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UNITED STATES DISTRICT COURT
DISTRICT OF OREGON

NATIONAL WILDLIFE FEDERATION, *et al.*

Plaintiffs,

v.

NATIONAL MARINE FISHERIES, U.S. ARMY
CORPS OF ENGINEERS, and U.S. BUREAU
OF RECLAMATION,
Defendants.

Civ. No. 01-00640-RE (Lead Case)
Civ. No. 05-0023-RE
(Consolidated Cases)

**FOURTH DECLARATION OF
ROCK PETERS**
(Injunctive Relief)

COLUMBIA SNAKE RIVER IRRIGATORS
ASSOCIATION, *et al.*,

Plaintiffs,

v.

CARLOS M. GUTIERREZ, *et al.*,

Defendants.

FOURTH DECLARATION OF ROCK PETERS

I, Rock Peters hereby state and declare as follows:

1. I work for the U.S. Army Corps of Engineers (Corps) Northwest Division (Division) as a Fishery Biologist. I am currently the Senior Program Manager for the District Support Team for fish related issues in the Columbia River Basin. I have been in this position since December 27, 2004. My primary duties include overseeing and providing strategic guidance and direction to multi-district projects directed at improving dam and reservoir survival of fish.
2. Previously, I worked for the Corps at the Portland District Office as a Fishery Biologist. I was the Anadromous Fish Evaluation Program (AFEP)¹ Coordinator for Portland District. As part of my duties I developed the District's research priorities, chaired AFEP committees and coordinated regional, Division, and District technical activities. I was in this position from February 1999 to December 2004. I was also the Environmental Resources Fish Passage Team Leader, overseeing 7 fishery biologists. I was responsible for establishing team priorities and overseeing their work.
3. Between December 1987 and February 1999, I was a Fishery Biologist in the Environmental Resource Branch, Portland District, responsible for fishery technical support and input to District planning and engineering activities. I provided fisheries input for all aspects of pre-authorization studies, pre-construction planning, and other District activities. I also served as study manager and coordinator on various fish research studies on the Columbia, Willamette, and Rogue rivers. From 1982 to January 1987, I worked as a Fishery Biologist for the Corps on adult passage

¹ AFEP, a technical team tasked with producing scientific information to assist the Corps in making engineering, design, and operational decisions for safe efficient passage through the Snake and Columbia rivers migration corridor. (Peters Declaration ¶7)

evaluations at Lower Monumental, Ice Harbor, McNary, John Day, and Bonneville dams.

From 1985 - 1987, I served as the Operations Biologist at Bonneville Dam.

4. I earned a Bachelor of Science degree in Wildlife Science from Oregon State University in Corvallis, Oregon in 1977.
5. I have reviewed the Plaintiffs' Motion for Further Injunctive Relief and the Declaration of Thomas K. Lorz In Support of Motion for Further Injunctive Relief (2006 Operations), the Declaration of Robert Heinith, Second Declaration of John Williams, Declaration of Bruce Suzumoto, Second Declaration of Colonel Gregg Martin, and have formed the following opinions.
6. Based on my review of this information and literature, it is my professional opinion that: (1) the Plaintiffs' proposed action does not acknowledge and adhere to the best available science and it side-steps a systematic scientific approach, and therefore will not provide the best operations for passage of juvenile and adult salmon and steelhead as compared to the planned operation set forth in the Second Declaration of Col. Martin; (2) the adaptive management process used by the Corps for adjusting spill volumes and patterns at its mainstem Columbia and Snake run-of-river projects reflects and implements the best available science and will lead to significantly more adult returns than Plaintiffs' proposed action; and, (3) the Corps' planned summer spill operation is expected to better "spread-the-risk" by transporting approximately 50 percent of the fish with approximately 50 percent migrating in-river.
7. The following is a brief overview of some of the more adverse effects Plaintiffs' proposed operation would create:

- Plaintiffs' proposed spring and summer operation at Bonneville Dam will not increase yearling Chinook, subyearling Chinook, and steelhead survival as compared to the operation put forth in the Second Declaration of Col. Martin.
- There is no scientific evidence to support Plaintiffs' contention that the proposed increase in daytime spill at John Day will increase wild and hatchery steelhead survival and provide additional benefit for yearling Chinook.
- The Plaintiffs' proposal for increased spring spill will increase the number of fish left in-river when the transport benefit is high and will decrease adult returns, in contrast to the operation described in the Second Declaration of Col. Martin which will maximize adult returns.
- Plaintiffs' summer spill proposal will not provide for Snake River fall Chinook migration of 50% in-river and 50% transportation.

