

Objectives BPA Expects to Meet Through Implementation of Alternative 2 Concepts
November 9, 2007

This document is in response to a request made at the November 2, 2007, Slice Workshop, for BPA to outline the objectives of implementing Alternative 2 concepts **related to Slice delivery limits**, along with an explanation of how BPA's implementation proposal meets those objectives and how BPA perceives the customer's implementation proposal falls short of meeting those objectives.

Overall Objectives:

Refine the determination of Slice delivery limits such that they incorporate impacts BPA faces from, 1; system operating characteristics, and 2; system constraints and conditions.

Refine the determination of Slice delivery limits such that they are less theoretical and somewhat individualized to each customer's scheduling decisions.

Develop implementation processes and procedures that enable frequent updates to Slice delivery limits such that they incorporate impacts BPA faces from changes in system operating characteristics, constraints, and conditions.

Specific Objectives

1. Incorporate the system operational impacts BPA faces, with regard to the hydraulic link between Grand Coulee discharges and lower Columbia inflows, into individual Slice customer delivery limits and parameters
 - a. Grand Coulee discharges affect lower Columbia inflows approximately 24-hours later
 - b. Impacts from BPA's decisions regarding Grand Coulee discharges must be managed within the lower Columbia operation the following day
 - c. Slice customers should be expected to face similar impacts from their individual decisions

2. Incorporate the system operational impacts BPA faces, with regard to Mid-Columbia project influence on lower Columbia inflows, into overall Slice customer delivery limits and parameters
 - a. Mid-Columbia project draft and fill has a direct impact on lower Columbia inflows
 - b. The Mid-C projects operate independently from the Federal Operation, so BPA has limited knowledge of how they may operate
 - c. The impacts from the Mid-C operation should be shared equally with Slice customers

3. Incorporate the system operational impacts BPA faces, with regard to all static and non-static operating constraints, into overall Slice customer delivery limits and parameters
 - a. Some projects, especially the Snake and lower Columbia, are subject to numerous constraints
 - b. These constraints must be managed by BPA duty schedulers within hour-to-hour hydro operations
 - c. Slice customers' delivery limits should reflect the impacts from these constraints

4. Incorporate the system operational impacts BPA faces, with regard to sudden or unanticipated changes in stream flows, into overall Slice customer delivery limits and parameters
 - a. Sudden or unexpected changes in stream flows impact the operating flexibility available at certain projects (especially run-of-river projects)
 - b. BPA must manage the sometimes undesirable impacts from sharp, sudden changes in stream flows
 - c. Slice customers should be expected to manage the same conditions

5. Incorporate the system operational impacts BPA faces, with regard to operating limitations or requirements born from operating decisions, into overall Slice customer delivery limits and parameters
 - a. Decisions BPA makes regarding the operation of one project during a particular period of time has an impact on the operating limitations or requirements at that project and other projects in a future time period
 - b. The hydraulic link will capture some of this for customers
 - c. Another example would be incorporation of a variable light load hour minimum volume relative to day total output

6. Incorporate the system flexibility BPA sets aside in order to maintain prudent operations and system reliability, which is in addition to required Control Area operating reserves and regulating reserves, into overall Slice customer delivery limits and parameters
 - a. This concept is known as the uncertainty buffer
 - i. This buffer would be applied equally to all customers
 - ii. BPA should evaluate the potential for sharing associated revenues (if there are any) proportionally with Slice customers
 - b. To the extent expected generation values incorporate such buffers, there may be no need to further adjust Slice delivery limits

7. Incorporate the system operational impacts BPA faces, with regard to redispatch events, into overall Slice customer delivery limits and parameters
 - a. Redispatch events are usually announced with short notice
 - b. A process must be developed to capture the impacts from such events
 - c. The uncertainty buffer is one option to consider

8. Develop detailed delivery limits to emulate the flexibility available from those dispatchable projects that are typically subject to few operating constraints and offer significant storage and shaping flexibility (Grand Coulee and Chief Joseph).
 - a. This would be accomplished through a detailed model or simulator
 - b. Ideally, this simulator would incorporate individual customer schedules to determine limits for each customer

