BEFORE THE STATE OF WASHINGTON
ENERGY FACILITY SITE EVALUATION COUNCIL

IN RE APPLICATION NO. 96-1

OLYMPIC PIPE LINE COMPANY:
CROSS CASCADE PIPELINE PROJECT

EXHIBIT _____ ( )

REBUTTAL TESTIMONY OF ROBERT NIELSEN

ISSUE: STREAM CROSSINGS AND ASSOCIATED HABITATS

SPONSOR: OLYMPIC PIPE LINE COMPANY

Q. Please state your name, business address, and employment position.

A. My name is Robert Nielsen. I am employed by Dames & Moore as a Consulting Fish and Wildlife Biologist. I am a senior biologist in the Natural Resources Group of the Seattle office. My business address is 2025 First Avenue, Seattle, Washington, 98121. My duties include project lead on West Coast fisheries projects, supervision and collection of field data, and the writing of environmental reports and permit applications. I have degrees in Fisheries and Wildlife Science, including B.S., M.S., and Ph.D. degrees in Fisheries from the University of Washington. I have worked for over 25 years as a Fish and Wildlife Biologist in the Pacific Northwest with experience throughout the Western United States and Alaska.

Q. What is the subject matter of your testimony?

A. Stream crossings and associated habitat issues.

Q. To which prefiled testimony are you responding?

A. I am responding to issues raised or touched on by many witnesses, including but not limited to Erik Stockdale, Eric Anderson, Jerry Benson, Ron Friesz, Tony Opperman, Brent Renfrow, Jeff Skriletz, Gary Sprague, Bob Zeigler, David G. Bortz, Arthur Bower, Jr., Carl Jeffrey Cederholm, Todd Boehle, Terry Butler, Tim Goodman, Thomas F. Mumford, Jr., Ronn J. Schuttie, Susan C. Shaw, Nancy Sturhan, Ronald C. Devitt, Douglas Pineo, Donald Finney, Nick Gillen, Randy Sandin, Kurt D. Nelson, Terrance R. Williams, Steven S. Parker, Sarah S. Cooke, Gary A. Pascoe, Greg Ruggerone, Henry G. Landau, and George F. Wooten.

Q. What materials have you reviewed in preparing your testimony?

A. I have been involved in the research and analysis of the Cross Cascade Pipeline Project for Dames & Moore since June of 1997. I revised the fisheries section of OPL's EFSEC application, as well as the Cross Cascade Pipeline Project Fisheries and Aquatic Resources Technical Report, which is incorporated into the most recent version of the application. I have also maintained the natural resources data files for the project, and I prepared the fisheries section of the Cross Cascade Pipeline Project Biological Evaluation, which contains more extensive data on threatened, endangered, and sensitive species. I have also groundproofed most of the stream and wetland crossing sites.

At Dames & Moore, I have worked with David Every, Katy Chaney, Linda Krippner, Donna Frostholm and John Heal on this project. I have also worked extensively with Claude Harshbarger and Gordon Eastling from OPL, and with Richard Oestman of Jones & Stokes in connection with fisheries related issues in the DEIS. Finally, I have worked directly with many experts from governmental authorities, some of whom have submitted testimony in this proceeding. These include Gary Sprague, Eric Anderson, Tony Opperman, Brent Renfrow, Kurt Kramer, Keith Wolf, Paul Mongillo, and Bob Pfeiffer, all from the Washington Department of Fish and Wildlife; Sean Farrell and Tyler Patterson of the U.S. Forest Service; and Lynn Hatcher of the Yakama Indian Nation.

Q. Can you summarize your testimony?

A. My testimony describes the data collection and field work on fisheries resources performed by Dames and Moore, our analysis of projected impacts, and the mitigation measures designed to prevent impacts. In my opinion, given the additional site-specific surveys that OPL has committed to perform during the design phase, the Best Management Practices, Standards and

Guidelines that OPL has committed to follow during the construction phase, and the mitigation measures OPL has committed to undertake, construction and maintenance of the pipeline should not have any significant adverse impacts on fisheries and aquatic resources.

Response to Concerns Re: Methodology and Assessment of Stream Crossings

Q. Several witnesses contend that OPL's application contains insufficient site-specific data and analyses regarding various potential environmental impacts (*e.g.*, mitigation measures, site conditions, surveys of aquatic wildlife and vegetation). What types of information about the environmental conditions associated with the pipeline right-of-way will OPL gather and rely on during the design and construction phases of the project?

A. OPL expects the EFSEC permit to be conditional upon the development of more site-specific plans for each crossing. OPL will complete site-specific surveys of geological and hydrological conditions before construction to use in developing construction and monitoring plans for each site. If it is determined that a site has a risk from erosion, mass wasting and earth movements, debris flows, etc., the site-specific plan will contain additional mitigation and monitoring as agreed to with federal, state, and tribal authorities. (For more detail on these and other geotechnical issues, see the prefiled rebuttal testimony submitted by Steve Wilbur, Conrad Felice, and Mark Molinari.)

In addition, OPL will survey streams with channels identified as unstable and in need of additional scour analysis and monitoring. A site-specific scour analysis will be conducted for every stream to determine the maximum local scour depth and any impacts from the crossing methodology to the hydraulics of the crossing. OPL will reach agreement with the appropriate agencies on the appropriate maximum scour depths of concern, subject to overall approval of EFSEC. The agreed upon figures will be incorporated into OPL's designs and plans. OPL will

also survey elevations at crossings of streams with unstable channels, set a bench mark, and monitor cross sectional elevations at 1, 3, and 5 year intervals. Once pipeline cover depth is halved, OPL will contact EFSEC and other appropriate authorities and assess the need for stabilization measures. OPL will monitor crossings at risk of scour damage after each five year flood event.

The sensitivity of fisheries and other natural resources of each site will also be further evaluated if necessary and methods incorporated into the crossing plan to address mitigation and monitoring. Additional baseline data regarding habitat at each crossing will be gathered prior to construction to better assess impacts during the monitoring process. Additional data will include an accurate assessment of the channel morphology and the locations of LWD structures to assist in reconstruction of the site, optimal pipeline alignment to avoid large mature trees if trees are present, streamside vegetation, species-specific considerations for construction windows, tree canopy/temperature impacts, erosion and sediment control, fish removal from diversions or if blasting is required, identification of culverts that are undersized, improperly oriented, or barriers to fish migration, wastewater and soil disposal, mitigation prescriptions, and monitoring prescriptions. Because changes in habitat have occurred between different surveys by Dames & Moore biologists, detailed environmental data will be gathered as close to the development of site-specific construction plans as possible to account for recent modifications to the environment.

Q. Some witnesses have raised concerns that the pipeline will need to cross additional streams and wetland habitats not cataloged in the application. Can you respond to these concerns?

A. Preliminary habitat surveys have been conducted on the ground at all stream crossings. The entire pipeline route has been walked by Dames and Moore fisheries, wetlands, and wildlife biologists, and I believe that all significant jurisdictional watercourses have been reported. Early reports and the first version of the EFSEC application were based on GIS coverage and databases and have since been ground-proofed. Many stream crossings have either been added or deleted by changes in the pipeline alignment.

In his testimony, Kurt Nelson states that he observed five unreported streams between mile posts 8 and 25. The exact location or sizes of these streams was not reported, but OPL's application acknowledges the possibility that the stream survey missed small streams that were either dry or difficult to see while surveying the route. It is possible that these streams fit that category. Mr. Nelson also states that habitat surveys were only conducted on 24 of the first 83 stream crossings. This comment may refer to an earlier version of the EFSEC application. As noted above, the entire route has been surveyed.

In his testimony, George Wooten states he observed 29 riparian crossings along the southwest side of Keechelus Lake where the application listed only five stream crossings and the Cross Cascade Pipeline Project Fisheries and Aquatic Resources Technical Report ("Fisheries Report") listed only 13. He also lists an area near North Bend where five streams or wetlands were omitted from the Application along a 1.5 mile stretch. The area near North Bend is not specified, so I cannot compare it to our map atlas, but it is possible to compare the section near Keechelus Lake. Table 3.4-8 of the May 1, 1998 draft application, the Public Notice of Application for Permit to the U.S. Army Corps of Engineers, and the most current version of

the Fisheries Report list 15 jurisdictional streams (natural streams with defined channels) as defined by the Army Corps of Engineers. (A copy of the Application for Permit is attached to my testimony as an exhibit.) I have personally walked this route and have verified these streams and could find no other waterways that meet the definition of a jurisdictional stream. The witness does not define riparian crossings and may be referring to seeps, ditches or valleys with riparian vegetation.

Nick Gillen states that there are two unreported crossings of a stream south of the Tolt River crossing #27. These crossings were not on the pipeline alignment at the time of the last revision of the EFSEC application. A realignment of the Tolt River crossing in 1998 crosses this stream at the locations that the witness mentions. The crossings have been surveyed by a Dames & Moore biologist and will appear in any documents issued after the realignment. This stream is crossed above the proposed directional drill on the Tolt River. There is a possibility that after the entrance and exit locations of the directional drill are determined for the Tolt River crossing, it may be possible to align the pipeline to avoid this stream.

Q. Can you respond to the assertion by some witnesses that cost was OPL's primary consideration in determining the methodology to be used in crossing watercourses?

A. Regulations at the time of the initial EFSEC application did not require alternatives be explored to avoid trenching small non-fish bearing streams. OPL chose at that time to use the most cost-efficient methodology, using the BMPs and standards and guidelines in effect at the time. Environmental restrictions to building a pipeline have changed since the permitting process for the Cross Cascade Pipeline was started. OPL has consistently proposed new methods to cross streams and waterways as environmental regulations have become more restrictive and the aquatic resources in many streams have declined. Wherever possible, the pipeline alignment

has been adjusted to avoid impacts and stream crossing methodologies have been evaluated to develop the best available crossing method for each site. The first criteria used in methodology selection is minimization of environmental impacts. The second criteria is feasibility (the method has to be physically possible within the constraints of the topography and the materials, land use restrictions, pipeline safety and worker safety). If more than one method is feasible and the environmental impacts are judged to be equal, the most cost efficient method is chosen.

Q. A number of witnesses complained that OPL failed to conduct an analysis of pipeline route and construction methods alternatives. Can you comment on that contention?

A. A Draft Alternatives Analysis for the Cross Cascade Pipeline was prepared that addressed alternative crossing methodologies for sensitive wetland and stream crossings.

Q. Some witness suggest that OPL can avoid most environmental impacts simply by placing the pipeline on bridges at every stream crossing. Is that correct?

A. Existing bridges will be used where feasible if a permit can be obtained from the owner or agency having jurisdiction. The bridge must be structurally sound, have adequate space for the pipe, and not be at risk from debris torrents. Hanging the pipe must not compromise personnel safety during construction, operation, or maintenance. Constructing new bridges or rebuilding bridges is often not practical for crossing sensitive areas because of the permanent environment impact associated with their construction such as disturbing wetlands, streambanks, and streambeds to provide footings for support structures, creating new permanent access into the stream or wetland. Building a new bridge also often will require greater impacts to surrounding riparian areas.

Q. Can you characterize OPL's approach to mitigation of environmental impacts to streams, wetlands, and riparian habitats from pipeline construction?

