DIRECT TESTIMONY OF CHARLES SIMMONS
HIGHLAND CITIZENS
VIRGINIA STATE CORPORATION COMMISSION
CASE NO. PUE-2005-00101

Q. Please state your name and position.

A. My name is Charles Simmons and I have been retained to provide assistance to Highland Citizens in regard to the application of Highland New Wind Development, LLC to construct a wind generation facility in Highland County.

Q. On whose behalf are you testifying in this proceeding?

A. I am testifying on behalf of Highland Citizens.

Q. What is the purpose of your testimony?

A. Highland Citizens has requested that I review the Application of Highland New Wind Development in Case No. PUE-2005-00101 and materials related to these proceedings, address the potential impacts of Highland's proposed project and comment on the testimony of various witnesses in the case.

In that regard, I have :

- Described how generating units are dispatched including the constraints that must be taken into account.
- Provided cost of generation for Virginia Power and Appalachian Power by fuel type to indicate the economic factors involved in generation dispatch.
- Compared wind speed data to determine amount of wind generation during the summer peak load season.

- Reviewed the RSG report sponsored by Mr. High and commented on the assumptions and conclusions as to generation displacement contained in that report.
- Examined the economic data submitted in response to interrogatories to determine the degree to which the energy produced would be competitive with other suppliers in Virginia.
- Reviewed the filings and correspondence regarding the potential impact on the wildlife as submitted by the applicant and the various governmental agencies involved.
- Arranged for the development of Exhibits to provide information on the visibility of the wind turbines being proposed.

Q. What conclusions have you reached as a result of your reviews and your background in the industry?

A. My conclusions can be stated rather quickly and they are:

- There will be no increase in energy available to the Virginia consumer or no reduction in emissions in Virginia if this project were to be built since the energy will be sold to parties outside the Commonwealth.
- While there will be a reduction in emissions on a regional or national basis, any reasonable estimate of the amount and location of any such reduction would require a much more rigorous study than that presented in this case.
- Wind generation is at a very low level during the summer peak load period and will have minimal effect on capacity requirements.

- There are unavoidable environmental impacts in regard to wildlife as well as visual impacts that would result from this project.

Q. What is your educational and professional background?

A. I have a Bachelor of Science Degree in Electrical Engineering from West Virginia Institute of Technology and have participated in postgraduate Management training programs at the University of Michigan as well as the Massachusetts Institute of Technology Senior Executive Program. I am a Registered Professional Engineer in the Commonwealth of Virginia and in the State of West Virginia. I was employed by Appalachian Power Company (APCO) from 1956 until my retirement in 1996. Following my retirement, I have remained active with a variety of consulting assignments. The last seventeen (17) years of my employment at APCO were as the Vice President – Construction and Maintenance.

Q. Have you testified before this Commission in the past?

A. Yes. I have testified before this Commission on a number of occasions in regard to line siting cases, rate cases and various other matters.

Q. Based on your 50 plus years working for an electric utility and providing consulting services on utility matters, could you give an overview of industry practices regarding generation and in particular, how generation is dispatched?

A. Yes. The electric utility industry has a long history of power generation, transmission and distribution of energy in an efficient, reliable and economical manner. For much of the industry's history, the incentive for developing and instituting the most economic practices was the regulation by State Commissions

and the limitations on rates to the consumers. The development of the economic dispatch system and the sharing of resources among the utilities were two of the practices that did the most to improve reliability and to limit the cost of generation. These concepts of economic dispatch and resource sharing are the practices most germane to this proceeding.

Q. Can you describe what you mean by economic dispatch?

A. Economic dispatch in its simplest form is a control system that assigns the next increment of production to the unit within the control area with the lowest delivered cost. This cost is developed using the cost of fuel, the heat rate of the unit involved at various load levels and the variable operating and maintenance costs. There are, of course, various constraints that will affect the ability to optimize the economic dispatch.

Q. Can you give examples of such constraints?

A. There are a number of issues that may affect the dispatch to some degree such as transmission constraints. Other possible constraints are that units may need to be re-dispatched due to anticipated line overloads or loss of certain transmission paths. The obligation to meet a proper share of the "spinning reserve" requirement may mandate certain units are to be on line. One of the most serious constraints is imposed at low load conditions by coal- fired units. For safety reasons, coal fired units can not be operated at levels significantly below half load unless supplemental firing (oil or natural gas) is used for flame stability. The time to return a coal- fired unit to service (8 to 24 hours from start-up to full load) precludes taking such units off line to respond to the lightest loads on the system.

These lightest loads are commonly referred to in the industry as light load minimums.

Q. Is wind generation a positive or a negative in dealing with the problem of meeting light load minimums?

A. Any generation which cannot be dispatched or stored whether it is "run of the river" hydroelectric or wind generation actually contributes to the difficulty of meeting the light load minimums. This leads to supplemental firing, generally with oil, to maintain flame stability on coal-fired units.

