# CONTAINS REDACTED INFORMATION

**DIRECT TESTIMONY**
**OF**
**DANIEL M. VIOLETTE, PH.D**
**ON BEHALF OF**
**PIEDMONT ENVIRONMENTAL COUNCIL**
**BEFORE THE**
**STATE CORPORATION COMMISSION OF VIRGINIA**
**CASE NOS. PUE-2007-00031 AND PUE-2007-00033**

**Q. PLEASE STATE YOUR NAME, YOUR EMPLOYER AND BUSINESS ADDRESS.**

A. My name is Daniel M. Violette. I am employed by Summit Blue Consulting, LLC at 1722 14th Street, Suite 230, Boulder, Colorado 80302.

**Q. WHAT IS YOUR POSITION?**

A. I am a Principal and Founder of Summit Blue Consulting.

**Q. WHAT IS YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL EXPERIENCE?**

A. My experience and educational background is presented in Exhibit DMV-1. A summary is presented below. I have been working in the area of Demand-Side Management (DSM) since the early 1990's. I led a state-wide evaluation of energy efficiency programs in New Jersey encompassing all the DSM programs at both the investor-owned electric and gas utilities. This involved almost 100 DSM programs. I have continued to work on resource planning issues in the utility industry with a focus on demand-side options including energy efficiency and demand response. This work has included serving as the project manager for a number of state-wide evaluations through multi-year, multi-million dollar efforts in Michigan, Wisconsin, and New Jersey. I am currently the project manager for a state-wide evaluation of New York's energy efficiency programs funded through the Societal Benefits Charge and implemented as part of that State's industry restructuring and move to retail choice. That project addresses over 30 energy

efficiency and demand response programs across five utility service territories. In addition, I am the project manager for a state-wide impact evaluation of demand response programs being implemented by the three California investor-owned utilities. Evaluation work I have performed has frequently served as the basis for utilities filing for DSM incentives and lost margins in several states.

I have worked on policy issues surrounding DSM as a consultant to various state and utility DSM collaborative efforts in Massachusetts, California, Ohio, Kentucky, Utah, and Florida. I have testified in rate cases covering a wide variety of issues, including DSM incentives, cost allocation, tariff design, performance-based rates, and prudence issues.

I have presented a number of papers at meetings of the National Association of Regulatory Utility Commissioners (NARUC), led workshops for the U.S. Environmental Protection Agency (EPA) and NARUC related to energy efficiency, authored reports for NARUC on principles for regulating DSM programs, and been an invited speaker and contributor to NARUC Conference proceedings. I have developed guidebooks related to energy efficiency for regulators (through Oak Ridge National Laboratory), for the International Energy Agency (IEA), and for the California Measurement Advisory Council. I completed a guide for valuing demand response (DR) resources and the integration of DR in planning for the IEA with approximately 20 countries directly contributing funds to this IEA DSM Annex and 15 separate U.S. entities also contributing, including state commissions, utilities, independent system operators, associations (e.g., the Association of Western States' Governors) and the U.S. Department of Energy.

I also co-authored a DSM guide for the Canadian Association of Public Utility Tribunals (CAMPUT), the association of regulators in Canada and an affiliate of NARUC, on a variety of

DSM issues which have led to presentations at the annual CAMPUT meetings, and the Canadian Electric Association's Regulatory Dialogue in this past year.

I am currently serving as expert staff to the California Public Utilities Commission (CPUC) and the California Energy Commission on DR hearings addressing the impact assessment of DR programs and the cost-effectiveness assessments of DR programs in forward-looking resource plans. In addition, Summit Blue Consulting is working with 8 utilities on the design and implementation of DSM programs, and I am working with a team of consultants to develop and assess DSM program designs appropriate for that utility.

My industry experiences include serving three elected terms as the President of the Association of Energy Services Professionals (AESP) and serving two terms as the founding Vice Chair of the Peak Load Management Alliance (PLMA). I currently serve on the Boards and Executive Committees of both the AESP and PLMA.