A. Mitigation for pipeline construction, maintenance, and operational impacts will follow the principals of avoidance, minimization, rectification, reduction or elimination over time, compensation (replacing, or enhancement), and monitoring. The pipeline has been routed to avoid sensitive areas whenever possible. When sensitive areas cannot be avoided through an exploration of alternative routes, the route with the lowest impact is chosen and the best feasible crossing methodology chosen to minimize the impacts. Mitigation plans will be developed for each site using all BMPs, standards and guidelines and stipulations agreed to between OPL and consulting federal, state, and tribal agencies to rectify, reduce, or eliminate impacts from the crossing. Where impacts occur that cannot be avoided or minimized, OPL will consult with the appropriate agencies to develop an acceptable method and level of compensation.

Response to Concerns Re: Construction Impacts

Q. What are some of the potential cumulative impacts of construction on the stream systems crossed by the proposed pipeline?

A. Cumulative impacts from construction activities would be expected to occur in the mainstem Snoqualmie, South Fork Snoqualmie, and Yakima Rivers from the effects of multiple tributaries being crossed by pipeline construction activities. These would be excessive turbidity, deposition of fines in spawning gravels, filling of pools by excessive bedload transport, and increased temperatures. A reduction in available LWD and recruitment of LWD could also occur.

Q. What measures will OPL take to minimize or avoid such impacts during the design and construction phase of the project?

A. Sediment and erosion control measures have been outlined in the application, and site-specific plans will be developed in conjunction with the appropriate federal, state, and tribal agencies prior to construction to address issues not addressed by BMPs and Standards and Guidelines. Turbidity will be monitored by independent consultants with the authority to halt construction (until the situation can be resolved) if turbidity levels increase beyond prescribed levels. Only a few streams will be crossed each day in each river's watershed and turbidity increases in the mainstem will create no significant impacts on fish behavior or mortality if kept within prescribed limits.

Sedimentation levels will never approach the level required for pool filling. A significant increase in bedload from frequent or large mass wasting events would be required to aggrade (build-up the streambed) a stream channel sufficiently to reduce pool depths and reduce channel diversity (pool/riffle structure, under-cut banks, etc.). Assuming there are no catastrophic mass wasting events or loss of drilling muds into the channel during directional drilling, the only anticipated sedimentation impacts from pipeline construction at most crossings will be a slight increase in turbidity levels for less than a day during construction. This increase will be over a day's duration in the case of the Yakima River if divert and trench methodology is required, but will not contribute to any significant pool filling.

The percentage of trees removed from stream crossings where trees are present will represent only a small percent of the available canopy cover on most west-side streams and will produce no measurable increases in mainstem river temperatures. A slight possibility exists that measurable cumulative temperature effects could occur in the upper Yakima River. To compensate for this and the direct effects of tree removal along the river if divert and trench

methodology is required for the Yakima River crossing, black cottonwood will be planted in locations along the Yakima River, selected with the advice of WDFW and YIN biologists, to increase the shade and cover of the middle reaches of the river.

Tree removal will be limited to those individuals that would directly interfere with trenching, pipe installation and backfill. Trees will be removed with rootwads intact and will remain as LWD within the stream or elsewhere within the floodplain. Placement within a stream will be done in consultation with a qualified habitat biologist. Prior to construction, site-specific plans will be developed in consultation with the appropriate federal, state, and tribal agencies if compensation is required for the loss of future potential LWD if trees are removed from streams with low LWD recruitment potential. Streams with low LWD potential would occur in areas where most of the riparian trees near the crossing and throughout the stream's watershed have been removed through clearcutting or agricultural and grazing practices (farming and grazing use near a streambank often prevents the recruitment of new trees, eventually reducing the standing crop of riparian trees). In arid areas east of the Cascade Mountain range, streams below the tree line often have only narrow patches of trees along their streambanks. These streams would have low LWD potential due to a low number of streamside riparian tress per linear mile of stream channel.

Q. How will the seasonal construction window be decided for stream crossings?

R. The general construction windows described in the application are those that the WDFW uses for instream construction guidelines. These windows are generally for low summer flow periods when the release and transport of fine sediment from construction activities into the stream is reduced. The windows are also selected to avoid instream construction when fish are

migrating, spawning, or eggs and alevins are in the gravel. Where trenched construction was proposed for streams containing sensitive or anadromous fish, local fisheries biologists for the tribes and WDFW were contacted to evaluate the best available stream windows. These windows have been adjusted several times as additional information was received from the contacted agencies, public comment, or D&M surveys. Fisheries resources are not the only factors involved in determining these windows. There are often conflicting construction windows for nesting birds, sensitive and endangered wildlife, and deer/elk calfing/wintering areas. The flip/flop of water flows in streams used for irrigation add additional restrictions. In the case of the Yakima River, there is no available construction window that will completely minimize or avoid impacts to all species and a window had to be selected based on what timing would have the lowest overall impact.

Construction windows for additional sensitive streams will be determined when site specific plans are developed for each crossing. Windows for instream work will be established by EFSEC in consultation with the appropriate federal, state, and tribal agencies. The timing of all in-stream construction will consider the migrational periods and spawning and rearing conditions of salmonids. A qualified EFSEC designated environmental monitor will monitor water quality/turbidity with authority to halt construction until any problems are remedied. Construction windows serve to reduce or minimize impacts to water quality and fish. They are not intended or expected to completely eliminate impacts or to substitute for the use of BMPs, Standards and Guidelines, other mitigation measures, or monitoring.

Q. What mitigation measures are proposed to minimize sedimentation during construction arising from unexpected rainstorms and thunderstorms.

A. Site-specific erosion and sedimentation plans will be developed, prior to construction, in consultation with the appropriate federal, state, and tribal authorities. In areas, such as the Columbia plateau, with highly erodible soils and intense summer thunderstorms, additional construction prescriptions beyond the applicable BMPs and Standards & Guidelines may be adopted if there is a risk of sediment release into streams or destabilization of the streambanks from storm events. These erosion and sedimentation control plans could include, but not be limited to, stopping construction during a storm, covering spoils piles with tarps to prevent the release of sediment into stream channels, monitoring turbidity above and below the crossing site, and stabilizing stream banks with jute mats and other methods of bank stabilization.

Q. Can you respond to the concerns of some witnesses about potential for sedimentation and dewatering effects associated with under-culvert stream crossings.

A. The methodology used in crossing under (and over) culverts was discussed in the draft Alternatives Analysis for the Cross Cascade Pipeline. The culvert must be long enough to allow excavation under it without the culvert falling into the trench. The ground conditions must also provide for relative ease of excavation. The installation is accomplished in much the same way as pipe is installed in the flume and trench method. The use of the ground below a culvert in good repair avoids all impacts to the stream. If a culvert must be replaced because it is a barrier to fish passage or inadequate to support floods or debris flows that occur at the site, the normal impacts that would be associated with that type of activity are to be expected and best management practices will be employed to minimize those impacts.

OPL has agreed to replace or re-orient identified undersized or improperly oriented culverts at or near pipeline crossings with the potential to adversely impact the pipeline. OPL agrees to monitor these replacement or re-oriented culverts and the stream channels at 1, 3, and 5 year intervals for proper function. OPL will also replace of modify any culverts crossed by the pipeline that are barriers to fish migration. Because placement of the pipeline under culverts will not impact stream channels, and because the replacement of culverts that are undersized, improperly oriented, or inadequate for the passage of fish, flood waters, or debris flows, such replacement will be done as an enhancement measure, not as mitigation for stream channel impacts.

Q. Can you comment on the concerns expressed regarding the potential for in-water blasting in areas like Peoples Creek.

A. If and when blasting is found necessary, fish will be removed from impacted areas and relocated to the nearest safe and appropriate habitat in consultation with appropriate state, federal, and tribal agencies. OPL will notify EFSEC and the appropriate agencies of any unexpected blasting activity before it occurs, and a blasting plan will be developed and submitted to EFSEC and the appropriate state, federal, and tribal agencies for review and approval prior to any blasting activity. Where acceptable, fish will be removed by multiple passes with electrofishing equipment. OPL recognizes that an unknown percentage of fish will not be captured or will be killed or injured during the capture process. The construction plan for any crossing requiring blasting in the vicinity of a fish bearing stream will include mitigation stipulations developed through consultation with the appropriate state, federal, and tribal agencies.

Q. How do you respond to the detailed suggestions for minimizing and mitigating construction impacts set forth in the testimony of witnesses such as Donald Finney and Ronald Devitt?

A. OPL is already planning to comply with most of their suggestions, with the following exceptions:

Wherever possible, the pipeline route will avoid Class 1 and Class 2 streams, and where avoidance is not possible, every possible effort will be made to cross the stream and any associated wetlands by horizontal directional drill or an existing bridge. However, in the case of Griffin Creek and some tributaries of Cherry Creek, these options do not exist due to streambank topography, and it will be necessary to trench across the creek using flume or diversion methodology. In these cases, every effort will be made to align the pipeline to cross the least sensitive habitat available and minimize impacts to the streambank and channel, fish and aquatic resources, and associated wetlands and riparian areas. Among other measures, construction windows will be selected to coincide with no impact to spawning or migration of fish.

Anadromous salmonid spawner, redd, and juvenile surveys will be made at the appropriate times, but the baseline stream survey information will be the prime source of information used in developing site-specific construction plans.

Restoration of riparian vegetation will be considered successful if the native herbaceous and/or woody cover comprises at least 80% of the total cover, and native species diversity is at least 50% of the diversity originally found in the area. OPL will regularly monitor and actively manage for restoration and erosion control. If revegetation is not successful at the end of the five-year post-construction monitoring period, the applicant will develop and implement a plan to actively revegetate the riparian area with native species.

Q. Describe how OPL will return the streambanks to their original contour following pipeline construction.

A. Each crossing will be photographed and large structures (*e.g.*, boulders, LWD, etc.) that determine the hydrology and morphology of the stream channel will be mapped along with the composition of the substrate. If it is determined that stream morphology and hydrology can be improved when reconstructing the trench, these changes will be added to the restoration plan for the crossing. Gravel of the appropriate size and contour will be the preferred substrate in the top 1-foot of fill placed back into the trenched streambed. Where spawning gravel is removed, it will be replaced by gravel of an appropriate size for the salmonid species that spawn at that location. Boulders and LWD will be replaced and anchored in the appropriate sections of the stream channel. Any trees removed during construction will be placed in the stream channel with their root balls intact in a configuration determined by WDFW and other regulatory agencies to provide proper channel structure and fish habitat. The streambanks will be restored and stabilized by bioengineering methods and revegetated. Structural reinforcement of the streambanks by rip-rap will only be used where alternative methods of stabilization are not feasible.

Q. When will protective concrete coating be used on the pipeline?

A. A concrete coating will be used wherever the pipe is buried below a stream crossing or where there is a possibility of mechanical damage (*e.g.*, on bridges). The pipe will have a protective concrete coating for its entire distance under the stream channel's area of lateral migration.

Q. What will OPL do to minimize or eliminate potential adverse impacts arising from the disposal of construction spoils?

A. OPL will stipulate that contractors will dispose of spoils in legal upland areas and will not allow third parties to haul spoils away unless the final disposal of these materials is known and can be verified as legal and not used to fill in wetlands or sensitive habitat areas. In addition to disposal methodology listed in the application, the following stipulations have been agreed to between OPL and the Yakama Indian Nation. These stipulations would apply to disposal of spoils throughout the project area: (1) The topsoil will be removed and protected throughout construction. (2) This material will be stockpiled outside of wetland and riparian areas. (3) During construction, all spoil material from water body crossings will be placed in the right of way at least 10 feet away from the ordinary high water line. (4) At a minimum, all spoil shall be contained within sediment filter devices. (5) Any spoil not used to refill the trench will be hauled away off site and disposed elsewhere if it cannot be left within the right of way out of the 100 year floodplain.

