

Temperature Control Device Update – Dennis directed the AMWG to read the scoping letter (**Attachment 15a**) that was distributed in today's meeting packets identifying Reclamation's intent to prepare an environmental assessment for modification of two penstocks on Glen Canyon Dam. This is pursuant to the recommendation that AMWG made last August following the science advisors risk assessment. The science advisors had advocated a test as you go process. They actually would have liked to have seen some way to temporarily modify GCD. Reclamation went back and challenged our engineers to do that and they came up with several designs, all of which they consider too risky to the powerplant, that is if there was a storm that would collapse the units, they would end up in the penstocks. It's just too risky to try it that way so the decision was made to do a test as you go somewhat differently that we would modify two units, test for a period of we think three years, possibly 4, that would be determined by the research plan and evaluation of the resources and then to make iterative decisions on following modifications. In the course of that time, we have also asked those engineers to do a feasibility level design analysis on an external frame temperature control device quite similar to the one that is on Flaming Gorge Dam. The TCD that we've asked them to evaluate would allow operation and delivery of warm water all the way down to the penstocks and I'm going to show you a graph from some modeling done by Amy Cutler and I'd like to acknowledge Amy for her fine work in doing that. The thinking early on on the time frame for the environmental assessment was that we would do it quickly. We would have it done in time for the AMWG to re-evaluate, that is the draft by their July or August 2004 meeting. Then we got to looking at our maintenance schedule. We looked at other conflicts in the workload that you're going to see tomorrow associated with the proposed 05 budget and work plan and decided it made good sense for us to extend that period and now we intend to have a draft in April of 05. One other reason for delaying was the issuance of questions from certain people about if the reservoir is as low as it is and if it continues to go lower, would we begin to see warm water release from GCD without a TCD and do you have studies or proposals in place to address the warming of the water. We thought it would be prudent to look and do some modeling once again Amy using a model called C-Qual W2 to determine whether or not or what the prospects are for seeing warmer water and I'd just like to take a minute to show you the results of that modeling effort (**Attachment 15b**).

Dennis said that Reclamation met recently with GCMRC to discuss the studies that need to be developed, whether or not these release temperatures occur, the studies that should be in progress when the TCD is built if the decision is made to modify the dam. He said Ted would briefly discuss some of the existing monitoring and the projected studies that might be implemented. Questions and answers were recorded (**Attachment 15c**).

Bruce Taubert (AGFD) – Dennis, have you determined what the maximum water temperature increase would be if you only had two units for a phased in test?

Dennis – It of course depends considerably on the volume of water that's being released. Each of the units will release about 4,000 cfs so we're not going to be releasing more than 8,000. How high can we go with that temperature depends on the temperatures in the reservoir but it also depends potential effects on hydroelectric generation. We don't know right now where that band is at. There are additional evaluations that need to be done. But you're talking probably in the range of 3-4 degrees Celsius as the maximum.

Bruce – My concern is that if you call it a test and you only increase it by very few degrees centigrade, then it isn't a test because you're not taking it up to the maximums that you wanted so it doesn't provide the data that you want for a test.

Dennis – Well we think it does. If you look at the potential effects downstream, you have to reach about 16 degrees Celsius before you're going to see reproduction. That's admitted. The data, the studies are there. But for example, we're leaving thermal shock of small fish existing below the Colorado River could be done at 13 degrees so the likely effects from a modification of only two units would be increase in survivorship of fish that are exiting the Little Colorado River.

Bruce – I thought our goal was mainstream spawning of HBC, not to increase survivorship of the young going out?

Dennis – Well earlier we were talking about recovery goals and there may be differences between what the recovery goals require and what we're trying to do for the biological opinion but we're trying to increase recruitment in the Colorado River, whether that comes about through additional reproduction in the mainstem or additional survivorship of fish from the LCR, is a question that we have to address. I think what we're really looking for is recruitment in the

Bruce – I thought what we're looking for is massive spawning in there so we would swamp this whole system with enough HBC that recruitment wasn't a limiting factor, not just looking at increasing the success recruitment out of the Little Colorado River. I would like to see more information on what the potential increases are from this test because I'm not convinced that a test of two units over this 3-4 years is a test of what we might have as a result of increase in water temperature using a TCD.

Dennis – and the EA will definitely address those questions and the research plan that GCMRC will put together will provide a plan for what we would measure and how we would measure it.

