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ANADROMOUS FISH EVALUATION PROGRAM
Fish Facility Design Review Work Group
Minutes
April 26, 2001

ATTENDEES:

<u>Name</u>	<u>Organization</u>
Steve Anglea	Battelle Pacific Northwest Laboratory (Battelle)
Anneli Astun	U.S. Army Corps of Engineers (Corps)
Jim Bluhm	Corps
Jim Cain	Corps
Ken Cash	U.S. Geological Survey (USGS)
Kevin Crum	Corps
Brad Eppard	National Marine Fisheries Service (NMFS)
Rick Emmert	Corps
Gary Fredricks	NMFS (Conference Call)
Bill Hevlin	NMFS
Dave Hurson	Corps
Rebecca Kalamasz	Corps
Dan Katz	Corps
Dana Knutson	Corps
Mark Lindgren	Corps
Tom Lort	Columbia River Inter-Tribal Fisheries Commission (CRITFC)
Mike Mason	Corps
Lynn McComas	NMFS
Sean Milligan	Corps
Paul Ocker	Corps
Charles Palmer	Corps
Steve Pettit	Idaho Fish and Game Department (IDFG)
Chris Pinney	Corps
Steve Rainey	NMFS
Lynn Reese	Corps
Chris Ross	NMFS (Conference Call)
Ann Setter	Oregon Department of Fish and Wildlife (ODFW)
Marvin Shutters	Corps
Mark Smith	Corps
Larry Swenson	NMFS (Conference Call)
Rod Woodin	Washington Department of Fish and Wildlife (WDFW)
Tonia Elsey	Corps

The Fish Facility Design Review Work Group (FFDRWG) meeting was held in the Castle Room on April 26, 2001, at the U.S. Army Corps of Engineers (Corps), Walla Walla District, 201 North Third Avenue, Walla Walla, Washington. Rebecca

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Kalamasz organized the meeting, and Tonia Elsey served as note taker. The meeting was audio taped in order to facilitate completion of the minutes.

Rebecca Kalamasz distributed the agenda and asked if there was anything that needed to be added to the agenda. Steve Rainey stated that he wanted to discuss updates on the Computational Flow Design (CFD) and integration. Rebecca Kalamasz stated that Tim Wik was scheduled to talk about the monitoring at Lower Granite Lock and Dam (Lower Granite) and about the 3D work at Lower Granite, but he would not be available. There is no one at the present time to backup the 3D discussion, but someone at the Corps could fill in some of the concepts that were going to be discussed for monitoring at Lower Granite. Steve Rainey stated that he had asked Lynn Reese about adult Passive Integrated Transponder (PIT) installation at McNary Lock and Dam (McNary). Rebecca Kalamasz indicated that was on the agenda. Steve Rainey asked about Lower Granite Fish Guidance Efficiency (FGE). Rebecca Kalamasz stated that it was going to be discussed when the discussion about the drought summary and updates came up, but Tim Wik was working on a summary plan for that as well. Bill Hevlin stated that he would like to discuss Lower Granite surging and the turbine priorities at approximately 10:15 a.m. and have Chris Ross participate in the discussion via conference call. Steve Rainey stated he would like to get some updates from Dan Katz on the separator operations at McNary. Rebecca Kalamasz stated that several people were leaving for McNary right after lunch to go to another meeting to discuss spring transport at McNary and resolve some issues going on there. Steve Rainey stated that it might be a good idea to discuss spring transport a little before they leave because one of the issues relates to whether or not the protocol for spring transport at McNary is the same as it is for the other projects. Dave Hurson stated that transport at McNary would be standard operating procedure. Steve Rainey indicated the topics he thought definitely needing to be discussed were items like; should separation be optimized, should juveniles be held in separate bins, *etc.* Dave Hurson also stated that the main discussion at McNary today was to discuss with (PSMFC) how they were going to set up the separation by code and incorporate the Public Utility District's (PUD) fish. Dave Hurson stated that his understanding of the spring transport at McNary would be to collect on one day and transport the next day. That would be a transfer of 50 percent of the fish. The plan is to transport only 25 percent of the PUD study fish, so on the days of collecting, the (unclear) PIT-tag diversion system would be turned on, and it would divert every other Mid Columbia River PIT-tag (unclear) units.

1. PROGRAM UPDATES.

a. McNary Juvenile Fish Facility Improvements. Chuck Palmer distributed handout number 1 (see appendix). Larry Swenson was called to participate via conference call. Chuck stated he had available for review technical specifications on site construction, concrete, metals, doors and windows, and electrical. The submittal on the debris plugging issue has been delayed because there was going to be a seminar on slip lining pipe on May 7, 8, and 9. Chuck indicated he was planning to attend that seminar to get a better perspective on the

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slip lining to determine if it is a viable option to treat the pipe for the debris problem. The submittal report on the debris plugging issue will be out in late May. Chuck also stated that he is asking for comments on the PIT-tag improvements report by May 18, 2001.

Steve Rainey stated that one of the good things with regards to the PIT-tags (relating more to the adult detection than the juvenile detection) is the preliminary indications are that the adult detection is coming out really well. It gave them, at NMFS, a vote of confidence or a reason for optimism that the juvenile detection system will be ready. Chuck Palmer indicated the debris plugging issue and the PIT-tag would be combined into one contract and would attempt to get them installed in the next outage. Steve Rainey asked if the procurement was on schedule. Chuck Palmer stated that it was. Steve Rainey asked when a contract award was anticipated. Chuck Palmer stated that it should be in late October. Bill Hevlin asked if the funds for construction on the juvenile fish facility improvements were coming out of fiscal year 2002 budget. Chuck Palmer stated that all the construction would be out of 2002 budget, and that the combined cost for both these projects would be approximately three quarters of a million dollars. Steve Rainey asked if there were any concerns about the existing outfall site. It was decided that would be investigated in the evaluation in 2002. Larry Swenson asked if the McNary Collection Channel Adult Fallback report was on track. Chuck Palmer stated that it has been delayed a little. The HDR is waiting for some drawings coming from the project. The submittal has not yet come in, but should within the next week or two. Larry Swenson asked if there was going to be a prototype study next year to see if the concept works and then evaluate it. Lynn Reese stated that it has been discussed but nothing has really been determined yet. Rebecca Kalamasz asked what kind of test would be run. Lynn Reese stated the test would be to see if the fish would jump at the upper end.

b. McNary Turbine. Jim Bluhm stated he was filling in for Dave Coleman, the project manager for the McNary Modernization Study. Jim Bluhm stated that McNary has been known to be a hydraulic bottleneck from day one. McNary is old and most of the units are 45 to 50 years old and are becoming unreliable. The purpose of this study is to increase the flow at the project to better match the downstream projects and provide better reliability and better material conditions of the units. The economic study will be done soon. The report will be written on the alternative selection and will be submitted approximately June 1, 2001. Jim Bluhm asked that anyone interested in reviewing the specifications for the new turbines give their name to Rebecca Kalamasz. Jim Bluhm stated that the turbine design has already been chosen, but the decision on how many turbines still needs to be made. Dave Hurson asked which design had been chosen. Jim Bluhm stated it was a minimum gap diagonal flow runner. There was discussion on the diagonal flow turbines and the differences between that turbine style and others. Dave Hurson stated that model studies would have to be done. Jim Bluhm stated the Corps is currently working on turbine plans and specifications to save time because of the length of this project. Sixty percent review of the turbine plans and specifications will

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be ready approximately the end of May. Biddability, constructability, and operability (BCO) specifications will be done in approximately the October timeframe. The Corps will have advertise packages ready at the year end. It will be a typical request for proposal (RFP) process selecting three contractors to build models based on the contract criteria for efficiency flow, fish friendliness, *etc.* Those models will be test proven approximately the middle of fiscal year 2003 and will go to the Corps, Waterways Experiment Station (WES) for bio testing. There was discussion on the testing and turbines. Steve Rainey asked when the installation of the first unit would take place. Jim Bluhm stated that the Corps was anticipating selecting someone to build the first prototype in March 2004. There was discussion on the different testing that would be done at WES with the prototypes. Jim Bluhm stated that the first installation would be approximately the middle of 2006.

Rod Woodin indicated the State of Washington is highly concerned about changing the hydraulics at the Juvenile Bypass System (JBS). He also stated that he was encouraged to hear the outline of the process because it sounds to him like all or almost all of the issues are being considered. Jim Bluhm stated the first turbine would be installed in unit six. There was discussion on the turbine installation, draft tubes, and the conditions for fish passage.

2. ICE HARBOR LOCK AND DAM (ICE HARBOR) SPILL STUDY

MODIFICATIONS. Marvin Shutters stated that Ice Harbor is all set up and ready for a study to go through spillway survival and a number of other tests. Marvin distributed handout number 2 (see appendix) showing the changes in the study to compensate for a low flow and possible no spill season at Ice Harbor. Marvin covered the objectives that can be reached with the low flow problem this season. Steve Rainey asked what the downstream terminus of tracking would involve. Brad Eppard stated it would be radio tracking of the downstream and the mouth of the Umatilla at Plymouth Island. The radio-tagged fish would also have PIT-tags so there will be detections at John Day Lock and Dam (John Day) and Bonneville Lock and Dam (Bonneville). Steve Rainey stated that there should be good median delay through the (unclear) forebay. Brad Eppard agreed. Marvin Shutters stated that most of the fish would be going through the PIT-tag detectors. There was discussion on the aerial antennas and the different ways of detecting the fish. Brad Eppard stated that McNary would be completely wired, all the screens, the JBS collection channel, and the separators to help detect the fish. Marvin Shutters stated that at McNary there are radio antennas on the screens that will show telemetry hits to show fish going through the turbines, as well as which turbine they went through. There was discussion on the screen antennas. Rod Woodin asked if there was going to be a timing problem with the 8-day PIT-tags. Brad Eppard stated that the tags are guaranteed to last 8 days but typically will last as long as 15 days and is not concerned about the tags not lasting long enough. There was discussion on the tags and their functions. Rod Woodin asked Brad Eppard if he felt confident about getting essentially 100-percent detection of all radio tags that end up in the barges. Brad Eppard stated that because of the PIT-tag he would know which fish go to the barges. There was discussion on the PIT-tag, radio tag, and the 50-percent

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transport targets. Dave Hurson asked if there would be additional PIT-tag fish released after the 900 radio-tagged fish. Brad Eppard indicated they would be releasing initially 24,000 and conducting a (unclear) release study. There was discussion on the multitude of information that will be available with the PIT-tag studies. Lynn Reese asked if this was a multi-year study or just a 1-year study. Marvin Shuttters indicated next year the Corps was anticipating going back to the original objective of the spill survival study. Marvin Shuttters stated he missed the Study Review Work Group (SRWG) meeting and did not know what was discussed. Steve Rainey stated they discussed only surface objectives, nothing very detailed. Rebecca Kalamasz stated that the Biological Opinion (BI-OP) gives the Corps direction to look at spill effectiveness, efficiency, fish passage efficiency (FPE), spill volume, and daytime spill. There was discussion of additional handling on already PIT-tagged fish. Brad Eppard stated he needed a decision on what to do at Ice Harbor. He needed to know if he should pull screens and put antennas on them or should the antennas be dropped into the gatewells. Dropping the antennas in the gatewells would detect the fish that go through the bypass but would not supply any information on turbine survival or tailrace residence time for the fish that pass through the turbines at Ice Harbor. Bill Hevlin and Steve Rainey stated they did not think the screens should be taken out now. Dave Hurson stated that it would not be hard to install the screens at Ice Harbor. Marvin Shuttters stated that NMFS installed them last year. Rebecca Kalamasz asked for a vote on lifting the screens and installing antennas. After much discussion on the subject, the decision was tabled until later in the meeting. Bill Hevlin asked if the PIT-tagged fish that end up in the sample get anesthetized. He was informed that they were. There was discussion on the PIT-tag fish and sample fish.

Bill Hevlin stated there was a Systems Configuration Team (SCT) meeting on May 17, 2001, and asked that FFDRWG people attend if at all possible.

