Planning for and Responding to Overgeneration Events

BPA Public Workshop
February 25, 2011

Overgeneration Workshop Overview

- Welcome
- Security reminder
- Review agenda
- Conference call procedures
- Purpose and objectives

BPA Overgeneration Management

Overgeneration Analysis

Study update

- On February 17th, BPA held a conference call on its paper titled *Northwest Overgeneration: An assessment of potential magnitude and cost.* During this call BPA agreed to make the following changes to the paper:
  - Include the percentage of wind curtailment in the MW-mos overgeneration table.
  - Provide a sense for when and how long these curtailments could be expected.
  - Acknowledge the effect of the recession on loads.
  - Finally, a reference to “300” in the conclusion should be “100,” it has been corrected.

Potential Transmission Actions Considered

Transmission Services

Facilitate Exports and Access to Loads

Transmission utilization

- **Improve use factor of transmission, interties.**

  Status: The Transmission Utilization Group (TUG) has not completed its final report yet (the TUG report is due to be released later this spring and BPA will continue to evaluate any possible opportunities to increase utilization of the intertie).

  BPA is a participant on the TUG and is aware of the preliminary results and did not want to duplicate efforts that were already underway. As part of the study, BPA reviewed the AC Intertie utilization using the June 2005 through June 2010 hourly data. The analysis showed a high level of utilization – i.e., the AC intertie was scheduled up to the Operating Transfer Capability (OTC) limit, in most cases, when the NW is experiencing high levels of hydro run-off. (See slides 13 and 14.)

- **Resolve the current disconnect between the lead time for CAISO nominations (90 minutes before the delivery hour) and the BPA deadline for releasing transmission capacity (50 minutes before the delivery hour). And, strive for more advance coordination on release of transmission rights.**

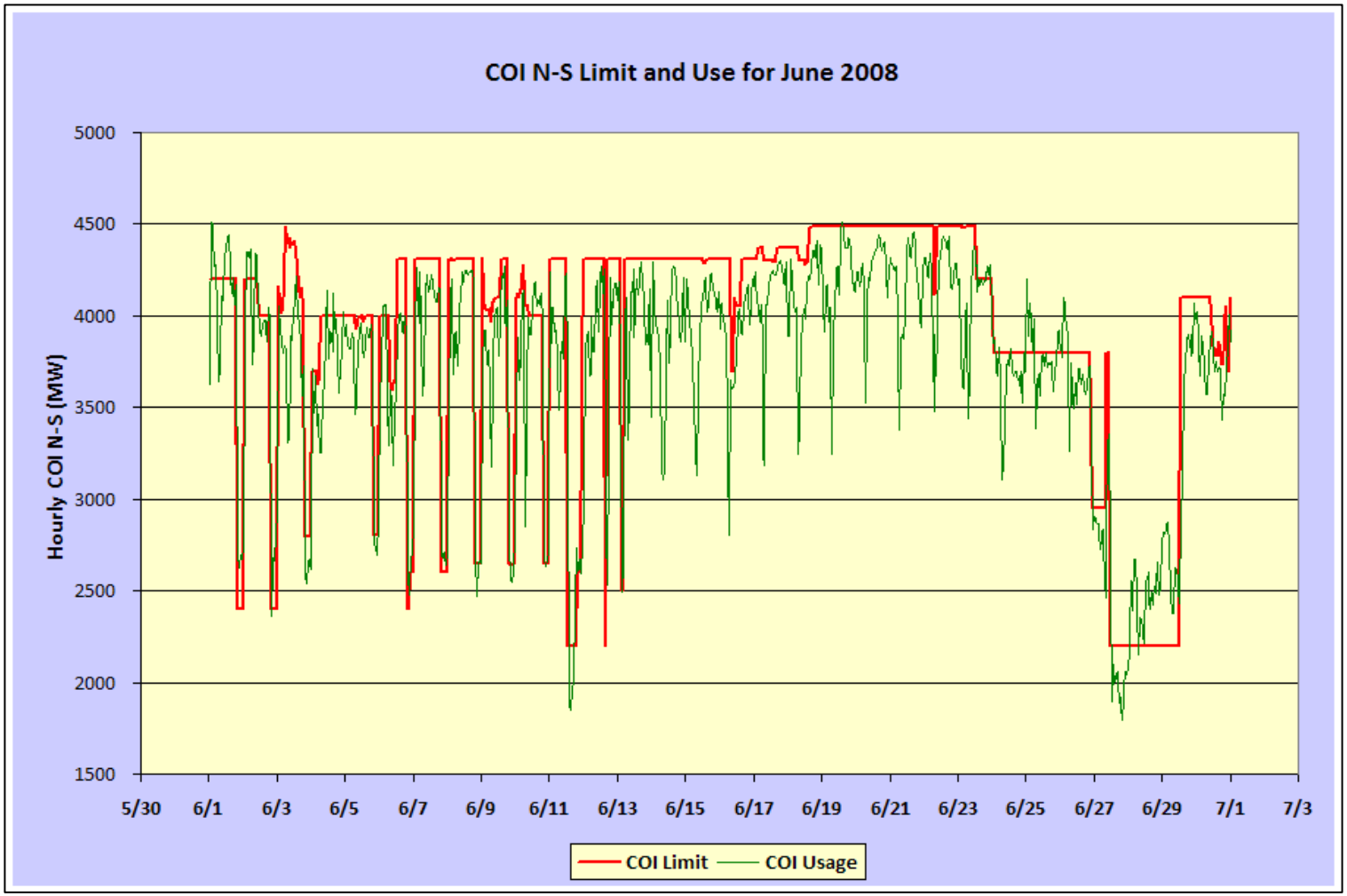
  Status: Although there are some disparities in the transmission scheduling and reservation timelines between the different transmission providers, the June 2008 and June 2010 hourly data shows that during the high water events, the intertie is fully utilized.

