



**BPA Responses to Public Power Council Questions Submitted October 12, 2010
Concerning Overgeneration Management
November 12, 2010**

Q: General Costs and Revenue Impacts: Please list all revenue/cost impacts (including opportunity costs) from what BPA perceives to be actions taken in response to the High Wind/High Water event, disaggregated by type of transaction as listed in the *Columbia River High-Water Operations Report*, pages 6 and 7 (Sept. 2010), including those listed below.

A: BPA is not prepared at this time to offer detailed analysis of revenue and cost impacts relating to the overgeneration events of June 2010. Instead, we will provide a high level discussion of each specific action.

Increased hydro generation and spill. *Lack of market spill during the peak of the runoff is not an irregular event. About half of the last 15 years have had a week or more of lack of market spill at Grand Coulee and Chief Joseph dams. It is all about the shape of the runoff. In a very pointed runoff, where the flows are very high for a short period of time, it is challenging to simultaneously manage multiple non-power constraints, lack of market spill, and system Total Dissolved Gas levels. In June 2010, due to the oversupply of generation, the mid-Columbia, light-load-hour, day-ahead power price was at or below \$3 to \$4/MWh by June 8. Thus, BPA had to market a large volume of energy at a time when energy traded at little to no value. BPA took all of the prudent steps to manage the high flows and capture the maximum value for the energy. A less pointed, smoother, runoff would have likely allowed BPA to capture more value for the water.*

Canceled or delayed outages on non-essential hydro units. *BPA worked with the U.S. Army Corps of Engineers and the Bureau of Reclamation to cancel, delay, or otherwise reschedule planned maintenance outages. Since the end of the June 2010 over supply of generation event, BPA has not spilled a project due to lack of turbine capacity, so it is unlikely that shifting outages and delaying maintenance had a negative impact on power revenue and it certainly increased generation during the high flow event.*

Changes in hydro operations, including movement of spill, generation, and water storage between hydro units. *Changes to hydro system operations listed in the "Columbia River High-Water Operations" report were attempts to move generation from periods where it would have been spilled to periods where it would have been sold, so these actions had a positive revenue impact.*

Limiting generation at Energy Northwest. *Columbia Generating Station's generation was reduced nightly to the lowest level that would allow a high likelihood of being able to return to full capacity at the end of the high flow event. It's not likely that the nightly reduction of generation at CGS had a negative impact on power revenue.*

Purchased storage at B.C. Hydro. *There was no purchase of storage from B.C. Hydro. BPA coordinated a 5 KCF5 reduction in Arrow flows, the largest reduction acceptable to B.C. Hydro, given its hydraulic conditions.*

Suspension of maintenance of transmission lines within BPA and externally. *The Transmission Services organization routinely reschedules, delays, or otherwise moves planned maintenance so as to minimize impact on the use of the federal high-voltage transmission system by its customers. Transmission Services follows standard NW Power Pool procedures for posting its 45 day plan for transmission maintenance and outages to OASIS so that its customers can find other available transmission and reschedule on different paths.*



Minimizing capacity reductions on intertie lines to California. *Although the California interties were fully utilized on peak hours, there was ample transmission capacity available on shoulder and light-load hours. The interties to California were largely in service and functioned as expected during the June high flow event.*

Existing Protocols

Q: What is the current inventory of tools or protocols that BPA could use to respond to High Wind/High Load events in the future?

A: BPA has routine procedures in place to manage conditions when there is an oversupply of generation. The list of tools and protocols, in no particular order, includes:

- 1. Acquiring load in the marketplace through the real-time, day ahead, and balance of month markets.*
- 2. Pumping water into available storage in Banks Lake.*
- 3. Cutting storage under the Pacific Northwest Coordination Agreement.*
- 4. Requesting non-federal load in the form of positive bias through Hourly Coordination.*
- 5. Requesting an inefficient operation at Grand Coulee to operate units at speed-no-load (moving water through an un-energized unit).*
- 6. Rescheduling non-essential planned unit outages.*
- 7. Requesting additional spill on FCRPS Willamette Valley projects.*
- 8. Coordinating flow reductions out of Canadian projects by reshaping treaty flows or entering into mutually agreeable storage agreements.*
- 9. Coordinating with the Corps and Reclamation to minimize generation at the federal headwater projects including Libby, Hungry Horse, Albeni Falls, and Dworshak.*
- 10. Reducing DSO-216 balancing reserves.*

Q: What is the order of actions that BPA took to manage the event in June?