3. DROUGHT PLAN UPDATES.

a. Drought Plan at McNary. Mark Smith distributed handouts 3 and 4 (see appendix). Chris Ross joined the meeting via conference call. Mark stated that the Corps is currently working on using flow inducers in the forebay to mix the warm water before it reaches the gatewells. The Corps is currently working with United States Geological Survey (USGS) to conduct a study to use the flow inducers. The main concern is where to put the flow inducers. Steve Rainey asked if the hydraulic people have been involved in this study. Mark stated that they have become involved and are looking at using temperature (unclear) developed by Marshall Richmond to assist the Corps. The Corps is contemplating putting the fish on the barge in the morning to help reduce any possible temperature impact. The Corps is also researching improvements of the 3-D modeling of the river, which is an on-going process with Battelle. Ann Setter asked if there was any idea of the quantity of water that would be influenced with the use of the flow inducers. Mark Smith stated that the large inducers push 2,500 gallons per minute (gpm) and the smaller inducers push half that amount. Ann Setter asked for that figure in terms of

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cubic feet per second (cfs). Lynn Reese stated that on the large inducers it converts to approximately 40 cfs. There was discussion on the different flow and temperature problems, as well as the tailrace temperature model. Rebecca Kalamasz stated the main priority was to do something to help the fish, and the evaluation was secondary. The discussion continued on the effects of using the flow inducers. Steve Rainey stated that in the last 2 years NMFS has done studies on mixers in the forebays at Callus Falls. The studies have been done mainly June through August and showed that when operation slowed down to one turbine negligible velocities appeared. The juveniles still approach the forebay, but the main influence or main movement of water is associated with the small and the large configuration of mixers. This makes it very apparent that mixers have a real influence on flow and shows that there needs to be an awareness of how things are being changed. Ann Setter stated it was unclear to her where the mixers are placed and where the cool water is going to come from because of the potential solar penetration. Rebecca Kalamasz stated that it really is not intended so much to mix the lower water with the upper water, but to simulate a 3-knot wind. Discussion continued on the use of flow inducers.

Rebecca Kalamasz stated that Washington State did some temperature monitoring out at the project and found a reduction in temperature when a certain velocity of wind across the surface was present. That is what the real effort is, not to actually mix the forebay, but to emulate the wind effect. Rebecca also stated that there was going to be a meeting in the next week to attempt to identify the critical locations, deployment, timing, etc. on temperature monitoring. The meeting has not been scheduled yet. Steve Rainey asked who would be attending the meeting. Rebecca Kalamasz stated the Corps, BRD?, and project personnel. Bill Hevlin asked that he and Steve Rainey be informed of the time and place.

The discussion continued on the use of mixers. Ann Setter asked if the Corps had any confirmed areas where the mixers would be used. Mark Smith stated in the area of unit one, or on the pier nose, pushing flow out, or on the barges, pushing flow up or down, he was not sure. Dave Hurson stated all the data the Corps has right now has been taken from the base of the dam. There is no data for the temperature 300 feet or more out in the forebay. The Corps would like to install some monitors out in the forebay in several locations. Ann Setter asked how deep the warm water was based on the data already available. Dave Hurson stated it was measuring approximately 3 to 5 feet below the surface at the dam but it tracks very well with the dissolved gas monitoring station, which is 15 feet deep. Bill Hevlin asked if the fans were screened so the fish cannot be vacuumed. Steve Rainey stated the fans were a low velocity or low revolutions per minute (rpm's) so there would not be any vacuum. The fans are not screened. Bill Hevlin asked if they had been tested. Lynn Reese stated they had been tested in Callus Falls for whether fish could get into them, and they found them to not be a problem. Rebecca Kalamasz backed that up by stating that although the Corps had no data, Callus Falls determined there were no concerns with fish impact. There was more discussion on the mixers. Rebecca Kalamasz stated that the state people have

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done extensive monitoring, and the project people are fully involved. There are critical consultants helping to decide how they need to be positioned and where they need to be placed so it will not be a one-time, throw out, fix for water temperature problems.

b. Drought Plan for Lower Granite. Mark Smith stated that at the brainstorm meeting, held March 16, 2001, the Corps discussed two different options for Lower Granite. The two options discussed were halting and using the Behavioral Guidance System (BGS), both of which are still currently being discussed. A spring pulsing plan is being developed by NMFS, specifically Chris Ross, but is still in the planning stages, and there are still some questions about using upper river reservoirs for augmentation. Chris Ross stated that the spring pulsing plan has been proposed for the past few weeks. It is in the Federal plan, has been distributed, and is currently receiving comments. The spring pulsing plan is a proposed plan to do a Lower Granite surging operation with modifications based upon input received at NMFS. The NMFS is asking for one surge per week, a level of reverse load factoring, and augmentation for Brownlee. At the present time, BPA is having discussions with Idaho power. Steve Rainey asked Chris to expand on the reverse load factoring and how it would be different from current operations. Chris Ross stated at yesterday's Technical Management Team meeting they discussed the reverse load factoring. The late morning peak was running approximately 40K, going down into the 30K range in the afternoons and evenings, then dropping to approximately 15K after 10 p.m. The BPA was asked to try and continue the 30K level until midnight. Chris stated he tried to clarify that the preferred operation was to shift the peak into the evening rather than the daytime. There was discussion on the pros and cons of doing the reverse load factoring. Rod Woodin stated he thought the whole idea sounded less good for the fish and more a matching of power load. Chris Ross stated he did not see it that way at all. There was continued discussion on the pulsing plan. Rebecca Kalamasz asked when all the involved organizations would know what NMFS is going to do. Chris Ross stated the executives were meeting the next day with a tentative approach to provide a final Federal agency operation plan. Tribal comments for Montana and Washington have not been received as of yesterday. Chris Ross is assuming decisions will be made at that meeting. Steve Rainey asked if implementation would be early next week. Chris Ross stated that BPA was considering a start time of the week of May 7, 2001, using Brownlee water for 4 weeks. Mark Smith stated that whatever is decided, the Corps has plans to monitor and evaluate whatever conditions occur. There was discussion on the number of fish available to track. Mark Smith asked for discussion on whether using the BGS in the spring was a good idea. Lynn Reese stated that Fish Guidance Efficiency (FGE) appeared to be higher, but the bigger benefit was the fish travel time through was quicker. There was discussion on the BGS and FGE. Ann Setter stated that nothing has really been shown or said that shows a win situation for the fish. All participants of the FFDRWG meeting concurred that there should not be a spring BGS.

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Steve Rainey asked to discuss the spring FGE testing evaluation and distributed handout number 5 (see appendix). Steve Rainey stated he had talked to Tim Wik and relayed that what Tim is proposing is changing the unit priority for operation at Lower Granite to accommodate some FGE assessment using the radio-tag fish for approximately a 1-month period with units 4, 5, and 6 secluded. The thought is that those units are getting a higher FGE and with the BGS out of the way a comparison between FGE in the included units and FGE in units 1, 2, and 3 can be done. Normal fish passage plan operations show the priority as being unit 1, then 2, and then 3. This would be an excursion from the fish passage plan criteria. Tim Wik asked NMFS to look at how that would affect adult passage. Chris Ross explained handout number 5. Bill Hevlin stated that Tim Wik's idea was to block 3 days a week, operating a North priority, then operating a South priority the rest of the week. There was discussion on this 3-day on, 3-day off proposal. Rod Woodin suggested that NMFS should try running 4, 5, and 6 and look at the tailrace and make sure there are no concerns with the tailrace. If there are any concerns with the tailrace, then the FGE assessment should not be done. Rebecca Kalamasz stated she would talk to Tim Wik and let him know there is concern on the tailrace conditions. Bill Hevlin stated with the low flows there would be a little delay for the adults, but not enough to be meaningful.

Rebecca Kalamasz stated that Lynn Reese could answer most of the questions on the 3-D Research. Steve Rainey stated there were two parts to that research, the 3-D and the integration. Steve Rainey summarized the discussion at the SCT meeting on the 3-D research. Bill Hevlin stated there was no funding in the fiscal year 2001 budget to do the 3-D research. Rebecca Kalamasz stated the plan was to get the funds from the Portland District, but it appears there are funds recovered under the Removable Spillway Weir (RSW) work. Lynn Reese stated John Nessler has done a preliminary (unclear) model. He is still working out the bugs but feels he would be ready in early June to demonstrate the model to all the agencies. There was discussion on the 3-D research and when a good time would be for John Nessler's presentation.

4. TRANSPORTATION.

Rebecca Kalamasz stated there was a request to discuss the transportation issues before people left for the meeting at McNary. Steve Rainey stated at the last FFDRWG meeting the separator research was discussed. Steve Rainey also said that he went by McNary and the wet separator had too much water over the top of the bars again. The main question was, is that the way it will be operated for this separation in the spring. Dave Hurson stated that the operators would have to start paying more attention to it now that the spring separation season is here. Rebecca Kalamasz stated the copy of the proposal for spring transport was received only yesterday so there has not been any real discussion for spring transport. Steve Rainey stated NMFS has not yet seen the hydraulics with the pan in place and would really like to see that in operation. Rebecca Kalamasz stated when the talk about drought first started, the idea was, maybe there should be some transporting

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at McNary. The Corps was asked, “if you are going to do transport at McNary will there be any kind of evaluation.” The Corps did not feel it was the right year to do any evaluation in the District but was interested in doing an index group to provide information for setting up a study design for future transport studies. The Corps is not doing a full transport study at Lower Granite because the river conditions are not good enough to do a good comparison. The Corps has several new ideas or requests for more elaborate transportation studies that compare the in-river fish to the transported fish. The Corps has discussed using fish from other studies to provide the fish for this study design and have also discussed marking fish at McNary. McNary has some special problems associated with diverting fish, they have to accommodate them a little differently. All this is basically what the meeting at McNary today is all about. There was discussion on the transportation studies at McNary. Bill Hevlin explained the process NMFS is planning for the transport studies. Discussion continued. Bill Hevlin explained the routing rationale as being transporting every other day. On the days not in transport mode, McNary will operate the same way it has for the last 4 or 5 years. The first PIT-tag diversion gate will be de-activated so all the fish will go through that gate, and downstream they will be routed to the tailrace along with all the other fish. Bill Hevlin stated if the detection is low then the evaluation cannot be done. Dave Hurson asked if the reason for transport at McNary was because of low flow or strictly for transport evaluation. General consensus among the FFDRWG people was transporting was going to be done for both reasons. There was discussion on the reasons for transporting at McNary.

5. SPILL ISSUES AND MODEL UPDATES.

a. Lower Monumental Stilling Basin Erosion. Dan Katz distributed handout number 6 (see appendix). Dan Katz stated the general model was operating and extends approximately 1 mile downstream from the project. Steve Rainey and Dan Katz went to WES in March to discuss interim spill, to look at a variety of conditions to possibly alleviate some of the erosion in the stilling basin and to look at some possible long-term solutions to the erosion problem. Two of the solutions looked at were deflectors on the end bays and a longer divider wall between the powerhouse and the spillway. The general observations and conclusions on the sectional model are that almost any flow down into the voluntary spill range there is debris in the stilling basin and at the upper range of voluntary spill, and debris can actually be brought into the stilling basin. Stilling basin damage is likely at any spill level. Transducers have been installed in the erosion holes to measure pressure. Steve Rainey asked if the Corps was primarily concerned about a high flow condition, which provides a direct pressure, or because the deflectors are being over ridden causing uplift pressures. Dan Katz stated the main concern is what will happen to the stilling basin in very high spill. In the general model, the main focus was on interim spill patterns and verification of historical patterns that may have caused the erosion to begin. The Corps has determined that the stilling basin was not designed for the full pressure of the forebay, and in this case is translated into very high velocity jets hitting the stilling basin floor. There was

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discussion on the different forces of pressure and the erosion problem. The Corps is still looking at the vulnerability of the monolith with the spillway itself. Dan Katz stated the Corps is concerned about the stilling basin, but the real dam safety question is the stability of the monolith. When the answer to that question is found, the scheduling and logic will all fall into place. The Corps is hoping to have the structural analysis complete by the May 17 SCT meeting. The long-term schedule indicates construction on the deflectors will be done by March 2003. The dam safety repairs schedule is dependent on the structural analysis. Dan Katz stated he thought there would be a dam safety benefit by installing the end bay deflectors. There was discussion on the different problems and projects at Lower Monumental. Rick Emmert stated the outfall was designed with powerhouse flow not spill flow. Steve Rainey asked if interim spill was a key issue. Dan Katz stated the interim spill is a critical issue depending on what is found in the structural analysis. Discussion continued on spill at Lower Monumental. Mark Lindgren stated that there are no schedules for work being done until there is a dam safety issue answer. There was discussion on the procedures for fixing the erosion problem and the problems erosion might be causing the fish. Rod Woodin asked if it was feasible to have the end bays installed by 2002. Steve Rainey stated it was not very feasible at all. Mike Mason stated if everything fell into place at the right time the hole could possibly be filled in 2003, but to do that, construction would have to start in the water by July 2002.

b. Little Goose Lock and Dam (Little Goose) Deflectors. Jim Cain distributed handouts 7 and 8 (see appendix). Jim Cain stated the sectional model at Little Goose was complete. Testing on the sectional model had not yet begun. Most of the downstream telemetry is installed and work is currently being done on the upstream telemetry. Construction has started on the main portions of the general model. The testing for the sectional model should be done by approximately the end of this fiscal year.

c. McNary Deflectors. Jim Cain stated the general model has recently been completed. Last fall the decision was made to go ahead with plans and specifications for the deflectors. The Corps is in the process of deciding whether or not to install the deflectors in this next year. On the North side, the existing spill pattern has a split leave spill out of bays 1 and 2 that do not have deflectors. All the flow coming out of those two bays feeds into the central bays instead of going downstream. There is a vertical eddy that causes a demand to pour water into it. Jim Cain explained the flow patterns currently at McNary and how the deflectors change those flow patterns. Rod Woodin asked if the Corps looked at the training wall with spill only in bay two. Jim Cain stated they had not. There was discussion on the different configurations of flow patterns. Steve Rainey stated the main objectives for all the deflector projects were, in the tailrace for example, you would try to get good juvenile egress, spill gate settings that are in a spill schedule for the fish passage plan that are uniform to get good gas benefits, and then try to get conditions that look good for adults also. Jim Cain stated the testing really has only just begun on the McNary model and is not any where near where the Corps would

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liked to have been at this point. The Corps is uncertain as to what elevation the deflectors should be installed. Jim Cain also stated there has been some expressed concern about the interim year being a bad condition year to run without the training wall. The training wall has not yet been designed and is not scheduled for construction until next year. Discussion continued on the different tests being run with the general model. Jim Cain ran a video that showed how dye, inserted into the spillway with different scenarios, was dispersed. Steve Rainey stated NMFS had a trip report that could be distributed among FFDRWG members that were interested. In the trip report, NMFS recommended going forward with the spill bay 1 and 2 training wall extension and not go forward with the training wall extension on the south side of the spillway. The NMFS is also recommending the deflectors be built at elevation 259, except for spill bay 2. Spill bay 2 deflectors would be built at elevation 256 based on what they saw on the general model. Rick Emmert stated the advertising for the deflector contract would be open on May 18, 2001, and would start construction in October.

