BP-18 Transmission Rate Case Workshop

July 13, 2016

Time: 10:00 a.m. – 12:00 p.m.
Where: BPA Rates Hearing Room
Phone Bridge: (877) 336-1828 **Passcode**: 2906902#

Agenda

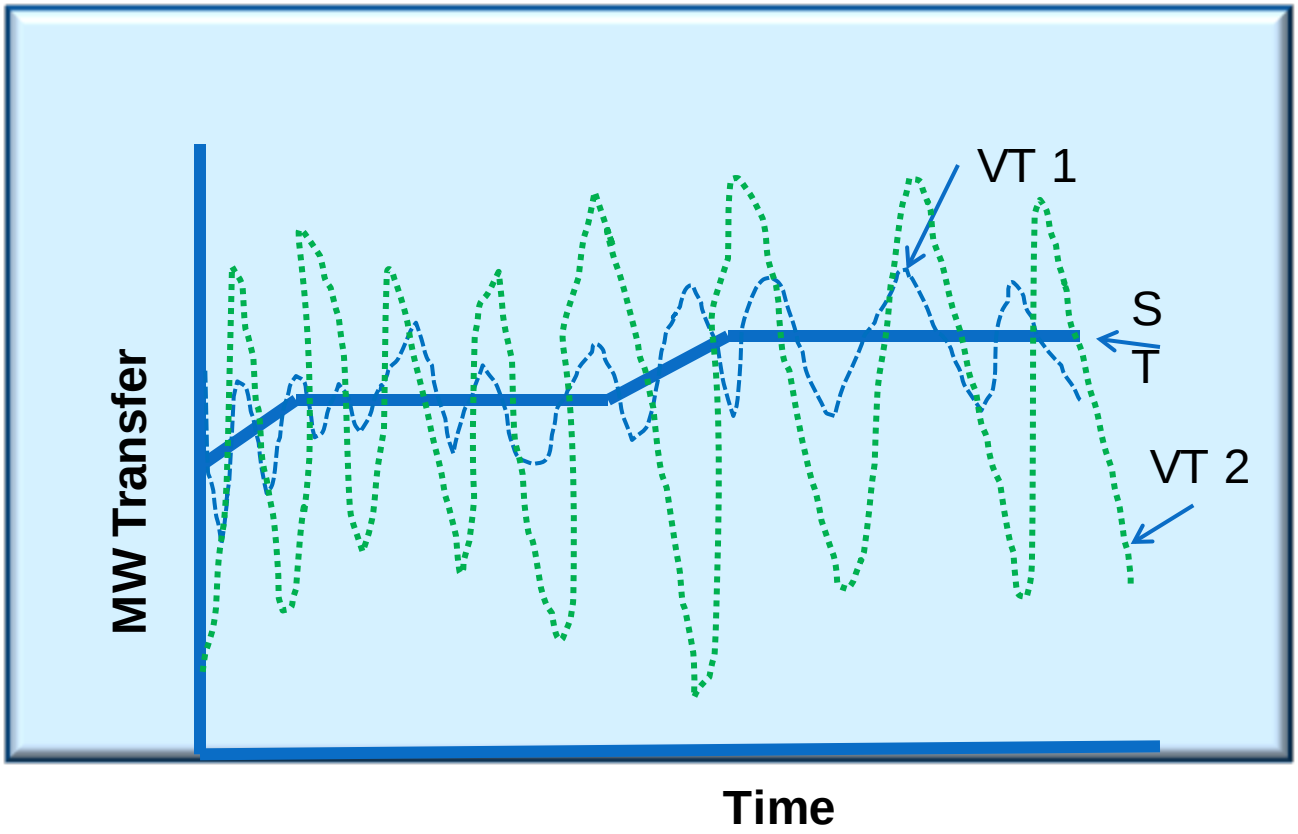
- Dynamic Transfer Capability – How it Works
- Segmentation Update
- Transmission Rate Schedule Changes

DTC – How it Works

DTC Program Overview

- BPA's Dynamic Transfer Capability ("DTC") Program has several key components
  - Reliable and fair operation of existing DTC
  - Evaluation of existing system DTC
  - Evaluation of demand for DTC
- Reliably and cost-effectively manage & plan for DTC
- Limiting increased device switching and dispatcher workload due to DTC use

What is Variable Transfer or DTC?



Variable Transfer (VT): Refers to the physical variations in actual power flows across a path / flowgate that are generally unpredictable and repetitive during a defined time period (e.g. 30 minutes).