**Q. HAVE YOU PREVIOUSLY APPEARED AS AN EXPERT WITNESS?**

A. I have testified as an expert witness before state or provincial commissions in Arizona, Iowa, Ohio, Delaware, Texas, New Jersey, Hawaii and Ontario, Canada. In 2007, I testified in Ontario as part of the DSM Generic Hearings, and in Hawaii on Hawaiian Electric's proposed DSM plan and related incentive provisions. I am currently serving an expert to regulatory staff at the CPUC in an ongoing demand response proceeding and I have participated in numerous collaboratives, often as a designated expert on specified issues. A section in Exhibit DMV-1 lists my testimonies as an expert.

**Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

A. Counsel for the Piedmont Environmental Council has requested that I introduce the Summit Blue Assessment paper entitled "Situational Analysis of Demand-Side Management

Options in the Commonwealth of Virginia" (DSM Assessment) attached as Exhibit DMV-2, review Scope and Conclusions of DSM Report, compare the relative risk and cost-effectiveness of demand management and energy efficiency, and address issues raised in the Prepared Testimony of David F. Koogler of Dominion Virginia Power (DVP) with a particular focus on the time of use (TOU)/dynamic tariffs discussed by Mr. Koogler.

**Q. ARE YOU FAMILIAR WITH THE "DSM ASSESSMENT" THAT IS EXHIBIT DMV-2?**

A. Yes. The DSM Assessment was prepared under my direction. It provides:

1) An overview of the economics associated with DSM, DSM achievements in other jurisdictions, as well as DSM administration and funding approaches.

2) An assessment of the DSM potential for the Commonwealth of Virginia based on available information on the customer base, current energy and peak demand by market segment, forecasts of future energy consumption and earlier DSM studies. These data were augmented by secondary data on DSM measures, contributions to energy savings, costs and benchmark program design.

3) An initial description and recommendation for the implementation of five DSM programs targeted at technology and market sectors. These five programs represent a basic DSM portfolio that can generate energy savings and peak reductions consistent with the potential assessment.

4) Finally, the assessment concludes with a DSM action agenda. This action agenda would help protect ratepayers from higher energy prices in the future, enhance reliability, improve the quality of the environment, and help maintain the Commonwealth of Virginia's regional economic competitiveness.

**Q. DR. VIOLETTE, PLEASE SUMMARIZE THE KEY FINDINGS FROM THE DSM ASSESSMENT?**

A. The DSM Assessment develops a portfolio of five DSM programs that are based on successful programs implemented by other utilities. These programs incorporate both energy efficiency (permanent demand reductions) and demand response (targeted peak demand reductions). The DSM Assessment examined a 10-year horizon and concluded that a well-designed portfolio of DSM programs could reduce the peak demand for the Commonwealth of Virginia by approximately 5,000 MW by 2017 and energy consumption by approximately 7,800 GWh. The ten-year horizon was selected as a reasonable planning scenario. Values that could be achieved in a 5 year period were not explicitly estimated but derived through interpolation, taking into account projected annual growth rates. DVP serves approximately 80% of the population of Virginia. Were DVP to implement these programs, the cumulative reductions in peak demand and energy consumption within five years would be in the range of 2,000 MW and 3,000 GWh respectively.

The five programs are:

1. **Residential and Commercial High-Efficiency Lighting Programs** that provide incentives to customers and also to lighting retailers and specialty contractors to increase promotions and installations of high-efficiency lighting systems**.**
2. **Residential HVAC Retrofit and Quality Installation Programs** that promote high-efficiency HVAC equipment as well as assistance to HVAC retailers and specialty contractors to increase promotions and installations of high-efficiency HVAC equipment. These programs would be enhanced by demand response protocols that would lower electricity use at times of high market prices or when grid reliability is

jeopardized (*i.e.*, times of peak system demand) through the use of switches or communicating "smart" thermostats, or other appropriate technologies.

3. **Residential and Commercial New Construction Programs** provide assistance to home / facility owners to incorporate energy efficiency into the design, construction, and operation of new or renovated homes and other facilities. These programs would be enhanced by incorporating a demand response protocol that would install appropriate DR enabling technologies.