6. CONSTRUCTION UPDATES.

a. The RSW Construction. Kevin Crum distributed handout number 9 (see appendix). The McNary perforated plate replacement contract will have installation complete by mid June. The bolt availability problem has been solved, and installation is now back on schedule. All of the McNary Extended Submerged Bypass Screens (ESBS) and the prototype should be changed by mid June. The perforated plate contracts for Lower Granite and Little Goose are done. The Lower Granite surface bypass collector (SBC) modifications is complete with the exception of some diving work. The spillway weir construction at Lower Granite is nearly done. The landing pad was placed on March 17, and all the elements on the face of the dam were installed by March 31. The hinge beam is installed, but the bolts need to be tensioned prior to the installation of the RSW. The Corps has a request out, waiting for approval, to go into the water prior to the June 20 date (date for installation of the RSW). This request is to send divers down to tension the bolts on the hinge beam. Kevin Crum stated he did not know the status of that request. The general schedule for the transport and installation of the RSW has not changed (see schedule on handout 9). Kevin Crum distributed handout number 10 (see appendix) which showed the RSW in its present state, which is essentially complete. There was discussion on how it will be launched, barged, and put into place.

Rebecca Kalamasz stated that on the update for the Ice Harbor screen installation, the Corps had to make three points of contact. One of those points is in-house for funds, another is project personnel, and the third is coordination with Reservoir Control Center (RCC) to do it. In house, the Corps will find funds if the project can do it. Rebecca Kalamasz stated she would try to get an answer from the project and relay it to the members of FFDRWG.

b. Auxiliary Water Supply. Cary Rahn distributed handout number 11 (see appendix). Cary Rahn stated at Ice Harbor the plans and specifications are

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complete. Bid openings are scheduled to open tomorrow. Construction cost on this project increases almost daily. The construction estimate is now approximately \$8 million. Last fall's original budgeted amount was only \$5.64 million. The Corps has a few construction issues with Ice Harbor. There still is no formal letter signed by NMFS that allows the Corps to have both the north and south shore ladders out of service simultaneously, but expect a signed copy soon. The coordination issue with NMFS is to extend the original construction schedule from 3 years to 4 years. The first year will be the crunch year as far as dollar amount and what the Corps will attempt to accomplish. The Corps plans to install one pump on the north shore each year of construction with additional construction the first year consisting of the Jib crane, a bridge crane, saw cutting, and modifying the diffusers into the ladder. They will also upgrade all the electrical switchgear to support the new pump, as well as the two existing pumps. This construction will be done in January and February 2002. In year 2, the construction will continue with replacing pump 2 on the north shore, year 3 replacing pump 3 on the north shore, and finally in the fourth year the electrical switchgear upgrade on the south shore. Rod Woodin asked to have the Corps give FFDRWG the results of the bid openings.

Cary Rahn stated with regards to Lower Monumental, the Corps had to take a few steps backwards as far as moving into plans and specifications. Original concepts have too many questions with respect to viability from an engineering standpoint and also fish friendly applications. The Corps has hired another Architect Engineer (A/E) to joint venture. The A/E firms are doing a two-phase approach in regards to the technical report. The Corps is doing a letter report looking at alternative ideas other than the ideas submitted by CH2M Hill. The A/E firms have looked at two alternatives that deal primarily with using the discharge water from the juvenile bypass facility. There was discussion on these alternatives at Lower Monumental. Cary Rahn stated all of the remaining auxiliary water supply projects could have plans and specifications finished by the end of this calendar year, with the exception of Lower Monumental. Lower Monumental should have plans and specifications by early next calendar year. Cary Rahn stated in addition to the auxiliary water supply projects at Lower Monumental, Little Goose, and Lower Granite the Corps has initiated a numeric hydraulic model at the fish way systems to try to get a better idea on ways to handle some operational problems that could improve fish passage criteria. The first model, at Lower Monumental, is installed and running. There was discussion on a possible bottleneck somewhere at Lower Monumental.

Cary Rahn stated there was nothing new to report for Little Goose. This project has been on hold for approximately 2 1/2 months waiting for re-programming of funds through Headquarters. There was discussion on the possibility of a bottleneck at Little Goose. The Corps plans to start plans and specifications again next month.

Cary Rahn stated on the Lower Granite auxiliary water supply project the Corps is at approximately 30- to 40-percent completion of plans and

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specifications. There is already a 1-pump redundancy. To improve system operation and maintenance, the Corps plans to replace an existing gearbox, manufactured by Philadelphia, with a Faulk gearbox, which matches the other two gearboxes on-site. Then they will send the bad one out to be refurbished. Dave Hurson stated that gearbox was refurbished in 1982 and has never been used. Cary Rahn stated he would check into that. There was discussion on the spare gearbox. Cary Rahn stated that part of the upgrade for Lower Granite is to isolate the electrical switchgear. Dave Hurson stated he thought the problem was more a diffuser problem than an electrical problem. Cary Rahn stated Lower Granite was part of the model study so the electrical or diffuser problem could be examined under that study. There was discussion on the model study and the fact that Lower Granite has trouble maintaining criteria.

c. Adult PIT-Tag Detector. Cary Rahn stated he was informed last week that the work on the McNary adult PIT-tag would not be done in-house. The Corps is still waiting for the prototype testing results on the Oregon shore testing at McNary using the weir-type antennas. The NMFS is going to investigate using flow-type or weir-type antennas with an orifice installation. Steve Rainey stated NMFS is getting very good detection rates with the 4 weir and 8 orifice antennas. There was discussion on the prototype testing and construction.

d. Test Separator Facility Removal. Rick Emmert stated this was the last year for using the test separator facility at Ice Harbor, under the evaluation separator program. The Corps is scheduled to do a final report this fiscal year on all the research that has been done. A decision needs to be made on the temporary test facility. Rick Emmert stated he wanted to start preparation of contract documents to remove it this year but felt he needed to ask FFDRWG if they thought that was the best plan. Rick Emmert stated it had another 5 years worth of life just sitting there doing nothing and could be used for research. At the end of the evaluation separator program it will be turned over to Operations Division to maintain. The main question is if it should be removed. The cost for removal is minimal and is already budgeted. Steve Rainey stated he thought it could be used for some ongoing research. There was discussion on PIT-tag detection testing and possible other uses for the test separator facility. Dave Hurson stated he thought the Corps should finish the final report first and then take it out while the budget line item is on the books. The FFDRWG made the decision to do plans and specifications this year and put a place holder on the budget until the final reports are complete. There was continued discussion on possible uses for the facility.

e. Transition Pull Update. Marvin Shutters stated he had a draft report on the (unclear) from the University of Idaho (U of I) that includes data from December 2000. The analysis showed the transition pull was better, but so much different from the old data, when compared, that they did not think they would get a good evaluation or a conclusive result. The U of I would like to change from the weir design to a block design experiment. There was discussion on the different options. Marvin Shutters asked the FFDRWG group what they thought about changing to a

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block design experiment, working at night. Marvin asked if there were any concerns. There was continued discussion. It was decided to let the U of I go ahead with the new design experiment and provide a power test.

Meeting was adjourned at 4:38 p.m.

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ANADROMOUS FISH EVALUATION PROGRAM
Fish Facility Design Review Work Group
Minutes
April 26, 2001
APPENDIX

This appendix includes those handouts distributed by speakers and referenced in the minutes, including the following:

- a. Agenda. From Rebecca Kalamasz.
- b. Handout #1. From Chuck Palmer, McNary Lock and Dam PIT-tag Detector Installation Site Plan.
- c. Handout #2. From Marvin Shuttters, Revision of study design for the Ice Harbor Spillway Survival Study, 2001.
- d. Handout #3. From Mark Smith, Summary of Brainstorming Meeting Regarding Expected Low Flows and High Temperature at McNary and Lower Granite 3/16/01.
- e. Handout #4. From Mark Smith, Summary of Actions for McNary and Lower Granite 3/16/01 Brainstorming Meeting.
- f. Handout #5. From Steve Rainey, Turbine Priority and its Effects on Passage of Steelhead at Snake River Dams.
- g. Handout #6. From Dan Katz, Lower Monumental Stilling Basin Erosion.
- h. Handout #7. From Jim Cain, McNary End Bay Deflectors Photo Handout.
- i. Handout #8. From Jim Cain, Drawings of McNary End Bays.
- j. Handout #9. From Kevin Crum, Construction Updates for McNary, Little Goose, and Lower Granite.
- k. Handout #10. From Kevin Crum, Pictures of the RSW.
- l. Handout #11. From Cary Rahn, Auxiliary Water Supply for Ice Harbor, Lower Monumental, Little Goose, and Lower Granite, as well as, McNary Adult PIT-tag.

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Appendix Agenda

**Walla Walla District - FFDRWG Meeting
Agenda
April 26th 2001
Castle Room**

Thursday, April 26

- 8:00 - 9:00** **Program Updates**
McNary Juvenile Fish Facility Improvements - Palmer
McNary Turbine – Bluhm
- 9:00 - 10:00** **Ice Harbor Spill Study Modifications - Shutters**
- 10:00 - 10:15** **Break**
- 10:15 - 11:30** **Drought Plan Updates**
McNary – Smith
Lower Granite - Smith
- Summary
- Monitoring – Wik
- 11:30 - 12:30** **Lunch**
- 12:30 - 2:00** **Spill Issues and Model Updates**
Lower Monumental Deflectors/Erosion/Outfall – Katz/Lindgren
McNary Deflectors – Cain/Lindgren
Little Goose Deflectors - Cain/Lindgren
- 2:00 - 2:15** **Break**
- 2:15 - 4:00** **Construction Updates**
RSW Construction – Crum
Auxiliary Water Supply – Rahn
Adult PIT Tag Detector - Rahn
Test Separator Facility Removal - Emmert
- Adjourn**

