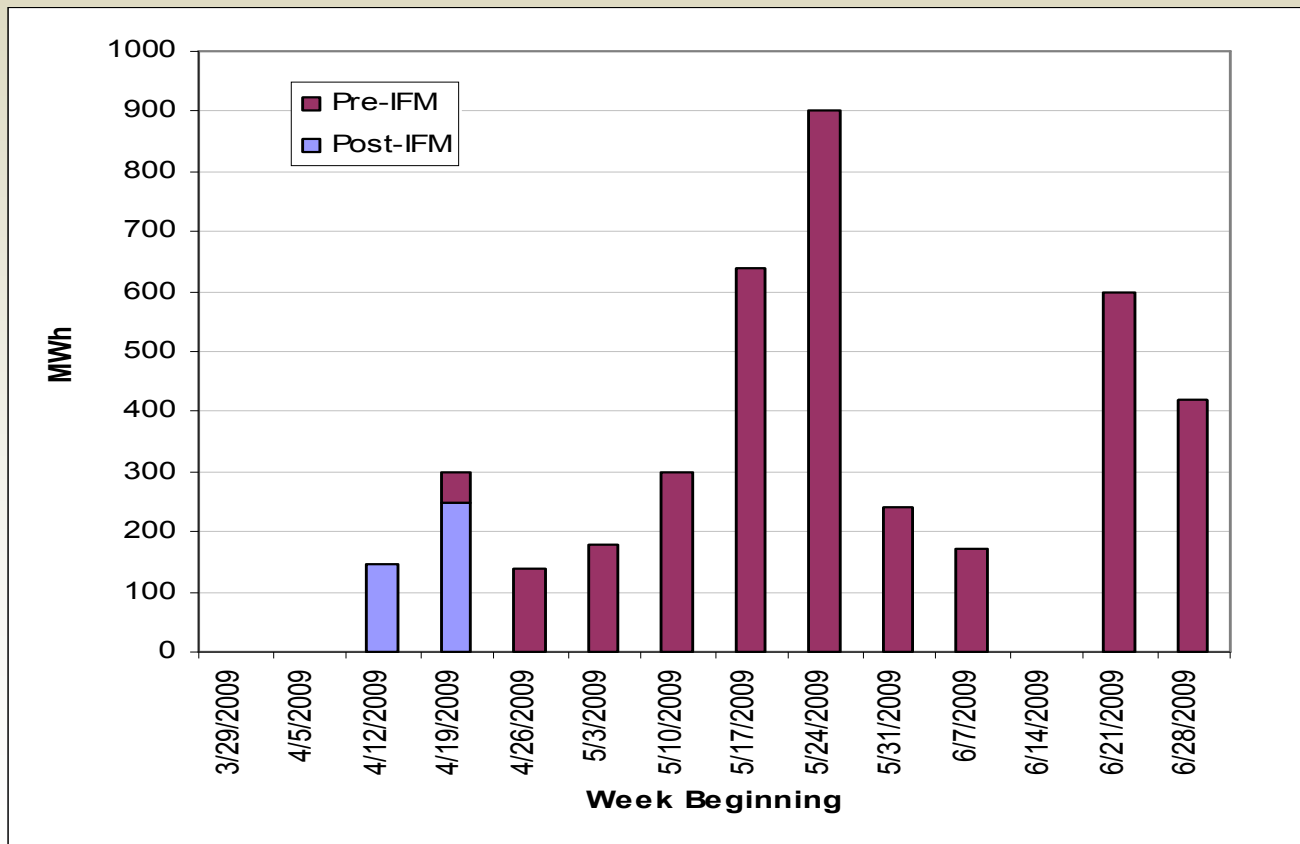
- Unit commitment based on Operations Engineers' daily transmission network analysis
- Primarily for voltage support and contingencies
- Ongoing clearances in San Diego area required support through much of April and May

Weekly Frequency



Exceptional Dispatch for G-206 (San Diego Local) - Energy Volume

Weekly Energy (Gross MWh)

