

# NORTHWEST PULP & PAPER

NORTHWEST PULP & PAPER ASSOCIATION  
1300 114TH AVENUE SOUTHEAST, SUITE 110  
BELLEVUE, WASHINGTON 98004  
(425) 455-1323 FAX (425) 451-1349

March 31, 2000

Federal Caucus Comment Record  
C/o BPA-PL,  
707-W Main St., Suite 500  
Spokane, WA, 99201

**SUBJECT: FEDERAL CAUCUS COMMENT RECORD WITH REFERENCE TO  
U.S. ARMY CORPS OF ENGINEERS DRAFT LOWER SNAKE RIVER JUVENILE  
SALMON MIGRATION FEASIBILITY REPORT AND EIS/JOHN DAY DRAWDOWN  
FEASIBILITY STUDY/ALTERNATIVES TO FISH AND WILDLIFE  
IMPLEMENTATION PLAN EIS**

Dear Sirs:

Northwest Pulp and Paper Association (NWPPA) submits these comments for the record in the above-named proceedings. NWPPA represents the majority of the pulp and paper producers in the Pacific Northwest including a number of large world-class pulp and paper mills on the Columbia/Snake River system which are directly affected by decisions regarding the operation of the river system. NWPPA members also have facilities on the Willamette River which are also both directly and indirectly affected by such decisions.

NWPPA appreciates the opportunity this process presents to comment on the issues with respect to the development and implementation of the various components of a regional plan for the mitigation and recovery of Columbia Basin fish and wildlife. As the BPA's "Need Statement" suggests, there is a lack of coordination among the various responsible jurisdictions. Consequently, from the perspective of affected parties, there is almost a bewildering array of on-going proceedings. However, the question of dam breaching or removal, appears to be a common theme dominating the above referenced proceedings.

NWPPA is squarely opposed to dam breaching or removal for the following reasons. First there are large-scale economic impacts that would be disadvantageous to the region and to NWPPA members in particular. Secondly, these economic impacts are too big a risk to take when at the present we are faced with dueling experts and sometimes totally opposite scientific views as to what would be accomplished. Our economic and science concerns are summarized:

### Economic Concerns

NWPPA member facilities, the employees of these mills and the communities that depend on them would be adversely affected economically by any of the policy options calling for drawdown or breaching of the Lower Snake River dams or the John Day Dam. These facilities depend on availability of barge transportation of raw materials and products. At this time there is no cost-effective substitute. Commodities now transported by barge would be shifted to the region's railways and highways. These have been constructed along the banks of the Columbia/Snake Rivers, including the scenic Columbia River Gorge, and upgrades would entail another set of environmental and aesthetic impacts that might not be acceptable to the region's residents. Even assuming such upgrades would be acceptable to

1, 2  
cont.

the region's residents; the additional costs to the users would become unacceptably high. Transportation of raw materials by rail and trucks, instead of barges, would almost double transportation costs for the region's pulp and paper mills. Dam breaching is estimated to have a direct economic impact on these mills ranging between \$1.5 to 4.0 million a year in increased transportation costs.

3

The prospect of these additional costs is a key factor in why NWPPA sought intervention in the case of NWF v Corps of Engineers (Civil No. 99-442-FR) now before Judge Frye of the District Court in Portland. NWPPA submits for the record in this proceeding the affidavit of NWPPA in support of intervention (Attachment A), which provides more detail on the economic impact to our industry.

#### Environmental Concerns

As mentioned above, NWPPA is also concerned that policy regarding the operation of the dams on the Columbia/Snake river systems is being decided when there is not yet an understanding of what the changes, such as dam breaching, would accomplish. Furthermore, the agencies with jurisdiction have competing views regarding key factors pertaining to the river system dynamics. This concern was an additional reason that NWPPA sought intervention in NWF v Corps of Engineers. Very simply, NWPPA noted that the Corps of Engineers has a model that predicts that the temperature of the lower Snake would actually rise if the lower Snake River dams were breached or removed. EPA Region X has a model, which predicts the opposite, that the dams cause or contribute to elevated temperatures in the lower Snake River. Complicating matters are other debates in the scientific community as to which temperature regimes are the various species of fish actually need.

4, 5

NWPPA submits for the record in this proceeding, the affidavit of Dr. Peter Shanahan which discusses this issue in more detail (Attachment B). This affidavit was also prepared for submittal in NWF v. Corps of Engineers.