Q. Are there other strategies that are employed to assist with meeting light load minimums?

A. A method used by the two major utilities in Virginia is pumped storage. Pumped storage takes advantage of the light load periods (late night, early morning) to pump water from a lower reservoir to an upper reservoir. The water is released during the higher load periods of the day to provide generation to assist in meeting peak loads. This maximizes utilization of generation capacity while also providing the ability to mitigate the light load minimum problem. In the case of Appalachian Power, the pumped storage facility is known as the Smith Mountain Project. In Dominion Virginia Power, the facility is the known as the Bath County Project.

Q. You said earlier that the economic dispatch and the sharing of resources with other utilities improved reliability and reduced costs. In what way?

A. In addition to utilizing the principles of economic dispatch in their own generation fleet, the utilities participated in energy exchanges through major

interconnections. These interconnections enhanced reliability through sharing of spinning reserve margins designed to maintain supply in the event of loss of a generating unit or plant or the unanticipated outage of a major transmission line. Costs were reduced when a utility with a higher marginal generation cost purchased energy with a lower marginal cost. The price of such an energy transaction was typically established at the mid-point of the cost of the buyer and the seller. The savings were then shared equally by each of the utilities and their customers.

Q. How has this changed with de-regulation?

A. The incentive to control costs through such items as economic dispatch has not changed. De-regulation, particularly at the wholesale level, and the open access transmission requirements have substituted market forces for the more traditional state regulation systems. The control areas under regulation generally involved one company or a group of companies that voluntarily joined forces. In an open access transmission world, PJM becomes the control area in our region. With the customers now able to choose among a large group of suppliers, cost of generation becomes the overriding concern.

Q. Are there other changes due to de-regulation?

A. Yes. The entry of the Non-utility Generator (NUG) has introduced new competition in the generation market and, in some cases, added to the constraints imposed by the transmission system. The lack of a defined service area and customer base has led to shorter term solutions with most of the more recent generation units utilizing higher priced natural gas as the fuel source.

Q. Why do you consider the existence of economic dispatch systems to be a factor to be considered in this proceeding?

A. It is important to consider what the order of dispatch will be to determine what fuel would be displaced by wind generation to determine actual impact on costs and environment. There is no question but that the cost of fuel and the resultant cost of generation will determine the units that will operate.

Q. Can you provide us with an idea of the relative cost of generation per kwh segregated by the predominant fuel type for the two major utilities in Virginia?

A. The generation cost by plant type for Virginia Electric and Power Company*(VEPCO) have the following ranges:

- Nuclear (Approx. 40%) 1.21 to 1.34 cents per kwh
- Coal (Approx. 50%) 1.99 to 4.50 cents per kwh
- Natural Gas (Approx. 6.5%) 8.20 to 14.30 cents per kwh
- Oil (Approx. .02%) 11.93 to 24.97 cents per kwh
- Hydro & Wood (3.48%)

VEPCO's net purchases of energy are equal to approximately 27% of it's own generation. It is expected that such purchases are from NUGs and predominately use gas as the energy source.

*FERC Form 1 for VEPCO at end of 2005.

Similar generation cost by plant type for Appalachian Power* has the following ranges:

- Coal (Approx. 97%) 1.89 to 3.4 cents per kwh
- Pumped Storage Net (1.6%) 3.40 cents per kwh

- Natural Gas (.007%) 12.49 cents per kwh
- Hydro (1.1%) .35 to .55 cents per kwh

*FERC Form 1 for Appalachian at end of 2005.

Q. What do these generation cost figures indicate to you about what generation would be displaced by any wind generation?

A. The principals of economic dispatch result in starting with the lowest cost units being dispatched first and proceeding to load units in order of their cost. Similarly, the higher cost units are the first units to be reduced as load requirements are decreased. The very high cost oil units would be the first units to be affected but they are presently being dispatched at very low levels. A major impact of additional wind generation would be to further reduce the operation of the gas fired plants (combustion turbines or combined cycle units) since they represent the bulk of the higher cost generation.

Q. Do the loads of utilities vary to any great extent or are they reasonably constant?

A. There is a great variation in customer loads both on a seasonal basis as well as a weekly and daily basis. The highest hourly period during a year is referred to as the peak load. Depending on the utility involved, the peak load may occur during the summer air conditioning season or during the winter heating season. In addition to seasonal variation, loads will vary depending on the day of the week with loads being higher Monday to Friday, which is the workweek for most industry. Loads also vary greatly during the twenty-four hour day with the lightest load periods occurring late evening and extending to the early morning hours. This is most pronounced during the spring and fall periods when heating

and cooling requirements are at very low levels. Actual variation from minimum to maximum loads over the year result in the hourly peak load exceeding the minimum hourly load by 180%.

