BEFORE THE STATE OF WASHINGTON
ENERGY FACILITY SITE EVALUATION COUNCIL

In the Matter of Application No. 2006-02

Desert Claim Wind Power Project

EXHIBIT 18

PREFILED DIRECT TESTIMONY

DAVID BLAU

Q. Please state your name and your business address.

A. David Blau. My business address is 150 Chestnut Street, San Francisco, CA 94111.

Q. What is your position?

A. I am a Senior Vice President with the environmental consulting firm EDAW | AECOM, based in San Francisco, California.

Q. What topics will your written testimony address?

A. My testimony will address the following topics:

(1) My background and experience.

(2) My involvement with the Desert Claim Wind Power Project.

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(3) The visual impacts of the Desert Claim Wind Power Project, with particular emphasis on the impacts on those residing near proposed turbines.

Background

Q. Briefly describe your educational background.

A. I received my Bachelors Degree in Landscape Architecture from Pennsylvania State University in 1968 and my Masters Degree in Urban Planning from the Georgia Institute of Technology in 1970.

Q. Briefly describe your employment experience.

A. During and immediately following graduate school, I worked as a planner for a land planning firm in Atlanta, GA. I served three years as an officer in the Naval Civil Engineering Corps based in Philadelphia, where I led the preparation of master plans, housing studies and environmental analyses for naval bases on the northeast coast. I joined EDAW in 1974 and have specialized in large-scale energy, water resources and land management plan projects. I now serve as Senior Vice President for Environmental Planning within EDAW and lead many of our projects that integrate planning, design and environmental disciplines. My resume (**Exhibit 18.1**), provides further details on my experience.

Q. Briefly describe your experience with analyzing visual impacts?

A. I have prepared visual impact analyses on a wide range of facility types including energy generation, energy transmission, electrical substations, hydroelectric projects, mining projects, offshore oil & gas development, transportation projects, and wild &

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scenic river management plans. I have worked in locations ranging from wilderness to rural to suburban to urban. I am very familiar with the visual resource management systems developed by the U.S. Forest Service, the U.S. Bureau of Land Management, and the U.S. Department of Transportation. I have used all or parts of these visual resource management systems in my work.

My resume provides a complete summary of my visual analysis project experience, which spans over 30 years.

Q. Are you familiar with the Washington State Environmental Policy Act (SEPA)?

A. I am familiar with the Washington State Environmental Policy Act (SEPA) and have managed a number of environmental impact analysis projects in the State of Washington. For example, I am currently leading the preparation of a SEPA EIS for a major shoreline park project for the City of Bellevue.

Q. Are you familiar with the Washington Energy Facility Site Evaluation Council (EFSEC)?

A. Generally, yes. I have looked at the Council's website and regulations, and I have reviewed one of the Council's recent decisions, but I have not previously worked directly on a project that was before the Council.

Q. Have you testified as an expert about visual impacts before?

A. Yes, I have testified as an expert on visual resource analysis and visual impacts in a number of legal proceedings. I served as the primary expert witness on behalf of the

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U.S. Department of Justice concerning visual perception of lake land changes over time at Mono Lake, California. I served as an expert witness as part of the California Energy Commission's licensing process for the Morro Bay Power Plant Modernization Project. I also served as an expert witness in the California Energy Commission's licensing process for the C&H Sugar Refinery Cogeneration Project.

Desert Claim Wind Project

Q. Briefly describe your involvement with the Desert Claim Wind Project.

A. I was retained by the Applicant in 2008 to analyze the visual impacts of the Project. In particular, I was asked to analyze what some people have called the "looming effect" of turbines on nearby residents. After providing my initial analysis, I was asked to provide testimony during the Council's proceedings.

Q. You've testified that you have experience evaluating visual impacts for a variety of project types. Is there anything different about evaluating the visual impacts of a wind project than evaluating the visual impacts of other projects.

A. The traditional steps in assessing visual impact – namely, (1) categorizing the existing landscape setting; (2) selecting representative viewpoints; (3) preparing visual simulations; (4) characterizing viewer sensitivity and exposure; (5) determining overall visual quality; (6) determining level of visual impact, and (7) determining appropriate mitigation measures if necessary – are generally the same for all project types.

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The difference is often found in the public's perception of the facility and the symbolism they might attach to what they see. This can directly affect one's feelings of whether the project is positive or negative. Several recent studies of viewer perceptions indicate that the public seems to be embracing renewable energy, such as wind power as a clean, sustainable form of energy. The British Wind Energy Association (BWEA), for example, has conducted more than 60 public perception surveys at or near wind power facilities since 1990. Support averaged 70 to 80 percent, both for wind energy in general and in the opinion of residents living near wind farms. This attached symbolism can play directly into the overall conclusions about the visual change and the degree of public acceptability of that change.

Q. Can you describe generally what you have done to analyze the Project's visual impacts?

A. I've done several things, including the following:

(1) Conducted a site visit to the Project Area and its vicinity.