#### Conclusion

In conclusion, NWPPA believes that this is not just another debate of economy versus the environment. It is far more complicated. At this point is too risky to the economic viability of the region to base major policy decisions such as dam breaching when we are faced with dueling scientific opinions as to what it would accomplish.

Thank-you for your consideration of these comments.

Sincerely,



Llewellyn Matthews,  
Executive Director

cc: Senator Slade Gorton  
Senator Patty Murray  
Congressman Brian Baird  
Congressman Doc Hastings  
Congresswoman Jennifer Dunn  
Congressman Norm Dicks  
Congressman George Nethercutt

Senator Gordon Smith  
Senator Ron Wyden  
Congressman Greg Walden  
Governor Gary Locke  
Governor John Kitzhaber

Idaho and Montana congressional members

Attachment A

1 Richard S. Gleason, OSB No. 81239  
 Beth S. Ginsberg  
 2 Kevin J. Beaton  
 STOEL RIVES LLP  
 3 900 SW Fifth Avenue, Suite 2600  
 Portland, OR 97204-1268  
 4 Telephone: (503) 224-3380  
 Facsimile: (503) 220-2480  
 5 E-mail: rsgleason@stoel.com

**DOCKETED**Date 6/25/99

6 Attorneys for Applicant/Intervenor  
 Northwest Pulp & Paper Association  
 7  
 8

## UNITED STATES DISTRICT COURT

## DISTRICT OF OREGON

11 NATIONAL WILDLIFE FEDERATION,  
 et al.,

Civil No. CV 99-442 FR

Plaintiffs,

v.

14 U.S. ARMY CORPS OF ENGINEERS,

Defendant.

AFFIDAVIT OF LLEWELLYN  
 MATTHEWS IN SUPPORT OF  
 NORTHWEST PULP & PAPER  
 ASSOCIATION'S JOINDER TO  
 POTLATCH CORPORATION'S  
 INTERVENTION APPLICATION

17 STATE OF WASHINGTON )  
 )  
 18 County of King ) ss.

19 I, Llewellyn Matthews, being first duly sworn, state as follows:

20 1. I am the Executive Director of Northwest Pulp and Paper Association ("NWPPA").

21 I have held this position for approximately 20 years. I make all statements contained in this  
 22 Affidavit based upon my personal knowledge and professional experience. If called as a  
 23 witness I will testify to the truthfulness of the matters stated herein.

24 2. NWPPA is a nonprofit trade association incorporated in 1956 to represent the  
 25 interests of pulp, paper and pulping chemical industries in the Pacific Northwest in  
 26 environmental and energy issues of common concern to these industries. NWPPA was

Page 1 - AFFIDAVIT OF LLEWELLYN MATTHEWS IN SUPPORT OF NORTHWEST  
 PULP & PAPER ASSOCIATION'S JOINDER TO POTLATCH CORPORATION'S  
 INTERVENTION APPLICATION

STOEL RIVES LLP  
 ATTORNEYS

900 SW FIFTH AVENUE, SUITE 2600 PORTLAND, OREGON 97204-1268  
 Telephone (503) 224-3380

1 originally established because its member companies desired to participate with the state (and  
2 now regional) governments regarding water quality issues on the Columbia River system, and  
3 its tributaries which include the waters at issue in this lawsuit.

4 3. The plaintiffs in this case seek to accomplish an end-run around established  
5 administrative processes currently in place to address water quality issues posed by the dams at  
6 issue. Plaintiffs seek a ruling that water quality standards are directly enforceable against any  
7 facility, whether or not that facility is a point source subject to enforceable discharge limits  
8 imposed through Clean Water Act discharge permits (otherwise known as "NPDES" permits).  
9 Established Ninth Circuit precedence teaches, however, that water quality standards are not  
10 directly enforceable because they must be first translated into discharge limitations imposed by  
11 NPDES permits. See Northwest Environmental Advocates v. City of Portland, 56 F.3d 979  
12 (9<sup>th</sup> Cir. 1995). Significantly, EPA has long held the view (which has been judicially upheld)  
13 that dams are not point sources and therefore are not required to obtain NPDES permits. See  
14 e.g., National Wildlife Federation v. Gorsuch, 693 F.2d 156 (D.C. Cir. 1982).

15 a. The issuance of NPDES permits every five years to pulp and paper mills  
16 dictates the amount of capital investments necessary for their wastewater treatment facilities to  
17 meet water quality standards and consequently, the level of production necessary to pay for  
18 that capital investment. Accordingly, certainty with respect to water quality obligations for  
19 member mills is paramount to corporate confidence in making future capital investments in  
20 these facilities. An adverse precedent in this case that renders the NPDES permitting process  
21 uncertain as the primary mechanism for achieving water quality requirements has a chilling  
22 effect on long-term capital investments necessary for mills to stay competitive.

