Network Integration Transmission (NT) Service – Redispatch

April 23, 2014

Meeting Agenda

- NT Redispatch Background
- Customer Comments on Draft NT Redispatch Protocols and BPA Responses
- Revisions to Draft NT Redispatch Protocols
- BPA Rates Potentially Impacted by NT Redispatch
- 15-Minute Scheduling and Congestion Management
- Project Timeline and Customer Engagement Plan
- Next Steps

NT REDISPATCH – BACKGROUND

NT Redispatch - Background

As a condition to receiving NT Service, NT Customers agree to the redispatch of designated Network Resources (DNR) – OATT sections 30.5 and 33.2.

- NT Redispatch is provided during congestion events to avoid curtailment of Firm NT transmission schedules.
    - NT Customers must redispatch their available resources when requested by BPA and they will be compensated for providing redispatch.
- With rise in non-Federal DNRs, restrictions in operations of FCRPS, BPA is creating processes and procedures to make non-Federal DNRs part of the NT Redispatch program.
- If a transmission constraint cannot be further relieved through NT Redispatch, Firm NT transmission schedules may be curtailed.

NT Redispatch – Tariff Guidance

- Section 30.5 of BPA's Tariff states-
  - "Except as provided in Attachment M, as a condition to receiving Network Integration Transmission Service, the Network Customer agrees to redispatch its Network Resources as requested by the Transmission Provider pursuant to Section 33.2."
- Section 33.2 of BPA's Tariff states –
  - "Except as provided in Attachment M, to the extent the Transmission Provider determines that the reliability of the Transmission System can be maintained by redispatching resources, the Transmission Provider will initiate procedures pursuant to the Network Operating Agreement to redispatch all Network Resources and the Transmission Provider's own resources on a least-cost basis without regard to the ownership of such resources."

Attachment M Redispatch

- Currently, BPA provides NT Redispatch through Attachment M of BPA's Tariff.
  - Attachment M provides for redispatch of the Federal Hydro System (the FCRPS).
- Three types of redispatch:
  - *Discretionary:* may be requested and may be provided prior to curtailment of any firm or non-firm schedules (PTP or NT) to avoid or ameliorate curtailments.
  - *NT Firm:* requested for purpose of maintaining Firm NT transmission schedules, after curtailing non-firm PTP and secondary NT schedules consistent with NERC curtailment priority. Redispatch is provided from the FCRPS to the extent it can be done without violating non-power constraints.
  - *Emergency:* requested upon declaration of a "system emergency" as defined by NERC.

NT REDISPATCH – UPDATED PROTOCOLS

DRAFT

Eligibility Criteria

- Designated Network Resources (DNR) will become part of the NT Redispatch program if they meet the following criteria:
  - *Effectiveness & Dispatchability* – Based on the designated MW demand of a resource and its ramp rate, the DNR is paired with a Federal generator to calculate flowgate relief. If the flowgate relief is 3 MW or greater over a 10-minute period on any one flowgate, the resource is deemed effective and dispatchable.
  - *Controllability* – Resource is either staffed or generation levels can be adjusted remotely such that the ramp rates assumed in criteria #1 above are achievable; AND
  - *Cost* – Communication/equipment cost per MW of 10-minute effectiveness is less than the cost per MW of effectiveness of the estimated option premium for bilateral redispatch.

Exceptions to Eligibility Criteria

- A DNR can be exempted from participating in the NT Redispatch program if the customer can demonstrate that the resource is non-dispatchable.
- A customer may potentially demonstrate non-dispatchability of a DNR if:
  - The resource is a “base load” DNR.
    - Customer is required to demonstrate that the resource is operated a base load resource (minimal variation in generation level across a 24-hour period), based on historical use.
    - DNR may be exempted from providing INC capacity.
  - Moving the resource (INC or DEC) in any manner outside of its normal operating parameters/curve would damage plant or cause it to violate operating restrictions.
    - Demonstrate through provision of generator operating specifications/manual and any other supporting information.