2006 Spill Operations

8. Mr. Lorz repeatedly overstates the value of spill as the preferred passage route in spring and summer, for all juvenile anadromous fish, at all dams. This characterization is not supported by the research available to date. Previous research has demonstrated that at a given dam, because of its configuration and spillway and bypass system features, some species passage survival is improved with reduced spill volumes and/or duration. For example, at The Dalles and John Day dams, increased spill has shown decreased juvenile survival (Absolon, R. et al, 2002; Counihan et al. 2003). In other instances, the research indicates that a higher spill volume 24 hours/day results in improved passage conditions for increased survival during the

- subyearling migration (Counihan et al. 2003). Thus, it is important to ensure that the spill regime applied is supported by science and is tailored to the particular project and species.
9. Caution should be exercised when proposing, as the Plaintiffs have in their motion, a spill operation that has not been tested (e.g. spill volumes and patterns), and it must be understood that there may be unanticipated effects on juvenile and adult fish passage. One such example occurred last year when excessive spill created an eddy condition in the tailrace at Little Goose Dam that delayed and impeded adult passage until spill levels were lowered (Third Declaration of Rock Peters, Docket No. 1036 at ¶¶ 23-29).
 10. When considering a change in operations, spill, transport, or project configuration, it is imperative to thoroughly understand potential effects on the species, and the relationship to other project facility operation (e.g. navigation locks, adult fish passage facilities, juvenile bypass facilities, and powerhouse discharge). For this reason, the Corps funds research on spillway configuration, spill volumes, and spill patterns with the objective of maximizing juvenile and adult salmonid passage survival through optimized project operations. The Corps' strategy for resolving uncertainties about how best to pass fish within season and at the different projects has been directed at conducting studies and research systematically.
 11. The Corps typically carries out two levels of study to address the uncertainties associated with passage through the hydrosystem. The first level of studies include research to assess dam survival. These studies are used to optimize individual dam operations and configuration for adult and juvenile passage. The second level of studies evaluate juvenile survival through the entire hydrosystem and assess returning adults as an indicator of success of the operation. The transport versus in-river study is an example of the second level of study.

12. Rather than addressing uncertainties in a methodical/systematic manner, Plaintiffs, in addition to their generalization that spill is the preferred means of passage for juvenile fish, couch their request for relief as achieving a “balance between in-river migration of juvenile salmon and steelhead with improved river conditions and collection of these fish for transportation.” Plaintiffs’ Memorandum in Support of Plaintiffs’ Motion for Further Injunctive Relief, at 8, citing Lorz Declaration, ¶¶ 26 and 37.
13. The Corps typically characterizes this “balancing” as the management approach referred to as “spread-the- risk,” which is used to address uncertainties about various passage routes. For example, uncertainty continues about whether and when juvenile transport or in-river migration during the summer will yield greater adult returns for some species, therefore a combination of transport and in-river migration passage is utilized.
14. During the summer subyearling fall Chinook outmigration, there is presently little to no evidence to support that one approach is superior or inferior to the other. For a number of years, the strategy used in the summer for subyearling fall Chinook, has been to maximize transportation. To assist in developing the best management strategy to achieve the highest adult fall Chinook returns, the Corps is working with the region to develop a comprehensive evaluation in 2006 (*see*, Second Declaration of Col. Martin). This 2006 operation will support this comprehensive evaluation and still provide for a “spread-the-risk” management option so approximately 50% of the juvenile fall Chinook will be collected and transported, and approximately 50% will migrate in-river. The study design also requires that good in-river conditions be provided to ensure optimum survival at each of the dams and adult passage is not impacted. The planned operation provides the requisite in-river conditions.

