WHISTLING RIDGE ENERGY LLC
DAN MEIER
PREFILED TESTIMONY
EXHIBIT NO. 3.00

BEFORE THE STATE OF WASHINGTON

ENERGY FACILITY SITE EVALUATION COUNCIL

In the Matter of Application No. 2009-01: WHISTLING RIDGE ENERGY LLC; WHISTLING RIDGE ENERGY PROJECT	EXHIBIT NO. 3.00

APPLICANT'S PREFILED DIRECT TESTIMONY

WITNESS #3: DAN MEIER

Q Please state your name and business address.

A My name is Dan Meier, and my business address is 111 Southwest Columbia Street, Suite 1500, Portland, Oregon 97201-5850.

Q What is your present occupation and profession, and what are your duties and responsibilities?

A I am an Engineering Geologist with URS Corporation, an international environmental and engineering consulting firm providing services to organizations such as Whistling Ridge Energy LLC. URS Corporation assists organizations in analyzing

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environmental impacts and land use compatibility of projects such as the Whistling Ridge Energy Project. I am a Licensed Engineering Geologist in the State of Washington with over 21 years of professional geologic experience in the western United States. My specialties include on-site geologic mapping, subsurface exploration, as-constructed geologic mapping, construction inspection, interpretation of field data, and preparation of maps and reports. I have experience in seismic hazard evaluations, landslide evaluations, engineering geology, and construction management and inspection. My duties on this Project were to provide engineering geology expertise, including stereo photo analysis, review of published geologic documents, site reconnaissance and preliminary assessment of slope, seismic, and soil hazards at the proposed site. I assisted in the preparation of the Application for Site Certification for this Project.

Q Please identify what has been marked for identification as Exhibit No. 3.01.

A Exhibit No. 3.01 is a résumé of my education background and employment experience.

Q Are you sponsoring any portions of the Application for Site Certification for the Whistling Ridge Energy Project?

A Yes. I am sponsoring the following sections for which I was primarily responsible for the analysis and development:

Section 2.1.2	Prominent Geographic Features
Section 2.1.3.1	Geology
Section 2.15	Protection from Natural Hazards

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Section 3.1	Earth
Section 3.3	Water (Not including Section 3.3.1, Surface Water Resources (Movement/Quality/Quantity) and Section 3.3.2 (Runoff/Absorption))

Q Are you sponsoring any appendices or other documents that are part of the Application for Site Certification?

A Yes. I am sponsoring the following appendix:

Appendix A	Geotechnical Report

Q Are you familiar with the identified sections and appendix of the Application for Site Certification?

A Yes.

Q Did you prepare these sections and appendix, or, if not, did you direct and/or supervise their preparation?

A Yes.

Q Is the information in these sections and appendix within your area of authority and/or expertise?

A Yes.

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Q Are the contents of these sections and appendix of the Application for Site Certification either based upon your own knowledge, or upon evidence, such as studies and reports that reasonably prudent persons in your field are accustomed to rely on in the conduct of their affairs?

A Yes.

Q To the best of your knowledge, are the contents of these sections and appendix of the Application for Site Certification true?

A Yes.

Q Do you incorporate the facts and contents of these sections and appendix as part of your testimony?

A Yes.

Q Are you able to answer questions under cross examination regarding these sections and appendix?

A Yes.

Q Do you sponsor the admission into evidence of these sections and appendix of the Application for Site Certification?

A Yes.

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Q Are there any modifications or clarifications to be made to those portions of the Application for Site Certification that you are sponsoring?

A No.

Q Would you please summarize and describe the prominent geographic features of the site?

A The Project site is located on a series of north-trending ridges that range in elevation from approximately 2,100 to 2,300 feet above mean sea level (msl). The land west of the proposed Project site drops sharply to a narrow river terrace and then to an elevation of less than 800 feet above msl in the Little White Salmon River valley. The topography northeast of the site drops gradually toward the White Salmon River or climbs gently up the northeast flank of Underwood Mountain (2,728 feet above msl). To the south, the topography drops to a terrace of largely agricultural use, then toward the Columbia River.

