BEFORE THE STATE OF WASHINGTON

ENERGY FACILITY SITE EVALUATION COUNCIL

In the Matter of Application No. 2009-01 of WHISTLING RIDGE ENERGY LLC for WHISTLING RIDGE ENERGY PROJECT	EXHIBIT NO. 21.00 PREFILED DIRECT TESTIMONY OF DEAN APOSTOL

PREFILED DIRECT TESTIMONY OF WITNESS # 21
DEAN APOSTOL

ON BEHALF OF

INTERVENORS FRIENDS OF THE COLUMBIA GORGE
AND SAVE OUR SCENIC AREA

Q. Please state your name and address.

A. My name is Dean Apostol. My business address is 815 SW 2nd Ave., Suite 200, Portland, OR 97204.

Q. What is your professional occupation, experience, and areas of expertise?

A. I am a professional landscape architect with over 31 years experience. I am currently employed as a Senior Landscape Architect by MIG Inc., a multi-disciplinary planning and design firm with over 100 staff in California and Oregon. My areas of professional emphasis include scenic resource assessment, natural resource planning, landscape ecology and ecological restoration. My clients have included numerous government bodies, non-profit organizations, and private businesses, including the Oregon Department of Transportation, the U.S. Forest Service, the National Park Service, the Washington Forest

Law Center, the Forest Stewardship Council, Metro (regional government for the greater Portland metropolitan area), Friends of the Columbia Gorge, and several private landowners located within the Columbia River Gorge National Scenic Area. Prior to entering private practice in 1996, I was chief landscape architect at Mt. Hood National Forest. My work included having the lead role for management of scenic resources and implementation of scenic resource management principles, and design of several projects within the Columbia River Gorge. A more complete resume has been included as Exhibit 21.01.

Q. Have you reviewed the Aesthetics section in the Whistling Ridge Energy Project Application for Site Certification?

A. I have reviewed the sections of the WREP Application that address scenic impacts, including maps, drawings, photos and simulations.

Q. Although the Draft Environmental Impact Statement is not being reviewed in this proceeding, the contents of that analysis may be relevant to your testimony. Have you reviewed the aesthetic impacts analysis in the DEIS?

A. I have reviewed the sections of the WREP DEIS that address scenic impacts, including the maps, drawings, photos and simulations.

Q. Have you reviewed the testimony of the WREP witnesses Dautis D. Pearson, Chris Watson, and Tom Watson?

A. Yes.

Q. Are you familiar with the area that would be affected by the proposed development?

A. I am familiar with the general area from previous work in the Gorge, including recent visits to the area.

Q. Could you describe the project, the project site, and the surrounding landscape?

A. The proposal is to construct a wind energy project in the southeast portion of Skamania County, Washington, north and west of Underwood Mountain. Up to 50 commercial scale wind turbines are proposed on forested land owned by SDS and Broughton Lumber

Companies. According to the Application, the total land area involved is 1,152 acres, of which about 384 acres would be developed with turbines and associated facilities and roads. The proposed towers would each be over 400 feet tall measured to the blade tip, each with three blades up to or over 150 feet long. Many of the turbines would likely be required to have flashing aviation lights. Analysis by the proponent demonstrates that many or most of the proposed turbines would be visible from multiple Key Viewing Areas (KVAs) within the Columbia River Gorge National Scenic Area, as well as from other public and private viewpoints.

The project site lies within the Cascade Mountain Range, and is at the western edge of the Columbia Plateau. The site includes a series of ridges west of White Salmon that orient generally northwest to southeast and overlook the Columbia River and Hood River, Oregon. The ridges are bound to the east by the White Salmon River and to the west by the Little White Salmon River. Current land use of the project site is commercial timber and is a patchwork of forest, brushfields, and meadows in varying stages of regeneration from timber harvest. The surrounding area includes dramatic mountain and gorge vistas, steep rocky cliffs, pastoral lands, open space areas, recreational lands, and the Columbia River. Landforms in the vicinity are steep, complex and dissected by deep ravines.

Q. Could you provide a general description of modern industrial wind energy facilities and how those facilities can affect aesthetic resources?

A. Wind energy is still a relatively new type of land development, both in the Pacific Northwest and nationally. The first large-scale commercial wind energy project in the United States appeared at San Gorgonio Pass near Palm Springs, California in the early 1980s. This project and others in California (Altamont and Tehachapi passes) were and still are controversial, with aesthetic impacts often noted as a serious issue. The past few years have seen a significant increase in wind energy development nationally and within Washington and Oregon. Parts of the Pacific Northwest region, most notably the Columbia Basin, have already been visually transformed by the sheer number of turbines installed. Wind energy projects are land extensive, with single turbines needing 50 or more acres of free space around them, depending on the topography. If present trends continue, hundreds of thousands of acres in Oregon and Washington will be developed with wind turbines within the next decade. Valued landscapes will be transformed from open, rural or wild to what is essentially an industrial appearance.

The fundamental aesthetic problem of commercial wind energy development is that it introduces very large-scale, modern, industrial structures into rural, semi-natural, or wild landscapes. *Due to their large scale and unique appearance, modern wind turbines by their very nature result in high visual contrast to most landscapes. High contrast* normally results in *high impacts* to scenery. Wind turbines challenge conventional

approaches to scenic resource conservation, which rely on eliminating or reducing the contrast of built facilities or landscape alterations. In most cases modern wind turbines cannot reasonably be "visually blended" into natural or cultural landscapes. They are inherently visually dominant due to their huge scale, unique appearance, high color contrast, moving parts and the need for lighting for aviation safety.

Q. How does the size and visual character of modern wind facilities fit in with rural, undeveloped, or natural landscapes?

A. Commercial wind turbines are *very* large, out of scale with anything in the landscape surrounding the project site. They are nearly as tall as the tallest buildings in downtown Portland, and do not resemble any rural building or structure in existence. Modern wind towers and blades are nothing like the historic, small-scale, vernacular, water-lift windmills of the Netherlands or Nebraska. They are sleek, industrial facilities, large enough, different enough, and high contrast enough, to transform landscapes from predominantly natural or rural into an industrial scene.

Wind turbines are not designed to be place-sensitive. Energy companies are focused on maximizing productivity and minimizing costs. Thus, a one size fits all approach is used, and custom design that fits a particular location is almost never considered. Wind facilities are context-free, and the structures look the same anywhere. While they are perfectly appropriate as an expression of their own function, like a jet aircraft, they do not aesthetically fit in many landscapes.

Q. What constitutes a scenic landscape, how are these objectively determined, and how do modern wind turbines fit within them?

A. Scenic landscapes are determined either directly or indirectly by public preference. Scenic landscapes are sometimes officially recognized through local, state, or federal designations, including the Columbia Gorge NSA. "Scenery" can be defined as: *the general appearance of a place or its natural features from a picturesque point of view.*" Research and practice have shown that most people within our cultural context prefer natural landscapes that exhibit complexity and diversity at large scales. Simple, flat, bland landscapes are less valued for scenery. Think of the difference between places like the Columbia Gorge and Oregon Coast and places like central Nebraska. The first two are highly valued for their scenic attributes, while the latter one is not.

