

A photograph of several white wind turbines in a field under a blue sky. The image is partially obscured by a green and blue graphic overlay.

Operational Controls for Balancing Reserves (OCBR)

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Operational Controls for Balancing Reserves (OCBR)

- **Operational Controls for Balancing Reserves (OCBR) Tool**
- Base changes from DSO 216 to OCBR for 15 Minute Scheduling
 - OCBR Trigger Levels
 - OCBR Timing Levels

Operational Controls for Balancing Reserves (OCBR)

Operational Controls for Balancing Reserves (OCBR) and System Reliability

- The reliability of the system is at risk if BPA is unable to maintain load and resource balance in the balancing authority area because of extreme generator station control errors.
- The OCBR tool is being designed to reduce generation station control error on the system when available balancing reserve capacity is exhausted to prevent the occurrence of a system emergency.
- For example, generation station control error may exceed available balancing reserve capacity from both the Federal system and third parties, as was observed this past Spring.
- During these rare events, BPA must be able to take steps to mitigate adverse impacts to system reliability.

Operational Controls for Balancing Reserves (OCBR)

- Expands operational reliability protocols to all non-controlling non-Federal generation in the BA.
 - FCRPS generators are excluded units, as they provide the FCRPS balancing reserves or will be handled through changes to internal Operating Practices.
 - During over-generation events, VER plants must reduce generation to relieve the reliability event.
 - During under-generation events, schedules (or eTags) are cut to relieve the reliability event.
 - For Level 1 events (90% of balancing reserves deployed), reserve allocations are given to generators to allow for deviation from schedule within acceptable ranges.
 - For Level 2 events (currently 100% of balancing reserves deployed),
 - The system must have already recently experienced a Level 1 event.
 - No reserve allocations are given to greater assist the system in getting back to a reliable state.

Operational Controls for Balancing Reserves (OCBR)

- “Netted” groups of plants will be allowed to combine their SCEs and reserve allocations for OCBR events.
 - A “netted” group will combine its SCE for diversity benefits and its allocation of reserves for a larger operational deadband.
 - For under-generation (INC) events, when/if the group is subject to a curtailment, the curtailment amount will be a pro-rata curtailment applied across the plants within the netted group who are outside of their INC allocation.
 - For Level 1, this would be the difference between the “netted” groups basepoints and the “netted” groups generation plus allocated reserves
 - For Level 2, the would be the difference between the “netted” groups basepoints and the “netted” groups generation

Operational Controls for Balancing Reserves (OCBR)

- “Netted” groups, continued
 - For over-generation (DEC) events, the “netted” group must keep their combined generation below:
 - For Level 1, this would be the “netted” groups basepoint (schedules) plus allocated DEC reserves
 - For Level 2 this would be the “netted” groups basepoint (schedules)
 - NOTE: DER generation as part of a “netted” group would be subject to these events as part of the “netted” group.
 - Any parties who wish to sign a netting agreement together may form a netted group, including different owners/operators and different resource types (VER, DER, etc.).
- Link to existing documentation:
<http://www.bpa.gov/Projects/Initiatives/Wind/Pages/operational-controls.aspx>

OCBR: Under-Generation (INC) Events

- Under-generation events are the times where the BA uses all (or a majority) of it's INC balancing reserves due to:
 - Under-generation of non-controlling generation within the BA
 - Over-consumption of loads within the BA
- For under-generation (INC) events, generators will automatically have their schedules (eTags) curtailed by:
 - For Level 1, the difference between their basepoint (sum of schedules) and generation plus allocated INC reserves
 - For Level 2, the difference between their basepoint (sum of schedules) and generation
 - No generator operator action is required.
- It is BPA's intent to apply the under-generation OCBR events to all non-controlling non-Federal generation within the BPA BAA.

OCBR: Under-Generation (INC) Events

- The impacts of federal non-controlling generation will be handled through an active operational procedure to neutralize impacts on OCBR.
- Non-VER Behind-the-Meter Generation will be exempt from OCBR Under-Generation (INC) Events, due to these generators:
 - Only serve internal load
 - Do not have eTags to curtail; They submit generation estimates only.
 - BPA would receive no relief from the reliability event by altering their basepoints
 - These projects amount to 195 MW of thermal generation and 294 MW of hydro generation in the BPA BAA.

