Large Generator Interconnection

Joint Operating Committee Meeting

January 12, 2010

9:30 – 12:30 p.m.

Welcome and Introduction

9:30 – 9:45	Welcome and Introduce Topics – Scott Simons
	JOC Member Check- in – Steve Enyeart
9:45 – 10:30	Draft Netting Concept for Dispatcher Standing Order (DSO 216)
	Events – Scott Simons/Kevin Johnson
10:30 – 11:20	Feedback from JOC Members on Effectiveness of
	Current Persistent Deviation – Bart McManus
11:20 – 11:30	Break
11:30 – 12:20	Discussion with Thermal Generators – Bart McManus
12:20 – 12:30	Closing Remarks and Next Steps – Scott Simons

Netting for Dispatcher Standing Order (DSO 216) Events

Presented by Scott Simons and Kevin Johnson

Background for Netting for DSO 216 Events

- The balancing reserves available to wind generators in BPA's Balancing Authority and used for DSO216 events are based on the aggregate performance of all wind facilities and load in the Balancing Authority.
- The purpose of DSO216 and the Failure to Comply (FTC) penalty charge is to maintain reliability of the BPA system. DSO216 is also necessary to reinforce distinct limits on the amount of balancing reserves available to wind generators in BPA's Balancing Authority.
- Some owners of variable generators have expressed interest in being able to net their generation and add dispatchable generators to the netting process so they can choose which generator or generators to adjust to meet the limitation requirement provided by BPA.
- Although BPA makes no commitment to allow netting at this time, we have prepared a draft netting concept for discussion today. Under BPA's draft netting concept, BPA would allow netting of wind generators only.
- Netting involving both wind and dispatchable generation will be addressed under the Customer Supplied Generation Imbalance Pilot.

Draft Netting Concept for DSO 216 Events

- BPA's draft "netting" concept would allow a customer to combine several wind projects to form a single "virtual project" or "net" on the BPA system. In turn, BPA would supply balancing reserve to the virtual project.
- Any deviation from the schedules from the individual projects (that comprise the virtual project) would be netted to determine the station control error of the virtual project.
  - Station control error (SCE) is the difference between actual generation and schedule.
- As a reminder, BPA deploys balancing reserves based on the entire balancing authority and not on individual SCE's.

Draft Netting Concept for DSO 216 Events (cont'd)

- This proposed approach would reduce the absolute deviation from schedule for the netting entities because under most conditions some wind projects would be expected to generate more power than scheduled whereas other projects would be expected to generate less than scheduled.
- The formal rules, practices, and procedures for netting will be developed through BPA Transmission Services' standard business practice development process.

How Netting Would Work for DSO 216 Limit Events

- In an over-generation condition, AGC would continue to send an individual signal to the facilities or to the operator of any entity that would be netting their facilities.
- The entity would calculate and allocate the maximum generation limit to which the virtual project needs to reduce its output so as to stay at or below its limit.
- Violations (FTC's and operational strikes) would be assessed to the entity based on the performance of the virtual project.

How Netting Would Work for DSO 216 Curtail Events

- In an under-generation condition, AGC would continue to calculate the amount of curtailment needed.
- For individual facilities, AGC would send the amount of curtailment needed and the transmission e-Tags would be curtailed as they currently are today.
- With respect to a virtual project, BPA would curtail e-Tags of individual plants but they would be based on the netted relief needed.
- The following slides provide examples of various scenarios.

Example No. 1 - Netting for DSO 216 Events

DSO216 Scenarios Limit	Plant 1	Plant 2	Plant 3	Plant 4
Current Process				
Actual	95	275	74	74
Schedule	75	200	50	50
Dec reserve allocation	15	54	24	24
Target Generation	90	254	74	74
Needed Movement	5	21	0	0
Expected Response (today)	-5	-21	0	0
FTC Penalty				
Actual Response (meets objective)	-5	0	-10	-11
FTC Penalty		$21,000		
Actual Response (fails)	-2	-13	0	0
FTC Penalty	$3,000	$8,000		

Example No. 2 - Netting for DSO 216 Events

"Netted" Process

Scenario #1	Plant 1	Plant 2	Plant 3	Plant 4	Net
Actual	95	275	74	74	518
Schedule	75	200	50	50	375
Dec reserve allocation	15	54	24	24	117
Target Generation	90	254	74	74	492
Needed Movement	5	21	0	0	26
Actual Response (meets objective)	-5	-21	0	0	-26
FTC Penalty					0
Actual Response (meets objective)	-5	0	-10	-11	-26
FTC Penalty					0
Actual Response (fails)	-2	-13	0	0	-15
FTC Penalty					$11,000

Scenario #2	Plant 1	Plant 2	Plant 3	Plant 4	Net
Actual	95	275	55	60	485
Schedule	75	200	50	50	375
Dec reserve allocation	15	54	24	24	117
Target Generation	90	254	74	74	492
Needed Movement (none)					0

Example No. 3 - Netting for DSO 216 Events

For the curtailment side of DSO216, aggregate the SCE of wind facilities and distribute the calculated schedule curtailment to underperforming plants, pro-rata by transmission Priority.

