APPENDIX F

RIVER GRAVEL QUALITY STUDY CONSULTATION
MEETINGS AND DOCUMENTS

RIVER GRAVEL QUALITY STUDY LIST OF AGENCY CONSULTATION MEETINGS		
Date	**Agenda**	**Attendees** *
7/26/83	1983 Gravel Sampling Schedule	WDF, WDG, NMFS, & USFWS
12/17/85	District response to agency comments on gravel studies	WDF, WDG, NMFS, USFWS, TT
1/29/86	Familiarize Joint Agencies with Project Power Management concerns	WDF, WDG, NMFS, USFWS, TT

* WDF--Washington Department of Fisheries; WDG--Washington Department of Game (now Wildlife); TT--Tulalip Tribes; NMFS--National Marine Fisheries Services; and USFWS--U.S. Fish and Wildlife Service.

RIVER GRAVEL QUALITY STUDY
INDEX TO AGENCY CONSULTATION DOCUMENTS

Continued on next page

RIVER GRAVEL QUALITY STUDY
INDEX TO AGENCY CONSULTATION DOCUMENTS

* WDF--Washington Department of Fisheries; WDG--Washington Department of Game (now Wildlife); TT--Tulalip Tribes; NMFS--National Marine Fisheries Services; and USFWS--U.S. Fish and Wildlife Service.

SNOHOMISH COUNTY
PUD
PUBLIC UTILITY DISTRICT No. 1

2320 California St., Everett, Washington 98201 258-8211
Mailing Address: P. O. Box 1107, Everett, Washington 98206

February 25, 1982

Mr. Jon Linvog
National Marine Fisheries Service
1700 Westlake Avenue North
Seattle, WA 98109

Mr. Martin Kenney
U. S. Fish and Wildlife
2625 Parkmont Lane S.W.
Olympia, WA 98502

Mr. R. Gary Engman
Department of Game
509 Fairview Avenue North
Seattle, WA 98109

Mr. Robert Gerke
Department of Fisheries
3939 Cleveland Avenue
Tumwater, WA 98504

Mr. David Somers
Tulalip Tribes, Inc.
6700 Totem Beach Road
Marysville, WA 98270

Gentlemen:

Sultan River Project
"Evaluation of the Quality of Sultan
River Spawning Gravels" by Michael Wert

On February 16, 1982, the Snohomish County PUD Board of Commissioners authorized execution of the "Uncontested Offer of Settlement - Joint Agencies". In order to comply in part with Item 3b of that agreement the enclosed study proposal for streambed sediment analysis has been prepared for your review and comment. Since it is the Joint Agencies' desire that the initial sampling be conducted prior to construction it is critical that we obtain your written approvals of our proposed program as soon as possible. We would appreciate receiving your comments by March 10, 1982.

The District has contracted with Mike Wert to perform the sediment sampling and prepare the report of the study results. All of you have worked with Mike or know him through his association with George Eicher and their work on the two-year Sultan River Fish and Wildlife Research Contract with the Department of Game. A copy of Mike's resume' is attached for your information.

Evaluation of the Quality of Sultan River Spawning Gravels

Mike Wert has arranged for Mr. Cleve Steward to assist him in the sampling program. Mr. Steward's Masters Thesis on gravel analysis is listed as a reference in the proposed study. He has had field experience in the proposed "state-of-the-art" method of collecting streambed sediments in spawning gravels. He will also assist Mike in the analysis of the field sampling data. Mike will be responsible for writing the formal report.

Our tentative schedule for this program is as follows:

Agency Approvals:	No later than March 10, 1982
Field Reconnaissance of Sampling Sites with Mike Wert (if desired by Joint Agencies representatives)	Week of March 15 (depending on river conditions)
Initial Sampling:	Week of March 22 (depending on river conditions)

The sampling schedule is necessarily dependent upon the weather and river conditions. Therefore it is important that we be prepared to take advantage of favorable conditions as they occur. Your prompt responses will be helpful in ensuring that the program meets your needs and is accomplished prior to construction.

Your responses should include identification of your agency representative and his availability for the field reconnaissance trip during the week of March 15. The sampling locations shown on Figure 2 of the proposal are suggestions on the general vicinities with site specific identification to occur during the field reconnaissance. Therefore, we request your written approvals of the enclosed proposal and the proposed sampling locations as shown on Figure 2.

Yours very truly,
Original Signed by
R. E. VINE

R. F. Vine
Sultan Project
Construction Manager

Enclosures

c: W. G. Hulbert, Jr. w/enc.
D. G. McMillen w/enc.
M. Wert w/enc.

cc: R. F. Vine
J. B. Olson — Williams, Novack, Hansen
G. Kirmeyer 1 copy — R. Willoughby
R. Metzgar — M. H. Stevenson
A. Griffith copy

HN SPELLMAN
Governor

ROLLAND A. SCHMITTEN
Director

STATE OF WASHINGTON

DEPARTMENT OF FISHERIES

115 General Administration Building • Olympia, Washington 98504 • (206) 753-6600 • (SCAN) 234-6600

March 9, 1982

NOTED

MAR 1 2 1982

J. B. OLSON

Mr. R. F. Vine
Sultan Project Construction Manager
Snohomish County PUD No. 1
P. O. Box 1107
Everett, Washington 98206

Dear Mr. Vine:

Review of Sultan River Spawning
Gravel Monitoring Proposal

Department of Fisheries staff have reviewed the referenced proposal prepared for the PUD by Michael Wert and comments and recommended modifications to the proposed program follow.

First, we recognize the need for haste in collecting pre-construction samples, if indeed, construction at the powerhouse or Culmback Dam is surely going to begin by June 1. However, we urge the PUD to delay initial sampling as long as practical if the construction schedule slips.. If actual construction will not commence until later this spring or summer, then the field crew collecting the freeze core samples could have the benefit of working under more favorable weather conditions (greater chance of 5 continuous days without rain) and lower, clearer flows. Water clarity and ease of mobility will be crucial in the selection of specific sample sites.

We also firmly believe that changes are necessary regarding the five proposed sampling reaches. First, reach No. 3 upstream of Woods Creek and below the powerhouse should be dropped from the program because on-site observations by WDF biologist, John Easterbrooks, indicate that very limited spawning habitat exists in this reach. This stretch of river is a continuous rapids or cascade with large rubble and boulder substrate and no spawning gravel except occasional patches behind boulders. A spawning survey in 1979 revealed only one fall chinook carcass in this area and no redds. Secondly, reach No. 5 adjacent to the Sultan River Park should also be dropped since this area is not extensively used for spawning. Since the objective of this study is to assess the impact of construction and operation of the Sultan Project on spawning habitat, we believe that it makes the most sense to expend sampling effort in areas heavily utilized by the fish --- ease of access should not be the primary consideration in site selection. In place of the two reaches we would drop, a new site should be selected at one of two locations in the lower river downstream from the

BPA powerline. Pink salmon and fall chinook spawn extensively on two large riffles in this stretch of river. Approximately 700 of the total 1,100 pink salmon counted on the spawning survey last fall were observed at one of these locations. The remaining three proposed reaches (No's. 1, 2 and 4) are satisfactory.

We feel strongly that the portion of the program regarding quantitative measurement of water velocities and depths at the study sites is an unnecessary, unproductive task. Specific sampling sites should be selected by fish biologists with a good knowledge of where the various species spawn. WDF personnel have conducted spawning surveys for four years in all areas of interest and are capable of locating the exact location where fish spawned last fall or in previous years. Besides, the suitability of the substrate for spawning and not the flow characteristics on a particular day are most important in selecting specific sites. For example, locations which appear to be spawnable based on depth and velocity distributions during high spring flows may not be suitable and probably won't be used by fall chinook or pink salmon spawning at lower fall flows. The depth-velocity work should be deleted from the program.

Our final comment deals with the number of core samples to be removed in each reach. It is the opinion of our personnel experienced in freeze core sampling and gravel quality analysis, that 10 samples per reach is excessive. They feel that a maximum of 5 samples is adequate since they have found that the variability between samples is quite low (if the sites are selected properly).

The remainder of the proposal appears to be satisfactory for our purposes. If you or your consultant wish to discuss our recommendations further or have any questions, please feel free to call either John Easterbrooks (753-4159) or Bob Gerke (753-3624).

John Easterbrooks will be available to accompany Mike Wert and assist in selecting specific sites based on known spawner distribution. In line with our earlier comment, we would like to see the entire study delayed until later in the year consistent with a realistic prediction of construction start up. However, he will be available the week of March 15 if pre-construction field time is truly limited.

A vitally important issue which should be discussed between the PUD and the Joint Agencies in the near future, after the Aquatic Mitigation Settlement Agreement is formally signed by all parties, is how the data obtained from the above study will be used to partially fulfill Article 3.b. of the agreement. Specifically, we need to: 1) determine what percentage of fines in the core samples constitutes a significant contamination problem, and 2) what percentage of the total number of core samples must show evidence of contamination before corrective measures are taken, and 3) agree on what corrective measures are actually feasible and appropriate.

The Department of Fisheries looks forward to continuing the cooperative working relationship we have had with the PUD as the Sultan Project moves from the licensing phase into the construction and finally the operational phase.

Sincerely,

Robert J. Burke/for

Rolland A. Schmitten
Director

cc: Engman
Somers
Linvog
Kinney

SNOHOMISH COUNTY
PUD
PUBLIC UTILITY DISTRICT No. 1

2320 California St., Everett, Washington 98201 258-8211
Mailing Address: P. O. Box 1107, Everett, Washington 98206

March 10, 1982

Washington Department of Fisheries
115 General Administration Building
Olympia, WA 98504

ATTN: Mr. Millard Dueson

Washington Department of Game
Seattle Regional Office
509 Fairview Avenue
Seattle, WA 98109

ATTN: Mr. Phil Schneider

Gentlemen:

Sultan River Project
Hydraulic Project Application
Streambed Gravel Sampling

This is to submit an Hydraulic Application form to conduct streambed sediment analysis of the Sultan River as part of our agreement with your agencies and others concerning the potential effects on fisheries of constructing the Sultan River Hydroelectric Project. The proposal attached to the application form has already been submitted for review by your agency representatives.

Since it is the desire of your agencies that initial sampling be conducted prior to construction, which is tenatively scheduled to commence within the next few weeks, it is urgent that this application be handled expeditiously. (Sampling should start the week of March 22nd, river flow conditions permitting.)

Due to the short time remaining for processing this application and initiating field work, we are submitting this application prior to receipt of any review comments on the proposal. Any comments can be incorporated during processing of the application, such as specification of sampling sites determined through field reconnaissance. We expect that you will be developing such information from either our field reconnaissance or by others with Mr. Mike Wert who will be doing the sampling.

If there are any questions, please contact Roy Metzgar at (206) 258-8637.

Very truly yours,

W. G. Hulbert, Jr.
Manager

Enclosures

cc: Mike Wert (letter only)
R. F. Vine " "
D. G. McMillen " "

RGM:cw

HYDRAULIC PROJECT APPLICATION
(R.C.W. 75.20.100)

RTMENT OF GAME
Capitol Way North
pia, Washington 98504

DEPARTMENT OF FISHERIES
General Admin. Bldg.
Olympia, Washington 98504

PLEASE PRINT OR TYPE
DO NOT WRITE IN SHADED AREA

AST NAME / FIRST: ublic Utility District No. 1 of Snohomish Co.	[19] CONTACT PHONE(S): (206) 258-8211
TREET OR RURAL ROUTE: . O. Box 1107	
CITY: verett	STATE: WA ZIP: 98206
TREAM OR LAKE: Sultan River	TRIBUTARY TO: Skykomish River
UARTER SECTION: See Attachment 1	SECTION / TOWNSHIP / RANGE (E-W)
COUNTY: Snohomish	[11] TYPE OF PROJECT: Hydroelectric power plant, streambed sediment analysis

[1] [2] [3] [4] [5] [6] [7] [8] [9] WRIA A B C D [14] [15] [16] [17] F G

DESCRIPTION OF WORK, METHOD, AND EQUIPMENT

See Attachment 2 - "Evaluation of the Quality of Sultan River Spawning Gravels"

(IF NECESSARY USE BACK OF THIS SHEET OR ADDITIONAL SHEETS)

DISTANCE, DIRECTIONS TO PROJECT SITE FROM NEAREST TOWN

Town of Sultan from RM 0.0 to 9.6

ISED STARTING DATE	PROPOSED FINISHING DATE	PARTICIPATING ORGANIZATIONS (IF ANY)
March 15, 1982	June 1, 1982	P.U.D., Mike Wert

EPA AGENCY/DATE: [X] YES Final SEPA EIS June 12, 1979 Final FERC EIS September 18,1981 [22] $230,000,000

HER PERMITS: See Attachment 3

UNDERSTOOD THAT NO WORK WILL ARTED UNTIL A SIGNED APPROVAL CEIVED.

SIGNATURE

3/10/82
DATE

ME LIMITATIONS:

JOHN SPELLMAN
Governor

FRANK LOCKARD
Director

STATE OF WASHINGTON
DEPARTMENT OF GAME
Seattle Regional Office—509 Fairview Avenue North, Seattle 98109. Telephone: 464-7764

March 10, 1982

NOTED

MAR 12 1982

J. B. OLSON

R. F. Vine, Sultan Project Construction Manager
Snohomish County PUD No. 1
P.O. Box 1107
Everett, WA 98206

Re: Evaluation of the Quality of Sultan River Spawning Gravels

Dear Mr. Vine:

We have reviewed the subject study proposal and have the following comments.

1. We concur with the general locations of all sample stations with the exception of site 3. Sites 1, 2, 4, and 5 are all located in the vicinities of observed steelhead spawner usage. We have seen little to no steelhead spawner activity at site 3. A more useful location may be the vicinity of RM 2.0. We recommend moving site 3 to that location.

2. Final, exact site selection, should be based on actual spawner use. Statements on page 2 of the proposal imply that selection will be based on sites that simply have the correct depth and velocity. These factors are a direct function of flow. Since Sultan discharge can vary widely, a site deemed suitable by this method may not be suitable when spawning actually occurs. Therefore, only sites actually used by spawners should be selected. As a part of this study, spawner use of selected sites should be documented.

3. Statistical validity of study design and results is exceptionally important. We appreciate that statistical expertise has been sought in study planning. To ensure that adequate samples are collected, qualified statisticians must be involved throughout study implementation and data analysis. It is essential that final results are statistically valid and remedial measures, if required, be adequately justified.

4. Criteria should be identified to specify what conditions will require remedial action. What percentage of fines or expected in-gravel survival, or changes in these factors, will trigger corrective action? These criteria should be developed by your consultant and agreed to by all parties early in study implementation.

5. Drafts of each study report should be distributed to all parties for review and comment. Review comments should be incorporated in the final reports.

6. A component part of conclusions reached in this study should be recommendations for corrective actions. Consultant shall develop and describe alternative corrective measures, if needed, for consideration and selection of appropriate action.

We understand that this proposal is submitted to comply with the "Sediment Analysis" subject of the agreement, and that the "Gravel Analysis" element will be the subject of further work.

Thank you for the opportunity to provide comment.

Very truly yours,

R. Gary Engman, Program Manager
Habitat Management Division

RGE:td

cc: U. S. Fish and Wildlife Service
National Marine Fisheries Service
Tulalip Tribes
Washington Department of Fisheries

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
ENVIRONMENTAL & TECHNICAL SERVICES DIVISION
847 NE 19th AVENUE, SUITE 350
PORTLAND, OREGON 97232
(503) 230 5400

F/NWR5/JL/1503-14

MAR 10 1982

NOTED

MAR 12 1982

J. B. OLSON

R. F. Vine
Sultan Project Construction Manager
Snohomish County PUD No. 1
P.O. Box 1107
Everett, WA 98206

Dear Mr. Vine:

National Marine Fisheries Service (NMFS) has reviewed the study proposal entitled "Evaluation of the Quality of Sultan River Spawning Gravels" and has the following comments for your consideration.

In general, the methodology described in the study proposal should provide the necessary data to determine if degradation of spawning gravels has occurred as a result of Sultan Project construction and operation. However, we also recommend inclusion of the following additional considerations:

1. Once the study reaches are identified, we suggest that actual usage of these specific areas by spawning fish be documented. This could possibly be accomplished through coordination with Washington Departments of Fisheries and Game field personnel in annual spawning surveys.

2. If tests of comparison show that spawning gravels have been degraded, development of remedial measures will be necessary. As indicated in item 3b of our settlement agreement, the "...Licensee and the joint agencies shall jointly determine appropriate remedial measures." We believe that such measures, if needed, should be initially developed and proposed by the Licensee as part of the study and included in the final report. This could then serve as a basis for further discussions and/or negotiation with the joint agencies.

3. Prior to issuance of formal reports after each study phase, the joint agencies must be allowed thirty (30) days to review drafts of these reports. We also suggest that comments from the joint agencies be appended to the reports.

Mr. Jon Linvog of my staff in Seattle is prepared to participate in the study as time and funding permits. Thank you for the opportunity to review the study proposal. We look forward to your continuing cooperation.

Sincerely,

Dale R. Evans
Division Chief

cc: Mike Wert

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
2625 Parkmont Lane, S.W., Bldg. B-3
Olympia, Washington 98502

NOTED

MAR 15 1982

J. B. OLSON

March 11, 1982

R. F. Vine, Construction Manager
Sultan Project
P.O. Box 1107
Everett, Washington 98206

Dear Mr. Vine:

As requested in your letter dated February 25, 1982, we have reviewed the report entitled, "Evaluation of Sultan River Spawning Gravels", which was prepared by Mr. Michael Wert. Our comments on the report are as follows.

General Comments

We appreciate the references on freeze-core sampling and the latest methods being used to analyze sediment composition of core samples. We believe the methods described by Mr. Wert should be employed in evaluating the quality of spawning gravels.

While the Methods section of the report was adequately covered, we believe the report was deficient because it did not address two major subjects. These two subjects are:

1. Based upon the information in Table 1 presented by Lotspeich and Everest (1981), at what level will the percent of fine sediments significantly impact the survival of salmon and steelhead eggs and fry and be determined unacceptable? The Washington Department of Fisheries (WDF), Washington Department of Game (WDG), Tulalip Indian Tribe, National Marine Fisheries Service (NMFS), and the Service, in conjunction with Snohomish County P.U.D., will have to make a determination on the percent of survival of eggs and fry we expect to be achieved in the Sultan River in relation to quality of spawning gravels. The level of percent agreed upon should be presented in your first formal report and be used as a future basis for determining if significant impacts have occurred from construction activities or project operation.

2. The report did not present any corrective actions that the P.U.D. is considering using if construction or project operational practices are found to be causing significant sedimentation problems of the Sultan River gravels. Your first formal report to the joint fish and wildlife agencies should have a section outlining remedial actions that could be taken if a problem occurs. One action your formal report should address is the use of flushing flows from Culmback Dam to dislodge and transport silt that has accumulated in the gravels so that egg-to-fry survival is maintained.

Specific Comments

Page 2, Methods, Sediment Sampling

It was stated in the report that five spawning reaches have been selected. Prior to gravel sampling, the five spawning reaches should be field checked by WDF and WDG to verify the sites chosen do represent good spawning habitat. Once a site is chosen, in consultation with the above agencies, it should be permanently marked to insure that future sampling will occur in the same area.

Since our agency is recommending the five spawning reaches be field checked by WDG and WDF, we believe there is no need to take quantitative measurements of water velocity and depth to identify spawning habitat. WDG and WDF, through their past field studies on the Sultan River, should be able to direct Mr. Wert to the best spawning areas.

Page 3, Methods, Sediment Sampling

It is stated that "the number of samples to be removed per reach will depend on the reach size . . . ." How will this reach size be determined? We would also like to know if the samples in a given reach will be taken randomly or in straight-line transects.

It is also stated in this section that "according to statisticians at University of Washington, up to 10 samples per reach may be required." Our agency wants to emphasize that we definitely want enough samples taken at each stream reach that the results will be statistically sound (i.e., 95 percent confidence limit). We believe this is a very important concept, particularly if the joint fish and wildlife agencies and P.U.D. are trying to determine if damages to a spawning reach have occurred. We expect the statistical results will be published in every report prepared by Mr. Wert.