Q. Several commenters have called for OPL to hire trained inspectors with environmental expertise and stop-work authority to oversee construction of the pipeline. Can you respond to these comments?

A. OPL has already agreed to give such authority to a qualified EFSEC-designated environmental monitor to monitor water quality/turbidity downstream of drilled and trenched crossings during construction equipment operation in or near channels known or suspected to contain salmonids. The monitor will have authority to halt construction until any problems are remedied. Thus, minimization of construction impacts will be assured by a qualified independent monitor

monitoring the stream crossing construction site and by continued monitoring over a five-year post-construction period to assure that revegetation of the site is successful.

Q. Some commenters have expressed concerns with wet trenching in fish bearing streams. Can you address those concerns?

A. Wet trenching is proposed for only three streams. These are small streams that contain resident trout and are proposed for crossing during their lowest flow periods, after trout fry have emerged from their redds. A wet trench is proposed for the crossings because there are no alternatives to a trenched crossing and there is no room for a flume or diversion. Site-specific sediment control plans will be in place before construction and all possible methods to restrict the release of fine sediment into the streams and the rivers they flow into will be used. Site-specific compensation for any impacts will be agreed to before construction.

Q. Can you address King County's suggestion of additional mitigation for reduced or lost function and value of stream/riparian corridor or to mitigate for indirect impacts?

A. Compensation for unavoidable reductions or losses of function and value due to pipeline construction will be stipulated by OPL after the development of site-specific mitigation plans. These mitigation plans and any compensation for construction impacts will be agreed to after consultation with the appropriate federal, state, and tribal agencies.

Q. Some commenters have urged that a detailed fish survey should be required. Does OPL plan such a survey?

A. Anadromous salmonid spawner, redd, and juvenile surveys for streams with such species will be made at the appropriate times. In addition to using information available from the literature

and GIS coverage available, all streams crossed by pipeline have been surveyed to determine the species of fish present at each site. Reports of any additional species at crossing sites from federal, state, tribal, and individual sources have been evaluated and species added to the list of known fishery resources for each site. This baseline stream survey information will be the prime source of information used in developing site-specific construction plans.

Q. How do you respond to commenters who urge that OPL should plant trees along the stream corridor following construction?

A. As noted above, OPL will plant black cottonwood in locations along the Yakima River, selected with the advice of WDFW and Yakama Indian Nation biologists, to increase the shade and cover of the middle reaches of the river. Prior to construction, site-specific plans will be developed in consultation with the appropriate federal, state, and tribal agencies if compensation is required for the loss of riparian trees. Compensation for unavoidable reductions or losses of function and value due to tree removal at stream crossings will be stipulated after the development of site-specific mitigation plans in consultation with appropriate authorities.

Q. Can you comment on the suggestion that a filtration system should be used at stream crossing construction sites to prevent fine sediments from disturbing fish habitats?

A. OPL has already agreed to use such a system. As set forth in OPL's stipulation with the Yakama Indian Nation: water will be detained in ponds or holding areas and discharged to the ground or through filtering media before it is allowed to permeate soils or enter any watercourse; sediment filter devices will be installed and maintained; these devices will be inspected on a daily basis and repaired as needed; water discharge rate will be regulated and

energy dissipation devices will be used to prevent erosion of upland areas, stream bottom scour, suspension of sediments, or excessive stream flow. Thus, sediment filter devices will be installed and maintained at all stream banks. Similar precautions will be taken for hydrostatic test water (see below).

Q. Will OPL remove fish from streams during trenching?

A. Fish will be removed from dewatered areas and relocated to the nearest safe and appropriate habitat. OPL will consult with the appropriate state, federal, and tribal agencies concerning the presence of fish at these locations and appropriate habitat for relocation of such fish. Where acceptable, fish will be removed by multiple passes with electrofishing equipment. In most cases, the total stream channel dewatered during construction will be between 30 and 60 feet in length. This represents a very small portion of a stream's available habitat. The channel will usually only be dewatered for approximately a day, during the diversion or fluming of the water. OPL recognizes that an unknown percentage of fish will not be captured or will be killed or injured during the capture process. The construction plan for any crossing requiring the dewatering of a fish bearing stream will include mitigation stipulations developed through consultation with the appropriate state, federal, and tribal agencies.

Q. Please respond to the concerns expressed by some witnesses regarding the potential discharge of hydrostatic test water into small streams.

A. OPL intends to purchase hydrostatic test water from water purveyors with existing water rights. At least 30 days prior to use, EFSEC will be provided with a list of specific locations for withdrawals and discharge of hydrostatic test water. This water will be used with EFSEC's approval and notification will be given to that regulatory body at least 48 hours prior to testing.

If water cannot be purchased for hydrostatic testing, water will be obtained with EFSEC's approval from stream locations selected to minimize impacts on aquatic resources. If water is obtained from a fish bearing stream, the intake hose for hydrostatic test water will be screened with 3/32" mesh to prevent entrainment of fish and the maximum approach velocity will not exceed 12 cm per second.

When hydrostatic testing is complete, the test water will be analyzed and treated if necessary, prior to placement in any pond or holding area, to make it suitable for discharge in compliance with the water withdrawal and discharge permits issued for the project. The water will be detained in ponds or holding areas and discharged to the ground or through filtering media before it is allowed to permeate soils or enters any watercourse. Water discharge rate will be regulated and energy dissipation devices will be used to prevent erosion of upland areas, stream bottom scour, suspension of sediments, or excessive stream flow. Erosion protection measures will be incorporated into the water discharge procedures. Final discharge plans will be developed in consultation with EFSEC.

Q. The Department of Fish and Wildlife suggests that trench blocks should be installed at all locations where water might migrate along the trench outside the stream banks. Isn't OPL already planning to do this?

A. Yes. OPL is already planning to use trench plugs as necessary to prevent diversion of water into upland portions of the pipeline trench.

Q. What are some of the other mitigation measures OPL intends to use to minimize potential construction impacts?

A. Many of these mitigation measure have been touched on in the questions above, and many more are discussed in some of the more specialized sections below (*e.g.*, mitigation relating to concerns about scour and revegetation). Additional measures include the following:

- Construction impacts to streams and riparian areas will be minimized by using the narrowest possible corridor (30' or less) and by constructing during a time of year when the resources (nesting and migrating birds, water quality, sensitive wildlife, or sensitive fish) are either not present or less vulnerable as determined by a qualified habitat specialist.
- All riparian corridor boundaries will be flagged and clearly marked.
- Along with other temporary erosion and sedimentation controls, filter fencing and straw bales will be used during construction to eliminate sedimentation in wetlands and riparian corridors and to deter construction equipment operators from encroaching into sensitive areas.
- The topsoil will be removed and protected throughout construction. This material will be stockpiled outside of wetland and riparian areas.
- Equipment will not be placed directly in wetlands or stream channels unless placed on a mat or portable bridge. Mats or bridges with foreign material, including weeds, will not be used.
- After the pipe is installed in a trench, the subsoil will be replaced, followed by the topsoil.
- EFSEC, WDFW, and any other relevant state or tribal agencies will be notified at least 48 hours prior to proposed construction activities within streambeds.

- Downstream flow rates will be maintained.
- Revegetation will be performed as soon as appropriate after construction using native vegetation which is quickly established, and native trees for long-term stabilization.
- OPL will take immediate action to address and correct any pipeline related condition which could cause an impact to the fish resources or water quality.

OPL has agreed to use all BMPs and standards and guidelines of federal, state, and local authorities during the construction, maintenance, and operation of the pipeline. In addition, OPL will develop site-specific plans, incorporating stipulations agreed to before the issuance of the EFSEC permit.

Response to Concerns re: Scour and Lateral Migration

Q. Describe what steps OPL will take to investigate and determine scour depth and lateral migration potential of streams during construction so as to ensure proper placement of the pipeline and thereby minimize the risk of pipeline exposure.

A. As described in more detail in the testimony of Steve Wilbur, OPL will conduct site-specific analysis for all streams crossed by the pipeline to determine the maximum local scour depth and any impacts from the crossing methodology to the hydraulics of the crossing. OPL will reach agreement with the appropriate agencies on the appropriate maximum scour depths of concern, subject to overall approval of EFSEC. The agreed upon figures will be incorporated into OPL's designs and construction plans. OPL will bury the pipe at least 2 feet below the maximum scour depth across the entire width encompassed by any potential lateral migration of the stream. OPL will also survey elevations at crossings of streams with unstable channels, set a bench mark, and monitor cross sectional elevations at 1, 3 and 5 year intervals. Once pipeline

cover depth is halved, OPL will contact EFSEC and other appropriate authorities and assess the need for stabilization measures. OPL will also monitor crossings at risk of scour damage after each five year flood event.

Q. What are the potential impacts of construction to stair step habitats in high-gradient streams?

A. This habitat consists of a series of plunge pools and small falls created by either large woody debris (LWD) or boulders and cobble producing a stair-step stream morphology that produces deep pools and cover necessary for salmonids and other fish in these streams. OPL will rebuild and stabilize sites to maintain the morphology after trenching any such crossing.

Q. Please respond to King County's specific concerns that stream crossings 51, 56, 72, 76, and 77 are all within channel migration hazard areas.

A. OPL will site crossing #72 on a bridge to avoid impacts to the streambanks and channel. OPL is proposing to cross the streams at crossings 51, 56, 76, and 77 by burying the pipeline in the roadbed under the culverts and will not be using invasive methods to cross these streams.

Q. How will the status of the stream crossings be monitored?

A. Aerial surveillance of stream crossings and other subsidence areas will be performed weekly, weather permitting, and in no event less than 26 times per year. It will also be performed after every five-year storm event. On the ground monitoring of specific crossings of streams with unstable channels, as determined by EFSEC and OPL, will be performed after each five year flood event. OPL will visually inspect these crossings and use a handheld portable hydrocarbon

detection device. Pipeline operations will be stopped where necessary to insure the safety of the pipeline.

Response to Concerns re: Forest Practices and Revegetation at Streams

Q. What are some of the potential impacts of tree removal associated with stream crossings.

A. The removal of streamside trees has the potential to increase stream temperatures, decrease the recruitment of large woody debris, and decrease streambank stability.

Q. Will the pipeline adversely affect stream temperatures along its route?

A. Most studies of streamside canopy removal on water temperatures have studied large scale modifications to the environment from the effects of suburban development, clearcutting, overgrazing, water conservation practices (removal of streamside vegetation), and agricultural practices. The Cross Cascade Pipeline is a utility pipeline involving the construction of a utility through a narrow corridor. The impact of vegetation removed in building a 30 foot corridor through a stream's riparian zone is far smaller than that of the harvesting or removal of trees throughout a stream's watershed. The pipeline will follow established utility or road corridors wherever possible. Tree clearing has already occurred in many of these corridors and there will be no further tree removal from pipeline construction.

Most crossings will avoid the removal of trees. This is particularly the case at crossings of Yakima River tributaries, where the cumulative effects of stream crossings to Yakima River water temperatures is a concern. In trenched crossings where tree removal is necessary, the crossing will be sited to avoid as many trees as possible. A maximum of 30 linear feet of stream canopy will be impacted. Temperature impacts to a stream depend upon the presence or absence of canopy cover downstream and the increase in temperature caused by tree removal at

the site. Where crossings are found to have the potential to impact streams with marginal temperatures, site-specific mitigation prescriptions will be developed after consultation among the appropriate state, federal, and tribal agencies to compensate for these impacts. Because there is a potential for cumulative impacts from multiple stream crossings tributary to the upper Yakima River (which has marginal temperatures in the late summer/early fall after the irrigation season), black cottonwood will be planted in locations along the river, selected with the advice of WDFW and Yakama Indian Nation biologists, to increase the shade and cover of the middle reaches of the river.