Sam Spiller (USFWS) – I always thought maybe I was mistaken but thought we didn't really have an option for only 2. I thought it was the TCD was an effort to maximize our capability to warm the water up in the river and I guess, am I wrong? I thought it was always a maximum type situation. We want to warm it as much as possible because what I've always heard around the table for several years was it was questionable whether we would even warm it up enough with the TCD so I question whether two is an appropriate strategy to do with. I question how that came about and again my concern. I want to say well maybe we ought to just have the plan show that if we do test with two, then at some point we would get to the end. In other words if we do need 8, we get there but the time of testing all of that could take a 20 year period if not more and we could lose the fish by then so again I go back to my previous thought, I always thought the TCD was an effort to maximize our capability to warm water and it looks like we're deviating from that.

Dennis – Well, different people have different impressions I'm sure. We think we're following the advice of the science advisors in the risk assessment. We think we're following a pattern that is required under an adaptive management program and that is to do incremental testing. It will take a good period of time to determine. There is about a \$30 million investment in the first two units and we think it's a wise and prudent approach to addressing this question. There have been many statements made about the potential unintended negative consequences of warming the water too much. We're also looking at that as a potential effect that we don't want to enter into. We think adjusting the temperature incrementally makes good sense.

Sam – and taking our advice which I think is a good idea, what's your interpretation of your Section 7 requirements?

Dennis – It's to do a feasibility assessment on the TCD. It doesn't say 8 units. It says a TCD selective withdrawal

Sam – for what?

Dennis – for warm water and below GCD

Sam – for the purpose of?

Dennis – improving recruitment in HBC. There is no number of fish that's identified in the biological opinion. The only numbers occur in the recovery goals.

Nikolai Ramsey (GCT) – I think we have to move and be very aware of the risks in playing with temperature and also being aware of the risks about the reservoir dropping gives us. We may want to look at in the analysis putting in 4, 6, 8, maybe 2 but that should be based on what we get out of it and it shouldn't be determined by an economic factor. I think the Bureau is saying 2 instead of 8 because of what the science advisory board said but because it is expensive to do it rather than 2. You could have 8 structures and run 2 of them and have the capacity to do 8 and not have to go through another EA down the road, the 20 year scenario that Sam alludes to, to where we say well, 2 is getting us partway there but not enough there and then we've got construction that we have to plan it with the maintenance of the penstocks. We've got all that to work through again instead of one and done and we can do the one and done and run the very limited, very safe experiment by just minimizing our use of 8 structures, or 4 structures, something more than 2 and we have the flexibility and we have a more efficient time sequence in which to address this issue. That is an important point that I'm hearing and I want to echo it and then it seems the temperature movement going up to where we have the potential for an uncontrolled temperature experiment and the spectre of non-natives migrating throughout the river system appreciating the warm water makes me think that we ought to consider the possibility of selective withdrawal that can also at appropriate times drop the temperature that we ought to be able to pull water from deeper levels from a declining reservoir to cool the water if we find that we have to do that. I think we're in a really dangerous environment.

Dennis – the design I described to you would allow you to do that. I want to make a comment. The Bureau of Reclamation, unlike the AMWG, has to go to Congress and seek appropriations. The Bureau of Reclamation has to justify to the Office of Management and Budget through a capital asset plan the cost of building this. There have been many worries and concerns about the negative consequences of warming the water. We think this is a solid middle road, a path to take that is justified in an adaptive management concept.

Nikolai – I just want to make clear because you say wise and prudent which sounds to me an euphemism for we don't have the money or it's hard to justify the money when the science says go a toe at a time and I'm just pointing out that we're really making an economic assessment in the midst of a really controversial area.

Bruce – I'm taken aback also. I thought that we were going to have a TCD that would allow us to go wherever we wanted to. I've been told that we can reverse this simply by shutting it off so there is no danger of over building. How many years down the road are we going to wait? I thought we were assured that we would have complete flexibility in temperature in a 4-5 year period. We were given dollar figures for building the whole enchilada, not dollar figures for building a piece of it, I thought unless I'm mistaken. I guess AMWG as a body we may want to

have a dialogue on this and see where we all come from because I think we're starting down a slippery slope from my perspective.

Dennis – the design that you speak of Bruce that have all 8 units of course would be totally out of the water at this point and would have no utility. The Bureau of Reclamation wants to hear from the AMWG. This is a cooperative effort and no doubt about that. We will provide a process for your input. We're talking about April 2005 in having the environmental assessment. We're just beginning scoping. There will be plenty of opportunities for you to provide input.

Bruce - I guess this is an opportunity for the AMWG as a whole to provide input not just individual agencies. There are at least 4 or 5 of us around the table that have been uncomfortable with what you've given us so far and we may want to have a little more dialogue possibly tomorrow on telling the Secretary that this is not where we wanted to go and make a recommendation to her that this can go there a little bit faster.