23 b. NWPPA's members own forest and farmlands along the Columbia and  
24 Lower Snake River systems. Silvicultural activities on these lands can lead to run-off of  
25 pollutants into surface waters, which, as non-point sources under the Clean Water Act, are  
26 regulated through the adoption of "best management practices" ("BMPs"). NWPPA has

1 worked closely with environmental officials in the Northwest to establish BMPs regulating  
2 these non-point sources of pollution that contribute to exceedances of water quality standards,  
3 including those promulgated for temperature. An adverse precedent in this case that renders  
4 the best management practices in place uncertain as the primary mechanism for achieving  
5 water quality requirements for non-point sources also has a chilling effect on long-term capital  
6 investments necessary for mills to stay competitive.

7 c. NWPPA has been very active in the technical, scientific and legal aspects of  
8 water quality issues in the Pacific Northwest for the past four decades. NWPPA's  
9 comprehensive involvement in water quality issues is reflected by: its funding of numerous  
10 water quality studies; its participation in the development of public policy, rulemakings and  
11 programs aimed at addressing water quality issues of the Columbia River system; and its  
12 intervention in and/or commencement of litigation involving water quality issues on these  
13 rivers. More specifically, NWPPA and its members have actively participated in the Lower  
14 Columbia River Bi-State Water Quality Program and has contributed substantial funds for  
15 water quality technical studies. NWPPA is currently participating in the Lower Columbia  
16 River Estuary Program which is focused on achieving compliance with water quality standards.  
17 NWPPA also intervened in Northwest Environmental Defense Center v. Browner, (No. C96-  
18 1438)(Western District of Washington) which centered on establishing a schedule for  
19 promulgation of total maximum daily loads for impaired water bodies. The majority of those  
20 impaired water bodies are listed as not meeting the state temperature standard, a direct concern  
21 to NWPPA members.

22 4. The members of NWPPA, in addition to Potlatch Corporation, that are directly  
23 affected by this lawsuit include Boise Cascade Corporation, Fort James Corporation, Longview  
24 Fibre Company, and Weyerhaeuser Company. Each of these companies owns and operates  
25 pulp and paper mills and/or tree farms and forest lands in the lower Snake and Columbia River  
26 systems and is substantially dependent upon the use of these hydrologically interconnected

1 river systems in their present configuration and navigable states. While the Complaint seeks to  
2 compel the four dams at issue to be operated in such a manner that ensures compliance with  
3 water quality standards and does not otherwise specify a path to accomplish the same, the two  
4 obvious mechanisms for achieving that result (assuming arguendo that the plaintiffs can  
5 establish that the dams are in fact causing temperature exceedances) include reservoirs draw  
6 downs and the breaching of the dams themselves. Either of those forms of relief will radically  
7 alter water flows and elevations which currently support the industrial activities necessary for  
8 the continued viability of these member companies in the Pacific Northwest.

9 a. More specifically, the ability of these member companies to continue to  
10 barge raw materials and finished products on the Snake River and the Columbia River system  
11 generally, would be significantly impaired if not altogether eliminated. Some of these member  
12 companies, like Potlatch, depend on the ability to barge wood chips from sawmills and  
13 chipping facilities on the Snake River for use at the pulp and paper mills on the Columbia.  
14 Transportation by barge is the most cost-effective method of getting raw materials from the  
15 inter-mountain region to down river mills. All members are dependent upon chip transfer and  
16 loading facilities on the Snake and Columbia River below the confluence of the Snake River.  
17 For example, Longview Fibre Corporation receives wood chips barged down the  
18 Columbia/Snake River system from two of its facilities on the Snake River and processes those  
19 raw materials in its pulp and paperboard plant. All members are heavily dependent upon the  
20 continued navigability of these waters for trade and industrial purposes. In fact, all of  
21 NWPPA's members who own and operate mills depend to varying degrees on independent  
22 commercial sources of raw materials which are barged throughout the river system.