Loads are constantly changing minute by minute, as electricity has to be produced at the time of use. Customers determine load as they turn on or turn off lights, appliances, air conditioning equipment, computers, etc.

Q. *Does this variation in load have any impact on the value of wind generation in* meeting peak demands?

A. There is very little contribution from wind generation during the critical summer peak season. Since generation as well as transmission and distribution facilities are limited in their capacity by thermal constraints, the summer peak loads are the most critical. Wind generation is generally at its lowest level during the warmest periods of the warmest days in the year.

Q. Can you illustrate why you have arrived at that conclusion?

A. In reviewing the data contained in Exhibit 7 of HNWD in response to interrogatories, it is clear that the average and maximum wind speeds are much lower in the summer season. The monthly maximums for the winter (December, January and February) exceed the monthly maximums in the summer (June, July and August) by a factor of two-thirds or more using the Tamarack Met Tower location.

Q. Did you do any other review of the data contained in that response?

A. Using the peak hour for the all-time summer peak for Appalachian (August 2, 2006 at 4pm) as a marker, I went to the hourly data recorded for that same hour in

2000, 2001, 2002 and 2003. The wind speed recorded for that particular hour in 2000 ranged from 21% to 25% of the winter maximum. In 2001, the data was missing except for the 25-meter level and the speed recorded for that hour was 9% of the winter maximum. In 2002, the wind speed for the marker hour ranged from just over 1% of the winter maximum to slightly over 20%. In 2003, the range was 22% to 25%. In short, the wind generation supply is at the lowest level when the need for capacity is at its greatest.

Q. Would this variation in the output of wind generation be a factor in the dispatch of capacity to meet customer loads?

A. Yes. Loads are projected on a day ahead and on an hour ahead basis within the control area (PJM in this case) in order to schedule sufficient units in service to meet the expected load and to provide the necessary spinning reserve. The spinning reserve provides the margin for the units to respond to the minute-by-minute load changes as well as to absorb the impact of an unexpected loss of generation. The units respond to load changes within their pre-set bandwidth by sensing any deviations from 60 Hz frequency and automatically opening or closing control valves to maintain frequency. Bandwidths are altered by an automated system to maintain economic dispatch as loads change. The variation in wind generation would make it very difficult to incorporate any specific capacity from that source in the day ahead planning which is an essential part of maintaining a reliable system.

Q. Would the capacity of the wind generation then be a factor in the price a utility would be willing to pay to the supplier?

A. No. Absent any mandated requirements to pay a higher price, the price any utility would be willing to pay would be the avoided cost of the energy the utility would have otherwise been required to generate. HNWD confirms this in its application in stating that the Project will have no significant impact on generation reserves in the region.

Q. Section 14 of the application discusses how the proposed project furthers the goals of advancement of electric competition in Virginia. In your opinion will there be such an advancement?

A. No. There is no question but that the reality of sales to northeastern states mentioned in this section is the true reality. States such as New Jersey, Maryland and Pennsylvania have established compliance schedules for renewable resources with substantial economic penalties. The New Jersey penalty for non-compliance is $50 per MWH or 5 cents per kWh. The Pennsylvania penalty for non-compliance is $45 per MWH or 4.5 cents per kWh. This effectively raises the value of the wind generated kwh to the suppliers in New Jersey and Pennsylvania over and above its actual value by a major portion, if not all, of the 4.5 to 5 cents. The penalty provisions alone exceed the total price available to a large number of Virginia customers. (See Attachment 1 on which prices shown include transmission services.) The current rates available to Virginia Customers from Appalachian Power for example range from 3.249 cents per kWh for large industrial customers to 4.053 cents per kWh for large commercial customers. The Appalachian price for residential customers is 3.714 cents per kwh. The statement that "HNWD has a preference for trying to sell its output to Virginians

if that becomes economically feasible" is an empty one when the customers in Virginia would be faced with a huge increase to compete with suppliers in New Jersey or Pennsylvania.

Q. Are you aware of a wind generation project in West Virginia referred to as Backbone Mountain Windpower, LLC? If so, are you aware of the disposition of the energy from that project?

A. Yes. This installation is in the same general area as the proposed project, approximately forty-five miles north of the proposed project. The ridge and valley orientation of the two projects are similar and the applicant for the Backbone Mountain installation stated that the location had been determined to be one of the best on the East Coast. Currently, the entire output of this project has been sold to Exelon Corporation for the next 20 years. Exelon Corporation is a public utility holding company that owns utilities Commonwealth Edison in Illinois and PECO Energy in Pennsylvania. Exelon is also one of the world's largest power producers and wholesale marketers. It is clear that there is little likelihood of any of the Backbone Windpower energy being available to West Virginia customers at a reasonable price.