The objective elements of landscapes that provide scenic qualities include the basic elements of *form, line, color and texture*, which together provide the visual identity of a place. *Forms* result from large and small scale elements interacting to create spaces. They

can be regular or irregular, curvilinear or geometric. *Lines* are linear features, like rivers, ridges, or the edge of a meadow. *Natural colors* include greens, browns, grays, tans and blues. *Textures* can be rough, smooth, fine or coarse grained. To the extent that landscape changes or new objects or structures repeat these elements, contrast is reduced between a proposed development and natural landscape character. *Less contrast generally means less of a visual impact*. It's not hard to understand how large arrays of modern wind turbines dominate over the form, line, color and texture of scenic, natural, and cultural landscapes. It is extremely difficult to relate them to existing landforms, vegetation patterns, and natural lines in ways that reinforce or harmonize, much less blend in. Turbine arrays introduce strong vertical lines and have a color and texture unlike anything that is found in most natural landscapes. The moving parts and flashing aviation lighting increase the contrast and draw attention away from landforms.

Q. Could you describe some of the key factors in assessing the visual impacts of wind turbines?

A. Key factors in assessing the visual impact of wind turbines include the following:

- The number of visible turbines and the extent to which they dominate vertically and horizontally.
- The visual coherence or sense of order they present. Because they tend to be so prominent, turbines should "make sense" within the view. Chaotic clusters appear incoherent, or make less visual sense, than orderly arrangements.
- Wind turbines appear more coherent in simple, open, low relief landscapes like farm, prairie or rangeland. They appear out of place in highly complex landscapes with lots of vertical relief and diverse vegetation patterns, like those of the Columbia Gorge.
- In mountainous landscapes turbines are more likely to break the skyline from scenic viewing areas, which draws more attention to the structures than if they were located in flat terrain without a skyline affect. Breaking the skyline means they protrude above natural high points, which are the most visually prominent features in most landscapes.
- The moving blades on wind turbines draw more attention and increase contrast with surrounding landforms.
- Roads and power lines serving turbines are can add substantially to visual impacts of wind energy developments.
- Turbine placement may include other landscape disruptions, particularly forest clearing.
- FAA-required turbine lighting is designed to draw attention to turbines from miles away, which necessarily makes wind turbines highly contrasting when the lights are on.

There is little question that the vertical and horizontal scale of modern wind turbines has the power to visually transform entire landscapes, as has already happened just east of the CRGNSA. The huge size of individual towers, the horizontal scale of large projects, the large moving parts, and aviation lighting can create substantial impacts even when viewed from distances of 10 miles or more.

Q. How does siting wind turbines on ridgelines affect scenic resources?

A. Ridgelines are places where the land meets the sky and where the viewer's eye is naturally drawn. When people scan a landscape, their eyes tend to move up the valleys and down the ridges. Wind turbines, including those proposed for the Whistling Ridge Energy Project, are often located on high, visually prominent topographic points, particularly long ridges, causing them to extend far above the horizon and create "skyline" impacts that accentuate their visibility. This detracts from surrounding landforms, even if the ridgeline is farther away and there are more attractive features closer to the viewer. In other words, the eye will tend to "hang up" on the skylined turbines because they are at prominent locations within the view. One reason wind turbines look more at home on flat or gently rolling topography is the absence of conflict with prominent land forms. In prairie landscapes, it is more natural for the eye to keep sweeping across the wise horizon. Since there are no prominent landforms, the turbines do not stand out in the same way.

Q. How does the movement of turbine blades affect scenic resources?

A. The rotating blades of wind turbines are a unique feature that attracts additional attention. The human eye is naturally drawn towards movement. This movement draws more attention and increases visual contrast and thus impacts.

Q. How does aviation safety lighting affect scenic resources?

A. Lighting accentuates visual impacts and extends them to all hours. FAA safety lighting is designed to draw attention to flight hazards. As such, safety lighting is inherently high contrast, if lighting was not highly contrasting it would not be serving its purpose. The impacts of nighttime lighting can extend through dusk and dawn, and can affect sunset and sunrise views. Introducing highly contrasting flashing lights into natural landscapes can significantly degrade visual quality.

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Q. Would it be safe to say that moving parts and flashing lights breaking the skyline of scenic landscapes generally causes significant impacts to visual resources?

A. It is safe to assume that to the extent moving parts and flashing lights extend above a visually prominent landform, scenic impacts will be compounded and will distract viewers from natural landforms or other attractive features well below the skyline.

Q. You've previously said that you reviewed the visual analysis in the WREP Application. Do you think the analysis used appropriate visual assessment methodologies and were those methodologies implemented properly?

A. On page 4.2-27 the Application states, "It assesses the potential for visual impacts using accepted methods of evaluating landscape quality and predicts the type and degree of effects the project likely would have on those attributes." Two methods were used: The U.S. Forest Service Landscape Aesthetics Handbook and the Federal Highway Administration (FHWA) process for visual impact assessment.

In my opinion, the FHWA method is not a suitable method for evaluating the visual impacts of wind energy projects in general, and this project in particular. The FHWA visual impact system was designed to be used *only for assessing impacts from highway related development*. It contains no process or method for assessing the visual contrast presented by wind turbines or other energy facilities (such as power lines). This is stated in the very title of the FHWA manual: *Visual Impact Assessment* *for Highway Projects*, and is explicitly noted in the opening sentence on page one: "This field guide is intended to help those who prepare or review the coverage of visual impacts in environmental assessments *for highway projects*" (emphasis added). This limitation is repeated throughout the FHWA's manual. Compared to the Forest Service and BLM methods, the FHWA process is not as flexible and cannot be easily adapted to different project types. The mere fact that other wind projects have used it in the past does not justify its continued misapplication. I'll add that for other wind projects I've reviewed, including Windy Flats, Windy Flats West, and Steens Mountain projects, the applicants used the BLM manual for their analysis of scenic impacts. BLM has developed a programmatic EIS that specifically addresses visual impacts of wind turbines, and has created guidelines for assessing and mitigating visual impacts of wind turbines. As far as I know, the FHWA method has never been updated to address impacts from wind energy development.

Like all visual impact assessment methods, the FHWA contains terminology, approaches and ideas that can be borrowed or used elsewhere, but the proponent seems to have gone beyond mere borrowing and has assumed this method is more adaptable than it is. Also, by borrowing and adapting FHWA terminology, many of the principles are distorted and incomplete or erroneous analysis is generated.

Both the Forest Service and BLM visual assessment methods were designed and have been gradually adapted and refined to address numerous impact types. Though neither method initially anticipated giant commercial wind turbines, both have been used for years to review utilities, dams, mining and other energy related infrastructure. The Forest Service method includes separate handbooks for assessing and mitigating visual impacts from utilities, including microwave towers and transmission lines, as well as roads. The BLM visual contrast method has proven to be very useful, and as mentioned has already been adapted to assessing wind turbine and other energy development.

Q. Even if you think the FHWA methodology is inappropriate for evaluating the project, were there any flaws in the analysis?

A. Yes. For example, the FHWA handbook specifically notes that some places: "are already officially designated – national parks and scenic rivers, for example. This may be considered proof of high visual quality, and *a first approach to establishing the visual quality of a project area is simply to check for designated scenic areas.*" U.S. DOT, Visual Impact Assessment for Highway Projects at 46 (1988) (emphasis added). Thus, the first step in analyzing scenic quality should have been to acknowledge that views from within the National Scenic Area, particularly those seen from designated Key Viewing Areas (KVAs) are at least high sensitivity by definition. Instead the Application attempts to recreate visual quality assessments for the affected viewpoints.

Additionally, the measurements the Applicant used for assessing visual quality are unclear. For example, Table 4.2-4 provides a "Landscape Scenic Quality Scale" that incorporates elements from the both FHWA and Forest Service methodologies, but doesn't specify which elements were used and which ones were created by the Applicant. Rather than relying on tested principles, the Application appears to be reinventing the wheel. Also, as mentioned Table 4.2-4 skips the "first step in analyzing scenic quality" as provided by the FHWA handbook, which is that designated scenic areas are high quality scenic landscapes.