23 b. The option of shipping these materials by rail increases the costs to these  
24 mills by approximately \$28-\$30 per done dry unit or more. If these materials are shipped by  
25 truck, the cost increases by approximately \$40 per done dry unit. Assuming shipment by rail  
26 and depending upon the volume of chips used at each mill, the cost impacts could range from

Page 4 - AFFIDAVIT OF LLEWELLYN MATTHEWS IN SUPPORT OF NORTHWEST  
PULP & PAPER ASSOCIATION'S JOINDER TO POTLATCH CORPORATION'S  
INTERVENTION APPLICATION

STOEL RIVES LLP

ATTORNEYS

900 SW FIFTH AVENUE, SUITE 2800 PORTLAND, OREGON 97204-1269

Telephone (503) 224-3380

1 an estimated \$1,500,000.00 to \$4,000,000.00 per mill per year. This estimate does not  
2 include the additional costs associated with upgrading the mills' rail and truck receiving  
3 facilities.

4 c. If the dams on the Lower Snake were breached or the reservoirs drawn  
5 down, energy costs for all of NWPPA's members will be significantly increased. The four  
6 dams on the lower Snake provide approximately 15 percent of the total power generating  
7 capacity of the Corps' dam system. Consequently the loss of these dams will significantly  
8 affect energy supply and therefore increase energy costs.

9 5. It is obvious that Plaintiffs also seek to establish legal precedent for public and  
10 private dams on the lower Snake and Columbia Rivers systems which are hydrologically  
11 connected. Both Oregon and Washington have listed virtually the entire Columbia River as  
12 water quality impaired under section 303(d) of the Clean Water Act. Consequently, the same  
13 arguments and precedents in this case could be applied to the dams on the Columbia River. If  
14 the plaintiffs are successful in achieving a radical change to dam operations or the removal of  
15 the lower Snake River dams altogether, water flow and levels on these rivers necessary to  
16 support a variety of activities essential to the continued viability of the mills would be  
17 adversely affected.

18 a. All of these down river mills located on the Columbia are dependent on the  
19 hydrology of the Snake River system because of the hydrological connection between the two  
20 rivers. Consequently, all of these down river mills have built a number of structures which  
21 operate within the range of water levels currently maintained not only by the Snake River  
22 dams, but the Columbia River dams as well. Water intake structures located at the mill sites  
23 provide process water for each mill, ranging between 35 and 65 million gallons per day  
24 depending on the production. A change in water levels outside that currently provided by the  
25 dams would result in the need to relocate some of these structures.

26

1           b. Similarly, Boise Cascade has 8600 acres of irrigated tree farms in the Snake  
2 River basin and an additional 9600 acres in the Columbia River basin below the Snake River  
3 dependent on water supply and associated intake structures and pumps. If this Court requires  
4 the Lower Snake River dams to be breached or the reservoirs to be drawn down, the water  
5 intake devices for these facilities will be required to be relocated and redesigned at significant  
6 capital costs to the company.

7           c. Like Potlatch, Fort James owns dams which could be adversely affected by  
8 the ruling reached in this case. The dams owned by Fort James provide a portion of the Camas  
9 mill's water supply needs. If this option for providing water were eliminated due to an  
10 inability of the dams to continue operating, Fort James would need to invest \$150,000 to  
11 modify its intake structure. Additional pumping costs would increase by roughly \$400,000 per  
12 year for this mill.

13           d. The dams on the Lower Snake and Columbia River system provide important  
14 flood control functions. In 1996 there was a 100 year storm event that caused widespread  
15 flooding in the Pacific Northwest. While all mills experienced difficulties, one case in  
16 particular illustrates the critical flood control function that dams provide in the river system.  
17 Fort James owns and operates a wastewater treatment facility on Lady Island for its mill at  
18 Camas. The berms on Lady Island, which contain the 108 acres wastewater treatment lagoons  
19 for the Camas mill, were nearly breached during this high water event. Because water backed  
20 up into the Camas mill's sewer system, wastewater generated by the mill could not be  
21 discharged and the mill had to shut down. Therefore, if the dams at issue in this case were  
22 breached or substantially modified, the mills would become far more vulnerable to flooding  
23 due to the hydrological connection between the Lower Snake and the Columbia River system.  
24 The increased risk of flood damage during peak runoff periods will impact the shoreline  
25 facilities at Fort James' Camas and Wauna facilities, including riverbank pump stations,  
26

1 wastewater treatment facilities, dock warehouses and fuel unloading stations in addition to  
 2 other critical structures and equipment located within the floodplain.

3 6. At the June 11, 1999 regular quarterly meeting of the NWPPA Board of Trustees,  
 4 the members voted to authorize NWPPA to intervene in this case on their behalf because of the  
 5 significant impacts that this case portends to NWPPA's members with mills and forestlands  
 6 located on or near the Columbia and Snake River systems.