Finally, all the joint resource agencies should have an opportunity to review content and language of all draft reports prior to them being finalized.

We appreciate the opportunity to comment on this report. If you have any questions concerning our comments, please contact Martin Kenney, of my staff, at 753-9440.

We also look forward to reviewing your baseline evaluation of gravel quantity of the Sultan River. If you have any questions regarding this study, please contact Mr. Kenney.

Sincerely,

Charles A. Dunn

Charles A. Dunn
Field Supervisor

cc: WDG
WDF
NMFS
Tulalip Indian Tribe

SNOHOMISH COUNTY
PUD
PUBLIC UTILITY DISTRICT No. 1

2320 California St., Everett, Washington 98201 258-8211
Mailing Address: P. O. Box 1107, Everett, Washington 98206

March 26, 1982

shington Department of Fisheries
5 General Administration Building
ympia, WA 98504

Washington Department of Game
Seattle Regional Office
509 Fairview Avenue
Seattle, WA 98109

TN: Mr. Millard Dueson

ATTN: Mr. Phil Schneider

ntlemen:

Sultan River Project
Hydraulic Project Application
Streambed Gravel Sampling

On March 10, 1982 the District submitted an Hydraulic Application rm to conduct streambed sediment analysis of the Sultan River as part of our reement with your agencies and others concerning the potential effects on sheries of constructing the Sultan River Hydroelectric Project. On March 25th field reconnaissance of sampling sites was conducted with representatives from ur agencies (John Easterbrooks and Gary Engman) and also the National Marine sheries Service (John Linvog) and the Tulalip Tribes (Dave Somers). This ordinated field reconnaissance was delayed due to unfavorable river conditions.

Results of the field reconnaissance identified mutually agreeable sites d the scope of sampling to be conducted on them. The enclosed map shows the neral location of the following five sites agreed to:

1) Gold Camp area
2) Chaplain Creek gaging station (vicinity)
3) BPA power line crossing (several hundred yards downstream)
4) Winters Creek (several hundred yards downstream)
5) Public fishing access area (north of SR 2 bridge)

Sites were denoted in the field such that subsequent sampling can be nducted again on those sites. Several samples will be taken at each site to ovide statistically valid results. Sampling work will avoid redds within ch site.

Since runoff, reservoir and river conditions may continue to be favorable next week, Mike Wert, who will be doing the sampling work, anticipates initiation of sampling as soon as feasible. This letter and map consitute the remainder of our application pending before you, unless we are notified otherwise. Your continued cooperation in expeditiously handling this application is appreciated. If there are any questions, we refer you to your representatives or Roy Metzgar at (206) 258-8637.

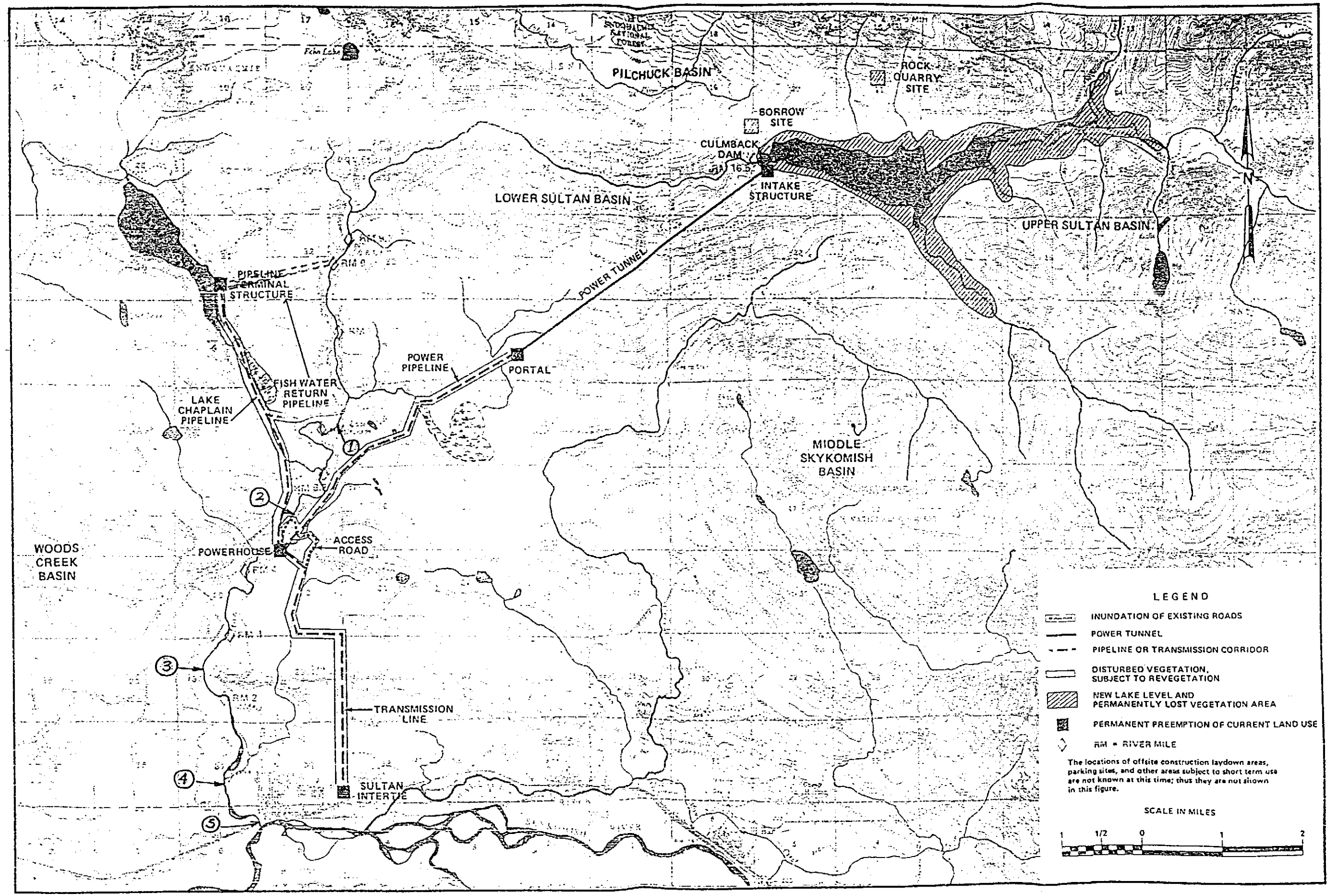
Very truly yours,

/s/

W. G. Hulbert, Jr.
Manager

Enclosure

bcc: W. G. Hulbert, Jr.
Mike Wert w/att.
R. F. Vine w/att-
D. G. McMillen w/att.
R. G. Metzgar w/att.



GENERAL PROJECT ARRANGEMENT

Sultan River Hydroelectric Project
Snohomish County Public Utility District No. 1

←O Streambed sampling site
RGM: 3/25/8227

SNOHOMISH COUNTY
PUD
PUBLIC UTILITY DISTRICT No. 1

2320 California St., Everett, Washington 98201 258-8211
Mailing Address: P. O. Box 1107, Everett, Washington 98206

April 1, 1982

Mr. Jon Linvog
National Marine Fisheries Service
1700 Westlake Avenue North
Seattle, WA 98109

Mr. Martin Kenney
U. S. Fish and Wildlife
2625 Parkmont Lane S. W.
Olympia, WA 98502

Mr. R. Gary Engman
Department of Game
509 Fairview Avenue North
Seattle, WA 98109

Mr. Robert Gerke
Department of Fisheries
3939 Cleveland Avenue
Tumwater, WA 98504

Mr. David Somers
Tulalip Tribes, Inc.
6700 Totem Beach Road
Marysville, WA 98270

Gentlemen:

Sultan River Project
"Evaluation of the Quality of
Sultan River Spawning Gravels"

Attached for your review is a discussion of responses to your agency's comments related to the District's program to evaluate Sultan River spawning-gravel quality. It is understood that this study will be conducted to partially satisfy Amended License Article 56 and conditions in the Stage II Settlement Agreement with the Joint Agencies. Additional studies related to evaluation of spawning-gravel quantity will be dealt with at a later time.

We have submitted an application for a Hydraulic Permit to conduct the proposed field work essential to basic data collection. All necessary equipment is on hand and we are prepared to proceed as soon as the permit is issued and as river conditions allow. We must, however, have your written acceptance of this program, as evidenced by your signature below and return of this letter, prior to actual sampling. Your timely response will be appreciated.

Yours very truly,

R. F. Vine
Sultan Project
Construction Manager

cc: Mr. Michael Wert

Attachments

Approval: _____

The District has reviewed Joint Agency comments provided in response to the District's proposal entitled "Evaluation of the Quality of Sultan River Spawning Gravels" (February 25, 1982), written by Michael Wert. Some of these comments were discussed by participants during the March 25 Sultan River field trip conducted for the purpose of visually inspecting and reaching agreement on specific spawning reach sampling sites.

Participants of the field trip were Gary Engman (Washington Department of Game), John Easterbrooks (Washington Department of Fisheries), Jon Linvog (National Marine Fisheries Service), Dave Somers, (Tulalip Indian Tribes), Michael Wert and Cleve Steward (Biological Consultants to the P.U.D.). Final agreement was reached by all as to sampling site locations. Easterbrooks, Engman and Wert confirmed salmon or steelhead spawning use at specific areas selected for sampling at each site based on their previous spawning survey observations. Detailed maps of each site and access routes will be provided in a report to be written following baseline data collection and evaluation.

A general description of these sites is (1) Gold Camp spawning reach (RM 7.2) just upstream of Horseshoe Bend; (2) along the west bank downstream of the U.S.G.S. Chaplain Creek gage station; (3) along the left bank below the riffle located adjacent to the end of First Street (RM 2.5); (4) downstream of Winters Creek confluence at RM 0.5; and (5) near the river mouth (RM 0.1) along the right bank at the Sultan River Park (see Figure 1).

It is our understanding that your comments, questions and concerns regarding sampling site locations have been answered to your satisfaction and you concur with the above.

Our responses to written comments received are presented in the order submitted by the agencies, and for your reference, we have attached copies of the Joint Agency letters we received.

National Marine Fisheries Service

1) Salmon or steelhead spawning at the agreed upon sampling locations has been documented for all sites for at least the past four years. Future monitoring of spawning use would provide continued information as to relative use of these sites, but this may or may not be reflective of gravel quality changes. Future spawning surveys by Washington Departments of Fisheries and Game at these sites might be incorporated into their programs of annual spawning surveys.

2) The District agrees that remedial measures, should they be necessary, would be developed and proposed in a subsequent report subject to discussion with the Joint Agencies. The measures and their implementation would depend on results of the analysis indicating the degree of change in gravel quality. Detailed or extensive effort on rehabilitation strategies is premature at this time.

3) Joint agency review of report drafts of each study phase prior to their issuance will be allowed for a period of 30 days. Review comments will be incorporated into the final draft of each report.

Washington Department of Game

1) Agreement has been reached regarding sampling sites.

2) Water depth and velocity will not be measured to relate these parameters to spawner use, but may be used in evaluating comparisons of results of sediment levels between samples and/or sites.

3) Statisticians will be involved in data analysis. While it was recommended that up to 10 samples be taken at each site, the observed homogeneity of substrate at selected sites combined with the practical experience of Bob Gerke of Washington Department of Fisheries and Cleve Steward of Research Institute (U of W) indicate fewer samples will be required. Five samples will be taken at each site. This may be more than is necessary to adequately describe the variance between samples, but it is felt that it is better to lean in this direction.

4) Criteria will be identified to specify the conditions which will require remedial action, including determining the percentage of fines or expected in-gravel survival, or changes in these factors, which will trigger corrective action. We will expect the Joint Agencies to provide input to this criteria.

5) Agreed, See NMFS No. 3.

6) Discussion of remedial measures will be included in the final report. See also NMFS No. 2.

Washington Department of Fisheries

Agreement has been reached regarding sampling locations. Water depth and velocity will not be measured to relate these parameters to spawning use - See WDG No. 2.

1) Concerning the issue of percentage of fines which constitutes a significant contamination problem - see WDG No. 4.

2) Same as 1.

3) A general discussion of remedial measures will be included in the final report. Based on study results a more specific discussion of remedial measures, should it be required, will be presented. Agency input as to the appropriateness of the measures can be incorporated into the reports following agency review and prior to finalization of each report. See also NMFS No. 2 and WDG No. 4.

United States Fish and Wildlife Service

1) We agree that the Joint Agencies and the District must determine what percent survival of eggs to fry is reasonable to expect from the existing Sultan River if in the event data analysis indicates a change in the quality of Sultan River spawning gravels due to Project construction and operation.

2) Remedial measures will be presented as discussed in NMFS No. 2 and WDG No. 4.

3) Concerning sampling sites and water depth/velocity measurement see WDG No's. 1 and 2.

4) Samples will be taken at random locations along a selected transect parallel to flow to avoid variability of results due to differences in velocity across the river.

5) As to statistical validity of samples, see WDG No. 3.

6) Agency review and comment of draft reports and disposition of responses is addressed in NMFS No. 3.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
2625 Parkmont Lane, S.W., Bldg. B-3
Olympia, Washington 98502

April 14, 1982

R. F. Vine, Construction Manager
Sultan Project
P.O. Box 1107
Everett, Washington 98206

Dear Mr. Vine:

We have reviewed your letter dated April 1, 1982, which was in response to comments provided by the Washington Department of Fisheries, Washington Department of Game, National Marine Fisheries Service, Tulalip Indian Tribe, and our agency regarding Snohomish County Public Utility District's program to evaluate the quality of Sultan River spawning gravels.

The U.S. Fish and Wildlife Service is in full agreement with the spawning gravel evaluation the District proposed to implement, with one exception. As the Service pointed out in its letter of March 11, 1982, we want enough freeze-core samples taken at each stream reach that the results will be statistically sound (i.e., 95 percent confidence limit).

The District's original sampling concept, as presented in Mr. Michael Wert's February 25, 1982, report, was that up to 10 freeze-core samples would be taken at each site. It is stated in an attachment to your April 1, 1982, letter that only five samples will be taken at each site, based upon the observed homogeneity of the substrate.

We believe it would be better to take more samples than may be needed until actual results verify that fewer samples can be taken and still remain with the imposed 95 percent confidence limits.

We hope this clarifies our concerns. If you have any further questions, please contact me at 753-9440.

Sincerely,

Martin J. Kenney

Martin J. Kenney
Acting Field Supervisor

cc: WDG
WDF
NMFS
Tulalip Indian Tribe

NOTED
APR 16 1982

NOTED
APR 19 1982
R. F. VINE

JOHN SPELLMAN
Governor

FRANK LOCKARD
Director

STATE OF WASHINGTON
DEPARTMENT OF GAME
Seattle Regional Office—509 Fairview Avenue North, Seattle 98109, Telephone: 464-7784

April 14, 1982

R. F. Vine, Sultan Project Construction Manager
Snohomish County PUD No. 1
P.O. Box 1107
Everett, WA 98206

NOTED

APR 16 1982

J. B. OLSON

Re: Evaluation of the Quality of Sultan River Spawning Gravels

Dear Mr. Vine:

I have reviewed your April 1, 1982 discussion of agency responses to the District's program to evaluate Sultan River spawning gravel quality per item 3b, "Sediment Analysis" of the Uncontested Offer of Settlement." In light of certain specific responses you made to certain comments by the agencies, some clarification is necessary.

1. In your comment item 1 to National Marine Fisheries Service, you respond to theirs and presumably our reference to the need to document actual spawner use of selected sampling locations. We said this should be part of your study. Your response, in part, said, "Future spawning surveys by Washington Departments of Fisheries and Game at these sites might be incorporated into their programs of annual spawning surveys." Speaking for the Game Department, we have no plans to continue annual spawning surveys of Sultan River. Spawning surveys over the past few years were expressly conducted as part of our cooperative studies with the District. We do not anticipate continuing these surveys. Therefore, documentation of sample site spawner use must be part of your study effort. We are only asking for documentation of whether steelhead are continuing to use these sites. We took some care to pick sites that were used in past years and we only seek confirmation of whether they continue to be used in years this sampling effort occurs. For steelhead, this should only require a minor effort. Since gravel sampling is planned to occur in spring, steelhead use could be documented concurrently.

2. We note you have decided to collect five samples per site. We, and others, pointed out the essential need for statistical validity of study results. Paramount to achieving this objective is the collection of adequate samples. Frankly, we don't care how few samples you collect as long as the results are valid. Five samples will probably suffice, but this remains to be demonstrated. Final number collected should be based on actual sample variability at each site. Once the first series has been collected and analyzed, the number really needed in subsequent series should be clearer.

3. Per our field trip of March 25, we reached agreement on sample site location.

4. Per other elements of the plan and comments, we seem to be in agreement.

With these understandings, in concert with relevant stipulations of the "Uncontested Offer of Settlement," we concur with this sampling plan.

Very truly yours,

R. Gary Engman
Habitat Management Division

RGE:td

cc: U. S. Fish and Wildlife Service
National Marine Fisheries Service
Tulalip Tribes
Washington Department of Fisheries

THE TULALIP TRIBES

6700 TOTEM BEACH ROAD
MARYSVILLE, WASHINGTON 98270

April 21, 1982

R.F. Vine, Sultan Project Manager
P.O. Box 1107
Everett, Washington 98201

Dear Mr. Vine:

The Tulalip Tribes are in agreement with the proposed gravel sampling program with one possible exception.

I remain concerned that the sample size outlined in your letter of April, is smaller than was agreed upon at the recent field trip involving the P.U.D. consultant, and the Joint Agencies.

At that time the agencies all agreed that 10 was a minimum sample size which would most likely give a statistically significant sample. This is based on current literature on the subject. Taking too small a sample size, especially at the preconstruction stage, could seriously threaten the validity of the entire study and cause unnecessary debate on the results.

I hope you can proceed with the pre-construction sampling at the earliest possible date.

Sincerely,
THE TULALIP TRIBES

Dave Somers,
Environmental Biologist

NOTED

APR 23 1982

J. B. OLSON

DS/smb

NOTED

APR 26 1982

R. F. VINE

SNOHOMISH COUNTY
PUD
PUBLIC UTILITY DISTRICT No. 1

2320 California St., Everett, Washington 98201 258-8211
Mailing Address: P. O. Box 1107, Everett, Washington 98206

April 23, 1982

Mr. Jon Linvog
National Marine Fisheries Service
1700 Westlake Avenue North
Seattle, WA 98109

Mr. Martin Kenney
U. S. Fish and Wildlife
2625 Parkmont Lane S. W.
Olympia, WA 98502

Mr. R. Gary Engman
Department of Game
509 Fairview Avenue North
Seattle, WA 98109

Mr. Robert Gerke
Department of Fisheries
3939 Cleveland Avenue
Tumwater, WA 98504

Mr. David Somers
Tulalip Tribes, Inc.
6700 Totem Beach Road
Marysville, WA 98270

Gentlemen:

Sultan River Project
"Evaluation of the Quality of
Sultan River Spawning Gravels"

Recently, we requested your written concurence with our proposed program. To avoid later possible misunderstandings, the District intends to implement the program in the following fashion as regards points raised by Engman, Kenney and Somers concerning sampling.

1. Number of samples. Mike Wert conferred with Jeff Cederholm (DNR) about the most likely number of samples that would be needed to provide statistically valid results. (Cederholm's experience in sediment studies is well-documented for watershed investigations on the Olympic Peninsula.) Due to reservoir release project construction scheduling, we won't have the opportunity to resample for additional pre-construction samples. Therefore, pre-construction sampling will be a "one-shot" effort at each station. According to Cederholm "8 to 10 samples" should assure acceptable results. Although Cederholm felt five samples might be adequate to describe sediment variance at each sample site, 8 to 10 samples would be a sounder number without preliminary laboratory results. Therefore, as proposed originally, 10 samples (pre-construction only) will be taken and analyzed for each station. Subsequent program sample numbers may vary depending upon earlier experience and results.

2. Spawning use survey of sample sites. Engman commented on this due to our earlier statement assuming future agency steelhead spawning surveys. We interpret the scope of the steelhead spawner use survey to be incidental to streambed sampling, such as during field observation and note taking related to sampling work. If that is the case, the District will incorporate it within the scope of the streambed sampling program, provided mutual agreement on what constitutes steelhead spawner site use documentation. We propose that documentation means reporting or notes in field notebooks on field observations about steelhead spawning use of the sampling sites.

