UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
1201 NE Lloyd Boulevard, Suite 1100
PORTLAND, OREGON 97232-1274

March 21, 2013

Lyle G. Gilbreath
Northwest Fisheries Science Center
FE Division
P.O. Box 67
North Bonneville, Washington 98639

RE: Determination of Take for Research Purposes (20-13-NWFSC91)

Dear Mr. Gilbreath:

National Marine Fisheries Service (NMFS) Hydropower Division's Federal Columbia River Power System (FCRPS) Branch has determined that take associated with the study, "Validation of Computational Fluid Dynamics (CFD) Analysis and Evaluation of Fish Condition and Gatewell Residence Time for Juvenile Salmonids in a Modified Gatewell at the Bonneville Dam Second Powerhouse" is permitted in 2013 under the 2010 FCRPS Supplemental Biological Opinion (2010 Opinion). If this research continues beyond 2013, the take allowed under the determination process must be updated annually. The estimated numbers of listed salmonids needed to complete this study in 2013 are given in Table 1 below.

Project Justification, Description, and Methods

Justification
This research addresses the 2010 Biological Opinion Measure Hydropower Strategy 2: Reasonable and Prudent Alternative (RPA) No. 18 (Modify Columbia and Snake River Dams to Maximize Juvenile and Adult Fish Survival – Bonneville PH2 Gatewell Modification Testing).

Description
Observations by the Bonneville Dam Smolt Monitoring Program and results of prior tests conducted by NMFS have confirmed that operation of Second Powerhouse turbines at the upper end of the 1% peak efficiency range results in negative passage effects for juvenile Chinook salmon passing through the 14A Gatewell environment. The U.S. Army Corps of Engineers (Corps) has conducted extensive CFD modeling studies of the gatewell environment. Results suggest that poor gatewell flow conditions exist at upper 1% flows and that improvement could be achieved by installation of turbulence reduction devices. Prototype devices have been fabricated and will be installed in March 2013. This research will determine if the devices improve mortality and injury rates for juvenile Chinook salmon passing through the modified gatewell.

Should turbulence reduction devices prove effective, juvenile Chinook salmon passing through Second Powerhouse gatewells would sustain less mortality and descaling. Deployment is also expected to help determine if the design is practical for future deployment across the powerhouse.

Methodology

Test fish will be obtained directly from Spring Creek National Fish Hatchery (NFH) and from the Bonneville Dam Smolt Monitoring Program. Fish will be Passive Integrated Transponder (PIT)-tagged the day after transport or selection, then allowed to recover until release the following day. Tagged fish will be transported to the elev. +90 deck of the Second Powerhouse and released via 4 inch diameter hose into the 14A Intake at a point 3 to 6 feet downstream from the trashrack and about 6 feet below the intake ceiling. Further details may be found in the attached research proposal.

Test fish will be released in three independent test series: Series 1, Spring Creek NFH subyearling Chinook; Series 2, Run of river (ROR) yearling Chinook; and Series 3, ROR subyearling Chinook. Each series will require approximately 3,000 fish in order to determine statistically significant 3% additive differences in mortality and/or descaling rates at $\alpha = 0.05$. Each test series will include four replicate releases under each test conditions: A) no turbulence reduction device and upper 1% unit flow, B) turbulence reduction device installed and upper 1% unit flow, and C) no turbulence reduction device and lower 1% unit flow.

Tagged test fish will be recaptured at the juvenile facility using separation by code, examined, and data recorded for determination of mortality, injury, and descaling rates. The existing pre-anesthesia system will be used to move fish from the Easy Sort by Code (SbyC) Raceway to the second floor exam area. After examination, surviving test fish and bycatch will be allowed to recover from the effects of anesthetic prior to release to the river.