A: BPA utilized all of the above mentioned tools or protocols, many of them were coordinated simultaneously. BPA's trading floor worked to move as much energy as possible using the marketplace. The short-term planning group coordinated the operation of CGS and the headwater projects with Energy Northwest, the Corps and Reclamation. The real-time staff worked to simultaneously implement the Columbia River BiOp, maximize generation, minimize lack of market spill, and meet all of BPA's non-power hydraulic objectives.

Q: What would BPA do differently in responding to future events using its current protocols?

A: We did everything we could with the existing tools and are working now to see whether and to what extent we might be able to expand our repertoire before next spring comes around. In retrospect it would likely have been more beneficial to BPA to limit DSO-216 INC reserves as well as DEC reserves. If we would have limited the INC reserves, we could have generated more on heavy-load hours, thus reducing light-load hour lack of market spill and overall TDG levels on the system.

Q: To what extent can BPA curtail non-federal generation to protect fish or maintain other statutory obligations (such as protecting against flooding)?

A: BPA's Transmission Services organization can curtail any generator in BPA's balancing authority for reliability reasons but the Power Services organization does not have a mechanism in place for curtailing non-federal generation for implementation of the Biological Opinion or to manage state and federal water quality standards.



Other than occasional curtailment of wind generation due to the restrictions of DSO-216 balancing reserves, we are not aware of any non-federal generating resources being curtailed during the June event.

Hydro Operation Impacts

Q: To what extent did hydro operations change as a result of the event?

A: These actions are listed in the “Columbia River High-Water Operations” report.

Q: What are the increased maintenance costs resulting from actions taken during the event?

A: There should not be any increased maintenance costs as a result of the June high flow event. Operations were routine and all essential maintenance was completed. No steps were taken by BPA that would jeopardize unit or system reliability, or increase maintenance costs.

Q: Please quantify the impact of Slice generation and storage caused by the actions taken during the event.

A: BPA has not attempted to specifically quantify the impacts of actions on Slice generation. Instead, we will answer the questions qualitatively. Starting at the beginning of June, Slice participants were required to operate within a range of flows at McNary Dam. The intent was to manage lower Columbia flows close the Initial Control Flow and achieve system refill by early July. By the end of the first week of June, it became apparent that flows were about to go much higher than expected. BPA required the Slice participants to operate to fixed flows at Bonneville Dam to help manage system TDG levels and refill of Grand Coulee Dam. Throughout June, when BPA declared Elective-spill, the Slice participants were freed from their maximum generation restrictions so that they could make every attempt possible to use the marketplace to acquire load and reduce total system TDG levels. For the most part, Slice participants closely followed the federal operations.

Thermal Generation Questions

Q: How did thermal generation contribute to the event in June? Was all thermal generation decremented as a result of the event?

A: By June 8, the graph in the “Columbia River High-Water Operations” report shows that essentially all thermal generation in the region was shut down since value of electricity was below the cost of fuel. There were a few thermal resources running for non-economic reasons such as reliability, voltage support, or balancing reserves.

Q: Are there generators that cannot be decremented for reliability reasons (e.g. voltage support)?

A: In terms of a standing agreement or understanding with the BPA BA, there are no must run thermal units in BPA’s balancing authority. However, there is thermal generation in other BAs that may be must run and would not be able to fully participate in taking additional over supply generation from the BPA BA. In addition, reducing west-side thermal generation increases the risk of congestion on the West of Cascades-North flowgate, Cross Cascades flowgates, and the I-5 corridor flowgates. When west-side thermal generation decreases, so do the System Operating Limits on the above mentioned flowgates. This decreases the available transmission to serve west-side loads. Shutting down thermal generators completely can cause voltage support issues. There were no system reliability problems during the high flow event.