Generally, the removal of 30 feet of tree cover will not cause a measurable increase in stream temperature except for a slight increase in temperature at the immediate area of the removal site. In a 1998 flood control project on Linda Creek, a tributary of the American/Sacramento Rivers of the central valley of California, temperature impacts caused by the removal of over 200 oak trees from the stream banks were modeled and found to create no measurable increases in stream temperatures. Linda Creek is a low gradient stream flowing through open agricultural and suburbanized land with sub-lethal to lethal temperatures for rearing chinook and steelhead during the spring and summer months. Average spring and summer temperatures far exceeded any that exist along the Cross Cascade Pipeline route.

Q. What about impacts to large woody debris?

A. Large Woody Debris ("LWD") creates channel diversity and provides habitat for rearing salmonids and other fish. Any wood debris present at the crossing site of a trenched crossing will have to be removed during pipeline construction. Reductions in the recruitment of LWD usually occur after the commercial harvest of mature timber in a stream's watershed. Development, agriculture, grazing and other land management activities can also create

widespread losses in the recruitment of LWD in stream channels. In the past, road maintenance activities have mandated the removal of LWD from streams to prevent damage to roads and bridges during floods. The Cross Cascade Pipeline is a utility pipeline involving the construction of a utility through a narrow corridor. The impact of tree removal in a 30 foot corridor through a stream's riparian zone is far smaller than that of the land management practices mentioned above. The pipeline will follow established utility or road corridors wherever possible. Tree clearing has already occurred in many of these corridors and there will be no further tree removal from pipeline construction.

As noted above, most crossings will avoid the removal of trees, particularly at some crossings of Yakima River tributaries where there is a low level of LWD recruitment. In trenched crossings where tree removal is necessary, the crossing will be sited to avoid as many trees as possible. A maximum of 30 linear feet of stream canopy will be impacted. Tree removal will be limited to those individuals that would directly interfere with trenching, pipe installation, and backfill. Trees will be removed with rootwads intact and will remain as LWD within the stream or elsewhere within the floodplain. Placement within a stream will be done in consultation with a qualified habitat biologist. The replacement of any LWD removed from the stream channel during construction and placement in the channel of any streamside trees removed during construction will actually lead to a temporary increase in LWD. Any impacts to LWD recruitment will occur at trenched crossings where the removal of mature streamside trees is required for construction or monitoring of the pipeline. However, considering the small area impacted, loss of LWD recruitment will not be significant unless the stream is located in an area of exceptionally low recruitment.

Where crossings are found to have the potential to impact the recruitment of LWD, site-specific mitigation prescriptions will be developed after consultation among the appropriate state, federal, and tribal agencies to compensate for these impacts.

Q. Please respond to commenters' concerns regarding the impacts of tree removal on stream bank stability.

A. Tree roots, in conjunction with the roots of shrubs and herbaceous plants, contribute directly to streambank stability. Tree removal near streambanks will be limited to those individuals that would directly interfere with trenching, pipe installation and backfill. Most crossings will avoid the removal of trees. In trenched crossings where tree removal is necessary, the crossing will be sited to avoid as many trees as possible. A maximum of 30' linear feet of stream canopy will be impacted. In addition, Forest Practice BMPs, Standards and Guidelines were developed to address the impacts of activities such as clearcutting and excessive forest road construction on bank stability. By following these requirements, where they are appropriate for utility construction, OPL will be using the standard methods developed to minimize construction impacts to aquatic resources. Although it is difficult to harvest timber near stream channels without significantly impacting streams, the potential impact to a stream from a single utility corridor crossing it is far less significant.

Q. Please respond to the assertion that the pipeline project is inconsistent with the Aquatic Conservation Strategy.

A. A draft Analysis of Consistency with the Northwest Forest Plan has been prepared, with a NEPA style analysis of the consistency of the project with all USFS and BLM land management plans. Since the preparation of the DEIS, the route has been slightly revised to

move it out of the Late Successional Reserve area to make the route consistent with the Northwest Forest Plan.

Response to Concerns re: Fisheries Impacts from Stream Crossings

Q. Can you comment on the catalogs of various fish species presented by the various witnesses in this proceeding?

A. All streams along the pipeline route have been surveyed on the ground by OPL for the presence of fish. Species presence data was usually gathered during one or two visits to a crossing. Streams were surveyed or resurveyed by me (I have either surveyed or resurveyed most streams) for approximately 100 feet upstream and 200 feet downstream for fish and fish habitat. Visual ID was used for earlier surveys and electrofishing for later surveys. Species present were identified to species or subspecies where possible. Additional information on fish presence was gathered from databases and GIS coverage, telephone and personal interviews with local biologists, and personal knowledge of many of the areas. Information from comments to the application and public hearings was also added after verification. Whenever possible, I have attempted to verify reports in the field. If suitable salmonid rearing or spawning habitat was observed, this was reported but not quantified. Population abundance of recorded species was not surveyed. Some of the difficulties in recording species presence at some crossings were the migratory behavior of anadromous fish, uneven distribution of fish throughout a stream, and sample size. Requested data from several sources was never received and many reports are in house publications by agencies and environmental organizations that do not appear in any abstracts or library catalogs. As these sources of information have been located or volunteered, they have been incorporated into our database.

On one occasion I received incorrect information that was placed in the EFSEC application. This occurred during a telephone interview when I understood the source to indicate that bull trout were found during surveys of several tributaries of Keechelus Lake. In a later discussion with Eric Anderson, I was informed that this information was incorrect. The only known population of adfluvial bull trout in this lake spawns in Gold Creek. A juvenile bull trout was recorded from the mouth of Rocky Run Creek (on the opposite side of the lake from the pipeline) but there was no indication from its location if it was actually produced in this creek.

Greg Ruggerone states that spawning fall chinook salmon were not reported from the area below Wanapum Dam on the Columbia River and that this area was not listed as a spawning area. This is correct. I was not aware of the existence of these spawner surveys at the time that the last version of the application was written. During the fall of 1998, I began anadromous salmonid spawner presence surveys in all streams that have adequate access and habitat for salmon and did observe fall chinook spawning activity at this site. Greg Ruggerone also states that the application incorrectly identifies the federal classification of Upper Columbia River spring chinook and Middle Columbia River steelhead. This was probably a typo. The classifications were correctly given in the DEIS and the Biological Evaluation for the Cross Cascade Pipeline.

Kurt Nelson states that fish utilization is listed as "unknown" in 58 of the first 83 stream crossings. He may have been referring to an early version of the EFSEC application. Fisheries utilization has been recorded by on the ground surveys of all streams along the route. It is possible that some species remain to be sampled during surveys or reported from the literature. Spawner, redd, and smolt surveys for steelhead and salmon were begun in September of 1998 and will continue. Kurt Nelson also notes that bull trout may inhabit the Snoqualmie River and

Griffin Creek. The only known spawning population of bull trout in the Snohomish River watershed is in the Skykomish River. Fluvial or anadromous bull trout (spawned in the Skykomish River basin) probably are found in the mainstem of the Snoqualmie up to Snoqualmie Falls and this population was reported in the application. It is possible that bull trout may enter Griffin Creek to follow spawning salmon but no bull trout has been recorded in this creek.

Kurt Nelson, Donald Finney and several others have mentioned that fall chinook salmon spawning was not reported in the Tolt River. This is correct. I observed 11 pairs of spawning chinook salmon near the Tolt River crossing in the fall of 1998 and agree that the area near that crossing is an important spawning area for chinook and other salmonids. Fall chinook were correctly listed in the application as rearing at this site. Kurt Nelson also notes that Cherry Creek steelhead and Griffin Creek chinook salmon and steelhead were not reported in the application. The application did report the presence of steelhead in Cherry Creek. Surveys of Griffin Creek have not produced any chinook or steelhead juveniles at the crossing site and chinook spawners were not observed during the fall of 1998. However, a steelhead redd was flagged below the site and steelhead have been reported in the literature to occur below the crossing site. In my professional opinion, steelhead do utilize this section of the creek and there is suitable spawning gravel and access for Snoqualmie River chinook to be opportunistic spawners at this site.

Gary Sprague states that the DEIS did not mention the presence of pygmy whitefish in Keechelus Lake or mud minnows in Cherry Creek. The presence of pygmy whitefish was addressed in the EFSEC application, Biological Evaluation and Fisheries and Aquatic Resources Report. The reason for its absence in the DEIS is unknown, as we did not prepare that document. No mud minnows have been surveyed at the site but a range extension report of

their presence in the Cherry Creek watershed was referred to me by Gary Sprague and will be incorporated in any future data.

GIS coverage by the Pacific Biodiversity Institute was submitted in testimony that incorrectly lists the presence of steelhead in the Yakima River above Keechelus Dam, Spring and Summer Chinook in Little Bear Creek, Chum Salmon in the Yakima River up to Keechelus Lake and in the Columbia River past the town of Wenatchee, Washington. Chum Salmon are not found in the Columbia River watershed above Bonneville Dam. This GIS coverage also correctly lists bull trout in the Yakima watershed but omits the presence in the Snoqualmie River watershed.

George Wooten lists the presence of torrent sculpin in the Yakima River and Brent Renfrow lists the presence of shorthead, mottled, torrent, and piute sculpin in the Yakima River. Gary Sprague mentions margined sculpin. The application and reports did not separate sculpins to the species level. No listed or priority species of sculpins have been reported along the pipeline alignment. All other species of non-salmonid fish have been reported to species. The margined sculpin is a state priority species found in the Tucannon and Walla Walla River watersheds of Washington. I assume that since these waters are tributaries of the Snake River, Gary Sprague believes there may be some possibility of their presence in the Columbia River Basin upstream from the confluence of the Snake River.

Greg Ruggerone lists several salmon Evolutionarily Significant Units ("ESU's") from the lower Columbia River as species of concern. These are the Lower Columbia River chinook, chum, and steelhead; and the Upper Willamette River chinook and steelhead. S.W. Washington cutthroat trout are also listed as proposed for threatened status. Potential impacts from the Cross Cascade Pipeline do not extend downstream to the distribution of these ESUs. In addition, although all sea-run cutthroat are candidates for listing under the ESA, I do not

know of any S.W. Washington populations that have been federally proposed as threatened by NMFS, and I can find no reference to the FWS having listed them on the FWS online database or any correspondence that I have received during a current project in that area.

Finally, many species of fish other than listed species were regarded as species of concern and Brent Renfrow listed all species of fish in the Columbia River drainages as important to the environment. I agree with the assessment but also recognize that sensitive, rare, or listed species are of particular importance in regards to determining the most sensitive stream crossing sites. Certainly any species of fish or wildlife found in these streams is worthy of all the protection that can be reasonably provided.

Q. What will OPL do to minimize construction impacts on Puget Sound Chinook Salmon?

A. This ESU is listed as threatened. Puget Sound fall-run chinook salmon are known to utilize the following streams along the pipeline route: Little Bear Creek, Snoqualmie River, Cherry Creek, Tolt River, and Griffin Creek. It is not known for certain if they utilize Cherry Creek or Griffin Creek as far upstream as the pipeline crossings, but it is assumed that they utilize all the above streams. Spawning occurs at all of the crossings with the possible exception of the Snoqualmie River crossings which are still used for rearing and migration. The proposed Snoqualmie River crossings are by bridge, and all other crossings, with the exception of Griffin Creek, are proposed crossings by horizontal directional drill. For Griffin Creek, there are no existing bridges near the utility corridor and the topography of the crossing area prevents the use of directional drilling or jack-and-bore to cross the stream. With the exception of Griffin Creek, there will be no construction or maintenance related impacts to any of these streams.