7 7. In short, without an ability to intervene in this lawsuit, NWPPA will be unable to  
 8 adequately protect the important proprietary interests of its member companies and will be  
 9 unable to safeguard the substantive and procedural interests it has spent more than two decades  
 10 achieving through participation in established Clean Water Act processes.

11 \_\_\_\_\_  
 12 \_\_\_\_\_  
 13 \_\_\_\_\_  
 14 \_\_\_\_\_  
 15 \_\_\_\_\_  
 16 \_\_\_\_\_  
 17 \_\_\_\_\_  
 18 \_\_\_\_\_  
 19 \_\_\_\_\_  
 20 \_\_\_\_\_  
 21 \_\_\_\_\_  
 22 \_\_\_\_\_  
 23 \_\_\_\_\_  
 24 \_\_\_\_\_  
 25 \_\_\_\_\_  
 26 \_\_\_\_\_

Further this affiant saith not.

EXECUTED this 23<sup>rd</sup> day of June, 1999.

Llewellyn Matthews  
LLEWELLYN MATTHEWS

SUBSCRIBED AND SWORN to before me this 23<sup>rd</sup> day of June, 1999.

Annice Benuradi  
Notary Public of Washington  
Residing at Issaquah  
My Commission Expires: 10/28/2000



**COPY**

Attachment B

1 Beth S. Ginsberg  
Kevin J. Beaton  
2 Bryan S. Geon, OSB#97505  
STOEL RIVES LLP  
3 900 SW Fifth Avenue, Suite 2600  
Portland, OR 97204-1268  
4 Telephone: (503) 224-3380  
Facsimile: (503) 220-2480  
5 E-mail: bsgeon@stoel.com

6  
7 Attorneys for Intervenors Potlatch Corporation  
and Northwest Pulp & Paper Association

8  
9  
10 UNITED STATES DISTRICT COURT  
DISTRICT OF OREGON

11 NATIONAL WILDLIFE FEDERATION, et  
12 al.,

Civil No. CV 99-442FR

13 Plaintiff,

14 v.

15 U.S. ARMY CORP OF ENGINEERS,

16 Defendant,

17 POTLATCH CORPORATION;  
NORTHWEST PULP & PAPER  
18 ASSOCIATION; COLUMBIA RIVER  
ALLIANCE; and INLAND PORTS AND  
19 NAVIGATION GROUP,

20 Intervenors.

DECLARATION OF PETER SHANAHAN,  
Ph.D.

21 1. My name is Peter Shanahan, Ph.D.

22 2. I am a consulting engineer and hydrologist and have formed my own company,  
23 HydroAnalysis, Inc. in Acton, Massachusetts. I specialize in hydrology, water quality,  
24 hydraulics, and computer modeling. I am also a Lecturer in the Department of Civil and  
25 Environmental Engineering at the Massachusetts Institute of Technology (MIT) in Cambridge,  
26 Massachusetts. A current version of my curriculum vitae is attached.

Page 1 - AFFIDAVIT OF PETER SHANAHAN

**EXHIBIT A**

1           3. I hold Bachelor of Science degrees from MIT in Civil Engineering and Earth and  
2 Planetary Sciences, a Master of Science degree in Environmental Earth Sciences from Stanford  
3 University, and a Doctor of Philosophy in Environmental Engineering from MIT. I am a  
4 registered Professional Engineer in Massachusetts and other states.

5           4. I have extensive experience in the use of computer models to assess and predict  
6 water temperature. I first developed models of water temperature in 1974 as a graduate student  
7 at Stanford University.

8           5. From 1974 to 1976 I was employed as Hydrothermal and Hydraulic Engineer at  
9 Bechtel Incorporated. There I developed and applied computer models of temperature and  
10 waste heat disposal for numerous power generation and other facilities throughout the United  
11 States and overseas. At Bechtel, I also completed several studies of dams and reservoirs,  
12 including evaluations of dam operations and the selective withdrawal of cold water from deep  
13 reservoirs.

14          6. From 1976 to 1978 I was employed at Resource Analysis, Inc., a consulting firm  
15 established by four MIT professors that specialized in computer model applications in water  
16 resources. Resource Analysis has since been purchased and remains a part of Camp Dresser &  
17 McKee. While at Resource Analysis I developed the temperature simulation algorithms of the  
18 Massachusetts state water-quality model, STREAM7. I also developed a model of the  
19 hydrology, hydraulics, and dam operations of the Cumberland River system for the U.S.  
20 Army Corps of Engineers and was a co-author of the Corps of Engineers Water Hammer and  
21 Mass Oscillation (WHAMO) model for simulation of hydropower operations.

