UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southwest Region
777 Sonoma Avenue, Room 325
Santa Rosa, California 95404

November 2, 2015

MEMORANDUM FOR: Joyce Ambrosius

CC: Rick Wantuck

FROM: David White

SUBJECT: Environmental Services Branch Comments on Sleepy Hollow Raw Water Intake and Water Supply System Upgrade BOD Report

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1. Regarding recirculation elements being a significant part of the cost-- If further analysis of the benefits of a recirculation system is performed, the analysis should include both low flow years (when recirculation will expand the operational capacity of the SHSRF) ***and sediment mobilizing flows*** and bank failure events (from the newly constructed channel above the dam) that may overwhelm the proposed single pass screening and sediment removal system.

   For me, the primary benefit of the recirculation system is as an insurance policy for sediment transport events caused by dam removal, and secondarily as a means to expand the operational or seasonal capacity of the facility. I haven't been been closely involved in the sediment studies, but I would think that sediment transport risks will exist for several years as the newly cut channel and banks stabilize, especially in El Nino years. Perhaps someone more intimate with potential sedimentation issues can weigh in? Also, recirculation may allow significant improvements in normal operations such as increasing feed rates (to decrease cannibalism) or increasing allowable population density without increasing diversion from the river.
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2. The Maximum Screen Approach Velocity in Table 2-1 should be changed to 0.33 feet/second and reference the NMFS Southwest Region Fish Screening Criteria for Anadromous Salmonids, 1997 (rather than the NMFS Northwest Region document, 2011). While the Northwest and Southwest regions have merged into a single West Coast Region, in California we still use the more protective 1997 criteria. Required Screen Effective Area should reflect this change. This should not affect the screen selected as the screen selected was sized with some excess capacity.

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3. The chosen location and type of cone screen will be a dramatic improvement over the existing configuration. Just curious--Did you consider a vertical cylinder screen located a bit downstream of the proposed location in a deeper area of the pool? Darryl Hayes has been having some success with that shape in deeper areas. Deeper may mean slower velocities and more sedimentation of course, but it makes me wonder if there is a circulation pattern or scouring that has caused that deeper pool to develop and persist and might be a good location. I only visited the site once so my recollection of the pool may be off on this.
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4. If there is significant current, internal baffles may be needed inside the fish screen to get the approach velocities right. Without baffles, water tends to flow into the screen on the upstream side and out of the screen on the downstream side, reducing the effective surface area of the screen. We have found that 4 vertical baffles (dividing the cone into 4 quarter pie shapes) are effective.
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5. In our fish screen inspections, we have seen spray bars work very well for resuspending sand and silt near fish screens. The most effective openings are small holes drilled in galvanized pipe--Nozzles tend to erode or plug. The spray bars work to about 2 feet away from the sprayer, so I don't think one spray bar will keep the whole 10 foot by 10 foot pad clean. I suggest building a spray ring around the cone rather than on just one side of it. In the plan view in Figure 2-2, the spray bar looks below the 12" pipe, but in the profile view below, it looks above the 12 inch pipe. It might be more effective to have the spray bar below the pipe so that it sprays and deflects near the hard pad.
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6. We have not had much luck with air burst systems. They don't tend to much move sediment and they often promote growth of stubborn black algae on the screen. I have little experience with low elevation vanes in this type of application.
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7. In Figure 2-3, I'm used to seeing a gate valve downstream from the pumps but before the check valve so we could throttle the pumps open, or isolate a pump for maintenance as check valves can fail. I defer to the designers however as I've never worked with 12" pipe or variable speed pumps. Where the two 12" pipes come together at the Y, should the pipe diameter increase?
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8. I know of two expensive hatchery ozone systems that are not in use because they are complicated and can produce harmful byproducts, depending on what's in the water supply. We ended up using UV effectively for raising endangered winter run Chinook in a near total recirculating system. Our water was free of sediment, however, and we were

using Cornell-type tanks.
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9. When calculating recirculation capacity, are you able to assume decreased feed rates or is cannibalism too big a problem? I would think that recirculation ability would be greatly enhanced by decreasing feed rate.
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10. I see on page 28 that existing transformers barely provide enough power to the existing system. How much (if any) extra power does recirculating require? Would it require new transformers? Can the back-up generators power the recirculation system? How about adding a section on emergency procedures (power outage, high sediment load, water shortage)?