Another flaw with Table 4.2-4 and how Table 4.2-4 was implemented for scenic quality evaluations is that it inappropriately uses a comparative analysis to determine the quality of views. Table 4.2-4 describes scenic quality ratings 1 (low) through 6 (outstanding). It states that "each viewpoint was assigned a final rating based on the scale." In part, placement on the scale is determined by whether a view is "below average" or "above average." But what is the base point for averaging? A landscape is considered scenic based on its intrinsic qualities within a regional context. Every landscape region has places that are more inherently scenic than other places. In the Washington Cascade Mountains for example, steep, rugged, complex and diverse landscapes, especially those with water features, rank higher on scenic quality scales than do areas in the same region that have

gentle terrain, continuous and less diverse vegetation cover and no visible water. This isn't based on averaging aesthetic quality, but is rather based on documenting the presence or absence of aesthetic attributes of the landscape. Both the BLM and Forest Service methods are useful in assessing the intrinsic scenic quality of landscapes within given ecological regions and subregions. These sources and materials should be used or their pre-existing analyses for this area relied upon so that scenic impacts can be properly evaluated and understood.

The Application's analysis downplays the visual prominence of the series of landforms and water bodies that comprise the project area and surrounding landscape, including Whistling Ridge, Saddleback Mountain, Underwood Mountain, Underwood Bluff, Chemawa Hill, Dog Mountain, Cook Hill, the Little White Salmon River, the White Salmon River, and rock faces and vegetation patterns that increase visual interest to these landforms. These are prominent and important focal features. The visual integrity of some of these landforms has been somewhat compromised due to housing development, timber harvest and utility line construction, but that does not make them less important or less visible.

The Application's failure to properly analyze the impacted area's landscape character is an important omission because landscape character is the baseline from which changes or contrasts are determined. Natural and cultural landscapes have identifiable form, line, color and texture characteristics that can be documented and described. The extent to which a development either blends or contrasts with these characteristics is a key basis for understanding impacts.

Q: Are you familiar with the scenic resource inventories for the CRGNSA, created by the Forest Service and Gorge Commission, and are you familiar with the scenic resource management policies and guidelines in the CRGNSA Management Plan?

A: Yes. I have reviewed the inventories and I am familiar with the Scenic Area guidelines from previous work. Relevant portions of the inventory maps are included as Exhibit 21.06.

Q: Are you familiar with the Forest Service's Visual Management System (VMS)?

A: Yes. I have worked with the VMS throughout my career. It is the scenic resource management methodology provided in the Forest Service's "National Forests Landscape Management Vol. 2" (Agriculture Handbook 462).

Q: Are you familiar with the concept of Visual Quality Objectives (VQOs)?

A: Yes. Visual Quality Objective, or VQO, is a term used to describe the goal for managing a scenic landscape.

Q: Have VQOs been established for Scenic Area landscapes?

A: Yes. In the CRGNSA Management Plan, VQOs are articulated as development standards, namely the visually subordinate standard for the General Management Area and the visually subordinate and not visually evident standards for Special Management Areas. Visually subordinate is equivalent to partial retention, and not visually evident is equivalent to retention.

Q: In your opinion, completely independent of any regulatory considerations, can these inventories, maps, and VQO guidelines be used to help measure the scenic impacts of the Whistling Ridge Project, even thought the proposed wind turbines would be sited outside the National Scenic Area?

A: Yes, I think they can and should be used to help assess impacts. The analysis in the Application attempted to rate the visual quality of viewsheds seen from several KVAs. The visual resource inventory maps provide a baseline analysis of the visual qualities of this area. These maps are very detailed and were developed by highly qualified agency experts in scenic assessment. I see no reason why these visual inventories should not be used for this project. Using the existing inventory data and ensuing resource protection guidelines is an efficient and accurate way of understanding potential impacts to the views from within the Scenic Area. A key point here is that while the Scenic Area Act regulates projects only within the CRGNSA boundaries, the viewsheds extend well past these boundaries. Viewers standing inside the Scenic Area do not change their expectation based on a boundary they cannot see and probably don't know even exists. The Scenic Area inventories show that the potentially affected viewsheds have high intrinsic scenic qualities, and that these qualities extend beyond the legislative boundary. While the proposed turbines would be located outside the Scenic Area, they would clearly impact the views from within. As far as visitors to the CRGNSA are concerned, the impacts are the same whether the development is occurring inside a designated Scenic Area or just outside of it. So yes, it would be helpful to use the Scenic Area inventories to help understand the impacts.

Q: What can you tell us about the scenic resource development standards "not visually evident" and "visually subordinate?"

A. The *visually subordinate standard*, used within the CRGNSA, is a very useful tool to help measure impacts. First, the standard itself was established through a rigorous process that evaluated the sensitivity of various places within the Scenic Area. Roads, trails, and viewpoints with high levels of use, and those with viewers who are most sensitive to landscape quality, were designated as Key Viewing Areas (KVAs). Visual subordinance means that a proposed project must not noticeably contrast over the natural form, line, color, and texture of the land in view. It provides a qualitative benchmark that can be measured using objective methods. And, this standard reflects the sensitivity of the viewer and viewsheds in question here.

If a development is located just outside of the Scenic Area boundary, but is visible from KVAs within, that means it is seen by the same numbers and types of viewers that the Scenic Area was established to protect. A project that fails to be visually subordinate from a KVA (or multiple KVAs in this case) by definition will thus have a high impact on scenic resources.

Q: Are any other Scenic Area guidelines relevant for evaluating the scenic impacts of this project?

A: Yes. Some examples of relevant Scenic Area guidelines include a requirement that new development must not break the skyline of views seen from Key Viewing Areas, and a requirement that lights must be screened from view from KVAs. These rules were developed because experience shows that it is very hard for projects that break the skyline or that have bright lighting to be visually subordinate. Projects like Whistling Ridge, with multiple structures extending well above the skyline, are assumed to not be visually subordinate, which is why they are prohibited outright within the Scenic Area itself.

Q. The National Forest Service and the National Park Service have both commented on this project. Have you reviewed those letters? If so, could you share your observations about them?

A. I have reviewed the comment letters from the Forest Service and the Park Service, which are included as Exhibits 21.02, 21,03, 21.04, and 21.05. I agree with the observations and recommendations of both agencies, which point out that the project would likely cause significant impacts to the Scenic Area. The comments are consistent with the principles of aesthetic impacts analysis. The measures proposed to reduce impacts would help reduce the scenic impacts of the development.

Q. Could you provide more detail on how one uses landscape character and visual quality assessments to evaluate impacts to views?

A. Understanding the character and visual quality of a landscape helps in evaluating the extent to which a proposed development will likely contrast with that landscape. In the BLM method, an objective measurement of contrast is combined with viewer sensitivity to determine the likely level of impact. A number of factors should be considered, including distance, view angle, view duration, project size, atmospheric conditions and motion (i.e. spinning blades). Visual contrast is a useful way of measuring impacts regardless of whether a resource management objective has been established, because it relies on simple and time-tested, objective, analytical standards, summarized below from BLM Manual 8431, Visual Contrast Rating:

Degree of Contrast	**Criteria**
None	The element (*i.e.* wind turbines) contrast is not visible or perceived.
Weak	The element contrast can be seen but does not attract attention.
Moderate	The element contrast begins to attract attention and begins to dominate.
Strong	The element contrast demands attention, will not be overlooked, and is dominant.

