



**Reserve Group and DCS Issues with Wind
Generation**

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Power Operations

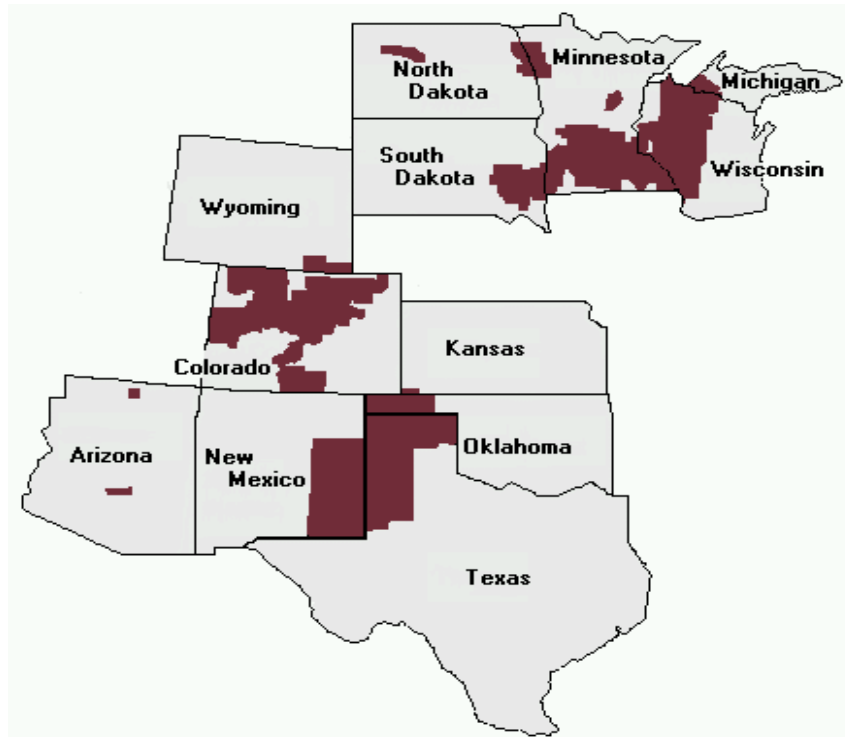
Commercial Enterprises

Xcel Energy

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Xcel Energy

Serving Territories of:



- Northern States Power
- Northern States Power - Wisconsin
- PSC of Colorado
- Southwestern PSC

Current Wind on System

<u>System</u>	<u>Contracted Wind</u>	<u>2004 Capacity Penetration</u>	<u>2004 Energy Penetration</u>
NSP	491	6.0%	3.1%
PSCo	222	3.6%	2.0%
SPS	165	3.5%	1.8%

Planned Wind on System

<u>System</u>	<u>Total Wind</u>	<u>When</u>	<u>Why</u>
NSP	1125	YE 2010	Mandates
PSCo	722	YE 2006	Economics CO2
SPS	445	YE 2006	Economics CO2

Hourly Load Planning

- **Transmission Request Requirements on OASIS**
 - Requests must be submitted 30 minutes prior to the start of transaction
 - Tags must be submitted and approved 20 minutes prior to the start of power flow
- **Options limited after scheduling deadline**
 - Activation of Reserves (If available)
 - Loss of planned resource replaced by generation fleet

NERC Criteria

- **CPS1 is a statistical measure of ACE variability.**
- **CPS1 measures the ACE in combination with the interconnection's frequency error.**
- **If a Control Area's ACE is in the same direction as the frequency error, the Control Area is contributing to the frequency error.**
- **If a Control Area's ACE is in the opposite direction of the frequency error, the Control Area is opposing the frequency error.**
- **CPS2 is a statistical measure of the ACE magnitude.**
- **CPS2 is designed to limit a Control Area's unscheduled power flows.**

NERC Criteria Continued

- **Disturbance Control Standard (DCS) – The DSC states that a Control Area shall return their ACE to either zero or to it's pre-disturbance ACE value within 15 minutes following a disturbance.**
- **Balancing criteria and reserve requirements**
 - **CPS 1 & 2**
 - **SPS** **L10** **54**
 - **PSCO** **L10** **55**
 - **NSP** **L10** **100**
 - **DCS**
 - **Contingency Reserves**

SPS	160
– NSP	386
– PSCO	297+
- **No allowances for intermittent generation/loads**

What is DCS

- **Sudden loss of Generation**
- **Reportable is 80% of Largest Hazard**
- **NERC regions may require lower threshold**
- **NERC policy designed around traditional resources**

DCS Vs. Wind

- **Wind is very intermittent**
- **Difficult to determine sudden loss of generation**
- **Not considered the same as loss of traditional generation from industry perspective**

Reserve Group Variance

- **Groups have varying opinions on wind generation**
 - **RMRG (Rocky Mountain) & NWPP will respond to breaker or transmission trips only**
 - **MAPP participants can call on any loss of resource serving native load.**
 - **Pools with balancing authority will balance for any resource variance financially**