15. The Corps has reviewed a SIMPAS analysis of Plaintiffs' proposed operation conducted by NMFS for the summer operation. This analysis reveals that Plaintiffs' proposal will result in approximately 33% of the fish to be transported compared to Mr Lorz reported 41% (*see*, Lorz Declaration, ¶37). To provide a more balanced management strategy, or "spread-the-risk," due to the uncertainty on which operation provides the highest adult returns, the Corps' operation described in the Second Declaration of Col. Martin will provide approximately 45% of the fish in transport and 55% fish in-river. (*see*, Suzumoto Declaration, ¶ 11, Table 2).
16. As the region is predisposed to focus on improving juvenile fish passage, it is important to be mindful of how changed operations may affect adult passage as well. Increasing daytime spill has been shown to result in increased delay and fallback of adult salmonids. The accumulation of effects associated with adult delay and fallback has the potential to negatively affect adult returns. This response is not unique to Bonneville Dam where most of the delay in adult passage times has been observed. Increasing daytime spill has been shown to cause adult passage delays and increased fallback at projects on the lower Snake and Columbia rivers. (Exhibit 1, pgs. 3 & 28-34, Boggs, C.T. et al. 2005.) Fallback has shown negative population-level impacts to adult escapement back to spawning areas from 1-4%. In my opinion, significantly increasing daytime spill at hydroprojects in the lower Columbia and Snake rivers above levels previously evaluated, as the Plaintiffs have proposed, poses additional risk for adult salmonids reaching the spawning areas.
17. Below is a discussion of issues raised in Plaintiffs' requested spill operations for spring and summer, and scientific support for the Corps' planned operation.

Spring Operations

Bonneville Dam

18. Plaintiffs' requested spring operation at Bonneville Dam is to continue the 2004 UPA/BiOp nighttime spill levels, i.e. 120 kcfs up to the gas cap, and increase daytime spill from 75 kcfs to 100 kcfs. However, based on the Corps' analysis and review of survival studies of various passage routes at Bonneville Dam, spring migrant survival would be highest with 24 hour spill at 100 kcfs, as reflected in the Corps' planned operation described in the Second Declaration of Col. Martin.
19. A review of the 2004 and 2005 project survival studies indicates that overall dam survival at Bonneville Dam was very high for spring Chinook and steelhead ranging from 95% to 99% (Exhibit 2, figures 1 and 2; Exhibit 3, Table 1). However, the research results showed low spillway survival for both spring Chinook and steelhead. Conclusions about spillway passage from this report include:
- Spillway passage for yearling Chinook had the lowest survival rates overall for both 2004 and 2005 – i.e. spillway survival was lower than survival of fish passing through turbines.
 - For steelhead, spillway passage survival and juvenile bypass system (JBS) survival were similar, however, steelhead survival was highest with the Bonneville 2nd Powerhouse (B2) corner collector.
 - A breakout of the 2005 results for yearling Chinook and steelhead suggests that survival through the spillway was higher with nighttime spill to gas cap as compared to daytime spill survival; however, spillway survival generally was lower than survival through the other juvenile passage routes, i.e. B2 corner collector and the JBS, and B2 turbines (Exhibit 3, Table 1). Steelhead spillway survival was 98.6% at night, which was not as

high as either the B2 JBS or the corner collector. However, differences were not statistically significant. Steelhead spillway survival during the day again showed lower survival than most other passage routes -88.4%.

20. A meeting of the AFEP Studies Review Work Group (SRWG) was held on October 24th to discuss the low spillway survival research results for 2004 and 2005, and identify possible alternative spill operations to improve adult and juvenile fish survival at Bonneville Dam. The SRWG identified several alternative spill operations. (Exhibit 4).
21. In his declaration, Mr. Lorz states that “the workgroup agreed to recommend that the daytime spring and summer spill level at Bonneville should be increased to 100 kcfs.” (*see*, Lorz Declaration, ¶10). Contrary to Mr. Lorz’ statement, no recommendation was made. As indicated in the meeting notes four alternative strategies were identified for further consideration and discussion, with several additional actions to be taken prior to reaching a recommendation (Exhibit 4).
22. Having conducted additional analyses of the 2004 and 2005 data following the October 24 meeting, the results suggest that the Corps’ plan to increase spring spill in the daytime to 100 kcfs would minimize the operation of the Bonneville 1st powerhouse, while keeping spill within the threshold that minimizes adult passage delays (Exhibit 5, figures 3&4²). Based on model results, decreasing spill from gas cap spill of approximately 120 kcfs to 100 kcfs at night improves survival for yearling Chinook and steelhead through a range of flows in the spring.
23. It should be noted as depicted in these figures, the differences in survival between these two operations would likely be very small. However, the results for both spring Chinook and

² Model assumptions and input available upon request.

steelhead suggest a 100 kcfs spill 24 hours/day provides the highest dam survival through a range of flows in the spring as more juvenile fish would pass through the corner collector and the Bonneville 2 JBS. Based on this information, the Corps' planned operation of 100 kcfs 24 hour operation, results in similar to slightly better biological benefits than Plaintiffs' proposal.