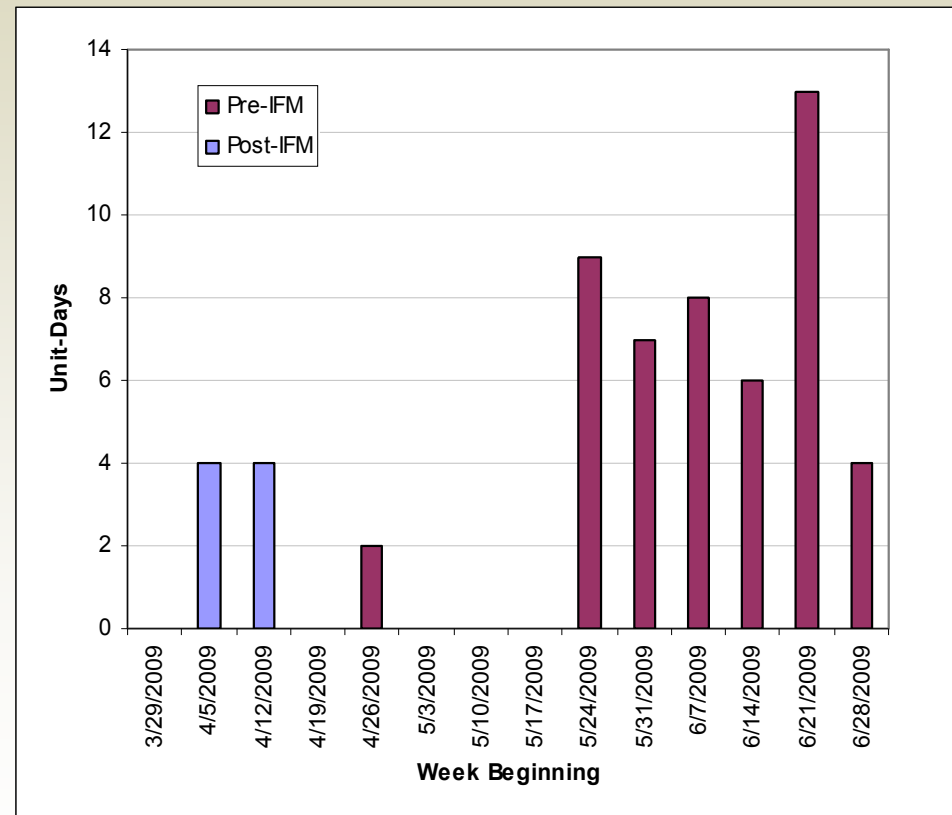


Exceptional Dispatch for G-219 (SCE Orange County Local) – Frequency and Reasons

Reasons

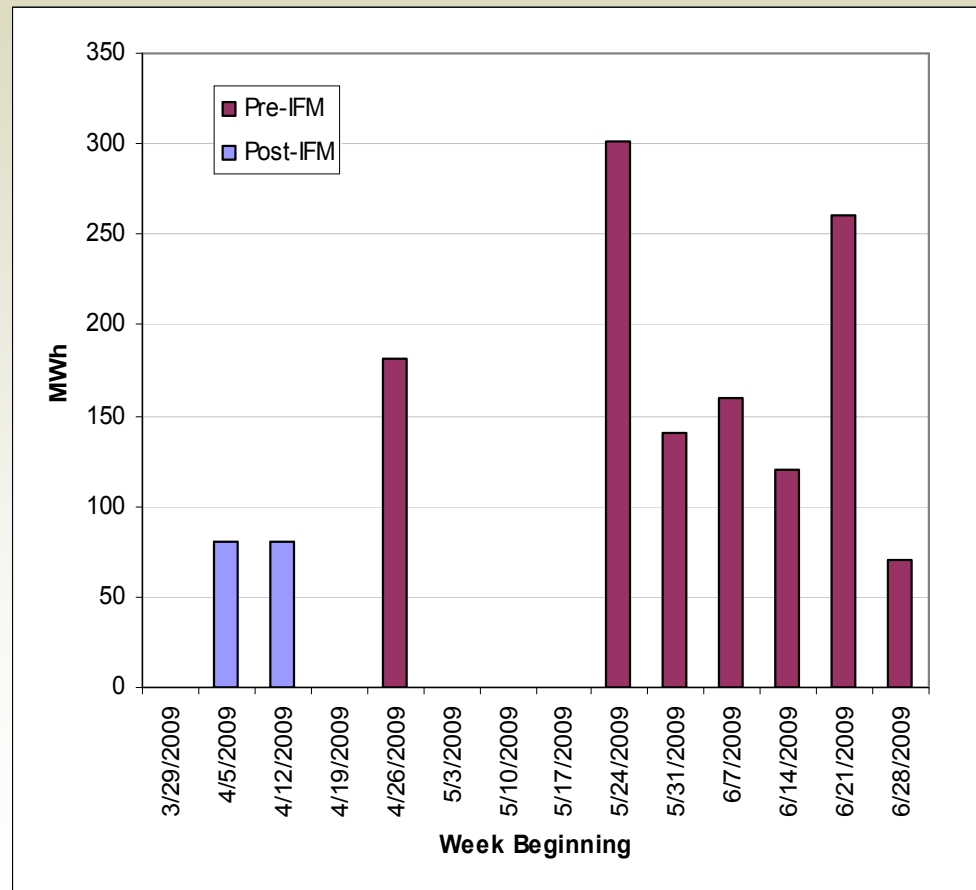
- Commitments issued prior to G-217
- Local area voltage and capacity requirements
- Approximately 1 to 2 units committed per day