DSO216 Scenarios Curtail Schedules	Plant 1	Plant 2	Plant 3	Plant 4	
Scenario #1					
Actual	45	150	20	25	
Schedule	75	200	50	50	
INC reserve allocation	26	38	17	17	
Target Generation	71	188	37	42	
Curtail by (current)	4	12	13	8	
Scenario #2					Net
Actual	85	150	20	25	280
Schedule	75	200	50	50	375
INC reserve allocation	0	38	17	17	72
Target Generation	85	188	37	42	352
Curtail by (by plant)		12	13	8	33
Curtail by (netted)	0	8	9	6	23
Scenario #3					Net
Actual	110	150	20	25	305
Schedule	75	200	50	50	375
INC reserve allocation	0	38	17	17	72
Target Generation	110	188	37	42	377
Curtail by (netted)					0

Benefits Gained by Netting for DSO 216

- Owner/operators with multiple facilities can leverage geographical and systems diversity when responding to DSO216 directives. (Potentially more flexibility associated with restrictions on wind turbines capability.)
- BPA operators benefit by increasing the probability of shorter time delays for responses to directives by owner/operators.
- There are no benefits for an owner/operator with only one facility.

Additional Work Required for Netting

- Continue to develop and discuss with wind operators and customers the operational and technical features of the netting concept.
- Obtain internal management decisions and assess and allocate internal resources.
- Develop and share the draft business rules, practices, and procedures for netting with operators and customers.
- Modify FTC calculator for evaluating DSO216 response.
- Assess “Strike” compliance on an aggregate basis.
- Develop a process for requesting resources to be netted (which may include development of agreements).
- Enhance the DSO216 curtailment algorithm.
- Training would be required for BPA dispatch and scheduling and for customers involved in netting.
- Develop final operational procedures and business practices through BPA Transmission Services’ standard business practice development process.

Feedback from JOC Members on Effectiveness of Current Persistent Deviation

Presented by Bart McManus

Feedback from JOC Members on Effectiveness of Current Persistent Deviation

- BPA has received input from various entities concerning persistent deviation
  - Persistent deviation versus DSO 216
  - Persistent deviation and its affect on scheduling accuracy
- Floor is open to all members at this time to give BPA feedback on the persistent deviation rate, pros and cons.

Discussion with Thermal Generators

Presented by Bart McManus

- Topics for discussion include:
  1. Lower output during curtailment events.
  2. Adjusting schedules following contingencies.
  3. Ramping on the hour during the scheduled ramp period.
  4. Voltage control and generators' contribution via AVR.

Discussion with Thermal Generators

- Lower output during curtailment events
  - Numerous curtailments have occurred with no response from some generators that have been curtailed.
  - When curtailment occurs, the tag is the communication device – generator must lower output to meet the schedule following curtailment within 10 minutes.
  - Failure to Comply penalties apply to generators that do not meet the criteria.

Discussion with Thermal Generators

- Adjusting schedules following contingencies
  - When contingency reserve is called on the generator receives reserve for up to 90 minutes
    - If reserve called on prior to 30 minutes past the hour, contingency reserve delivered until the top of current hour
    - If reserve called on after 30 minutes past the hour, contingency reserve delivered until the top of next hour
  - Generation schedules must be adjusted for the following hour, next hour if reserve called on prior to 30 minutes past the hour, the following hour (hour plus 2) if reserve called on after 30 minutes past the hour.
    - This has not been happening with consistency.

Discussion with Thermal Generators

- Ramping on the hour during the scheduled ramp period
  - Ramps occur from XX:50 through XX+1:10 for all fixed schedules.
  - Generation must ramp with the schedule change.
    - Have had issues with generation changing its output at half past the hour rather than on the hour.
    - An example of this is the schedule changes by 100 MW from one hour to the next, but generator changes output by 200 MW at half past the hour. Integrated value looks right, but the control method is incorrect.
  - If this behavior continues, it will increase the amount of reserve capacity assigned to thermal generators. As a result, thermal generators may need to purchase reserve capacity in the next rate period.

Discussion with Thermal Generators

- Voltage control and generators' contribution via AVR
  - All generators must have AVR operational and in voltage control mode unless otherwise directed by BPA Dispatch per NERC Standard VAR-STD-002a-1.
  - This is critical for system reliability.

Closing Remarks and Next Steps

- Review follow-up issues and Actions Identified
- Additional responses and/or answers will be posted on BPA's JOC website
- Any other comments from JOC members
- Next Steps
- Thank you for joining the discussion today