OCBR: Over-Generation (DEC) Events

- Over-generation events are the times where the BA uses all (or a majority) of it's DEC balancing reserves due to:
 - Over-generation of non-controlling generation within the BA
 - Under-consumption of loads within the BA
- For over-generation (DEC) events, generators must keep their generation below:
 - For Level 1, the requirement is the generator's basepoint (sum of schedules) plus allocated DEC reserves
 - For Level 2, the requirement is the generator's basepoint (sum of schedules)
- It is BPA's intent to only apply the over-generation OCBR events to variable generation (VER) within the BPA BAA.

OCBR Reserve Allocation Example

- In July 2014, BPA held 942 MW of INC Balancing Reserves
 - VER generators pay for and are allocated 569 MW of the total.
 - Load and non-VER/non-controlling generation in the BA pay (directly or indirectly) for the capacity associated with the remaining 373 MW
 - Because BPA will not drop load (unless directed by the RC and/or an Energy Emergency Level 3 is reached) and not all generators/loads are going to be off at the same time in the same direction, the remaining 373 MW of INC reserves can get spread among all of the non-VER/non-AGC/non-Federal generation
 - Non-Fed Non-VER Non-AGC Generation have approximately 3,948 MW of nameplate, therefore they would receive the greater of 9.4% of nameplate (rounded to the nearest MW) or 1 MW.
 - These generators could opt to form a netted group to potentially shield each other.

Operational Controls for Balancing Reserves (OCBR)

■ Sample Curtailment Event #1

Plant	Nameplate	INC Allocation	SCE	Netted INC	Netted SCE	Curtailment
VER 1	100	15	-23	N/A	N/A	-8
VER 2	100	15	-12	N/A	N/A	NONE
VER 3	260	39	-60	N/A	N/A	-21
DER 1	300	15	5	30	-19	NONE
DER 2	100	5	-13			NONE
VER 4	200	10	-11			NONE
DER 3	600	29	-25	N/A	N/A	NONE
DER 4	100	5	-12	N/A	N/A	-7
DER 5	50	2	4	N/A	N/A	NONE

Operational Controls for Balancing Reserves (OCBR)