Weekly Frequency



Exceptional Dispatch for G-219 (SCE Orange County Local) – Energy Volume

Weekly Energy (Gross MWh)

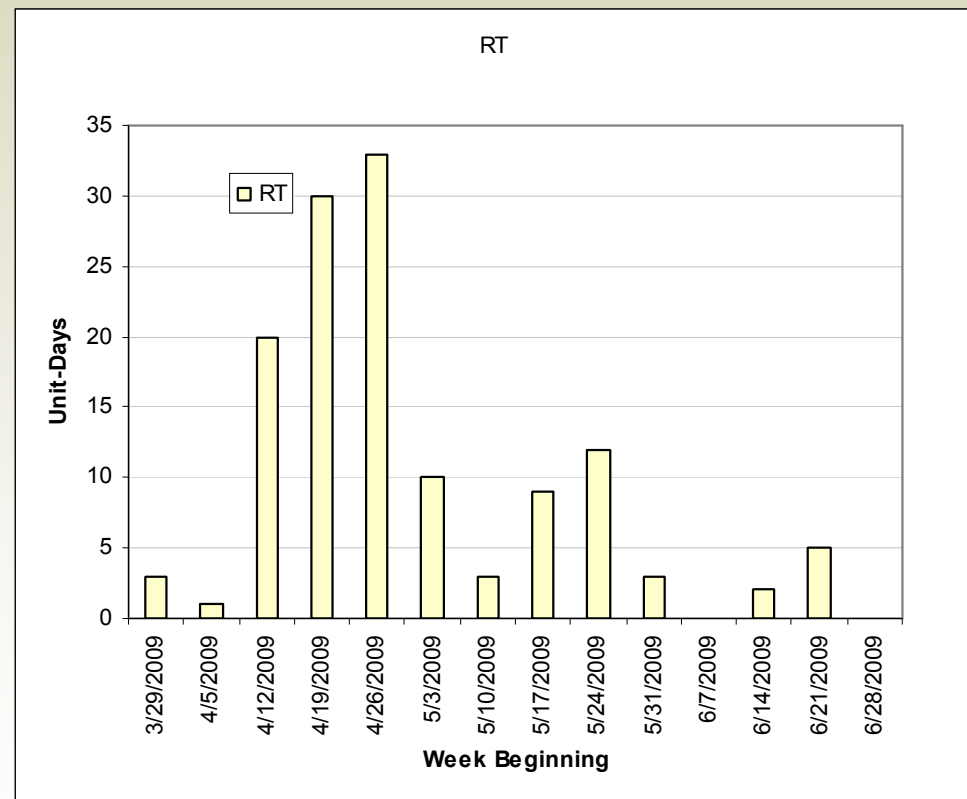


Exceptional Dispatch for Ramp Rate – Frequency and Reasons

Reasons

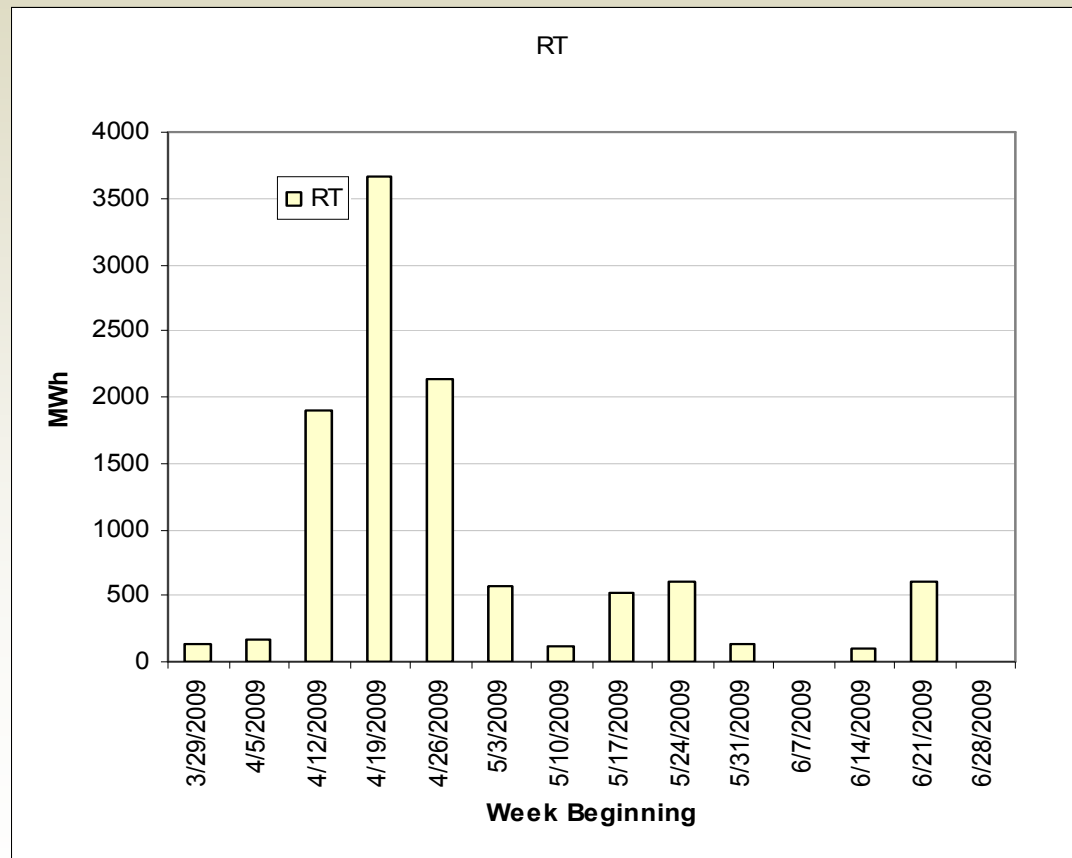
- RT instruction only
- Brings units that are committed at minimum load to a higher output level that has greater ramping capability
- ED in April and May particularly to units committed for transmission outages

Weekly Frequency



Exceptional Dispatch for Ramp Rate – Energy Volume

Weekly Energy (Gross MWh)

