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**BEFORE THE STATE OF WASHINGTON
ENERGY FACILITY SITE EVALUATION COUNCIL**

In the Matter of Application No. 96-1,
Olympic Pipe Line Company
Cross Cascade Pipeline Project

EXHIBIT _____ (BZ-T)

PREFILED DIRECT TESTIMONY
WASHINGTON DEPARTMENT OF FISH & WILDLIFE
WITNESS: BOB ZEIGLER
(Wetlands Habitats and Values)

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Q: Please state your name, business address, position, professional experience and education.

My name is Bob Zeigler. My business address is 600 North Capitol Way, Olympia, WA 98501-1091. I am the Wetland Biologist for the Washington Department of Fish and Wildlife (WDFW). My duties include serving as the agency technical expert on wetland issues. My primary responsibilities are to represent WDFW in interagency efforts to evaluate, protect, and restore wetlands. I also serve as a consultant to agency regional and area biologists on wetland issues. My duties include review of state and federal rules and policies affecting wetlands and commenting on potential impacts to fish and wildlife.

I have worked as the agency Wetland Biologist since April, 1986. Prior to that I worked in efforts to mitigate wetland impacts in environmental review and permitting for the agency since July, 1976. Prior to my employment with the agency I served as a consultant on power plant impact statement studies and worked in an aquaculture project raising catfish and Tilapia in warm water of a power plant.

My resume is attached as Exhibit _____ (BZ-1).

Q: What is the purpose of your testimony?

A: The purpose of my testimony is to describe:
what wetlands are;
why they are important;
what different types of wetlands would be found along the pipeline route and fish and wildlife associated with them;
potential wetlands impacts from oil/gas products pipeline construction and operation;
wetland mitigation including avoidance, replacement ratios and buffers.

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Q: What is a definition or description of the term “wetland”?

A: Wetlands are a portion of the aquatic system in a watershed. They are called the transition areas between water and land. Wetlands are those areas where water flows onto the land or ground water is close to the surface to saturate soils. When saturation or inundation is long enough every year, chemical changes take place in the soils. Pores in the soil are filled with water, which removes oxygen from the soils. This creates a habitat that encourages plants that are adapted to live in saturated soils that are devoid of oxygen at least a portion of the growing season. These are the wetland plants like cattail and skunk cabbage. The interaction of water and plants in the wetland and adjacent uplands allow plants of different types and heights to grow. Wetlands are only those areas where the expression of water is long enough to create chemical and biological changes in and on the soils. It is estimated that approximately 5 percent of the landscape in western Washington and 1 percent of the landscape in eastern Washington are wetlands. Note these estimates double when the adjacent uplands that are part of the wetlands are also included. The adjacent uplands are not wetlands but are biologically part of the wetland system providing nutrients, protection from high and low temperatures, and nesting habitat for wetland species. Even considering adjacent uplands, the entire wetland systems comprise only about 10 percent of the state.

Q: What is the importance of wetlands?

A: Wetlands and their adjacent uplands do many important functions that we benefit from.

1. They store water in high rainfall events and slowly release it to streams and groundwater. This prevents flooding which protects landowners as well as salmon in the streams. The slow release of water from wetlands is what allows many streams to flow

1 year round instead of drying up in summer. Wetlands moderate stream flows in high flow
2 and low flow events.

3
4 2. They slow and filter surface water and remove pollutants. The pollutants attach to
5 soil particles that settle out into the wetland. This maintains surface and ground water
6 quality. In this way wetlands function as the kidneys of the aquatic system.

7
8 3. Fish and wildlife evolved with and take advantage of the moderating benefits of
9 wetlands. Wetlands and their adjacent uplands provide primary breeding and or feeding
10 habitat for more than 85% of the terrestrial vertebrates in the state and they help maintain
11 habitat for all fish and other freshwater aquatic species.

12
13 **Q: What is the importance of wetlands to fish and wildlife?**

14 **A:** Wetlands and their adjacent uplands provide key habitats for large number and types of
15 fish and wildlife. Wetlands are the systems that our fish and wildlife species evolved
16 with. They are the areas of concentrated fish and wildlife use. Wetlands meet life needs
17 of animals by providing water, food supply, cover from predators, and protection from
18 extremes of climate. Wetlands provide habitat for many types of animals because of
19 different heights and types of plants in wetlands and their adjacent uplands. Elk will raise
20 their young in wetlands and adjacent uplands. Mallard ducks feed in the wetland and nest
21 in adjacent uplands. Bogs and vernal pools have specialized plant and animal
22 communities that take advantage of their unusual nutrient and water situations. Young
23 coho salmon, steelhead and cutthroat will move out of a stream and into a wetland in high
24 flow periods. This allows them to feed and not have to spend energy fighting the stream
25 currents. Fish that can move into the wetland to feed in winter have been reported to
26 grow six times as fast as fish that are not able to do so and must feed in the streams.