- **Look at algorithms and protocols for assigning transmission to avoid inadvertent flow seizing intertie.**

  Status: Inadvertent flow procedure is detailed in IRO-STD-006-0 for Qualified Path Unscheduled Flow Relief. The inadvertent flow on COI is managed with the unscheduled loop flow mitigation procedure. During times of COI congestion if BPA determines inadvertent flow is negatively impacting COI SOL, BPA requests CAISO to implement procedure. Algorithms are utilized to maximize capacity on Paths using a static SOL which would require some margin for reliable Operations will reduce capacity. Algorithms do not impact inadvertent flow.

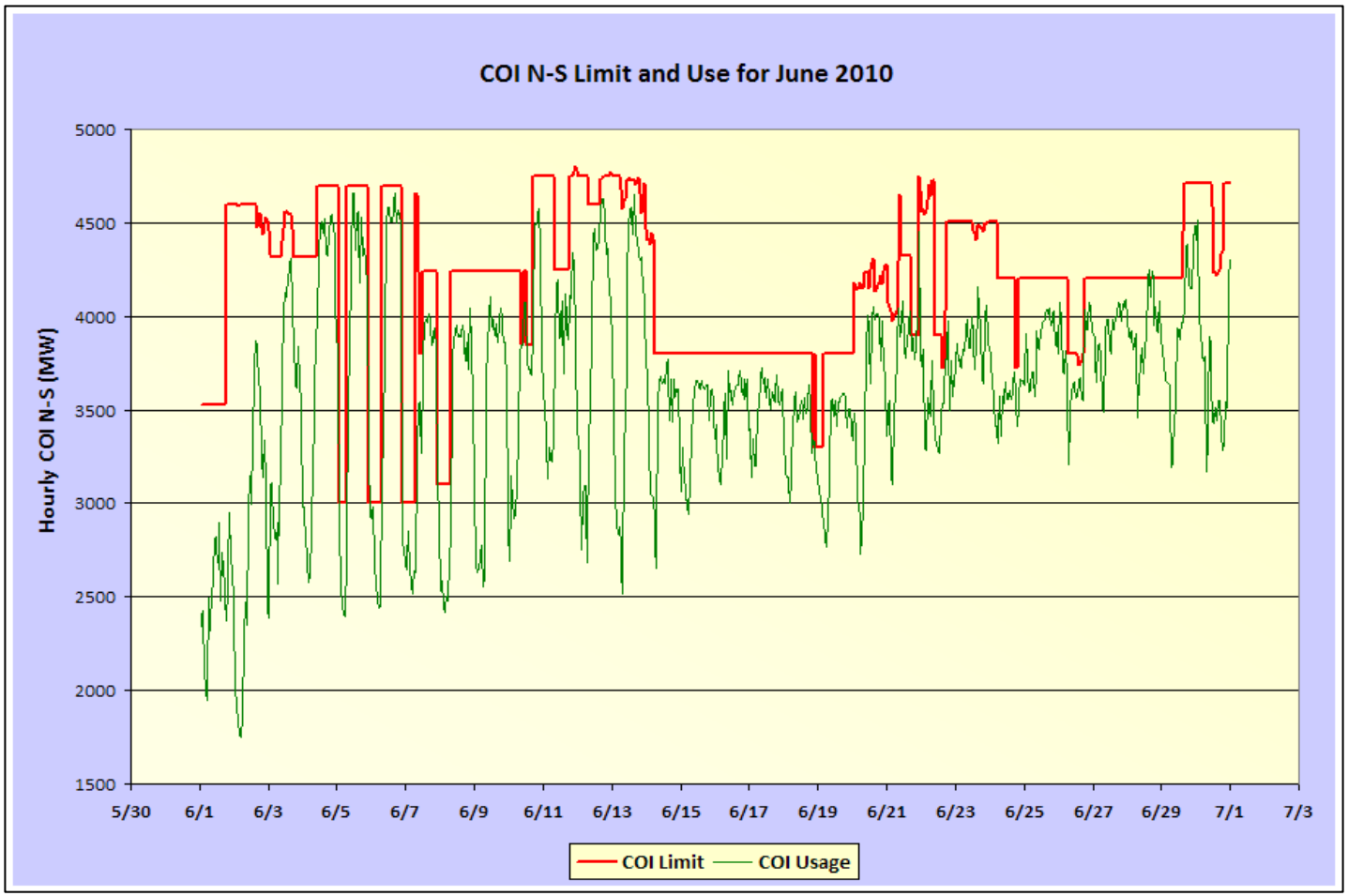
Facilitate Exports and Access to Loads

Transmission utilization (Continued)



Facilitate Exports and Access to Loads

Transmission utilization (Continued)



Facilitate Exports and Access to Loads

Outage coordination

- **Modify scheduled maintenance that would limit export capabilities.**

  - Transmission and Power Services have implemented daily and weekly meetings to review upcoming Transmission Maintenance activities that may create ESA/CWA issues.

  - Currently BPA's OB-19 Significant Equipment Operating Bulletin recommends Oct-Apr Transmission outage for COI/PDCI. Regardless of timeframe BPA-T evaluates outages and possible concerns if significant SOL reductions. Increased awareness of ESA/CWA issues have been added to the outage coordination process for proposed maintenance whether internal or external to the BPA TOP footprint.