NT Redispatch – Types of Eligible DNRs

	Considered for NT Redispatch?	Considered for INC?	Considered for DEC?
Long-Term On-System (In BPA Balancing Authority Area) DNRs	Yes	Yes	Yes
Long-Term Off-System (Out of BPA Balancing Authority Area) DNRs	Yes	Yes	Yes
Short-Term DNRs	No	N/A	N/A
Market Purchase DNRs 1	Yes	No	Yes
Variable DNR (Wind, etc) 2	Yes	No	Yes

•[1] These are DNRs that are not associated with an individual resource, but are more akin to arrangements for generation made with Mid-C BAAs, WSPP Schedule C purchases.

•[2] Can be both an off-system or on-system DNR.

NT Redispatch – DNR Informational Requirements

- For DNRs required to participate in the NT Redispatch program, the following information will be required:
  - 10-minute response capability (if applicable, at various generation levels);
  - Future generation forecast (if available);
    - Currently, provided on an hourly basis.
  - Real-time generator output information;
    - BPA currently has the capability to view real-time operation of DNRs located in BPA's Balancing Authority Area (BAA).
  - Forecasted (anticipated) INC and DEC capacity and/or minimum and maximum generation levels.
    - Customer will be required to update this information on a regular basis over a system interface.
  - Forecasted INC and DEC cost information
    - Customer will be required to update this information on a regular basis over a system interface.
  - Real-time response from generator/operator on whether NT Redispatch can be provided from DNR when requested.

NT Redispatch – Compensation Mechanism

•Principle – The customer will be held whole financially for providing NT Redispatch.

	Hydro	Thermal	Variable	Market Purchases
INC Pricing	Higher of actual cost or opportunity costs based on the **highest price** of the 24-hour period starting with the hour for which NT Redispatch is requested (based on an hourly energy index in the Pacific NW).	• Higher of **opportunity cost** vs. **actual cost.** • Opportunity Cost – Hourly index in the Pacific Northwest for the interval in which NT Redispatch was requested.	- Not Applicable	- Not Applicable
DEC Pricing	- Lower of net actual cost and savings or opportunity cost based on the **lowest price** of the 24-hour period starting with the hour for which NT Redispatch is requested (based on an hourly energy index in Pacific NW). - If hydro resource is in spill condition the opportunity cost is zero.	**Method**: **Net of actual cost and savings.**	**Method**: Net of actual costs and savings.	***Method: net of actual costs and savings.**

NT Redispatch – Compensation Mechanism

- Determining Actual Costs and Actual Savings
  - Actual Cost may include:
    - Cost of fuel
    - Variable operation and maintenance expense
    - Start-up costs
    - Costs of additional operating reserves
    - Costs related to minimum run times
    - Lost tax credits, renewable credits
    - Liquidated damages, penalties (if applicable)
    - *Other* related verifiable and quantifiable costs
  - Actual Savings may include:
    - Avoided fuel costs
    - Other verifiable and quantifiable costs
- Reporting Costs of NT Redispatch
  - BPA will post the costs incurred as a result of NT Redispatch on OASIS on a monthly basis.

Creating the NT Redispatch Resource Stack

The NT Redispatch resource stack for each flowgate will be determined based on cost per MW of congestion relief. The resource stack will consist of the eligible DNRs, paired and ranked in the following manner:

- NT Redispatch pairs will be created using all the possible combinations of INC and DEC DNRs. The maximum MW quantity available for Redispatch for each Redispatch pair will be the lesser of the INC or DEC quantities (PairMW).

Creating the NT Redispatch Resource Stack

- The MW quantity of relief each NT Redispatch pair is capable of providing for the congested flowgate (pair flowgate relief) will be calculated as follows:
  - Subtract the power transfer distribution factor (PTDF) corresponding to the DEC DNR from the PTDF corresponding to the INC DNR to calculate the impact on the specified flowgate (PairPTDF).
  - If the PairPTDF is a negative value, the NT Redispatch pair is retained.
  - If the PairPTDF is zero or a positive value, the NT Redispatch pair is eliminated.
  - The flowgate relief available for each remaining NT Redispatch pair is the PairMW multiplied by the PairPTDF (Pair flowgate relief = PairMW x PairPTDF).
  - The cost of the Pair flowgate relief is calculated by subtracting the DEC price from the INC price and then dividing the result by the PairPTDF, as measured in $/MWh of relief on the flowgate.
  - The NT Redispatch stack for each flowgate is determined by ranking the retained NT Redispatch pairs based on the $/MWh of relief on the flowgate in ascending order (i.e., least cost of relief at the top, and greatest cost of relief at the bottom).