Q. How will OPL minimize construction impacts to Middle Columbia River steelhead?

A. This ESU is also listed as threatened. The ESU is present in the Upper Yakima River along the pipeline alignment and has also been documented to utilize portions of Swauk, Cabin, Little, and Big Creeks. The Yakima River will be crossed by directional drilling. If the Yakima River crossing cannot be drilled, divert and trench methodology has been proposed as an alternative. The pipeline will be in the John Wayne Trail along the shoreline of Keechelus Lake. An agreement with the Yakama Indian Nation has been reached to address the tribe's concerns about possible impacts to tribal fisheries and fish stocks in the Yakima and Columbia River drainages. This agreement addresses the necessary construction, operation, maintenance, monitoring, mitigation, and spill response measures the Yakama Indian Nation holds as conditional to the construction of the pipeline.

Q. How will OPL minimize construction impacts to Upper Columbia River spring-run chinook and steelhead?

A. The Upper Columbia River spring chinook and steelhead ESUs are listed as endangered. These ESUs migrate past the Columbia River crossing below Wanapum Dam. A horizontal direction drill is the preferred methodology for crossing the Columbia River. Crossing on the I-90 bridge, railroad bridge or Wanapum Dam are secondary alternatives to the preferred directional drill under the river. An agreement with the Yakama has been reached to address the tribe's concerns about possible impacts to tribal fisheries and fish stocks in the Columbia River drainages. This agreement addresses the necessary construction, operation, maintenance, monitoring, mitigation, and spill response measures the Yakama Indian Nation holds as conditional to the construction of the pipeline.

Q. What about Snake River Fall and Spring/Summer chinook, steelhead and sockeye salmon?

A. The chinook and sockeye salmon ESUs are listed as threatened and the steelhead ESU is listed as threatened. These ESUs migrate up the Snake River past the pipeline terminal at Pasco. There will be no construction or maintenance impacts to the Snake River or these fish.

Q. What will OPL do to minimize construction impacts on Puget Sound coho salmon?

A. A candidate for federal listing, the Puget Sound coho salmon ESU is present in the Little Bear Creek watershed at crossings #1 and #4, and the watershed is a productive coho spawning and rearing stream. It is also present in the Snoqualmie River and its tributaries at crossings #11, 14, 18, 19, 20, 22, and 26. 27, and 28. Griffin Creek is a major producer of coho salmon in the Snoqualmie River basin, and Harris Creek, Peoples Creek, Cherry Creek, and the North Fork Cherry Creek are also major coho spawning and rearing streams. These streams were reviewed in the application and reviewed under the alternatives analysis as particularly sensitive stream crossings along with other streams that supported population downstream from the pipeline crossings. The only streams listed above with proposed invasive crossings at sites with coho habitat are #18 and #19 on the North Fork of Cherry Creek and Griffin Creek. The alternatives analysis lists the reasons why trenched crossings could not be avoided at these crossings. There were no existing bridges or culverts to cross and the steepness of the topography make drilling or boring these crossings impossible.

Q. Please characterize the construction impact of the pipeline on Coastal/Puget Sound bull trout.

A. This ESU is currently proposed for listing as threatened. Both anadromous and fluvial fish that are known to spawn in the Skykomish River, are known to rear in the Snoqualmie River. No fish have been reported from surveys of any of the Snoqualmie tributaries and no populations have been reported in the FWS review of bull trout ESUs. The same review mentioned a record of a charr being caught in Lake Washington, two charr were reported by a fisherman from Issaquah Creek and there were old reports of fishermen catching charr in the Tolt River. The FWS discounted reports of charr in the Tolt River but listed the Sammamish River as a possible bull trout population. These fish were probably anadromous fish that entered the Lake Washington system to follow spawning salmon or steelhead. They also could be drop downs from an isolated population in Chester Morris Reservoir in the Cedar River watershed. None of the Sammamish River tributaries have a temperature regime that would be likely to permit successful bull trout spawning. Impacts to bull trout rearing in the Snoqualmie River were addressed in the EFSEC application and Biological Evaluation. The Snoqualmie River will be crossed over a bridge and this crossing will have no impact on bull trout.

Q. Please respond to concerns expressed regarding the impact of the pipeline on Columbia River Bull trout.

A. This ESU is listed as threatened. These fish are found along the pipeline route in Lake Keechelus and the Yakima River. They probably also enter the lower reaches of tributaries such as Cabin, Swauk, Little, and Big Creeks and may still exist in the mainstem of the Columbia River. They could also enter Roaring and Meadow Creeks, tributary to Keechelus Lake. Bull trout require extremely cold water for successful spawning and known spawning

populations that could contribute to bull trout rearing at pipeline crossings are only found in Gold Creek draining into Keechelus Lake and the Teanaway River draining into the Yakima River below Keechelus Dam. The only other known spawning populations in the Yakima River drainage are found above dams on the Cle Elum and Kachess Dams and in Ahtanum Creek in the lower Yakima River drainage. None of these spawning streams are impacted by the pipeline route. The only known impacts would be to fish rearing in Keechelus Lake, the Yakima River and the tributaries mentioned above. Impacts to these populations were addressed in the EFSEC application and Biological Evaluation. The Yakima River and the Columbia River will be crossed by directional drilling (or bridge if an alternative route is used). If the Yakima River crossing cannot be bored, divert and trench methodology has been proposed as an alternative. The pipeline will be in the John Wayne Trail along the shoreline of Keechelus Lake. An agreement with the Yakama Indian Nation has been reached to address the tribe's concerns about possible impacts to tribal fisheries and fish stocks in the Yakima and Columbia River drainages. This agreement addresses the necessary construction, operation, maintenance, monitoring, mitigation, and spill response measures the Yakama Indian Nation holds as conditional to the construction of the pipeline.

Q. Can you respond to the concerns raised by some commenters about the potential negative effects of deposited sedimentation on salmonid viability?

A. The release of sediment into a stream channel can increase bedload leading to pool filling. The aggregation of the stream channel from increased sediments in the bedload leads to decreased channel diversity from the filling of pools. When sediments enter a stream channel faster than bedload transport can move them, the channel begins to aggrade (fill in with sediments). Pools gradually fill in and the streambed becomes more uniform in depth. The elevation of the

channel will eventually begin to rise and the stream channel will widen to accommodate its decreased depth. The elevation of the channel will eventually begin to rise and the stream channel will widen to accommodate its decreased depth. Fish and macroinvertebrates require a variety of stream habitats provided by a combination of deep pools, smaller "pocket" pools behind large rocks, boulders, and LWD, shallow riffles, and deeper runs.

This loss of habitat diversity reduces the capacity of the stream to rear fish and the population of resident fish and salmonid smolts decreases. Increased fine sediments in spawning areas can also reduce the survival of eggs by reducing the flow of oxygenated water through spawning gravels.

Studies conducted on the effects of increased sedimentation in a watershed on stream channels, water quality, and aquatic resources have addressed the impacts of forest practices such as road building and timber harvest. The impacts of clearcutting and excessive forest road construction on stream channels have been well documented. The BMPs, Standards & Guidelines, and any other stipulations required by EFSEC for the construction of the pipeline were developed to address sedimentation impacts from road building and timber harvest. By following these requirements, OPL will be using the standard methods developed to minimize construction impacts to aquatic resources.

Additionally, the Cross Cascade Pipeline is a utility pipeline involving the construction of a utility through a narrow corridor. The impact of vegetation removed in building a 30' corridor through a stream's riparian zone is far smaller than that of the clearcutting or even selective harvesting of trees throughout a stream's watershed. The pipeline will follow established utility corridors wherever possible and will not require the construction of new roads. The construction and maintenance (or lack of maintenance) of forest roads for the harvest of timber is the largest contributor of fine sediments released into stream channels from

forest practices. Although it is difficult to harvest timber from a watershed without significantly impacting stream channels, the potential impact to a stream from a single utility corridor crossing is far less significant, and if construction procedures and methodology are properly planned and executed and rehabilitation and revegetation of the site is done in a timely manner and properly monitored, sedimentation impacts to the stream should be insignificant.

Q. Can you address witness concerns regarding the potential impact of trench construction methods on fall spawning species?

A. Several witnesses have stated that although impacts to spawning gravels can be minimized through following the correct prescriptions for construction of pipeline stream crossings, fall spawning salmonids that use spawning gravels in the immediate vicinity of the construction site before winter and spring freshets have flushed fine sediment out of the spawning gravels will be impacted and probably will not use these spawning gravels during the first spawning season after construction. This impact will be quite small and limited to gravels in a trench approximately eight feet wide, with a trench length equal to the stream channel width. In many streams, no gravel will be impacted by the trench. Where fall spawning salmonids will be impacted by trenched crossing methodologies during the first season after construction, mitigation prescriptions will be developed on a site-specific basis with the appropriate state, federal, and tribal agencies to compensate for this loss of recruitment by agreed to on- or off-site habitat improvements.

Q. Please comment on the concerns expressed by commenters regarding the potential impacts on fish from increased stream turbidity.

A. Excessive turbidity levels can cause mortality to fish and produce avoidance behavior in rearing and migrating fish. High levels of turbidity can also reduce macroinvertebrate production. Impacts from turbidity will vary and probably will only be significant if a storm event causes a higher than normal release of sediments during construction and before stabilization of the streambanks or during the diversion of stream channels where somewhat higher increase in turbidity will occur. The maximum levels given in the application for turbidity levels were for short term releases of sediment that may occur during a sudden cloudburst during trenching of a streambed. In all but the largest streams (the Yakima River if it must be trenched), construction will be finished within one day, the banks will be stabilized by the methods stated in the application, and various site-specific construction practices and mitigation measures will be implemented for each crossing.

Most trenched crossings of salmonid streams will be flumed, and turbidity levels will not be allowed to exceed natural concentrations by more than a small prescribed percentage. Turbidity 100 feet upstream and downstream of the construction site will be monitored by a qualified EFSEC designated environmental monitor with authority to halt construction until any problems are remedied. When the percent increase exceeds prescribed limits, OPL will take immediate action to address and correct any pipeline related condition causing the increased turbidity.

Even for diversions, turbidity levels should not reach the limits during the low flows that will be in existence during construction windows (unless there is a sudden storm event). Construction at trenched crossings will be completed in less than a day for all but a few large streams and it is unlikely in these situations that the any significant increases in turbidity levels

over the environmental baseline will persist for more than a day. The expected levels of turbidity in this project should not cause any mortality to fish and may cause limited mortality to some sensitive macroinvertebrate populations. Chronic impacts would not occur from these limited increases in turbidity unless a significant mortality of the macroinvertebrates occurs.

The prescribed limit will not be high enough to produce avoidance behavior except in the case of diversions, where some avoidance may occur during construction (which will be usually less than one day). With the exception of the Yakima River (if necessary), construction of trenched crossings will not occur during spawning migrations. If it is necessary to trench the Yakima River, a window between steelhead and chinook spawning migrations will be selected with advice from the WDFW and the Yakama to minimize impacts as much as possible. If a short term high increase in turbidity occurs during a storm event that halts construction, remedial action will be taken immediately and construction will not begin again until turbidity levels are brought to within prescribed levels. This should be within hours of the event. Any avoidance behavior by residence fish to the increased turbidity levels should be short-term and cause minimal impact from competition with downstream fish populations.