22          7. From 1978 through 1981, I was a teaching and research assistant at MIT while I  
23 pursued my doctorate. At MIT, I participated in a research study of computer modeling of  
24 reservoir and stream temperature and contributed to a study of heat transfer by evaporation.  
25 From 1981 through 1988, I was Water Resources Engineer and later Manager of Water  
26 Resources at ENSR Corporation. While at ENSR I completed or directed studies of waste heat

1 disposal and water temperature at industrial facilities in Minnesota, New Hampshire, and  
2 South Carolina.

3 8. In 1988, I formed HydroAnalysis, Inc. to offer specialty consulting services in  
4 hydrology, water quality, hydraulics, and computer modeling. At HydroAnalysis, I have  
5 completed studies related to water temperature and waste heat disposal for water bodies in  
6 Connecticut, Idaho, Massachusetts, New York, Pennsylvania, the U.S. Virgin Islands, and  
7 Indonesia. I have also served as an invited participant in an EPA Workshop on the effects of  
8 climate change on water quality and have developed computer models and completed water-  
9 quality analyses of several lakes and reservoirs.

10 9. I am the author of over forty journal articles, book chapters, and conference  
11 papers dealing with topics in hydrology, water quality, and hydraulics. I am the author of  
12 numerous papers pertinent to the fate and transport of heat in water bodies, including an EPA-  
13 published review of water temperature modeling.

14 I have been retained by Potlatch Corporation and the Northwest Pulp & Paper  
15 Association to review expert declarations submitted by the Plaintiffs in National Wildlife  
16 Federation, et al. v. U.S. Army Corps of Engineers (D.Or.), Civil Case No. 99-442FR. I  
17 have reviewed the Declaration of David J. Wegner and offer the following observations and  
18 conclusions:

19

20 10. Heating of water in rivers and reservoirs depends upon a complex interplay  
21 between the speed of water movement, the volume of water within the water body, and the  
22 surface area exposed to the atmosphere.

23 11. Surface water is cooled or heated by the transfer of heat across the water surface.  
24 Incoming radiation heats the water, outgoing radiation cools the water, evaporation cools the  
25 water, and conduction of heat between the water and the atmosphere may either heat or cool  
26 the water depending upon the relative temperatures of the water and atmosphere. In models of

1 water temperature, mathematical equations are used to predict these various modes of heat  
2 transfer across the surface of a water body. These equations are well established in the  
3 technical literature and accepted in the profession.

4 12. The temperature of a body of water depends not only upon the amount of heat  
5 transferred across its water surface but also upon the characteristics of the water body itself.  
6 Water that moves slowly tends to be warmed more than water that moves quickly. Shallow  
7 water warms more than deep water. Water shaded by shoreline vegetation is warmed less than  
8 unshaded water. Water sheltered from the wind experiences less evaporative cooling than  
9 water open to the wind. Water open to the wind also tends to have a more uniform  
10 temperature vertically than water that is less stirred by wind action. These and other  
11 characteristics of the water body help determine the temperature of the body of water and the  
12 distribution of temperature within the body of water.

13 13. Given the complexity of surface heat transfer and water-temperature dynamics, it  
14 is not scientifically appropriate to conclude summarily that dams or hydropower facilities on  
15 the Lower Snake River increase water temperature. Rather, changes in temperature depend  
16 upon the multitude of factors outlined above and must be evaluated on a case-by-case basis.

17 14. Region 10 of the United State Environmental Protection Agency released a draft  
18 report entitled "Columbia River Temperature Assessment: Simulation Methods" prepared by  
19 John Yearsley in February 1999. I have completed a detailed technical review of this report  
20 and attended a meeting held by the EPA on September 17, 1999 at which technical information  
21 on the model was presented and discussed. The study described in the EPA report entailed the  
22 development and application of a mathematical model of river water temperature utilized on a  
23 digital computer. The stated purpose of the model was to evaluate the effects of dams and  
24 tributaries on water temperature in the Columbia and Snake Rivers.

25 15. The EPA model was issued in February in draft form. At the September 17  
26 meeting, EPA representatives indicated the following: (1) the temperature model has been

1 circulated for formal and informal peer review comments; (2) the EPA is currently preparing  
2 responses to peer review comments; (3) the model has been and may continue to be revised in  
3 response to peer review comments; and (4) the report on the model is being rewritten. EPA  
4 representatives indicated that the agency hopes to issue a final report that includes a written  
5 record of the peer review process by the end of October 1999. The agency declined to release  
6 the current report draft or peer review comments in the meantime.