  - June 2010 events increased awareness of new concerns during spring runoff which requires increased coordination and communication on outages both internal/external to BPA.

Facilitate Exports and Access to Loads

Outage coordination (Continued)

- **Further coordinate outages with other utilities to modify planned maintenance to improve intertie capacity.**
  - Currently BPA coordinates outages with co-Path operators to maximize maintenance efforts and maintain intertie capacity. While BPA-T has no authority to cancel outages external to the BPA TOP (Transmission Operator) footprint external utilities are aware of ESA/CWA concerns and work with BPA-T to modify outages when required. Outages by external entities that create Reliability concerns can be modified by the WECC Reliability Coordinator.
  - BPA-T utilizes the NWPP 45 day outage process and encourages the use of this process for all utilities within the Western interconnection
  - For Outage coordination the first principle is to maintain a Safe and Reliable Power System. Transmission Services recognizes the impact of the June 2010 event. This recognition has resulted in increased communication with Power Services.

- **Issue "Restricted Maintenance Operations" declaration for transmission maintenance during high runoff.**
  - BPA has developed guidelines for the "RMO" Restricted Maintenance Operations procedure; this will be finalized by April 2011.
  - This will not eliminate the need for all Transmission outages. Reliability Standard required, emergent, or urgent outages will always occur – it's a dynamic System.