Finally, site-specific mitigation prescriptions will compensate for expected impacts at diversions and mitigation for storm-related impacts will be developed with the consultation of appropriate agencies.

Q. Can you address the concern expressed by some witnesses that increased turbidity will cause an avoidance response in salmonids?

A. Several witnesses speculated that this problem could halt migration of spawning adults, cause fish to leave habitat near the construction site, and impact populations downstream. Some of

this testimony seemed to be premised on the idea that turbidity levels would be high enough to cause this behavior to be of extended duration.

The maximum levels given in the application for turbidity levels were for short term releases of sediment that may occur during a sudden cloudburst during trenching of a streambed. In all but the largest streams (*i.e.*, the Yakima River if it must be trenched), construction will be finished within one day and the banks stabilized by the methods stated in the application and whatever site-specific methods are determined to be appropriate for the crossing. Turbidity will be monitored during construction and work stopped if the turbidity level exceeds a prescribed level. The prescribed level will not be high enough to produce avoidance behavior except in the case of diversions, where some avoidance may occur during construction (which will be usually less than one day). With the possible exception of the Yakima River, trenched crossings will not occur during spawning migrations. If it is necessary to trench the Yakima River, a window between steelhead and chinook spawning migrations will be selected with advice from the WDFW and the Yakima to minimize impacts as much as possible. If a short term high increase in turbidity occurs during a storm event that halts construction, remedial action will be taken immediately and construction will not begin again until turbidity levels are brought to within prescription levels. This should be within hours of the event. Any avoidance behavior by residence fish to the increased turbidity levels should be short-term and cause minimal impact from competition with downstream fish populations.

Q. What about the potential impact on aquatic insects?

A. Several witnesses have stated that macroinvertebrate populations in the vicinity of trenched crossings may be depressed for as long as 2-3 months after construction. Since the decreases in insect populations will occur shortly before the fall or winter season, the possibility exists that

fish rearing in the impacted areas will experience lower survivability during the winter months due to decreased nutrient intake. These impacts will vary and probably will only be significant if a storm event causes a higher than normal release of sediments during construction and before stabilization of the streambanks or during the diversion of stream channels, where somewhat higher increase in turbidity will occur. At most, if not all, sites, turbidity release will not exceed site plan prescription parameters. The only reduction in macroinvertebrates at these sites will occur in the 8 foot wide trench across trenched streams. Site-specific mitigation prescriptions will compensate for expected impacts at diversions and mitigation for storm-related impacts will be developed with the consultation of appropriate agencies.

Q. How will OPL minimize fish impacts caused by sedimentation from construction activities?

A. As noted above, all construction at stream crossings will use all applicable BMPs, Standards and Guidelines, forest practice rules, and stipulations agreed to between OPL and the appropriate federal, state, and tribal agencies. In all but the largest streams (the Yakima if it must be trenched), construction will be finished within one day and the banks stabilized by the methods stated in the application and whatever site-specific methods are determined to be appropriate for the crossing.

Streambanks and streambeds will be returned to their original configurations immediately after trenching. The last foot of fill in the streambed trench will be composed of clean material of adequate size to prevent increased downstream transport.

Where trenching occurs, soils and vegetation will be restored to their previous condition (with the exception of trees directly over the pipeline). Restoration of riparian vegetation will be considered successful if the native herbaceous and/or woody cover comprises at least 80% of

the total cover, and native species diversity is at least 50% of the diversity originally found in the area. OPL will regularly monitor and actively manage for restoration and erosion control. If revegetation is not successful at the end of the five-year post-construction monitoring period, the applicant will develop and implement a plan to actively revegetate the riparian area with native species. OPL will use vegetative jute matting, straw matting, or other measures to prevent erosion of seeds and protect their ability to develop as quickly as possible. Clearing for staging areas will be confined to the minimum area necessary. Revegetation will be performed as soon as appropriate after construction using native vegetation which is quickly established, and native trees for long-term stabilization. In rangeland, revegetated areas will be protected by fencing, where permitted, to allow quick regrowth of streamside vegetation. Rock barbs will be used to encourage sediment deposition and vegetation establishment to stabilize banks near stream crossings where needed.

Q. Please comment on the commenters' concerns regarding the effect of mass wasting on fish populations.

A. Mass wasting and other geotechnical issues are addressed in greater detail in the testimony of Conrad Felice and others. While it is true that a catastrophic mass wasting event, such as a landslide or debris flow, could release a large sediment load into a stream and impact fish and aquatic resources significantly, many if not most of the potential mass wasting sites along the pipeline alignment are pre-existing and will not be destabilized by pipeline construction. Stream crossing sites with mass wasting potential that cannot be avoided will have site-specific plans to minimize the potential of mass wasting and monitoring and response plans developed before construction begins.

Responses to Concerns re: Specific Streams and Rivers

Q. Can you respond to commenters' concerns about whether OPL has assessed the short term and long term potential impacts of open trenching, as well as potential mitigation measures, associated with crossing Griffin Creek (#28)?

A. Construction impacts from diverting and trenching this crossing will be minimized by trenching during a low flow period after smolt outmigration and before the first spawning runs of salmon. Construction practices will minimize turbidity downstream from the site. Turbidity will be higher than for fluming methodology but will be below naturally occurring turbidity levels during winter and spring freshets. Construction will be finished within a day and the site restored as closely as possible to its original morphology. Short term impacts will be the temporary displacement of fish from the diversion and stress from a short increase in turbidity downstream from the site. Long term impacts will be the loss of riparian trees, loss of an undetermined percentage of cutthroat trout, steelhead, and coho juveniles during the removal of fish from the diversion, and the possible refusal of salmon to use the trench's replacement gravel the first fall after construction. The long term impacts will be confined to the immediate area of the diversion and trench and will impact a very small percentage of the stream's salmonid population.

There are no existing bridges near the utility corridor the pipeline will follow and the valley slopes surrounding the stream are too steep to permit crossing by directional drilling or jack-&-bore methodology. Therefore, OPL has proposed to cross this stream by using divert and trench methodology. The only potential for significant impacts under the conditions stated above would be a catastrophic mass wasting event. Mass wasting concerns are addressed in the prefiled rebuttal testimony of Conrad Felice and Mark Molinari. A site-specific plan to

minimize the potential for mass wasting and response plan will developed before construction begins.

A qualified EFSEC designated environmental monitor will monitor water quality/turbidity downstream of the crossing during construction equipment operation, with authority to halt construction until any problems are remedied. Minimization of construction impacts will be assured by a qualified independent monitor monitoring the stream crossing construction site and by continued monitoring over a 5 year post-construction period to assure than revegetation of the site is successful. A site-specific mitigation prescription addressing LWD and other streamside issues will be developed after consultation among the appropriate state, federal, and tribal agencies to compensate for any construction impacts.

Q. Can you respond to King County's concern about whether OPL has considered short term and long term potential impacts of open trenching, as well as mitigation measures, with respect to the Cherry Creek crossing (#20)?

A. Construction impacts from diverting and trenching this crossing would have been minimized in much the same manner as OPL will minimize impacts at Griffin creek. Although the total long term and short term construction impacts would have been relatively small, OPL has nonetheless agreed to directionally drill this stream crossing to eliminate these potential impacts out of concern for the importance of this stream's anadromous fish populations.

Q. Does OPL's plan to cross Cherry Creek via horizontal directional drilling address the concerns raised by the commenters?

A. Yes. Directional drilling will address the concerns of witnesses about channel scour and migration, and the anadromous fisheries of this stream by eliminating construction impacts to the stream and its riparian zone.

Q. Can you respond to specific concerns raised about the crossings at Little Bear Creek (#1 and #4)?

A. At least one witness stated that this stream contains Lake Washington fall chinook and sockeye salmon. The fall chinook are part of a proposed federal listing of Puget Sound chinook as threatened. Although the sockeye have not become candidates for listing, they are probably a stock of original Lake Washington sockeye salmon (most of the sockeye in the Lake Washington system are introduced Baker River fish). Because of these concerns, a horizontal direction drill is proposed for these two crossings.

Q. Can you respond to specific concerns raised about the crossing at Snoqualmie River (#11)?

A. The Snoqualmie supports a run of fall chinook that is a component of the proposed listing of Puget sound Chinook and has major runs of Puget Sound coho salmon which is a candidate ESU. The testimony of DNR and King County witnesses indicates that the Snoqualmie River is a navigable stream and must either be avoided, drilled, bored, or crossed on an existing bridge. Because of these concerns, the River will be crossed on a bridge, as will all crossings of the Snoqualmie or its South Fork.

Q. Can you respond to specific concerns raised about the crossing at People's Creek (#14)?

A. Peoples creek supports a run of Puget Sound coho salmon which is a candidate ESU. Some witnesses have expressed concerns that sediment released from pipeline construction would impact the creek. This stream will be crossed over a road culvert, avoiding impacts to the stream.

Q. Can you respond to specific concerns raised about the crossing at People's Creek (#15)?

A. This section of the creek is above the distribution of Puget Sound coho, but resident cutthroat trout are found in this section of the creek. There has been some concern expressed in testimony that blasting may be necessary to flume and trench across this crossing. OPL does not propose to blast at this crossing, but if bedrock is encountered, fish will be removed from the blasting zone by the fish removal methods outlined above. Because of the topography, directional drilling is not possible.

Q. Can you respond to specific concerns raised about the crossings at North Fork Cherry Creek (#18 and #19)?

A. These crossings occur in floodplain under a utility corridor. These creeks support a population of Puget Sound coho and are regarded as sensitive crossings by King County because these streams are situated in a floodplain. There are no existing bridges across these streams and the steepness of the topography make crossing by directional drill or jack-&-bore methodology impossible. OPL is proposing to cross these streams by flume and trench methodology and will mitigate the impacts of trenching by the methods listed in the mitigation section above.

Q. Can you respond to specific concerns raised about the crossing at Harris Creek (#22)?

A. Several witnesses state that this stream is a productive Puget Sound coho salmon spawning stream and steelhead trout may spawn as far upstream as the crossing area. The crossing is also located in the middle of a large wetland. Because of the sensitivity of the crossing, the stream and wetland will be crossed by horizontal directional drilling.

Q. Can you respond to specific concerns raised about the Tolt River crossings (#26 & #27)?

A. Many witnesses have stated this stream is a major producer of several species of salmon, including Puget Sound fall chinook and coho salmon. It also supports a small run of summer-run steelhead. The presence of spawning chinook salmon was not reported in the application, but a spawner survey conducted in the fall of 1998 found 12 pair of spawning fall chinook in the immediate vicinity of the crossing. Also, the method of diversion originally proposed in the application would have dewatered a large channel with a large cobble and boulder substrate, potentially causing the death of many juvenile salmon (including chinook salmon). Further, some governmental witnesses maintain that the Tolt River is a navigable stream and must either be avoided, drilled or bored, or crossed on an existing bridge. Because of these concerns, OPL will cross this stream by horizontal directional drill methodology. The prefiled testimony of Conrad Felice contains additional information about the Tolt River crossings.

Q. Can you respond to specific concerns raised about the crossing at Tokul Creek (#34)?

A. Although witnesses agree that anadromous salmonids do not migrate as far upstream as the crossing site on this stream, such species do migrate to within a half mile of the crossing. In addition, there is a fish hatchery on the creek below the crossing site. Because of these concerns, the creek will be crossed on an existing bridge.