The Dalles

24. The Corps has worked with regional biologists to modify both spill patterns and facilities at The Dalles Dam. With the installation of a "spillwall" in 2004 to provide better juvenile egress and minimize predation, studies indicate that 40% spill, 24 hours/day for spring should be continued (Counihan, T., et al. 2005). The spill operation requested by Plaintiffs is consistent with the Corps' analysis of maximizing juvenile survival at The Dalles. Further research is planned to enhance survival at this project.

John Day

25. Plaintiffs' requested spring operation of 45%, 24 hours/day during the spring at John Day Dam is not supported by the best available science. From 1999 to 2003, alternative spill operations were evaluated comparing 30% daytime spill with nighttime spill of 60% total river discharge verses spill up to the gas cap for 12 hours at night for both spring and summer (Exhibit 6, pg. 1, Table 1). Fish passage metrics used to compare the different alternatives included survival, fish passage efficiency, forebay retention time, and tailrace egress.

26. The results indicate that spilling during the daytime in the spring reduces both wild and hatchery steelhead survival and provides no additional survival benefit for yearling Chinook (Exhibit 6, pg. 4, Table 2). Mr. Lorz incorrectly implies that the 2002 test did not adequately evaluate wild steelhead survival under 12 and 24 hour spill treatments. (*see*, Lorz

Declaration, pg. 8, ¶13). The conclusion from the 2002 evaluation that wild steelhead survival was reduced with daytime spill is consistent with results in the test conducted in 2000, which also suggested a survival reduction for hatchery steelhead under the 24 hours spill condition.

27. Adult fish passage studies were conducted from 1999 to 2003 during the 12 hour nighttime versus 24 hour spill tests at John Day Dam. (*see*, Letter Reports: [http://www.cnr.uidaho.edu/uiferl/Reports.htm#Letter Reports](http://www.cnr.uidaho.edu/uiferl/Reports.htm#Letter%20Reports). Letter Report, dated October 27, 2003, pg. 1). Adult fallback³ increased by 2% with the addition of daytime spill, however, this increase was not statistically different than with nighttime only spill. Based on the data, the Corps plans continuing no daytime spill with a nighttime 60% total river discharge spill operation, which has been demonstrated to provide optimum passage conditions at the John Day project taking into account both spring Chinook and steelhead survival. The Plaintiffs' proposal to increase daytime spill to 45%, may impact adult fallback in excess of what was measured in previous years.

McNary

28. The current spring spill operation at McNary Dam is no spill during the day and spill to the gas cap at night. In 2005, the Corps funded an evaluation of 24 hour spill versus 12 hour nighttime spill. Initial results from the 2005 evaluation indicate that survival was higher for yearling Chinook and lower for steelhead with 24 hour compared to 12 hour nighttime spill; however, these differences were not statistically significant (Exhibit 7, pg. 7). As there is often year to year variability, it is standard scientific practice to conduct a minimum of two

³ Adult fallback – adult fish that move upstream past a project through the adult passage facilities then fallback past the project. Fallback of adult fish has been shown to decrease escapement to spawning areas.

years of research when evaluating changes in spill operations to make an informed decision on what is the most biologically sound operation.

29. The Corps is planning to coordinate through AFEP, a second year of testing 12 versus 24 hour spill at McNary Dam in 2006 consistent with last year's test. With the limited data available, it would be premature to implement the Plaintiffs' requested 55%, 24 hour spill operation. The Corps' planned operation includes a second year test of nighttime spill of 150 kcfs versus 40% instantaneous spill, 24 hour/day. (*see*, Second Declaration of Col. Martin). The SRWG will continue to refine details of the test and evaluate potential improvements to spill patterns to determine if bulk spill may improve steelhead passage conditions.

Ice Harbor

30. The Plaintiffs proposed no change in spill operations for Ice Harbor in 2006. However, based on study results that occurred in spring 2005, the Corps plans to conduct a second year test comparing the 2004 UPA/BiOp spill regime of 45 kcfs day/gas cap at night to a treatment with 30% spill for 24 hours/day.⁴
31. The research results from spring of 2005 compared an operation of the RSW with training spill - 34% spill to an operation without the RSW - 82% bulk spill at the gas cap 24 hours/day. The respective preliminary estimated spillway survival rates for these treatments were 97% and 96% for spring Chinook, and 99% and 97% for steelhead (Exhibit 8, tables 2&3). These differences in survival rates are not statistically significant.
32. In addition, the preliminary project survival rates were higher for spring Chinook with the RSW operation - 95% compared to 93% without, but lower for steelhead with the RSW - 91% compared to 93%, again with no apparent statistical difference. It appears that both

⁴ The Corps recommends the technical work groups re-evaluate spill patterns to determine if they can be improved to reduce forebay delay.

spillway and juvenile bypass survival was very high during the 2005 test with most of the reduction in survival occurring in the forebay prior to reaching the dam. The Corps anticipates review of the spill patterns prior to next years' operation to improve approach conditions to the dam.