7         16. A statistical technique known as Kalman filtering was used to adjust certain  
8 model parameters in the EPA model in an attempt to improve the agreement between model  
9 predictions and measured river temperatures under historical conditions. The process of  
10 adjusting model parameters so as to improve model predictions is usually called model  
11 calibration. During the September 17 meeting, it was revealed that the draft report does not  
12 provide a full description of the extent to which the model parameters were adjusted by  
13 calibration. In particular, the evaporation coefficient, which determines the amount to which  
14 the water is cooled by evaporation, was adjusted during model calibration but is not so  
15 reported in the draft report. Usually, the evaporation coefficient is determined from first  
16 principles and is not treated as a calibration parameter in models of water temperature. The  
17 evaporation coefficient of the EPA draft model was varied during its calibration in such a way  
18 as to lower the evaporation coefficient from its initial value. Lowering of the evaporation  
19 coefficient reduces the amount of water predicted to evaporate. This in turn lowers the amount  
20 of heat predicted to leave the water body as the result of evaporation and leads to higher  
21 predicted water temperatures. The adjustment of the evaporation coefficient is an important  
22 aspect of the model development because the adjustment itself is atypical and the effect of the  
23 adjustment was to raise the predicted water temperature. Because the draft report does not  
24 describe this adjustment, some or all peer reviewers were unaware of it and the peer review  
25 was thereby incomplete. As a result, the EPA model, even when "finalized" will not have  
26 undergone a complete peer review.

1           17. The EPA report identifies the Columbia River temperature model as a "screening  
2 model" suitable for identifying issues to be addressed in more detailed research. The purpose  
3 of the model, as indicated by EPA personnel in the September 17 meeting, was to determine  
4 whether dams or tributary inflows had a greater effect on water temperatures in the Columbia   
5 and Snake River mainstems. EPA indicated the purpose of this comparison was to determine  
6 which of these two factors should become the focus of future research. The model's developer,  
7 Dr. John Yearsley, directly stated "that EPA has not reached any conclusions about dam  
8 removal based on this model." Moreover, it is my opinion that it would be inappropriate to  
9 reach such conclusions based on this type of screening model. A far more detailed and  
10 complete model and analysis is required to make decisions of the magnitude of the proposed  
11 dam removals.

12           18. My review of the EPA temperature model indicates that the model was calibrated  
13 based on its ability to match water temperatures observed throughout the year. In contrast,  
14 only the portion of the model predictions involving extremely high summertime temperatures  
15 was used in evaluating effects of dams. Careful inspection of the EPA calibration shows that  
16 the model does a poor job of predicting extreme summer temperatures and tends to predict  
17 higher temperatures than actually observed during the summertime extreme. The mismatch  
18 between the calibration process and the use of the model, and the systematic error in the model  
19 predictions call into question the ability of the model to predict river temperatures accurately. I  
20 do not believe the model in the form presented in the February draft report can be used with  
21 confidence to predict extreme summertime temperatures in the Columbia or Snake Rivers.

22           19. At the September 17 meeting, it was reported by representatives of the Walla  
23 Walla District of the Corps of Engineers that the district had sponsored the development of  
24 another model of temperature in the Snake River. That model was developed by the Pacific  
25 Northwest Laboratories and is described in a draft report entitled "Long-Term One-  
26 Dimensional Simulation of the Lower Snake River Temperature for Current and Unimpounded

1 Conditions" dated August 1999. I have not had the opportunity to review this report in detail  
2 and cannot comment on its technical soundness. Nonetheless, as presented at the September 17  
3 meeting, this model predicts that removal of the Lower Snake River dams would result in  
4 higher summertime water temperatures in the Snake River below Ice Harbor Dam than with  
5 the dams in place. The result is diametrically opposed to the trends predicted by EPA's draft  
6 model and indicates the need for further research on the effects of dams on water temperature  
7 in the Lower Snake/Columbia River system.

8 20. The water temperature in the Columbia and Snake Rivers exceeds the standard of  
9 20 °C due to natural causes. For example, water temperature was measured by the U.S.  
10 Geological Survey in the Snake River near Anatone, Washington from October 1959 through  
11 September 1993. This measurement station is upstream of the Lower Snake River dams that  
12 are proposed to be removed. In all of the summers from 1960 through 1993, measured river ✖  
13 water temperatures rose above 20 °C in the river at this station. Because the river temperature  
14 exceeds the 20 °C standard upstream of the Lower Snake River dams it is impossible for  
15 removal of the dams to cause the standard to be met downstream.