Facilitate Exports and Access to Loads

Evaluate ability to schedule to the east

This would require action on two elements:

1. **Adding scheduling points at Summer lake to move power east**

   BPA has been working on this topic for over a year and has engaged in weekly meetings for the past two months. It is estimated that implementation will take approximately two months. If the decision is adopted, it would likely be early summer 2011 before it is implemented. BPA faces two challenges on loading of the Summer Lake moving power east.

   - The rating change from 400MW to 550MW has been approved by WECC Path Rating process however the required facilities have not been constructed and the operating studies and operating procedures must be completed.
   - The loading of Summer Lake east bound would require a heavy flow on COI. The COI path loading is close to a 1 to 1 impact on flow east bound from Summer Lake to Idaho. Idaho Power and PacifiCorp are proposing to have a system to system scheduling to mitigate any potential impact.

2. **Adding infrastructure from John Day to Summer Lake to increase OTC capability**

   Transmission South is already fully utilized and scheduling east would impact the OTC South bound.

Facilitate Exports and Access to Loads

Facilities actions

These are Long Term Actions requiring 2 years or more to implement.

- Automating Remedial Action Schemes (RAS)
  - Transmission Services is evaluating RAS automation for better operation of the system and not from the perspective of increasing capacity. Transmission Planning will address this project as part of the Asset Management program for RAS in 2011.
- Add infrastructure or make other physical improvements (including COI)
  - Facilities work is underway (shunt and series capacitors) to increase available COI capacity to full 4800 MW rating. BPA Technical Operations will present System Operating Limit (SOL) studies for approval at the April 2011 NOPSG meeting.
- Improve north to south intertie efficiency
  - Transmission Operations had suggested that installation of 400 to 500 MVAR SVC at Captain Jack will most likely eliminate the need for Klamath Falls generation role in COI rating, BPA Transmission Planning may consider alternative solutions over the long term.

Potential Power Operations or Marketing Actions Considered

Power Services

Managing Excess Generation

Provisional hydro drafts ahead of high water, backed up by options to replace energy from other sources if high runoff does not materialize

- High-priority FCRPS objectives (Biological Opinion, Clean Water Act, flood control) will continue to take precedence over power production.
  - Decisions on reservoir operations during the Spring are not discretionary decisions made by BPA.
  - Spring reservoir operations are coordinated in a regional process that attempts to balance the high-priority objectives.
- When high flows are forecasted in the spring, reservoir outflows may increase prior to the event in order to manage refill.
  - When there are no high flows forecasted, holding space in reservoirs below flood control requirements may be contrary to Biological Opinion flow objectives.
- BPA will continue to work with other Federal agencies and stakeholders to assess FCRPS flexibility.

Managing Excess Generation

Seek more flexibility on use of Canadian storage

- BPA regularly coordinates storage agreements with Canada that are mutually beneficial.
  - BPA will coordinate with B.C. Hydro any possible reduction in flows at Arrow Dam during these high run-off events.

Reduce INC reserves for wind as well as DEC reserves

- These are standard actions taken by BPA, COE and BOR to minimize system TDG.
  - Reduce wind balancing reserves (both INC and DEC in 2011).
  - BPA will reduce INCs as well as DECs if studies indicate the reduction can effectively reduce TDG. However, there will always be sufficient INC and DEC capacity made available for load balancing.

Managing Excess Generation

Additional or time-shifted irrigation pump load

- The time frame to implement a fairly complicated program from scratch was too short for the 2011 irrigation season. There were too many uncertainties to work out.
  - Customers believed the benefits to themselves and to growers were insufficient to alter historical behavior.
  - Customers have differing business models (e.g. slice/block vs. load following; TOU vs. flat retail rates).
  - Not clear that irrigation pump loads could be continuously available during the over-generation period:
    - In late June and July, many irrigators may be pumping 24x7.
    - Earlier in the season, seedlings may require consistent irrigation during windy conditions.
    - Many large irrigators may have already shifted irrigation times to LLH hours where it makes economic sense to do so.