Lower Monumental Dam

33. Plaintiffs propose no change in spring spill operations from the 2004 UPA/BiOp operations, which is 24 hour spill up to the gas cap. Mr. Lorz suggests that altering the spill patterns for 2006 may be beneficial. The Corps anticipates an evaluation of Lower Monumental spring spill patterns will occur, and as indicated above, the Corps plans to continue funding the participation of regional parties at the Corps' research facilities in Mississippi to assist in evaluating alternative spill patterns.

34. Consistent with the Plaintiffs' request, the Corps' plan is to spill 40 kcfs 24 hours/day through April 19. The remainder of the spring, the Corps plans to operate to maximize transport of juvenile migrants. (*see*, Second Declaration of Williams). Following the May transport season, 24 hour spill to the gas cap will resume at Lower Monumental until June 20.

Little Goose

35. The 2004 UPA/BiOp spring operation for Little Goose is no spill during the day and gas cap at night. Plaintiffs proposed operation is to add 30% spill during the daytime. In addition, Mr. Lorz noted another recommended operation by fish managers to evaluate an operation that would "compare 30% spill 24-hours/day to BiOp spill, which would simulate a future RSW operation and compare it to a 30% day spill/spill to the gas cap at night." (*see*, Lorz Declaration, ¶23).

36. As part of the regional plan for implementation of RSWs, the Corps is planning a test of 24 hour spill at 30% bulk spill versus 30% flat spill at Little Goose. This test will provide information to determine the optimal location of a future RSW. The test period will be from approximately April 15 to May 25. Following the test, the Corps plans to continue 30% day and 30% night spill from June 1 through June 19.
37. The Corps' plan as noted above will provide information about how the juvenile fish approach this project and where best to locate the RSW. In addition, this test will be conducted during a time when juvenile spring Chinook and steelhead are benefited by transport. It is important to minimize the potential impact to the juveniles while obtaining important research information. The Corps' planned 30% day/30% night operation will result in more juvenile fish being transported than the Plaintiffs' proposed operation and will result in higher adult returns.
38. The Corps's plan also includes monitoring adult counts so if a drop in numbers of adults passing the project is observed (adult delay in the tailrace), spill levels would be adjusted. During the court ordered spill last summer, adult fish experienced delays, which was corrected by reducing daytime spill to 30% of the river flow.

Lower Granite

39. At Lower Granite, Plaintiffs propose continuing 2004 UPA/BiOp spring spill levels. The Corps' plan is to operate consistent with the Plaintiffs' requested operation through April 19, which is 20 kcfs through the spillway with the RSW in operation. From April 20 to the end of May, spill would end to maximize collection and transport of juveniles (*see*, Second Declaration of Williams). Following the maximum transport operation, on June 1, 24 hour spill will be implemented at 20 kcfs until June 20.

Summer Operations

Bonneville Dam

40. Plaintiffs requested an operation of 100 kcfs spill daytime and 120 kcfs spill at night for the summer operation at Bonneville Dam. The Corps' Portland District modeled the alternatives that were discussed in the SRWG technical meeting on October 24, 2005. For subyearling fall Chinook, the highest survival for a summer operation is the 2004 UPA/BiOp spill operation of 75 kcfs day/gas cap at night (Exhibit 9, figure 5). This operation optimizes flow conditions so fish utilize the B2 corner collector and juvenile bypass facilities, which have a higher survival during the day than the spillway. Further collaborative discussions with the SRWG are warranted and will assist in determining whether additional operational refinements can be identified to make juvenile survival improvements. However, it appears that increasing spill will not provide increased survival as the Plaintiffs proposal suggests.

The Dalles

41. The Plaintiffs' proposal is to continue the 2004 UPA/BiOp spill regime of 40% spill, 24 hours/day. As noted above in ¶ 24, with the installation of a spillwall in 2004 to provide better juvenile egress and minimize predation, studies indicate that 40% spill, 24 hours/day in the summer should be continued. Further research is planned to enhance survival.