Q. Can you respond to specific concerns raised about the upstream Snoqualmie River crossings (#38, 42, and 43)?

A. These crossings are above Snoqualmie falls and do not contain anadromous salmonids. DNR and King County maintain that the Snoqualmie River is a navigable stream and must either be avoided, drilled or bored, or crossed on an existing bridge. All these crossings will be accomplished on existing bridges. It will be crossed on an existing bridge.

Q. Can you respond to specific concerns raised about the creeks near Twin Falls State Park (#45 and #46)?

A. One witness indicated concern about the steepness of these creeks and the possibility of erosion. The streams will be crossed in the JWT over culverts.

Q. Can you respond to specific concerns raised about the crossings at Mine Creek (#53) and Hall Creek (#57)?

A. King County has indicated its preference that the pipeline route not leave the John Wayne Trail in this area. King County and the DNR feels that keeping the pipeline in the JWT and crossing the railroad bridges at Mine and Hall Creeks will protect the pipeline from debris flows. OPL engineers wish to avoid crossing these high bridges for exactly that reason. The bridge at Hall Creek has only recently been replaced after the original span was destroyed by a debris flow. Placing the pipeline on these bridges would increase the possibility of damage to the pipeline from debris flows if one of these bridges were destroyed again. Also, if the JWT bridge is destroyed by a debris flow, there is no quick way to replace the bridge or restore pipeline service. The difficulty of replacing one of the high bridges on the JWT and the time involved is a major consideration in siting the Mine and Hall Creek crossings below the JWT in a more

accessible area. OPL has routed the pipeline below the JWT to avoid these bridges and place the pipeline alignment below the steep slopes of the side of the S.F. Snoqualmie valley. Burying the pipeline well below the scour depth in a trench is the proposed method of crossing Mine and Hall Creeks. A wet trench is proposed because there is no room on the upstream side of the bridge to flume or divert the stream. The upstream side of the bridge is preferred to keep the crossing as far from the South Fork of the Snoqualmie as possible and the lack of room on the downstream side. This crossing area would be a deposition area for debris flows. Placing the pipeline over the culvert would expose it to damage from debris flows. Burying the pipeline below the maximum scour depth will protect it from mechanical damage due to debris flows. Because a wet trench methodology must be used at this site, some sedimentation impacts to the S.F. Snoqualmie River are unavoidable. The crossings will be scheduled to occur during the lowest flow period for the creek after trout fry have emerged from their redds. The trench will be dug, pipe laid, and trench refilled as quickly as possible (less than a day). There will be a substantial increase in turbidity and release of sediments during construction. A site-specific sediment control plan will be in place before construction and all possible methods to restrict the release of fine sediment into the South Fork of the Snoqualmie River will be used. Site-specific compensation for any impacts will be agreed to before construction.

Q. Can you respond to specific concerns raised about crossings #51, #56, #76, and #77?

A. Testimony by King County indicates that these crossings occur within a floodplain. King County and the DNR would prefer that the pipeline route remain in the JWT in this area. The reasons for OPL's not using the JWT are given above for the Mine and Hall Creek crossings. OPL is proposing to cross these streams by burying the pipeline in the roadbed over the culverts

and will not be using invasive methods to cross these streams. The only other non-invasive alternatives are to stay on the JWT, which isn't practical for reasons given above.

Q. Can you respond to specific concerns raised about the crossings at Carter Creek (#72) and Hansen Creek (#75)?

A. Witnesses have expressed concern about the braided channel structure at this crossing. WDFW has expressed a preference for relocating the pipeline alignment to the JWT or, alternatively placing the pipeline on the bridge at this crossing. For reasons described for the Mine and Hall Creek crossings, OPL would prefer to avoid placing the pipeline route on the JWT at this location. OPL has agreed to place the pipeline on the bridge crossing these sites.

Q. Can you respond to specific concerns raised about crossing at Humpback Creek (#78) and Olallie Creek (#83)?

A. Some witnesses expressed concerns about crossing these creeks. The pipeline alignment has been shifted to the JWT west of the original Humpback Creek crossing to avoid impacts to a USFS Late Successional Reserve. These creek will be crossed in the JWT over a culvert, eliminating impacts to Humpback and Olallie Creeks.

Q. Can you respond to specific concerns raised about the crossing at Cold Creek (#88)?

A. Concerns about fish passage through the Cold Creek culvert have been expressed by witnesses from the WDFW. As the testimony and OPL's application both recognize, this culvert is a complete barrier to fish migration above the JWT. The application also states that a culvert on nearby Mill Creek also is a barrier to fish migration. Any attempt to restore these creeks as spawning streams for Keechelus Lake bull trout will require that passage through these culverts

be restored. OPL has agreed to replace any culverts along the pipeline route that are barriers to fish passage. Because the replacement of the culvert corrects a pre-existing condition, replacement will be done as an enhancement measure, not as mitigation for stream channel impacts.

Q. Can you respond to specific concerns raised about the crossing at Mosquito Creek (#103)?

A. Witnesses have expressed concerns about using divert and flume methodology instead of the bridge on the JWT at this crossing because the creek contains a population of rainbow trout and is a spawning stream for Yakima River rainbow trout. The bridge over Mosquito Creek on the JWT has been classified as a National Heritage landmark bridge, however, and cannot be modified by hanging a pipeline from it.

Q. Can you respond to specific concerns raised about Stampede Creek (#104)?

A. WDFW has raised concerns with trenching this crossing because the creek contains a population of rainbow trout and is a spawning stream for Yakima River rainbow trout. The Stampede Creek crossing will be done either over or under the culvert in the JWT and will not impact Stampede Creek.

Q. Can you respond to specific concerns raised about Cabin Creek (#117)?

A. A variety of concerns about Cabin Creek have been expressed. At least one witness has urged that if the existing bridge is inadequate, it should be improved. WDFW believes that Cabin Creek presents a dangers from excessive scouring and channel movement. The extensive wetlands in the area of the crossing are also viewed as a complication. Armoring the stream banks were suggested to protect bridge supports.

OPL engineers regard the Cabin Creek bridge as inadequate to support the pipeline. The substrate in the area of the crossing is unsuitable for horizontal directional drilling or jack-&-bore methodology. The crossing location just downstream from the bridge was chosen because it avoids open water and forested wetlands above and below the crossing site. OPL engineers believe that diverting cabin creek (dewatering approximately 60% of part of the channel during each diversion), digging a trench, and burying the pipeline two feet below the maximum local scour depth will present less hazard than an exposed pipeline and less environmental impact and risk than attempting to rebuild the bridge and hanging the pipe from the Cabin Creek Bridge.

At a minimum, sedimentation control, restoration, stabilization, revegetation, and monitoring measures agreed to in stipulations between OPL and the Yakama Indian Nation for the Yakima and Columbia River basins (summarized above) will be followed to avoid, minimize, and mitigate for construction, maintenance, and operation impacts at this stream crossing.

Q. Can you respond to specific concerns raised about the crossing at Big Creek (#127) and Little Creek (#129)?

A. Historically, spring chinook salmon, coho, and steelhead spawned and reared in these creeks. Bull trout may have also spawned in the headwaters of these creeks. Despite dewatering from irrigation diversions, chinook and steelhead still spawn and rear in portions of these creek and bull trout probably enter the lower section occasionally.

There is insufficient clearance from power line conductors to setup the equipment for a horizontal directional drill and the topography and distance required for the crossing makes jack-&-bore methodology infeasible. Crossing the streams by trenching a minimum of two feet

below the maximum local scour depth after fluming or diverting the creek is proposed. The pipe will have a protective concrete coating for its entire distance under the lateral migration area of the creek channels. And sedimentation control, restoration, stabilization, revegetation, and monitoring measures agreed to in stipulations between OPL and the Yakama Indian Nation for the Yakima and Columbia River basins (summarized above) will be followed to avoid, minimize, and mitigate for construction, maintenance, and operation impacts at this stream crossing.

Q. Can you respond to specific concerns raised about the crossing at Granite creek (#131)?

A. WDFW is concerned that this stream has a history of channel instability and scouring. Crossing the stream by trenching a minimum of 2 feet below the maximum local scour depth after fluming the creek around the construction site is proposed. The pipe will have a protective concrete coating for its entire distance under the lateral migration area of the creek channels. And, as above, the measures agreed to in stipulations between OPL and the Yakama Indian Nation will be followed to avoid, minimize, and mitigate for construction, maintenance, and operation impacts at this stream crossing.

Q. Can you respond to specific concerns raised about the Yakima River crossing (#147)?

A. DNR maintains that the Yakima River is a navigable stream and must either be avoided, drilled or bored, or crossed on an existing bridge. WDFW and the Counsel for the Environment state that the Yakima River at the pipeline crossing location contains multiple fish resources (Mid-Columbia River ESU spring chinook salmon, Middle Columbia River ESU steelhead, and Columbia River ESU bull trout) that make it difficult to time a construction window for an invasive crossing without impacting spawning fish or eggs and alevins in gravel. WDFW

recommends using a noninvasive method of crossing (*i.e.,* suspension of the pipeline or building a bridge). Other witnesses express concern that the pipeline crosses a slope that has been destabilized by leakage from the Kittitas Reclamation District Main Canal and the permanent loss of large shoreline trees.

The two listed ESUs, bull trout and steelhead, are rare in the proposed crossing area of the upper Yakima River. The majority of Yakima River steelhead spawn in Satus Creek and the Naches River basin, tributaries of the lower Yakima River. Although steelhead have been documented spawning near the crossing site, the major spawning sites in the mainstem of the Yakima are at least 2 miles above and below the crossing site. Since regular monitoring of Yakima River fish stocks by electrofishing studies began in 1990, three bull trout have been sampled near Cle Elum and one bull trout was sampled near Ellensburg. During that period tow angler caught fish were also recorded from Easton Lake and the Yakima River near Benton City. The only known fluvial or stream resident stocks of bull trout in the Yakima River watershed are in the North Fork of the Teanaway River, the headwaters of Ahtanum Creek, and tributaries of the Naches River. The Teanaway and Ahtanum populations are regarded as stream resident populations and the Naches River and Ahtanum Creek are a tributaries of the lower Yakima River. All other populations are above impassable dams. Recruitment of bull trout in the mainstem of the upper Yakima River is probably almost completely dependent on fish that pass over these dams.

The proposed method of crossing the Yakima River is by horizontal directional drill to avoid impacts to salmonids. If the underlying substrate proves infeasible to drill through, the stream will be crossed by divert and flume methodology. OPL has reached an agreement with the Yakama Indian Nation to use a horizontal directional drill if feasible, keeping the crossing a minimum of 20 to 25 feet below the river bed and a minimum of 2 feet below the maximum

scour depth across the 100 year flood plain, which will be calculated separately. If it is not possible or permitted to directionally drill the entire distance to the east side of State Route 10, OPL will explore a drilled crossing from a site approximately 2/10 of a mile west of the river under the river that would terminate in the middle of a field between the river bank and the west side of State Route 10.

If neither drilled crossings are determined to be feasible due to geological conditions, OPL proposes to use a trenched crossing. Grade controls or sills, both upstream and downstream of the trenched crossing, will be used to prevent or minimize rechannelization of the river during flood events. An adequate plan will be developed prior to any construction to control downcutting, river migration, or rechannelization. Prior to construction, OPL will perform a site specific scour study for both the river and the 100 year floodplain to determine the maximum depth of scour. All work on the crossing will be accomplished during times of minimum flow and within EFSEC designated and Yakima approved windows to avoid spawning and migrating fish.