Communicating an NT Redispatch Request

- Communicating NT Redispatch to DNRs in BPA's BAA:
  - Signal via Integrated Curtailment and Redispatch System (iCRS)
    - Web-based signal to resource.
    - System is currently installed and available to all generators.
  - Signal via *SCADA/ICCP* System
    - Available to generators who currently have the system installed.
- Communicating NT Redispatch to Market Purchase DNRs:
  - Via *curtailment* of a transmission schedule (e-tag).
    - Market purchase DNRs are eligible to provide DEC capacity, and the transmission e-tag will be curtailed if necessary.
    - Despite the curtailment of e-tag, the NT Customer load will be met by INC from another DNR through NT Redispatch.
- Communicating NT Redispatch to DNRs outside of BPA's Balancing Authority Area (BAA)
  - Two potential mechanisms:
    - Via creation of *Emergency E-tags*
      - Effectuates necessary impact to account for interchange between BAAs;
      - Requires approval of source and sink BAA.
    - Via *Dynamic Signal*
      - Immediate signal to resource

Communicating an NT Redispatch Request

- Following a request for NT Redispatch, the customer/resource will be required to provide a response on whether redispatch can be provided as requested:
  - DNR will have 5 minutes to respond to BPA whether redispatch can be provided as requested from the time of the original request.
- Potential reasons for why DNR may not be "*available*" to provide NT Redispatch, among others:
  - *DNR used to make third-party sale.*
    - Sales for less than one year.
  - *Damage to resource*
    - Moving DNR will cause damage to resource.
  - *Moving the DNR will likely result in violation of non-power constraints.*
  - *DNR is shut down for maintenance.*
  - *Lack of water, fuel.*
- Customer must demonstrate supporting documentation, after the fact, for not providing NT Redispatch as requested.

CUSTOMER COMMENTS AND BPA RESPONSES

Customer Comments
Eligibility Criteria

- General support for Effectiveness and Dispatchability criterion
  - Clarification of effectiveness requested. BPA has clarified the criterion in the latest draft.
- General support for Controllability criterion
- Questions regarding Cost criterion
  - How will cost-effectiveness be measured? Will seasonality be considered?
  - BPA has responded that this criterion is likely to be unnecessary due to BPA's probable use of existing communication tools. These low-cost tools will ensure that there is minimal cost to bring DNRs into the program.

Customer Comments
Exceptions to DNR Eligibility Criteria

- General support for exceptions identified in the draft protocols.

- Customer request to revise the damage exception language from “would damage the plant” to “could damage the plant.” BPA has made the suggested revision.

Customer Comments
Types of DNRs To Be Considered for NT Redispatch

- The inclusion of market purchases in the NT Redispatch pool raised the most issues:
  - Difficulty of forecasting liquidated damages
  - Suggestion that due to this difficulty, market purchases should be redispatched last
    - BPA is currently considering this approach
  - Question whether redispatch is allowed under terms of the agreement between BPA customer and their seller.
  - The “gradual inclusion” of short-term DNRs was questioned.
    - BPA has revised the protocols to exclude short-term DNRs for the time being.

Customer Comments
Informational Requirements

- Customers emphasized importance of an efficient, automated interface to ensure accuracy of information
  - BPA agrees that accurate information related to DNRs should be the goal. However, due to the anticipated, infrequent need for NT Redispatch, the goal of accurate information on DNRs should be balanced with minimizing administrative burden to NT customers.
- Customers cited need for documentation of DNR data. One suggestion was a matrix that would include all relevant DNR information (i.e., operational constraints, communication protocols, cost calculations, etc).
  - BPA recognizes the value of such documentation and will explore with customers the development of a matrix of DNR information and the means of memorializing the agreement.