Protocols chosen for the research will minimize take. Test releases will be scheduled to avoid periods of high juvenile salmonid passage, for example during the days immediately following Spring Creek NFH production releases. Releases will be made in morning hours (0800-1000) which will reduce bycatch during SbyC, since most test fish will arrive at the Juvenile Facility prior to the evening peak of daily passage. It is likely that over 50% of ROR test fish will be obtained from normal Smolt Monitoring Program (SMP) samples, without increasing their sample rate. When necessary, daily coordination with SMP will provide a basis for increasing SMP sample rates without capturing excess numbers of fish. Run of river yearling Chinook salmon selected for tagging stock will be adipose fin clipped, which will limit tagging impacts to known hatchery origin fish. Finally, the use of PIT tags allows pre and post passage comparison of condition for each fish used in the study. Consequently, fish with preexisting partial descaling can be used. Past observations suggest that using only non-descaled fish could increase the number of fish handled during collection of tagging stock by up to five times.

Terms, Conditions, and Requirements

Fish listed under the Endangered Species Act (ESA) must be handled with extreme care and kept in water to the maximum extent possible during sampling and processing. Adequate circulation and replenishment of water in holding units is required. When using gear that captures a mix of species,

ESA-listed fish must be processed first, to the extent possible, to minimize the duration of handling stress. Endangered Species Act listed fish must be transferred using a sanctuary net (which holds water during transfer) whenever practical to prevent the added stress of being out of water. Should NMFS determine that a researcher's procedure is no longer acceptable; the researcher must immediately cease such activity until an acceptable alternative procedure can be developed with NMFS. To implement the Hydro research, monitoring & evaluation (RM&E) reasonable and prudent alternatives (RPAs), the Applicant shall ensure that all of the following conditions are met:

1. Researchers must not intentionally kill or cause to be killed any listed species unless a specific monitoring or evaluation proposal, approved by NMFS, specifically allows intentional lethal take.

2. Each ESA-listed fish handled out of water must be anesthetized to prevent injury or mortality.

3. Anesthetized fish must be allowed to recover (e.g., in a recovery tank) before being released. Fish that are simply counted but not handled must remain in water, but do not have to be anesthetized. Whenever possible, unintentional or indirect mortalities of ESA-listed fish that occur during scientific research and monitoring activities shall be used in place of intentional lethal take, if applicable.

4. Each researcher must ensure that the ESA-listed species are taken only by the means, in the areas, and for the purposes set forth in the research proposal, as limited by the terms and conditions.

5. Each researcher, in effecting the take authorized by the incidental take statement (ITS) (Chapter 14, 2008 Opinion – incorporated into the 2010 Opinion) and through NMFS' Take Determination Letters, is considered to have accepted the terms and conditions of the ITS and any additional terms or conditions required by NMFS' Take Determination Letters, and must be prepared to comply with the provisions of these two documents, and the applicable NMFS' regulations and the ESA.

6. Each researcher is responsible for the actions of any individual operating under the authority of the researcher's designated take authorization within the ITS of the 2010 Opinion and NMFS' Take Determination Letters.

7. Each researcher, staff member, or designated agent acting on the researcher's behalf must possess a copy of the ITS in the 2010 Opinion and the NMFS authorizing Take Determination letter when conducting the activities for which a take of ESA-listed species or other exception to ESA prohibitions is authorized herein.

8. Researchers may not transfer or assign a take authorization included within this determination to any other person(s), as person is defined in Section 3(12) of the ESA. The take authorization ceases to be in force or effective if transferred or assigned to any other person without prior authorization from NMFS.

9. Each researcher must obtain any other Federal, State, and local permits or authorizations necessary to conduct the activities provided for in this ITS.

10. Each researcher must coordinate with other applicable co-managers and researchers to ensure that no unnecessary duplication or adverse cumulative effects occur as a result of the researcher's activities.

11. NMFS reserves the right to inspect research activities as they occur. This may include observation or review of research activities, facilities, records, etc., pertaining to ESA-listed species covered by this determination.

12. Under the terms of NMFS' regulations, a violation of any of the terms and conditions of this ITS will subject the offending researcher and/or any individual who is operating under the authority of this ITS to penalties as provided for in the ESA for authorized take.