Q. Capacity factor for a wind generation plant is a major factor in determining both the economic viability of such a project and the amount of any displaced emissions. What data is available in regard to the Backbone Mountain Project?

A. There is some question as to the capacity of the Backbone Mountain installation. Some sources have referred to it as 66 MW but Exelon Corporation, the purchaser of the energy, describes it as a 75 MW installation. At the time of approval, the

West Virginia Public Service Commission (PSC) Order discussed a range from 71 to 90 MW. Using the 66 MW figure and the actual energy production reported for 2005, the capacity factor was 26.6%. Using the 75 MW value, the capacity factor was 23.4%.

Q. Referring to the Comments submitted to the State Corporation Commission (SCC) on March 29, 2006 by Mr. Webb and Mr. Boone concerning this case, which Mr. Hewson attached to of his testimony, are you in agreement with those comments?

A. I am in general agreement with Mr. Webb and Mr. Boone in their comments except for the methodology they used to develop their Table 1. They have treated the capacity factors for both the conventional power plants and the wind plants on the same basis in developing the table and this is not the case. Capacity factor is the percentage of the energy (kwh) that could have been generated by a plant in a year if it was operating at full load for the entire year. A wind farm like "run of the river" hydro will operate at its highest capability any time wind is sufficient to support that level of operation except when forced out of service for maintenance or repairs. Conventional plants on the other hand will operate at the level necessary to meet the customer loads and in order of their cost of generation. In other words, the capacity factor of the conventional plant is not dictated solely by its ability to produce but by the need to serve customer load. There is no question but that any of the coal plants shown in Table 1 would have a capacity factor of 80% or greater except for the lack of need for their production during light load periods. The critical question is not what the capacity factor is for the

conventional plant but what capacity is available at the time of peak load. To bring Table 1 closer to a proper comparison, I adjusted the capacity factors for the five coal plants below 80% to the 80% level. This is a conservative level since maintenance is scheduled during lighter load periods to maximize availability when peak load periods occur.

Q. Did you make any other adjustments?

A. Yes. Mr. Webb and Mr. Boone used a 30% capacity factor for the wind generating units. In my opinion, the capacity factor of the nearby Backbone Mountain facility is more applicable. I chose to apply the 26.6% factor from Backbone.

Q. What was the result of these adjustments?

A. This increased the number of wind turbines required by a factor of 15%.

Q. Were there other changes?

A. Yes. Mr. Webb and Mr. Boone were conservative in using 8 turbines per mile to measure ridgeline impact. The filings of HNWD show the turbines on Tamarack to be approximately 1000 ft. apart or roughly 5 turbines per mile, which extends the impact.

Q. What are your comments in regard to Mr. High's testimony?

A. Prior to discussing my concerns with the study itself, I would strongly disagree with Mr. High's statement that hydroelectric power is rarely able to respond to fluctuating load changes. The exact opposite is true in that hydro is the most responsive generation in that power generation responds immediately to changes in water flow. With hydro for example, there is no requirement for additional

steps such as conveying fuel to a burner, increasing water flow for steam production or provision of an increase in combustion air. With additional load, the control valves automatically open to provide additional flow until the generator meets the load or reaches maximum capacity. This is true of all plants with storage capability whether that storage be hourly, daily or weekly. This is an extremely important issue in this case since both Appalachian and Virginia Power have significant pumped storage facilities. These large pumped storage facilities play a major role in the dispatch function of both companies in meeting peak demands as well as providing a cost effective means of dealing with light load minimum requirements. The failure to include these two large flexible installations (600 MW at Smith Mountain and 2500MW at Bath County) in the analysis discussed in the Resource Systems Group (RSG) report is difficult to understand.

Q. Do you have other concerns?

A. As a threshold issue, the inclusion of two additional wind farms about which there are no facts at all presented other than general locations renders any conclusions so speculative as to be of no value in this proceeding. The little information that is available demonstrates the grouping to be inappropriate in that the additional two facilities are removed from the HNWD project in both distance and elevation. It is also worth noting that the inclusion of these two "ghost" projects have the effect of increasing the values in the report fourfold. Of even greater interest is that the larger of these projects is not even going to be pursued. An article in the August 30, 2006 edition of the Roanoke Times quoted a PJM spokesman in

relating that Invenergy had withdrawn application for an interconnection agreement feasibility study after the first stage of the study.