Note that measuring contrast does not involve having an assigned protection objective. The Applicant makes the argument that it used the FHWA method because visual quality management objectives have not been assigned to the Whistling Ridge Area. But measuring visual contrast is useful in any case, and the Applicant failed to do this.

The Forest Service method (*Landscape Aesthetics, A Handbook for Scenery Management*) has similar applicability, but substitutes the terms Retention (no contrast), Partial Retention (weak contrast), Modification (moderate contrast) and Unacceptable modification (strong contrast). Either of these methods is appropriate for use on the Whistling Ridge project. Depending on the quality of a viewshed and viewer sensitivity, development with weak, moderate, or strong contrast may have high impacts on visual resources. As I have already pointed out, viewer sensitivity is clearly high in this case.

Q: So if the Scenic Area standards are used as a measuring stick, how would you translate those standards into the BLM or Forest Service methodologies, recognizing that visually subordinate equals a partial retention VQO?

A: "Visually subordinate" corresponds to "partial retention" under the Forest Service method, and "weak contrast" under the BLM method. In order for a project to achieve this standard, it could be seen but would not be so prominent or contrasting as to attract attention and become a dominant element. If it remains sub-dominant, then one could reasonably conclude that it would have a low to moderate impact. A development that has moderate or high contrast seen from a sensitive viewpoint or corridor would by definition have a high impact.

Q: On pages 4.2-28–4.2-29, the Application states that "Scenic quality ratings were based on observations in the field, photographs of the affected area, methods for assessing visual quality, *and research on public perceptions of the environment*…" (emphasis added). Do you have any observations about this statement, particularly the part about public perceptions of the environment?

A: With respect to public perceptions, commercial wind project proposals in scenic landscapes tend to generate a lot of public concern and opposition, while proposals in less scenic areas generate very little opposition. For example, Cape Wind (off Cape Cod), several wind projects in New England and upstate New York, previous projects along the Columbia River Gorge National Scenic Area, including the abandoned Cascade Wind proposal not far from the WREP site in Wasco County, projects proposed near the Wallowas and Steens Mountains in Oregon, and those in coastal areas have raised significant public opposition.

In contrast, multiple projects proposed and built in the open range and farm land of the Columbia Basin and in the Plains States have generated very little opposition based on aesthetic impact. This experience suggests that much if not most of the public is uncomfortable with the scenic impacts of commercial-scale wind energy projects in natural or rural landscapes valued for their scenic qualities. They are accepting of wind energy development in less scenic areas because they are not as highly valued for scenery. This suggests that there are objective, commonly held perceptions of what is scenic and where commercial wind energy belongs and doesn't belong with respect to scenic impacts.

The Columbia River Gorge is clearly valued for its scenic qualities, both natural and cultural. It is a federally protected national scenic area. It has a unique bi-state commission that plans, regulates, and monitors to protect scenic quality. The American Society of Landscape Architects has identified the Columbia River Gorge as one of the most outstanding landscapes in the United States, ranking it along with Yosemite,

Yellowstone and other national icons. Clearly, the public has already weighed in on the issue of whether the Gorge is scenic and merits conservation, and the answer is "yes." The public's perception of the affected environment reinforces the conclusion that Scenic Area viewsheds have high or outstanding visual quality based on objective measurements.

Q. Does the Application do an adequate job of analyzing viewer sensitivity?

A. Given that the project borders on a federally protected National Scenic Area, and that Key Viewing Areas and Visual Quality Objectives have already been established for this landscape, there seems little need to create new assumptions about sensitivity from these viewpoints. *All KVAs are by definition high sensitivity*. This definition of high sensitivity viewpoints at page 3-159 in the Draft Environmental Impact Statement supports this conclusion:

> "**High**. Residential, recreational and viewers congregating in public viewing areas (churches, schools, *designated scenic viewpoints*, etc.) are considered to have comparatively high visual sensitivity." (emphasis added).

It should be crystal clear that viewers from KVAs and similarly *designated viewpoints* and view corridors are highly sensitive to scenic quality. There is no need to reevaluate this question. It's a given.

Q: On pages 4.2-30–4.2-31, the Application factors in distance in measuring viewer sensitivity. For example, the designation of a "high" sensitivity viewer is generally reserved for when the project would be visible within 0.5 miles of the viewpoint. Is this appropriate?

A: The Application is in error by associating the distance between the viewer and the proposed facility as a factor in evaluating viewer sensitivity. Contrary to the statements on pages 4.2-30–4.2-31, sensitivity is not related to distance. A KVA, by definition, is a high sensitivity viewpoint, regardless of the distance to the object viewed. Viewpoints are inherently sensitive or not, regardless of the distance to a development. What is changed by distance is the degree of contrast experienced. At greater distances, contrast is reduced and thus visual impacts normally decrease.

Q: On page 4.2-34, the Application states, "Each viewpoint was assessed using the methodology described in Section 4.2.3.1, Methodology, as well as for its scenic quality and viewer sensitivity, and a rating was applied to provide an overall average for the

area." Do you have any thoughts on the notion of basing the impacts analysis on "an overall average for the area?"

A: Viewer sensitivity, as previously stated, should be presumed to be high for any KVA. That is exactly why they were designated KVAs in the first place. There is no such thing as an "overall average" with respect to scenic quality. One cannot average the scenic quality or impacts among differing viewpoints. Each must be assessed on its own merits.

For viewpoints outside of the Scenic Area (*i.e.*, Husum) some analysis on sensitivity is helpful to understanding the scenic impacts of the proposed development. Viewpoints outside the Scenic Area, such as recreational trails in the Gifford Pinchot National Forest and on lands owned by the Washington Department of Natural Resources, also likely have a high sensitivity. Time could have been spent evaluating sensitivity of non-designated viewpoints, but once a viewpoint has been designated as sensitive (*e.g.*, a KVA) there is no reason to reevaluate its sensitivity. Its sensitivity has already been determined.

Q. At page 4.2-65, the Application describes a "High Level of Impact" as follows:

> High levels of impact were assigned in situations in which turbines would be highly visible in areas with a high number of sensitive viewers, and would greatly alter levels of vividness, unity, and intactness, decreasing the level of visual quality. This is the largest number of viewers from that key viewpoint. The assessment does account for the number of viewers and would add that into the discussion.

What is your opinion of this description?

A. First, the description asserts that turbines would need to be "highly visible" to have high impacts. However, depending on the quality of the view and the sensitivity of viewers, turbines may only need to be moderately visible to have a moderate to high level of contrast and impact. Under the BLM methodology, "moderate" contrast could be sufficient to cause high impacts. Similarly, turbines that are not visually subordinate as seen from KVAs can have high impacts.

Next, the Application states that there needs to be a high number of sensitive viewers. The total number of viewers is not conclusive of a high level of impact. For example, the Forest Service methodology specifically identified situations where development can cause high levels of impacts even if there are few viewers. An example is designated wilderness or scenic areas where there may be very few viewers from a particular viewpoint but they have very high sensitivity. Any contrasting development in such locations would have a high level of impact for that group. So "high numbers" is not the only measure of high

impacts. There is value in identifying both the number and type of viewers, but small numbers alone should not be used to conclude that impacts are low.

Along the same lines, the Application states that "This is the largest number of viewers from that key viewpoint." I'm not sure what this means. If it means that only viewpoints with high numbers of viewers can be classified as high impact, then I'd say this is incorrect.

