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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 _____ (WGS-T)
REBUTTAL TESTIMONY OF W. GEOFFREY SPAULDING
ISSUE: PALEONTOLOGIC RESOURCES AT GINKGO STATE PARK
SPONSOR: OLYMPIC PIPE LINE COMPANY

1 **Q. Please provide your name and business address to the Council.**

2
3 A. W. Geoffrey Spaulding, Ph.D.
4 Dames & Moore
5 7115 Amigo Street
6 Suite 110
7 Las Vegas, Nevada 89014

8 **Q. Please summarize your employment and educational background.**

9 A. I hold M.S. and Ph.D. degrees in Geosciences from the University of Arizona, with
10 emphasis on paleobotany and paleoecology. Subsequent to the receipt of a multi-year
11 research contract from the U.S. Geological Survey, in 1979 I took the position of
12 Research Associate at the College of Forest Resources, University of Washington,
13 Seattle. In 1983 I accepted an appointment as a Research Professor in the Department of
14 Botany, University of Washington. I held this position until 1989, when I accepted a
15 position as Senior Scientist with the environmental and engineering consulting firm,
16 Dames & Moore. I currently hold the titles of Senior Scientist and Manager,
17 Environmental Services. In this position I manage a multidisciplinary (biological
18 resources, cultural and paleontologic resources, NEPA and CEQA compliance)
19 environmental services unit, and continue to practice my technical specialty. A copy of
20 my curriculum vitae is attached as Exhibit WGS-1 to my testimony.

21 **Q. What is your technical specialty?**

22 A. For the past twenty-five years my technical specialty has been the use of fossil plants to
23 understand environmental changes in the western United States, and the identification of
24 fossil plant remains as a key to understanding long-term ecosystem changes. I have
25 published papers on these topics in such scientific journals as *Nature*, *Science*, and

1 *Quaternary Research*, and am sole author of a U.S. Geological Survey Professional Paper
2 on paleoecological and paleobotanical studies.

3
4 **Q. Generally, what is the subject of your testimony?**

5 A. My testimony concerns the scientific importance of the fossil woods preserved in the
6 basalts of the Ginkgo Flow, and the potential impacts of the construction of the Cross
7 Cascade Pipeline.

8
9 **Q. What particular qualifications do you have regarding the assessment of
10 construction related impacts to paleontologic resources?**

11 A. As part of my responsibilities for the last 8.5 years since joining Dames & Moore, I have
12 prepared project related paleontologic resources assessments for EAs, EISs, and EIRs;
13 supervised paleontologic resources surveys; assessed potential impacts from projects to
14 paleontologic resources; developed mitigation measures for review and approval by
15 federal agencies, and supervised and participated in paleontologic resource mitigation
16 programs.

17
18 **Q. Are you familiar with the fossil resources of Ginkgo Petrified Forest State Park?**

19
20 A. I am familiar with the fossil resources of Ginkgo Petrified Forest State Park (GPSFP)
21 through both field trips to the Park when I was a Professor of Botany at the University of
22 Washington, as well as my knowledge of the scientific literature on the Tertiary
23 paleobotany of the western United States.

24
25 **Q. How are impacts to paleontologic resources usually assessed?**

1 A. Impacts to paleontologic resources resulting from construction-related activities are
2 typically assessed by considering (1) the significance of the fossil deposit and (2) the
3 extent and degree of disturbance resulting from construction.
4

5 **Q. Have you reviewed the prefiled testimony of Professor Edward Klucking and, if so,
6 for what purpose?**

7 A. Yes, I have reviewed Prof. Klucking's testimony to evaluate it for its accuracy in the
8 characterization of the fossil resources of GPFSP, and potential impacts from the project.
9

10 **Q. Do you have any observations regarding the scientific importance of the fossil woods
11 within GPFSP arising from that review?**

12 A. Yes. It is important to note that the fossil woods from the area, and other fossil deposits
13 of similar age from the Columbia Plateau, have been studied more extensively than
14 suggested by Prof. Klucking. The remains from the GPFSP have been studied and
15 considered in the larger context of the Middle Tertiary floristics of the Columbia Plateau
16 by Prakash and Barghoorn (1961a, b) and Smiley (1963). Most importantly, Chaney
17 (1959) considers the fossil woods from the area of the GPFSP in the context of the
18 overall paleobotanical record of the Columbia Plateau, which is well represented by a
19 number fossil localities, not only the GPFSP. This means that, along with Prof.
20 Klucking's less widely published works, a considerable amount is already known about
21 this deposit.
22

23 **Q. Why is prior scientific work on these fossils relevant to the issue at hand?**

24 A. It means that the effects of the pipeline route through the GPFSP are unlikely to
25 compromise scientific values in terms of information that has yet to be gathered.

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Q. What are the most important criteria for determining the significance of a fossil deposit?

A. The most important criteria for determining the significance of a fossil deposit are (1) The potential for determining the age of the fossil assemblage, (2) the taxonomic resolution of that fossil record, and (3) the fossil assemblage’s stratigraphic and taphonomic integrity.

Q. Using these three criteria, how would you assess the significance of the fossil deposits at GPFSP?

A. The deposits of petrified wood at GPFSP meet two of these three criteria: their age is determinable, and the remains are frequently identifiable to the species level. They do not, however, possess substantial taphonomic integrity, and in some places lack stratigraphic integrity.