Q. Do you have concerns with the report itself?

A. Yes. I have a number of concerns such as:

- The report simply states assumptions and reports conclusions with no stated valid basis for the assumptions and without demonstration as to how the conclusions were reached. Many of the assumptions are questionable or simply incorrect. The previously mentioned omission of over 3000 MW of highly dispatchable generation on the basis that hydro is rarely responsive is based on a false premise.
- There is no real stated basis for the selection of the plants to be used in the analysis. The selections don't seem to consider that the entire PJM pool is now one control area and the transmission paths are the critical issue and not necessarily geography or state lines. (The report is confusing in that the only listing of plants is on what is labeled as Table 1. The report, however, states at one point that the plants used in the analysis are shown in Figure 3, which does not exist. At another point, the report states the displaced generation is expected to occur at the plants listed in Table 2 which lists no plants at all.)
- A Possum Point plant is listed as a coal plant. There are two Possum Point plants but neither of them are coal fired. One is a 687 MW gas plant while the other is a 1234 MW plant using gas and oil.
- Yorktown is shown as coal plant but this 1257 MW plant is primarily oil fired.
- The selection of the West Virginia plants for the analysis is particularly surprising since it includes the Elkem 40 MW plant. This is a pre WWII plant with which I

am familiar both on a personal and professional basis. The plant was built to serve induction furnaces within a ferrous alloy plant at 25 cycles. Portions of the plant were closed years ago with some furnaces converted to the use of purchased power from Appalachian Power. The currently operated 40 MW unit is a 25 cycle unit and is devoted to supplying internal 25 cycle load. There would be no impact on the operation of this unit by generation at outside sources. The alloy plant is served by Appalachian Power with a low cost interruptible power contract. To supply this service the plant is integrated with Appalachian Power (APCo) through a 138kv tie from the 400MW Kanawha River Plant, which serves a major portion of the alloy plant load. Kanawha River Plant is integrated with the grid through a 345kv bulk transmission line which connects not only Kanawha River Plant but also the Amos plant which is the largest plant in AEP (2900 MW) with the Virginia service area. Considering the Elkem 40 MW plant, which consists of a single 25-cycle unit serving an internal plant load, while ignoring a plant ten times its size to which it is connected is not defensible. The facts are that Kanawha River, Amos and other northern plants in APCo are electrically closer to the Virginia load centers than the APCo plants that were utilized in the analysis which were Glen Lyn and Clinch River. Clinch River and Glen Lyn are integrated by lower voltage transmission lines (138kv) while plants such as Kanawha River, Amos and Mountaineer are integrated at 345Kv and/or 765Kv transmission lines.

- The importing and exporting of power both within the PJM pool and external to the pool are major factors that must be considered in any study if any reliance is to be placed on that study.
- Similarly, ignoring transmission constraints is not reality since the ability to displace depends on the transmission system to effect any such displacement. The transmission systems are now attempting to serve purposes they were not designed to provide and the present problems are not going to be easily solved. Customer demands continue to grow, non-utility generation plants are located to benefit the developer instead of optimizing the system and transmission lines steadily become more difficult to site and construct.

I strongly disagree with the statement that these simplifying assumptions outlined above are unlikely to significantly affect the results.

Q. Do you agree that the matching of the wind generation against the hourly generation of the fossil fuel plants as outlined in the report produces a proper result in terms of reduced emissions?

A. Absolutely not. The lack of any information in the report as to how the conclusions were reached prevents any meaningful review but it is clear that many critical areas were not considered.

Q. In your opinion what would constitute a more valid study?

A. The only way to even approximate the extent of any emission reduction would be to carry out a series of simulations using actual values with injection of various levels of wind generation to determine which units responded. You can make no rational judgment as to the extent of any emission reduction without knowing

which units will be affected. The grouping of units as coal, gas or oil is far to simplistic to produce meaningful results. The variation in heat rate between units and the variation over the load range on the same unit, the presence or absence of pollution controls and their effectiveness, the fuel characteristics and transmission constraints all will have an effect that can be determined only by knowing the units affected. As pointed out earlier, the largest plant in the AEP system was ignored in the RSG report. The 1300MW unit 3 at this plant will have scrubbers installed in 2007 with an expected 98% efficiency. The two remaining 800MW units will have scrubbers installed following completion of the 1300 MW unit. Improvements of this type are being made at many locations with huge impacts on emissions. These impacts, however, can only be considered with a unit by unit study and not by grouping by fuel type.

Q. Why do you use the term "to even approximate" in referring to the simulation methodology?

A. The electrical system is constantly changing as thousands of individual customers increase or decrease their use of electricity. These shifting patterns result in a moving target that requires virtually continuous change in generation and transmission. The introduction of a variety of generation sources that are also varying has also added to the complexity. The fact that the system is always changing means that a simulation would be a snapshot of that one instant in time. A series of snapshots under a number of conditions could provide an approximation of the impact but any significant change such as the loss of a unit would result in new conditions.

Q. Do you agree with the statement in footnote 1 on page 6 that small differences in capacity factors have relatively little effect on avoided emission rates?

A. The term small is not defined but any change in capacity factor is directly proportional to the energy available for displacement purposes. I don't see any basis for such a statement.