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Appendix Handout #1

McNary Lock and Dam PIT Tag Detector Installation Site Plan

#1

Routing and Transmittal Slip

Date: 4/27/01

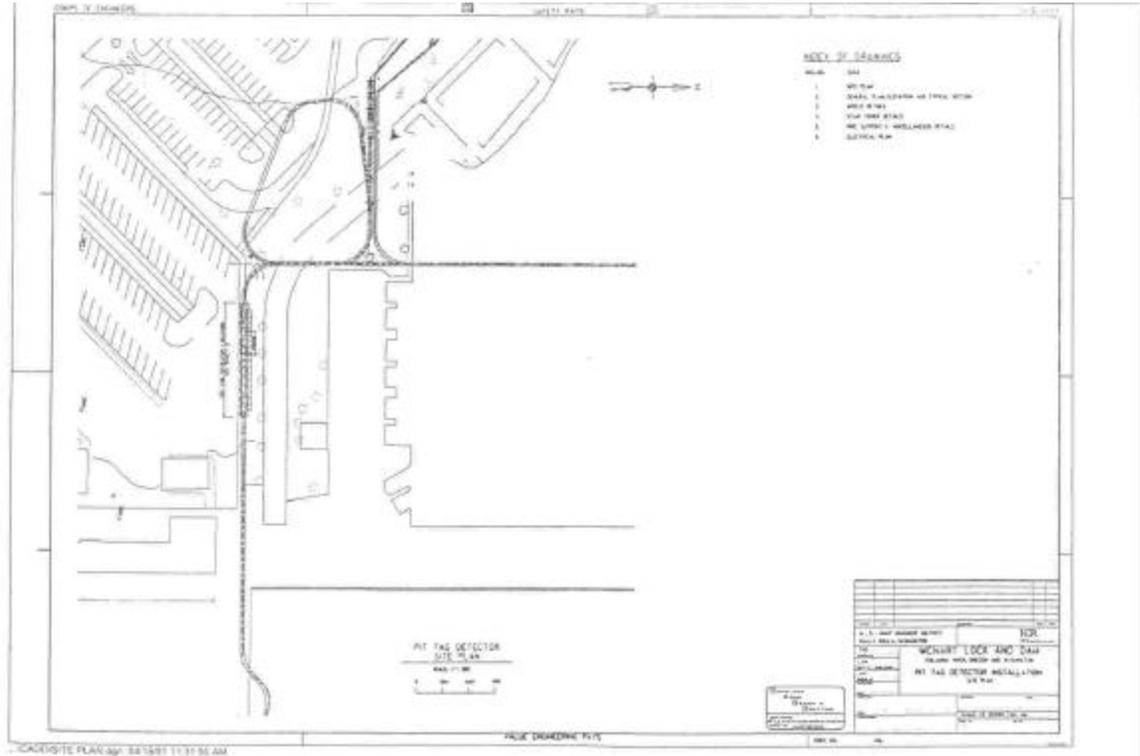
From:
NWW-ED-D-ME
Chuck Palmer, Project Manager
509-527-7571

Distribute to:

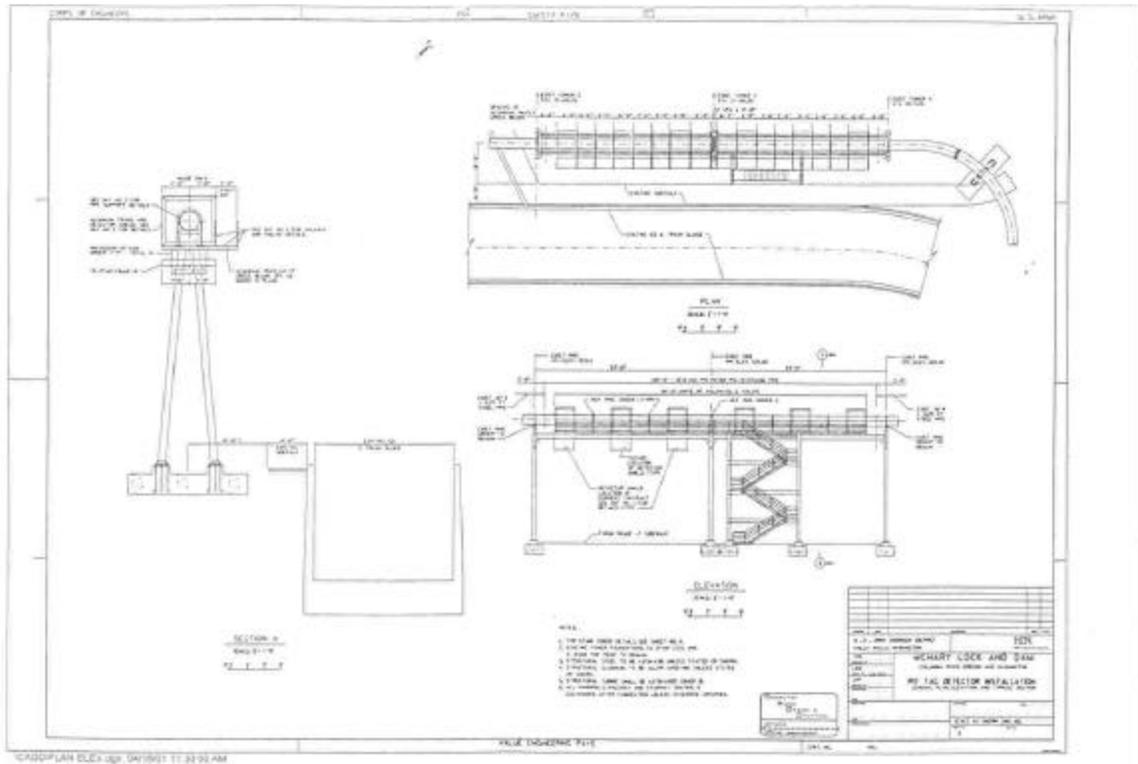
	Spec Package	Location
1. Dave Hurson – Ops	NO	3 rd floor
2. Lisa Hetherman – Ops	NO	3rd
3. Dave Coleman – Ops	NO	McNary
4. Brad Eby – Ops	NO	McNary
5. Lynn Reese – Eng	NO	2 nd floor
6. Tim Wik – Planning	NO	2 nd floor
7. Rebecca Kalamasz – Planning	NO	2 nd floor
8. Pete Poolman - Planning	NO	2 nd floor
9. Kevin Crum – Eng	NO	2 nd floor
10. Dick Eilertson – Eng	YES	2 nd floor
11. John Boschker – Eng	YES	2 nd floor
12. Chuck Palmer – Eng	NO	2 nd floor
13. Mike Mason – CRFM Manager	NO	3 rd floor
14. Steve Fink – Eng	YES	2 nd floor
15. Steve Lightbody - Eng	YES	2 nd floor
16. Steve Rainey - NMFS	NO	
17. Ed Nunnallee – NMFS	NO	
18. Earl Prentice - NMFS	NO	
19. Larry Swenson - NMFS	NO	

1. Transmitting copies of the 100%Pit Tag Improvements report as prepared by HDR Engineering. If you did not receive a technical specification package but would like one please let me know.
2. Please review the report and provide comments, electronically, to Chuck Palmer NLT 18 May 2001.
3. chuck.r.palmer@usace.army.mil

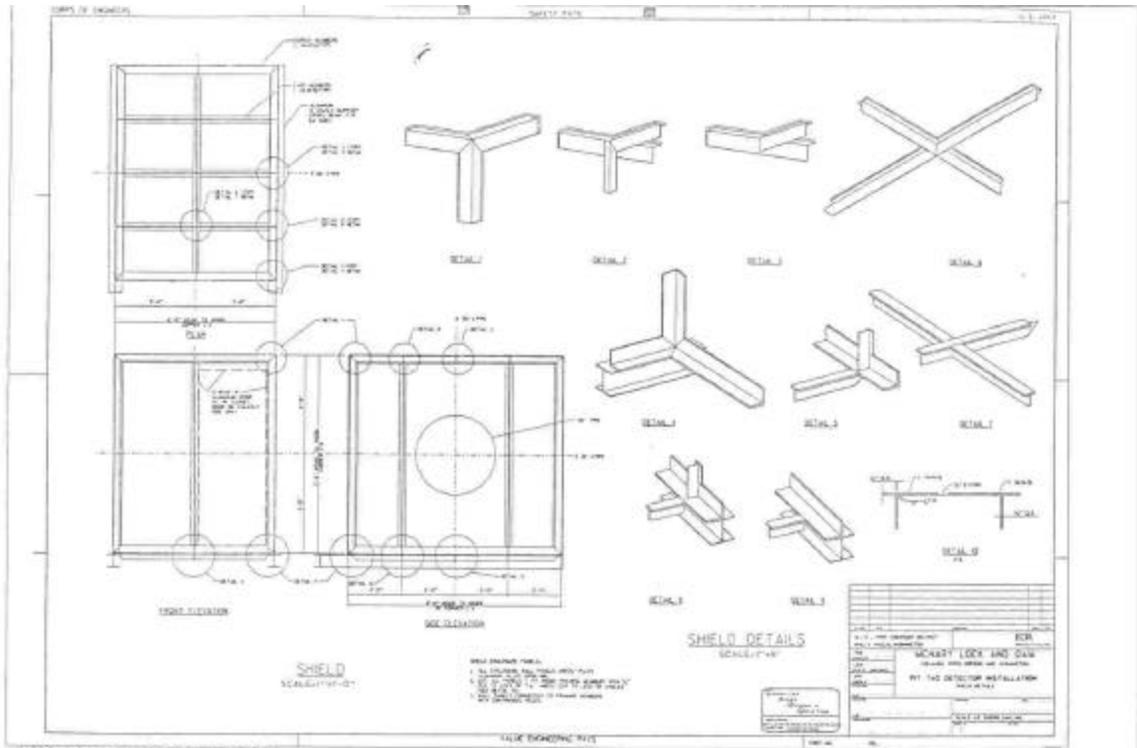
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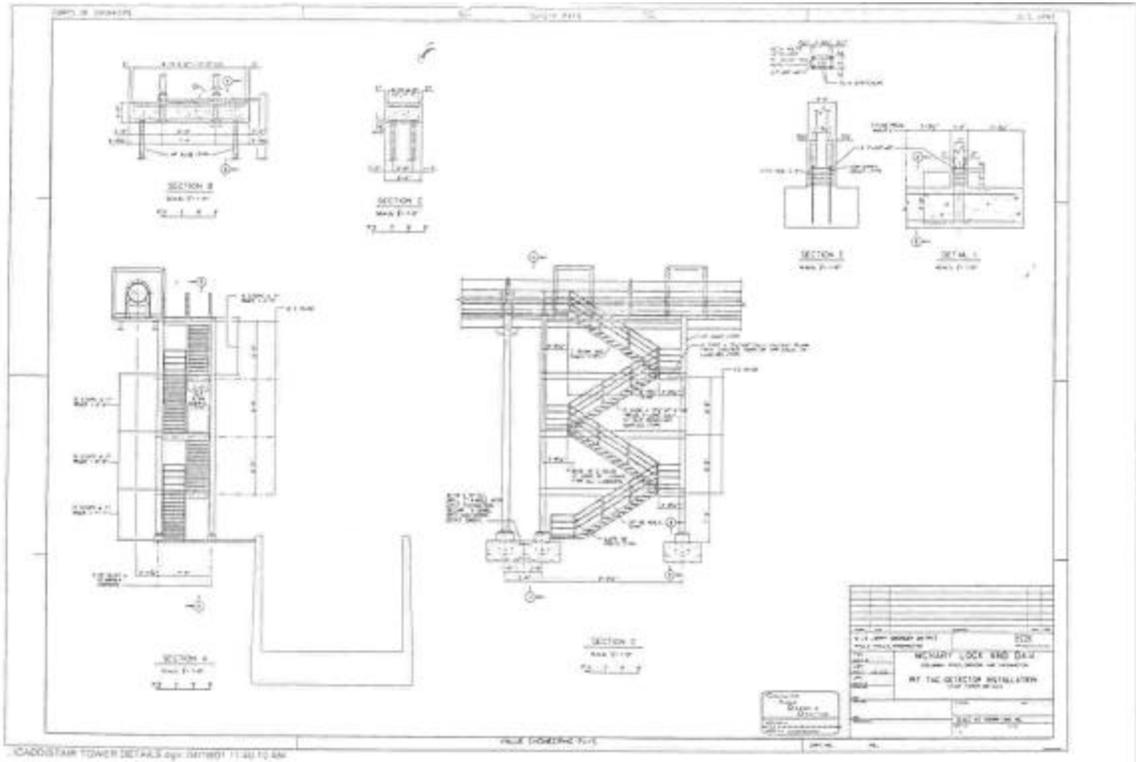
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Appendix Handout #2

Revision of Study Design for the Ice Harbor Spillway Survival Study, 2001

#2

Revision of study design for the Ice Harbor Spillway Survival Study, 2001

M. Brad Eppard
Fish Ecology Division
Northwest Fisheries Science Center
National Marine Fisheries Service

Study Codes: SPE-W-00-1 and SPE-W-00-2

After consulting with U.S. Army Corps of engineers personnel and based on projections of low flows and the high probability for no spill at Ice Harbor Dam during the juvenile chinook outmigration 2001, we have made the following changes to our study design:

1. Both PIT-tagged and one half of the radio-tagged (about 900 fish) fish will be released 2 - 5 miles upstream of Ice Harbor Dam. The other 900 radio-tagged fish will be released into the tailrace of Ice Harbor (via the JBS outfall pipe) in an effort to insure an adequate number of fish reach McNary Dam with live radio tags. Our radio tags will have an exact life of 8 days. Due to low flows and the high probability for no spill we anticipate that travel times from release to passage through McNary Dam will increase significantly from those of fish tagged for our 1999 and 2000 work (In 1999, median travel time from the tailrace of Lower Monumental to detection at McNary Dam was about 4.5 days. In 2000, median travel time from release at Ice Harbor Dam to detection at McNary Dam was 2.0 days).
2. Additional receivers and antennas will be installed at Ice Harbor Dam to monitor entrance into the immediate forebay and passage through the powerhouse and juvenile bypass system. Monitoring of turbine intakes would require us to pull the STS's for installation of antennas. If preferred we can install a simple underwater antenna into the gatewell from the intake deck.
3. We will use a single release model to estimate survival for PIT-tagged fish from release above Ice Harbor Dam through McNary Dam.
4. The study area downstream of Ice Harbor Dam will not change from the original proposal.