John Day

42. At John Day, the scientific data supports continued 30% spill 24 hours/day as described in the 2004 UPA/BiOp. The Plaintiffs' proposed increase in daytime spill from 30% to 45% would be accompanied by a reduction in juvenile bypass passage and would have little effect on reducing turbine passage at John Day Dam, and more importantly is not supported by any

- available information for juvenile passage (Exhibit 6). Furthermore, there are no survival data to assess what the overall dam survival effects would be if daytime spill were increased.
43. There is some evidence that increasing nighttime spill percent would reduce the proportion of subyearling Chinook that pass through turbines. However, increasing spill percent at night reduces juvenile bypass system and powerhouse survival, so the benefits of redistributing fish may be offset by reduced survival through these routes.
44. Based on the best available information, the Corps' plans to continue the 30% day/30% night operation in 2006 and pursue further collaborative discussions with the regional agencies and Tribes on configuration alternatives for future implementation.

McNary

45. Plaintiffs' motion seeks a voluntary spill level of 60% of river flow at McNary in the summer of 2006 citing 2005 summer operations which they assert was "an operation that generated very successful spillway survival estimates of nearly 100%." (*see*, Lorz, ¶32). During the June 22 - July 31, 2005 period when spill averaged about 60% of the total river flow, preliminary results of the radio tracking studies show that roughly 64% of the subyearling fall Chinook passed through the spillway, and 17% went through the bypass system (Exhibit 10, pg. 15; Exhibit 11, pg. 3&4). Dam and spillway survival were 96% and 100% respectively. Bypass survival of 86.5% was lower than expected, which may have been a result of tailrace egress problems at the juvenile bypass release site associated with high spill. Under high spill conditions, flow from the turbines and bypass can get drawn into the spillway, increasing passage times in the tailrace and exposing bypassed fish to higher potential predation.

46. The Corps' planned evaluation is designed to help understand the low survival numbers for bypassed fish by testing a 40% day/40% night versus the 60% day/60% night, and to increase bypass survival, turbine survival, and overall dam survival. This operation is also intended to more closely approximate a 50/50 spread-the-risk scenario in conjunction with the operation at the other three collector projects. For the remainder of the spill season, we plan to continue the test operation to provide a more balanced "spread-the-risk" operation for in-river and transported fish.

Ice Harbor

47. The Plaintiffs proposed no change in summer spill operations for Ice Harbor in 2006. Last summer, a test of the recently installed RSW was conducted. The preliminary results for dam survival at Ice Harbor in 2005 are 99.6 % for the non-RSW test and 98% with the RSW, at approximately half the spill volume (Exhibit 10, pg. 12&13; Exhibit 12, table 2). These differences are not statistically different and survival is very high in either case. With the RSW treatment, bypass survival was about 99%. We were not able to get an assessment of bypass survival with the non-RSW treatment as too few fish went through the bypass system. A second year test is planned for the summer to ensure reliability of the survival estimates. The details of the test will be worked through the SRWG technical work group.

Lower Monumental

48. Plaintiffs' requested operation is 24 hour spill up to the gas cap, which was the court ordered operation implemented in the summer of 2005. Based on the 2005 radio tracking study conducted during summer operation, spill levels averaged 21 kcfs with most fish passing through the spillway - 88%, and very few passing through the bypass system - 8%. Dam survival was low at 86.2% (Exhibit 10, pg. 10; Exhibit 12, table 1). When the forebay losses

are added in, the dam plus reservoir survival dropped to 72.2%. In interpreting this information, caution must be exercised as the evaluation occurred late in the season, with a high potential for either juvenile losses in the forebay and/or fish exhibiting holdover behavior that may have affected the test results.

49. Because this project exhibited much lower dam survival than any of the other projects, the Corps opposes implementing the Plaintiffs' request for 24 hour/day spill to the gas cap in the summer. Based on the Corps' analysis, the planned summer operation is to spill about 17 kcfs 24 hours/day with the objective of approximating a 50/50 spread-the-risk scenario. This should increase the number of fish in the bypass system and still provide adequate flow conditions for juvenile passage through the tailrace. Additional summer monitoring will be conducted to determine how to reduce juvenile losses in the forebay.

Little Goose

50. At Little Goose Dam, Plaintiffs are requesting a daytime spill level of 30% and spill to gas cap at night. This is the operation that resulted after implementation of the court ordered spill proved to result in significant adult passage delays⁵. The Corps conducted radio tracking studies during last summer's operation and based on these operating conditions - 30% daytime spill and gas cap at night, spill levels averaged 18 kcfs with 84% of the fish going through the spillway and 13% of the fish going through the bypass system (Exhibit 10, pg. 8; Exhibit 11, pg. 3, table 2). Dam and spillway survival were 91.6% and 92% respectively, and no survival estimate was available for the bypass system as most of the bypassed fish were transported.