4. **Residential and Commercial High-Efficiency Appliance/Office Equipment Programs** work with customers to encourage the purchase and use of ENERGY STAR® rated home appliances and office equipment. These programs can be enhanced by establishing partnering arrangements with the ENERGY STAR Program and other national and regional resources and expertise.

5. **Commercial Data Center Efficiency Programs** provide assistance to owners and facility managers at large, energy-intensive commercial data centers to incorporate energy efficiency measures into the design, construction, and operation of these types of facilities. The programs would also seek to use available backup generation capacity at these facilities to develop additional demand response resources.

**Q. HAVE THESE PROGRAMS BEEN DEMONSTRATED IN OTHER JURISDICTIONS?**

A. Yes. As discussed in the DSM Assessment, variants of these five program types have been deployed in many jurisdictions over the past twenty years and have achieved substantial energy savings and peak demand reductions within planning horizons of five years or less. The benefits of these DSM programs can be enhanced further when combined with innovative rates

designed to shift energy use from high-cost periods to lower-cost periods, and other time-differentiated rates that support DSM. It should be noted that this action plan is a starting point recommendation. As these initial programs are rolled out and gain traction in the market, other programs should be added to maximize long term benefits.

**Q. DR. VIOLETTE, WHAT ARE THE OBJECTIVES OF DSM?**

A. DSM seeks to save energy through energy efficiency and reduce peak demands through demand response. DSM is designed to help customers make decisions regarding energy use that will lower there bills in the near term, and also lower overall future revenue requirements for energy providers such as DVP by selecting least cost resources that include demand-side programs. These revenue requirements are eventually translated into rates paid by customers. An effective use of demand-side resources will suppress rates lower into the future and help maintain the economic competitiveness of the region.

Another important objective of DSM is to bring demand into play in the electricity market, allowing consumers to respond to changes in market conditions. For example, an effective demand response program will decrease demand on peak days when the costs of providing electricity are at their highest. Studies have shown that reducing demand on peak days by as little as 3% to 5% can reduce electricity prices by as much as 20% to 50% depending on the region.

**Q. ARE THE ECONOMICS OF THESE DSM PROGRAMS FAVORABLE COMPARED TO SUPPLY-SIDE ALTERNATIVES?**

A. Yes, the economics can be very favorable. Regulators and utility executives have endorsed the use of DSM as a cost-effective resource for meeting both existing demand and future growth in demand. The key to cost-effective DSM is a commitment to the implementation

of quality programs that include regular feedback on program accomplishments. As discussed in the DSM Assessment, sizeable amounts of DSM have been able to be delivered at a cost averaging $0.03/kWh, a cost less than that associated with the development of equivalent supply-side resources. In addition, DSM can be implemented quickly. A resource mix that takes full advantage of DSM in combination with and in support of least-cost supply-side plans represents the best approach for effectively managing electricity prices for the benefit of ratepayers. DSM options provide diversity in the portfolio and this can be important given supply-side uncertainties in the form of environmental compliance costs, fuel prices and related fuel delivery infrastructure, and the rapid increases in the cost of materials such as steel and copper. The resulting diversification of the resource portfolio with DSM resources located at load centers can reduce the risks of price spikes, overall volatility, and increase overall system reliability. These economic factors are driving regulators and utilities in neighboring states to pursue DSM aggressively, and appropriately align financial incentives with cost-effective investments in DSM.

**Q. BY HOW MUCH CAN A DSM PORTFOLIO LOWER ENERGY CONSUMPTION AND PEAK DEMAND IN THE COMMONWEALTH OF VIRGINIA?**

A. The potential analysis in the DSM Assessment shows that these programs can reduce peak demand by approximately 5,000 MW and energy consumption by 7,800 GWh over a 10 year planning horizon. These estimates represent a peak reduction of 17% (based on 2007 peak demand) and a 10% reduction in energy use (from 2007 levels). These DSM contributions are within the ranges of demand and energy consumption reductions achieved in other jurisdictions. These potential results lead to an action agenda calling for targets of 1% reductions in energy use in each year — a 10% reduction year 10 over what would other wise have been the case — and a

1% reduction in peak demand annually. Some companies and jurisdictions, for example Xcel Energy and the State of Vermont, have adopted more aggressive targets on the order of 1.5% reductions in energy and peak demand on a cumulative annual basis.