Wind Generation and Balancing Reserves Rate Impacts

Q: Aside from overuse of balancing reserves, under what situations does BPA have authority to curtail wind generation (e.g. fish, flooding, etc.)?

A: BPA can curtail any generator in its balancing authority for reliability reasons.

Q: What cost of balancing wind born by BPA as a result of the event was already accounted for in the WIT rate, and what additional costs were seen following the event? For example, how does this event change your future forecast of spill in the GARD model?

A: Rates are set based on an average of 70 water conditions. To the extent that the events of June 2010 are reflected in the historical water year set, the rate has accounted for the impacts. The rate impact depends on the frequency of like events occurring in the historical water year set. While there will be changes to how the GARD model forecasts wind integration costs, there is nothing explicitly related to the June event.

Q: How would the proposed Variable Energy Resource Balancing Reserves (VERBS) rate have functioned if it were in place this rate period?

A: The rate would have functioned in the same manner.

Q: Are there regulatory barriers to forward purchasing of DEC's or INC's?

A: No, there are no regulatory barriers to forward purchasing of balancing reserves. However, internal business practices do not allow balancing reserves to be met by parties other than Power Services. There are also legal issues about whether or not balancing reserves are ancillary services as very few parties have the ability to sell those at market rates. FERC typically approves such transactions on a case by case basis. And finally, balancing reserves must be carried on firm transmission.

Impacts at the Columbia Generating Station (CGS): According to the report CGS was cycled diurnally through June and into July.

Q: How was CGS cycled during this period (e.g. how frequently was generation moved, in what MW range, etc.)?

A: The "Columbia River High-Water Operations" report contains a graph showing CGS operations. From June 3 until June 8 CGS operated at 50 percent of its 1120 MW capacity for maintenance. On the June 8, CGS was further reduced down to roughly 30 percent of capacity for continued maintenance. On June 11 CGS was further reduced to 20 percent of capacity for maintenance. Once maintenance was complete, on June 14, BPA requested that the plant cycle down to 85 percent of capacity on light-load hours to reduce the amount of lack of market spill and resulting total dissolved gas levels on the FCRPS. Energy Northwest conveyed to BPA that any further nighttime reduction would increase the risk of not being able to return to full generation at the end of the high flow event.

Q: Why was it necessary to cycle into July? Why was it necessary to cycle diurnally?



A: Flows on the FCRPS remained high into early July and BPA requested light-load hour generation reductions to help manage system wide total dissolved gas levels and lack of market spill. BPA was able to market the full output of CGS on heavy-load hours so there was no need to ask for daytime generation reductions.

Q: How different was operation from status quo?

A: BPA requesting decreased light-load hour generation from CGS during spring time high flow events is not unusual.

Q: How does cycling affect future maintenance and budgeting at CGS?

A: Unit cycling as a result of the high flow event should not impact future maintenance budgeting at CGS.

ATC Impact

Q: Were there any impacts to ATC impacts as a result of the event, including curtailments of nonfirm service or restricted sales of secondary or nonfirm?

A: Between June 8 through June 30, there were five instances of wind curtailments (per established DSO 216 procedures); four instances of curtailments on the North of John Day flowgate and one curtailment on Raver-Paul.

Q: Were there any voltage stability or reliability impacts seen as a result of the event?

A: There were no reliability or voltage stability impacts.

Q: What was the hourly inertia loading during this event on the COI, especially compared to loading under normal conditions?

A: During the heavy-load hours the COI was essentially fully utilized. There were periods in light-load hours when the COI was not fully utilized. The California ISO reported that off peak prices were as low as -\$20, thus one wouldn't expect power to flow south over the COI.

Impacts on Transmission Service

Q: During the event, did the actions that BPA took limit the ability of NT or PTP customers to access their federal or non-federal resources and if so, which actions?

A: The curtailments to wind would have reduced these generators' ability to schedule from these plants. Additionally, curtailments on BPA's North of John Day and Raver-Paul flowgates would have been made to reduce flows on those paths to ensure that BPA remained within the System Operating Limit for each path. This may have impacted customers' ability to schedule from federal or non-federal resources.