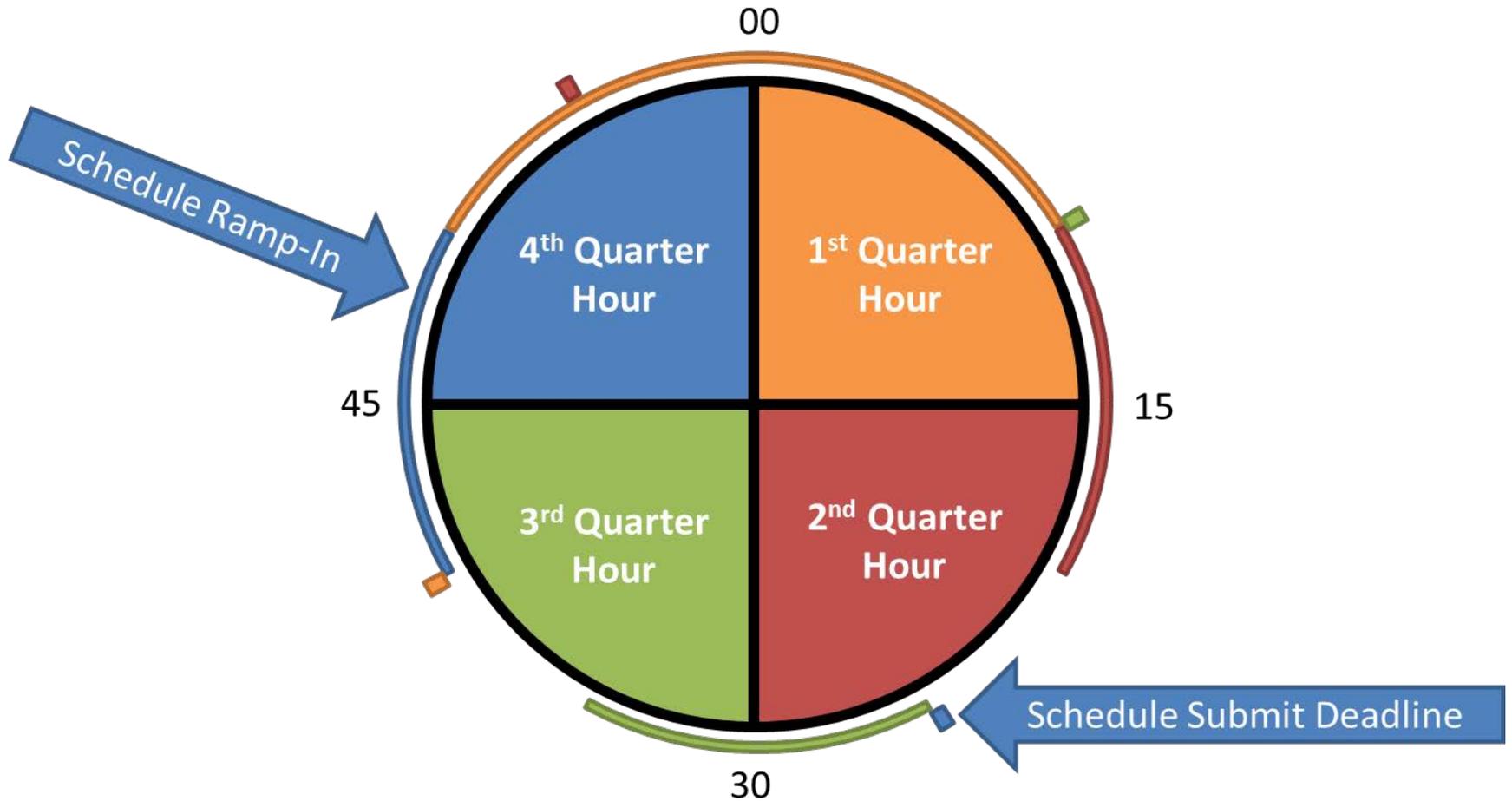
■ Sample Curtailment Event #2

Plant	Nameplate	INC Allocation	SCE	Netted INC	Netted SCE	Curtailment
VER 1	100	15	3	N/A	N/A	NONE
VER 2	100	15	-37	N/A	N/A	-22
VER 3	260	39	-75	N/A	N/A	-36
DER 1	300	15	-17	30	-50	-1
DER 2	100	5	4			NONE
VER 4	200	10	-37			-19
DER 3	600	29	-45	N/A	N/A	-16
DER 4	100	5	13	N/A	N/A	NONE
DER 5	50	2	-5	N/A	N/A	-3

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OCBR Changes for 15 Min Schedules



OCBR Changes for 15 Min Schedules

OCBR Level Trigger Thresholds

- Level at which Balancing Reserves Deployed (BRD) must be above for a OCBR event to initiate.

OCBR Level	DSO 216 Value	OCBR Value
Warnings	85%	85%
Level 1	90%	90%
Level 2	100%	97%

- Decreasing Level 2 to **97** % gives time for OCBR to implement prior to over-deploying the FCRPS, which can be intensified by 15 min scheduling.

OCBR Changes for 15 Min Schedules

Dispatcher Review Time

- The time from a OCBR Alarm in which BPA Dispatchers have to review the event, discard the event or implement the event immediately
- After this time, the event will auto-implement, if criteria for the OCBR Alarm still exist.

OCBR Changes for 15 Min Schedules

Dispatcher Review Time, continued

- Current Dispatcher Review Time = 4.5 Minutes
- Proposed Review Time = 0 Minutes with Auto-Suspend for certain system events:
 - DC RAS
 - AC RAS
 - Large ACE Detection
 - Large ACE without corresponding Frequency change indicates a telemetry error.

OCBR Changes for 15 Min Schedules

Dispatcher Review Time, continued

- Why?
 - Dispatch rarely discards events
 - OCBR is explicitly designed to only impact the parties that are causing the problem.
 - Dispatch has the ability to Suspend OCBR for system problems in addition to the events listed above.