(2) Conducted a site visit to the Goodnoe Hills Wind Project in Klickitat County, which uses the same REpower MM-92 model turbines that have been proposed for use at the Desert Claim Wind Project.

(3) Reviewed photographs taken from various viewpoints surrounding the Project and computer generated simulations representing the views from those locations following Project construction.

(4) Reviewed the Visual Impacts Section 3.4 of the Draft Supplemental Environmental Impact Statement.

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(5) Researched and analyzed the visual impact of the Project, with particular attention to "looming effect" and the impacts to residences located close to Project turbines.

Visual Impacts and "Looming Effect"

Q. In general, how would you characterize the current visual environment in the area where the Desert Claim Project is proposed?

A. The proposed Desert Claim Project is generally spread out over a relatively flat and open, rising valley floor. The elevation rises gradually south-to-north about 400 feet over a distance of about 3.5 miles. The Project Area is a broad alluvial fan at the base of the mountains with several small creeks flowing generally north to south. The valley has an arid to semi-arid climate.

The valley is a working agricultural landscape. Barns, silos, hay storage and farm equipment are present. Patches of native shrub-steppe or grassland vegetation remain, but most of the valley is dominated by agriculture. Extensive areas of rangeland are used for grazing.

The Project Area has an open, windswept appearance. Rural residential development occurs as scattered residences and ranch properties on large lots. Interestingly, residences are oriented in many different directions with no apparent consistency in orienting toward favorable views such as the mountains to the north. The varied orientation of the existing residences in the area suggests that the views were not a primary consideration in the design and construction of these residences.

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The Project Area lies within a major cross-state electrical transmission utility corridor that links hydroelectric dams on the Columbia River with the power market of western Washington. Six high-voltage transmission lines cross or are adjacent to the Project Area and run in an east-west direction; five are owned and operated by Bonneville Power Administration (BPA) and one by Puget Sound Energy (PSE). Highway 97, to the southwest of the Project Area, is a major travel route of regional importance.

The Kittitas County Comprehensive Plan (2006, 2007, 2008) does not acknowledge any special scenic or visual resource values in the Project Area and does not include policies that are specifically oriented to protection of Project Area scenic qualities.

Q. Have you had an opportunity to review section 3.4 of the Draft Supplemental Environmental Impact Statement (SEIS) concerning visual impacts?

A. Yes.

Q. Do you generally agree with the conclusions of the Draft SEIS chapter?

A. Yes. The Draft SEIS uses a systematic methodology to access level of visual impact, comparing existing visual quality with post-Project visual quality. Twenty-four simulations were used to represent the range of visual impacts. Four viewpoints were rated "high" and represent the viewpoints closest to the turbines. Thirteen viewpoints was rated "Moderate". Eight viewpoints were rated "Low or None" for visual impact. The DSEIS on p.3-59 concludes that:

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"On the whole, the visual impacts of the Desert Claim project have been reduced ... from the Final EIS. These include:

- a smaller, contiguous project area;
- reduced number of turbines and turbine density;
- fewer nearby residences;
- increased distances (minimum 1640 feet with actual closest at 1687 feet) between turbines and non-participating residences;
- reduced nighttime flashing lights and eliminated daytime strobes;
- reduced number of met towers; and
- reduced length of roads."

The DSEIS goes on to conclude, "While these measures and visual quality improvements would not lead to a project that is invisible, which is impossible, they would result in a project that fits better with the landscape of the Kittitas Valley...." I agree with these conclusions.

Looming

Q. In your experience, is the concept of "looming" something that is commonly considered as part of the analysis of a project's visual impact?

A. No, that is not a term that is used in standard visual impact analysis.

Q. As I understand it, some individuals have concerns that if a turbine is located too close to a home, the people in that home may feel that the turbine is "looming" over them. Is that concept something that is considered in standard visual analysis?

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A. No. Aside from the discussion of this issue in connection with the Kittitas Valley project that was permitted through the EFSEC process, I am not aware of any visual analysis found in an EIS or elsewhere that has looked at this particular issue, nor am I aware of any regulation or established standard governing the relationship between the height of a turbine and the appropriate distance from a residence.

Q. Have you done any research or analysis to consider this so-called "looming" phenomenon?

A. Yes. My research and analysis are discussed in more detail in the attached report entitled "Visual Looming Effect in the Landscape: Research, Analysis and Case Study" (**Exhibit 18.2**).

Q. Can you briefly summarize what you did to evaluate the looming phenomenon?

A. Yes. The methodology for the study involved examining existing research regarding the physiology of the human eye, and highlighting concepts of "looming" found in both scientific research and in architecture and urban design.

I then applied what I had learned from this research to perform a Case Study of an existing wind power project with identical wind turbines to those being proposed. In this Case Study, I visited the Goodnoe Hills Wind Project, which is currently in operation in Klickitat County, Washington. This project uses the same type of REpower MM92 two megawatt turbine that will be used at Desert Claim. I evaluated a series of four setback distances from one of the wind turbines to assess the visual looming effect of the turbine. This test included setback distance ratios

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(distance to height) of 1:1, 2:1, 3:1, and 4:1, ranging from 410 feet to 1640 feet. Photographs taken from each of the setback distances evaluated are shown in **Exhibits 18.5 and 18.6**.