The Application also states that the development would need to "*greatly* alter . . . the visual quality" to be deemed a high impact (emphasis added). Again, even if development is moderately contrasting, it can draw attention from high quality visual landscapes as seen by highly sensitive viewers. In such cases the impacts could be considered high. "Great" alterations are not a prerequisite for high impacts to high-value scenic viewsheds

Q. On pages 4.2-65–4.2-66, the Application states, "While a particular viewpoint may be characterized as having a "high" impact, that impact may be experienced by a relatively small number of individuals, or relate to a small portion of the project, and it does not account for the overall benefits of the project." Do you have any opinions as to the accuracy or relevancy of this statement?

A. Again, the number of viewers is not conclusive to the assessment of impacts. Small numbers of viewers may have sufficiently high levels of sensitivity to warrant a conclusion that impacts are high. Nonetheless, given the enormous number of highly sensitive viewers visiting KVAs in the Scenic Area, that there are high numbers of sensitive viewers shouldn't be in dispute.

The comment about "a small portion of the project" is also misleading. The portion of the project that is visible is not very informative of whether there is a significant visual impact. The portion of the project that is *not* visible is irrelevant to an evaluation of visual impacts of the portion of the project that *is* visible. A small portion of a project may still have high impacts based on contrast, the quality of the scenic landscape, and the sensitivity of viewers. The question that matters is how high of a contrast the "small portion" of a project that is visible creates.

With respect to the statement that levels of impact "do not account for the overall benefits of the projects," I'm unclear on what this statement is getting at. It appears to be focusing on other social benefits rather than aesthetic impacts. *The overall societal benefits of a project should have no bearing on evaluating visual impacts*. Overall benefits are relevant to decision makers weighing whether or not to approve a project, but this should not affect an objective analysis of the direct visual impacts of the project. The visual impacts

are what they are. They should not be deliberately downplayed to help justify a project on other grounds.

It appears that this sentence implies that significant adverse impacts from this project should be discounted based on a balancing of the benefits against an impact to a small group of people. This may be an entirely appropriate question for policy makers to address, but it is not helpful in analyzing the actual visual impacts of the project and should not be included in the visual impact analysis or discussion. Moreover, the adverse scenic impacts in this case would affect a large number of people, given that the CRGNSA is an internationally recognized tourist destination.

Q. The quote in the previous question is accompanied by a footnote that states, "Additionally, for reasons related to commercial viability and engineering feasibility, the project is proposed as an integrated whole, not a series of separate components where parts of the whole may be removed due to subjective, perceived visual effects." Do you have any opinions as to the accuracy or relevancy of this statement?

A. First, I do not understand why such a statement is included in the "Aesthetics" chapter of this Application, which claims to apply standardized, long-tested, and objective methodologies for evaluating visual impacts. The writers seem to be characterizing their own conclusions as "subjective, perceived visual effects." Any characterization of what should be an objective visual impacts analysis as subjective is contrary to the accepted principles of scenic impact assessment.

This is an important point that is often overlooked in debates about the pros and cons of any particular commercial wind development project. While individual perceptions of beauty have a degree of subjectivity, visual management systems used to analyze impacts account for subjectivity in evaluating viewer expectations. Visual management and assessment methods have been developed over many years to incorporate subjective, individual expectations about scenery into a wider objective evaluation. There are norms of human perception about what is scenic what is not. The best way to explain it is that we have very few legislatively protected scenic landscapes in the United States, and in the world for that matter. These are protected only because they elicit widespread agreement about their scenic qualities. Recognition of an area as scenic is an affirmation that landscape aesthetics are objective and belong to society. Once an area has been recognized as scenic, then objective methods are used to determine the extent to which a development project is visible and might contrast with the scenery. Professional impact analyses that properly implement visual resource management methodologies should be objective assessments. There can be professional disagreements within an objective analysis, as there is with any social science question. But these disagreements should be narrow, not wide, assuming a proper analysis has been done.

In this case, I do not believe that the Application used standardized methods appropriately for the reasons previously stated. The subjectivity of the Application's findings is revealed by the quoted statement. But this does not mean that objective methods could not be objectively applied.

I don't have the expertise to comment on the commercial viability or engineering feasibility of the project, or whether this proposal as an integrated whole cann be modified or adapted. I can say that I have been involved in many projects over many years driven by value engineering and cost considerations, and that developers are reluctant to make any changes that may increase project costs. On numerous occasions, faced with opposition or objections that they could not overcome, these same developers and engineers have discovered that yes, come to think of it they could move this turbine out of view, or slide the transmission line down the hill a bit, or remove fewer trees, or fill in the blank. In other words, I would advise the decision-making authorities to not take assertions about the inability to modify a project at face value. Projects of this magnitude are seldom take it or leave it. There is usually room to make changes to help mitigate or avoid resource damage.

Q. Figure 4.2-5 is a map showing the potential visibility of the proposed turbines from the surrounding landscapes and identifies the location of various visual simulation viewpoints. At page 4.2-34 the Application states that, "individual viewpoints were chosen as being the most representative views for the different roads, population areas, and recreation areas where views of the wind turbines would occur." What is the value of this type of map, and do you have any observations about how well the selected viewpoints represent views in the area?

A. This map is useful in assessing the potential visibility of proposed turbines from within the National Scenic Area and other affected views. One flaw is that the map and viewpoint selection fails to note the full extent to which the turbines would be exposed to Key Viewing Areas. The analysis treats the scenic impact problem as a *viewpoint impact* as opposed to a *view corridor* impact, but several of the affected KVAs are corridors, not single points. These corridors include designated scenic roads and the Columbia River. A proper analysis would analyze the distance along the entire length of these KVAs from which the project would be visible and would simulate views from several points along them in order to identify where the greatest impacts are likely to occur.

Based on my knowledge of the area and experience conducting visual impact assessments both inside and outside of the Gorge, the viewpoints chosen for analysis may not be sufficient to determine impacts. I-84, the Columbia River, and the Historic Columbia River Highway all have multiple possible view locations that may experience greater

impacts than the single locations chosen for modeling by the Applicant. There should be data on the total length of each KVA visually exposed to the turbines and other project elements. Each of these view corridors runs within 3 miles of the project, yet all sample viewpoints are more than 4 miles from the project. Additional views along these KVAs should have been analyzed. For example, simulations from the Historic Columbia River Highway at Mitchell Point and at Ruthton Point, directly across the Columbia River from the project would be helpful in capturing representative views. A good representative set of simulations should include the logical worst-case impacts. As it stands, the Application seems to avoid worst-case impacts analysis.

Q. The Application includes visual simulations, or photomontages. Could you explain the benefits and problems with the use of photomontages?

A. The Applicant is relying heavily on the selected viewpoints, simulations, and photomontages to determine the level of impact. Regulatory reviewers of this proposal, as well as concerned members of the public, need to understand the inherent limits of simulations and photomontages.

First, the choice of viewpoints is critical. As explained above, it is essential that the viewpoints are truly representative of the views available in the area. If one simulates views from inappropriate or too few viewpoints, the analysis is incomplete. Given the scale of this project and the number of viewpoints potentially affected, additional viewpoints should have been analyzed.

Second, simulations, no matter how well done, are not and cannot be true to life representations and should not be taken as such. The inherent limitations of photo simulations should have been discussed in the Application. Two-dimensional photo images cannot replicate the three-dimensional world, because people see stereoscopically and will view real-life turbines from within three-dimensional space, not as if they were painted upon a flat plane. Real world visual resolution is also much greater than what can be portrayed on a photo. *Brightness ratio* is a measure of contrast between the lightest and darkest elements in any given view. On a clear day, a viewer might experience a 1,000 to 1 brightness ratio. The same image on a computer monitor provides a 100 to 1, or at best 400 to 1 brightness ratio. Once this image is printed and placed in a report, the brightness ratio is further reduced. What this means is that a photographic image is inherently much lower contrast than what one would see in the real light of day. And since contrast is the key measure of impact, photo simulations tend to understate the impacts.