Q. Have you reviewed the comments filed by Mr. Hathaway and Ms. Jacobson?

A. Their comments rely heavily on the RSG report of Mr. High and are, therefore, subject to the same problems discussed regarding Mr. High's testimony.

Q. Was there anything new in these comments?

A. Yes. In footnote 5 on page 4, the value of .2951 was shown as stated to have been derived from the RSG study. This was of interest in that I found no capacity factor in the RSG study. I was also surprised in that a capacity factor would seem to be the result of turbine design, wind speeds, maintenance requirements and forced outage periods. I fail to see how a study on displaced emissions results in the calculation of a capacity factor. It should be the other way around and the emissions study should start with a capacity factor.

Q. Do you consider the .2951 to be a good figure?

A. I think a better approximation would be to use the actual figure for 2005 for the Backbone Mountain installation of 26.6%, which I referred to earlier.

Q. What do you expect the emission reduction to be in Virginia as a result of the HNWD if it were to be built?

A. I would not expect to see any reduction in Virginia emissions, as there would be no reduction in Virginia energy requirements. It is clear that to meet the total

target sales price of 5.15 cents per kWh to reach the revenue projection shown in their response to interrogatories, the sales will be outside of Virginia. The 5.15 cents per kWh consists of a rate of 4.30 cents per kWh plus a renewable energy credit of .85 cents per kWh. When adjusted from the 30% capacity factor to the 26.6% factor experienced by Backbone Mountain, in 2005 that 5.15 cents per kWh approaches 6 cents per kWh, which is not competitive in Virginia. (See Attachment which shows the cost to the retail customer of firm generation including the cost of transmission.) Energy produced in Virginia but sold outside Virginia has no effect on the energy required to meet Virginia customer requirements.

Q. Who prepared Attachments 2 and 3 to your testimony and what is the purpose of these attachments?

A. These attachments were prepared at my request by the Department of Landscape Architecture at Virginia Tech. The attachments were prepared under the direction and supervision of Benjamin C. Johnson, Professor of Landscape Architecture.

Q. Can you describe what these attachments show?

A. Attachment 2 shows the areas from which the wind turbines would be visible in daylight hours using a 400 ft. height and scanning an area projecting from the tower locations for a distance of 25 miles. Attachment 3 shows the areas from which the lighting on the nacelles (generator housings) would be visible using a 250 ft. height and scanning a similar area.

Q. What lighting will be required by the FAA?

A. My reading of FAA Circular AC 70/7460-1K is that the lighting should consist of 2 flashing beacons for each structure. It would appear that the owner could use either red or white lights for this purpose.

Q. Does that conclude your direct testimony?

A. Yes.

Attachment 1

Ken Schrad
Director

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FOR IMMEDIATE RELEASE
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SCC ISSUES THE 2006 AVERAGE "PRICE TO COMPARE" FOR ELECTRICITY SUPPLY SERVICE

RICHMOND -- The State Corporation Commission (SCC) has determined the "price to compare" for electricity supply service should competitive suppliers make offers in Virginia during 2006. This is the fifth year the SCC has done so.

The average "price to compare" is set for each customer class of the four local utility companies in Virginia that have opened their service territories to retail competition – Dominion Virginia Power, Appalachian Power, Allegheny Power and Delmarva Power.

The "price to compare" is the incumbent utility's charge for the generation and transmission of electricity, less any applicable competitive transition charge. The SCC found that such a charge is not necessary during 2006. The SCC will review again the need for the charge prior to 2007.

A consumer can use the "price to compare" as a benchmark for comparing offers for electricity supply service. Expressed in cents per kilowatt-hour (¢/kWh) of electricity, that number and the amount of electricity used over the past year allows a customer to compare the estimated annual cost of a competitive offer to what they would pay the incumbent utility.

All four companies show "price to compare" information and more detailed electric usage information on the monthly bill. The monthly bill also shows as separate items the charge for electricity supply service (including transmission costs), the charge for distribution service, a competitive transition charge (when applicable), and associated state and local taxes.

Electricity supply service is the service for which Virginians may eventually have the opportunity to shop. Distribution service will continue to be provided by the current electric company at rates approved by the SCC.

The following are annual averages for each customer class. The actual "price to compare" for a particular customer will vary depending on usage and the rate schedule of the existing electric company. A customer can always ask their current electric company for their actual "price to compare."