In closing, program field testing of the equipment began on April 23rd. We anticipate actual sampling to occur the week of April 26th.

Very truly yours,

R. F. Vine
Sultan Project
Construction Manager

cc: Mr. Michael Wert

SNOHOMISH COUNTY
PUD
PUBLIC UTILITY DISTRICT No. 1

2320 California St., Everett, Washington 98201 258-8211
Mailing Address: P. O. Box 1107, Everett, Washington 98206

February 09, 1983

PUD-14326

Mr. Millard Deusen
Washington Department of Fisheries
Room 115
General Administration Building
Olympia, Washington 98504

Sultan River Project
Sediment Analysis Study - HPA

Dear Mr. Deusen:

This is to submit a Hydraulic Project Application for a pending anadromous fish mitigation study. The enclosed HPA is for the second in a three-part study. The proposed work is identical to that conducted in the Spring, 1982. Gravel sampling will avoid redds whenever possible. However, the sites were chosen for that reason, known/used spawning gravel areas.

Work will commence as soon as the river is in shape. The earliest possible time might be the week of February 13th.

Our contractor will be Michael Wert who did the work before, assisted by the same team, Roy Metzgar, and Cleve Steward and Fred Winchell both from FRI. We're assuming that river conditions will permit completion by the end of the month.

If you have any questions, please contact Roy Metzgar at 258-8560.

Very truly yours,

R. F. Vine
Sultan Project
Construction Manager

RFV/RGM/sys

Enclosure - HPA permit

HYDRAULIC PROJECT APPLICATION
(R.C.W. 75.20.100)

RTMENT OF GAME
Capitol Way North
pia, Washington 98504

DEPARTMENT OF FISHERIES
General Admin. Bldg.
Olympia, Washington 98504

PLEASE PRINT OR TYPE
DO NOT WRITE IN SHADED AREA

LAST NAME / FIRST	[19] CONTACT PHONE(S)	[1] [2] [3] [4]
nohomish County Public Utility District No. 1	258-8560	
STREET OR RURAL ROUTE		[7] [8] [9] WRIA A B C D
. O. Box 1107 (Attn: R. Metzgar)		
CITY / STATE / COUNTY / ZIP		[14] [15] [16] [17]
verett, WA Snohomish 98206		
STREAM OR LAKE / TRIBUTARY TO		
ultan River / Skykomish River		
QUARTER SECTION / SECTION / TOWNSHIP / RANGE (E-W)	[11] TYPE OF PROJECT	
ec. 6, T27N, 31,30,19,8,5 T28N, R8E	Scientific Study	
River mile 9.7 to 0) and Sec. 32, T29N		

DESCRIPTION OF WORK, METHOD, AND EQUIPMENT

his is repeat of first sampling of sediment for mitigation study of effect of Sultan iver Project on spawning gravels. Streambed samples (60, 12-inch deep) will be re- oved from five salmonid spawning reaches using a tri-tube freese-cove samples. Work ill be done manually.

IF NECESSARY USE BACK OF THIS SHEET OR ADDITIONAL SHEETS.

DISTANCE, DIRECTIONS TO PROJECT SITE FROM NEAREST TOWN

he first sampling site is immediately upstream of the SR2 bridge over the river at Sultan.

PROPOSED STARTING DATE	PROPOSED FINISHING DATE	PARTICIPATING ORGANIZATIONS (IF ANY)
ebruary 6, 1984	February 29, 1984	DF, WDG, NMFS, USFWS, and ulalip Tribe

SEPA	[22]	[23] OTHER PERMITS
☐ YES ☒ NO	☐ UNDER $5,000 ☑ OVER $5,000	None

UNDERSTOOD THAT NO WORK WILL TARTED UNTIL A SIGNED APPROVAL CEIVED

SIGNATURE: W. Hullinghorst

DATE: 1-31-84

IME LIMITATIONS:

E-31

SNOHOMISH COUNTY
PUD
PUBLIC UTILITY DISTRICT No. 1

2320 California St., Everett, Washington 98201 258-8211
Mailing Address: P. O. Box 1107, Everett, Washington 98206

March 10, 1983
PUD - 10310

Washington Department of Fisheries
Washington Department of Game
U. S. Fish and Wildlife Service
National Marine Fisheries Service
The Tulalip Tribes

Gentlemen:

Sultan River Project
FERC No. 2157

Sultan River Sediment Analysis

The Uncontested Offer of Settlement with the Joint Agencies specifies a number of pre- and post-construction studies which are to be conducted by the District. Among them, "an initial study shall be conducted as soon as Sultan River conditions permit after January 1, 1982, to determine the percentage of fines in spawning gravel from the Diversion Dam to Skykomish River confluences." The initial field sampling was conducted, the results analyzed and reported.

This letter is to transmit the report "Evaluation of the Textural Composition of Sultan River Salmonid Spawning Gravels" for your information and file records.

If you should have any comments, please contact Roy Metzgar at 258-8560.

Very truly yours,

R. F. Vine

R. F. Vine
Sultan Project
Construction Manager

Enclosures (2 copies)
cc: R. Metzgar

JOHN SPELLMAN
Governor

WILLIAM R. WILKERSON
Director

STATE OF WASHINGTON
DEPARTMENT OF FISHERIES
115 General Administration Building • Olympia, Washington 98504 • (206) 753-6600 • (SCAN) 234-6600

August 5, 1983

Mr. Roy Metzger
2320 California Street
Everett, Washington 98201

Dear Mr. Metzger:

In response to your request during our phone conversation of July 27, 1983 I am submitting this letter regarding the need for gravel sampling this fall. The Department of Fisheries, in association with the other agencies present at the July 26 meeting, are requesting that fall, pre-spawning samples be collected. Since the deposition of suspended sediment into bedload occurs when the stream is falling (Iwamoto, et. al., 1978), we expect the highest concentration of fines to be in the gravel during the fall after the low summer flows. With normal conditions we expect these samples to be sufficiently different than the spring samples.

The quantity of fines in spawning gravel has been shown to affect the survival, emergence timing, number of fry that emerge prematurely, and the condition factor (overall size) of emergent fry. Though this relationship is not linear, the research data support the fact that above a certain level of fines, increased amounts adversely affect fry survival as determined by the above factors (McNeil, 1962; Koski, 1975; Cederholm and Salo, 1979; Bruya, 1981).

Thus, the composition of the gravel in the fall months is vitally important to the natural production of the Sultan River salmon. In the last two years, the construction activity in the Sultan River Basin may have increased the levels of fines. This conjecture is supported by the increased turbidity levels of Spada Reservoir and the Sultan River this year. Whether or not the streambed gravel downstream of the diversion dam has acted as a filter bed for these fines needs to be determined. Under normal conditions, the gravel would be impacted, but due to the relatively high flows experienced in the Sultan River during the past two summers, this deposition is probably minimized. So, it is in the Snohomish P.U.D.'s, the fisheries agencies' and the Tulalip Tribe's interests to conduct these fall gravel samples to determine the fall gravel composition and quantify the effects of construction and higher summer flows.

The data sampled in the fall will be used in conjunction with the spring sampling work to quantify the existing conditions and the change in the conditions over time. However, sampling has to be completed before salmon start spawning, to avoid disturbance and the potential loss of eggs due to the sampling procedure. For this reason, I suggest starting the sampling at station two, then to station one, and then continue upstream to minimize sampling interaction with prime pink and chinook spawning areas.

I have contacted Mr. Mike Wert regarding the possibility of decreasing the number of gravel samples needed. Since the between sample variability at the different sites was low, he thought this decrease in sample numbers per site may be feasible. He will be expecting a call from you regarding this matter. In talking with Mr. Wert, he indicated that the cost of this fall sampling will be substantially less than the initial sampling study, since the cost of the sampling equipment was included in the first study.

If I can provide further information with regard to the need for these gravel samples, please contact me.

Sincerely,

Ken Bruya

Kenneth J. Bruya, Fisheries Biologist
Habitat Management Division

Enclosure

KJB:sp

cc: Engman - WDG
Groves - NMFS
Kenney - USFWS
Somers - Tulalip Tribe
Wert - Eicher Associates

Literature Cited

Bruya, K.J. 1981. The use of different gravel depths to enhance the spawning of chum salmon, Oncorhynchus keta. M.S. Thesis. University of Washington. 86 pp.

Cederholm, C.J., and E.O. Salo. 1979. The effects of logging road landslide siltation on the salmon and trout spawning gravels of Stequaleho Creek and the Clearwater River Basin, Jefferson County, Washington. Fisheries Resi. Inst., University of Washington Final Report-Part III. FRI-UW-7915. 99 pp.

Iwamoto, R.N., E.O. Salo, M.A. Madej, and R.L. McComas. 1978. Sediment and water quality: A review of the literature including a suggested approach for water quality criteria. With a summary of the workshop and conclusions by E.O. Salo and R.L. Rulifson. The Environmental Protection Agency, Region 10, Contract No. WY-6-99-0825-J. 200 pp.

Koski, K.V. 1975. The survival and fitness of two stocks of chum salmon (Onchorhynchus keta) from egg deposition to emergence in a controlled stream environment at Big Beef Creek. Ph.D. Dissertation, University of Washington, Seattle. 212 pp.

McNeil, W.J. 1962. Mortality of pink salmon eggs and larvae in Southeast Alaska streams. Ph.D. Dissertation, University of Washington, Seattle. 270 pp.

IN SPELLMAN
Governor

FRANK LOCKARD
Director

STATE OF WASHINGTON

DEPARTMENT OF GAME

Seattle Regional Office—509 Fairview Avenue North. Seattle 98109. Telephone: 464-7764

August 15, 1983

Roy G. Metzgar
Snohomish County Public Utility District No. 1
P. O. Box 1107
Everett, Washington 98206

Dear Mr. Metzgar:

Sultan River Project, Settlement Agreement Study Plans, FERC 2157

As a follow-up to our July 26 meeting and Mr. Ken Bruya's letter from Washington Department of Fisheries, dated August 5, we would like to express our concurrence with and support of the fall sediment sampling and analysis as contemplated at the meeting and in Mr. Bruya's letter.

Very truly yours,

R. Gary Engman

cc: NMFS - Linvog
Tulalip Tribes - Somers
WDF - Bruya
USFWS - Kenney

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
2625 Parkmont Lane SW, B-3
Olympia, Washington 98502

August 16, 1983

Mr. Roy Metzgar
Snohomish County Public Utility District No. 1
Post Office Box 1107
Everett, Washington 98206

Dear Mr. Metzgar:

We received a copy of a letter from Washington Department of Fisheries (WDF) to you, dated August 5, 1983, discussing the need for gravel sampling this fall. This proposed sampling would be conducted as one of several pre-project fishery mitigation studies associated with the Sultan River Project (FERC No. 2157). This sampling was discussed at length at our July 26, 1983 meeting with you.

We concur with the analysis of the problem discussed by WDF in their above-noted letter and request that the gravel sampling be conducted this fall as part of the Sediment Analysis Study.

Sincerely,

Charles A. Dunn
Field Supervisor

cc: WDG, Seattle (Engman)
WDG, Olympia (Bruya)
NMFS (Linvog)
Tulalip Tribe (Somers)

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Environmental & Technical Services Division
847 N.E. 19th Avenue, Suite 350
Portland, Oregon 97232
(503) 230-5400

F/NWR5/AG/1504-13

AUG 16 1983

12797

Mr. Roy Metzgar
Snohomish County PUD
2320 California Street
Everett, Washington 98201

Dear Mr. Metzgar:

The National Marine Fisheries Service concurs with the views of the Washington Department of Fisheries in their August 5, 1983 letter stating the need for gravel sampling by the Snohomish County PUD this fall in the Sultan River.

Sincerely,

Dale R. Evans
Division Chief

cc: Bruya, WDF
Engman, WDG
Kenney, FWS
Somers, Tulalip Tribes
Wert, Eicher Associates

SNOHOMISH COUNTY
PUD
PUBLIC UTILITY DISTRICT No. 1
2320 California St., Everett, Washington 98201 258-8211
Mailing Address: P. O. Box 1107, Everett, Washington 98206

August 17, 1983
PUD - 12814

Mr. Kenneth J. Bruya
Fisheries Biologist
Habitat Management Division
Washington Department of Fisheries
115 General Administration Building
Olympia, WA 98504

Dear Mr. Bruya:

Sultan River Project
Anadromous Fish Mitigation Studies

In response to your August 5th letter presenting a request of the Joint Agencies for fall, pre-spawning gravel sampling in the Sultan River, the District has, with the assistance of its consultant, reviewed the July 26th meeting discussion and the reasoning of the agencies. The District declines to conduct additional sampling for the following reasons.

1. Summer flows this year have been significantly above average. The flows recorded have a very low frequency or probability of occurrence range. Therefore, consequent sedimentation or flushing of river bed gravels will reflect an unusual situation. You also so state in your letter. Lacking background data other than this past spring's sampling, the results of a fall 1983 sample set present information without essential context. In other words, the results are not likely to be meaningful in terms of the District's potential mitigation responsibilities, as intended when the study was required within the process of defining Settlement Agreement conditions.

2. We agree with your opinion that due to the high flows, sediment deposition from project construction has probably been minimized. If so, then what is the justification in terms of project effect/ mitigation to gather more sediment data? Rather the District views the information as being primarily of scientific interest for fish management rather than for project mitigation.

3. The influence of other ongoing activities also may introduce bias in sampling results. At this time, several mineral dredging operations are active in the river. This mining is primarily in search of gold. The nature of the dredging generates new turbidity and downstream sedimentation. This activity is permitted by HPA.

4. Turbidity levels have not been unusual this year at Spada Lake or in the Sultan River. A brief review was conducted of City of Everett water quality monitoring records by the project Water Quality Control Supervisor, Gregg Kirmeyer. Results suggest that turbidity values are strongly influenced by suspended colloidal material. This material remains suspended through slight agitating or motion. Hence, it is highly unlikely to settle out during transit of the Sultan River. The source of this material is not project construction. Consequently, additional sampling seems unjustified based on this premise.

To conclude the coverage of this subject, as discussed during the July 25th meeting, the District also declines to formally conduct the requested literature search on possible mitigation measures. Undertaking this work is unjustified since there is no evidence of any project effect which requires mitigation. Further, if such is encountered as a result of the studies, the work schedule coincident with the presence of fish in the river would preclude taking immediate mitigative steps. Thus, there would be ample time to subsequently conduct the requested research and apply corrective measures. Besides, the agencies should already be well-versed in this technical area of their management responsibilities. However, as a matter of professional curiosity and interest our staff representative will conduct a literature search and review as his work schedule permits. For example, the one reference which you have kindly provided already will be obtained, if possible.

The District is as interested as the Joint Agencies in conducting meaningful field studies to determine project effects, if any, on the anadromous fishery of the Sultan River. However, we urge that serious consideration be given to proposed study benefits/costs at all times. The District's rate payers, Commissioners and management are extremely interested in cost-effectiveness with its consequent implications to electrical rates.

Very truly yours,

R. F. Vine
Sultan Project
Construction Manager

cc: G. Engman - WDG
A. Groves - NMFS
M. Kenney - USFWS
D. Somers - Tulalip Tribes
M. Wert - Eicher Associates

bcc: W. G. Hulbert, Jr.
G. Mixdorf
P. Williams/T. Dickson
R. Metzgar
R. Vine
Field Office Files

JOHN SPELLMAN
Governor

WILLIAM R. WILKERSON
Director

STATE OF WASHINGTON
DEPARTMENT OF FISHERIES
115 General Administration Building • Olympia, Washington 98504 • (206) 753-6600 • (SCAN) 234-6600

September 2, 1983

Mr. W. G. Hulbert, Jr., Manager
Snohomish County P.U.D. No. 1
P.O. Box 1107
Everett, Washington 98206

Dear Mr. Hulbert:

1983 Gravel Sampling, Sultan River

We are disappointed in the PUD's treatment of the Joint Agencies and Tulalip Tribe's request for the supplemental, 1983 pre-spawning gravel sampling in the Sultan River. We were under the impression that the PUD would be more receptive to expanding the gravel sediment sampling based on previous discussions between the PUD and the Joint Agencies. We ask you to review the meeting notes (in draft form) of the July 26, 1983 PUD and Joint Agencies' meeting. Mr. Metzgar, the secretary for the group, reported in the minutes that if river flow conditions permit, Washington Department of Fisheries (WDF), through Mr. Ken Bruya, "has the lead in making the go/no go decision" regarding the supplemental gravel samples and we were asked to respond by August 12.

The PUD had requested sufficient lead time so the study could be put out for bid. Accordingly, the Department contacted Mr. Metzgar on July 27 by telephone relaying the Joint Agencies' wish to see the study proceed after we had contacted sediment experts both within and outside of the Department. During this phone call, Mr. Metzgar requested Mr. Bruya to put the request for supplemental sampling in writing and send it to him. Since this sampling was deemed necessary and will be an integral part of the sediment analysis to monitor the effects of reservoir clearing, tunneling, and construction around the powerhouse site and Stage II flows, Mr. Bruya sent the letter as requested, on August 5, 1983. The PUD has since received the request letter and the supporting phone calls or agreement letters from the other Joint Agencies and the Tulalip Tribes. Mr. Bruya was handed the notification of your unwillingness to collect these samples (letter from Mr. R.V. Vine, dated August 17, 1983) at the PUD office in Everett on August 22, 1983, 26 days after you received notice of "go" on supplemental sampling.

Our agency has tried to work with you, give you as much time needed to select any consultant and negotiate a good contract, as you requested. In return, the District has not responded in a timely manner for the Joint Agencies and Tulalip Tribes to review the objections and to

evaluate other avenues to ensure that the supplemental gravel collection is completed with a compatible methodology and proper level of sampling.

In regard to the letter from Mr. R.V. Vine, dated August 17, 1983, Mr. Vine stated four reasons why the supplemental gravel sampling is not necessary. We would like to respond to the District's reasons for not collecting these samples and further explain the Department's position regarding this matter.

With regard to the first point of objection, Mr. Vine states "the results are not likely to be meaningful in terms of the District's potential mitigation responsibilities, as intended when the study was required within the process of defining Settlement Agreement Conditions." The Uncontested Offer of Settlement states "If project construction or operation causes a significant build-up of fines and causes adverse impacts at critical life stages of andromous fish, Licensee and the Joint Agencies shall jointly determine appropriate remedial measures."

The physical evidence of clay-like sediment covering the river channel is visual proof that construction effects have impacted the river. This sediment is present well above the wetted riverbed, on boulders and exposed gravel bars as well as being in the river, and is in excess of 1/4 inch thickness in places. This deposition occurred this year, for this coating was not present during the 1982 spawning surveys and the earlier gravel sampling work. The occurrence of fines beneath the gravel-water interface is apparent when the gravel is disturbed. Photographs are available which document the present situation. The presence of this sediment indicates that changes have occurred and it is WDF's opinion that the level of this sedimentation should be documented. We also propose that post-operational pre-spawning gravel samples be collected. These two sets of pre-spawning samples will be used in conjunction with the presently agreed upon spring gravel samples to provide needed additional information to assess the effects of Stage II flows on gravel quality.

Mr. Jeff Cederholm, Department of Natural Resources, Principal Investigator of the Clearwater studies on the Olympic Peninsula, was contacted on July 27, 1983 regarding ths usefulness of the supplemental gravel sampling. He agreed to its value in understanding the effect of the project on salmon even though no preconstruction pre-spawning samples were collected. Mr. Clair Olivers, Everett Water Department, stated in an August 29, 1983 phone conversation with Mr. Bruya that he believed a study of the gravel every two weeks during a hydrologic year would quantify the effect of the flows on the sediment movement in the river and WDF agrees with Mr. Olivers but, the value of that level of sampling is questionable.

The presence of the clay-like sediment on the presently exposed boulders and gravel bars precludes that this level of sediment was caused by gold prospectors in the Sultan River. Gold dredging was not allowed in the river at the time these flows occurred. The effect of the sediment on the river is clearly the result of both the increased flows and this year's work in the watershed since this condition has not been present in other years.