13. Each researcher is responsible for biological samples collected from ESA-listed species as long as they are useful for research purposes. The terms and conditions concerning any samples collected remain in effect as long as the researcher maintains authority over and responsibility for the material taken. A researcher may not transfer biological samples to anyone not listed in the research proposal without obtaining prior written approval from NMFS. Any such transfer will be subject to such conditions, as NMFS deems appropriate.

14. NMFS may amend a take authorization identified in this determination, or adjust specific take levels after reasonable notice to the applicable researcher.

15. NMFS may revoke a take authorization identified in this ITS if the activities for which it provides are not carried out. If the activities are not carried out in accordance with the conditions of this ITS and the purposes and requirements of the ESA, or if NMFS otherwise determines that the continuation of activities would operate to the disadvantage of ESA-listed species.

Annual Reporting and Authorization Requirements

The conduct of scientific research and monitoring activities each year is contingent on submission and approval of a report on each proceeding year's research and monitoring activities. Researchers are providing annual reports summarizing the take of ESA-listed salmon and steelhead associated with their activity. These annual reports are to be provided to NMFS' designated Take Determination Coordinator by December 1 of each year unless this date is otherwise modified by NMFS' authorizing Take Determination letter. The report must include the following:

1. A detailed description of scientific research and monitoring activities, including the total number of fish taken at each location, an estimate of the number of ESA-listed fish taken at each location, the manner of take, and the dates and locations of the take.

2. Measures taken to minimize disturbances to ESA-listed fish and the effectiveness of these measures, the condition of ESA-listed fish taken and used for research and monitoring, a description of the effects of research and monitoring activities on the subject species, the disposition of ESA-listed fish in the event of mortality, and a brief narrative of the circumstances surrounding fish injuries or mortalities to ESA-listed fish.

3. Any problems that arose during research and monitoring activities, and a statement as to whether the activities had any unforeseen effects.

4. Descriptions of how all take estimates were derived.

5. Steps that have been and will be taken to coordinate research and monitoring activities with those of other researchers.

Operational Reporting & Notification Requirements

1. Researchers must obtain NMFS' approval prior to implementing research protocols (e.g., changes in sampling locations or fish handling protocols) that differ from those considered in the Take Determination Letters, unless immediate deviation from these same protocols are necessary to reduce impacts to fish in hand. In this case, researchers must contact NMFS' designated Take Determination Coordinator or other designated staff as soon as possible to report on the situation (including reporting any resultant unexpected take), the actions taken by the research to minimize impacts to research fish, and coordination of additional actions that are necessary before the research can continue.

2. Each researcher must alert NMFS whenever the authorized level of take is exceeded, or if circumstances indicate that such an event is imminent. Notification should be made as soon as possible, but no later than 2 days after the authorized level of take is exceeded. The researcher must then submit a detailed written report to NMFS. Pending a review of the circumstances, NMFS may suspend the research and monitoring activities or implement reasonable measures and/or alternatives to allow research and monitoring activities to continue.

3. Each researcher must alert NMFS when a take of any ESA-listed species not included in the research proposal is killed, injured, or collected during the course of research and monitoring activities. Notification should be made as soon as possible, but no later than 2 days after the unauthorized take. The researcher must then submit a detailed written report to NMFS. Pending a review of the circumstances, NMFS may suspend research and monitoring activities or implement reasonable measures and/or alternatives to allow research and monitoring activities to continue.

4. In the case of ongoing studies, a report of actual take will be submitted to NMFS no less than 30 days before the request for take for the next year is submitted. For studies which only last 1 year, or upon termination of a multi-year study, a report of actual take will be submitted no less than 30 days after the activities described in the take determination letter cease. Take reports will include the numbers, life stage, species, and evolutionarily

significant unit (ESU) of fish taken; the type of take (harass, handle, kill); and levels of incidental mortality. The reports will also include the location of the take (geographical names and Hydrologic Unit Code (HUC), and summarize take into blocks no larger than one month (i.e., take for April, May, etc.). Any of the incidents described in items 2 and 3 above (exceeded take limits, or incidental morality not covered by the take determination) will also be described in this report. The report will also include an evaluation if methodology can be improved to reduce take (especially incidental mortality).