Based on the above changes this study will provide the following information:

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1. Estimates of survival from release above Ice Harbor Dam through McNary Dam for PIT-tagged and radio-tagged hatchery yearling chinook salmon using a single release model.
2. Comparison of survival estimates and travel rates between PIT-tagged and radio-tagged fish.
3. Forebay, gatewell, JBS, and tailrace residence times and FGE for radio-tagged fish passing through the powerhouse at Ice Harbor Dam.
4. Estimates of turbine passage survival and bypass system survival for radio-tagged fish passing Ice Harbor Dam (turbine passage survival can only be estimated if antennas are mounted on the STS's)
5. Partition the reach from release above Ice Harbor Dam to McNary Dam and estimate survival for radio-tagged fish through the following sections using a single release model.
 - a. Release to Ice Harbor Dam
 - b. Ice Harbor to Goose Island
 - c. Goose Island to Strawberry Island
 - d. Strawberry Island to mouth of the Snake
 - e. Mouth of the Snake to Port Kelley
 - f. Port Kelley to McNary
 - g. Through the McNary tailrace

Estimate project survival (using the RSSM method), FGE, forebay, gatewell, and tailrace residence times at McNary Dam.

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Appendix Handout #3 Summary of Brainstorming Meeting

#3

4/25/01 DRAFT (mrs)

Summary of Brainstorming Meeting Regarding Expected Low Flows and High Temperature at MCN and LGR 3/16/01

❖ Definition of Potential Problems at MCN Dam

It is highly likely that water temperatures in the McNary Dam forebay and juvenile fish facility will reach near lethal if not lethal temperatures during the fish passage season. These high temperatures will likely cause significant stress, and possible mortality to juvenile salmonids passing MCN during the summer migration period. Based on historical temperature information it is likely that water temps will reach critical levels in late June through August. The most significant problems have been identified at the South end on the powerhouse and will transmit warm temperatures across the powerhouse as well as into the gatewells and fish facility.

❖ Suggested Solutions at MCN

- North powerhouse loading
 - Avoid turning units on and off
 - Lower turbine loads (priority on leaving units 1,2 and 3 off)
- Predictive temperature monitoring (forebay temp monitoring)
- Flow Inducers
- Daily Barge Loading (morning)
 - Allows fish to be held in tailrace rather than raceways
- Improve/Continue 3-D modeling
 - Currently on-going

❖ Definition of Potential Problems at LGR Dam/Pool

Expected low river flows and increased temperature throughout LGR pool may decrease fish passage, and at a minimal slow down fish travel time in LGR Pool. Low flows and increased temperature are expected to continue throughout the fish passage season.

❖ Suggested Solutions at LGR

- Consider "pulsing"/Flow control in LGR pool
- Use/Installation of BGS to potentially increase FGE in summer

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Columbia and Snake Rivers Water Temperature/Expected Low Flow Brainstorming Meeting 3/16/01

Moderator:	Mark Smith	USACE-NWW	
Attendees:	Rebecca Kalamasz	USACE-NWW	(509) 527-7277
	Paul Ocker	USACE-NWW	(509) 527-7295
	Brad Eby	USACE-NWW	(541) 922-2242
	Lynn Reese	USACE-NWW	(509) 527-7531
	Tim Wik	USACE-NWW	(509) 527-7276
	Marvin Shutters	USACE-NWW	(509) 527-7249
	Chris Pinney	USACE-NWW	(509) 527-7284
	Dave Hurson	USACE-NWW	(509) 527-7125
	Brad Eppard	NMFS-Pasco	(509) 547-7518
	Lisa Hetherman	USACE-NWW	(509) 527-7239
	Lynn McComas	NMFS-Pasco	(509) 547-7518
	Rosanna Tudor	WDFW-McNary	(541) 922-3630
	Paul Wagner	Golder Associates	(509) 737-9666
	Dennis Rondorf	USGS-BRD-Cook	(509) 538-2299 x228
	Ken Tiffan	USGS-BRD-Cook	(509) 538-2299 x279
	Paul Hoffarth	WDFW-Kennewick	(509) 734-7434
	Russ Heaton	USACE-NWW	(509) 527-7282
	Eric Hockersmith	NMFS-Pasco	(509) 547-7518
	Fred Higginbotham	USACE-NWW	(509) 527-7236
	Gordon Axel	NMFS-Pasco	(509) 547-7518
	Rex Baxter	USACE-NWW	(509) 399-2233
	Les Cunningham	USACE-NWW	(509) 527-7291
Call Ins:	Rudd Turner	USACE-NWD	(503) 808-3935
	Jim Athearn	USACE-NWD	(503) 808-3723
	Bell Hevlin	NMFS-Portland	(503) 230-5415
	Chris Ross	NMFS-Portland	(503) 230-5416
	Jim Nielsen	WDFW	
	Steve Rainey	NMFS-Portland	(503) 230-5418
	John Ferguson	NMFS-Seattle	(206) 860-3276
	Charles Morrell		
	Larry Swenson	NMFS-Portland	(503) 230-5416
	Gary Fredricks	NMFS-Portland	(503) 230-5416
	Steve Pettit	IDFG	

The purpose of the meeting was to focus on the expected impacts of temperature and low flows, primarily at Lower Granite and McNary dams during the 2001 outmigration. The intention was to have no ideas suppressed, and all viable and potential solutions would be presented to the division office.

Primary Goal: Identify what we can do to improve fish passage and survival this year during low flows and high temperatures.

Secondary Goal: Monitoring and evaluations

McNary Dam

Define the Problem

High forebay and gatewell temperatures (20°C) can occur as early as June 29th and have been known to reach 58-64°F in May and June. High temperatures can also expect to occur well into August. Temperature tends to be higher during the warmer times of the year on the South shore. Temperatures across the reservoir are stratified on both vertical and horizontal gradients, however the tailrace seems to be well mixed. Top to bottom, temperature can be as different as 8-10°F based on scroll case temperatures.

Reservoir control data will be out next week but discharge peaks are expected to be 160-170kcfs in early June.

Turning units off and on can cause higher temperatures to occur within the collection channel. Thermal differences occur between: the gatewell and collection channel; forebay and tailwater (several degrees at times). The raceways do not seem to be heating up during the day, however, a temperature spike has been measured at the end of the day throughout the system and peak at 3-7pm. Speculation was that the higher turbine loading, the more surface draw occurred, causing more heated water to enter the gatewells and collection channel.

Tim Bardish found that the reservoir appeared to be well mixed in August and Dave Hurson reported that 3-5mph winds seem to mix the temperatures in the reservoir quite well. Hourly reports from Paul Hoffarth show that there can be hourly changes throughout the day. Dave Hurson said that daily fluctuations can be 8°F. Temperatures 15 feet deep to the surface at unit 1 track the temperatures at unit 1 gatewell.

There is a concern that the thermal shock to fish from experiencing multiple temperature changes may cause not only initial but cumulative mortality problems.

Operations used in the past

In the 80's, standard screens caused lower flows in the gatewells. Management around warmer water temperatures included North powerhouse loading to avoid taking the warmer water. The new collection system still has temperature problems. Turning off a turbine unity causes a gatewell to cool down. There has been a reduced capacity of the powerhouse coinciding with running the turbines at 1% efficiency. Recent testing has been inconclusive, however, temperature at the separator can be reduced by 1°F by turning 2 units off. The south powerhouse seemed to have the highest gradient. A possible solution could be to only use the units on the south shore from 4am to 10am then shut them off for the rest of the day.

Tools

An early warning system was discussed including the capability of the corps using chain thermistors in the reservoir at strategic points to determine what may be going on in the reservoirs for some adaptive management at the project. WDFW mentioned that 34 stowaway temperature monitors were in place around the dam during that period that collect temperature at 30 minute intervals. In addition, Battelle is currently working on a 3-D temperature model for the Snake and Columbia rivers to McNary Dam.

BRAINSTORMING SESSION

Flow Mixers

These devices were used at Cowlitz Falls Dam in an attempt to guide fish towards a surface collector. We have two 30" diameter mixers and four 16" diameter mixers at present and because these are off the shelf items from the sewage industry, they may be easily obtainable. See handout for specs.

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Discussions were held regarding placement of the devices including suspension from barges, attachment to the dam at various locations et cetera.

Operation Changes

Suggestions and ideas for powerhouse running included:

- When possible, lower the loading on the turbines to as low as possible (45 megawatts) and if needed run more turbines to make up the discharge requirements. This would decrease the draw from the warm surface waters.
- Eliminate rapid load changes and try to keep the loading as stable as possible. This would reduce the incidence of high temperature water draws into the gatewell and CC.
- Flat load at McNary during higher water temperatures and power peak at other FCRPS dams.
- Shut down the three south units and spill the rest of the flow.

Other Suggestions included:

- Using a Behavioral Guidance Structure (BGS) as a flow deflector in the forebay
- Use a solid barrier wall at the turbine intakes, similar to the J shaped structures at The Dalles Dam
- Use extensions similar to those used at Bonneville Dam for the turbine intakes.
- Pump cooler water into the collection channel from a deep source
- Use a hypolon curtain, similar to the BGS for flow mixing
- Pull screens at non-operating units to minimize fish entrainment in the gatewells
- Perform gatewell salvage operations as needed
- Some amount of spill may reduce the water temperature
- Bubbling structures are often used in reservoirs for de-stratification perhaps they can be used.
- Perhaps water from gatewells of non-operating units can be pumped into gatewells of operating units to cool the water
- Perhaps direct barge loading at McNary if debris problems can be reduced
- Perhaps strategic barge operations including loading juveniles at coolest part of day and then transporting.
- Perhaps have a barge that is dedicated to McNary Dam only
- Crowding of gatewells or collection channels may decrease residence time
- Have an instant access web page for temperature data so managers can immediately get important temperature information.
- Perhaps put standard length screens in units 1, 2 and 3.
- Get a 3-D temperature model together so we can evaluate the effectiveness of some of these measures. Model would need to encompass the warm water lenses near the dam.
- Regulate the releases of hatcheries in an attempt to get an earlier run timing when temperatures are cooler

Questions and answers

- Q: Using unit 1 was required in the past for adult passage, is it required now?
A: Adult Radiotelemetry studies have indicated is not required.

Lower Granite Dam

The priority at Lower Granite reservoir is the lack of flow encountered by fish in the first reservoir and the associated delay caused by lower velocities. The reservoir length and low velocities can cause fish to be stranded in the reservoir. Early data has shown that in low flow years, fish tend to mill about or be "lost." Flows are expected to peak at 60-70k cfs at best and possibly peak 2 weeks earlier than the norm.

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LGR reservoir acts as a lake in low flow conditions. The reservoir soon develops a nutrient loading problem and sees an increase in productivity including a blue-green algae problem. Mixing of water from Dworshak reservoir does not occur optimally because the colder water from the Clearwater tends to slide under the warmer Snake water.

Pulsing

Flow pulsing through LGR reservoir was discussed. Coordinate releases from Dworshak combined with an evening increase in flows at the dam itself in a pulsing manner to get fish to move through the reservoir. Collection will increase with different sizes of spikes.

Releases from Dworshak typically take about 8 hours to reach LGR reservoir and effects to LGR Dam takes an additional 1.5 hrs. Releases may be increased from 1.3-1.5 kcfs to 10-14 kcfs, possibly doubling both discharge and velocities in the Lower Clearwater. (Velocities would increase in the free-flowing river from Dworshak downstream to the confluence as well). The discharge from Dworshak Dam would have a 4-hour ramp up time and would not increase velocities through Lower Granite Reservoir much. The greatest effect would be felt near the confluence (and in the Clearwater arm of the reservoir). On the other hand, ramping up releases through LGR Dam would increase velocities in the near dam area, but the effects would taper down to almost zero at the upstream end of the reservoir.

Suggestions and ideas for powerhouse running included:

At High pool, slant pool by operating the dams under MOP.

Perform a major drawdown at Lower Granite Dam and collect everything possible at Little Goose Dam.

Other Suggestions included:

Draw down Hells Canyon dam, essentially removing it from the power grid, for flushing flows. Intentionally increase the silt load to drive fish downstream

Afternoon Session

Discussion were held regarding feasibility of the alternatives. The following were the generalized results.