The WDF has asked the City of Everett to provide turbidity records for the

Sultan River. Until we receive that data, we can not comment on your statement that turbidity levels have not been unusual this year at Spada Lake or in the Sultan River. However, the physical presence of the sediment indicates something occurred this year that was not normal. Mr. Olivers explained on August 29, that the turbidity sampling in the river measures only colloidal, not settleable solids. If this is true, then the argument you used for not collecting these samples based on turbidity measurements may not be valid.

In summary, the Department believes that your objections to the supplemental sampling are without foundation. Recent observations of the Sultan River spawning habitat indicate the need for additional gravel samples to ascertain any possible effect on gravel quality. We believe that the PUD should be responsible for this supplemental sampling effort and such work should be conducted prior to the initial date of chinook and pink spawning, approximately September 20. Should the PUD decide not to conduct the supplemental sampling, the Joint Agencies and Tribes will endeavor to do so.

Please respond by Friday, September 9, 1983 so we incur no additional delay in organizing the collection of these samples. Mr. Ken Bruya at (206) 753-0250 or Mr. Robert Gerke, (206) 753-3624, should be contacted regarding your decision on this matter.

Sincerely,

Robert J. Gerke/for

William R. Wilkerson
Director

WRW:FRL:KJB:cp

cc: WDG-Engman
USFWS-Kenney
NMFS-Linvog
WDF-Chamblin
DOE-Slattery
Tulalip Tribes-Somers
FERC-Plumb

SNOHOMISH COUNTY
PUD
PUBLIC UTILITY DISTRICT No. 1

2320 California St., Everett, Washington 98201 258-8211
Mailing Address: P. O. Box 1107, Everett, Washington 98206

September 9, 1983
PUD 12988

Mr. William R. Wilkerson
Director
State of Washington
Department of Fisheries
115 General Administration Building
Olympia, Washington 98504

Dear Mr. Wilkerson:

Sultan River Project
Fish Mitigation Studies
Sultan River Gravel Sampling

We have your letter of September 2, 1983, pertaining to gravel sampling. In your letter you requested a response by September 9th. The date of receipt of your letter indicates that it did not arrive at the District until September 6th, and time has made it impossible to answer by mail until this date.

In your letter you make several statements of facts pertaining to the conditions in the river and which you believe to be the agreements between the parties. You furthermore state several opinions pertaining to the conditions in the river and types of studies and nature of studies which have been or should be conducted.

We feel this is not an appropriate time to go into detail to answer those matters which you have raised in your letter, but want you to understand that by failure to respond we do not admit that those statements are correct. When more time permits, we will be glad to review the entire situation with you and are certainly hopeful that we can continue to work together to arrive at acceptable statements of facts and mutually agreeable conclusions to be arrived at from those facts.

The immediate problem that you raise is that you desire to do sampling in the river this fall.

As a matter of fact, on the date of your letter, September 2nd, our Mr. Roy Metzgar received a call from Mr. Dave Somers, biologist for the Tulalip Tribes, requesting the use of the District's freeze core sediment sampling equipment so that the agencies themselves could see that a sampling program could be had by the agencies or under their direction at the least possible cost. Mr. Metzgar agreed, that subject to management approval, the agencies were welcome to use such equipment, under the following conditions: (1) the Joint Agencies (or whomsoever

conducts the sampling and laboratory analyses) would provide results and related information to the District as to all of the information contained in such test sampling and analysis; (2) the equipment would be returned to the District in the same condition in which it was turned over, subject only to normal wear and tear while being used for such testing purposes. Any equipment which was lost or damaged to such an extent as to be inoperable would be replaced. According to Mr. Somers, these conditions would be agreeable.

It must be understood, however, that the donating of the use of this equipment to the Joint Agencies and the Tribe would be complete consideration for the release of the District from any duty whatsoever to cause the sampling to be done this fall or for any requirement for sampling prior to the commencement of operation of the Project by the District. Furthermore, we point out that for safety purposes the one in charge of the field work must notify Mr. Metzgar (258-8560) of the date and time personnel would be working in the river for each separate sampling effect. The reason for this is to coordinate the operation of the valves at Culmback Dam. As you are aware, if there are water releases of a substantial nature when people are in the river a safety problem might well arise.

In addition, we believe that while any sampling is going ahead Mr. Roy Metzgar, our representative, should be present so that the District will be aware ~~of how the studies are proceeding and for the further and more practical and~~ economical reason that Mr. Metzgar can aid in such sampling and coordinate so that so nearly as possible it will be in the same sites and locations as that previously taken in the Spring of 1982.

I wish to reiterate that the District has at all times gone to great expenditures of time and money to coordinate and satisfy the fish agencies, not only as to this matter of sedimentation but also as to all other matters pertaining to fisheries. We desire to continue to work with the Agencies.

If after consultation with you and the other agencies it is deemed helpful to answer in detail other matter contained in your letter we will do so.

We will send copies of this letter to FERC and the other agencies to keep them informed.

Very truly yours,

W. G. Hulbert, Jr.
Manager

cc: R. J. Gerke
FERC-Plumb
WDG-Engman
USFWS-Kenney
NFMS-Linvog
WDF-Chamblin
DOE-Slattery
Tulalip Tribes-Somers
R. G. Metzgar

bcc: Parker Williams
R. Vine
W. G. Hulbert, Jr.

LAW OFFICES OF

BELL & INGRAM

A PROFESSIONAL SERVICE CORPORATION

WALL STREET BUILDING, SUITE 1000

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EVERETT, WASHINGTON 98206

AREA CODE 206
EVERETT 258-6261
SEATTLE 762-3623

NIS A. BELL (1982)
LIAM F. INGRAM
UGLAS L. BELL
EVEN D. UBERTI
ES H. JONES, JR.
NA L. BIGSBY
ES R. INNOT
BERT C. WARD
UCE R. BELL

eptember 9, 1983

enneth F. Plumb, Secretary
ederal Energy Regulatory Commission
25 North Capitol Street N.E.
ashington, DC 20426

e: PUD/Sultan River Project No. 2157/Joint Agency Agreement
sedimentation studies

ear Mr. Plumb:

Enclosed for filing please find a copy of the correspondence I ave sent to one of the licensees, on behalf of my client the ulalip Tribes of Washington, concerning the sedimentation studies percentage of fines) to be done under paragraph 3b of the Joint gency Agreement approved by the commission and made part of the icense herein.

Since it appears that the inability of the licensees and my lient to reach agreement on this matter may result in my client aking a position in future FERC proceedings on project no. 2157 hat could impact its ultimate date of operation commencement, I hought it would appropriate to call the dispute to FERC's attention t this time.

Thank you.

ery truly yours,

ames H. Jones, Jr.
ell & Ingram, P.S.
ttorneys for Tulalip Tribes of Washington

J24/b23
c: Mr. Parker Williams
Attorney for P.U.D.

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LEWIS A BELL (1982)
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DOUGLAS L BELL
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JAMES H JONES, JR
LORNA L BIGSBY
JAMES R IHNOT
ROBERT E WARD
BRUCE R BELL

September 9, 1983

Mr. Parker Williams
Williams, Novak & Hansen Law Firm
900 Wall Street Building
Everett, Washington 98201

HAND DELIVERED
Rec'd 9/12/83

Re: PUD/Sultan River Project No. 2157/Joint Agency Agreement sedimentation studies

Dear Parker:

This letter is to advise that the Tulalip Tribes are not in agreement with the anadromous fish mitigation study plans the PUD has prepared and proposed, which are in a packet dated June, 1983. We understand that representatives of the other agencies are also in disagreement with that study proposal.

We also understand that some of the agencies will be corresponding with the PUD concerning that proposal, and in particular to comment upon the PUD's August 17, 1983 correspondence. Mr. Somers, the tribe's biologist, will also be drafting a letter to the PUD to put in writing some of the concerns and suggestions he has concerning the proposal that he previously expressed to PUD representatives in the meetings, and which he stated again during our conversation on August 26, 1983.

I understand that the PUD claims that its proposed sampling plan for 1983 and subsequent years was previously agreed upon by the tribe. That is incorrect.

After the Joint Agency Agreement was signed, Mr. Somers and the other biologists cooperated with the PUD in approving the procedures and timing for the first sampling that occurred in the spring of 1982. Mr. Somers' understanding was that he was not being asked to then determine what samples would be taken after that point in time, when they would be taken, or the scope of sampling activities. Indeed, the fact that the PUD has recently been asking for his and the other biologists' concurrence in the new proposed study plans indicates that there was a similar understanding on the PUD's part.

I find the PUD's position that construction is not yet over,

and thus that the time for a second sampling is not yet due under the Joint Agency Agreement, to be hypertechnical in nature and of questionable validity if the PUD's true intent in entering the Joint Agency Agreement was to provide for studies which establish an adequate baseline against which to measure the need for future corrective action. Please keep in mind that adequate sampling must occur between the time construction actually ceases and any operation (including operation in the form of testing). Since, in our view, adequate sampling includes fall samples followed by spring samples so that seasonal flushing trends can be determined, the tribe takes the position that no operation (including testing) may occur before such fall/spring samples are gathered. If the samples are not to be gathered this fall and spring, then the tribe will request that operation not occur until such sampling can be done in the fall of 1984 and the spring of 1985.

It is not the tribe's desire to be forced into possibly impacting the ultimate start-up time of the project. However, the PUD's unwillingness to be cooperative regarding studies of relatively negligible cost will force the tribe to pursue this remedy if you do not reconsider.

In my view, what the biologists are requesting is imminently sensible because it will provide data so as to establish a pre-operation "trend" against which to measure the need for future corrective actions in the post-operational context. If such a "trend" is not established by adequate sampling, then the PUD will be stuck with measuring the need for future corrective actions against the initial spring, 1982, pre-operational sample that was taken, and whatever data the biologists can obtain from other sources concerning appropriate percentages of fines. Thus, it would seem to me that the additional sampling that is requested would in fact be in the PUD's interest if it showed a trend of decreasing percentages of fines in the post constructional period.

As the PUD knows, the time within which the desired sampling this fall must occur is very short. The apparent willingness of the PUD to ignore biologically sound sampling requests, since the tribe and agencies will have difficulty obtaining relief from FERC in sufficient time to require a fall sampling, is disturbing. I am advised by Mr. Somers that there was no objection to the request for such sampling this fall during the meetings this summer; but that the PUD only raised objections near the end of that meeting process in midAugust, 1983. Thus, Mr. Somers feels that he has been mislead by the PUD's seeming lack of objection, and now finds himself confronted with very little time within which to react to this

situation. As indicated, if the PUD continues in its refusal to conduct biologically appropriate samples, the tribe will consider asking FERC to delay project operation until proper sampling is completed.

We understand that the tribe and agencies are trying to find a solution to the fall sampling issue which would involve their conducting the sampling with PUD equipment. If this works out in time it may result in appropriate sampling this season, but does not resolve the tribe's concern as to appropriate future sampling.

By this letter, I request that all documents and correspondence, in this matter, pertaining to proposed studies or other settlement agreement compliance, be sent promptly to the tribe and to me. I also request that the PUD abandon its past practice of sending FERC documents without simultaneously sending them to this office, and that you strictly abide by the service rules when this plan is submitted for formal FERC consideration.

Please advise me whether the June, 1983 packet was sent to FERC and the date it was sent. If it has not been sent, please notify me immeidately when it has been sent, so that we may respond pursuant to paragraph 3 of the Joint Agency Agreement.

Very truly yours,

James H. Jones, Jr.
Bell & Ingram, P.S.
Attorneys for Tulalip Tribes of Washington

JJ24/b19

cc: Kenneth F. Plumb
Rick Miles

THE TULALIP TRIBES

6700 TOTEM BEACH ROAD
MARYSVILLE, WASHINGTON 98270

September 12, 1983

Mr. R.F. Vine
Construction Manager
Snohomish County PUD No. 1
P.O. Box 1107
Everett, Washington 98206

RE: Sultan River Project Anadromous Fish Mitigation Studies

Dear Mr. Vine:

At the August 22, 1983, meeting between the Joint Agencies and the Snohomish County PUD, we were presented with a copy of your August 17, 1983, letter to Mr. Ken Bruya (WDF). This letter was apparently in response to the discussions which took place at the July 27 Joint Agency/PUD meeting called to discuss the "Proposed Anadromous Fish Mitigation Study Plans" (June, 1983) developed by the PUD and its technical consultants.

At that meeting, it was determined by the Joint Agencies that a fall and spring sample would be needed for the "Sediment Analysis Study." Although I was not present at this meeting, Mr. Bruya informed me of this request. I concur that this fall sample is important and should be taken. I phoned Mr. Roy Metzgar soon thereafter to voice concurrence in this request. Neither at the time, nor at any time prior to the August 22 meeting, was any indication given to the Joint Agencies that this request would not be honored by the PUD. By delaying a response to the agencies, the PUD has placed us in a position where it is difficult, if not impossible, to resolve this dispute or arrange other means of obtaining the fall samples.

I would like to respond to the several points you made in your August 17 letter.

1. The unusual summer flow conditions which you mention are irrelevant. The study agreed to was to investigate the effects of construction and operation of the Sultan Project on bottom gravel composition. A goal is to determine whether the project is adequately flushing sediment, whatever the level or source may be. The fact that some of the construction took place during an unusually

wet summer only reflects the facts of the situation and does not in any way make a fall sampling, prior to project operation, inappropriate.

The fall sample is necessary for several reasons. As stated in the settlement agreement, a sample would be taken after construction but prior to operation of the project. This may only be done this fall, prior to operation and testing of the reservoir and powerhouse which is now scheduled to start November 1, 1983 (unless project operation and/or testing is delayed). Thus, the spring sample will represent conditions after the first winter of operation, not post-construction/pre-operation conditions. The fall sample also represents the conditions which are present during the spawning and incubation of this year's pink, coho, chinook, chum, and steelhead salmon runs in the Sultan River. Finally, the fall/spring sampling this year and in three years would allow within-year analysis as well as between-year analysis of bottom composition. We believe it would be to both the Joint Agencies and Snohomish PUD's benefit to obtain the best information possible regarding this concern.

2. The fall sample is necessary to document conditions prior to operation and to provide a point to which spring samples could be compared. By having a fall/spring sample the changes in bottom composition over the winter period could be assessed.

3. The magnitude of the mineral dredging which is occuring is miniscule as compared to the construction of the Sultan Project. Regardless, one of the main concerns which the study is supposed to address is whether or not project operation flows will be sufficient to flush fine materials from the system, regardless of their origin.

4. No date has been presented to support this contention. Visual inspection of gravels downstream of the Sultan Powerhouse reveal unusual deposition of fine materials on gravel surfaces. We would, however, request all water quality monitoring records so that we may analyze their significance to this matter.

You also state that "undertaking this work is unjustified since there is no evidence of any project effect which requires mitigation." As you must be aware the purpose of the study is to determine whether or not impacts are occurring which requires mitigation.

You also request that the Joint Agencies give "serious consideration to proposed study benefits/costs." We would request the analysis which you have performed to determine the benefit/cost

ratio for the study. The Tribe believes the fisheries resource of the Sultan River is a perpetual resource and in effect has an unlimited value. In addition, it is a resource which is reserved to the tribes by treaty (and it is not for sale), therefore no value can be appropriately assigned to it.

It was our understanding when we received the June 1983 Proposed Anadromous Fish Study Plans that we were to review those proposed study plans and comment on their adequacy. We are puzzled and disappointed that the PUD has declined to undertake the necessary sampling to accomplish the study which was agreed to in the Joint Agencies Settlement Agreement. In light of the importance of this fall study, and the short time frame necessary to undertake it, the tribe and agencies are willing to conduct the sampling and reserve the issue of compensation.

We would like to request that the PUD allow the Tulalip Tribes and the Washington Department of Fisheries to use the tri-tube freeze core sampling equipment owned by the PUD so that we may obtain the needed samples. We will assume all responsibility for the care of the equipment and will provide all the needed manpower for taking the required samples. I personally am experienced in the construction, maintenance and use of freeze-core equipment, as are the personnel of the Washington Department of Fisheries.

We would hope to be able to take the fall samples during the month of September, as water conditions allow. We are therefore requesting that we receive a written response to this request, no later than September 19th.

Sincerely,

David Somers
Habitat Biologist
Tulalip Tribes of Washington

JJ24/b24

cc: Mr. Parker Williams
P.U.D. Attorney

IN SPELLMAN
Governor

WILLIAM R. WILKERSON
Director

STATE OF WASHINGTON
DEPARTMENT OF FISHERIES
115 General Administration Building • Olympia, Washington 98504 • (206) 753-6600 • (SCAN) 234-6600

September 30, 1983

Mr. R.V. Vine
Sultan River Project Construction Manager
2320 California Street
Everett, Washington 98206

Dear Mr. Vine:

The contractural agreement regarding the loan of the tri-tube gravel sampling equipment sent to the Department on September 23, 1983 inaccurately contains the information exchanged between the Department, the Tulalip Tribes, and Mr. Roy Metzgar at the September 12, 1983 emergency meeting held in Mr. Parker Williams' office of the Williams, Novak, and Hansen Law Firm. The meeting was held at the request of Mr. Roy Metzgar, Snohomish PUD, Mr. Ken Bruya, Department of Fisheries, and Mr. Daryl Williams, Tulalip Tribes, to clarify and change the wording of the first and second complete paragraphs on page two of your letter to the Department on September 9, 1983. These paragraphs contained statements which created unacceptable conditions to all three parties regarding the loan of the gravel sampling equipment. Since the agreement still contains unacceptable conditions, the Department cannot sign it or request the other Joint Agencies to concur with the agreement.

The revised draft of the proposed fish mitigation plans did not reach our office until September 27, 1983 and unfortunately we will be unable to relay our questions and comments regarding these proposed studies by your requested date of September 30, 1983.

Sincerely,

Robert J. Jenke /for

William R. Wilkerson,
Director

WRW:KB:sp

cc: FERC
Somers-Tulalip Tribes
Engman-Game
Kinney-USFWS
Linvog-NMFS

SNOHOMISH COUNTY
PUD
PUBLIC UTILITY DISTRICT NO. 1
2320 California St., Everett, Washington 98201 258-8211
Mailing Address: P. O. Box 1107, Everett, Washington 98206

July 23, 1984

PUD 15448

Mr. Jon Linvog
National Marine Fisheries Service
7600 Sand Point Way N.E.
Bin C 15700
Seattle, Washington 98115

Dear Mr. Linvog:

RE: Jackson (Sultan) Hydro Project - FERC 2157
Anadromous Fish Mitigation - Sediment Analysis

The FERC order (Article 56) amending the project license allowing construction of Stage II and the Settlement Agreement required certain pre- and post-construction studies be conducted by the District. Such studies were to be conducted in accord with plans developed in consultation with the joint agencies. One of these studies on sediment analysis is three-phased: 1) pre-construction (Spring, 1982); 2) post construction (Spring, 1984); and 3) operation (Spring, 1987).

The first study report was completed in late 1982 and transmitted to the joint agencies for review. Subsequently, a meeting was held to discuss the results and revisions were proposed. Copies of the revised (final) report of the first study are enclosed.

The second study was completed this spring by the same consultant, Michael Wert. Copies of the second study report are enclosed also for your review.

Since the District is required to submit progress reports to the FERC on the anadromous fish mitigation studies, we wish to avoid any possible misunderstanding or misrepresentation to the FERC as to your position regarding the effect of the Jackson Project on the quality of gravel in the Sultan River bed. For scheduling purposes only, we request that you advise the District of your position on the results of the first two phases of the sediment analysis by August 13th. Should you have no comments at that time on either study, the District would appreciate written acknowledgement to that effect. If you have any questions, please continue to coordinate with Roy Metzgar at 258-8666.