Customer Class	Dominion Virginia Power	Appalachian Power*	Allegheny Power	Delmarva Power *
Residential	6.078¢/kWh	3.714¢/kWh	3.87¢/kWh	6.47¢/kWh
Small Commercial	5.699¢/kWh	3.535¢/kWh	3.96¢/kWh	7.00¢/kWh
Large Commercial	5.435¢/kWh	4.053¢/kWh	3.90¢/kWh	Not Applicable
Small Industrial	4.629¢/kWh	3.430¢/kWh	3.55¢/kWh	6.73¢/kWh
Large Industrial	4.217¢/kWh	3.249¢/kWh	3.34¢/kWh	6.00¢/kWh
Churches	6.651¢/kWh	3.452¢/kWh	Not Applicable	Not Applicable

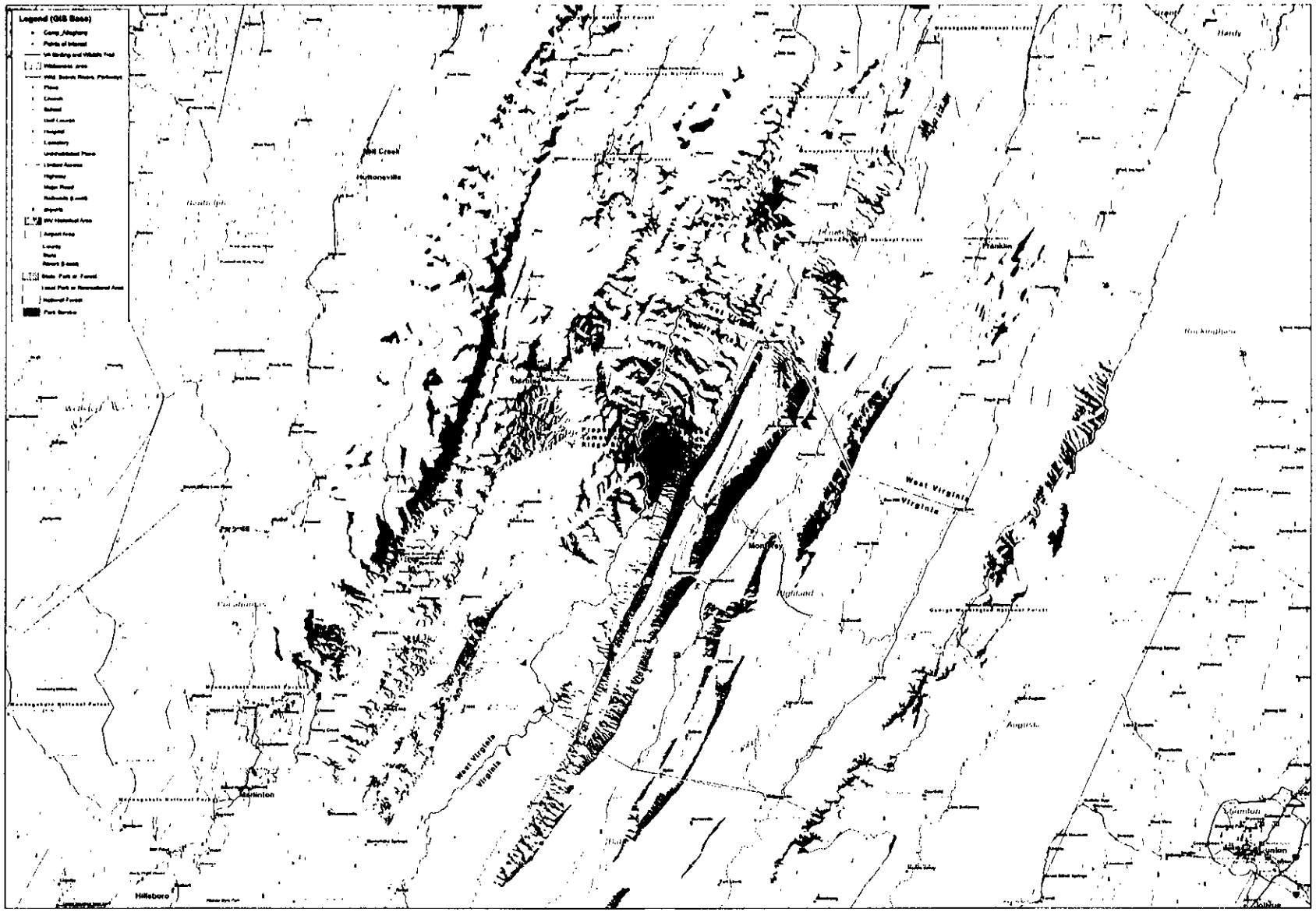
*The SCC may revise the "price to compare" for Appalachian Power and Delmarva Power during 2006 because of pending cases.

For additional information about the state's progress toward developing a competitive energy supply market, consumers are encouraged to visit the Virginia Energy Choice website at www.vaenergychoice.org.