Location	Action	Potential	Reasoning or Comment
McNary	North Powerhouse Loading with Flat Load	High	No adult issues, some has been done in the past, possibly peak in the morning
	Predictive Modeling	Moderate	The information would be good but is it really imperative that we have it?
	Flow Inducers	Moderate	Questions on placement, effectiveness, fish and debris entrainment, fish guidance changes, WES modeling and further investigation.
	BGS/Entraining Wall	Low	Time for construction, etc.. Makes this not feasible for '01
	Intake shaping	Low	Time for construction, etc.. Makes this not feasible for '01
	Cooler Water pumped into the CC or Gatewell	Possible	Concern for a high temperature gradient causing thermal stress and mortality
	Lower Turbine Loads	Possible	decrease surface draw and combine with a North Powerhouse loading

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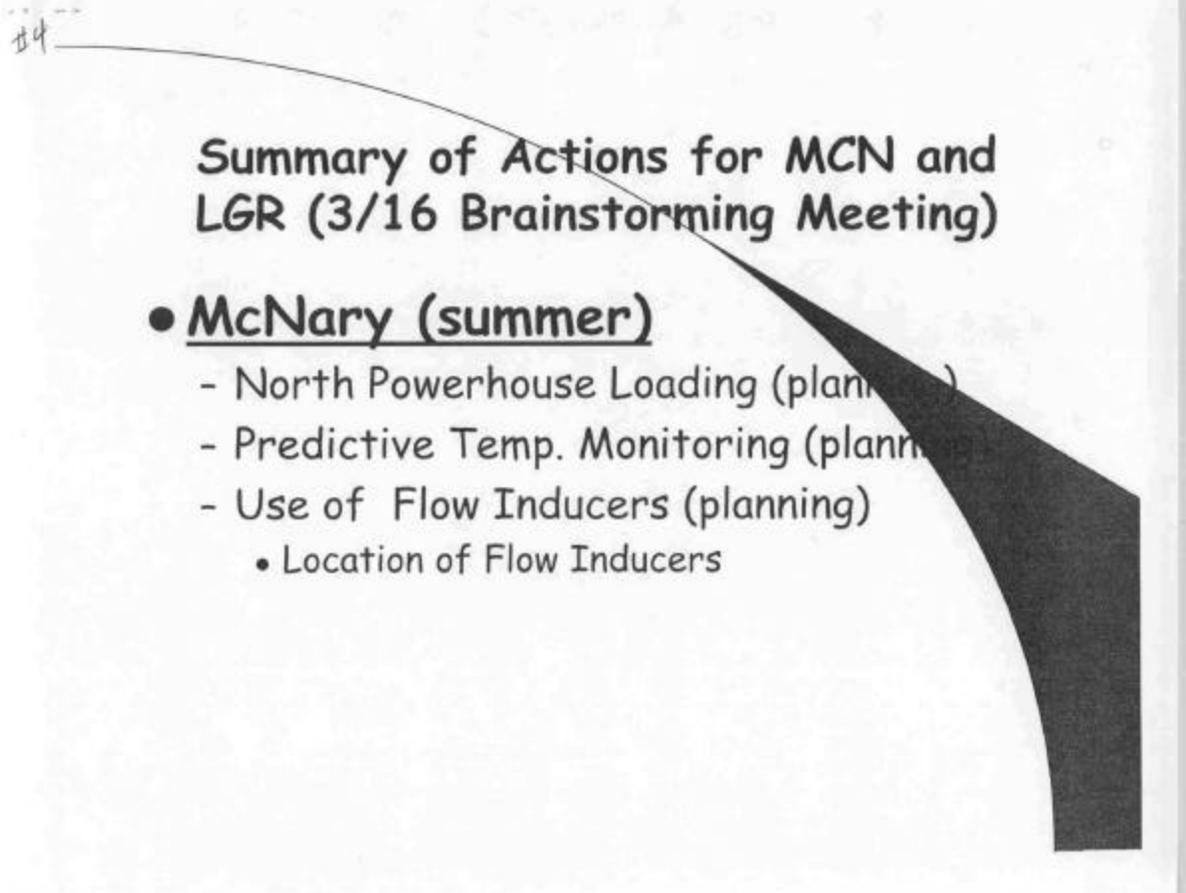
- Forebay purse seining
- Fish pump with leads like a merwin net in the forebay combined with some type of herding device like bubble wands
- Short duration (less than a half hour) pulsed spill

In addition to salvage options, the locations of salvage equipment, personnel, permit issues, and how to handle salvaged fish should be addressed prior to the 2001 out migration so that contingency plans are in place.

At the end of the meeting it was suggested to shut down the ICH ladder if or when temperatures create a migrational thermal block how about setting up an adults passive migration into a barge via a steep pass denil at ICH and then barge the adults to Lewiston?

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Appendix
Handout #4
Summary of Actions



**Summary of Actions for MCN and
LGR (3/16 Brainstorming Meeting)**

● **McNary (summer)**

- Daily (morning) Barge Loading
(planning)
- Improved 3D Temp Modeling (on
going)

Summary of Actions for MCN and LGR (3/16 Brainstorming Meeting)

● Lower Granite

- Spring "Pulsing"
 - Still under consideration
 - Not yet scheduled
 - Likely will not involve upper reservoirs or refill
- Use of BGS for to Increase Summer FGE
 - No decision yet
 - Discussion/recommended action ?

Other Lower Granite Issues

- Use of RT this Spring/Summer
- Discussion of 3D/Acoustic Tagging Study

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Appendix
Handout #5

Turbine Priority and its Effects on Passage of Steelhead at Snake River Dams



US Army Corps
of Engineers
Walla Walla District

g

TURBINE PRIORITY AND ITS EFFECTS ON PASSAGE OF STEELHEAD AT SNAKE RIVER DAMS

Part IV of final report for:

Migration of Adult Chinook Salmon and Steelhead Past Dams and
Through Reservoirs in the Lower Snake River And Into Tributaries

T.C. Bjornn, J.P. Hunt, K.R. Tolotti, P.J. Keniry, and R.R. Ringe
Idaho Cooperative Fish and Wildlife Research Unit
University of Idaho, Moscow, ID 83843

1998

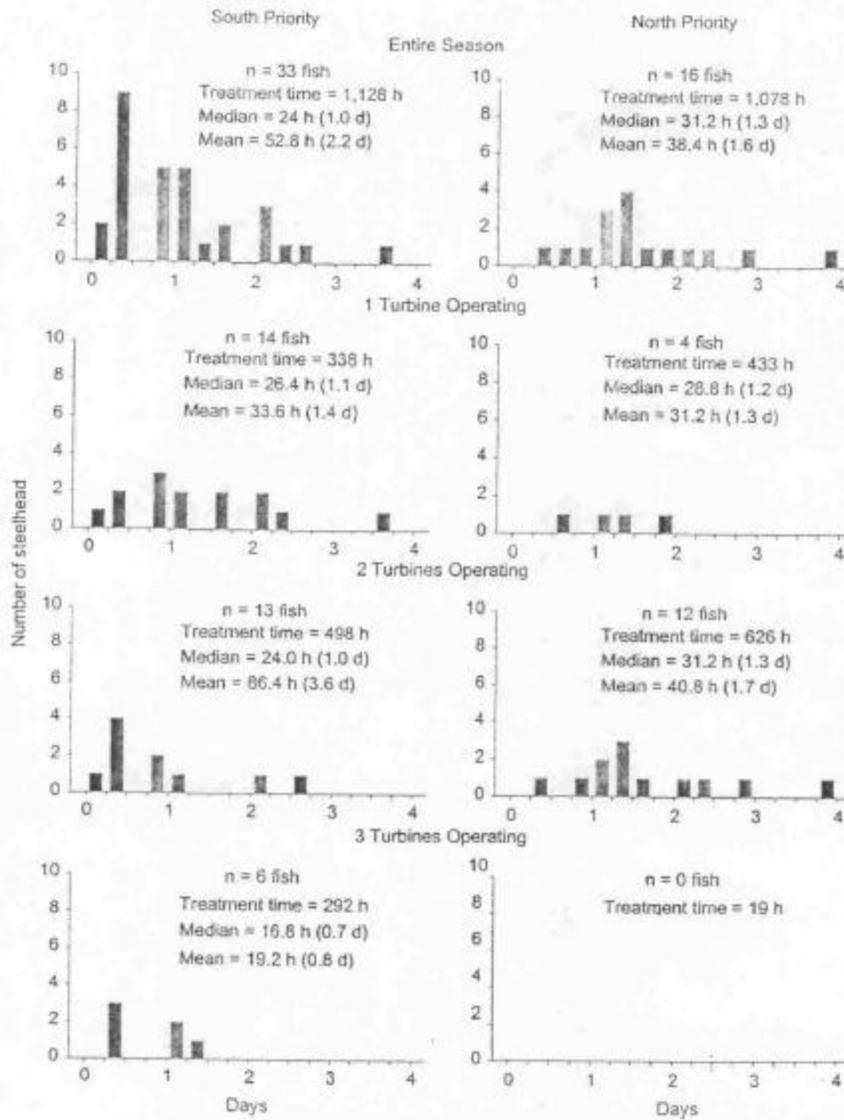


Figure 36. Time for steelhead to pass Lower Granite Dam after first entering the fishway during north- or south-turbine priority tests throughout the study season, and when one, two, or three turbines were operating in 1993.

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Appendix Handout #6 Lower Monumental Stilling Basin Erosion

#6

*Lower Monumental Stilling Basin Erosion
26 April 2001
FFDRWG Meeting Agenda
Walla Walla*

- Update
 - Sectional and General Models
 - NMFS and District visited WES in March
 - Purpose: interim spill; preliminary look at long-term solution
 - Observations and General Conclusions
 - Sectional Model
 - In large spill events (up to 50 kcfs/bay tested), high uplift pressure has been measured. Corresponds to theoretical forebay pressures.
 - At very small spillway gate openings (4 kcfs/bay), debris movement was observed. Stilling basin damage is likely for any spill level.
 - General Model
 - Model verification process
 - Interim spill options
 - Preliminary long-term solutions
 - End-bay Deflectors
 - Extended north training wall
 - Issues: interim spill; long-term solutions
 - Structural Analysis
 - Stilling basin damage will occur at high spill levels with plunging flow. Design strength of original slab is far exceeded when plunging flow occurs.
 - If stilling basin floor fails, and full uplift occurs under spillway monoliths, does the structure become unstable?
 - Next Steps: Short Term
 - Goal: By 17 May (next SCT meeting), complete the structural analysis and coordinate the internal Corps approach to interim spill.
 - Communicate with agencies prior to 17 May
 - Long - term schedule
 - Deflectors
 - Plans and Specs: Oct 2001 – May 2002
 - Construction: August 2002 – March 2003
 - Dam Safety Repairs
 - Schedule dependent on structural analysis

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Appendix Handout #7 McNary End Bay Deflectors Photos

#7

McNary End Bay Deflectors Photo Handout 26 April 2001 FFDRWG Meeting

The project operating condition for all of the following photos was:

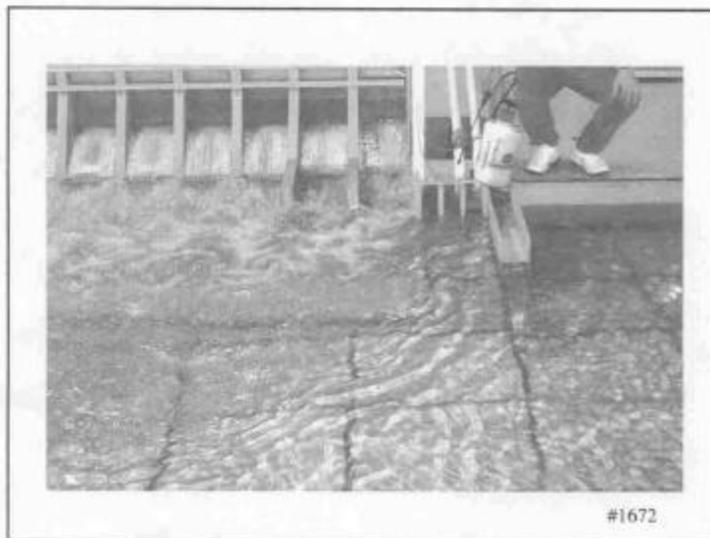
Q (total) = 260 kcfs
Q (spill) = 150 kcfs
Powerhouse: Units 1-9 (Units 10-14 off)
TW elev. = 267.0 (average for 260 kcfs)