Managing Excess Generation

Increase diversions to replenish irrigation aquifers

Opportunities:

- **Recharge from existing recharge rights at existing recharge sites**

  Conclusion: Potential exists for IDWR to divert 400 cfs this June near Milner Dam, on the Snake River using existing recharge rights and sights. The reduction is very small and likely will not have measurable effects downstream.

- **Increased pumping by High Lift Pumpers**

  Conclusion: Unlikely this could be implemented this year; however there may be an opportunity to make arrangements that increase or maximize power consumption in June and limit consumption in July and August in future years. Agreement with Idaho Power would be needed, and transmission constraints currently limit energy imports to southern Idaho.

- **Increased use of recharge rights at sites needing some additional development**

  Conclusion: Could not be implemented in the short term. With lead time and financing, additional capacity could be developed in the range of several hundred cfs.

- **Develop Lake Walcott Recharge Site**

  Conclusion: Could not be implemented in the short term, and would require significant investment in infrastructure.

These actions combined could result in withdrawal rates in the 1000 to 2000 cfs range. These actions are not considered feasible by BPA because significant investment in infrastructure would be required and it is not consistent with BPA authorization. Other significant issues include 1) impacts to Idaho Power, 2) lack of access wholesale power markets by Idaho irrigators, and 3) constrained transmission capability to Southern Idaho.

To put the impact of the potential diversions in context, flows on the Columbia River are typically in the 300,000 to 450,000 cfs range during high runoff periods.

Managing Excess Generation

Marketing

- Trading Floor staff has been in an aggressive outreach program with both NWPP thermal owners and large marketers throughout the winter in an attempt to garner additional load and price protection in Q2 during over generation and lack of market conditions similar to those witnessed during June 2010.
- In addition, a standard displacement offer was mailed out to all coal fired thermal owners on February 16th.

  - As of mid-February, we have executed several “non-standard” price hedges for Q2:
    - Multiple transactions have been completed that provide BPA the flexibility to deliver up to 1,200 MW at critical points in time, translating into up to 484,800 MWh of deliveries BPA can make over selected periods of time in May and June.
    - Additional transactions are actively being negotiated by the Trading Floor at this time.

  - The challenges found when pursuing displacement transactions are that some generators are unwilling to commit in advance to reduce their generation from June 2010 levels for a number of reasons including:
    - Multiple ownership requires an "all or none" displacement agreement and we're finding that some owners require units to run, even when uneconomical, to meet operational, reliability, and risk preference needs.
    - Voltage support requirements.
    - Some coal generation owners, or contract holders, pseudo tie or dynamically schedule from their units to "firm-up," shape, or stand ready behind variable generation resources.
    - Possible transmission availability limitations,
  - Given that some thermal generators have resisted taking their units completely down, it’s going to take some creative discussions, cooperation, and other capacity flexibilities to get these units to behave differently than they currently have in zero or cheaply priced markets in the past.

Other Actions

Legislative Action

Concept: to maintain qualification of renewable energy resource for federal and state renewable incentives when displaced by a hydro resource

- Spill conditions approaching gas levels prohibited under Clean Water Act for protection of species listed under the Endangered Species Act.
- Hydroelectric generation cannot be marketed for $0 or more.
- In such circumstances, renewable resources displaced by hydroelectric power could continue to qualify for federal and state production incentives for the amount of eligible renewable energy that would have been generated but for displacement by the transmission system operator.
- BPA is actively pursuing this concept in California's SB X2 to enact a 33 percent renewables standard.

Draft ROD on Environmental Redispatch and Negative Pricing Policy

Modification of Interconnection Agreements & the OATT

- BPA proposes to amend Generation Balancing Authority and Interconnection Agreements to clarify its authority for the environmental displacement of non-Federal generation:
  - Modify appendix C of the LGIA for both existing and future agreements.
  - Modify appendix 5 of the SGIA.
  - Modify related provisions of BAASAs and COMAs.
- BPA may also modify the body of its Open Access Transmission Tariff (OATT) to clarify its authority for displacing transmission schedules from generation within our BAA.