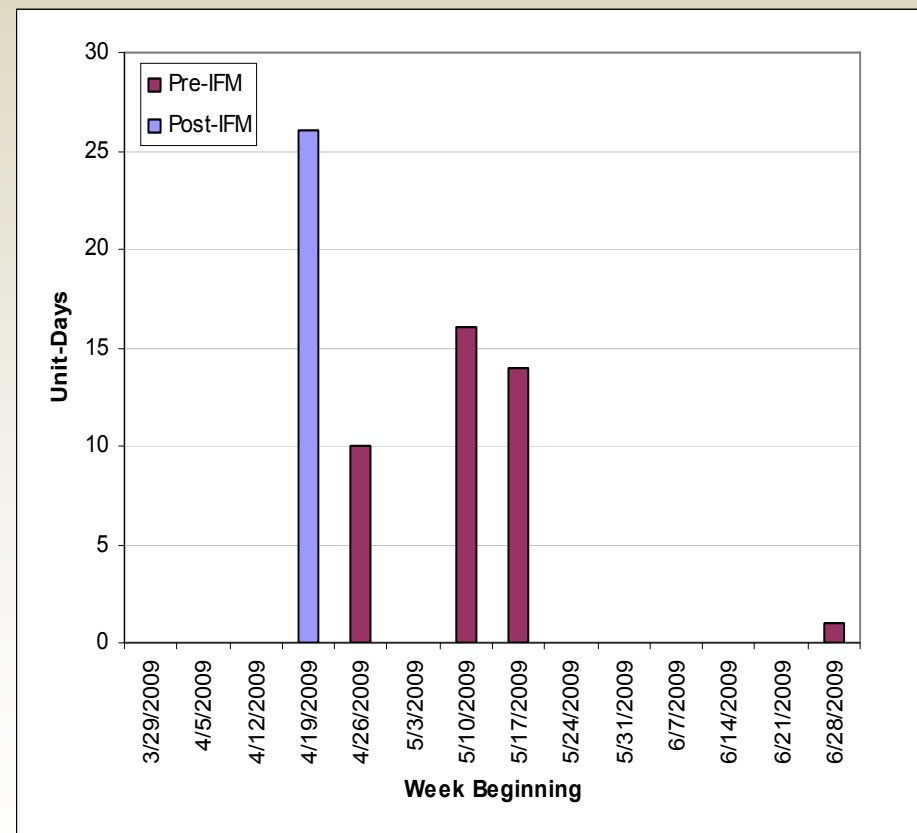


Exceptional Dispatch for SP26 Capacity – Frequency and Reasons

Reasons

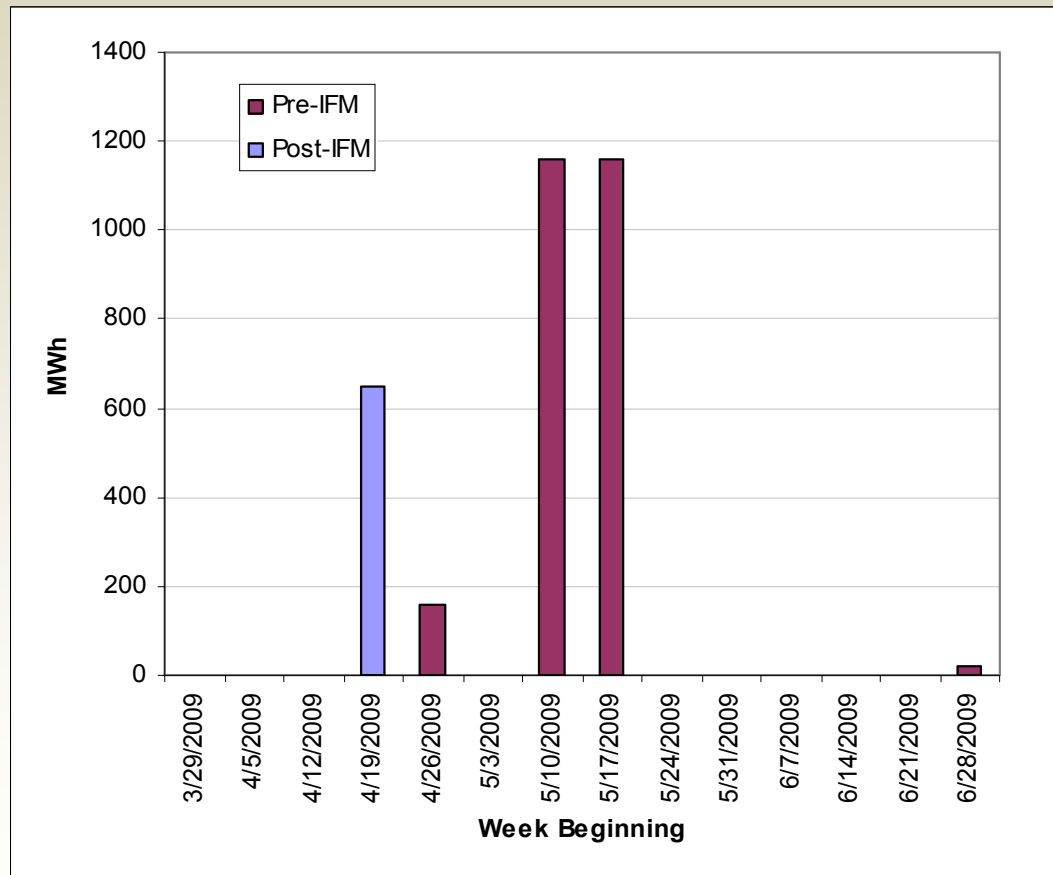
- SP26 capacity requirement
- Long-start unit held on for multiple days in May