<u>Photo #</u>	<u>Description</u>
1657	Existing Conditions (Dye from North Fishway Entrance)
1660	Existing Conditions (Dye from N. Powerhouse Entrance)
1665	With End Bay Deflectors ("Interim"?)
1672	<i>ditto</i>
1676	With End Bay Deflectors (With Training Walls)
1678	<i>ditto</i>
1679	<i>ditto</i> (Dye from Bay 2)
1680	<i>ditto</i>
1682	<i>ditto</i>
1681	<i>ditto</i>
1683	<i>ditto</i> (Dye from Bay 21)
1684	<i>ditto</i> (Dye from Bay 21)
1686	<i>ditto</i> (Dye from Bay 22)
1687	<i>ditto</i> (Dye from Bay 22)

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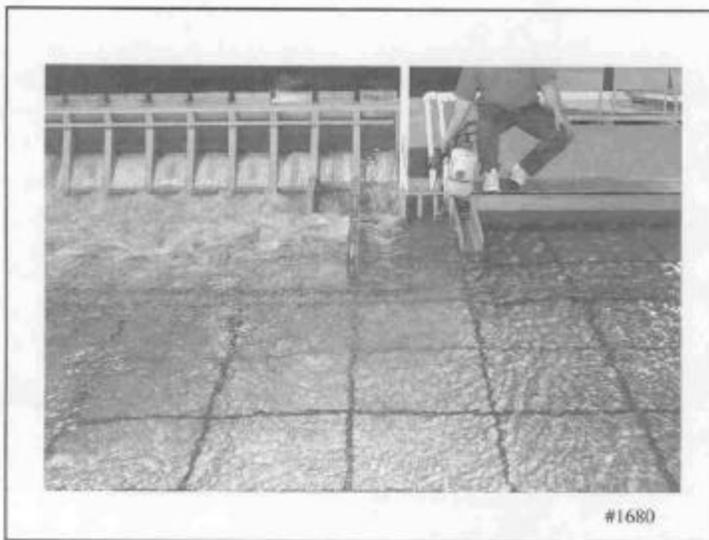
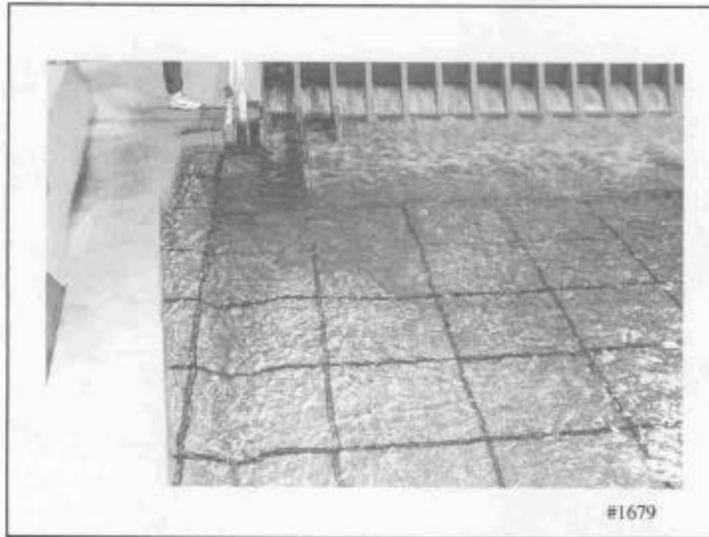
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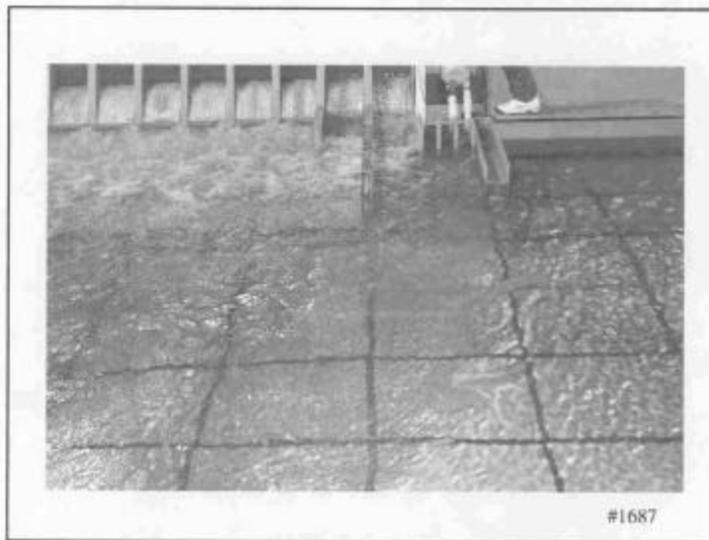
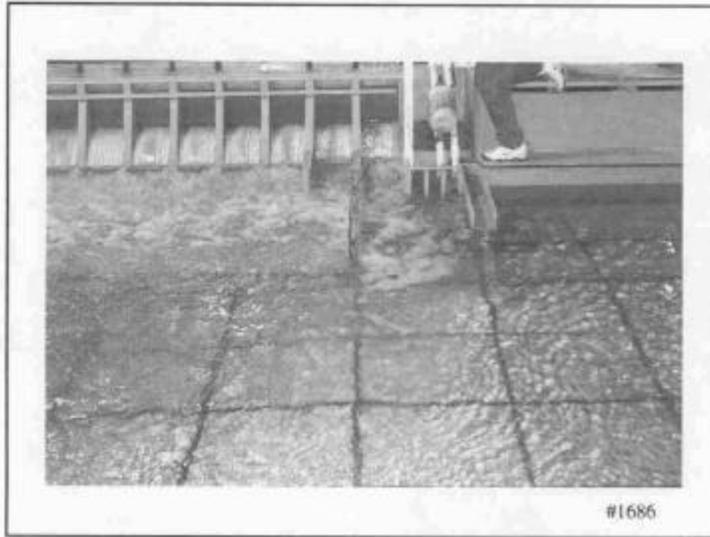
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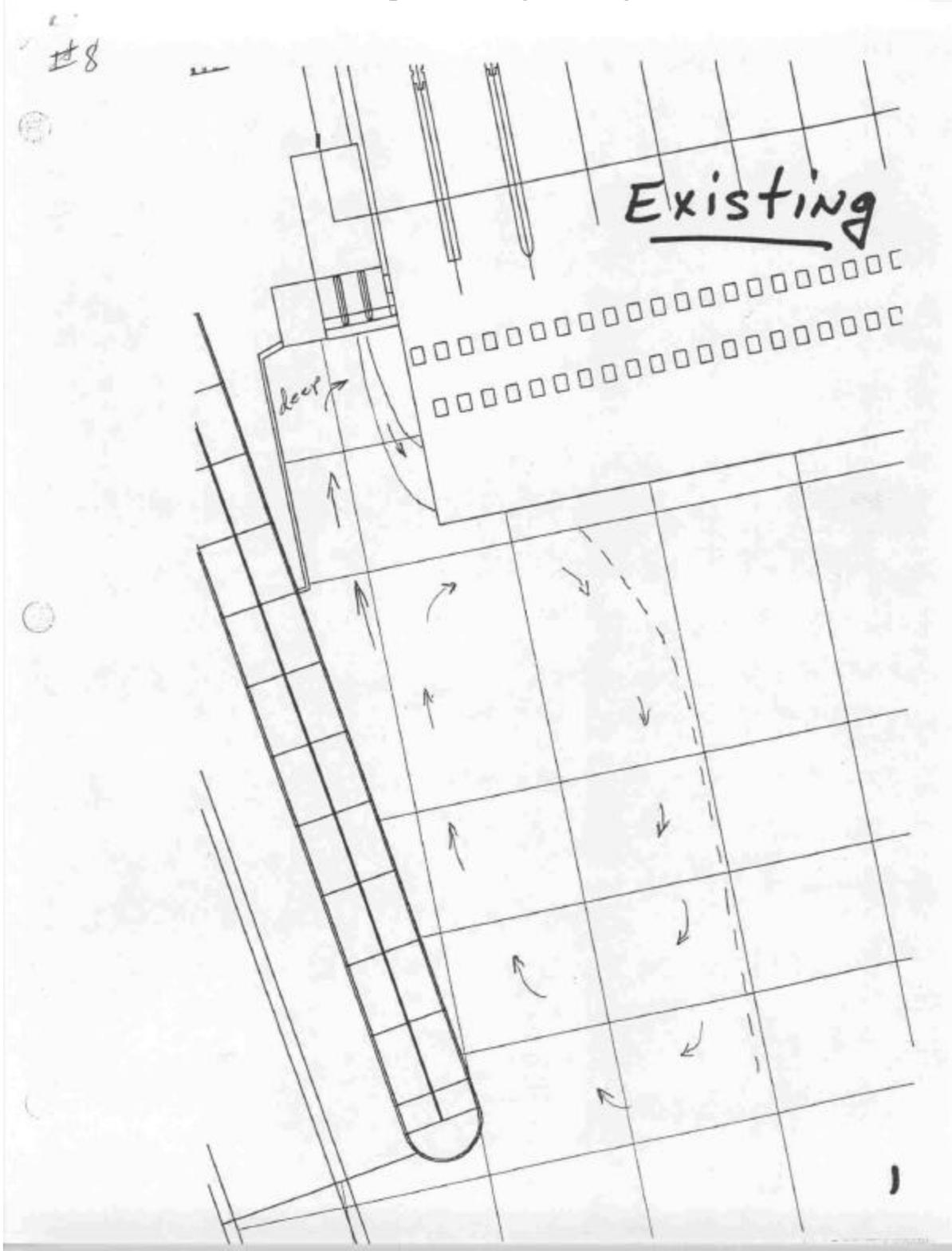


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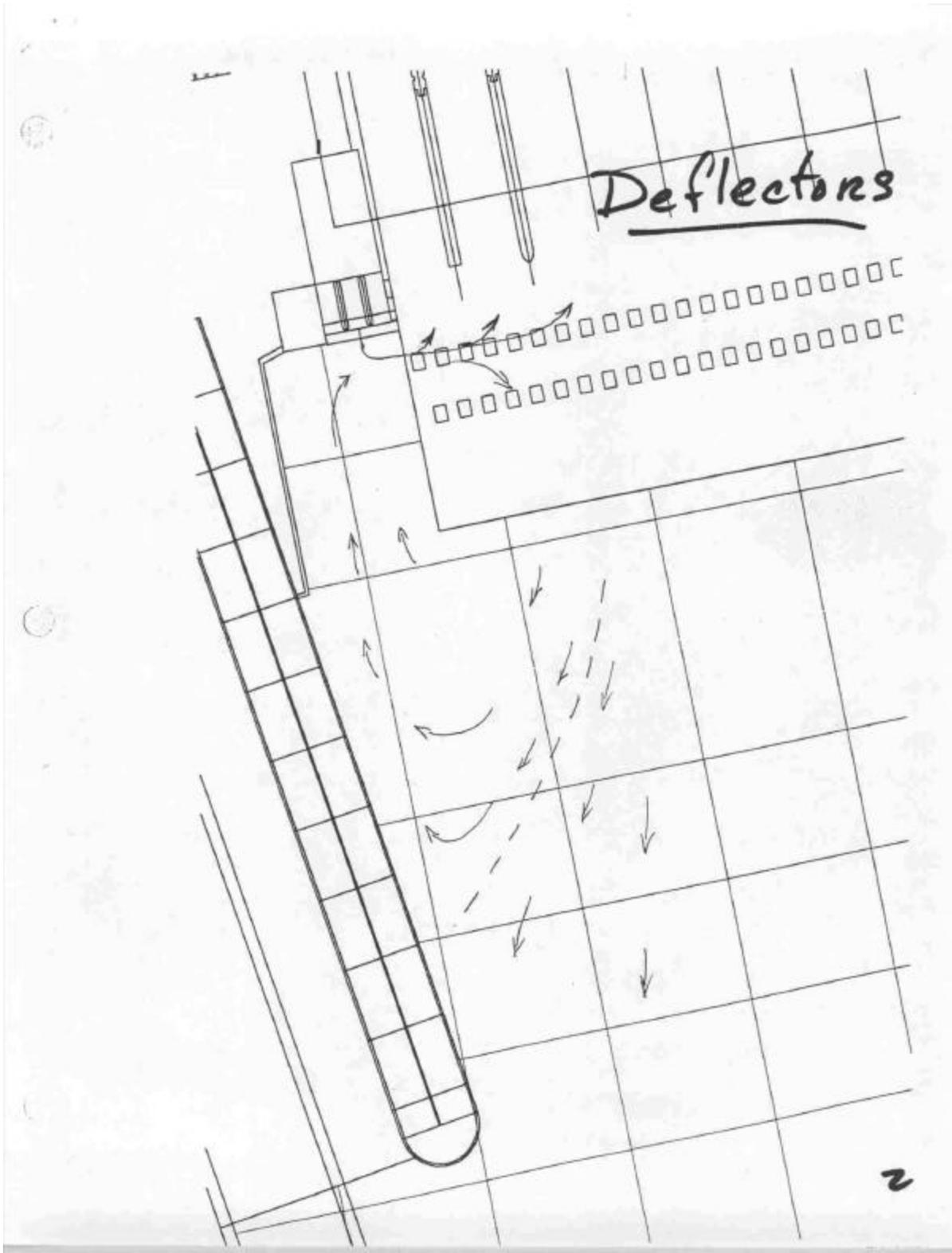