⁵ The summer operation during the day was restricted to 30% due to significant concerns about adult passage delays.

51. The Corps' planned operation is to spill 30% daytime/30% nighttime to increase the number of fish transported and still provide good project survival conditions. Based on a SIMPAS analysis done by NMFS, this operation in concert with planned operations at the other transport projects will approximate a 50/50 spread-the-risk approach. (*see*, Declaration of Bruce Suzumoto). We also plan to test 24 hour spill with both flat and bulk spill patterns to assist in determining the location of an RSW.

Lower Granite

52. The Plaintiffs request is to operate the RSW with similar training spill used during the spring migration. The Corps conducted radio tracking studies at Lower Granite Dam for part of last summer's spill period, June 20 - July 22, 2005. The evaluation consisted of a two treatment test comparing RSW spill of 18.5 kcfs to a non-RSW spill level at 30.5 kcfs during the course of the study period. The fish passage efficiency was similar for both treatments - 97.5% with the RSW versus 98% with non-RSW spill; however, dam survival was higher with the RSW - 93.9% versus 89.5% with non-RSW spill (Exhibit 10, pg. 5&6; Exhibit 11, pg 1&2; (Exhibit 13, pg. 3). These differences were not statistically significant.

53. The Corps concurs with Plaintiffs that the RSW operation provided the highest in-river survival. However, Plaintiffs request 21 kcfs spill, whereas the average spill level in the summer of 2005 was approximately 18.5 kcfs. Significant information gained from last summer's spill operation and RSW test is that the number of fish bypassed and collected under the non-RSW condition was only 4%, whereas, 11% were collected with operating the RSW.

54. In conjunction with other collector projects for implementation of a system 50/50 spread-the-risk approach, the Lower Granite operation will provide 18 kcfs spill including the RSW to

ensure a higher number of fish in the bypass system while still ensuring good in-river juvenile survival at the project.

Actions to Further Address Uncertainties

Summer Transport – “Spread the Risk”

55. As explained above, information from the SIMPAS analysis suggests the Corps’ planned operation (*see*, Second Declaration of Col. Martin, ¶12) will more closely approximate a spread-the-risk approach by providing a little less than 50% of the fish in transport and leaving slightly over 50% of fish in-river.
56. To verify the SIMPAS estimates, we used the radio tracking studies from the 2005 summer operation as a guide at each of the collector projects to determine approximate spread-the-risk levels under the Corps’ planned operation. We estimate that collection and transport would yield a 4 dam estimate of roughly 53% collected and transported (McNary 17%, Lower Monumental 10%, Little Goose 15%, and Lower Granite 11%). Note that this estimate does not include reservoir associated mortality, which when included, will likely reduce the number of fish actually collected to be much less than 50%. It is also important that this operation provide good passage conditions at each project, and it is my opinion that many of the projects should be evaluated for project passage efficiency and survival for 2006.

Summer Spill Timing

57. The action agencies and NMFS prepared a report following the 2005 summer spill program to summarize the information and research results stemming from the summer spill for fish passage for the Snake River and McNary Dams (Exhibit 14). The report indicated that based on information from the USFWS/NOAA PIT tag data and the smolt passage indices, nearly all the subyearling fish, including both hatchery and wild fish, had passed Little Goose and Lower Monumental dams by July 15th and July 31st respectively (Exhibit 14, pg. 6 and 7). This suggests that very few fish were migrating during the August spill period.
58. Subyearling fall Chinook have three primary origins: hatchery production, wild Snake River spawning, and wild Clearwater River spawning. Numerically, hatchery fish are most abundant followed by Snake River wild fish, with Clearwater fish making the smallest juvenile contribution to the population. The hatchery fish are generally larger and come out of the system early with the Snake River wild stock following later. The Clearwater wild fish, are generally the last group to migrate out of the system. The Clearwater fish are smaller due to cold water temperatures and are of smaller size, therefore these fish migrate later. The subyearling outmigration timing can change annually due to variation in environmental conditions and the physiological condition of the fish but most of the hatchery fish and wild Snake River fish pass Lower Granite Dam by August 1. The limited data available for the Clearwater fish indicates they migrate considerably later, with few of these fish migrating until September or October.
59. Based on results from the annual studies provided by the USFWS and NOAA, new information is becoming available on subyearling fall Chinook. Both the Snake River wild and Clearwater wild groups have some propensity to holdover (*see*, Williams Declaration),

but the Clearwater fish holdover at a higher rate. These fish holdover throughout the Snake and Columbia rivers and in recent years have produced the majority of adult fall Chinook returning back to the Snake River. The holdover juvenile fish migrate throughout the fall, winter and into the spring outmigration the next year. All these are listed stocks of subyearling fall Chinook and are important for recovery of the fall Chinook in the Snake River.

