THE STATE OF WYOMING

State Engineer's Office

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PATRICK T. TYRRELL
STATE ENGINEER

January 27, 2011

Ms. Paula Holwegner
Bureau of Reclamation
2900 4th Ave. North, Ste. 501
Billings, MT 59107

RE: Wyoming State Engineer's Office comments in regards to the Draft Bighorn Lake Draft Operating Criteria Evaluation Study and Report
Submitted electronically to: pholwegner@usbr.gov

Dear Ms. Holwegner:

Thank you for the opportunity to provide comments on the draft operating criteria. The results of the evaluation study and report are presented in a very readable, user-friendly fashion. From this agency's point of view, we commend Reclamation for taking into account many of the issues raised by this agency as well as other Wyoming agencies and citizens in the drafting of the changes to the operating criteria. The increase in target reservoir elevations of as much as twelve feet is a substantial change and will go a long way toward addressing Wyoming's concerns of keeping Horseshoe Bend usable for more of the recreation season. The web tools you have developed are a nice supplement to the written report for playing "what-if" scenarios to better understand the elasticity of the various inputs that determine estimated flows or target elevations.

One major concern of our agency is related to the estimated volume and impact of the winter month gains. As the volume of the station gains are the same order of magnitude as Boysen and Buffalo Bill releases, accurate estimation of these gains is critical to the winter operations of Yellowtail reservoir. Reclamation is to be commended for the statistical analysis completed that determined the overall trend has stabilized since the early 1990's. However, with an R^2 of 0.59, there will still be many events not predicted by the equation. As operations move through the water year and if the November-March inflows realized are substantially different than those predicted at the beginning of the water year, we encourage Reclamation to make mid-course corrections based upon the actual station gains. On page 21 (second full paragraph), you describe the flexibility that will be afforded in meeting the March 31 target elevation based upon runoff forecasts. We suggest that that same flexibility be built in throughout the winter months relative to station gains, which unlike forecasts, can be measured.

We all share a goal of estimating the November to March station gains as accurately as possible. As you were completing the statistical analyses which are described starting on page 15, we are curious if you also examined the relationship between November-March gains with the previous July-October gains. By decreasing the time frame from April back to July, this might take into account years where the conditions turn dry in the later

summer months, much like happened in 2010, influencing fall inflows into Yellowtail. We would appreciate hearing from Reclamation as to whether this relationship was examined, or perhaps this could be a continuing study area for the Long Term Issues Group.

We question the legitimacy of the "Balancing Risk" section which begins on page 18. While we appreciate the desire to not have releases manipulated more often than necessary, we do not understand the logic of what appears to be merely "manufacturing" 10,000 acre feet of water and using it as part of the forecasted gains when there is no scientific basis for adding that amount.

One component of the Draft Criteria that needs to be set out better and hopefully clearer is the rule curves discussed beginning on page 21. The development work that has gone on behind the scenes by the Bureau is commended. The brief discussion of the application of the rule curves is straight forward enough, but it is movement between curves that occurs as the season progresses that is essentially missing from the discussion. It has been presented that as new updated forecasts for the April – July runoff become available the Bureau will move from one curve to the next. This can result in a release adjustment that appears from the graphs to be significant in change of flow rate. We would recommend that intermediate curves be developed to minimize the effects of the jump from one curve to the next through the progression of the season. As the annual operation of Yellowtail is dependent upon the volume of water received during the run-off period, we encourage Reclamation to review their forecasting methods for further refinement. We understand that precipitation conditions can vary widely from April to June, but we must strive to make the spring forecast volumes as accurate as possible. Again, this may be a continuing agenda item for the Long Term Issues Group.

During years when flood releases will be necessary, it appears that reservoir levels will be drawn down to levels such that Horseshoe Bend Marina will not be usable at the Memorial Day weekend (Figure 8, page 23). If additional information could be provided from the modeling efforts estimating how often this scenario might occur, that would be helpful for understanding the risk. We appreciate the language in the second full paragraph of page 23 which states that flexibility and judgment will be exercised in applying these rule curves. We trust that the participants of the Long Term Issues Group will be kept fully informed during these upper decile or upper quartile years.

It should also be recommended that a set of simple rule curves could be developed that would map out the release program from the late July peak period to the October 31 target. Once the formula for the curves are developed and implemented users will quickly adapt to and rely upon the curves as they look into the future. It is that ability to look into the future and plan that makes these operating criteria most attractive.

The steps taken by the Bureau and the Long term Issues Group who have worked diligently toward this draft product have been substantial. Much progress has been made to date and many of the initial issues are now behind these groups. But their work is not yet complete. We encourage Reclamation to continue to organize meetings of this group with an agenda of further refinement of the operating criteria. One area that we believe

merits further research and examination by the Group is the concept of basing reservoir releases on downstream river elevation. Full recognition and accounting of the Big Horn Canal flows as a component of the total releases from the reservoir is also desirable. Also, further analysis of the impacts of the negative shifts at the St. Xavier gage may show that reservoir releases can be decreased and still result in adequate fishery flows.

Our overall impression of the draft criteria is very good. But new criteria are but half of the equation. Without the full implementation and execution of the new criteria, we are no further along the road to improved operations. We look forward to working with Reclamation as these new criteria are put into practice and stand prepared to provide input as appropriate as Reclamation exercises flexibility and good judgment when Mother Nature is unpredictable and doesn't follow the plan.

With best regards,

Patrick T. Tyrrell
Wyoming State Engineer

Cc: Office of Governor Matt Mead