Q Would you please summarize the geology of the site and surrounding area?

A The White Salmon, Washington area is located within the Cascade Range and the Columbia Intermontane Physiographic Province. The Project area is located just within the western boundary of the Columbia Plateau, which is located at the western edge of the Columbia Intermontane Physiographic Province. This lowland province is surrounded on all sides by mountain ranges and highlands, and covers a vast area of eastern Washington and parts of northeastern Oregon and western Idaho.

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A variety of younger volcanic rocks and sedimentary materials that range from Pliocene (1.8 to 5.3 million years before the present (BP)) to Holocene (less than 10,000 years BP in age) overlie the Columbia River Basalt Group (CRBG) in the Project area. Sedimentary rocks are generally thought to underlie the basalts in the Project area. The proposed Project site is located within the northern boundary of the structural Hood River Valley, which extends a few north miles into southern Washington. In general, the geology of the area consists of basalt flows extruded from local vents, layered with conglomerate, tuff, tuff breccias, and other volcanoclastic deposits. These formations are typically overlain by silt and clay soil of varying thickness in the Project vicinity. The bedrock underlying the proposed Project site consists of Grande Ronde Basalt of the CRBG and Quaternary basalt of Underwood Mountain—a shield volcano that lies approximately midway between the lower reaches of the Little White Salmon and White Salmon Rivers. Its southern slopes drain to the Columbia River.

Q Did your study identify seismic faults within the Project area?

A No faults are mapped within the footprint of the proposed Whistling Ridge Energy Project area. However, faults are mapped approximately 1.5 miles southwest and northeast of the proposed Project area. Many of these faults are inferred and assumed to be buried by younger surficial deposits. The activity of the area faults is unknown. However, a review of aerial photography shows no indication of recent movement along the trace of the inferred faults.

Q What are the seismic risks for the site?

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A The most common risk from a seismic activity is liquefaction. Liquefaction is a phenomenon whereby soils undergo significant loss of strength and stiffness when they are subjected to vibration or large cyclic ground motions produced by earthquakes. Typically, cyclic loading of saturated soils leads to the buildup of excess pore-water pressure as a result of soil particles being rearranged with a tendency toward denser packing. Under undrained conditions (such as during earthquake shaking), loads are transferred from the soil skeleton to the pore-water with consequent reduction in the soils' shear strength. Test pits excavated at the Project site encountered shallow bedrock covered with a combination of cohesive and cohesionless soil. No groundwater was observed in any of the test pits. Based on the soils encountered during the field explorations, it is my professional opinion that the potential for liquefaction is very low at this site.

Q Is settlement likely to occur to the turbine foundations if there was a seismic event?

A The risk of seismically induced settlement and lateral spreading is low due to the low liquefaction potential. It is my professional opinion that any settlements and lateral spread induced by a seismic event would be minimal. Coseismic surface rupture occurs when a fault breaks to the land surface during an earthquake. Surface rupture is usually associated with moderate to large earthquakes (M_w 6.5 or greater) or rarely during smaller, very shallow events. There are no mapped faults crossing the site. Therefore, the potential for coseismic primary surface rupture at the proposed Project site is small.

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Q The Application on page 3.1-20 states that the proposed access road (West Pit Road) traverses Class II LHAs. Could you please describe the associated geotechnical hazard(s)?

A The primary hazard to West Pit Road would be damage sustained due to debris flow or mass wasting. However, research done into published geologic information for the Project area did not reveal any mapped landslides along West Pit Road's route and none were observed during a preliminary site investigation. I believe the Class II designation in the area of West Pit Road is based strictly on slope angle. As Section 3.1.4.2 of the Application indicates, West Pit Road will need to be improved for purposes of this Project. The engineering for those improvements will include site-specific geotechnical evaluations to determine what, if any, slope mitigation will be required. In my professional opinion, based on current information, it seems very likely that this engineering can minimize the geotechnical hazards, if any exist, associated with traversing Class II LHA in this location. Engineering solutions that minimize the potential for debris flow and mass wasting are commonly utilized on roadways.