60. The Corps plans to terminate spill after August 15th, if 95% of all hatchery produced and Snake River wild subyearling fish have passed through the collector dams and Ice Harbor Dam (*see*, Second Declaration of Col. Martin). Too little information is known about the Clearwater subyearling migrants to make an informed estimate of their passage timing.
61. The action agencies are planning to conduct PIT tagging studies as mentioned previously. The current research plan calls for PIT tagging hatchery and wild fish from both the Clearwater and Snake rivers and provides an opportunity to assess in real time, the migration timing of fall Chinook through the Snake River dams. This information combined with the smolt monitoring program will provide information on general passage timing and will provide more precise information on timing for wild and hatchery fish from both the Snake and Clearwater rivers.
62. The Corps plans to work collaboratively with the regional agencies and Tribes to develop a methodology for real time analysis to assess passage timing. Based on the result of the real time analysis, when 95% of the run has passed any Snake River dam, or McNary Dam, the Corps plans to terminate spill at the respective dam, but not prior to August 15th in any event.

63. As Hanford subyearling fall Chinook will be also passing McNary Dam during this time, a similar method that includes the Hanford reach fish will be used to determine when spill is eliminated at McNary Dam; again, not prior to August 15th.

Flow Survival Relationship

64. Mr. Heinith indicates that it has been demonstrated that there is a relationship between increasing flow and improving salmonid survival. (Heinith Declaration, ¶¶ 17-21). However, in two different reviews concerning this relationship, the Independent Scientific Advisory Board (ISAB) has not found that such a relationship is clearly evident: “The paradigm that faster movement of smolts to the estuary and ocean is always favorable for survival needs to be evaluated... We see a need for more specific analysis of the relationship between survival rates in the upper reaches of the rivers, survival rates in the lower reaches, date of arrival of smolts at the estuary, timing of ocean entry, and their subsequent ocean survival.” (<http://www.nwcouncil.org/library/isab/isab2003-1.htm>). “The ISAB found the relevant science to be in flux, providing no unambiguous answers at this time.”

(<http://www.nwcouncil.org/library/isab/isab2004-2.htm>).

65. In addition a technical memorandum produced by NOAA Fisheries, indicates that the “relationship between flow exposure and survival of yearling Chinook and steelhead within seasons was generally weak and inconsistent.” (NOAA Technical Memorandum NMFS-NWFSC-63, "*Effects of the Federal Columbia River Power System on Salmonid Populations*," February 2005 (Tech. Mem.) at pgs.72-105.). The Declaration of Paul A. Ocker, ¶¶ 9-16, also addresses the weaknesses in the flow survival relationship information.

66. Based on a review of the ISAB reports and the NOAA technical papers, the relationship of increased flow and survival as asserted by Mr. Heinith has not been adequately demonstrated.

Conclusion

67. In summary, my opinion is that the Corps' planned operation in the spring will produce more adult returns than the Plaintiffs' proposed operation. The Corps spring operation plan uses the adaptive management principal by taking into account the most recent research information and applying the results to a biologically supportable management plan. In addition, the specific project operations identified in the Corps' plan for both spring and summer, will provide the best dam survival conditions considering both juvenile and adult salmonids. Where uncertainty exists in the dam survival information, the Corps plans to conduct research to further optimize dam survival.

68. For the summer migration, it is my opinion that it is prudent to "spread-the-risk" between in-river and juvenile transport through the hydrosystem due to the uncertainty in the best management approach. The Corps' plan provides a more balanced approach for a spread-the-risk strategy than the Plaintiffs' proposal. The Corps' planned operation also addresses the need to provide a long term evaluation to determine the best strategy for fall Chinook adult returns - leaving fish in-river or juvenile transport. The Corps' plan ensures that adequate numbers of fish will be available in each of the alternatives while providing good in-river passage conditions.

69. Pursuant to 28 U.S.C. § 1746, I declare under the penalty of perjury that the foregoing is true and correct to the best of my knowledge, based on my education, experience and professional judgment. Executed November, 21, 2005, at Portland, Oregon.



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