The optics of lenses and digital cameras can also create distortions. Page 4.2-31 of the Application states that "Visual simulations were developed using photographs taken with a 35 mm digital SLR camera. Various focal lengths from 40-70mm were used with the

intent to capture the maximum pixels and resolution for the simulation." A 50mm focal length approximates the field of vision and scale of what the human eye sees. A 40mm length shows a wider angle, and pushes an image farther away, while a 70mm length brings it closer to the viewer but narrows the range of vision. Stitching together several photos to create panoramic images can also distort distance unless the reproduced image compensates.

Additionally, the size of the image one looks at and the distance from which one views that image are crucial. Most people will view the photo simulations either on a computer monitor or on a printed page. Research indicates that to get a realistic sense of scale and distance, the original photo should be taken with a 70mm focal length and the image should be printed or viewed at a full page size, either 8 x 11 or 11 x 17 depending on the extent of the area being shown. If panoramic composites are created, even larger pages may be necessary. This is because most people need to hold an image 15 to 20 inches away from their eyes in order to be focused. Viewing a photo of an object several miles distant, and moving that photo a few inches away adds miles to the effective visual distance. The photomontages include both before and after photos on a single 8 x 11 page. This substantially increases the perceived distance between the viewer and the turbines in the simulation. Also, by clipping images together to create panoramas, the photomontages effectively make the turbines recede farther into the background than they would appear in reality. Between the selection of optics and the modifications necessary to present images on half of an 8 x 11 pages, the distortions in the Application area potentially substantial.

Another problem is that it is nearly impossible for people to judge the true scale of wind turbines when looking at photos of them taken from a distance of several miles. The problem is there is usually no clear frame of reference within the photo to measure the size of a turbine against. Unless there is something of known size near the turbines, a house or barn for example, one cannot tell if the turbines are 100 or several hundred feet tall.

Another problem is that the images included in the Application vary in scale. For example, the turbines appear larger or the same size in the simulation for viewpoint 3, a distance of 7.6 kilometers according to the DEIS, than they do for viewpoint 1, a distance of 6.4 kilometers according to the DEIS. How can this be? The turbines should appear to be noticeably larger in the closer view. The answer must be that the reproduced image provided, no matter what focal length was used, does not reflect the distance. This is also evident in comparing viewpoints 11 (14 km from nearest turbine) and 12 (11 km from the nearest turbine), which are similar view angles. The turbines in the simulation for viewpoint 12 appear smaller and farther away than those for viewpoint 11, even though the former is 3 kilometers nearer according to the data provided on in the DEIS. It's apparent that some combination of optics, composite panoramic imaging, and selected image size is affecting the scale of the image.

In short, the images provided are too few and too flawed to be determinative in assessing the potential visual impacts of the proposal.

Q. One of the Applicant's witnesses, Tom Watson, testified that he created some simulations by "photo stitching . . . multiple, overlapping, high focal length images" together to create more realistic panoramic simulations of the project. Tom Watson Testimony at 6. Do you see any risks of using this type of simulation?

A. Mr. Watson is correct that people do see in a wider angle of view than optics suggest. However, sticthing a panoramic image, while a commonly used and helpful procedure, can end up misleading the viewer. A stitched image normally has to be reduced to fit an 8 x11 size paper used in a printed report or viewed on a monitor. In effect, the image moves the project much farther from the viewer and lessens the visual impact by reducing the scale. The distance that the image is held from the viewer is not specified in the Application, but assuming one holds the image 15 to 20 inches from one's eyes, this can add miles of visual distance to the view being simulated. Since distance reduces contrast, the result underestimates the impacts. For composite panoramic simulations to accurately reflect real-world conditions they would need to be printed on a larger page than a single frame image. Some math is required to figure out the right size of the image to reflect the actual distance.

This potential distortion may explain some of the discrepancies I previously noted. At the least these distortions and qualifications should be noted in the Application. Otherwise the conclusions drawn from the simulations can be quite off, particularly with respect to scale.

Q. Tom Watson also testified that he has experience making animated simulations. Would this type of simulation have been helpful?

A. Yes, animations that include moving blades could be helpful. The issues of scale and distance still apply. Animated simulations could include flashing FAA aviation safety lighting as well.

I have reviewed animated wind energy simulations before, and found them to be useful. For example, Cannon Power prepared animated simulations for the proposed Windy Flats West project in Klickitat County. I was able to review these simulations, and I found them to be helpful in understanding the impacts and possible alternatives to individual turbine siting.

Visual impact analysis is always evolving, especially as technology improves. Industrial-scale wind energy development poses some unique problems in how to evaluate and

perhaps mitigate visual impacts. But the basics, that impacts result from introducing visual contrast in valued landscapes, remain the same. The higher the contrast, the higher the impact.

Q: One of the Applicant's witnesses, Dautis D. Pearson, testified that "Night simulations are inherently inaccurate, since they do not show the periodic flashing of the air warning lights." Pearson Testimony at 10. Do you have any observations about this statement?

A; This statement is accurate only with respect to static (*i.e.*, paper) simulations. Flashing lights *can* be simulated through the use of animations. I recommend the use of animations, to depict both the flashing lights and the moving blades of the turbines—aspects that cannot be replicated in a paper simulation.

Q. Please provide your impressions of the simulations and analysis of impacts of some of the selected viewpoints. For the photo simulations themselves, because the DEIS was created more recently and contains several simulations that differ from the Application based on the same viewpoints, feel free to refer to the DEIS photos. Let's start with Viewpoint 11. Could you provide your thoughts on the simulations and the impacts analysis?

A. First, I'd note that the DEIS includes "wireline" depictions of the project. This is a very helpful tool for analyzing impacts of wind projects. It helps avoid the misperceptions that occur when simulations are mistaken for accurate representations of real-world impacts. While distance and scale can still be distorted, the wireline images help focus attention on the way turbines are arrayed on the landscape. Much of the work on mitigating impacts from wind energy suggests that since the objects themselves are so hard to hide or mute (you can have any color as long as it is white), the way the turbines are arrayed is very important. Chaotic arrays have much higher impact than well ordered ones.

Looking at the before and after photos (DEIS Figure 3.9-8), one thing that is immediately apparent is that the boundary of the National Scenic Area is not relevant to the viewer. In other words, we have here a Key Viewing Area, a well traveled highway corridor, with a full-on view of the long ridgeline (Chemawa Hill to Whistling Ridge) that extends north from the Scenic Area Boundary. The prominent landform has good landscape qualities that are mostly natural-appearing. The after image shows multiple large white turbines that add a significant amount of contrast. But, the degree of contrast (and thus impact) depends greatly on 2 variables. One is the size of the image either on the screen or in print. What is the appropriate size given the actual distance? Should we view the image at 100% or 200% to get an accurate sense of scale? We do not know. I suspect neither does the Applicant.

Second, the image has white clouds right at the horizon line, where the turbines meet the sky. This is convenient for the Applicant in that it greatly reduces the contrast presented by the white turbines. The turbines would show stronger contrast against a blue or gray sky, both equally plausible in this location.