Negative Pricing Policy

- BPA will not pay negative prices to sell energy generated to comply with BPA's environmental requirements.
- Paying negative prices would represent an unreasonable cost shift to BPA's Fish and Wildlife Program and ratepayers.
- Paying negative prices would also distort the market, and provide opportunities for generators to hold out on BPA offers of low-priced or free power until the price turned negative.
  - Such hold outs would also create excessive uncertainty that could affect real-time operations.

Negative Pricing Policy

- Paying negative prices would be inconsistent with BPA's obligations under the Northwest Power Act and other legislation.
  - BPA has an obligation to ensure federal needs are met before making transmission available for the transmission of non-federal energy.
  - BPA must ensure timely repayment to the U.S. Treasury while keeping rates as low as possible consistent with sound business principles.
  - BPA must protect, mitigate, and enhance fish and wildlife of the Columbia River and its tributaries.

Triggering Events/Actions

- BPA regularly performs studies to manage these variables and determine how to meet hydraulic objectives over time. When studies project a mismatch between required flows and generation BPA seeks to address the situation.

- Actions BPA would evaluate *prior to* Environmental Redispatch (ER) include:
  - Sales through bilateral marketing
  - Cutting prescheduled PNCA storage
  - Deferring scheduled generation maintenance activities
  - Deferring scheduled transmission maintenance activities
  - Increased pumping into Banks Lake at Grand Coulee
  - Seeking flow reductions with BC Hydro
  - Positive bias under hourly coordination with Mid-Columbia Hydro Projects
  - Seeking access to additional reservoir storage space at Federal Projects
  - Generation Reductions at Columbia Generating Station
  - Requesting adjustments to mutually agreeable transactions
  - Operating hydro projects inefficiently and at speed-no-load
  - Implementing additional spill at FCRPS projects consistent with the Clean Water Act and applicable state waivers.
  - Reduce available Balancing Reserves to maximize turbine flows

- Actions that are available and effective for the circumstances would be instituted to mitigate conditions.

- If BPA predicts that these actions collectively will be insufficient to manage spill past unloaded turbines BPA would initiate ER.

Environment Redispatch Duration

- Primary exposure to ER is during spring runoff periods.
- Overgeneration conditions and unloaded turbine spill is more likely to occur in light load hours and shoulder periods when regional loads are lower.
  - During heavy load hours, hydro turbines may be loaded to full capacity due to other actions taken to avoid ER.
- BPA would match the period of redispatch with the expected duration of the conditions and the ability of hydro resources to provide redispatch.
  - This would be a minimum of several hours.
  - Could extend for days depending on severity of the event and the configuration of hydro resources.

Determination of ER Amounts & Allocation

- Potential ER resources would include:
  - Thermal resources operating without ancillary service or system reliability obligations or impacts.
  - Scheduled variable generation.
- ER algorithm:
  - Step 1: determine the quantities of generation needed to maintain TDG levels and the capability of hydro resources (Federal and Non-Federal) to increase turbine loading.
  - Step 2: determine the quantity of generation potentially available for Environmental Redispatch.
  - Step 3:
    - If value determined in step 1 is greater than step 2, then all available generation would be displaced to minimize the TDG exposure. Redispatch would meet deliveries.
    - If value determined in step 2 is greater than step 1, than available thermal generation will be displaced first, followed by a pro-rata displacement of variable generation. Redispatch would meet this subset of deliveries.
- BPA would expect to restrict available balancing reserves under these conditions (reductions in balancing reserves also frees up hydro capacity to better manage TDG, minimizing the need for ER).

Notification and Communications

- Exploring existing communications via DSO216 telemetry as the primary pathway to implement redispatch down instructions.
- Variable resources with older RTUs will need to use iCRS Generation Advisor.
- Dispatchable resources will require manual phone calls, at least initially.

Next Steps

Timeline and BPA Contacts

- BPA will take comments on the Draft ROD through 5:00 p.m. March 11, 2011. Please submit comments here: http://www.bpa.gov/applications/publiccomments/OpenCommentListing.aspx
- BPA will strive to issue the Final ROD by April 1, 2011.
- A draft Environmental Redispatch business practice will be posted soon. It will have a separate comment period.
- The primary point of contact for questions on overgeneration management is:
  - Syd Berwager, 503-230-5958, sdberwager@bpa.gov