Customer Comments
Informational Requirements

- Customers noted that BPA already collects some of the information that would be required to redispatch DNRs (i.e., through Oversupply Management Process) and suggests BPA use information available through those processes to reduce the administrative burden on NT customers associated with NT Redispatch
  - BPA agrees that to the extent relevant DNR data has already been provided, the NT Redispatch program should not duplicate the request for such data if possible.
  - BPA staff will explore a process to access such existing data and integrate it into the NT Redispatch program.

Customer Comments
Compensation Mechanism

- The use of a market index as the measure of opportunity cost was questioned by some customers. In particular, there was concern that at times the index may be based on relatively few trades or a market that would not necessarily reflect opportunity cost of redispatching the DNR.
  - BPA recognizes that an index may not always adequately capture actual cost incurred by NT customers when redispatching a DNR.
  - BPA proposes to allow compensation for all DNRs to be based on actual cost if the customer does not believe that opportunity cost for that particular event captures their true cost.
- Customers cited the importance of recovery of all liquidated damages incurred as a result of NT Redispatch.
  - BPA agrees that all verifiable and quantifiable costs, including liquidated damages, associated with provision of NT redispatch should be reimbursable.

Customer Comments
Compensation Mechanism

- Any penalties associated with violation of environmental standards should be specifically recognized as an “actual cost” under NT Redispatch.
  - BPA agrees that such costs should be included in actual cost.
- Several customers noted that provision of NT Redispatch would impact billing of both power and transmission products and services. The need to prevent billing errors due to NT Redispatch was emphasized.
  - BPA recognizes that a number of power and transmission products could be inaccurately billed for intervals in which NT Redispatch was provided by the customer.
  - BPA is committed to working with customers to identify all potential billing issues and a process to reflect NT Redispatch accurately in billing of NT customers.

Customer Comments
Communicating an NT Redispatch Request

- Customers expressed need for a highly reliable, automated method of implementing NT Redispatch.
  - BPA agrees that the process should be automated to the extent possible.
  - BPA proposes to request NT Redispatch through an automated process (not by phone calls) to ensure rapid responses to the need for NT Redispatch.
- A 30-day period for documentation of the reasons why a DNR could not provide requested NT Redispatch was recommended.
  - BPA agrees that NT customers should have a certain period of time to compile such documentation and will consider the recommendation.

Customer Comments
Communicating an NT Redispatch Request

- Customers requested clarification on the timelines associated with an INC or DEC request.
  - BPA proposes to provide an NT customer 5 minutes to respond to a request for NT Redispatch.
  - If the customer can provide the redispatch, it would have 10 minutes from the initial request for redispatch to reach the new generation level.
  - These short response times are critical given the limited amount of time BPA has to respond to a congestion event.

Customer Comments
Other Comments

- A 30-day period between posting and implementing a revised NT Redispatch business practice was suggested.
  - BPA recognizes the need for dispatcher training and other customer activities if there are substantive revisions to a NT Redispatch business practice.
  - BPA seeks comment from other customers regarding this proposal.
- Information on the impact of 15-minute scheduling on NT Redispatch was requested.
- Clarification of rate treatment of NT Redispatch was requested.

REVISIONS TO DRAFT

NT REDISPATCH PROTOCOLS

Revisions to NT Redispatch Protocols

- Types of DNR's to be considered moved to beginning of protocols and revised from a list into a table for clarity.
- Effectiveness and Dispatchability criterion revised for clarity (no substantive revision)
- Hydro compensation revised to allow actual cost or opportunity cost.
- Section on how the NT Redispatch resource stack would be created was added.
- Section on reporting of NT Redispatch was added.