**Q. PLEASE SUMMARIZE THE ACTION AGENDA RECOMMENDED IN THE DSM ASSESSMENT.**

A. The DSM Assessment recommends that the Commonwealth of Virginia act now to apply key lessons learned and adopt DSM best practices pioneered in other jurisdictions. This is a critical time for the Commonwealth of Virginia as large-scale electric infrastructure investments are being considered throughout the region. Investments not made on the demand-side now, may be lost forever as growing energy needs are met through higher-cost supply and transmission investments. Specific actions include:

- Setting targets for DSM that call for a minimum of 1% reductions per year in forecast energy consumption and peak demand growth, goals that are well within reach of DVP, the largest utility in the Commonwealth of Virginia.
- Addressing current financial disincentives for utility investment in DSM. This generally includes simple cost recovery of investments in DSM and related infrastructure, and appropriate treatment of lost margins on fixed costs (not total lost revenues) stemming from reduced sales due to DSM.
- Developing positive incentives for demand response programs, innovative rates, and advanced metering technology. One example would be to allow the utility to earn a margin on investments in DSM just as it receives a return on supply-side investments. This leveling of the financial playing field between demand-side and supply-side

investments will appropriately align the financial interests of the utility with the provision of a least-cost resource plan.

This alignment of financial incentives will allow for the development of a DSM power plant (comprised of a number of programs and activities) that does not put the utility at a financial disadvantage. Demand-side programs require resource commitments. While DSM is not necessarily a capital intensive investments, other service-based firms such as accounting, law and construction, expect to earn a return on their services. The same should be true with utility provided DSM services.

Q. **HAVE YOUR READ THE DIRECT TESTIMONY OF DVP WITNESS DAVID F. KOOGLER, DR. VIOLETTE?**

A. Yes I have, including his recent revision of the energy sales to customers taking service under TOU rates.

Q. **DO YOU AGREE WITH MR. KOOGLER'S UNDERSTANDING OF DSM AND HIS CATEGORIZATION OF DSM PROGRAMS?**

A. No. Mr. Koogler at page 1, lines 14-16, does captures the essence of DSM when he states that "Demand side management (DSM) can include a wide variety of utility activities designed to change or influence the level or timing of customers' electricity consumption and thus their impact on the demand for generation." However, Mr. Koogler confines DSM to two categories: 1) DSM education programs and 2) tariffs that either include direct load control or provide time- differentiated pricing. While education programs and tariffs are two important facets of DSM, but they do not encompass the full range and variety of DSM programs currently being implemented by other utilities and in other jurisdictions.

**Q. WHAT OTHER TYPES OF DSM PROGRAMS ARE OFFERED BY UTILITIES?**

A. I would include a much larger set of DSM programs in describing the different categories of DSM that have been successfully implemented. These include:

1) Equipment incentive programs. A number of utilities offer incentives and rebates for saved kWh resulting from energy efficiency equipment programs. Commonly, these cover high efficiency lighting, HVAC equipment, and motors with variable speed drive technologies. Utilities generally have a high degree of confidence in the savings that accrue from these programs, allowing savings targets to be set in advance based on the size and type of products involved. These tend to be "deemed savings" programs with the overall estimate of saved kWh being the product of the deemed savings levels and the quantity of equipment installed.

2) New Construction Programs. A number of utilities offer incentives to builders and the architectural and engineering firms with which they work to build homes and commercial structures that are energy efficient. These programs generally include a specified step termed "commissioning of energy-using equipment" to ensure that the installed equipment is working as anticipated in the new building. This has been found to be an important step actually attaining the anticipated energy efficiency benefits.