OCBR Changes for 15 Min Schedules

Minimum Time Between Event Levels

- Once a OCBR event level has been implemented, the system will pause for a specified amount of time before it will begin re-evaluating the Balancing Reserves Deployed for the next level.
- Currently the length of time the system pauses before re-evaluating Balancing Reserves Deployed is 10 minutes

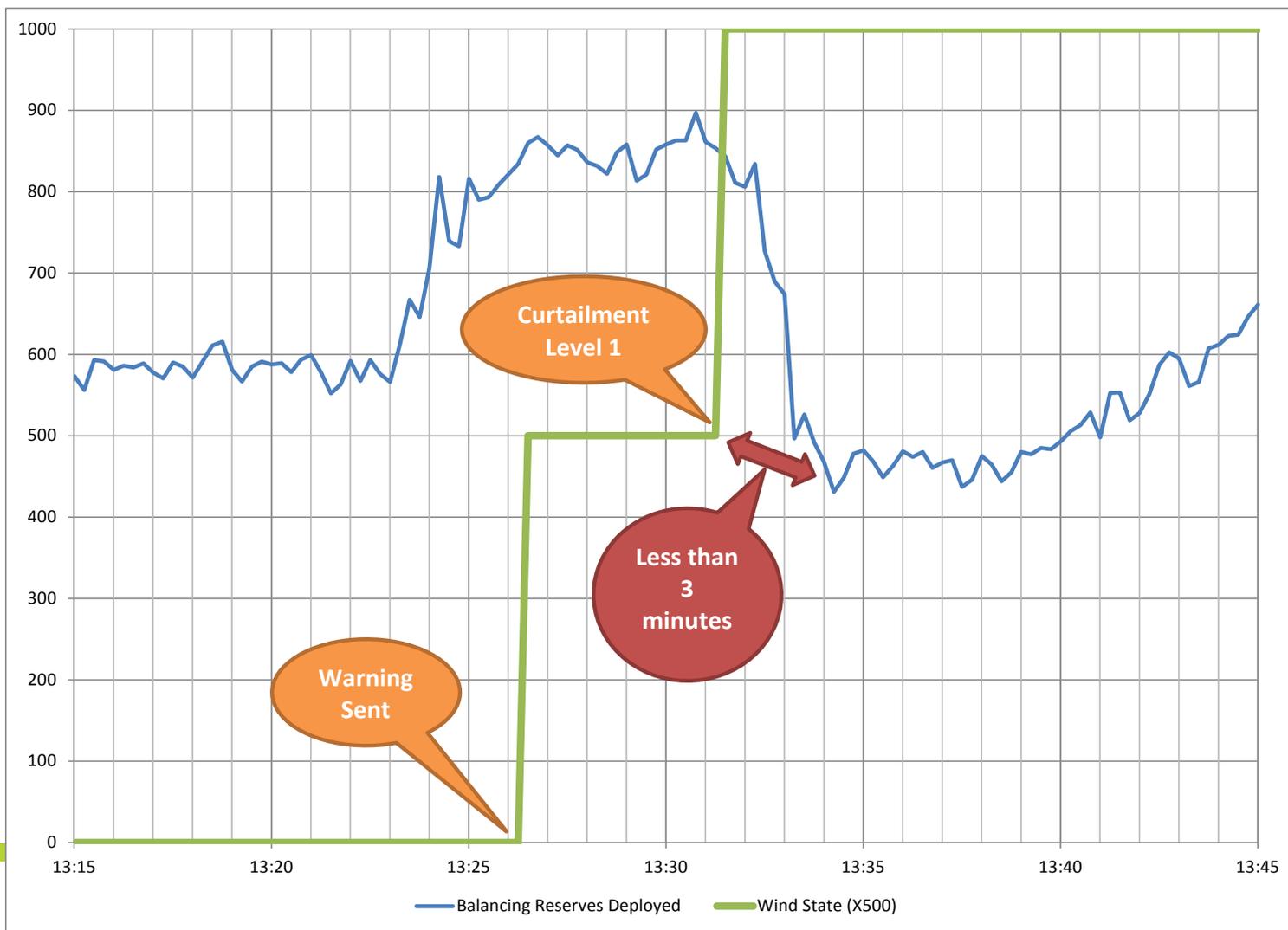
OCBR Changes for 15 Min Schedules

Minimum Time Between Event Levels, continued

- Proposed Minimum Time Between Levels is 5 Minutes
 - With 15 minute scheduling windows, 10 minutes is too long of a period to wait to re-examine use of Balancing Reserves Deployed.
 - Wind Curtailment events are reflected within 5 minutes of the onset of the event in the Balancing Reserves Deployed.
 - Wind Limit event performance has shown that 5 minutes is easily attainable. Wind parties will still be given 10 minutes before strikes are assessed.