Q What is your understanding of how Skamania County classifies landslide hazards?

A Skamania County recognizes three classes of landslide hazard areas (LHAs). Class I (Severe) LHAs are considered to present a severe landslide hazard and are distinguished as areas of known mappable landslide deposits which have been designated landslide hazard areas by the local legislative body. Class II (High) LHAs are areas with slopes between twenty and thirty percent that are underlain by soils that consist largely of silt, clay or bedrock, and all areas with slopes greater than thirty

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percent. Class III (Moderate) LHAs are areas with slopes between twenty percent and thirty percent not included in Class II.

Q Has URS performed a landslide hazard evaluation of the site?

A Yes, we conducted a preliminary landslide hazard evaluation of the site pursuant to Skamania County Code (SCC) Title 21A, Chapter 21A.06 - Landslide Hazard Areas, which provides that the primary criteria for landslide hazard designations are: presence of pre-existing, known mapable landslides; slope angle; and/or composition of the near-surface soils or rock. URS's investigation consisted of reviewing sections of the Skamania County Code that address Geologically Hazardous Areas, reviewing existing available topographic, geologic and soils literature and maps, analyzing Project-specific stereo aerial photographs, reviewing Project test pit logs and soil samples, and a one day site reconnaissance.

URS has created a color-coded map of the study area using an existing U.S. Geological Survey 10-meter digital terrain model (DTM) to segregate slopes into three categories: slopes less than 20%; slopes between 20% and 30%; and slopes greater than 30%. We then superimposed the Natural Resources Conservation Services (NRCS) soil survey map onto the slope map to provide soil type information. The resulting Landslide Hazard Map is presented as Figure 2.15-1 in the Application.

Q Did your study find any areas proposed for turbines that would meet Skamania County's criteria for Class I (severe) or Class II (high) LHAs?

A Based on our preliminary investigation, there are no areas of the site that meet Skamania County's criteria for a Class I LHA. Class II LHAs are shown in green on

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Figure 2.15-1, and none of the turbines themselves are proposed to be located in a Class II LHA.

Q Did your study find Class III LHAs on the Project site and would they cause an impact to the turbines or other Project facilities?

A Class III LHAs have been delineated adjacent to proposed wind turbines along the southern Tower Line A, and Tower Line C. Class III LHAs are not anticipated to have any impact on the proposed facilities, due to the robust nature of the proposed foundation designs.

Q Do you believe that the potential for landslides at the site would present a danger?

A It is my professional opinion that the proposed Project can be constructed and operated without danger to human life or the surrounding environment due to landslide hazards.

Q Were other natural hazards identified for the site?

A We also evaluated the potential for volcanic eruptions, tsunamis, seiches, and flooding. Mount Adams is the closest potentially active volcano to the Project site, situated approximately 30 miles due north, but is not historically active. Mount St. Helens is the closest historically active volcano to the Project site, situated approximately 42 miles to the northwest. Due to the Project site location, the risk from volcanic eruption would be primarily limited to ash deposit. In the event that a volcanic eruption would damage or impact project facilities, the Project facilities would be shut down until safe operating conditions return. If an eruption occurred

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during construction, a temporary shut-down would most likely be required to protect human health and equipment.

Q Would you please summarize your findings on tsunamis, seiches, and flooding?

A Tsunami waves may enter the Columbia River from distant circum-Pacific earthquakes, local offshore earthquakes on the Cascadia Subduction Zone (CSZ), or submarine landslides in the adjacent Pacific Ocean offshore area. The Project site is located on a series of north-trending ridges that range in elevation from approximately 2,100 to 2,300 feet above msl and would be above the area potentially affected by a tsunami wave.

Although seiches have been observed in the Pacific Northwest during the 1949 Queen Charlotte Islands, Canada, and the 1964 and 2002 Alaskan earthquake of approximately M_w 8 or greater, seiches have not been reported in the Columbia River, except in the reservoir directly behind the Grand Coulee Dam farther upstream. In our judgment, the seiche potential in this river near the site is minimal, and, due to the elevation of the site, the potential for damage from any seiche that might occur is considered to be remote.