RATES POTENTIALLY IMPACTED BY NT REDISPATCH

Rates Potentially Impacted by NT Redispatch

- Transmission Rates
  - Dispatchable Energy Resource Balancing Service (DERBS)
  - Energy Imbalance
  - Generation Imbalance
  - Failure to Comply
- Power Rates
  - Diurnal Flattening Service (DFS)
  - Secondary Crediting Service (SCS)
  - Forced Outage Reserve Service (FORS)
  - Transmission Curtailment Management Service (TCMS)

15-MINUTE SCHEDULING AND CONGESTION MANAGEMENT

Agenda

- Flowgate vs. Path Curtailments
- North of Echo Lake Overview
- Flowgate Flow Forecasting
- Curtailment Intervals
- Flowgate Curtailment Example

Congestion Management

Flowgate Curtailments

- Next interval curtailments
  - To be expanded to all flowgates.
  - Pro-rata within curtailment priority and schedule-based
  - Trigger is when next interval forecasted flows exceed the next interval System Operating Limit (SOL).
- Within-interval curtailments
  - Pro-rata within curtailment priority, schedule-based
  - Trigger is when actual flows exceed the SOL.

External Path Curtailments

•NERC priority will be preserved through preemption (not first come, first served)

•Next interval curtailments

- •Pro-rata within curtailment priority since January 2014.
- •Schedule-based once 15-minute scheduling goes live.
- •Trigger is when next interval schedules exceed the next interval SOL.

•Within-interval curtailments

- •Pro-rata within curtailment priority
- •Schedule-based
- •Trigger is when actual flows exceed the SOL.

NOEL Overview

- North of Echo Lake (NOEL) flowgate, along with South of Custer (SOC) were added February 2013 to address Puget Sound Area operational issues and comply with NERC ATC Standards.
- Prior to NOEL, BPA protected for the Puget Sound Area using the following mitigation protocols:
- The Northern Intertie SOL nomogram was affected by Puget Sound Area generation, outages and load.
- Puget Sound Area and Northern Intertie (PSANI) Curtailment Calculator that curtailed Puget Sound Area tags prior to the hour.
- Operational Support Generation contract with the Puget Sound Area parties that called upon an increase in local generation up to 3 hours prior to the operating interval if flows were expected to exceed the SOL.
- When NOEL was added, the above mitigation protocols were changed to:
- NOEL and SOC nomograms are affected by Puget Sound Area generation, outages and load instead of the Northern Intertie.
- Prior to hour NOEL curtailments if forecasted flows exceed forecasted SOL.