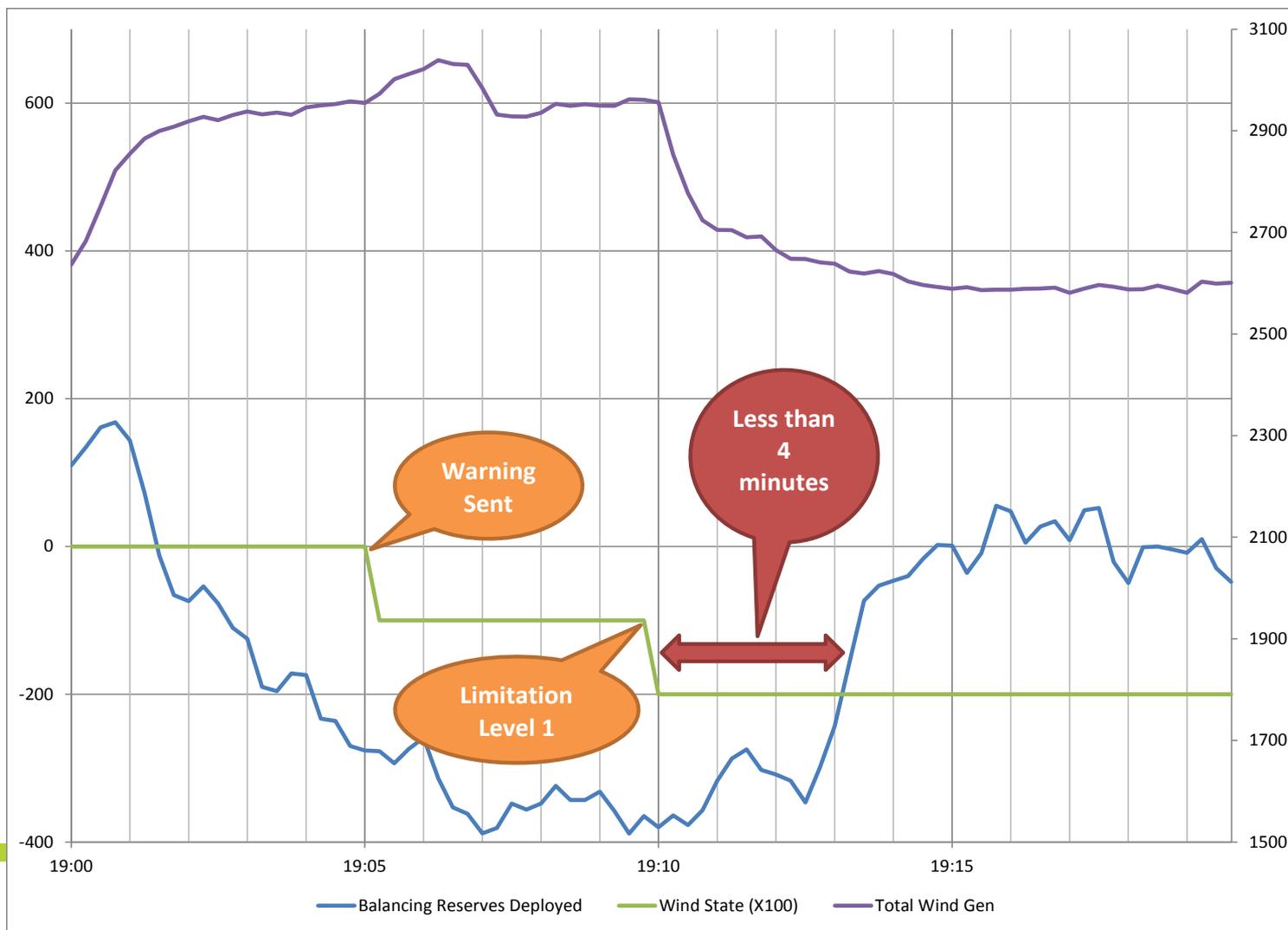
OCBR Changes for 15 Min Schedules

- Balancing Reserves Deployed response to a Curtailment



OCBR Changes for 15 Min Schedules

- Balancing Reserves Deployed response to a Limitation



Operational Controls for Balancing Reserves (OCBR)

Questions?