Take Estimates

The following tables list the total authorized take of listed salmon species.

Table 1. Total number of all potentially listed salmon species taken by the study. These numbers do not include numbers of fish carcass (no limit) which may be handled or sampled in the course of this project. Take levels: 1-harass or disturb, 2-capture and handle, 3-collect sample or tag, 4-lethal sampling.

Species	Clip status	Age	Age detail	Activity	Take Level	Take	Incidental mortality	Location	Dates
Chinook	unk	Subyearling	Subyearling	Passage study	2	2,820	51	Bonneville Dam	Apr-Jul
Chinook	Hatchery	Subyearling	Subyearling	Tag	3	3,123	312	Bonneville Dam	Apr-Jul
Chinook	unk	Subyearling	Subyearling	Tag	3	2,779	147	Bonneville Dam	Apr-Jul
Chinook	unk	Yearling	Yearling	Passage study	2	2,557	46	Bonneville Dam	Apr-Jul
Chinook	Hatchery	Yearling	Yearling	Tag	3	2,779	114	Bonneville Dam	Apr-Jul
Coho	unk	Yearling	Yearling	Passage study	2	2,233	40	Bonneville Dam	Apr-Jul
Sockeye	unk	Yearling	Yearling	Passage study	2	10,514	189	Bonneville Dam	Apr-Jul
Steelhead	unk	Yearling	Yearling	Passage study	2	1,808	33	Bonneville Dam	Apr-Jul

Species Summary	Take	Incidental Mortality
Chinook	14,058	670
Coho	2,233	40
Sockeye	10,514	189
Steelhead	1,808	33

Table 2. Estimated 2013 take activities for potentially ESA-listed salmonids authorized to be taken during the study. These numbers do not include numbers of fish carcass (no limit) which may be handled or sampled in the course of this project. Take levels: 1-harass or disturb, 2-capture and handle, 3-collect sample or tag, 4-lethal sampling.

ESU	Hatchery or Wild	Age	Age detail	Activity	Take Level	Take	Incidental mortality	Location	Dates
Snake River Fall Chinook	wild	Subyearling	Subyearling	Passage study	2	2	0	Bonneville Dam	Apr-Jul
Snake River Fall Chinook	wild	Subyearling	Subyearling	Tag	3	2	0	Bonneville Dam	Apr-Jul
Snake River Fall Chinook	hatchery	Subyearling	Subyearling	Passage study	2	18	0	Bonneville Dam	Apr-Jul
Snake River Fall Chinook	hatchery	Subyearling	Subyearling	Tag	3	17	1	Bonneville Dam	Apr-Jul
Snake River Fall Chinook	wild	Yearling	Yearling	Passage study	2	12	0	Bonneville Dam	Apr-Jul
Lower Columbia Chinook	wild	Subyearling	Subyearling	Passage study	2	28	1	Bonneville Dam	Apr-Jul
Lower Columbia Chinook	hatchery	Subyearling	Subyearling	Passage study	2	1,015	18	Bonneville Dam	Apr-Jul