9. Develop simplified delivery limits to emulate the flexibility available from those dispatchable projects that are typically subject to numerous operating constraints and offer limited storage and shaping capability (Snake and lower Columbia projects).
 - a. This would be accomplished by transforming the expected operation from these projects into Slice delivery limits, with an ability to reshape and deviate, within established parameters
 - b. Determination of the ability to reshape and deviate is key to this concept

10. Develop tools and implementation processes necessary to enable frequent (hourly) determination and publishing of updated Slice delivery limits in order to incorporate impacts from the above concepts
 - a. This publication would contain all Slice delivery limits and would be submitted to Slice customers electronically
 - b. Development of an automated process to update delivery limits on a periodic basis would be required
 - i. At some point during each day, possibly around noon, the GFI could also be updated

11. Provide additional operational information to Slice customers in order to improve their ability to manage their Slice schedules and storage within published limits
 - a. This information could be incorporated into the publication mentioned above
 - b. The exact information made available is yet to be determined, but could include data such as:
 - i. Expected inflows
 - ii. Expected generation amounts
 - iii. Other data deemed necessary or useful

The following table reflects the BPA and customer assessments of the **BPA proposal** in relation to the specific objectives listed above:

<u>Specific Objective</u>	<u>BPA's Proposal</u>	<u>BPA Assessment</u>	<u>Customer Assessment</u>
1. Incorporate the hydraulic link	Determine separate GCL/CHJ and Rest of System delivery limits, schedule energy separately for the two subsystems, determine a customer-specific (theoretical) GCL/CHJ discharge delta, and apply an adjustment to each customer's ROS allotment based on their delta	Fully achieves the objective. Separate accounting of GCL/CHJ schedules is direct, customer specific, and could be used to determine detailed limits, such as hourly mins/maxs and LLH min volumes.	

<u>Specific Objective</u>	<u>BPA's Proposal</u>	<u>BPA Assessment</u>	<u>Customer Assessment</u>
2. Incorporate the Mid-Columbia project influence	Incorporate the expected operation of the Snake and lower Columbia projects into the ROS delivery limits and update the limits frequently to capture changing conditions	Fully achieves the objective. The expected lower Columbia operation would naturally reflect the flow impacts from Mid-C operations, and would be updated through time.	
3. Incorporate all operating constraints	Incorporate the expected operation of the Snake and lower Columbia projects into the ROS delivery limits, develop detailed limits for Coulee/Chief, and update the limits frequently to capture changing conditions	Fully achieves the objective. The expected Snake and LCOL operation, plus detailed limits for GCL/CHJ would capture constraints and characteristics of the dispatchable projects hour by hour.	
4. Incorporate changes in stream flows	Incorporate the expected operation of the Snake and lower Columbia projects into the ROS delivery limits and update the limits frequently to capture changing conditions	Fully achieves the objective. Expected Snake and LCOL operation, plus updates to limits should capture impacts from stream flow changes for those river reaches. The GCL/CHJ model could also incorporate updated flows.	
5. Operational limits or requirements born from other decisions	Incorporate the hydraulic link concept, develop an iterative model to simulate detailed Coulee/Chief operating limits.	Partially achieves the objective. The hydraulic link captures some of this. The detailed Coulee/Chief model should capture additional. Only very detailed models and several separate schedules would get us 100% there.	

<u>Specific Objective</u>	<u>BPA's Proposal</u>	<u>BPA Assessment</u>	<u>Customer Assessment</u>
6. Incorporate the uncertainty buffer	PS duty scheduler quantifies, logs, and applies uncertainty buffers equally to Slice and PS marketing. To the extent expected Snake and LCOL generation values reflect such buffers, delivery limits would need no further adjustments.	Fully achieves the objective. The goal of the uncertainty buffer is to apply impacts from all uncertainty proportionally to all customers.	
7. Redispatch events	Incorporate the expected operation of the Snake and lower Columbia projects into the ROS delivery limits, develop detailed limits for Coulee/Chief, and update the limits frequently to capture changing conditions	Unclear Since the future of redispatch is unclear, this is difficult to assess. If redispatch is similar to today, BPA's proposal will achieve the objective.	
8. Detailed Coulee and Chief delivery limits	Develop a model or simulator to determine detailed delivery limits for Coulee and Chief	Fully achieves the objective. Many details need to be developed.	
9. Simplified Snake and lower Columbia delivery limits	Incorporate the expected operation of the Snake and lower Columbia projects into the ROS delivery limits	Fully achieves the objective. Many details need to be developed	
10. Frequent updates to System Resource documents	Develop tools and processes that allow frequent determination and updates to Slice delivery limits.	Fully achieves the objective. Tools and process need to be developed or improved.	