Static Transfer (ST): Conventional transfers across a path / flowgate, usually made up of fixed hourly schedules between defined PORs (Points of Receipt) and PODs (Points of Delivery)

What is Dynamic Transfer Capability?

- Dynamic Transfer Capability (DTC) is the amount of within-hour change in power flows (up or down) a system or facility can tolerate over short periods of time (such as over a five minute period) without causing an unacceptable voltage excursion or some other adverse system condition

- New use of DTC is accomplished through dynamic and pseudo-tie schedules, which are an acceptable usage of transmission rights.

- DTC limits are expressed in MWs; thus, for example, 50 MW of DTC means power flows may increase or decrease 50 MW from current operating levels over, say, five minutes without causing an adverse system condition

Why are DTC Controls Needed in the PNW?

- No one coordinates and controls all the reactive devices in real time in the region to maintain the voltage profile.
- Voltage and transient stability are not yet studied in real time and proper control actions have not been implemented.
- Many shunt devices and transfer taps are not automatically controlled to maintain proper voltage profile.
- High level of Variable Energy Resources are integrated in the region

Why is DTC Important?

- BPA's system is uniquely sensitive to unanticipated changes in power flows over short periods, which can cause unacceptable voltage excursions or other adverse system conditions unless these changes are limited.
- BPA's system is sensitive to DTC for the following reasons:
  - Distance from Generation to Load
  - Manual Voltage Control
  - Remedial Action Schemes (RAS – otherwise known as Special Protection Schemes)
  - Unknown ramping schedules of generation

- Currently, BPA limits changes to RAS arming or voltage control resulting from DTC use to two changes per hour

What are Current DTC Uses?

- Transmission customers request DTC from BPA to:
  - Move generation across BPA's system from generation to load;
  - Balance wind power or otherwise self-supply balancing services to a generator or load;
  - Market balancing services across BPA's system;
  - Electrically move a generator out of BA (i.e, thereby changing who is responsible for supplying balancing and other services to that generator);
  - Provide station control service; and
  - Supports the EIM Transfers