Q. What do you mean by taphonomic integrity?

A. Taphonomy is the study of how paleontologic assemblages are altered from the living state, in this case a forest, to a fossil assemblage, in this case a jumble of logs intercalated in a basalt flow. As noted in the prefiled testimony of Jack Powell, the assemblage of woods in the basaltic Ginkgo Flow is likely the result of a lahar; a cataclysmic debris flow such as that which occurred on the northwest face of Mount St. Helens in 1980. The lahar which was responsible for the deposition of the ginkgo petrified wood incorporated trees that grew in a wide variety of habitats, at different elevations. In other words, the woods in the deposit were entrained in the debris flow across many miles prior to their deposition, and therefore they represent a mix of species from different environments.

1 **Q. How does a lack of taphonomic integrity affect the significance of these deposits?**

2 A. In two ways. First, because the fossil woods in the Gingko Flow at any one locality
3 represent a mix of species from different environments, disturbing individual specimens
4 from their original context would not be a significant impact because that original context
5 has little value to the interpretation of prehistoric environments and evolution. Second, in
6 opposition to what was implied by Prof. Klucking (p. 6, lines 3-4), the relative abundance
7 of different species, as well as the exact location of specimens within the Gingko Flow,
8 does not have substantive scientific meaning.

9
10 **Q. Are there any other pertinent considerations arising from the fact that the**
11 **specimens in the Gingko Flow represent a mix of species from different**
12 **environments.**

13 A. Yes. It means that, in opposition to Prof. Klucking's testimony (p. 5, lines 16-17) and
14 despite the name, the woods within the Gingko Flow do not represent a forest *per se*.

15
16 **Q. You noted that, in some areas, the fossils in GPFSP also lack stratigraphic integrity.**
17 **What do you mean by that?**

18 A. Pieces of fossil wood lying on the surface, and incorporated into alluvial and colluvial
19 deposits, can no longer be confidently related to the geological stratum from which they
20 came. In most cases, such a lack of stratigraphic integrity compromises the scientific
21 value of fossils. This fact is now recognized by some federal land management agencies,
22 which permit amateur collection of fossils on federal lands where those fossils are not in
23 stratigraphic context.

1 **Q. What is your assessment of the extent and degree of potential impacts of this project**
2 **to the fossil resources of the GPFSP?**

3 A. Excavation of a pipeline trench no more than 5 feet deep and two feet wide (at the
4 bottom) will result in the fragmentation and exhumation of petrified wood in those areas
5 where the trench crosses the lower third of the Ginkgo Flow. Compared to the overall
6 extent of the fossiliferous deposit, the impacts will not be extensive. With respect to the
7 degree of impact, individual fossilized logs will be fragmented and exhumed. However,
8 that fragmentation will not necessarily compromise the diagnostic characters that provide
9 clues to the identification of that wood. And, as observed above, the exhumation of such
10 specimens will not, in and of itself, compromise the scientific value of the material, since
11 the deposit itself is a jumble of material originating from different areas.

12
13 **Q. How has the Olympic Pipeline Company (OPC) addressed potential effects of the**
14 **Cross Cascade Pipeline to the paleontologic resources of GPFSP?**

15 A. OPC representatives accompanied State Parks personnel in a walk-over of the pipeline
16 route through the GPFSP and made in-field adjustments of the alignment to avoid
17 identifiable surface outcrops of wood north of Interstate 90.

18
19 **Q. To your knowledge, were these steps considered adequate by State Parks personnel?**

20 A. I have reviewed a memorandum dated December 18, 1998 from Mr. Cleve Pinix,
21 Director, to the Washington State Parks and Recreation Commission noting that the State
22 Parks project team “reached the conclusion that the route as now proposed would have
23 minimal impact on the paleontological/archaeological resources of the park.”
24
25

1 **Q. What additional plans are being formulated by OPC to mitigate potential impacts**
2 **from this project to paleontologic resources within GPFSP?**

3 A. The Olympic Pipeline Company recognizes that, despite the lack of taphonomic integrity
4 of the woods within the Ginkgo Flow, these fossils nevertheless represent resources that
5 are of educational value, as well as being of some continued value to understanding the
6 environmental history of the State. Therefore, OPC is developing a paleontologic
7 monitoring and mitigation plan for GPFSP that incorporates the following elements:

- 8
- 9 • Monitoring of excavation by a qualified paleontologic monitor where it
10 will cross the basalts of the Ginkgo Flow;
- 11
- 12 • Collection of representative samples of fossil wood that may be exhumed
13 during construction, and cataloging that material with respect to locality
14 found;
- 15
- 16 • Preparation of the fossil material for curation in an appropriate institution,
17 such as the facilities of the State Park itself, or at Central Washington
18 University; and
- 19
- 20 • Provision of paleontologic sensitivity training to all field construction
21 personnel that will explain the importance of monitoring and mitigation,
22 and emphasize that the collection of petrified wood within the GPFSP is
23 not permitted.
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Q. In your judgment as a professional experienced in assessing and mitigating project-related impacts to paleontologic resources, what would be the result of such a monitoring and mitigation effort?

A. Paleontologic sensitivity training would reduce the possibility of unauthorized collecting with the boundaries of GPFSP. Monitoring, recovery and subsequent curation of any exhumed fossil woods would provide additional specimens for scientific study, a goal articulated as being important by Prof. Klucking (p. 6, lines 9-11). Potential project related impacts therefore would not be significant.

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I declare under penalty of perjury under the Laws of the State of Washington for that the above testimony is true and correct to the best of my knowledge and belief.

DATED this _____ day of March, 1999.

W. Geoffrey Spaulding, Ph.D.

References

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- 6 Prakash, U., and E. S. Barghoorn. 1961b. Miocene Fossil Woods From The Columbia Basalts of
7 Central Washington, II. *Journal of The Arnold Arboretum* 42(3): 347-358.
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