Yours very truly,

Original Signed By James Maner

J. D. Maner
Executive Director
Utility Operations

Enclosures
RGM:mb

SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT No. 1

2320 California St., Everett, Washington 98201 258-8211
Mailing Address: P. O. Box 1107, Everett, Washington 98206

August 14, 1984
PUD 15591

Mr. Gary Engman
Department of Game
509 Fairview Avenue North
Seattle, Washington 98109

Mr. Lynn Childers
U.S. Fish & Wildlife
2625 Parkmont Lane S.W.
Olympia, Washington 98502

Mr. Jon Linvog
National Marine Fisheries Service
7600 Sand Point Way N.E.
Bin C 15700
Seattle, Washington 98115

Mr. Robert Gerke
Department of Fisheries
3939 Cleveland Avenue
Tumwater, Washington 98504

Mr. David Somers
Tulalip Tribes, Inc.
6700 Totem Beach Road
Marysville, Washington 98270

Dear Sir:

Jackson (Sultan) Project - FERC 2157
Anadromous Fish Mitigation - Sediment Analysis Report

During the meeting on July 31st at the powerhouse held after field observations of the Pelton unit full power discharge, fish passage berm and fishwater return flows at the Everett diversion dam, Mr. Metzgar advised you about ongoing fish mitigation study activities. The schedule of these activities was also discussed. In particular, it was suggested and agreed that the due date be revised for review comments on two reports by Michael Wert on river sediment analysis.

The purpose of this letter is to note the report review/comment schedule change and remind you of it. Our letter of July 23rd, which transmitted copies of the reports, requested a due date of August 13th. By mutual agreement that deadline is now August 31st. Since we have several reports and study scopes before you for review at the same time, we trust that this notice will aid clarification.

In closing, August 6th was the due date for powerhouse fish passage berm study work program review comments. At this time we have received comments from the NMFS and Department of Fisheries. If you intend to comment, please advise Roy Metzgar immediately since a contract with the consultant must be consummated soon if essential preparations and field work are to begin on time.

Yours very truly,

Original Signed By James Maner

J. D. Maner
Executive Director
Utility Operations

cc: Mr. M. Wert

Dr. D. Weitkemp
Parametrix, Inc.

RGM:mb/lk
bcc: R. Metzgar
L. C. Grimes
G. Mixdorf

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
ENVIRONMENTAL & TECHNICAL SERVICES DIVISION
847 NE 19th AVENUE, SUITE 350
PORTLAND, OREGON 97232-2279
(503) 230-5400

August 30, 1984 F/NWR5

J. D. Maner, Executive Director
Utility Operations
Snohomish County PUD No. 1
P.O. Box 1107
Everett, Washington 98206

Dear Mr. Maner:

Jackson (Sultan) Hydro Project (FERC No. 2157),
Sediment Analysis Reports Before Project Construction (November 1982)
and After Project Construction (July 1984)

National Marine Fisheries Service (NMFS) has reviewed the referenced reports. We agree with the conclusion that the immediate need for mitigative measures to improve Sultan River spawning gravels following project construction is not indicated by the study data.

However, our final position will necessarily be based upon data from the two referenced reports compared to the final sediment analysis scheduled for the year 1987.

Thank you for your continuing cooperation.

Sincerely,

Dale R. Evans
Division Chief

NOTED
SEP 0[illegible] 1984
R. G. METZGAR

cc: WDG (Engman)
WDF (Bruya)
USFWS (Stout)
Tulalip Tribes (Somers)
Snohomish PUD (Metzgar)
GCNW (Bodi)
Michael Wert

JOHN SPELLMAN
Governor

FRANK LOCKARD
Director

STATE OF WASHINGTON

DEPARTMENT OF GAME

Region Four Office, 16018 Mill Creek Boulevard, Mill Creek 98012 - Telephone: 775-1311

September 5, 1984

NOTED

SEP 07 1984

R. G. METZGAR

Roy Metzgar
Snohomish County Public Utility District No. 1
P. O. Box 1107
Everett, Washington 98206

Re: Evaluation of the Textural Composition of Sultan River Salmonid Spawning Gravels Following Hydroelectric Project Construction, Jackson Hydro Project No. 2157.

Dear Mr. Metzgar:

We have reviewed the subject report and believe it satisfactorily measures and describes post-construction conditions during February-April 1984. According to results presented, there is apparently no immediate need for mitigative measures. We do, however, reserve judgment as to the potential future need for mitigative measures until all data are available for comparison and consideration.

Very truly yours,

THE DEPARTMENT OF GAME

R. Gary Engman by TD

R. Gary Engman
Habitat Management Division

RGE:td

cc: WDF - Bruya
NMFS - Linvog
USFWS - Stout
Tulalip Tribes - Somers
Division - Fenton
Region - Muller, Phillips, Kraemer

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
2625 Parkmont Lane S.W., Bldg. B-3
Olympia, Washington 98502

September 7, 1984

NOTED

SEP 24 1984

R. G. METZGAR

J. D. Maner
Snohomish County Public Utilities District No. 1
P.O. Box 1107
Everett, WA 98206

Re: Jackson (Sultan) Hydro Project - FERC 2157
Anadromous Fish Mitigation - Sediment Analysis

Dear Mr Maner:

Thank you for the opportunity to review the report, EVALUATION OF THE TEXTURAL COMPOSITION OF SULTAN RIVER SALMONID SPAWNING GRAVELS FOLLOWING HYDROELECTRIC PROJECT CONSTRUCTION - JULY, 1984, transmitted with your July 23, 1984 letter.

We note from Section 1.5 (Study Scope and Objectives) that the issue of project induced impacts to the textural composition of spawning gravels is being addressed by a three-phase evaluation, two of which have already been completed. The first phase was to establish pre-project conditions; the second, to identify construction related changes. From the data and analysis presented in the report, it does not appear that the physical construction of the project has caused significant changes to the gravel composition. It is implied in the report that the last phase, to be conducted in 1987, will be sufficient to determine the long-term impacts related to project operation. While we encourage the collection of this data in 1987, we do not believe that it, by itself, can adequately address the long term impacts. We doubt that long term impacts can be adequately assessed as early as 3 years following project completion. We are not, however, suggesting that the 1987 study be postponed because the immediate correction of any identified problems is essential to the protection of the fishery resource. We strongly recommend that the gravel composition studies be extended through the year 1999 to cover a period of 15 years of project operation. Sampling should not be less frequent than once every five years; and increased sampling frequency should be based on hydrologic conditions (extended periods of high or low water) and other factors (landslides, forest fires, etc.) which are likely to affect sediment input and deposition.

We do not have any comments to make at this time regarding the six methods/techniques (DGW, DGD, DGLS, PFW, PFD, PFLS) used in the data analysis. We, however, expect to provide a more complete review and analysis of the methods used after the 1987 results are made available. (2)

Sincerely,

Charles A. Dunn

Charles A. Dunn
Field Supervisor

cc: WDG (Engman)
WDF (Bruya)
NMFS (Linvog)
Tulalip Tribes (Somers)

JOHN SPELLMAN
Governor

WILLIAM R. WILKERSON
Director

STATE OF WASHINGTON
DEPARTMENT OF FISHERIES
115 General Administration Building • Olympia, Washington 98504 • (206) 753-6600 • (SCAN) 234-6600

September 17, 1984

NOTED
SEP 21 1984
R. G. METZGAR

Mr. J.D. Maner
Executive Director
Utility Operations
Snohomish County Public Utility District
P.O. Box 1107
Everett, Washington 98206

Dear Mr. Maner:

Review of the Draft Report Regarding the Evaluation of Textural Composition of Sultan River Salmonid Spawning Gravels Following Hydroelectric Project Construction

The Washington Department of Fisheries (WDF) is pleased to provide you with the following comments regarding the second report in the series of studies to analyze the effects of the construction and operation of the Jackson Project on the gravel composition in the Sultan River. We hope these comments will be helpful in determining what additional work is still needed to meet the objectives of this study.

General Comments

WDF agrees with the study outline and the objectives to be met by this study but believe the data, as analyzed and presented in this report, do not accurately quantify the effects of the construction of the Jackson Project on the gravel resources in the Sultan River. Additional information, analysis and qualifications of comparisons are indicated to delineate and clarify some of the results and conclusions. One of these cases in regard to the comparisons between the baseline study and this year's work. Since the baseline study data were collected in the spring of 1982 and the samples collected for this report were collected during the winter of 1984, a literature review of theoretical qualifications and results of specific case studies comparing gravel samples collected during different times of the year, specifically winter and spring, are needed to understand whether this comparison is meaningful. (1)

River flow conditions effect the gravel composition and certain qualifying effects, e.g. less fines, greater average dg values, composition changes over time, etc., may be expected from (2)

samples collected during unstable flow conditions. When the expected effects on gravel composition are presented in conjunction with the specific flow data from 1982 spring and 1984 winter, this comparison should indicate whether testing the differences between the control and the test study's data is warranted.

Also, the authors have compared the results of this study to data collected with a McNeil or modified McNeil sampler to show that gravel composition in the Sultan River is adequate for incubation and is similar to undisturbed Northwest salmon streams. It is important to quantify the differences between the sampling method used in this study (tri-tube freeze core sampler) to those used in the referenced studies (Figure 11 and Table 9). If the tri-tube sampler picks up significantly less fines than the McNeil sampler as we suspect, and sampling streams during the winter produce samples with significantly less fines due to the higher flows and unstable stream conditions, the comparison of the present study to the referenced data is misleading and may be erroneous. (3)

Summary, Objectives 3, 4, and 5, page 5. WDF agrees that these are valuable objectives but due to the present sampling methods, times of sampling, and that of the sampling work reported in the literature not being analogous to the work done in the Sultan River, these objectives may not be realized and the comparisons may be meaningless. (4)

Section 1.5, Study Scope and Objectives, pages 6 and 7. WDF will require additional analysis and proof that objectives 3, 4, and 5 can even be done with the data collected by the PUD. If the literature supports meaningful comparison, these comparisons have to be qualified so that the reader can assess the effects of comparing different sampling times and sampling methods to those in the literature. An explanation of the rationale behind changing the sampling time is needed. This change in timing is incongruous to the PUD's position contained in a August 17, 1984 letter to Mr. Kenneth Bruya from the PUD. At that time WDF and other resource agencies were requesting the PUD to conduct additional late summer gravel sampling so samples from similar stable hydrologic conditions could be compared (even though sampling method differences needed to be assessed) to that contained in the literature and reported in this document. It is unfortunate that the PUD chose to collect the 1984 samples during a different time of the hydrologic cycle than their samples from 1982, thus requiring analysis and proof that these samples are comparable to the baseline samples as well as to the data in the literature. (5) (6)

Section 2.1, Sample Collection, page 8. It is WDF's understanding that gravel composition tends to alter during the unstable high to low flows of the late fall to spring hydrologic season in the Pacific Northwest. Because of this, gravel samples taken at that period of time need to be monitored

throughout the season to be meaningful, and since gravel analysis is an indicator of porosity or intra-gravel flow, monitoring of oxygen and flow within salmon redds is probably the more logical study data to be collected during these times, not gravel samples. On the other hand, gravel samples taken during low flow, stable summer conditions in natural systems has been looked at with respect to egg survival, numbers of smolts produced and returning adults. Sampling during this time period produces a sample that historically has been the indicator which contains the summation of the effects of hydrological and fish cycles, not just one point in a variable, dynamic system. WDF agrees with the advice of Cederholm and Lestelle, 1974, and Cederholm and Salo, 1979, (whose data is relied heavily upon by the authors of this report) with regard to the importance of gravel sampling during stable summer conditions. Adams and Beschta (1980) recommendations may be valuable in specific cases, but it is not logical in this case. Also, the data collected by them does not appear in Figure 11 or Table 9, which were used for comparing the data from the Sultan River. However, data from Cederholm and Lestelle (1974), Cederholm and Salo (1979), Tagart (1976), and other summer sampling studies are heavily relied upon. The differences between sampling in winter, in spring, and in summer and the differences between sampling with a tri-tube freeze core sampler and the McNeil sampler needs to be quantified and the subsequent analysis and comparisons in this report needs to be presented with those qualifications. (7)

Section 4.0, Discussion, page 28 and Data in Table 7. Page 30. This comparison and data do not take into account the differences due to sample collection timing or methodology differences. This entire section should be rewritten after comparative analyses are completed. As presently presented, Table 7 is misleading and may be in error. (8)

Section 4.0, Table 8, page 33. Since the gravel-water interface section of the freeze core is significantly different from the other levels, why didn't this analysis contain the comparisons of the lower three freeze core strata? This analysis would be more biologically significant since that is where eggs predominantly would be incubating. (9)

Section 4.0, Table 9, page 34. The heading for this Table is incorrectly labeled as containing data from streambed core samples. This indicates that these data are from freeze core samples, which they are not. (10)

Section 5.0, Conclusion, page 35. This section should be rewritten after sample collection methodology and sample collection timing differences have been taken into account. (11)

Table B-7

RANGE IN DAILY FLOW CHANGES, SULTAN RIVER, WY 1964
PRE-CULMBACH DAM (STARTUP GAUGE)

A. Pre-Culmback Dam River Discharge	1963						1964					
% Absolute Change	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Maximum % Increase from Previous Day (Change in CFS)	108 (272)	43 (86)	460 (476)	661 (691)	206 (5,020)	146 (1,405)	246 (1,722)	96 (640)	127 (601)	66 (530)	70 (461)	32 (522)
Maximum % Decrease from Previous Day (Change in CFS)	-30 (-157)	-21 (-50)	-26 (-107)	-60 (-2,285)	-58 (-4,317)	(-43) (-1,440)	-63 (-4,573)	-37 (-630)	-39 (-592)	-41 (-719)	-33 (-735)	-19 (-415)
Pre-Culmback Mean Flow (CFS)	364	169	228	549	1,512	1,144	1,281	689	693	1,002	1,461	1,682
Minimum Flow (CFS)	199	116	103	107	654	358	444	401	389	645	619	902
Maximum Flow (CFS)	628	285	579	3,808	7,450	3,367	7,281	1,689	1,511	1,797	2,699	2,612
B. Operational Phase River Discharge												
River Discharge Below Powerhouse Mean Flow (CFS)	239	102	140	578	1,226	1,144	1,182	559	424	744	1,027	1,492
Maximum Flow (CFS)	357	105	157	1,430	2,540	1,716	2,670	1,292	844	1,094	1,582	2,016
Minimum Flow (CFS)	103	102	102	152	760	335	478	167	165	609	445	1,168
Powerhouse Discharge Mean Flow	134	0	0	416	1,017	982	967	380	248	564	861	1,267
Maximum Flow (CFS)	249	0	0	1,252	1,300	1,300	1,300	1,067	643	892	1,300	1,300
Minimum Flow (CFS)	0	0	0	0	605	223	336	0	0	437	305	1,051

WDF appreciates being able to comment on this draft report. We hope our comments have helped to point out the inconsistencies that need correction and we will be looking forward to reviewing another draft or the corrected completed report. WDF notes that due to the innate problems associated with this gravel study, it may be necessary to collect additional sample data beyond the presently proposed 1987 study. (12)

Sincerely,

Robert J. Graber/for

William R. Wilkerson,
Director

cc: Engman-Game
Linvog-NMFS
Ging-USFWS
Somers-Tulalip Indian Tribe

SNOHOMISH COUNTY
PUD
PUBLIC UTILITY DISTRICT No. 1

2320 California St., Everett, Washington 98201 258-8211
Mailing Address: P. O. Box 1107, Everett, Washington 98206

December 6, 1985
PUD-16639

Mr. Gary Engman
Washington State Department of Game
16018 Mill Creek Blvd.
Bothell, WA 98012

Mr. Jon Linvog
National Marine Fisheries Service
7600 Sand Point Way N.E.
Bin C 15700
Seattle, WA 98115

Mr. David Somers
Tulalip Tribes, Inc.
6700 Totem Beach Road
Marysville, WA 98270

Mr. Gwill Ging
U.S. Fish & Wildlife
2625 Parkmont Lane S.W.
Olympia, WA 98502

Mr. Robert Gerke
Department of Fisheries
3939 Cleveland Ave.
Tumwater, WA 98504

Gentlemen:

Jackson (Sultan River) Project - FERC #2157
Anadromous Fish Mitigation Studies
River Gravel Quantity and Textural Composition

In accordance with pertinent Project License Articles and Orders issued by the Federal Energy Regulatory Commission, Settlement Agreement conditions, and the Anadromous Fish Study Plans (Proposed), the District has completed three studies on gravel in the Sultan River. Reports were submitted to the Joint Agencies for review and comment. Two were done by Michael Wert (1982 and 1984) on sediment quality analysis (textural composition). The third was conducted by GeoEngineers (1984) on quantity (bedload transport). The technical interrelationships of the studies became obvious as work progressed by Geo Engineers. Therefore, the District has combined them for purposes of response and mitigation planning.

The purpose of this letter is to transmit the District's draft response to comments received from the Joint Agencies on the gravel study reports prepared by Wert (1984) and GeoEngineers (1984). Our response includes a proposed gravel mitigation plan which is presented herein to serve as a basis for discussion at the pending meeting on the subject. The meeting is scheduled for 1:30 p.m. on December 17, 1985, at NMFS, Sand Point, Seattle. The attached responses (when finalized after that meeting) are intended to serve as the District's formal response to your comments and will be incorporated into the final reports which will be forwarded to the FERC.

268U

The District's response to the Joint Agencies' comments can be grouped generally into six categories as follows:

1) study objective/purpose;

2) editorial revisions;

3) timing of flushing flows;

4) frequency and duration of flushing flows;

5) monitoring; and

6) mitigation.

Each category is discussed briefly in this letter by presenting a summary of the major points. Further discussion and specific information or details are presented in the response to comments attached.

1) Study Objective/Purpose

This category concerns the adequacy of the study results in satisfactorily fulfilling the fundamental objective/purpose intended. Basically, Wert's studies and the GeoEngineers study were to provide baseline information in order to evaluate the subsequent condition of river gravel in later years. The comments received to date, with one exception (WDF's), state that the results of all three studies do provide acceptable information and achieve the intended objectives.

The WDF raises technical issues about the technique and timing of freeze core sampling and consequent interpretation of the results regarding textural composition. Also, the validity is questioned of the results in terms of theoretical qualifications and comparative interpretation with other similar, referenced studies.

The District's response to the WDF concern is presented in greater detail in the attached response. The District conducted the textural composition studies in accord with the proposed study plan. Plan development was coordinated closely with the Joint Agencies. Also, as stated on page 8 of Wert's 1984 report, "Following the recommendation of Adams and Beschta (1980) and because the intention of the gravel texture analyses was to index Sultan River quality as a fisheries resources, the stream bed was sampled during the winter when eggs of anadromous fish are in the gravel."

2) Editorial Revisions

This category deals with misstatements about minimum instream flows and updating the status of flood control. There is no disagreement with the Joint Agencies' comments and appropriate revisions will be made in the text.

3) Timing of Flushing Flows

Several issues (biological, hydrological and operational) must be dealt with in determining when to release a special flow from Culmback Dam for transporting and cleaning gravel in the Sultan River (if needed). Based on biological considerations (the life cycle timing of salmonid eggs, embryos, alevins, fry, juveniles and critical level of fines in the gravel), the springtime (May and/or June) was mentioned in the GeoEngineers report (p. 47) as the most favorable period for a mitigative release to cleanse and transport gravel. Further details supporting this statement are presented in the attached response.

From the hydrological viewpoint, May/June makes sense because historically, river flows sufficient to transport and clean gravel, have occurred due to rainfall/snowmelt events. Operationally, according to Exhibit H, Figure H-3, the project is in the upper portion of the proportional filling period for the reservoir. Therefore, sufficient volumes of water would normally be available and unintended spill could occur due to unanticipated flow increases. The likelihood is greatest in the spring of complete reservoir filling after a large release (controlled or uncontrolled) for gravel mitigation. A high flow release later into summer would constitute an "unnatural" event: the high flow and colder water temperatures would 'shock' the system, and the probability of refilling the reservoir would be substantially less. This is a brief explanation of the reasoning about flow release timing and does not mean that consideration of any other time is unacceptable to the District. We anticipate substantial constructive discussion about this matter with the Joint Agencies to determine when a special mitigative flow release would be made, if ever needed, from Culmback Dam.

4) Frequency and Duration of Flushing Flows

Once criteria for mitigative action are mutually agreed upon, the basis for action will be through periodic monitoring, which is discussed in the attached responses to comments. Monitoring frequency should be resolved, once diagnostic characteristics for gravel quality are identified with confidence. The District proposes a conservative monitoring schedule based upon the frequency of high flow events (defined later) and coordinated with the previously agreed to study years of 1987 and 1994. Essentially, gravel monitoring would occur two years after a high flow event, subject to revision based upon experience and accumulated information. In 1985, two high flow events occurred. Therefore, we would not expect any need for either monitoring or a flushing flow until 1987 at the earliest. At this time the frequency "might" be two years, subject to modification based on monitoring results.