Next, I visited the Desert Claim Wind Power Project site to understand the visual resource setting and to examine the relationship between select turbine locations and the closest residences (the seven non-participating residences within 2500 feet of a proposed turbine). I examined the visual simulations prepared as part of Section 3.4 of the Draft Supplemental EIS and compared them to my observations from the Goodnoe Hill Case Study.

Q. What did you conclude from your research on the physiology of the human eye?

A. As I've explained in more detail in the report, the physiology of the human eye is such that a person has a particular stationary range of vision. Generally, a person has a 20-30 degree of vertical range (10-15 degrees above and below the horizon sight line) without moving the eyes or head. This is illustrated in **Exhibit 18.3**. If an object fits within the vertical range of the standard stationary field of vision, then it would not appear to be "looming over" the viewer.

This standard field of vision can be illustrated with photographs depicting the ordinary vertical range. A standard 35 mm camera equipped with a 50 mm lens captures a 31 degree vertical field of view, so it closely approximates the normal sight lines of the stationary human field of vision.

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Q. What did you learn from your research in scientific fields that pertains to the concept of "looming"?

A. I found that the concept of looming is used in some scientific fields, but in those fields, the term "looming" is typically used to describe the movement of objects towards the viewer and obstacle avoidance. Looming applications for movement have been tested in the vision sensor devices of robots. Consequently, I did not find this scientific literature to be applicable to the visual analysis of stationary wind turbines.

Q. What did you learn from your research in Architecture and Urban Design that pertains to the concept of looming?

A. The literature from the fields of architecture and urban design has frequently addressed the relationship between the height of buildings and surrounding open space. From as long ago as the 1400s to as recently as the 1990s, architects and urban designers have advocated ratios of between 2:1 and 4:1 as the appropriate relationship between the height of buildings and the distance of adjacent open spaces. This literature is discussed in more detail in my report (**Exhibit 18.2**) and is summarized in **Exhibit 18.4**.

Q. What did you conclude about the appropriate distance between wind turbines and nearby residences based on your Case Study at the Goodnoe Hills Project?

A. Based on the Case Study I conducted at the Goodnoe Hills Project, I concluded that any so-called visual looming effect of the 410 foot high wind turbine substantially dissipated at a setback ration of 3:1 and was non-existent at a setback ratio of 4:1.

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The visual looming effect was most evident in setback ratios of 1:1, then 2:1. A 4:1 setback ratio provided some buffer distance to further dissipate the visual looming effect and to account for changes in site topography and viewing angle. This analysis is illustrated in **Exhibits 18.5** and **18.6**.

If you take a look at **Exhibit 18.5**, it shows the view of a turbine at distances that correspond to ratios of 1:1, 2:1, 3:1 and 4:1. At a setback of 1:1, looking straight ahead you see only the bottom of the tower, and you must tilt your head well back to see the top of the turbine. In a sense, the turbine is looming above you. At a setback of 2:1, you can see more of the turbine, but you still need to tilt your head back to see the top. At a setback of 3:1, you can see virtually all of the turbine looking straight ahead, and at a setback of 4:1 you can see the entire turbine as well as considerable airspace above the top of the turbine. These photographs show how any sense of "looming" is largely avoided at a setback of 3:1, and is not present at a setback of 4:1.

Exhibit 18.6 illustrates this same point in a slightly different way. In the exhibit the multiple 50mm photo frames are used to illustrate the view at the different setback distances. At a setback of 1:1, almost three full frames are required to show the entire turbine, but at a setback of 4:1, the entire turbine fits well within a single frame.

Q. What did you conclude from your visit to the Desert Claim project site?

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A. After the Case Study at Godnoe Hills, I visited the Desert Claim project site to consider whether the same conclusions would apply given the landscape of the proposed Desert Claim Wind Power Project. When I visited the project site, I paid particular attention to the relationship between select turbine locations and the seven non-participating residences that are located closest to proposed turbine locations. Four of the visual simulations developed as part of the DSEIS (Views 1D, S1I, S1J and S1K) were examined in the field. Distance from viewer to closest turbine in these four simulations were 1530 feet, 2129 feet, 2944 feet, and 2679 feet. The locations of these viewpoints and the simulations are presented in **Exhibit 18.7**.

I found no adverse looming effect at any of these locations, even at the location of View 1D which is 1530 feet from the nearest proposed turbine. This confirmed my conclusion that a setback ratio of 4:1 or 1640 feet is more than adequate to eliminate any adverse looming effect. All of the non-participating residences are located greater than a 4:1 setback ratio, or more than 1640 feet from a proposed turbine.

Q. Does this conclude your testimony at this time?

A. Yes.

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