1 Because of the importance to fish and wildlife, Washington Department of Fish and
2 Wildlife considers wetlands to be a Priority Habitat.

3
4 **Q: What are the types of wetlands that might be found along a pipeline route and fish
5 and wildlife habitats associated with each?**

6 A: There are several ways in which wetlands are differentiated:

7 1. Department of Ecology Rating based on sensitivity to impact and difficulty to
8 replace:

9
10 Category 1: Most sensitive and irreplaceable:

- 11 a) bogs and fens (than take more than 10,000 years to form); or b) mature forested
- 12 wetlands that can take between 60-200 years to form; or
- 13 c) wetlands providing documented habitat for threatened or endangered species; or
- 14 d) salt marsh and other estuarine wetlands greater than 5 acres in size.

15
16 Category 2:

- 17 a) Large and diverse wetlands, or
- 18 b) wetlands with waterfowl, mink, shorebird concentration areas; or
- 19 c) wetlands providing documented habitat for priority species of fish or wildlife; or
- 20 d) wetlands with documented habitat for sensitive plant or animal species; or
- 21 e) estuarine wetlands between 1-5 acres in size.

22
23
24 Category 3:

- 25 a) Small but diverse wetlands; or
- 26 b) wetlands greater than two acres in size but lacking diversity of category 2; or

1 c) estuarine wetlands less than one acre in size and not providing habitat for
2 priority species.

3
4 Category 4:

5 a) Less than 2 acres in size, isolated and lacking diversity.

6
7 In this system, the most sensitive and difficult to replace are Category 1 and 2.

8
9 2. Wetlands are also differentiated by where their water comes from and where it
10 discharges. Riverine wetlands have waters that originate from streams or rivers.
11 These provide important functions for trout and salmon as well as waterfowl and
12 mammals such as mink and elk.

13
14 Depressional wetlands are those whose waters come from ground water or surface flows
15 from small basins. These include bogs with specialized plants and invertebrate
16 communities that evolved in these low nutrient systems. Some plants obtain their
17 nutrients by catching and consuming insects. Depressional wetlands also include
18 sensitive vernal pool, pothole and playa wetlands in eastern Washington that serve as
19 oasis in dry climates. Depressional wetlands also include marshes and ponds with deeper
20 water that support fish and waterfowl.

21
22 Lake fringe wetlands provide habitat for young fish and nesting for marsh wren,
23 chickadee and some species of waterfowl as well as food for beaver and muskrat and
24 other waterfowl.

25
26 Slope wetlands are those that are fed by springs. They provide habitat for amphibians and

1 some birds. They generally flow downhill into other wetlands or surface waters.

2
3 Estuarine fringe wetlands provide essential habitat for salmon such as chinook and chum
4 as they transition from fresh to marine water systems. They also provide spawning
5 substrate for herring; crab habitat; and feeding for waterfowl, shorebirds, and marine
6 mammals.

7
8 3. The third way wetlands are differentiated is the frequency of inundation and
9 saturation. Most people are aware of the importance of permanently inundated wetlands.
10 Wetlands that are seasonally inundated are often overlooked but they play important roles
11 for fish and wildlife. Many of the agricultural wetlands are seasonally inundated. They
12 provide feeding habitat for waterfowl and shorebirds that capture invertebrates. This
13 consumption of protein is needed for egg production. Waterfowl and shorebirds will
14 concentrate in these areas in late fall through spring. Eagle and peregrine falcon will
15 concentrate to feed on these birds. Seasonally inundated wetlands are also important in
16 forested environments. These are frequently important rearing areas for coho salmon and
17 steelhead. In eastern Washington there are wetlands converted to agriculture that support
18 winter wheat in December and after snow melt in April they are flooded and support
19 sandhill crane, heron and waterfowl.

20
21 **Q: What are the potential direct impacts to wetlands from laying a pipeline?**

22 **A:** Direct impacts to a wetland and its associated fish and wildlife species would occur
23 during construction of a pipeline in removing existing vegetation and disturbance of soils.
24 Sediments could erode into streams and surface water impacting water quality and aquatic
25 species. The vegetation structure impact would be most severe if this vegetation were
26 mature forested or bog plants. Areas where the soils are disturbed could be colonized by

1 non native exotic plants with reduced wildlife value. The impact to vegetation and
2 structure would occur along the pipeline right of way and would extend over time for as
3 long as the vegetation is managed in that area. Other direct impacts to wetlands and their
4 resources could occur if the pipeline and trench provided a channel that drained the
5 wetland by flowing down slope or breaking a clay seal allowing water to percolate into
6 underlying gravels. Very severe direct impacts would occur if the pipeline broke and
7 gasoline, jet fuel or diesel flowed into the wetland and adjacent surface and ground
8 waters. One problem with crossing wetlands, especially those with organic soils such as
9 peats and mucks, is differential settling of soils in the trench under the pipeline leaving it
10 susceptible to additional stresses during use and during even small earthquakes. This can
11 lead to breaks in very sensitive wetland areas. These are areas of usually high
12 concentrations of fish and wildlife.