Determining the duration of a flushing flow release to produce intended results will be based on experience. Methods for determining the effectiveness and related duration are discussed further in the attached

responses. Initially, the District proposes that the peak of the flow be held for 12 hours, subject to revision after analysis of the initial release.

A key element remains to be determined, however. What are the criteria (e.g. % of accumulated fines, mean d_g, etc.) against which monitoring results will be evaluated? We believe that the criteria is a scientific or technical issue. Its determination, however, may require professional judgment.

5) Monitoring

Surveillance of gravel conditions will provide essential information needed to determine if mitigative action is needed. The techniques and basis for the proposed schedule have been discussed already, and are discussed further in the mitigation plan and attached responses to Joint Agencies' comments. As noted above, due to the high flows already this year, 1987 is now proposed to be the next monitoring year, subject to no high flow event occurring in 1986.

6) Mitigation

The District is as interested as the Joint Agencies are in accurately and confidently determining the basis for and need of any mitigative action with gravel in the Sultan River. (Again, what is the criteria/value?) At this time, a special flow release at Culmback Dam via the valves at the base of the is envisaged as the most likely method. The amount of flow needed (theoretically) is 2,500 cfs at the diversion dam and 4,500 cfs at the powerhouse, subject to verification for effectiveness. This release would be for flushing accumulated fine sediment. However, it would also transport gravel downstream. Since the source area for Sultan River gravel recruitment is below Culmback Dam. Apparently there may be no need for special activity or mitigation regarding gravel quantity due to project operation, other than operating the sluice gate at the diversion dam, which will be done.

Gravel Mitigation Plan

In summary, the following four items comprise the proposed continuing mitigative plan concerning Sultan River gravel quantity and quality.

1. Continue freeze core gravel sampling - assuming that 1985 is the most recent high flow event year, in 1987 sample at three sites; one upstream and two downstream from the powerhouse. If no flushing flow (2,500 cfs or higher at the diversion dam) occurs in 1987, sample again in 1988. Continue the sequence in order to obtain a two, three, four and five year after high flow event sample. That is, if 1985 is the last high flow event year for several years, then the 1987 sampling is the two years after sample; the 1988 sample would be the three years after; the 1989 would be the four years after; and 1990 would be the five years after sample. The purpose of this sampling scheme and schedule is to establish a trend baseline of fine sediment accumulation

versus time. In 1994, regardless of the flow record and sampling schedule, a full scale sample (10 samples each at all five baseline sites) would be done. The sampling schedule is triggered by the high flow event; two years after it, sampling would be initiated from 1987 until 1994. If, however, a high flow event occurs in 1986, then 1988 becomes the two years after sample year, 1989 three years after, etc. Sampling after 1994, if needed, will be determined by the results obtained to that time. The amount of sampling proposed assumes that it is needed. Results in two, three, or four years may/may not indicate that more (or less) frequent sampling and at different scheduling would be as or more effective. The sampling schedule is intended to illustrate the District's commitment to developing an effective monitoring effort, not to specific years.

2. Install scour chains - this is another monitoring method. Three sites would be used (one upstream and two downstream from the powerhouse). Sites to be selected later in consultation with the Joint Agencies. The chains would be checked after "high flushing" flows.

3. Operate diversion dam sluice gate - when "high" flows occur, the gate will be raised to permit gravel movement downstream.

4. Flow release - if results of monitoring/sampling show accumulation of fine sediment beyond acceptable maximum levels (to be mutually agreed upon), a controlled release will be made at Culmback Dam via the valves for a 12-hour period. The timing, duration and frequency are 'tentative' or 'conditional', meaning that they are subject to revision based on the results of the monitoring/sampling work.

Final Steps - (Meeting Notice)

A final report is to be submitted to the Federal Energy Regulatory Commission in accord with the Settlement Agreement. Prior to completing the reports and determining appropriate remedial actions, we agree with your comments about the need for further constructive discussion with the District and its study consultants. Therefore, for that purpose, we have scheduled a meeting for 1:30 p.m. on December 17th in the conference room, NMFS, offices at Sand Point (Seattle). The consultants (Wert, Miller and Dr. Dunne) will be in attendance at this meeting along with appropriate District personnel. A proposed meeting agenda is attached.

In closing, it is our expectation that results of the December 17th meeting will provide the basis for concluding the present studies, identifying a mutually agreeable mitigative plan, and submitting a final report to the FERC. We are mindful, however, that with flood control operation unresolved and with a project operational study pending, it may be sometime before all mitigation matters are finally completed. Thank you for your cooperative assistance to the District.

Yours very truly,

Original Signed By
R. K. SCHNEIDER
Robert K. Schneider
Power Manager

Attachments (2)
RGM:jk
cc: M. Wert
J. Miller, GeoEngineers

bcc: R. Metzgar
G. Mixdorf
R. Schneider
C. Grimes
L. King
J. D. Maner

P/UH-8-5

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
ENVIRONMENTAL & TECHNICAL SERVICES DIVISION
847 NE 19th AVENUE SUITE 350
PORTLAND, OREGON 97232 2278
(503) 230 5400

15493

August 30, 1984 F/NWR5

J. D. Maner, Executive Director
Utility Operations
Snohomish County PUD No. 1
P.O. Box 1107
Everett, Washington 98206

Dear Mr. Maner:

Jackson (Sultan) Hydro Project (FERC No. 2157),
Sediment Analysis Reports Before Project Construction (November 1982)
and After Project Construction (July 1984)

National Marine Fisheries Service (NMFS) has reviewed the referenced reports. We agree with the conclusion that the immediate need for mitigative measures to improve Sultan River spawning gravels following project construction is not indicated by the study data. (1)

However, our final position will necessarily be based upon data from the two referenced reports compared to the final sediment analysis scheduled for the year 1987.

Thank you for your continuing cooperation.

Sincerely,

Dale R. Evans
Division Chief

NOTED
[illegible]
R. G. METZGAR

cc: WDG (Engram)
WDF (Bruya)
USFWS (Stout)
Tulalip Tribes (Somers)
Snohomish PUD (Metzgar)
GCNW (Bodi)
Michael Wert

F-72

NOAA

Response by Public Utility District No. 1 of Snohomish County
to the National Marine Fisheries Service Comments of 8/30/84

1. Comments noted.

268U

6

JOHN SPELLMAN
Governor

FRANK LOCKARD
Director

STATE OF WASHINGTON

DEPARTMENT OF GAME

Region Four Office, 16018 Mill Creek Boulevard, Mill Creek 98012 • Telephone: 775-1311

September 5, 1984

NOTED
SEP 07 1984
R. G. METZGAR

Roy Metzgar
Snohomish County Public Utility District No. 1
P. O. Box 1107
Everett, Washington 98206

Re: Evaluation of the Textural Composition of Sultan River Salmonid Spawning Gravels Following Hydroelectric Project Construction, Jackson Hydro Project No. 2157.

Dear Mr. Metzgar:

F-73

We have reviewed the subject report and believe it satisfactorily measures and describes post-construction conditions during February-April 1984. According to results presented, there is apparently no immediate need for mitigative measures. We do, however, reserve judgment as to the potential future need for mitigative measures until all data are available for comparison and consideration. (1)

Very truly yours,

THE DEPARTMENT OF GAME

R. Gary Engman by td

R. Gary Engman
Habitat Management Division

RGE:td

cc: WDF - Bruya
NMFS - Linvog
USFWS - Stout
Tulalip Tribes - Somers
Division - Fenton
Region - Huller, Phillips, Kraemer

Response by Public Utility District No. 1 of Snohomish County to the Washington Department of Game Comments of 9/5/84

1. Comments noted.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
2625 Parkmont Lane S.W., Bldg. B-3
Olympia, Washington 98502

September 7, 1984

NOTED
SEP 24 1984
R. G. METZGAR

J. D. Maner
Snohomish County Public Utilities District No. 1
P.O. Box 1107
Everett, WA 98206

Re: Jackson (Sultan) Hydro Project - FERC 2157
Anadromous Fish Mitigation - Sediment Analysis

Dear Mr Maner:

Thank you for the opportunity to review the report, EVALUATION OF THE TEXTURAL COMPOSITION OF SULTAN RIVER SALMONID SPAWNING GRAVELS FOLLOWING HYDROELECTRIC PROJECT CONSTRUCTION - JULY, 1984, transmitted with your July 23, 1984 letter.

We note from Section 1.5 (Study Scope and Objectives) that the issue of project induced impacts to the textural composition of spawning gravels is being addressed by a three-phase evaluation, two of which have already been completed. The first phase was to establish pre-project conditions; the second, to identify construction related changes. From the data and analysis presented in the report, it does not appear that the physical construction of the project has caused significant changes to the gravel composition. It is implied in the report that the last phase, to be conducted in 1987, will be sufficient to determine the long-term impacts related to project operation. While we encourage the collection of this data in 1987, we do not believe that it, by itself, can adequately address the long term impacts. We doubt that long term impacts can be adequately assessed as early as 3 years following project completion. We are not, however, suggesting that the 1987 study be postponed because the immediate correction of any identified problems is essential to the protection of the fishery resource. We strongly recommend that the gravel composition studies be extended through the year 1999 to cover a period of 15 years of project operation. Sampling should not be less frequent than once every five years; and increased sampling frequency should be based on hydrologic conditions (extended periods of high or low water) and other factors (landslides, forest fires,etc.) which are likely to affect sediment input and deposition. (1)

Response by Public Utility District No. 1 of Snohomish County
to the U. S. Dept. of Interior, Fish and Wildlife Service Comments of 9/7/84

1. The District agrees with the FWS premise about the need for additional gravel sampling besides 1987. The frequency of and the need for gravel sampling will be based on the frequency and effectiveness of antecedent, high, natural runoff flows or spills from the reservoir (Spada Lake) to provide transport and cleaning of gravel. This information was developed in the complementary study on river gravel quantity (bedload transport) which was not available during preparation or review of the sediment analysis (textural composition) report.

   The future schedule for gravel sampling and monitoring may or may not require a period of 15 years of record from initial project operation. This does not mean the District disagrees with the recommendation for the period of "gravel composition studies be extended to cover a period of 15 years of project operation". Rather, it is anticipated that results prior to 1999 will provide information about the need and schedule for gravel sampling and monitoring and consequent need for mitigative action, if any.

   In October and November, 1985, the Sultan River experienced two high flow events. District flow records (unofficial) for the diversion dam show the following values. The peak flow was substantially greater than those shown below.

Date	Flow	
October 24	3,839 cfs	(24 hr. ave. flow)
" 25	5,214 cfs	"
" 26	3,562 cfs	"
" 27	5,171 cfs	"
November 1	2,738 cfs	"
2	7,345 cfs	"
3	7,010 cfs	"
4	2,966 cfs	"

   Add 1,300 cfs to these flows for the lower river below the powerhouse (and overlooking additional tributary inflows).

   Since a minimum flow of 2,500 cfs at the diversion dam and 4,500 cfs below the powerhouse is believed to be required for effective bedload transport and breaching of the river channel armor layer, Sultan River gravel should be in suitable condition for at least the 1986 spawning season, if not much longer. Therefore, the District proposes to conduct the next gravel sampling/monitoring in 1987 (late winter/spring) as agreed originally, provided another high flow event doesn't occur in 1986.

2. Results of the proposed 1987 gravel sampling gravel study will be made to the Joint Agencies.

We do not have any comments to make at this time regarding the six methods/techniques (DGW, DGD, DGLS, PFW, PFD, PFLS) used in the data analysis. We, however, expect to provide a more complete review and analysis of the methods used after the 1987 results are made available. (2)

Sincerely,

Charles A. Dunn

Charles A. Dunn
Field Supervisor

cc: WDG (Engman)
WDF (Bruya)
NMFS (Lianog)
Tulalip Tribes (Somers)

IN SPELLMAN
Governor

WILLIAM R. WILKERSON
Director

STATE OF WASHINGTON
DEPARTMENT OF FISHERIES

115 General Administration Building • Olympia, Washington 98504 • (206) 753-6600 • (SCAN) 234-6600

September 17, 1984

NOTED
SEP 21 1984
R. G. METZGAR

Mr. J.D. Maner
Executive Director
Utility Operations
Snohomish County Public Utility District
P.O. Box 1107
Everett, Washington 98206

Dear Mr. Maner:

Review of the Draft Report Regarding the Evaluation of Textural Composition of Sultan River Salmonid Spawning Gravels Following Hydroelectric Project Construction

The Washington Department of Fisheries (WDF) is pleased to provide you with the following comments regarding the second report in the series of studies to analyze the effects of the construction and operation of the Jackson Project on the gravel composition in the Sultan River. We hope these comments will be helpful in determining what additional work is still needed to meet the objectives of this study.

General Comments

WDF agrees with the study outline and the objectives to be met by this study but believe the data, as analyzed and presented in this report, do not accurately quantify the effects of the construction of the Jackson Project on the gravel resources in the Sultan River. Additional information, analysis and qualifications of comparisons are indicated to delineate and clarify some of the results and conclusions. One of these cases in regard to the comparisons between the baseline study and this year's work. Since the baseline study data were collected in the spring of 1982 and the samples collected for this report were collected during the winter of 1984, a literature review of theoretical qualifications and results of specific case studies comparing gravel samples collected during different times of the year, specifically winter and spring, are needed to understand whether this comparison is meaningful. (1)

River flow conditions effect the gravel composition and certain qualifying effects, e.g. less fines, greater average dg values, composition changes over time, etc., may be expected from (2)

DRAFT

Response by Public Utility District No. 1 of Snohomish County to the Washington Department of Fisheries Comments of 9/17/84

1. The timing and technique of gravel sampling were specifically selected to avoid the concerns expressed by the WDF. The District conducted the textural composition studies in accord with the proposed study plan. Plan development was coordinated closely with the Joint Agencies. Also, as stated on page 8 of Wert's 1984 report, "Following the recommendation of Adams and Beschta (1980) and because the intention of the gravel texture analyses was to index Sultan River quality as a fisheries resources, the stream bed was sampled during the winter when eggs of anadromous fish are in the gravel."

   Previous work by Dunn (1979) and Nelson (1971) and the current work by GeoEngineers indicate that the greatest amount of sediment movement (suspended or bedload) occurs during high flow events. The timing of project field sampling has occurred after most seasonal high flows. Thus, the timing of the samples provides the lowest baseline value for geometric mean of "fines" or percentage of fines,, which is the worst case standard from the District's viewpoint, but best case for the resource agencies.

   The District disagrees that comparisons of February/March samples (1984) to those of April/May (1982) are invalid due to potential gravel compositional changes as a result of river flow. For the lower river, it has been preliminarily determined that 4,500 cfs is required to alter gravel composition. The period of mid-February to May typically does not provide flows of this magnitude (Table B-7) nor in the year sampled.

   The purpose of the initial pair of studies was to "determine whether or not project construction or operation cause a significant build-up of fines and/or cause adverse impact on critical life stages of anadromous fish." In other words, set a baseline for future monitoring and evaluate pre- and post-construction gravel quality conditions. Comparison of study results (with other studies regardless of technique) was done to provide insight that might be useful and was not intended to be definitive. The difference between the timing of the pre-construction sampling (April/May, 1982) and the post-construction sampling (February/March, 1984) was set by the Joint Agencies in the Settlement Agreement, Study Plan and the District's project construction schedule. Study results achieve the intended study objectives. There is no need for project mitigation purposes to expend additional effort on comparative analysis of the results with other studies or different sampling timing and techniques. Also, see subsequent comments.

2. See comment No. 1. Additionally, the District and Joint Agencies agree that river flow conditions effect gravel composition. High flow frequency records for the Sultan River indicate that the months of October through January and May/June are the months of highest flow (Table B-7, draft SEPA/EIS, February, 1979). Those months have flows sufficient to alter gravel composition. Considering the historical record, late winter/spring sampling provides representative baseline data of Sultan River gravel.

samples collected during unstable flow conditions. When the expected effects on gravel composition are presented in conjunction with the specific flow data from 1982 spring and 1984 winter, this comparison should indicate whether testing the differences between the control and the test study's data is warranted.

Also, the authors have compared the results of this study to data collected with a McNeil or modified McNeil sampler to show that gravel composition in the Sultan River is adequate for incubation and is similar to undisturbed Northwest salmon streams. It is important to quantify the differences between the sampling method used in this study (tri-tube freeze core sampler) to those used in the referenced studies (Figure 11 and Table 9). If the tri-tube sampler picks up significantly less fines than the McNeil sampler as we suspect, and sampling streams during the winter produce samples with significantly less fines due to the higher flows and unstable stream conditions, the comparison of the present study to the referenced data is misleading and may be erroneous. (3)

Summary, Objectives 3, 4, and 5, page 5. WDF agrees that these are valuable objectives but due to the present sampling methods, times of sampling, and that of the sampling work reported in the literature not being analogous to the work done in the Sultan River, these objectives may not be realized and the comparisons may be meaningless. (4)

Section 1.5, Study Scope and Objectives, pages 6 and 7. WDF will require additional analysis and proof that objectives 3, 4, and 5 can even be done with the data collected by the PUD. If the literature supports meaningful comparison, these comparisons have to be qualified so that the reader can assess the effects of comparing different sampling times and sampling methods to those in the literature. An explanation of the rationale behind changing the sampling time is needed. This change in timing is incongruous to the PUD's position contained in a August 17, 1984 letter to Mr. Kenneth Bruya from the PUD. At that time WDF and other resource agencies were requesting the PUD to conduct additional late summer gravel sampling so samples from similar stable hydrologic conditions could be compared (even though sampling method differences needed to be assessed) to that contained in the literature and reported in this document. It is unfortunate that the PUD chose to collect the 1984 samples during a different time of the hydrologic cycle than their samples from 1982, thus requiring analysis and proof that these samples are comparable to the baseline samples as well as to the data in the literature. (5) (6)

Section 2.1, Sample Collection, page 8. It is WDF's understanding that gravel composition tends to alter during the unstable high to low flows of the late fall to spring hydrologic season in the Pacific Northwest. Because of this, gravel samples taken at that period of time need to be monitored

3. The effectiveness and comparability of the tri-tube freeze core sampler versus a McNeil or modified McNeil sampler is summarized by Shirazi and Seim (1979). Advantages/disadvantages of both methods are presented along with case studies which enable comparison of results. The WDF statement concerning results of these methods not being comparable has meager support in the professional literature, which indicates that comparisons are reasonable, although not without qualification. Therefore, presenting Table 9 and Figure 11 in the report is reasonable.

   Although the WDF concern might be valid about time of sampling for values reported in the professional literature for other Pacific NW streams (Table 9 - 1984 report), the purpose of the comparison was to obtain relative insight about the samples obtained from the Sultan River.

   "Comparisons of part one (baseline) to post-construction and operational evaluations will thus form the basis to determine whether or not mitigative measures may be required to maintain the quality of Sultan River spawning gravels. However, because there is but a single set of pre-construction samples, natural between-year variability cannot be determined, but significant changes, including build-up of fines, could occur independent of construction and operation. It may therefore be difficult, if a significant build-up does occur, to decide whether it is a consequence of project construction or operation. Data from other West Coast streams may be useful in this case." (Anadromous Fish Mitigation Study Plans, proposed, June 1983, p. 4.)

4. See responses nos. 1 - 3 above.

5. See responses nos. 1 and 3.

6. See responses nos. 1 - 3 above.

7. See responses nos. 1 - 3 above.

8. The District disagrees with WDF's contention on either the need for further analysis in and rewriting of Section 4.0 or that Table 7 is misleading for reasons explained previously. (See responses nos. 1 - 3).

9. This was accomplished; refer to p. 25 and Table 6 on p. 27.

10. Table 9's heading is labeled correctly. Text reference and presentation do not imply any specific methodology of core sampling, and none was intended.