ESU	Hatchery or Wild	Age	Age detail	Activity	Take Level	Take	Incidental mortality	Location	Dates
Lower Columbia Chinook	hatchery	Subyearling	Subyearling	Tag	3	3,123	312	Bonneville Dam	Apr-Jul
Snake River Spring Chinook	wild	Yearling	Yearling	Passage study	2	48	1	Bonneville Dam	Apr-Jul
Snake River Spring Chinook	hatchery	Yearling	Yearling	Passage study	2	81	2	Bonneville Dam	Apr-Jul
Snake River Spring Chinook	hatchery	Yearling	Yearling	Tag	3	241	10	Bonneville Dam	Apr-Jul
Upper Columbia Spring Chinook	wild	Yearling	Yearling	Passage study	2	70	1	Bonneville Dam	Apr-Jul
Upper Columbia Spring Chinook	hatchery	Yearling	Yearling	Passage study	2	141	3	Bonneville Dam	Apr-Jul
Upper Columbia Spring Chinook	hatchery	Yearling	Yearling	Tag	3	149	6	Bonneville Dam	Apr-Jul
Lower Columbia Chinook	wild	Yearling	Yearling	Passage study	2	7	0	Bonneville Dam	Apr-Jul
Lower Columbia Coho	wild	Yearling	Yearling	Passage study	2	34	1	Bonneville Dam	Apr-Jul
Snake River Sockeye	wild	Yearling	Yearling	Passage study	2	96	2	Bonneville Dam	Apr-Jul
Snake River Steelhead	wild	Yearling	Yearling	Passage study	2	69	1	Bonneville Dam	Apr-Jul

ESU	Hatchery or Wild	Age	Age detail	Activity	Take Level	Take	Incidental mortality	Location	Dates
Snake River Steelhead	hatchery	Yearling	Yearling	Passage study	2	149	3	Bonneville Dam	Apr-Jul
Upper Columbia Steelhead	wild	Yearling	Yearling	Passage study	2	139	3	Bonneville Dam	Apr-Jul
Upper Columbia Steelhead	hatchery	Yearling	Yearling	Passage study	2	213	4	Bonneville Dam	Apr-Jul
Middle Columbia Steelhead	wild	Yearling	Yearling	Passage study	2	242	4	Bonneville Dam	Apr-Jul
Middle Columbia Steelhead	hatchery	Yearling	Yearling	Passage study	2	451	8	Bonneville Dam	Apr-Jul
Lower Columbia Steelhead	wild	Yearling	Yearling	Passage study	2	22	0	Bonneville Dam	Apr-Jul
Lower Columbia Steelhead	hatchery	Yearling	Yearling	Passage study	2	26	1	Bonneville Dam	Apr-Jul

ESU Summary	Take	Incidental Mortality
Snake River Fall Chinook	51	2
Lower Columbia Chinook	4,166	331
Snake River Spring Chinook	370	12
Upper Columbia Spring Chinook	360	10
Lower Columbia Chinook	7	0
Lower Columbia Coho	34	1
Snake River Sockeye	96	2
Snake River Steelhead	218	4
Upper Columbia Steelhead	352	6
Middle Columbia Steelhead	693	13
Lower Columbia Steelhead	48	1

Pacific eulachon are listed as threatened under the ESA and eulachon critical habitat in the lower Columbia River and tributaries has been designated for protection. Nothing in this letter authorizes any take of eulachon which may occur as a result of your activities. If you encounter any eulachon in your activities, you should report any sighting, handling or other encounters with eulachon, and take all appropriate measures to avoid contact or minimize the potential for harm to the species. Any eulachon captured during your activities should be released as quickly as possible; and NMFS should be notified as soon as practicable. If your activities are also likely to adversely affect eulachon critical habitat, you should consult with NMFS.

Determinations by the FCRPS Branch for this research during the 2013 fish passage season and beyond will be made on an annual basis. The annual determination will depend upon information submitted in the research study's annual report, other new information, the annual anticipated status of fisheries stocks, and any subsequent review through regional review processes.

Please notify Trevor Conder, (503)231-2306 or Trevor.Conder@noaa.gov) as soon as possible of any deviation from the terms and conditions in this determination. Please include the study's official title and the number (from the subject line) of the current Take Determination Letter in all communications regarding this study. Please provide the FCRPS Branch's Take Determination Coordinator, Blane Bellerud (503-231-2238, Blane.Bellerud@noaa.gov), with the annual report for this research study.

Sincerely,

Ritchie J. Graves, Chief
Federal Columbia River Power System Branch
Hydropower Division

cc: Kinsey Frick
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