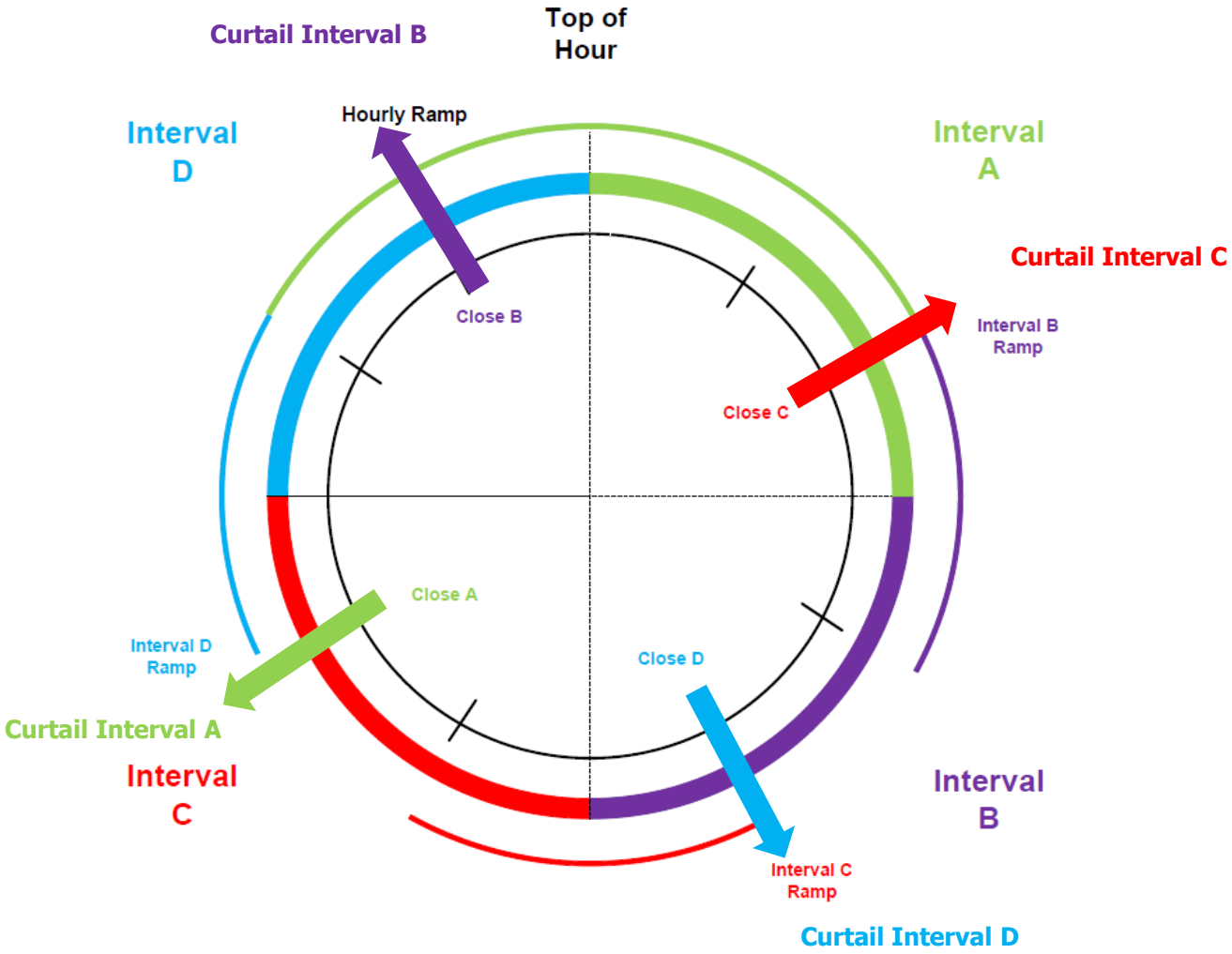
Flowgate Flow Forecasting

- BPA is using a simple feed forward method using impacts of tags across the flowgate compared to actual flows and feeding the delta forward to the next hour.
- Next Interval Flow forecast = Impact of Next Interval Schedules + Delta
- Delta = Current Actual flow – Impact of Current Schedules
- Dispatch and Real-time scheduling have requested that a forecast be produced for up to the next 2 hours.
- BPA will begin using these forecasts to assess a need for next interval curtailments on all network flowgates upon implementation of 15-Minute Scheduling.
- BPA will be comparing forecasts to actuals and making adjustments to the forecasting methodology as appropriate to improve accuracy.