11. See responses nos. 1 - 3, which support the conclusion as presented in the text.

throughout the season to be meaningful, and since gravel analysis is an indicator of porosity or intra-gravel flow, monitoring of oxygen and flow within salmon redds is probably the more logical study data to be collected during these times, not gravel samples. On the other hand, gravel samples taken during low flow, stable summer conditions in natural systems has been looked at with respect to egg survival, numbers of smolts produced and returning adults. Sampling during this time period produces a sample that historically has been the indicator which contains the summation of the effects of hydrological and fish cycles, not just one point in a variable, dynamic system. WDF agrees with the advice of Cederholm and Lestelle, 1974, and Cederholm and Salo, 1979, (whose data is relied heavily upon by the authors of this report) with regard to the importance of gravel sampling during stable summer conditions. Adams and Beschta (1980) recommendations may be valuable in specific cases, but it is not logical in this case. Also, the data collected by them does not appear in Figure 11 or Table 9, which were used for comparing the data from the Sultan River. However, data from Cederholm and Lestelle (1974), Cederholm and Salo (1979), Tagart (1976), and other summer sampling studies are heavily relied upon. The differences between sampling in winter, in spring, and in summer and the differences between sampling with a tri-tube freeze core sampler and the McNeil sampler needs to be quantified and the subsequent analysis and comparisons in this report needs to be presented with those qualifications.

(7)

Section 4.0, Discussion, page 28 and Data in Table 7, Page 30. This comparison and data do not take into account the differences due to sample collection timing or methodology differences. This entire section should be rewritten after comparative analyses are completed. As presently presented, Table 7 is misleading and may be in error.

(8)

Section 4.0, Table 8, page 33. Since the gravel-water interface section of the freeze core is significantly different from the other levels, why didn't this analysis contain the comparisons of the lower three freeze core strata? This analysis would be more biologically significant since that is where eggs predominantly would be incubating.

(9)

Section 4.0, Table 9, page 34. The heading for this Table is incorrectly labeled as containing data from streambed core samples. This indicates that these data are from freeze core samples, which they are not.

(10)

Section 5.0, Conclusion, page 35. This section should be rewritten after sample collection methodology and sample collection timing differences have been taken into account.

(11)

Table B-7

RANGE IN DAILY FLOW CHANGES, SULTAN RIVER, WY 1964
PRE-CULBACH DAM (STARTUP CAUSE)

	1963						1964					
A. Pre-Culbach Dam River Discharge												
% Absolute Change	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Maximum % Increase from Previous Day (Change in CFS)	108 (272)	43 (86)	560 (476)	661 (691)	206 (5,020)	156 (1,405)	236 (1,722)	96 (640)	127 (601)	66 (530)	30 (461)	32 (522)
Maximum % Decrease from Previous Day (Change in CFS)	-30 (-157)	-21 (-50)	-26 (-107)	-68 (-2,285)	-58 (-4,317)	(-43) (-1,440)	-63 (-4,573)	-37 (-630)	-39 (-592)	-41 (-719)	-33 (-735)	-19 (-415)
Pre-Culbach Mean Flow (CFS)	364	169	228	549	1,512	1,164	1,281	689	693	1,002	1,661	1,682
Minimum Flow (CFS)	199	116	103	107	656	358	664	401	389	645	619	902
Maximum Flow (CFS)	628	285	579	1,808	7,650	3,367	7,281	1,689	1,511	1,797	2,699	2,612
B. Operational Phase River Discharge												
River Discharge below Powerhouse Mean Flow (CFS)	239	102	240	578	1,226	1,164	1,182	559	424	744	1,027	1,492
Maximum Flow (CFS)	357	105	157	1,430	2,540	1,716	2,670	1,292	844	1,094	1,582	2,016
Minimum Flow (CFS)	103	102	102	152	360	335	478	167	165	609	669	1,168
Powerhouse Discharge Mean Flow	134	0	0	616	1,017	982	967	380	268	566	861	1,267
Maximum Flow (CFS)	249	0	0	1,252	1,300	1,300	1,300	1,067	663	892	1,300	1,300
Minimum Flow (CFS)	0	0	0	0	605	223	136	0	0	437	305	1,051

WDF appreciates being able to comment on this draft report. We hope our comments have helped to point out the inconsistencies that need correction and we will be looking forward to reviewing another draft or the corrected completed report. WDF notes that due to the innate problems associated with this gravel study, it may be necessary to collect additional sample data beyond the presently proposed 1987 study. (12)

Sincerely,

William R. Wilkerson,
Director

cc: Engman-Game
Linvog-NMFS
Ging-USFWS
Somers-Tulalip Indian Tribe

12. See above responses which support the District's disagreement with the WDF contention about innate problems associated with this study. There aren't any such. Additional gravel sampling is proposed for monitoring purposes as an element of the gravel mitigation plan, not to address WDF hypotheses. Timing of future gravel sampling will be considered in mitigation discussion with the Joint Agencies.

SNOHOMISH COUNTY
PUD
PUBLIC UTILITY DISTRICT NO. 1

2320 California St., Everett, Washington 98201 258-8211
Mailing Address: P. O. Box 1107, Everett, Washington 98206

January 22, 1986
PUD 16699

Mr. Gary Engman
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16018 Mill Creek Blvd.
Bothell, Washington 98012

Mr. Jon Linvog
National Marine Fisheries Service
7600 Sand Point Way N.E.
Bin C 15700
Seattle, Washington 98115

Mr. David Somers
Tulalip Tribes, Inc.
6700 Totem Beach Road
Marysville, Washington 98270

Mr. Gwill Ging
U.S. Fish & Wildlife
2625 Parkmont Lane S.W.
Olympia, Washington 98502

Mr. Robert Gerke
Department of Fisheries
3939 Cleveland Avenue
Tumwater, Washington 98504

Gentlemen:

Jackson Project
Anadromous Fish Mitigation Studies
River Gravel Mitigation Meeting

This is to transmit a copy of notes of the meeting on December 17, 1985. The next meeting is set for 0900 on Wednesday, January 29, 1986, again at NMFS, Sand Point, Seattle. Please note that we have moved up the meeting time by one-half hour to take full advantage of the day and the limited availability of the District's consultant.

We hope to be able to conclude consideration of the remaining technical issues and identify an acceptable mitigation plan proposal during this meeting. Please bring to this meeting the study reports and the Reiser and Ramey report on flushing flows, copies of which were sent to you recently.

Very truly yours,

Original Signed By:
R. K. SCHNEIDER

Robert K. Schneider
Director, Power Management

Enclosure

cc: GeoEngineers - J. Miller (2)
M. Wert

Jackson Project
Anadromous Fish Mitigation - River Gravel Studies
Meeting Notes - Joint Agencies

DATE: December 17, 1985 (0950-1630)

PLACE: NMFS, Sand Pt, Seattle

ATTENDEES: List Attached

AGENDA: Copy Attached

OPENING REMARKS

The purpose of this meeting was to present the District's response to the agencies' review comments on the gravel studies by Wert and GeoEngineers and to present a proposed mitigation plan. The District has combined the two studies (textural composition and bedload transport) for mitigation planning purposes because of the interrelationship of the issues and results. Metzgar reviewed the proposed agenda (copy attached) and it was agreed to be followed.

Before proceeding Metzgar made brief announcements about the District's administrative reorganization, a minimum instream low flow incident, the status of activities on wildlife mitigation planning, and the status of other mitigation study reports (Powerhouse Berm - Spada Lake Creel Census, Powerhouse Ramping Rate, Water Temperature, and Adult Fish Passage).

PURPOSE OF STUDIES REVIEW

Metzgar reviewed quickly the background and purpose of each study. Wert has done two tri-tube freeze core samplings of river gravel to measure the percentage of fine sediment/textural composition in the river before and after project construction and to set a "baseline condition" recognizing the limits of limited sampling. Five sampling sites were selected (2 above and 3 below the powerhouse) in cooperative best judgment with the agencies. The issue is that construction and operation of the project could cause "fine" material to accumulate and reduce reproduction in the fishery.

With river gravel bedload transport the concern was that the dam would intercept the downstream movement of sedimentary material needed to replenish and maintain areas used by salmon and steelhead for spawning. The sources of sedimentary material and the movement process were to be determined. The results of these studies would determine what, if any, mitigative actions might be needed.

REVIEW STUDY RESULTS

(These notes will attempt to summarize the general content/essence of discussional topics. Topics presented herein not necessarily in the sequence of actual discussion during the meeting.)

GRAVEL SUPPLY (SOURCE)

Somers asked if the gravel supplies above the Culmback Dam were not a factor downstream. Dunne explained that based on interpretation of aerial photos and USGS topo maps, gravel from areas above the dam was not likely to be found downstream. The river channel now under Spada Lake was a depositional area due to the low channel gradient - flat valley floor. Bruya asked about consideration of the high flows moving gravel downstream. Dunne responded, it probably occurred only during the big floods. Also, a substantial amount of material is available from Blue Mountain which is downstream from the Culmback Dam.

Metzgar illustrated the practical basis for monitoring gravel supply/movement by build-up of gravel deltas at the confluence of tributaries. Cascade Creek was used as an example wherein the material had formed a large fan projecting into the river channel before the high flows. Afterwards, the delta was cut back to the edge of the normal full-width river channel.

Experience with deposition and sluicing at the Diversion Dam was also reported. The dam crest is 19 feet above the channel bottom. The pool behind the dam was filled with sediment to one-foot below the spillway crest. Much of this material was removed by operating the sluice gate. The next high flows again refilled the pool behind the dam. After the pool is filled, subsequent gravel/sediment continues on downstream. The pool has become part of the river channel with no further gravel storage/retention capability. Miller added that high flows will move the sediment effectively both in terms of transportation and flushing accumulated "fines".

FINE ACCUMULATION/FLUSHING

Ging inquired about armoring. How fast are the "fines" removed when the armor layer is broken up? Dunne replied that the amount of fines in the top 6-12" is small. No one has studied the rate of removal; however, it is within a few minutes to less than an hour that the sediment is suspended and moves down the river. It takes a few hours of maintaining the flows to clean out the whole length of the river. Bruya asked, do you need to maintain the flows to keep the sediment moving? Yes, the smallest particles move first and as the flow increases, the larger particles start moving. The flow required to effectively flush/move the sediment was then discussed. Flows of 2,500 cfs and 4,000 cfs at the diversion dam and powerhouse, respectively, are the flows required for flushing.

Ging asked if the consultants were confident that information taken from other area studies/streams applies to the Sultan River? Dunne replied, yes, the process is the same. Bruya asked about assessing the net change in gravel composition (% fines) after a major flood event. Wouldn't you expect input of fines into the system and how do you relate later summer, early fall studies/conditions to after high flow situation typical in winter/spring? Miller and Dunne explained hydraulic concepts and transport mechanisms. The

basic issue in the amount of flow which is needed to wash fines out. That is where the monitoring element of the proposed mitigation plan comes in, such as the scour chain system. Metzgar added effectiveness or reliability of monitoring is a key feature.

MONITORING

Bruya stated that in the Sultan River, the lower part of the core samples will be consistent. The most variation will occur in the top 6 inches. Wert concurred that there were no significant changes in the lower levels of the freeze core samples taken from the river.

Miller pointed out the issue of determining how many seasons of fine build-up occur before creating a problem for fish reproduction?

Linvog suggested perhaps establishing a relationship between flow discharge and duration. Dunne added that the amount of fines present would determine the duration of flows for flushing. In response to the question of how long would be needed to flush fines out of the whole river? Dunne replied, probably a few hours. Crocker advised that travel time is about six hours for a full flow to reach the river mouth from Culmback Dam.

Discussion next focused on monitoring methods and potential problems. Ging observed that the river has a relatively small amount of "fines" present. If changes occur in the watershed to increase the "fines", would the PUD modify the mitigation plan recommendations? Miller noted that a lot of fine material is already available and in the system from Blue Mountain; also, logging is going on. Ging added, if a big source of fine occurred (such as a slide), would the timing of flushing and the number of flushes to remove the material be changed or additional water provided? We don't want a situation where those responsible for increasing sediment are not willing to "pay" for cleaning it up so that nothing gets done.

Dunne observed that the PUD would just be measuring the amount of sediment (accumulation) and then would flush to remove it when it reaches a certain level.

Metzgar replied that the problem posed and requiring a response will have to be thought out and it would be premature to imply a specific strategy or commitment. Payment might be sought from those responsible - the PUD provide the water/flush and then seek compensation. Metzgar preferred to have this as an unresolved issue (temporarily) in order to consider potential options. The response has policy implications that need review by others before proposing a strategy for the mitigation plan.

Somers suggested that the PUD simulate natural frequency of flushing. Metzgar referred to a packet that contained a frequency record of high flows. If it isn't needed (flushing every year), then the effort is a needless expense or cost in terms of reduced water supplies and power generation. Bruya noted that looking at the baseline, the river probably has had three

major flood events each year. Miller pointed out that it is a major benefit if you don't flush or experience a high flow except when you need it because then the eggs aren't damaged.

OPERATIONAL IMPLICATIONS

Crocker referred to Figure H-3 (Exhibit H-License Amendment Application) to explain project operation and the likely availability of stored water for a flushing flow. The scheduling of a release and the availability of other energy and its value are other considerations that need to be taken into account.

MITIGATION PLAN (PROPOSAL)

Discussion of the proposed plan focused first on monitoring gravel conditions, specifically the schedule and frequency of sampling to determine "fine" accumulation and the implied need for a flushing flow. Reference was made to page 4 in the District's letter of December 6, 1985, to the Joint Agencies. Linvog requested clarification on the proposed sampling schedule. Will there be gravel sampling in 1986 or 1987? Metzgar and Miller explained the rationale for the proposed sequence in sampling. Baseline conditions and "natural" flow reqime relationships have been established. Annually, a flow event exceeding 2,500 cfs has occurred prior to Stage II of the project. The quality of the gravel prior to Stage II regulated flows is assumed to have been acceptable and values (% of fines or mean dg) have been determined in 1982 and 1984. Since two high flow events have happened already (in 1985), the gravel is alright for 1986. Therefore, the next year (1987) would be logical for sampling, if no high flow event occurs in 1986. Although, if it should occur, then postpone sampling until a two year sequence of no high flow occurs in order to obtain a two-year sample.

Linvog observed that means sampling could be put off until 1994. Miller responded that we know what the gravel quality is after adequate high flow events. If the river flushes naturally, there is no need to sample. The need is to determine fine accumulation values over an extended period of time to determine when a flush is needed. (A criteria is needed on a threshhold value). Also, it is important to know if a high flow actually cleaned and moved gravel. That is why scour chains are proposed as a monitoring device.

Ging asked for an explanation of relationships between 1982 and 1984 flushing and gravel samples as a basis for the mitigation plan sampling schedule. A sequence chart was sketched on the wall writing board by Metzgar and Miller and explained by Wert. The first freeze samples were taken in May, 1982 and a reservoir spill (flushing) occurred in January, 1983. Another "big" spill happened in January, 1984 (new reservoir filling) and samples were taken in February. Flows exceeded 2,500 cfs at the diversion dam, so sampling followed flushing events. Extensive discussion followed on sampling scheduling, variability of samples temporally, etc.

Clarification of discussion of proposed monitoring and sampling left

Linvog stating uncomfortability with the possibility of waiting possibly ten years for the next gravel sample. Ging suggested that something more intermediate should be done, perhaps take another sample in four years if there is a flushing flow each year between now and then. Linvog responded that a specific date should be picked regardless of flow regime experience. Miller pointed out that if flushing flows occur, new information on "fine" build-up won't answer any questions, but merely provide an increased confidence level with existing data.

Discussion focused next on the season for sampling spring/summer or summer/fall. Dunne explained comparability issues and pros/cons. Bruya stated that he wanted to avoid sampling in the river when the fish (adults?) are in the river.

An hypothetical situation was posed which generated substantial discussion and resulted in an unresolved issue situation. Bruya asked what happens if a major landslide into the river occurs during times when the District wouldn't be monitoring river gravel? Metzgar replied that a contingency plan might be needed. Additional thought/time is needed to address that issue.

Ging sought further clarification on sampling/monitoring frequency. Assuming a natural flushing event, are we looking at sampling/flushing every two years in the future? He wants the resource (fish/gravel) protected in the future and is worried that if it is a low water year, then the PUD won't want to flush and the FWS won't have the data to support the need for flushing. Metzgar responded that the interests of both the agencies and PUD are identical from the standpoint of needing reliable data to support justifying a gravel flush release as well as protecting water storage to maintain a water supply for minimum instream flows, municipal supply, and power generation. The PUD proposes to continue sampling and monitoring in order to determine conditions and the basis for mitigation action. The issue(s) are, what is/will be effective in providing reliable information?

As the meeting was nearing conclusion, bruya asked Metzgar to summarize meeting results.

Summary

1. Next gravel sampling - use tri-tube freeze core sampling at five baseline site to be done in August, 1987 regardless of intervening flow regime. Five samples per site would be taken instead of ten ad would provide statistically valid results and comparable information.

2. Longer intervals of time between flushing flows needs to be established, if such an interval greater than annually is permissible. A two-year period would be the initial interval. The 1987 sample may or may not provide the two-year interval, it depends on the 1986-87 flow regime.

3. If a gravel flush is needed after two years (timing/scheduling not covered yet), the District will do as soon as water is available.

4. Instream flows needed for flushing are 2,500 cfs at the diversion dam and 4,000 cfs below the powerhouse.

5. The worst case scenario (landslide occurs between monitoring periods) is an unresolved issue.

6. The threshhold level of sediment that is critical needs to be identified - the triggering criteria for a flushing flow.

7. The project does not act as a major block to upstream sources of replenishing gravel. Blue Mountain below Culmback can provide adequate supplies to the lower river. Transport flows are needed; however, insitu gravel in the lower river provides spawning areas. Thus, the major issue is fine accumulation. (Note: #7 was not presented in summary at the meeting.)

8. The PUD will produce and distribute copies of the Pacific Gas and Electric report Review of Flushing Flow Requirements in Regulated Streams by Reiser and Ramey.

Next Meeting

Scheduled for January 17th at NMFS, Sand Point to continue the agenda. It will be a full day session. (Note: Meeting rescheduled at agency request due to conflict with another project's mitigation study schedule. Meeting to be held on January 29th.)

2271

Henry M. Jackson Hydroelectric Project
Public Utility District No. 1 of Snohomish County
Joint Agencies Meeting Agenda*

Anadromous Fish Mitigation River Gravel Studies

December 17, 1985
NMFS, Conference Room, Sand Point, Seattle

1:30 p.m. I. Review Purpose of Studies - (R. Metzgar)

A. Sediment Analysis - textural composition/build-up of fine sediment in river gravel
B. Gravel Quantity - gravel depletion

II. Review Study Results

A. Sediment Analysis - (M. Wert)
B. Gravel Quantity - (J. Miller/T. Dunne)
C. Operational Implications - (PUD)

III. Proposed Mitigation Plan - (R. Metzgar & consultants)

A. Continue freeze core gravel sampling
B. Install scour chains
C. Operate diversion dam sluice gate
D. Flow release at Culmback Dam

IV. Key Issues

A. Criteria (mean d_g fines?)
B. When to implement plan elements
C. Effectiveness

V. Discussion and Review of District Response to Joint Agency Comments

VI. Unresolved Issues

4:00 p.m. VII. Next Step - Concluding the Studies and Reporting to the Federal Energy Regulatory Commission

* Please remember to bring your copies of the study reports to this meeting.

RGM: 12/6/85

LLIAM R. WILKERSON
Director

STATE OF WASHINGTON

DEPARTMENT OF FISHERIES

115 General Administration Building • Olympia, Washington 98504 • (206) 753-6600 • (SCAN) 234-6600

February 11, 1986

Mr. Robert Schneider
Power Manager
Snohomish County PUD
P.O. Box 1107
Everett, Washington 98206

Dear Mr. Schneider:

River Gravel Quality Study

The Washington Department of Fisheries (WDF) has reviewed the above document. We would like to commend you and your consultants on the report.

The report adequately identifies baseline conditions, gravel sources, and stream processes that effect the gravel and bed load movement in the Sultan River.

We have read other agency comments regarding potential problems with the mitigation proposed in the report. WDF hopes that the present on-going discussions initiated at the December 17, 1985 meeting will resolve these issues so that the salmon resources WDF manages are protected.