16 21. It is impossible for the Corps of Engineers to alter its operation of the four  
17 Lower Snake River dams to lower river water temperature significantly. The Lower Snake  
18 River dams are known as "run-of-the-river dams" and possess limited storage capacity. As a  
19 result, the dams cannot be operated so as to store and release cooler water or otherwise  
20 appreciably control river temperature.

21 22. The EPA model predictions are based on the assumption that future climate and  
22 river basin hydrology will resemble those of the past. However, climatic trends, watershed  
23 development, and global climate change all have the potential to cause systematic changes in  
24 river temperature over longer periods of time. These factors are not considered in the EPA  
25 temperature model but may preclude the possibility of ever achieving the 20 °C temperature ✖  
26 standard in the river.

1           23. Paragraph 5 of Mr. Wegner's Declaration asserts that hydropower facilities  
2 increase water temperature. This statement is overly simplistic and belies the complexity of  
3 water temperature dynamics in natural water bodies. As described above, water temperature  
4 dynamics in surface water bodies are complex and require case-by-case analysis.

5           24. In Paragraph 5 of his declaration, Mr. Wegner lists characteristics of reservoirs  
6 associated with warmer water temperatures but neglects a multitude of factors associated with  
7 cooler temperatures. The greater depth and volume of a reservoir means that it responds more  
8 slowly to changes in weather and thus tends to be cooler during short-term "hot spells." In  
9 deep reservoirs, the greater depth of a reservoir insulates deeper water from heating by the  
10 atmosphere, creating a year-round store of cold water at depth. The larger open surface of a  
11 reservoir allows higher wind speeds and more evaporative cooling than does a river. The  
12 larger volume of water in a reservoir retains summer heat longer, as indicated by Mr. Wegner,  
13 but also retains winter cold longer, thus mitigating the usual summertime rise in temperature.  
14 Mr. Wegner omits these potentially ameliorative effects of reservoirs on water temperature  
15 from his one-sided portrayal of dams and reservoirs.

16           25. Mr. Wegner depends almost entirely upon the EPA's draft report on its  
17 Columbia River temperature model as the basis for his quantitative statements on the effects of  
18 dams. As reported by the EPA in its September 17 presentation, Mr. Wegner was one of three  
19 persons solicited by EPA to provide peer review of the EPA report and one of two who  
20 actually provided solicited peer reviews. Mr. Wegner's participation in this litigation and in  
21 the formal peer review process appears to be a conflict of interest as described by the EPA  
22 peer review guidelines published in the EPA report entitled "Science Policy Handbook - Peer  
23 Review" (EPA Report No. 100-B-98-001). Mr. Wegner may have been able to influence the  
24 EPA report and model through his participation in the EPA's formal peer review process.

25           26. Paragraphs 6 through 17 of Mr. Wegner's declaration are based on an uncritical  
26 acceptance of the draft EPA report and model as they were issued prior to peer review. At the

1 September 17 meeting, the EPA stated that the model and its calibration have been revised as  
2 the result of the peer review process and their report is being rewritten. Moreover, as  
3 described above, the draft report was incomplete in its description of the model calibration and  
4 thus the peer review itself may be incomplete. Further, as described above, I believe the EPA  
5 model is flawed by an inappropriate calibration procedure. Finally, as also described above,  
6 results that directly contradict the EPA model have been realized by the Corps of Engineer's  
7 model of water temperature in the Lower Snake River. The basis for Mr. Wegner's  
8 statements, namely the EPA model as reported in a preliminary draft, remains unproven and  
9 contested and has been superceded in any event.

10 27. Mr. Wegner's summary conclusions in Paragraph 7 are inappropriately drawn  
11 from the EPA temperature model, which was developed simply as a screening model. A  
12 screening model is defined in the EPA Columbia River temperature model report (pg. 5): as  
13 follows: "... screening models are used to satisfy the requirement for rapidly assessing either  
14 an extensive geographical area or a large number of water quality parameters. The output of  
15 screening models is for the purpose of identifying marginal and critical areas for additional  
16 study."

17 28. In short, Mr. Wegner's opinion that the EPA model "irrefutably demonstrates"  
18 effects of the Lower Snake River dams is contrary to the declared purpose and power of the  
19 EPA model.

20 DATED and SIGNED this 3rd day of October, 1999, at Acton, MA.

21  
22   
23 Peter Shanahan, Ph.D.  
24  
25  
26