The Project site is not located within any floodplain.

Q Please describe the soil conditions at the Project site.

A Based on the current test pits and field observations, the site soil is best represented as Soft Rock (IBC Soil Site Class B). Rock, with varying strength and weathering characteristics, was encountered at shallow depths (ranging from three to 12 feet bgs).

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Q Is there a potential for erosion at the site?

A The assessment of erosion potential is principally based on the erosion potential specified for the surficial soils by the NRCS, which uses an erosion factor (K) to indicate the susceptibility of a soil to sheet and rill erosion by water. The K-values for soil at the proposed development site and access roads are 0.20 for the McElroy and Timberhead gravelly loams, 0.24 for the Undusk gravelly loam, and 0.37 for the Underwood loam. These erosion factors indicate that the Underwood loam has a high potential for erosion by water and the McElroy, Timberhead, and Undusk units have a medium potential. Most soils found in the site vicinity are classified as having a low susceptibility to wind erosion.

Q Would you please summarize the potential for erosion, when it might occur and how it would be minimized?

A The potential for erosion or aggradation related to the planned development would be greatest during and immediately after the construction process. The NRCS classifies surficial soils at the site as generally having medium erosion potential. During the dry season, soils that are disturbed and stripped of vegetative cover may be susceptible to wind erosion. The potential for erosion by wind and water would be minimized through the use of erosion control measures to be outlined in the Stormwater Pollution Prevention Plan (SWPPP) as described in Section 2.10 of the Application.

Q Are additional studies planned for the site?

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A Yes, site-specific geotechnical engineering evaluations would be conducted prior to design of the Project to identify design methods to address the potential impacts presented above. Mitigation of soil impacts at the site would be incorporated into the final design of the foundations and roadways. A SWPPP would be developed prior to construction or modification of any roads or facilities. The SWPPP would be submitted for approval to EFSEC and followed throughout construction at the site.

Q Is the groundwater relatively close to the surface of the site?

A During the current subsurface exploration, groundwater was not encountered in the site up to a depth of 16 feet below ground surface (bgs). It should be noted that these observations reflect groundwater levels at the time of the field investigation. Actual groundwater levels may fluctuate significantly in response to seasonal effects, regional rainfall, and other factors not observed during this investigation. There may be regional or perched water tables at greater depth. Prior to final design of the tower foundations, additional subsurface investigations (boreholes) would be required to provide geotechnical data at foundation and anchor depths. Future deep foundation investigations will include observation of groundwater, if encountered.

Q In your professional opinion, would negative impacts to groundwater occur as a result of this Project?

A Construction and operation of the Project would have minimal negative impacts to groundwater. Any impacts due to construction of deep foundations for the towers would be proximal to the tower locations and would not likely affect the regional groundwater tables. For operations, a well would be installed by a licensed installer to

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serve the operations and maintenance facility. A well using less than 5,000 gallons of water a day, and thus exempt from permit requirements in RCW 90.44.040, would be installed to provide water for use to the operations and maintenance building. The well would be installed by a well contractor licensed pursuant to Chapter 173-162 WAC, and in compliance with the requirements and standards of Chapter 173-160 WAC. The well would be installed consistent with Skamania County Community Development Department and Ecology requirements for the new wells. This well would provide water for bathroom and kitchen use and is expected to consume less than 5,000 gpd. It is unlikely that the Project water use would have a direct effect on groundwater quantity, quality, and flow direction in the immediate area below the proposed facilities. Although the impervious surfaces would increase slightly with the construction of the Project, they are not expected to be significant enough to notably affect the water recharge and runoff on site. Therefore, negative impacts to the hydrologic setting within the Whistling Ridge Energy Project site are considered negligible.

Q Would the well to be installed for the operations and maintenance facility also be used as a source of water for construction?

A No.

Q Do you anticipate impacts to public or private water supplies as a result of this Project?

A No impacts to public water supplies and no adverse impacts to private water supplies (water wells) are expected.

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