Weekly Frequency



Exceptional Dispatch for SP26 Capacity – Energy Volume

Weekly Energy (Gross MWh)

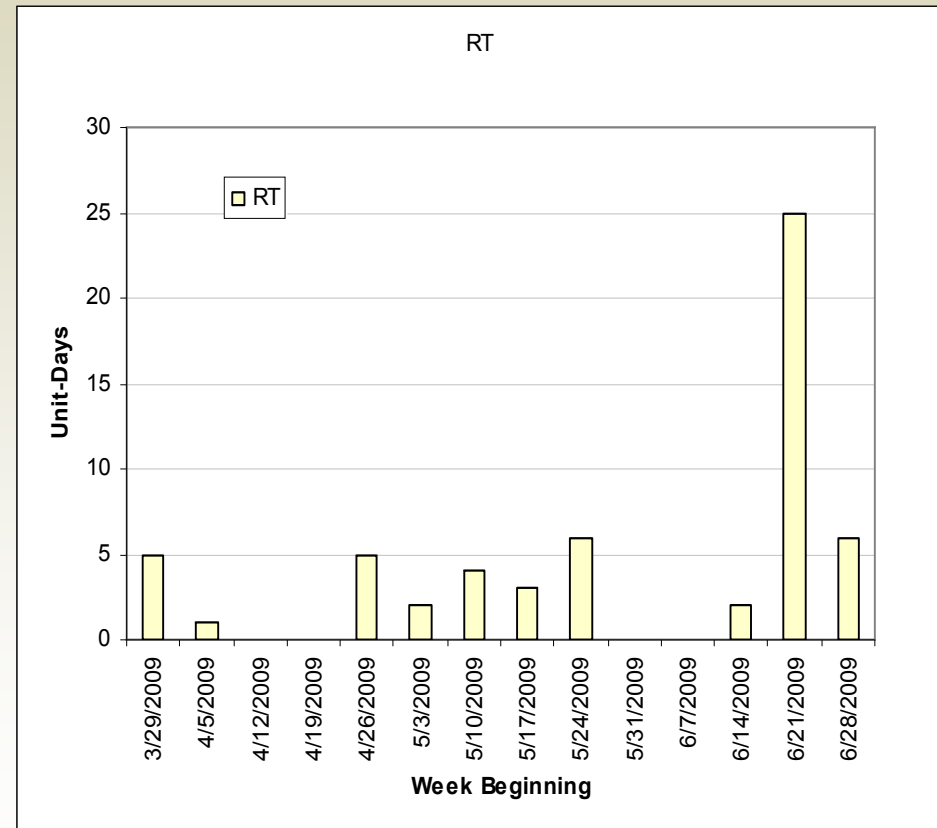


Exceptional Dispatch for T-138 (Humboldt Area) – Frequency & Reasons

Reasons

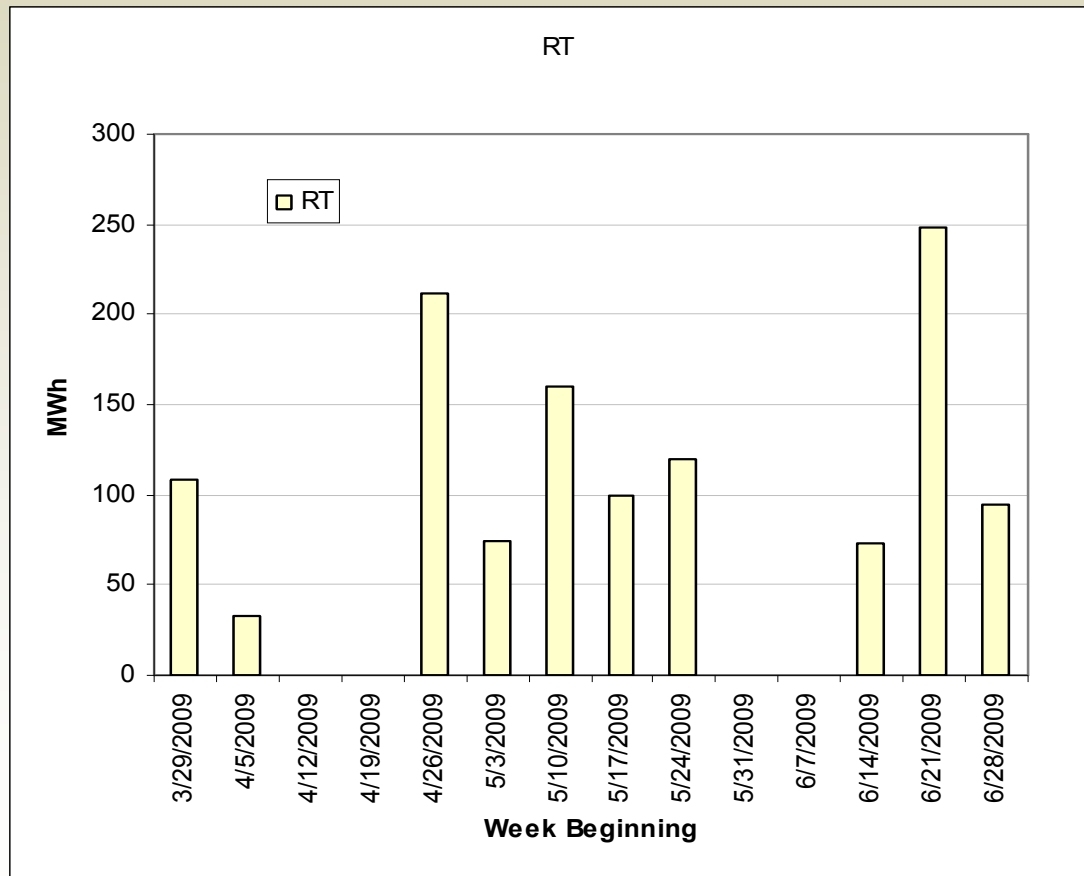
- Modeling issues in Humboldt usually due to inaccurate modeling of QF resources and frequent deviations from schedules
- Many dispatches of Humboldt resources are small movements of 0 to 20 MW
- Some resources require nightly ED shutdown

Weekly Frequency



Exceptional Dispatch for T-138 (Humboldt Area) – Energy Volume

Weekly Energy (Gross MWh)



Recommendations – Reducing Reliance on Exceptional Dispatch

- Test day-ahead pre-IFM unit commitment to determine whether pre-committed resources could be committed by the market
 - Ongoing transmission outages in particular may not require ED commitment
 - Validate / confirm assumptions about unit commitment for voltage support.
- Develop methods for including more generation requirements in market constraints

Recommendations – Reporting and Monitoring

- Improve logging and recording of ED so that dispatch time, market interval, specific reason, and information about competitive constraints is clear
- ISO ED Project Team is developing integrated full-featured IFM/RTN ED interface
- Will include SLIC data integrated with market data and competitive path information (for mitigation)
- Facilitates logging and reporting best practices for ED

References

- CAISO Tariff Section 34.9 – general
 - <http://www.caiso.com/23b2/23b2c9d974c00.pdf>
- ED Technical Bulletin – more specific
 - Provides overview of categories and settlement rules
 - <http://www.caiso.com/23ab/23abf0ae703d0.pdf>
- Operating Procedures M-402, M-402a, M-402b, S-318
 - Currently being updated with additional information on instruction type codes: undergoing review by ED project
 - M-402 series at <http://www.caiso.com/thegrid/operations/opsdoc/marketops/index.html>
 - S-318 at <http://www.caiso.com/thegrid/operations/opsdoc/sched/index.html>