For additional information, contact ken.schrad@scc.virginia.gov

State Corporation Commission
webmaster@scc.virginia.gov

Attachment 2



VIEWSHED ANALYSIS

Proposed Highland New Wind Development

400 Foot Observer (Top of Blades)

ANALYSIS VARIABLES:

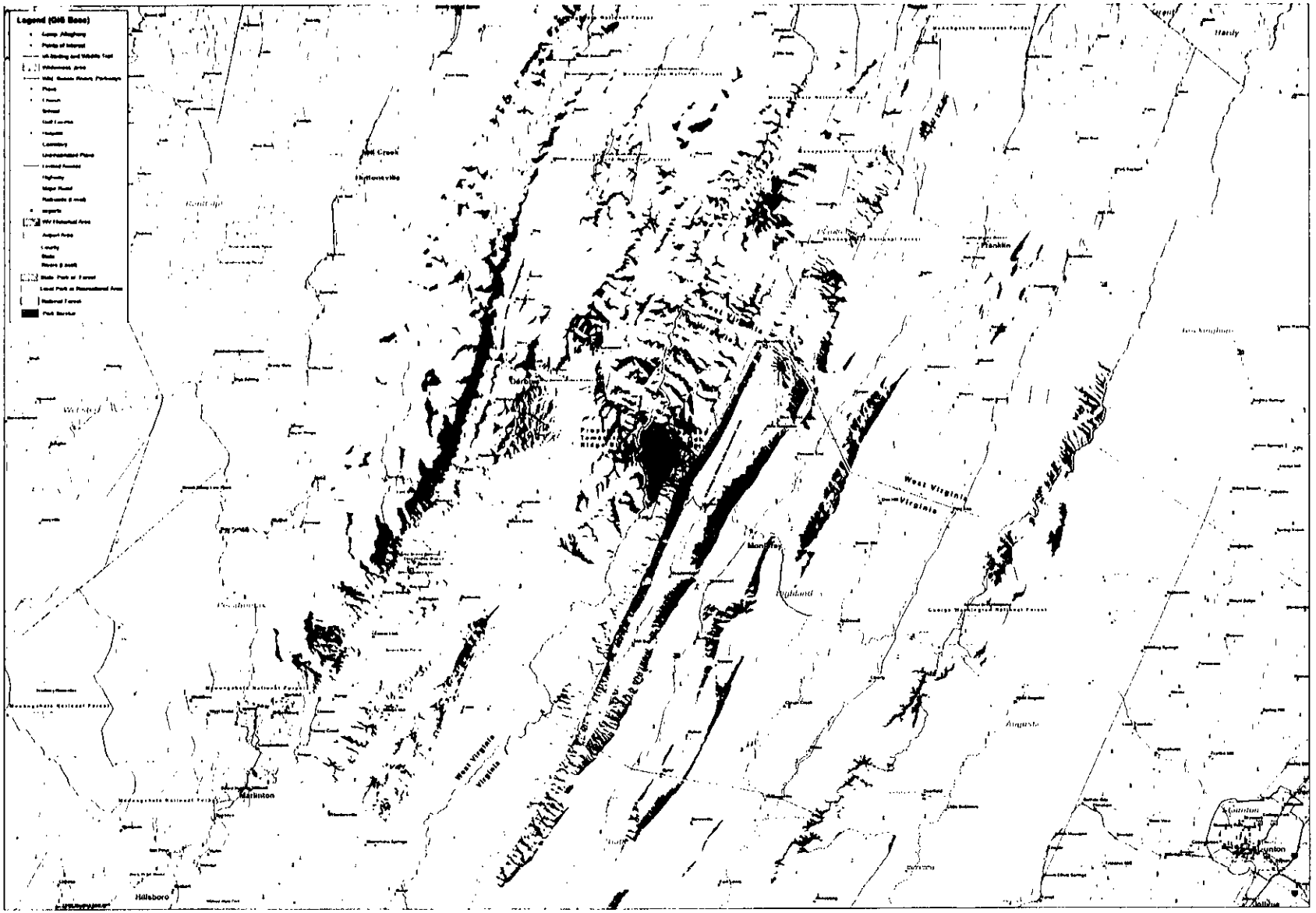
1. Observation Points' Heights (Top of Blades) 400 Feet
2. View Distance 75 Miles
3. Terrain Data: USGS 3" National Elevation Data
4. Barren Landscape: No Vegetation

LEGEND

- Viewshed Observation Points (Proposed Wind Tower Sites)
- Visible Areas

September 2008

Attachment 3



VIEWSHED ANALYSIS

Proposed Highland New Wind Development

260 Foot Observer (Center of Blades - Light Attachment)

ANALYSIS VARIABLES

1. Observation Points' Heights (Proposed Center of Blades): 260 Feet
2. View Distance: 75 Miles
3. Terrain Data: USGS 3" National Elevation Data
4. Earth Landscape: No Vegetation

LEGEND

- Viewshed Observation Points (Proposed Wind Tower Sites)
- Visible Areas

SCALE 1 : 450,000

September 2006