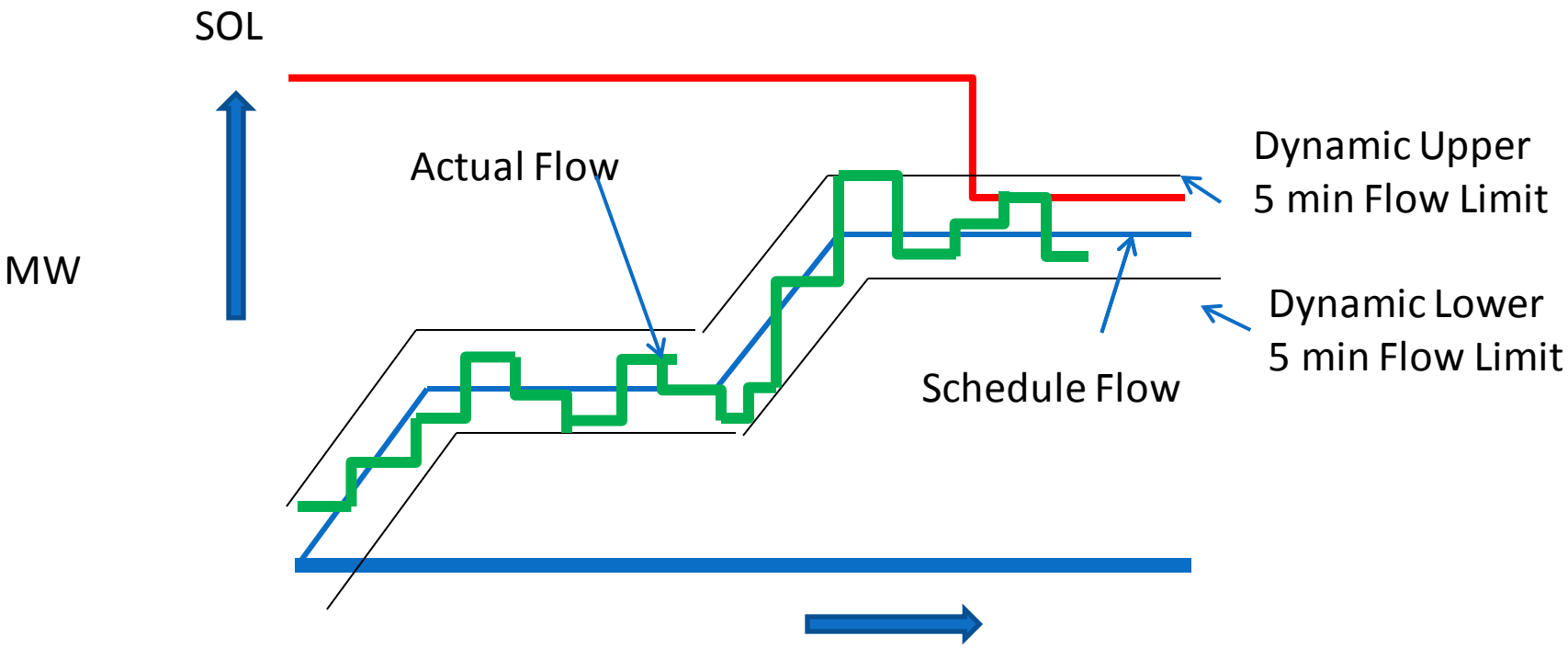
DTC Control – Specific Usage

- Once an entity submits a DTC request to BPA, BPA begins the evaluation
  - First evaluation is whether the use requested is actually a use of DTC
    - De minimus
    - Not truly moving dynamically but needs to use a dynamic transfer type e-Tag
    - Historic use
  - If those are not true, a study is run to ensure that the new use of dynamic transfer across the system would not cause reliability concerns on the system.

DTC Control – Study Methodology

- In order to study a new use of DTC across the BPA transmission system, multiple state estimator cases are used.
- These cases are then manipulated to show the movement of the proposed dynamic transfer
- If the dynamic transfer would cause voltages to exceed tolerances, the amount awarded will decrease accordingly
  - Will only allow an amount of dynamic transfer that will not cause voltage deviations in exceedance of the limits.
  - The amount of dynamic transfer awarded will not cause BPA Dispatch to increase the amount of switching actions on reactive devices.

Upper and Lower Limit Overview



Upper/Lower Limits are

Data Transfer in Support of Upper and Lower Limits for EIM transfers

- BPA sends effective Upper and Lower Limits to the CAISO in real time for BPA's internal flowgates (i.e., not the COI).
- BPA receives data on the EIM in real-time
  - Advisory 5-minute and 15-minute dispatches
  - Binding 5-minute and 15-minute dispatches
  - Forecasted 5-minute and 15-minute Market Flow
  - Binding 5-minute and 15-minute Market Flow
  - Load forecasts for EIM Balancing Authority Areas
  - Unit status
  - Shift factors for EIM Participating Resources impacts on BPA's flowgates
  - Net Scheduled Interchange and load for EIM Balancing Authority Areas and CAISO

COI – DTC Discussion

- BPA worked with ColumbiaGrid and other regional stakeholders to update DTC studies in 2014.
- The study provided significant results, including the ability to allow 400MW of Dynamic Schedules around-the-clock.
- BPA also identified a reliability need to freeze Dynamic transfers when flows are within 400MW of the SOL.
- Allocation of the 400MW is performed on the WECC-preschedule calendar by multiple TSPs on the northern section of the COI.

DTC Rate Consideration

- BPA would consider a new rate if there were future interest in growing the DTC capabilities beyond the current limits and charging customers that are requesting the service. A rate for DTC would be appropriate if there is a cost shift or if there are "free riders" that are causing costs from their DTC "use" but are not shouldering a commensurate cost burden through their transmission rates.

- Currently, BPA staff has not observed any changes in DTC that would require additional costs.
  - BPA has not identified a significant increase in true dynamic use of the system to date.
  - Current policies prevent increase in device switching and dispatch work load.

- Although BPA staff does not intend to propose a DTC rate for the BP-18 Initial Proposal, staff will continue to study this issue and, if it identifies any need for additional costs related to DTC, it may propose a DTC rate in future rate periods or through a mini-7(i).

DTC Rate Development Limitations

- In addition to not identifying additional costs specific to DTC (see previous slide), BPA has not identified a billing determinant for a DTC rate.
  - For example, dynamic and pseudo-tie schedules don't necessarily correlate to dynamic transfer.
- Development of a billing determinant may be a significant effort.

