



FISH PASSAGE CENTER

1827 NE 44th, Suite 240, Portland, OR 97213

Phone: (503) 230-4099 Fax: (503) 230-7559

<http://www.fpc.org>

e-mail us at fpcstaff@fpc.org

MEMORANDUM

TO: FPAC

Michele DeHart

FROM: Michele DeHart

DATE: May 2nd, 2012

RE: Potential for Reducing Daytime Spill/Increasing Nighttime Spill Using Storage at Bonneville to Aid in Adult Passage

At your request, we have estimated the amount of spill that could be reduced during the daytime period and increased over the nighttime period to potentially aid in the passage of adults at Bonneville Dam. Your request involved utilizing the Useable Storage Volume at Bonneville Dam between 73.0 feet and 76.5 feet twice daily to store and release water that otherwise would have been spilled. We understand that the purpose of this request is to consider reducing daytime spill at Bonneville Dam and increasing nighttime spill at Bonneville Dam. This modification of operations at Bonneville Dam is being considered on the basis of concerns regarding adult and juvenile salmon passage. An operation for Bonneville Pool is being considered in which the Bonneville Pool would be filled during daytime hours and drafted, every twelve hours, decreasing spill during the daytime hours and increasing spill during nighttime hours. Prior to an FPAC proposal of such an operation it may be prudent to discuss the following points.

- In a direct exchange of daytime spill for night time spill utilizing the Bonneville Pool, spill could be reduced by 11.7 kcfs during each daytime hour and increasing spill 16.4 kcfs during each nighttime hour.
- It is unclear whether this small difference in spill from the pool draft and fill would affect adult passage; particularly since weekly flow and spill has had much larger differences. For example spill decreased 30 kcfs from Sunday April 29 to Monday April 30.
- This operation could be defined as a load following operation. More power could be generated during daytime hours with the Bonneville Pool at a higher head and higher

pool elevation. This may not result in an increase of spill during nighttime hours so the presumed direct day/night change of spill may not occur.

- The twice daily pool fill and draft could affect the on-going tribal ceremonial fishery taking place in Bonneville Pool.
- There is no plan to actually evaluate this proposed operation and whether or not it will benefit adult passage or be adverse for adult passage.
- The twice daily pool fill and draft could effect tailwater fluctuations at The Dalles Dam which could affect adult passage at the project.
- Analyses of historical data have shown that water temperature is an important variable in considering adult passage at Bonneville Dam, Current water temperatures should be considered.
- The coordinated system operations and the specific hourly operations of the Bonneville project should be reviewed and understood before modifications in the project operation are considered. In addition the predicted flows should be reviewed to determine if the past weekend high flow and spill are expected to continue.

Expected effect of pool draft and fill operations

The Useable storage Volume between elevation 73.0 feet and 76.5 feet is approximately 13.5 Kaf. For this exercise, the daytime period was defined as a 14-hr period between 6 am and 7 pm and the nighttime period was defined as 10-hr period between 8 pm and 5 am. If the Bonneville Pool were at an elevation of 73.0 feet at 6 am, spill could be reduced 11.7 Kcfs each daytime hour, at the end of the 14-hr daytime period, the Bonneville Pool would be at 76.5 feet. At 8pm, Bonneville would increase spill 16.4 Kcfs each hour of the nighttime period, at the end of the 10-hr nighttime period the Bonneville Pool would be back at 73.0 feet.

It should be pointed out that the above estimates would only involve increases/decreases in spill amounts. It would be a direct trade. However, responses to date to operations do not provide any assurance that **that the project would operate in the assumed manner.**

In this simple exercise it was assumed that hourly powerhouse flows would be exactly the same as what would have occurred had this proposed operation not occurred. However, it is known that as head increases the amount of powerhouse flow needed to produce a certain level of power is reduced. Concerning this exercise, the daytime period would experience an increased forebay elevation (refilling from 73-76.5 feet) and also experience a somewhat lower tailwater elevation than would have occurred as total outflows would be reduced by the amount of the spill reduction. It is possible that if the powerhouse were operated to a certain power output, the increase in daytime head would lead to a lesser powerhouse flow equating to the same power output. **It is then possible that some of the potential for daytime reductions in spill could be offset to some degree by increasing powerhouse flows to produce an increasing level of power under increasing daytime head.**

In addition, the increased head during the start of lowering the pool overnight could result in putting more flow through the powerhouse and less through spill. In essence, the

potential for increasing adult passage gained from reducing spill during daytime hours from this operation could cause an increase in powerhouse operation and therefore, increased powerhouse passage for juvenile migrants.