Third, the Application uses distance as a factor to evaluate viewer sensitivity, stating elsewhere that greater distance equals lower sensitivity. For reasons stated earlier, this is a misapplication of how distance affects scenic impacts. Distance tends to reduce visual contrast, but does not reduce viewer sensitivity. My own analysis of the before and after images, even given the inherent uncertainties they present, is that the visual contrast of the 25 turbines within the view is high, and that the visual sensitivity from this Key Viewing Area within a Federally designated National Scenic Area is by definition high. Therefore the impact is high.

On page 4.2-60 of the Application, the analysis also factored in references to "the portion of the project that is visible from the viewpoint." .This photo (Viewpoint 11) is a good illustration that this is not relevant to impacts. Who cares that we are seeing only 25 out of 50 total turbines? The viewer certainly does not care. She only cares about what she sees, and in this case she sees all or portions of 25 turbines. She doesn't care about the 25 or so other turbines she is not seeing.

The Application states that based on moderate visual quality and the apparent small size of the turbines based on distance, there would be minimal effects (Application at 4.2-70). For reasons stated, the apparent small size of the structures in the photos is misleading. Differences between the Application's photo images and those in the DEIS raise legitimate questions as to how large the turbines would actually look from this distance. Choosing a base photo with white clouds on the horizon line also understates the contrast and effects of the turbines that break the skyline.

Based on the somewhat more informative simulation in the DEIS (Figure 3.9-8), and including the wireline simulatios, the turbines with visible hubs clearly are visually dominant over the natural form, line, color, and texture of the existing landscape. They are high contrast, even given the inherent brightness ratio limitations of the photomontages. They have a strong skyline presence that draws attention to them. Spinning blades would increase their obvious visual dominance, as would flashing aviation lights during twilight conditions and at night.

A key problem from this viewpoint, best illustrated in the wireframes provided in the DEIS but also illustrated in the Application, is the chaotic, jumbled appearance of the turbines. They are bunched up and overlap each other, creating too much visual density, with too little space between individual turbines and clusters. The turbines viewed from this vantage point present a *very high contrast*. Given the huge number of viewers, long

view duration, and high sensitivity, the visual impact from the I-84 KVA and the adjacent Columbia River KVA in this area is very high.

I would like to point out here that on page 4.2-28 of the Application, it states, "The analysis includes a systematic documentation of the visual setting, evaluation of visual changes associated, *and measures designed to mitigate the visual effects*" (emphasis added). In visual management practice, especially related to commercial wind energy, the measures one could use to mitigate impacts like the ones illustrated here include removing or moving some or all of the turbines out of the view, rearranging the turbines within view to present a less chaotic appearance, and/or using color or other methods to reduce contrast. The Applicant offers none of these. Instead, the Applicant simply downplays the magnitude of the impacts.

Finally, although the photo simulations have been updated from the Application to the DEIS, the lists of visible turbines for each simulation have not. For example, for Viewpoint 11 (I-84 Westbound), the Application shows 19 visible turbines, and lists those turbines by turbine letter and number (Application Figure 4.2-14). The DEIS revises the simulation to show that 25 turbines would be visible, but the list of *which* turbines would be visible has been dropped (DEIS Figure 3.9-8). The Applicant should provide an updated list of which turbines would be visible from which viewpoints. The absence of this information makes it difficult to assess which particular turbines have the highest impacts, and also makes it difficult to evaluate possible alternative turbine layouts and configurations.

Q: Please give us your thoughts on the simulations and analysis of Viewpoint 12 (Koberg Beach State Park).

A. Impacts from viewpoint 12 (DEIS Figure 3.9-9) are high, but not as high as from viewpoint 11. The angle of view is similar to the previous one, but because the distance is shorter, some of the turbines have ducked behind the horizon. The result is a bit better composition and thus less impact. The turbines are still visually dominant and clearly break the skyline, but their horizontal scale is less, and the array is more coherent. Taking these two images together, one can conclude that the impacts might be even greater when viewed from further east along I-84. This is supported by the viewpoint map, which indicates that more turbines are visible from further east. As a designated KVA and a State Park, the viewers from this location would have very high sensitivity irrespective of the Applicant's analysis. Based on the high visual quality, high viewer sensitivity, and the moderate to high contrast, the project would have moderate to high impacts from this viewpoint.

Q: How about Viewpoint 13 (I-84 Eastbound)?

A: The viewer sensitivity analysis on page 4.2-61 of the Application errs by assuming that because the viewers are "roadway travelers with fleeting views," that sensitivity is diminished. Roadway users do not have an inherent low sensitivity to scenic landscapes—even if views are fleeting—especially when those viewers are traveling along a Key Viewing Area within a protected National Scenic Area. Duration of the view can be factored into the analysis, but the Applicant does not provide any information on the actual view duration.

Despite the already determined high sensitivity of this view corridor, the Application arrives at the conclusion that viewer sensitivity is "moderately low." The following point bears repeating: all KVAs should be considered to have high sensitivity. This is inherent in their designation as Key Viewing Areas. There is no reason to reanalyze sensitivity from designated KVAs.

In this simulation (DEIS Figure 3.9-10), the skyline effect of the turbine cluster is strong, but the horizontal scale is modest. The biggest impact is due to the dense cluster of turbines being located at the highest point in the center of the image. This is more evident in the wireline image. In looking at the viewpoint map, it appears that these same turbines would be visible from along I-84 stretching 2 miles to the west and several miles to the east, including locations within 3 miles of the project site. This equates to a long-duration view, possibly including additional visible turbines. The composition of the turbines from this viewpoint is problematic. Based on the wireline image, there are two areas of overlapping rotors, which create some visual incoherence. Since the existing scenic quality is outstanding and viewer sensitivity is high, and given the strong skyline effect, the impacts from this viewpoint should be rated as high.

Q: How about Viewpoint 14 (Viento State Park)?

A: The analysis concludes that existing scenic quality is moderately high to high, and viewer sensitivity is moderate to high (Application at 4.2-61). For the same reasons stated before, sensitivity is high, not moderate. This conclusion is supported by the much more comprehensive inventories performed by the Forest Service and Gorge Commission , and by the designation of this viewpoint as a KVA.

The photo image (DEIS Figure 3.9-11) seems to understate the degree of visibility and contrast the turbines would present from this viewpoint. This understatement is due to the very light clouds that reflect light and diminish the contrast of the sky-lined turbines. The wireframe view provided in the DEIS indicates that 18 turbines would be visible along the skyline. Under clear atmospheric conditions these 18 turbines would likely be very high

contrast and would have high impacts, similar to those discussed under Viewpoint 11. The turbine placement has overlapping rotors and presents a jumbled, chaotic composition. The turbines located on the highest point in the center of the image create a particularly strong potential impact.

Q: How about Viewpoint 19 (Historic Columbia River Highway)?

A. The viewer sensitivity analysis includes the same errors made throughout the Application. Again, the viewpoint is highly sensitive because of its designation. Additionally, this portion of the Historic Columbia River Highway is a state trail dedicated exclusively to recreational walking and biking.

Selecting this single viewpoint over 7 miles from the project may not fully reflect the actual impacts to this Key Viewing Area. In addition, the atmospheric conditions in the photo simulation (DEIS Figure 3.9-14) diminish the visibility of the turbines due to the white clouds on the horizon. Based on viewing the wireframe in the DEIS, I conclude that the turbines would be very visible and moderate to high contrast, and would be co-dominant to dominant. Impacts would be at least moderate, and possibly high. One mitigating factor is that from this angle the turbine composition is reasonably coherent and the horizontal scale is not great in comparison to the landform. The location of the turbines at a low point along the ridge presents lower impacts than noted in the previous photos, where the turbines are on the highest point of the ridge. One concern is that the Historic Columbia River Highway runs within 3 miles of the project boundary west of this site. Some information on the Historic Highway is included as Exhibit 21.07.