13
14 **Q: What are the potential indirect impacts to wetlands?**

15 A: Indirect impacts would occur as a result of industrial growth and development in areas
16 where the diesel and gas product is distributed. Expanded industrial sites, parking
17 facilities, residential growth for workers would all place additional stresses upon the fish
18 and wildlife habitats in those areas.

19
20 **Q: Do you have concerns about construction and operation of a pipeline across a
21 stream tributary to a wetland?**

22 A: Concerns about construction and operation of a oil products pipeline in an upstream
23 tributary to a wetland would be in the event of a break. In this case, the oil product would
24 discharge into the wetland, and could be difficult to clean and would impact associated
25 fish and wildlife that used those waters and wetlands. These could be coho salmon or
26 nesting waterfowl or mink.

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Q: How can expected impacts be mitigated?

A: Some construction impacts can be mitigating by jacking the pipeline under the wetland system and by erosion control methods. Loss of trees and woody structure are very long term to permanent impacts. A line break and diesel or gas spill can be serious to catastrophic depending upon where the break occurs and quantity and type of material released. It could require removal and disposal of impacted soils and plant material. These impacts can be very long term to permanent.

Q: Should the applicant avoid siting the Project in all wetlands. Which are the most important to avoid?

A: The applicant should avoid siting the pipeline across wetlands because of their sensitivity and less stable soils in earthquakes. Where wetlands crossings cannot be avoided, compensatory mitigation would need to replace all lost area, structure and function. The wetlands that would be most important to avoid would be those that are the most sensitive and could not easily recover from construction impacts or a spill. These would be bogs and fens and mature forested wetlands. It is essential to avoid wetlands associated with streams or rivers where trout and salmon could rear. If these need to be crossed it would be important to jack the pipeline under the stream and associated wetland. It would also be essential to avoid wetlands identified as shorebird, waterfowl, swan, sandhill crane, bald eagle, peregrine falcon, or mink concentration areas in the Washington Department of Fish and Wildlife Priority Habitats and Species Maps.

Q: What are Wetland Rating Buffers and Replacement Ratios?

A: Department of Ecology's 1990 Model Wetlands Protection Ordinance (Exhibit ____ (BZ-2)) was drafted to identify the needed buffers and replacement ratios for wetlands

1 categorized in DOE's wetland rating system. The most sensitive systems needed greater
2 buffers. Those that required the longest time to replace had the largest replacement
3 ratios.

4
5 Category 1 wetlands are those that were the most sensitive and impossible to replicate.
6 They include: bogs, mature forested and wetlands with threatened or endangered species
7 of plants and animals. The Model Ordinance proposes buffers of 200-300 feet and 6:1
8 replacement ratios.

9
10 Category 2 wetlands are those that are large and diverse or support priority habitat
11 features (waterfowl, shorebird, mink, etc.) concentration areas or priority species of fish
12 and wildlife including all non-listed salmon and trout. For these wetlands buffers are
13 proposed to be 100-200 feet wide and replacement ratios are 3:1 for forested systems, 2:1
14 for scrub shrub systems, 1.5:1 for emergent systems. Note: our agency policy requires a
15 minimum of 2:1 replacement when we have HPA authority to ensure what is proposed
16 actually develops as functional wetlands unless mitigation is done in advance or 2:1 is not
17 feasible or warranted. (There are some Category 2 emergent wetlands that support fish
18 and require HPA for impact and we will require 2:1 instead of the 1.5:1 listed ratio.)

19
20 Category 3 wetlands are those that are large but not diverse or small but diverse. These
21 wetlands are proposed to be buffered for 50-100 feet and replacement ratios are 3:1 for
22 forested systems, 2:1 for scrub shrub systems, 1.5:1 for emergent systems. Category 4
23 wetlands are those that are less than 2 acres and isolated with low diversity of plant life.
24 These wetlands are proposed to be buffered between 25-50 feet and replacement ratios
25 are 1.25:1. DOE's Model Ordinance has been used by our biologists in designing
26 mitigation for wetland impacts in conjunction with our policies of requiring a minimum

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2:1 replacement. Two to one replacement has been required because what is designed to be wetland in mitigation seldom fully develops as wetland.

END OF DIRECT TESTIMONY

I declare under penalty of perjury that the above testimony is true and correct to the best of my knowledge.

EXECUTED this _____ day of February, 1999, at Olympia, Washington.

BOB ZEIGLER