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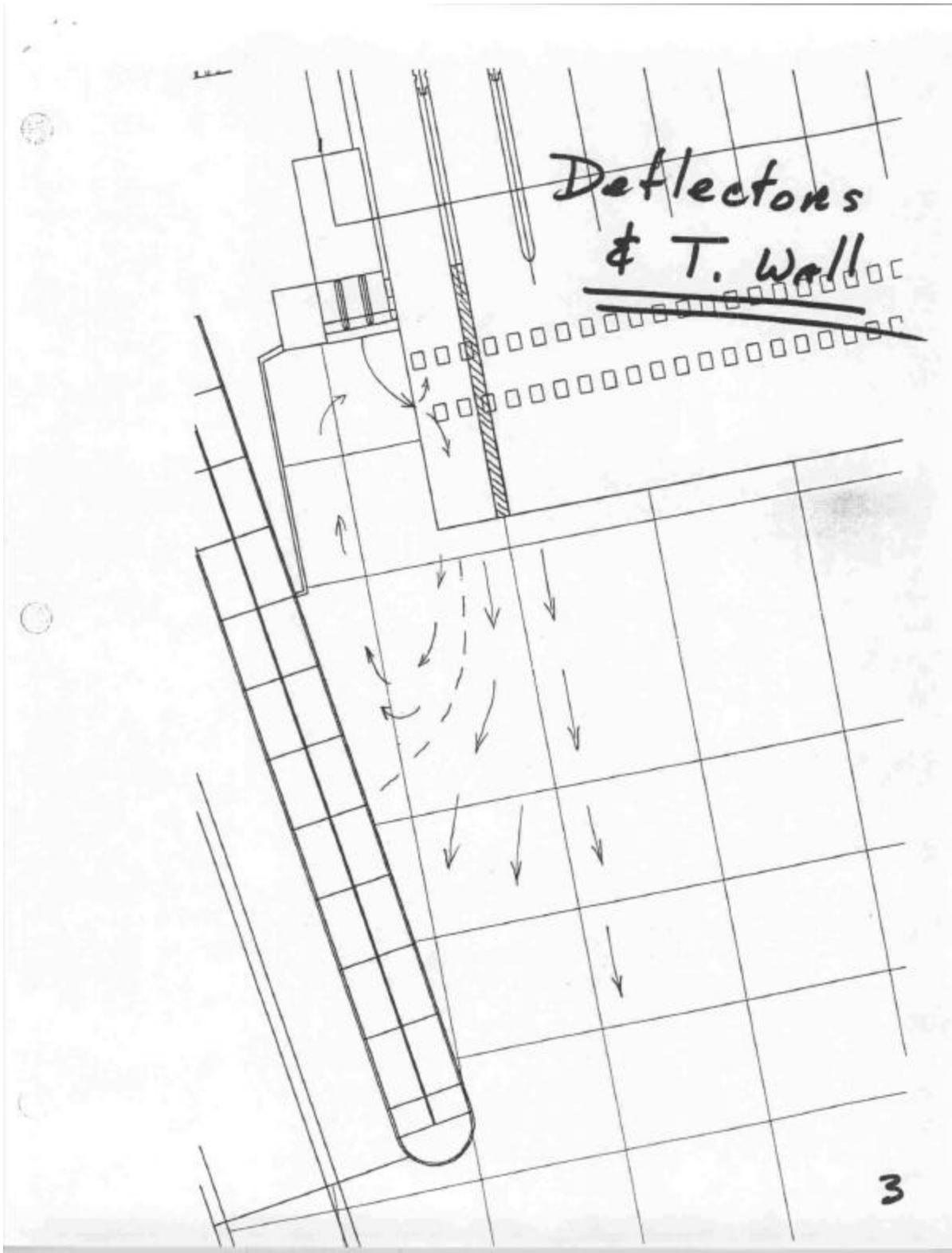
Appendix Handout #8 Drawings of McNary End Bays



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Appendix Handout #9 Construction Updates for McNary, Little Goose, and Lower Granite

#9

Fish Facility Design Review Work Group
Walla Walla District
April 26, 2001

Construction Updates:

McNary Perforated Plate Replacement Contract

Status: Contractor: S&R Industries. Will be completed with perforated plate installations by mid June.

Issues: Bolt availability problem solved, perforated plate installations back on schedule.

Goose-Granite Perforated Plate Replacement Contract

Status: Completed – All perforated plates have been replaced. All new RT antenna brackets have been installed on ESBS for the tests at Granite.

Lower Granite SBC Modifications for 2001

Description: Goebel Construction

Status: Completed

Lower Granite Removable Spillway Weir

1. Landing pad installation was placed on 17 March.
2. All dam "face" elements were installed by 31 March. Underwater work has ceased. Bolts need to be tensioned on hinge support prior to install of RSW. Above water work being completed this week (electrical, screw-jacks assembly on top of pier noses at spillbay #1).

Schedule:

Approx. 25 May: Begin shipment on barge from Vancouver Wash
Approx. 1 June: Arrive forebay at Lower Granite
Approx. week of 11 June: divers tension bolts on hinge beam support
Approx. 20 June: commence mobilization of RSW to dam face for installation
Approx. 11 July: finish installation of RSW on dam face
Approx. week of 16 July. Sink/raise RSW (no spill required)
Spill test ???
Biological test ???

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Appendix
Handout #10
Pictures of the RSW



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Appendix Handout #11 Auxiliary Water Supply and McNary Adult PIT Tag Updates

#11

Fish Facility Design Review Work Group
Walla Walla District
April 26, 2001

Ice Harbor Emergency Auxiliary Water Supply

Status: Plans & Specifications completed by CH₂MHill.

Schedule

- ⇒ Advertise March 2001
- ⇒ Open Bids April 2001
- ⇒ Contract Award June 2001
- ⇒ Phase I Construction on North Shore System
 - Jib and Bridge Cranes August 2001
 - Modify Diffusers January-February 2002
 - Install Bulkheads
 - Replace Pump #3
 - Upgrade Electrical Switchgear
- ⇒ Phase II Construction on North Shore System
 - Replace Pump #2 January-February 2003
- ⇒ Phase III Construction on North Shore System
 - Replace Pump #3 January-February 2004
- ⇒ Phase IV Construction on South Shore System
 - Upgrade electrical switchgear and isolate the existing pump systems January-February 2005
- ⇒ Complete Construction March 2005

Issues: Very tight construction window. North and South ladders will be down simultaneously for 2 weeks each outage to allow for 8 weeks of construction on the North ladder. Lessons learned (efficiencies) may allow for install of 2 pumps on the north shore Phase II construction period. Cost growth due to extended construction seasons, escalated costs of 5-12% for outyears, and detailed pricing of Government Estimate.

Budget Estimate: \$7.5M (\$5.64M original)

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**Fish Facility Design Review Work Group
Walla Walla District
April 26, 2001**

Lower Monumental Emergency Auxiliary Water Supply

Status: Initiated Phase II Technical Report with A/E firm INCA/RW Beck to investigate additional alternatives not covered in the CH₂MHill Report. Technical report includes numeric hydraulic computer model of the adult fishway system. The A/E will use the numerical model to develop final recommendations on the best operation of the adult bypass systems and to evaluate potential structural modifications to the fishway systems. New alternatives include using the discharge water from the By-pass facility to (a) power a new stand-alone turbine pump, or (b) power one of the existing turbine pumps, isolated from the other two. A/E is currently preparing feasibility report.

Schedule:

- ⇒ Initiate Report: INCA/RW Beck AE contract.....December 2000
- ⇒ Computer Model DevelopedApril 2001
- ⇒ Computer Model Simulations Completed..... May 2001
- ⇒ 100% Letter Report CompletedApril 2001
- ⇒ 100% Technical Report CompletedAugust 2001
- ⇒ Initiate P&S (depending on funds and priorities) October 2001
- ⇒ Advertise March 2002
- ⇒ Open Bids May 2002
- ⇒ Start Construction.....July 2002
- ⇒ Complete Construction March 2003

Schedule dependent on coordination with region to expedite completion while maintaining adequate adult egress.

Issues: Feasibility of large scale excavation or soil and bedrock adjacent to existing powerhouse facilities. Fail-safe operation of discharge water in the event of turbine problems, to preclude adverse affects on juvenile fish passage, and possible flooding of by-pass facility.

Budget Estimate: \$6.6M

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**Fish Facility Design Review Work Group
Walla Walla District
April 26, 2001**

Little Goose Emergency Auxiliary Water Supply

Status: Completed Technical Report in Sept 2000. Initiated Phase III Plans and Specifications with A/E JE/Sverdrup. In addition of plans and specifications that installs three new pumps in the roof of the existing intake, Phase III includes numeric hydraulic computer model of the adult fishway system. The A/E will use the numerical model to develop final recommendations on the best operation of the adult bypass systems and to evaluate potential structural modifications to the fishway systems.

Project was suspended for 2 months pending reprogramming of funds.

Schedule:

- ⇒ Initiate P&S JE/SverdrupDecember 2000
- ⇒ Computer Model Developed May 2001
- ⇒ Computer Model Simulations Completed.....July 2001
- ⇒ VE Study Completed January 2001
- ⇒ 60% Plans and Specifications June 2001
- ⇒ Plans and Specifications CompleteAugust 2001
- ⇒ AdvertiseDecember 2001
- ⇒ Open Bids March 2002
- ⇒ Start Construction..... June 2002
- ⇒ Complete Construction March 2003

Issues: Fishways are down for minimal time each winter. Need to coordinate a schedule to maximize work effort while maintaining adult fish passage. This will determine number of winter window periods needed to complete the work.

Budget Estimate: \$6.6M

*See
NHD.*

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**Fish Facility Design Review Work Group
Walla Walla District
April 26, 2001**

Lower Granite Emergency Auxiliary Water Supply

Status: Completed Technical Report in Sept 2000. Initiated Phase III Plans and Specifications with A/E JE/Sverdrup. One pump spare capacity already exists. Two of the three pumps can meet FFP criteria. Install oil heaters for the speed reducers to increase reliability, replace existing Philadelphia on pump 1 with Faulk speed reducer to match reducers on Pumps 2 and 3. Refurbish existing surplus Faulk gear reducer to utilize as on-site spare. Install electrical upgrades (auto transfer switch, reconfigure the pump supply system, physically separate motor control centers for the pumps. In addition of plans and specifications, Phase III includes numeric hydraulic computer model of the adult fishway system. The A/E will use the numerical model to develop final recommendations on the best operation of the adult bypass systems and to evaluate potential operational modifications to the fishway systems.

Schedule:

- ⇒ Initiate P&S JE/Sverdrup December 2000
- ⇒ Computer Model Developed May 2001
- ⇒ Computer Model Simulations Completed..... July 2001
- ⇒ 60% Plans and Specifications May 2001
- ⇒ Plans and Specifications Complete July 2001
- ⇒ Advertise August 2001
- ⇒ Open Bids October 2001
- ⇒ Start Construction..... January 2002
- ⇒ Complete Construction March 2003

Issues: Completing electrical upgrades during the outage so that 2 of the 3 pumps can be brought back on-line. Replacement of the Philadelphia gear reducer can be performed anytime outside of the Jan-Feb outage, with assumption of the risk of no backup pump capacity until the replacement is completed.

Budget Estimate: \$600,000

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**Fish Facility Design Review Work Group
Walla Walla District
April 26, 2001**

McNary Adult PIT Tag

Status: Modifications completed this fall to allow for prototype testing on the Oregon Ladder. COE to provide power source for out-of-ladder testing on Washington ladder this spring/summer. Scheduled to start Plans and Specifications for production installation on both Oregon and Washington ladders for FY02 implementation. Waiting for determination from NMFS regarding favorable results of both Bonneville and McNary Prototype tests. Current COE workload will require design to be accomplished by an A/E.

Schedule:

- ⇒ Initiate P&S A/E..... June 2001
- ⇒ Plans and Specifications CompleteSeptember 2001
- ⇒ AdvertiseSeptember 2001
- ⇒ Open Bids October 2001
- ⇒ Start Construction.....November 2002
- ⇒ Complete Construction March 2003

Issues: Favorable results from prototype testing at the McNary Oregon and Washington ladders to determine if preferred sites are suitable for production installation. Determination from NMFS that orifice-type antennas are to be utilized on the ladders, and not weir-type antennas. Development of A/E contract to meet schedule and budget.

Budget Estimate: \$1.75M (Includes BPA funding antennas)