Q: Did you note any other problems with the simulations or impacts analysis?

A: Some of the selected viewpoints include a substantial amount of clutter and development in the foreground. For example, Viewpoint 20 (State Route 35, Application Figure 4.2-23 includes an industrial complex in the immediate foreground. My memory of State Route 35 is that it is not lined with industrial complexes in the foreground, making the selection of this particular viewpoint a bit misleading. Similarly, the simulation for Viewpoint 7 (Mill A, DEIS Figure 3.9-7) was taken from within the BPA transmission line easement and includes transmission towers in the foreground. The residents of Mill A and the recreation visitors in this area probably don't spend a great deal of time inside the BPA transmission line easement. So the selection of this viewpoint may not be representative of what their experience would be.

Another error is the viewer sensitivity rating for Viewpoint 10 (Panorama Point, Application at page 4.2-59). The Application states that viewer types include "roadway,

residential" and sensitivity is rated as low. But Panorama Point is also a Key Viewing Area, which warrants a high sensitivity rating. It is also a Hood River City Park, not a roadway or a residential area. The Application should acknowledge that the viewpoint is a public park established specifically for its outstanding views of the landscape in all directions.

Q: Does the Application leave any questions unanswered, in addition to the ones already raised?

A: Yes. First, what will be the extent of short-term and permanent forest clearings around the turbines? Typically wind turbines need a lot of free space around them to reduce turbulence and blade interference. How far will this clearing extend from each turbine? Has all necessary forest clearing been incorporated into the photomontages? It does not appear to have been.

Second, the Application mentions new and improved roads, but no roads are shown in any of the photomontages. Has the proponent determined that these roads will not be visible, or have they simply been left out of the picture? Since the turbines are placed along prominent, narrow ridges, it is quite possible that roads will have to be cut into side slopes in order to be at an appropriate grade. If this is the case, the road cuts could be visible from some viewpoints, adding additional impacts.

Third, what turbines will be ultimately be used and how large will they be? The scale of commercial turbines continues to increase year by year. Taller turbines than the ones depicted would be even more visible and higher contrast. If this Application is approved, will the size of the turbines be restricted to those depicted in the images? Or could the Applicant substitute larger turbines?

Fourth, the analysis does not include sufficient analysis of impacts from lighting. Failure to adequately address lighting misses the opportunity to mitigate for its effects by using newer, radar activated technology.

Finally, the Application fails to address potential cumulative impacts of development. The land on which these turbines will be placed is already somewhat visually disturbed by periodic commercial timber clearcutting. As noted, additional permanent clearing will likely be part of this development, along with continued commercial timber harvest. These create mounting impacts that have synergistic effects.

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Q: Could you please summarize your conclusions about the completeness and adequacy of the scenic impacts analysis?

A: The visual impact analysis is faulty and incomplete.

- The photo images used to draw conclusions about visual contrast of the development, while presumably done with attention to technical accuracy, are misleading in terms of both the likely visual contrast and scale.
- A key error in the Applicant's analysis is the conclusion that visual sensitivity is only low to moderate for Key Viewing Areas within a congressionally designated National Scenic Area.
- Additional affected viewpoints and Key Viewing Areas have not been, but need to be, analyzed to get a better sense of the extent of impacts.
- Specific turbines visible from each of the viewpoints should be identified by turbine number, so that it is possible to identify which turbines are most visible from most viewpoints.
- Duration of view, particularly along KVA corridors, needs to be fully analyzed. Indications are that the view duration from I-84, the Columbia River, and the Historic Columbia River Highway will be lengthy, further exacerbating impacts.
- The white cloud background in several of the photo simulations reduces apparent color contrast of turbines skylined on visually prominent ridges.
- The simulations do not appear to take account of likely additional visual impacts from tree removal and roads associated with the turbines.
- The analysis fails to fully account for the visual impacts of lighting.

Q: Could you briefly summarize your recommendations and observations on how to improve the scenic impacts analysis?

A. These are some of the specific ways to improve the scenic impacts analysis:

- Photo images should be redone to reflect the clear sky atmospheric conditions under which the turbines would be most visible.
- Animations should be prepared simulating the moving blades and flashing lights of the proposed turbines.
- Photo images should be calibrated with an appropriate screen viewing and/or print size that approximates the scale at which one would see it in reality. If composite panoramic images are created, these should be printed on sheets large enough to compensate for the image shortening.
- Photo images should include a note describing the ideal distance from which the viewer should view the image to best approximate the actual scale.
- Reviewers should note that the images provided, no matter how good, are not reality. The real-world experience of viewing large turbines in three dimensions

with moving blades and much higher brightness will be different, and likely stronger, than can be depicted.

- Photo images should include likely impacts from permanent forest clearing and road construction.
- Photo images must include all of the visible turbines and turbine numbers should be provided to identify turbines that would cause high impacts.

Q: Could you please summarize your conclusions about the scenic impacts of the Project, and any errors in the Applicant's conclusions about these impacts?

A: I conclude with a high level of confidence that this project would have substantial adverse impacts to valued scenic resources for the following reasons:

- Given the location of the proposed turbines adjacent to the National Scenic Area, the project's high visibility from Key Viewing Areas and other important viewpoints, and the close proximity to recreational resources, the scenic impacts of the Whistling Ridge Energy Project are clearly high.
- The Applicant's understatement of the visual contrast caused a further, more important error with the conclusion that the impacts to scenery would be low to moderate from most viewpoints (Application at Table 4.2-5). This conclusion is simply not supported by the facts.
- Visual impacts of this project from Key Viewing Areas within the Columbia River Gorge National Scenic Area are moderate to very high from several of the viewpoints selected by the proponent for analysis.
- Research and practice is clear that, because modern commercial turbines are so large and inherently contrasting, good site selection and good design that is visually coherent is crucial to mitigating visual impacts. It appears that the Applicant has made no attempt to take these factors into account.
- The proposed project would be located on visually prominent, complex topographic features. Research and experience shows that it is difficult to successfully "blend" large-scale industrial commercial wind turbines with complex, forested landforms like those that make up the proposed site.
- From several viewpoints, the array of turbines in view is chaotic and incoherent. Rotors frequently overlap.
- The proposed turbines contribute to adverse cumulative impacts when added to existing clearcuts and transmission line corridors on or near the project site.
- Given that there are additional wind energy facilities currently proposed along the National Scenic Area boundary east of this project and a potential for some to the west, there is a real risk of increased cumulative impacts from multiple Key Viewing Areas. By approving projects one at a time, we could someday in the not too distant future reach a point where wind turbines are in view from Hood River all the way to the eastern boundary of the National Scenic Area and beyond.

Q: Do you have any additional recommendations or observations on how to avoid or reduce impacts of the project?

A: The proponent has not offered any meaningful mitigation for the visual impacts that would result from this project. The visual impacts are treated as unavoidable, even though no effort has been made to avoid them. There are ways to reduce or mitigate the impacts, and these should be considered and evaluated. The project should be sent back to the drawing board, and different turbine locations and sizes should be tested to reduce visual impacts. It may be possible to build some number of turbines, carefully located, in such a way as to avoid significant adverse impacts. In particular, the proponent should evaluate alternative arrays and siting of turbines, removal of the most visible turbines, use of alternative turbine colors, and use of newly available radar-activated lights.

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