Next Steps

- Benchmarking
- Assessing if there are any underlying variability trends/correlations over the past 10 years by looking at:
  - Flows on internal flowgates and interties
  - Voltages
  - Reactive Device Switching
    - Cap banks
    - Synchronous Condensers (or running units in condensing mode?)
    - Static VAR Compensators
    - Transformer Tap Changes
  - Total flow trends
  - Relationship to other quantities in regulatory flux such as Frequency Response Reserves (FRR)
  - System additions to specifically increase the DTC on certain flowgates
- Data gathering:
  - ~10 year look back to beginning of 2006
  - 5-min average variation (base data)
  - 15-min variation (clock intervals probably fine, as opposed to rolling)
  - 30-min variation (clock intervals probably fine, as opposed to rolling)
  - Monthly bins
  - Hour of day look

Other DTC Developments

- Technology Innovation Project 281 – Automation of tool to determine dynamic transfer capability on BPA's internal flowgates.
  - Complete in Fall/Winter 2016
- Technology Innovation Project 355 – Studying potential methods to increase dynamic transfer capability – COI and Network
  - Complete in Fall/Winter 2016
- COI DTC Studies – ColumbiaGrid-led effort to study dynamic transfer capability on the COI (entire facility, not just BPA's share) with key regional transmission owners/operators.
  - Completed in Spring 2015. Initial result implemented in Fall 2015.

QUESTIONS?

Segmentation Update

Segmentation – Plant in Service

- The Segmentation Study and Revenue Requirement reflect historical plant in service through FY 2015.
- A future Plant in Service forecast is used for FY 2016-19 in the Initial Proposal to project segmented net plant investment during the rate period.
- Segmented net plant is used to allocate capital related costs in the revenue requirement to specific segments.
- The Plant in Service forecast is based on initial capital spending levels currently being discussed in the 2016 IPR/CIR process, these levels are subject to change.

Plant in Service Forecast for FY 2016-19

($000)

	A	B	C	D	E	F	G	H
		Generation Integration	Network	Southern Intertie	Eastern Intertie	Utility Delivery	DSI Delivery	Total
	Stations							
1	FY 2016	-	198,544	296,572	167	-	-	**495,283**
2	FY 2017	-	139,694	90,067	103	-	-	**229,864**
3	FY 2018	-	217,815	7,245	75	-	-	**225,136**
4	FY 2019	-	167,480	17,933	105	-	-	**185,518**
	Lines							
5	FY 2016	-	365,350	31,598	-	-	-	**396,948**
6	FY 2017	-	89,219	9,376	-	-	-	**98,595**
7	FY 2018	-	102,051	1,804	-	-	-	**103,856**
8	FY 2019	-	132,336	1,784	-	-	-	**134,120**
	Lines & Subs							
9	FY 2016	-	563,894	328,170	167	-	-	**892,231**
10	FY 2017	-	228,913	99,443	103	-	-	**328,459**
11	FY 2018	-	319,867	9,050	75	-	-	**328,991**
12	FY 2019	-	299,816	19,716	105	-	-	**319,637**

	Other	Ancillary Services	General Plant
13	FY 2016	51,354	158,054
14	FY 2017	35,261	169,022
15	FY 2018	35,531	131,530
16	FY 2019	34,932	151,737

Draft Numbers

Plant in Service Forecast

- Big Eddy Knight, Central Ferry Lower Monumental and Celilo are included in the Plant in Service forecast in FY 2016.
- Consistent with past practices, the Final Proposal will be updated to reflect plant placed into service and retirements that occurred in FY 2016.
  - A large retirement is anticipated at Celilo in FY 2016, valued at approximately $90 million.
  - All things held equal, the retirement results in an estimated reduction of $3 million in the revenue requirement on average.
- The Plant in Service forecast will also be updated to reflect any updates in proposed capital spending for FY 2017-19.

Transmission Rate Schedule Changes

Proposed Rate Schedule Changes

- A draft redline version of the proposed BP-18 Transmission Rates Schedule changes is posted on the BP-18 Meetings and Workshops page.
  - **FTC** change is to clarify what can be passed through the customers.
  - **Reservation Fee** change is to clarify the language for the fee and what is being charged.

Next Steps

- Next BP-18 Transmission Workshop is **July 27**

Appendix

Future Customer Meetings

Date	BP-18 Rate Case	Other Workshops
Jul 22 (F)	• Generation Inputs	
Jul 27 (W)	• Revenue Requirement • Transmission Rates o LGIA o Load Forecasting o Sales o Repayment model o SDD o Rates Models	
Aug 9 (T)	• Power Rates o Overviews: Market Prices/Loads & Resources o TCMS for NT Secondary o Other	• RHWM Process

For the most up-to-date calendar of events, please visit the BPA Event Calendar.

Future Customer Meetings

Date	BP-18 Rate Case	Other Workshops
Aug 10 (W)	• Transmission Rates o Wrap-up • BPA response to proposed error correction process • Risk	
Aug 24 (W)	• Transmission Rates (Tentative) • Power Rates (Tentative)	
Aug 25 (Th)	• Generation Inputs (Tentative)	
Sept 7 (W)	• Transmission Rates (Tentative)	

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