<u>Specific Objective</u>	<u>BPA's Proposal</u>	<u>BPA Assessment</u>	<u>Customer Assessment</u>
11. Include System Info to Assist Customers	Not specifically addressed.	Partially achieves the objective. BPA has discussed the potential to share operational information to help customers "drive while looking forward"	

The following table reflects the customer and BPA assessments of the **customer proposal** in relation to the specific objectives listed above:

<u>Specific Objective</u>	<u>Customer's Proposal</u>	<u>Customer's Assessment</u>	<u>BPA Assessment</u>
1. Incorporate the hydraulic link	Apply the McNary Modeling Adjustment (MMA) to the Min/Max Daily limits rather than the Pondage limits, and maintain the current segregation of Snake and Rest of System limits		Partially achieves the objective. Shifting application of the MMA might properly affect the Min/Max Daily limits, but would not be customer specific, and could not be used to affect detailed limits.
2. Incorporate the Mid-Columbia project influence	Apply the MMA to the Min/Max Daily limits rather than the Pondage limits		Does not achieve the objective. The current MMA is based on the delta between a forecasted MCN inflow and the MCN inflows resulting from the Min/Max studies. Mid-C influence is assumed to be zero (pass inflow) in all 3 cases.

<u>Specific Objective</u>	<u>Customer's Proposal</u>	<u>Customer's Assessment</u>	<u>BPA Assessment</u>
3. Incorporate all operating constraints	Apply the MMA to the Min/Max Daily limits rather than the Pondage limits, revise pondage to better reflect actual flexibility, consider daily limits to pondage use, explore sustained energy limits, and have BPA hydro scheduler communicate limitations equally to BPA marketing and Slice customers		Partially achieves the objective. These changes would move delivery limits in the right direction. However, with the possible exception of the communication from the BPA hydro scheduler idea, this proposal falls short of focusing on hour to hour limits.
4. Incorporate changes in stream flows	Not specifically addressed, but customers have indicated concurrence that limits should be updated more frequently.		Partially achieves the objective.
5. Operational limits or requirements born from other decisions	Not specifically addressed.		Does not achieve the objective. Applying the MMA impact to the Min/Max Daily limits would not reflect customer-specific decisions
6. Incorporate the uncertainty buffer	After implementing new pondage limits, sustained energy limits, and better informational coordination (BPA's hydro scheduler to customers, Slice schedule forecasts from customers to BPA), buffers are not needed.		Partially achieves the objective. Reduces (but does not eliminate) the Slice uncertainty. Places impacts from remaining Slice uncertainty, and all other uncertainties, onto non-Slice customers.
7. Redispatch events	Not specifically addressed.		Does not achieve the objective.

<u>Specific Objective</u>	<u>Customer's Proposal</u>	<u>Customer's Assessment</u>	<u>BPA Assessment</u>
8. Detailed Coulee and Chief delivery limits	Leave current segregation of Snake incremental and Rest of System as is, develop sustained energy limits.		Partially achieves the objective. Incorporating sustained limits is helpful, but without segregating the determination of GCL/CHJ limits, this proposal doesn't provide a method for developing detailed limits.
9. Simplified Snake and lower Columbia delivery limits	Leave current segregation of Snake incremental and Rest of System as is, develop sustained energy limits, refine Pondage limits, and incorporate a daily Pondage limit.		Partially achieves the objective. The proposed refinements are a step in the right direction, but fall short of capturing realistic flexibility given the numerous constraints placed on these projects
10. Frequent updates to System Resource documents	Not specifically addressed.		Partially achieves the objective. Though not specifically addressed, the customers have indicated concurrence that limits should be updated more frequently.
11. Include System Info to Assist Customers	Communication between BPA's hydro scheduler and all marketers should be equal.		Partially achieves the objective Customer's proposal was with regard to limits BPA's hydro scheduler places on BPA's marketer. In addition, BPA could supply limited operational data to avoid customers having to "steer through the rear-view mirror"