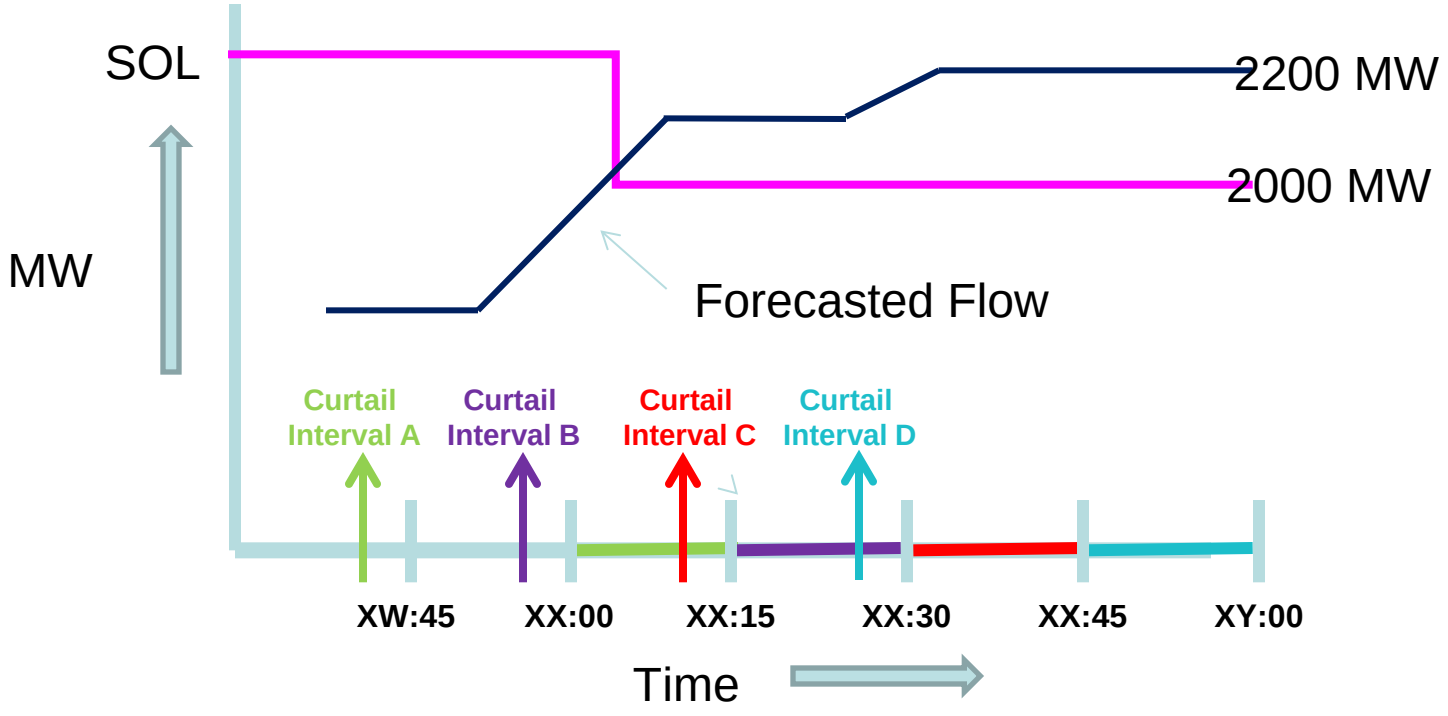
Curtailment Intervals

- BPA has decided to curtail only closed intervals (15-minute blocks) when actual or forecasted flows exceed the actual or forecasted System Operating Limit (SOL) on a path.
- Curtailing closed intervals
- Ensures curtailments are done in curtailment priority order.
- Less likely to cut intervals unnecessarily or deeper than necessary.
- Lessens likelihood of multiple curtailments.
- Ensures curtailments are done pro-rata for all schedules in the closed interval.
- BPA realizes this curtailment method deviates from the WECC Task Force Recommendation, which is to curtail to the end of the hour.

15 Min Scheduling – Curtailments



Flowgate Curtailment Example



	Interval A	Interval B	Interval C	Interval D
SOL	2000	2000	2000	2000
Flow Forecast	2100	2100	2200	2200
Margin	(-100)	(-100)	(-200)	(-200)

PROJECT TIMELINE AND CUSTOMER ENGAGEMENT PLAN

Project Timeline and Customer Engagement

- Key Dates
  - NT Redispatch Protocols development – by September 2014
  - NT Redispatch FERC Filing – ready by October 1, 2014
  - Commence Business Practice development – November 2014
  - NT Redispatch Implementation – as early as Summer 2015
    - Dependent upon FERC approval
- Customer Engagement
  - Customer Meeting – February 12, 2014
    - Customer comment period on NT Redispatch protocols
  - Customer Meeting – April 23, 2014
    - Customer comment period – April 23 to May 14
  - Customer Meetings in July and August 2014.

Next Steps

- Customer Comment Period on NT Redispatch Protocols
  - April 23 through May 14
  - Submit comments to Techforum@bpa.gov
- Individual Meetings with NT Customers on DNRs
- Development of DNR Information Matrix
- Review of Rates and Proposal for Billing Adjustment