The likelihood of bull trout and steelhead occurring at the Yakima River crossing site during construction is very slight and any impacts from construction (if an invasive methodology is used) would be indirect, turbidity related impacts to juvenile steelhead rearing near the site and direct impacts from digging up any steelhead eggs or alevins remaining in the gravel removed from the trench. Although the number of fish that are likely to be impacted is very small, the probability of these impacts exists and a "take" permit will probably be required if the river must be crossed by invasive methodology. If divert and trench methodology must be used at this crossing, OPL will minimize the impacts to steelhead and bull trout populations by following all applicable BMPs, Standards and Guidelines, and other stipulations required by

EFSEC. A qualified EFSEC designated environmental monitor will monitor water quality/turbidity with authority to halt construction until any problems are remedied.

If a drilled crossing is used, all work on the crossing will be accomplished within the same windows to avoid spawning and migrating fish unless it can be shown to the satisfaction of the appropriate agencies and the Yakama that the crossing is of sufficient depth with intervening geologic conditions to prevent any accidental introduction of drilling muds into the surface water.

The pipe under the river will be a 0.5 inch thick pipe. The pipe will be hydrostatically tested twice prior to operation. A block valve will be placed on each side of the Yakima River crossing. In addition, OPL will follow all other mitigation measures and monitoring procedures set forth the agreement (some of these are summarized in other portions of this document).

Q. Can you respond to specific concerns raised about the crossing at Swauk creek (#151)?

A. At least one witness has expressed concern that the streambed and streambanks at the crossing location are unstable and that there is excessive scour and lateral migration of the streambed. Other witnesses have stated that Swauk Creek has bull trout and that oak trees (priority habitat) are found in the riparian area of the stream. One witness (Hank Landau) pointed out that the application does not indicate the presence of listed ESUs or anadromous salmonids, while the DEIS does. He also states that the application doesn't mention species that have become extinct in the basin, such as Mid-Columbia coho salmon or attempts to reintroduce them. He also states that the application describes the crossing site as being in a more degraded condition than the Nature Conservancy finds it.

The contradictions that Landau found are likely attributable to lack of knowledge about the most recent version of the EFSEC application and the biological evaluation for the project. The information in the DEIS is correct and was derived from the most recent EFSEC application. Also, the pipeline alignment has been rerouted since the first version of the application and now crosses at the location the Nature Conservancy refers to. The crossing is primarily sensitive or unique habitat because of the presence of oak forest, which is a priority habitat. The pipeline will be routed to avoid removing oak trees, and impacts to the riparian area will be compensated for in the site-specific mitigation plan.

Swauk creek does provide spawning habitat for chinook and steelhead in the Yakima watershed, but according to interviews with WDFW biologists there is little or no utilization of the crossing site for anadromous salmonid spawning. However, juvenile salmonids do use the site as rearing habitat and there is always the possibility of salmonid spawning. The construction window for the site was designed to meet concerns expressed about the utilization of the location by rearing chinook salmon. It is recognized that rearing steelhead trout also use this location. There is no known spawning population of bull trout in Swauk creek and no spawning habitat with suitable temperatures for bull trout spawning in the area of the crossing. The only documented record of a bull trout in Swauk Creek was fish captured during 1993 in a trap 200 meters above the mouth of the creek. Yakima River bull trout undoubtedly use this area occasionally for feeding and rearing.

The preferred method of crossing Swauk creek is by trenching a minimum of 2 feet below the maximum local scour depth after fluming the creek around the construction site. The pipe will have a protective concrete coating for its entire distance under the lateral migration area of the stream channel. It is not possible to cross the creek by directional drilling because of

the steep slopes surrounding the crossing site (it would be necessary to exceed the bending radius of the pipe) and jack-&-bore methodology is infeasible due to the length of the crossing.

As usual, sedimentation control, restoration, stabilization, revegetation, and monitoring measures agreed to in stipulations between OPL and the Yakima for the Yakima and Columbia River basins (summarized above) will be followed to avoid, minimize, and mitigate for construction, maintenance, and operation impacts at this stream crossing.

Q. Can you respond to specific concerns raised about the crossings at Currier Creek (#177, crossings #178, #180, 186, Wilson Creek (#187), Naneum Creek (#190-193), and Coleman Creek (#196)?

A. Gary Sprague expresses concern that these creeks have a high water table due to irrigation. If pumping is necessary, the method of disposing of the water will need to prevent increased sediments and turbidity from pumped water entering the streams.

The following stipulations have been agreed to between OPL and the Yakama Indian Nation to prevent increased sediments from pumped water entering streams: Water will detained in ponds or holding areas and discharged to the ground or through filtering media before it is allowed to permeate soils or enter any watercourse. Sediment filter devices will be installed and maintained. The devices will be inspected on a daily basis and repaired as needed. Water discharge rate will be regulated and energy dissipation devices will be used to prevent erosion of upland areas, stream bottom scour, suspension of sediments, or excessive stream flow.

Q. Can you respond to specific concerns raised about the crossings at Middle Canyon Creek (#220 and #221)

A. Gary Sprague asserts that this creek has a history of catastrophic flash floods, which could affect the pipeline. There is no significant salmonid resource at the crossings, but damage caused by a flash flood could affect the pipeline and fisheries resources in the Columbia River. Therefore, the crossings of this creek will have adequate armoring of the streambanks and streambed to prevent damage to the pipe. The following stipulations have been agreed to between OPL and the Yakama Indian Nation to mitigate for impacts to fish and water quality in this situation: A complete inventory of streams identified as having unstable channels (including this crossing) will be conducted in the field. Those crossings identified as having unstable channels and in need of additional monitoring will receive additional crossing prescriptions and these will be incorporated into OPL's designs, plans, and construction bid documents.

Q. Can you respond to specific concerns raised about crossings #225-#229?

A. Gary Sprague and Ron Freisz have expressed concern that these streams flow into a chain of quality fishing lakes inside the Lower Crab Creek Wildlife Area (Lenice, Merry, and Nunnally Lakes). These lakes support important waterfowl production and a quality fishery for planted rainbow and brown trout. Although these streams flow down a steep slope below the crossings, which is composed of highly erodible soils, the area immediately below the crossings is of relatively low gradient, and most streams flow through small wetlands before reaching their steep gradient reaches. Where crossed by the pipeline, velocities are relatively low. These streams are heavily impacted by agricultural activities and most of their channels appear to be frequently dug-out by back hoes and other farm equipment. Two of the crossings were dry at

the time of several Dames & Moore surveys. It is doubtful that carefully flumed and trenched crossings (following BMPs and standards and guidelines agreed to by OPL during the EFSEC process) that have been properly restored during mitigation procedures will contribute any significant amount of sediment to these downstream lakes.

Q. Can you respond to specific concerns raised about crossing #238?

A. Gary Sprague has expressed concern that this stream flows into Red Rock Lake. This lake has a high quality fishery and impacts to water quality from sediment release during construction are a concern. Water quality impacts from sediment release during construction and maintenance would be slight. This watercourse has a low gradient. Where crossed by the pipeline, velocities are relatively low. The crossing is likely to be dry at the time of construction. It is doubtful that a carefully flumed and trenched crossing (following BMPs and standards and guidelines agreed to by OPL during the EFSEC process) that has been properly restored during mitigation procedures will contribute any significant amount of sediment to Red Rock Lake.

Q. Can you respond to specific concerns raised about crossing #259?

A. Ron Friesz has expressed concern that this wasteway flows into an area of productive wetlands and ponds supporting waterfowl production and a warm water fishery approximately one mile downstream in the Wahluke Wildlife Area. This is an important public fishing and hunting area. Impacts to water quality are a concern. However, water quality impacts from sediment release during construction and maintenance would be slight. This watercourse has a low gradient. Where crossed by the pipeline, velocities are relatively low. The crossing is likely to be dry at the time of construction. It is doubtful that a carefully flumed and trenched crossing

(following BMPs and standards and guidelines agreed to by OPL during the EFSEC process) that has been properly restored during mitigation procedures will contribute any significant amount of sediment to these downstream ponds and wetlands.

Q. Can you respond to specific concerns raised about crossing #262?

A. Ron Freisz has expressed concern that this stream flows in and out of large, diverse emergent wetlands and riparian zones, and provides habitat for diverse populations of wildlife and warm water fisheries. This is an important public fishing and hunting area. The proposed crossing is immediately above Bailie Lake, which is one of the larger wetlands in the complex. This drainage enters the Hanford Reach of the Columbia River approximately 10 miles below the crossing location. A salmon hatchery and steelhead rearing facility is operated by the WDFW at this location. Impacts to water quality are a concern. However, water quality impacts from sediment release during construction and maintenance would be slight. This watercourse has a low gradient. Where crossed by the pipeline, velocities are relatively low. It is doubtful that a carefully done flume or divert and trench crossing (following BMPs and standards and guidelines agreed to by OPL during the EFSEC process) that has been properly restored during mitigation procedures will contribute any significant amount of sediment to these downstream ponds and wetlands. Disturbance of riparian vegetation at the crossing site will be minimized and restored after the crossing is completed.

Q. Can you respond to specific concerns raised about the Esquatzel Coulee crossing (#285)?

A. Ron Freisz has expressed concern that this stream's riparian area contains permanent cover consisting of a combination of shrub steppe, emergent wetlands, and Russian olive trees and represents some of the best remaining wildlife in an area that has been heavily impacted by

farming activities. There is also concern about potential downstream water quality impacts in the Columbia River, approximately 8 miles down from the crossing, from sediments during construction. Water quality impacts from sediment release during construction and maintenance would be slight. This watercourse has a low gradient. Where crossed by the pipeline, velocities are relatively low. It is doubtful that a carefully done flumed and trenched crossing (following BMPs and standards and guidelines agreed to by OPL during the EFSEC process) that has been properly restored during mitigation procedures will contribute any significant amount of sediment to these downstream areas. Disturbance of riparian vegetation at the crossing site will be minimized and restored after the crossing is completed.

Q. Can you respond to specific concerns raised about the alternative crossing site proposed at Sand Hollow Creek (#24A)?

A. Witnesses have indicated that the lower mile of Sand Hollow Creek functions as a natural stream and provides suitable habitat that has attracted spawning fall Chinook since 1987. Ron Freisz also states that the federally listed steelhead trout also is suspected to have a spawning population at this site. Since this site is upstream from the mouth of the Yakima River, these steelhead would be Upper Columbia River Steelhead, which are listed as endangered. The fall chinook are not listed but are an important anadromous salmonid resource. During the second week of April 1998, I observed over 50 large rainbow trout between approximately 16" and 26" in length spawning in this section of the creek. I also observed spawning fall chinook at this location in 1998. The rainbow trout spawners could be either relatively small anadromous steelhead or a fluvial population of interior rainbow trout, naturalized hatchery rainbow trout, or residualized steelhead trout that are rearing in Wanapum Reservoir. I have not visually observed any rearing juvenile salmonids in this area or upstream from the spawning area. I

have sampled with electrofishing gear because I have only visited this site when adult spawners were present. Juveniles may be rearing in the reservoir.

This waterway crossing is on an alternative route and will not be crossed on the preferred route. Horizontal directional drilling methodology has been proposed for this crossing downstream from the spawning habitat and no impacts should occur to the salmonid resource if the alternative route is adopted.

END OF REBUTTAL TESTIMONY

I declare under penalty of perjury that the above testimony is true and correct to the best of my knowledge. Executed this 24th day of March, 1999.

_____

Robert Nielsen, Ph.D.