Sincerely,

Robert J. Hanlon /for

William R. Wilkerson
Director

cc: Plumb-FERC
Ging-USFWS
Somers-Tulalip Tribes
Linvog-NMFS
Engman-WDG

SNOHOMISH COUNTY
PUD
PUBLIC UTILITY DISTRICT No. 1

2320 California St., Everett, Washington 98201 258-8211
Mailing Address: P. O. Box 1107, Everett, Washington 98206

May 29, 1990
PUD-19134
- CERTIFIED -

Mr. Gary Engman
Washington Dept. of Wildlife
Region 4
16018 Mill Creek Boulevard
Mill Creek, WA 98012

Mr. Gwill Ging
U.S. Fish & Wildlife Service
2625 Parkmont Lane SW
Olympia, WA 98504

Mr. David Somers
Tulalip Tribes, Inc.
6700 Totem Beach Road
Marysville, WA 98270

Mr. Jon Linvog
National Marine Fisheries Service
7600 Sand Point Way NE, Bin C-15700
Seattle, WA 98115

Mr. Robert Gerke
Washington Dept. of Fisheries
3939 Cleveland Avenue
Tumwater, WA 98504

Gentlemen:

RE: Jackson Project - FERC No. 2157
Anadromous Fish Mitigation Studies
1987 River Gravel Textural Composition Evaluation

In accordance with pertinent Project License Articles and Orders issued by the Federal Energy Regulatory Commission, Settlement Agreement conditions, and the Anadromous Fish Study Plans, the District has conducted several studies related to the textural composition of gravel on the Sultan River.

Pre-construction of the Sultan Project State II level of fines in the gravels were conducted in 1982 and conditions immediately following construction were assessed in 1984.

It was agreed by all parties to conduct monitoring studies three years and ten years following construction (1987 & 1994 respectively). Please find enclosed two copies of a draft of the third study entitled "Evaluation of the Textural Composition of Sultan River Salmonid Spawning Gravels Following Hydroelectric Project Construction".

The consultant found that "the textural composition of the Sultan River streambed sediments at spawning reaches following project construction (1987) was generally similar to that evaluated for the same sites prior to and immediately following construction (1982 and 1984 respectively)". Furthermore, the Sultan

River spawning gravels appear to be able to "provide suitable conditioning for embryonic survival, depending on other survival limiting factors". Therefore, the consultant concludes that mitigative measures to maintain the quality of the salmonid spawning gravels are not necessary at this time.

Please call Bruce Meaker at 347-4322 if you have any questions about this study report. If you intend to comment on its comments, please send them to the District by Friday, June 29, 1990.

Very truly yours,

J. D. Maner, Director
General Engineering

Enclosures (2 copies)
cc: Bell & Ingram (1 copy)
L. Cashell, FERC (w/o attachments)
A. Martin, FERC (w/o attachments)
bcc: B. Jones, City of Everett (1 copy)
C. Olivers, City of Everett (1 copy)
Dr. Burgner (1 copy)
Mike Wert (w/o attachments)
D. Hale/G. Mixdorf (1 copy) - E4
J. B. Olson - E3 (w/o attachments)
R. E. Johnson - OP (w/o attachments)
B. F. Meaker - BB (1 copy)
D. A. Dole - BB (1 copy)
J. D. Maner - BA (w/o attachments)

SEPH R. BLUM
Director

STATE OF WASHINGTON
DEPARTMENT OF FISHERIES
115 General Administration Building • Olympia, Washington 98504 • (206) 753-6600 • (SCAN) 234-6600

June 20, 1990

Snohomish County PUD
ATTENTION: J. D. Maner
Post Office Box 1107
Everett, Washington 98206

SUBJECT: Comments on the Draft of the River Gravel Textural Composition Evaluation, Jackson Project, FERC No. 2157

Dear Mr. Maner:

The Washington Department of Fisheries (WDF) has reviewed the above-referenced report, dated June 1988. We feel that the following items are those which need clarification and/or further analysis.

On page 15, it is reported that the number of samples taken in each transect has been reduced in 1987 from ten to five. The document states that "analysis of within-transect variation from previous years' data substantiated the reduced sampling size." What was the within-transect variation, and how did it compare to the variation in previous years?

The first paragraph of the discussion (page 23) states that "prior to construction, gravels indicated a progressively smaller size with increased distance from the river mouth, whereas, after construction and operation, the spatial variability of geometric mean particle size showed no apparent trend among stations." Comparison of data from 1982 and 1987 (preconstruction and post-operation samples) in Table 7, appears to indicate that gravel size distribution in 1987 does indeed exhibit a trend, with particle size becoming progressively larger with increased distance from the river mouth. This is a reversal of the original pattern. A regression analysis comparing gravel size distribution relative to distance from the river mouth, particularly between the years 1982 and 1987, could be used to determine whether gravel size distribution has been significantly affected by project operation. In the event that distribution has been significantly altered, any effect on anadromous fish resources could then be evaluated, and, if appropriate, mitigation measures developed.

The discussion also states on page 23 that the coarse gravel at Station 5 may be due to gold dredging activities which occurred in the vicinity a few weeks prior to sampling. The next paragraph reports that particle size at Station 5 increased between 1982 and 1987, and 1984 and 1987, but not 1982 and 1984, but "the reason for such change is uncertain." This appears inconsistent with the previous statement that gold-dredging activities may have caused the coarser gravel at this station. What was the extent of this dredging, and was it on a scale which could indeed have produced or contributed to the observed sediment deposition?

Thank you for the opportunity to comment on the draft Evaluation of the Textural Composition of Sultan River Salmonid Spawning Gravels Following Hydroelectric Project Construction. If you have any questions regarding these comments, please call me a (206)586-6186.

Sincerely,

Brett DeMond
Fisheries Biologist
Habitat Management Division

BD:pr

cc: G. Engman, WDW
D. Somers, Tulalip Tribe
G. Ging, USFWS
J. Linvog, NMFS
L. Cashell, FERC

PNP 16-3-5-1-1
PUD-19177

DON W. BASS
Director

STATE OF WASHINGTON
DEPARTMENT OF FISHERIES
115 General Administration Building • Olympia, Washington 98504 • (206) 753-6600 • (SCAN) 234-6600

June 20, 1990

Snohomish County PUD
ATTENTION: J. D. Maner
Post Office Box 1107
Everett, Washington 98206

SUBJECT: Comments on the Draft of the River Gravel Textural Composition Evaluation, Jackson Project, FERC No. 2157

Dear Mr. Maner:

The Washington Department of Fisheries (WDF) has reviewed the above-referenced report, dated June 1988. We feel that the following items are those which need clarification and/or further analysis.

On page 15, it is reported that the number of samples taken in each transect has been reduced in 1987 from ten to five. The document states that "analysis of within-transect variation from previous years' data substantiated the reduced sampling size." What was the within-transect variation, and how did it compare to the variation in previous years? (1)

The first paragraph of the discussion (page 23) states that "prior to construction, gravels indicated a progressively smaller size with increased distance from the river mouth, whereas, after construction and operation, the spatial variability of geometric mean particle size showed no apparent trend among stations." Comparison of data from 1982 and 1987 (preconstruction and post-operation samples) in Table 7, appears to indicate that gravel size distribution in 1987 does indeed exhibit a trend, with particle size becoming progressively larger with increased distance from the river mouth. This is a reversal of the original pattern. A regression analysis comparing gravel size distribution relative to distance from the river mouth, particularly between the years 1982 and 1987, could be used to determine whether gravel size distribution has been significantly affected by project operation. In the event that distribution has been significantly altered, any effect on anadromous fish resources could then be evaluated, and, if appropriate, mitigation measures developed. (2)

SHAPIRO & ASSOCIATES, INC.

The Smith Tower
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August 23, 1990

Mr. Bruce F. Meaker
Senior Hydroelectric Environmental Specialist
Snohomish County Public Utility District No. 1
P.O. Box 1107
Everett, WA 98206

Re: 1987 Sultan River Spawning Gravel Analysis

Dear Bruce:

The following are my responses to comments received from Washington Department of Fisheries (June 20, 1990) regarding the 1987 analysis of spawning gravels on the Sultan River. I have included a copy of the letter to identify, numerically, the sequence of questions and my responses.

1. I have attached a hand written copy of my notes analyzing the within-transect variation of geometric mean diameter and percent fines for all five sampling stations. Also attached are graphs indicating the results of the analysis for geometric mean diameter for 1982 and 1984 for n=5 and n=10 using all four strata for each sample and using only the lower three strata for each sample.

2. Comparison of results of the lower three strata for 1987 samples (Table 6) indicates no significant differences among station 1-5 mean values for DGW, DGD, and PFLS. Stations 1 and 5 did display significantly different mean values for DGLS, PFW and PFD as compared to stations 2, 3, and 4. Such difference did not represent a trend from river mouth to upper river, however.

   Based on the results presented in Section 3.1, where all four strata were analyzed for each sample, all stations were of similar mean value for geometric mean particle size except for station 5. Both station 1 and 5 were of different mean value, with respect to percent fines, than the other stations. For this reason, no upper river to lower river trend is indicated.

   Comparison of mean values of geometric mean particle size among years for each station indicates no significant change for stations 1-3 (Table 7). This table represents a comparison of values for a given station among years and not among stations within a given year. The analysis of differences among stations during 1987 was presented in Section 3.1 as discussed earlier.

   Station 4 indicated DGW was larger in the upper river in 1984 as compared to 1982 but not significantly different in 1987 from either 1982 or 1984. DGD results were similar to those of DGW with respect to significant differences. DGLS results indicated no significant differences among years.

The discussion also states on page 23 that the coarse gravel at Station 5 may be due to gold dredging activities which occurred in the vicinity a few weeks prior to sampling. The next paragraph reports that particle size at Station 5 increased between 1982 and 1987, and 1984 and 1987, but not 1982 and 1984, but "the reason for such change is uncertain." This appears inconsistent with the previous statement that gold-dredging activities may have caused the coarser gravel at this station. What was the extent of this dredging, and was it on a scale which could indeed have produced or contributed to the observed sediment deposition? (3)

Thank you for the opportunity to comment on the draft Evaluation of the Textural Composition of Sultan River Salmonid Spawning Gravels Following Hydroelectric Project Construction. If you have any questions regarding these comments, please call me a (206)586-6186.

Sincerely,

Brett DeMond
Fisheries Biologist
Habitat Management Division

F-94

BD:pr

cc: G. Engman, WDW
D. Somers, Tulalip Tribe
G. Ging, USFWS
J. Linvog, NMFS
L. Cashell, FERC

Geometric mean particle size at station 5 was greater in 1987 than either 1984 (also after project construction) or 1982 before project construction. If the change was related to project operation it would seem that both 1984 and 1987 would be significantly different from 1982.

3. The reason for change in geometric mean particle size at station 5 in 1987 may be related to gold dredging activities observed at the site in weeks prior to sampling. The certainty of this speculation could not be proven, however. The distribution of dredge spoils at the site was not known.

Thank you for the opportunity to respond to these comments. I hope this has clarified the questions asked.

As a final note, I observed an error in Table 8 as I was reviewing the manuscript. The table listed DGW, DGD, and DGLS where it should have been PFW, PFD, and PFLS, respectively. I have enclosed a copy of the corrected table and page (24) for your publication of the report.

Sincerely,

SHAPIRO AND ASSOCIATES, INC.

Michael A. Wert
Project Manager

MAW:jjo
Enclosure

SNOHOMISH COUNTY
PUD
PUBLIC UTILITY DISTRICT NO. 1

1802 - 75th Street S.W. • Everett, WA • 98204 • (206) 347-4300
Mailing Address: P. O. Box 1107 • Everett, WA • 98206-1107

April 17, 1995
PUD 20198

Mr. Gary Engman
Washington Dept. of Wildlife
Region 4
16018 Mill Creek Boulevard
Mill Creek, WA 98012

Mr. David Somers
Tulalip Tribes, Inc.
6700 Totem Beach Road
Marysville, WA 98270

Mr. Gwill Ging
U.S. Fish & Wildlife Service
3704 Griffen Lane SE, Suite 102
Olympia, WA 98501

Mr. Jon Linvog
National Marine Fisheries Service
7600 Sand Point Way N.E.
Bin C 15700
Seattle, WA 98115

Dear Gentlemen:

RE. Jackson Hydroelectric Project - FERC No. 2157
License Article 55 - Final Report on Aquatic Resources Studies
1994 Sultan River Gravel Quality Study

Article 55 in the Order Amending License and Providing for Hearing (17 FERC 61,056) in conjunction with Articles 54 and 56 and the Settlement Agreement (22 FERC 61,140) require the Licensees (Snohomish County Public Utility District and the City of Everett) to consult and cooperate with the Joint Agencies (Washington Department of Fish and Wildlife, U.S. Fish and Wildlife Service, National Marine Fisheries Service and Tulalip Tribes), in conducting a series of mitigation studies for the aquatic resources of the Sultan River. In accord with Article 55, the Snohomish County Public Utility District (District) has been conducting the required studies on behalf of the Licensees. Annual reports on the status of the studies have been filed with the FERC beginning on June 1, 1987. At the request of the District, the FERC issued a December 6, 1990 order granting a time extension to June 30, 1994 for submittal of the final report on the studies. However, due to present circumstances, the Licensees have conducted further study (concurred with by the Joint Agencies) and on July 29, 1994 FERC issued an order granting a District requested extension of time for the final Article 55 report on aquatic resources to June 30, 1995. This letter presents the reasons for the delay and a request for your review of the 1994 Sultan River Gravel Quality Study for inclusion in the final Article 55 report on aquatic resources.

The Joint Agencies have always had an interest in the long term impacts of project operation on the Sultan River's spawning gravels below the project's diversion dam. With the raising of Culmback Dam the concern was sediment transport competency and that peaking flows to break up armoring would be altered to the detriment of spawning habitat maintenance. Specifically, if spill from Culmback Dam was not of a magnitude and frequency to maintain gravel conditions, the Licensees would need to mitigate. Therefore, to address this concern, the Licensees agreed in the Settlement Agreement with the Joint Agencies to conduct several multi-year studies of the Sultan River to determine the project operational impacts on the quality and quantity of spawning gravels from the diversion dam to the mouth of the Sultan River. Over the last twelve years the District has

completed the required studies according to the agreement schedule. Gravel quantity studies (supply) were conducted in 1984 following construction. Gravel quality studies were conducted pre-project construction (1982), immediately following construction (1984), and three years post project construction (1987). These studies addressed Sultan River conditions for project operations under operating rule curves established when the project was first allowed to generate power commercially in 1984.

Under license Article 57, a second interim operating plan (58 FERC 62,224) was approved by the FERC in 1992. The operating plan was submitted by the District as the culmination of a long process of consultations with the Joint Agencies and Corps of Engineers. During the consultation process the Licensees offered a set of modified rule curves as being mutually advantageous to the interests of all parties. The District has been operating under the revised rule curves with the consent and knowledge of all parties since November 1, 1989. However, one result of operating under the revised rule curves has been a decrease in the magnitude and frequency of spill flows at Culmback Dam, as project hydrologic modeling forecast during the development of the operating plan. Furthermore, the Pacific Northwest has been experiencing an extended period of dry hydrologic conditions which have resulted in no spill flows at Culmback Dam for the past four years (since December, 1990).

As previously scheduled, the final studies report of aquatic resources under License Article 55 were to be submitted on June 30, 1994. Given the change in operating rule curves following the last gravel quality study conducted in 1987 and the current condition of four years of no spill flows on the Sultan River, the District initiated with Joint Agency concurrence an additional textural analysis of the gravels. The effort was within the intent of the license and Settlement Agreement to determine the long term effects of project operations on the quality of spawning habitat. Under the conditions of the second interim operating plan, the District conducted (with Joint Agencies concurrence) this sampling in early September 1994. The timing was consistent with previous sampling of gravel quality.

To include the results of the report from this effort to the development of the final aquatic resources mitigation report under license Article 55 encompassing all the Sultan River gravel studies over the past twelve years, the Licensees request your review of the 1994 gravel quality study. Please provide your comments to the District on or before May 17, 1995.

If you have any questions, please contact the Jackson Project fish biologist, Murray Schuh, at (206) 347-4369.

Sincerely,

Original Signed by
B.F. MEAKER

Bruce F. Meaker
Jackson Project Manager

cc: Bell & Ingram (w/enclosure)
A. Martin - FERC, Portland (w/enclosure)
C. Olivers - City of Everett (w/enclosure)
bcc: B. Meaker - O1 (w/o enclosure)
M. Schuh - O1 (w/o enclosure)
R. Metzgar - City of Everett (w/o enclosure)
C. Thompson - E1 (w/o enclosure)

SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO. 1

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August 15, 1995
PUD 20246

Mr. Gary Engman
Washington Dept. of Wildlife
Region 4
16018 Mill Creek Boulevard
Mill Creek, WA 98012

Mr. David Somers
Tulalip Tribes, Inc.
6700 Totem Beach Road
Marysville, WA 98270

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3704 Griffen Lane SE, Suite 102
Olympia, WA 98501

Mr. Jon Linvog
National Marine Fisheries Service
7600 Sand Point Way N.E.
Bin C 15700
Seattle, WA 98115

Dear Gentlemen:

RE. Jackson Hydroelectric Project - FERC No. 2157
License Article 55 - Final Report on Aquatic Resources Studies
Final Report on Sultan River Gravel Quality and Quantity Studies

This letter requests your review of the final report on Sultan River Gravel Quality and Quantity Study for inclusion in the final Article 55 report on aquatic resources. Article 55 in the Order Amending License and Providing for Hearing (17 FERC 61,056) in conjunction with Articles 54 and 56 and the Settlement Agreement (22 FERC 61,140) require the Licensees (Snohomish County Public Utility District and the City of Everett) to consult and cooperate with the Joint Agencies (Washington Department of Fish and Wildlife, U.S. Fish and Wildlife Service, National Marine Fisheries Service and Tulalip Tribes), in conducting a series of mitigation studies for the aquatic resources of the Sultan River. In accord with Article 55, the Snohomish County Public Utility District (District) has been conducting the required studies on behalf of the Licensees. Annual reports on the status of the studies have been filed with the FERC beginning on June 1, 1987. At the request of the District, the FERC issued a December 6, 1990 order granting a time extension to June 30, 1994 for submittal of the final report on the studies. However, due to present circumstances, the Licensees have conducted further study (concurred with by the Joint Agencies) and requested extension of time for the final Article 55 report on aquatic resources to September 30, 1995.

The Joint Agencies have always had an interest in the long term impacts of project operation on the Sultan River's spawning gravels below the project's diversion dam. With the raising of Culmback Dam the concern was sediment transport competency and that peaking flows to break up armoring would be altered to the detriment of spawning habitat maintenance. Specifically, if spill from Culmback Dam was not of a magnitude and frequency to maintain gravel conditions, the Licensees would need to mitigate. Therefore, to address this concern, the Licensees agreed in the Settlement Agreement with the Joint Agencies to conduct several multi-year studies of the Sultan River to determine the project operational impacts on the quality and quantity of spawning gravels from the diversion dam to the mouth of the Sultan River. Over the last twelve years the District has

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As previously scheduled, the final report on aquatic resources under License Article 55 was to be submitted on June 30, 1994. Given the change in operating rule curves following the last gravel quality study conducted in 1987 and the current condition of four years of no spill flows on the Sultan River, the District initiated with Joint Agency concurrence an additional textural analysis of the gravels. The effort was within the intent of the license and Settlement Agreement to determine the long term effects of project operations on the quality of spawning habitat. Under the conditions of the second interim operating plan, the District conducted (with Joint Agencies concurrence) this sampling in early September 1994.

To include the final report encompassing all the Sultan River gravel studies over the past twelve years to the final aquatic resources mitigation report, the Licensees request your review of the final report on Sultan River gravel quality and quantity studies. Please provide your comments to the District on or before September 15, 1995.

If you have any questions, please contact the Jackson Project fish biologist, Murray Schuh, at (206) 347-4369.

Sincerely,

Danny Miles for

Bruce F. Meaker
Jackson Project Manager

cc: Bell & Ingram (w/enclosure)
A. Martin - FERC, Portland (w/enclosure)
C. Olivers - City of Everett (w/enclosure)
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