

MEMORANDUM FOR THE RECORD

SUBJECT: Mid season fishway ROV results for PH1, Main dam and PH2 fishways and comparison of divers vs. ROV inspections.

1. This year we used an ROV for our routine mid-season fishway inspection.
2. The mid season fishway inspection was scheduled for 03 August. The inspection carried over into 04 August for PH2 and Cascades Island. The cost of the second day was absorbed by the contractor since the delay was a result of their pilot becoming familiar with the ROV.
3. The ROV was able to inspect all the fishways as well as pull on grates, take sonar images, switch from color to black and white digital video and record information from the pilot.
4. All ladders looked good. The ROV was able to get clear images of debris under the grates. We found a build up of clam shells in Cascades Island but that was the only abnormality.
5. The ROV provided the following thrust on the grates to test for looseness.
 - a. Forward Thrust 121 lbf
 - b. Vertical Thrust 40 lbf
 - c. Lateral Thrust 40 lbf
6. Normally it would take less time to inspect with the ROV than with divers. For this inspection, it still took two days due to the learning curve as the contractor became familiar with their new ROV and the Project experimented with throttling fish valves rather than closing them. It is anticipated that in the future, all fishways can easily be inspected in one 8-10 hour shift.
7. We found that the fish valves and AWS still have to be closed down considerably or completely. We did not have to take clearances on the valves and the fish units did not have to be tagged out of service. This saved several hours of walking clearances.
8. The cost comparison, ROV v. Divers.
 - a. Divers can range anywhere from \$5,400 to \$7,000 **PER DAY, if not more**. A full dive inspection at Bonneville typically takes two days and a five man dive crew.
 - b. ROV inspections can run from \$2,450 to \$3,500 per day. A full ROV inspection at Bonneville could take up to 10 hours and a two man crew.
 - c. The ROV results in a 50 percent savings over using divers.
9. Given these comparisons, we believe the ROV provides an advantage over using divers, FOR ROUTINE INSPECTIONS, not only from a safety standpoint (no divers in the water), but a financial one as well.
10. Please feel free to call or email with questions.
11. The following attachments accompany this memo
 - a. Explanation of the sonar images of the fishway.
 - b. Explanation of sonar and ROV use.
 - c. Sonar images of the fishways.

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