3) Major Building Retrofit Construction Programs. These programs are similar to new construction, but involve existing buildings that are undergoing major renovations. The building and design companies are rewarded for incorporating energy efficiency designs and equipment into these retrofits of existing buildings.

4) Building Design Programs. Often the new construction and major retrofit programs are supported by a earlier-stage program that provides architects and equipment

design engineers (A&E firms) incentives to develop building designs and plans that meet high energy efficiency standards. A&E firms can receive funds that cover the costs of developing a set of plans for presentation to a client or developer that is constructing or retrofitting a building. These plans often have specific energy efficiency objectives (kWh per square foot).

5) On-Site Energy Audits. Inspectors are deployed to develop estimates of savings and costs for energy efficiency improvements. Customers are presented with the audit report along with list of approved contractors that can address the recommendations. Rather than just being an information program, aggressive audit programs offer incentives to customers to take specific actions that have long-lasting energy savings impacts.

6) Retro-Commissioning for Commercial Buildings. Implementation of this program is rapidly growing across utilities. It differs from a new or retrofit construction in that it focuses on the operation of existing equipment in a building. Many existing buildings have poorly maintained HVAC and other major energy-using equipment. A retro-commissioning program involves tuning up and providing needed maintenance to existing equipment. This helps to ensure that the installed equipment is operating as originally designed. Savings of up to 15% are often achieved.

These six program types go beyond Mr. Koogler's education and tariffs.

**Q. AT LINES 21-22 OF PAGE 2 OF HIS DIRECT TESTIMONY, MR. KOOGLER ASSERTS THAT "NON-UTILITY BUSINESSES AND LOCAL, STATE AND FEDERAL GOVERNMENT PROGRAMS HAVE GENERALLY REPLACED UTILITY-SPONSORED PROGRAMS." DO YOU AGREE?**

A. No. To the contrary, non-utility, local, state and federal programs are typically designed to work in partnership with utility programs and not be replaced by them. A good example is the EPA ENERGY STAR Program that, in partnership with utilities, delivers energy efficient solutions to customers. In fact, in a special feature in Fortune Magazine, Exhibit DMV-3, the EPA states that hundreds of utilities have partnered with its ENERGY STAR Program. Illustrative of these cooperative programs, TXU Delivery in Dallas, Texas won the 2007 ENERGY STAR Sustained Excellence Award. Arizona Public Service Company, Pacific Gas & Electric Company, and Southern California Edison all won Partner of the Year awards in Energy Efficiency Program Delivery in 2007. Other ENERGY STAR 2007 award winners include Georgia Power and Long Island Power Authority for excellence in ENERGY STAR promotion, and National Grid won the 2007 ENERGY STAR award for Excellence in Home Improvement. A full list of utilities that are participating in the ENERGY STAR programs and award winners can be found on the ENERGY STAR website at www.energystar.gov. With over 100 utility partners, this well-known program is not meant to displace utility involvement in energy efficiency programs. DVP has recently announced that it expects to become more involved in Energy Star efforts.

**Q. MR. KOOGLER DISCUSSES OTHER ACTIONS TAKEN BY THE FEDERAL GOVERNMENT THAT HAVE REDUCED THE NEED FOR UTILITY PROGRAMS. CAN YOU DISCUSS THIS?**

A. The federal government has taken actions on energy efficiency standards for equipment and appliances, as well as creating tax credits. But this limited federal involvement does not displace the need for well-designed utility programs. Many utilities have continued their DSM activities through these federal actions with modifications to their programs to best leverage the federal actions to enhance overall energy efficiency in their service territory.

**Q. PLEASE EXPLAIN THE ECONOMICS OF DSM IN WHICH THE UTILITY PROVIDES INCENTIVES TO PROGRAM PARTICIPANTS.**

A. If the monies spent on energy efficiency programs for saved kWh are less than what it would cost to produce the same kWh from a supply-side generation unit; then, the program is cost effective since it meets customer energy needs at a lower cost than supply-side alternatives that include generation and transmission. The six programs that I discussed earlier all involve customer incentives to save energy by purchasing high-efficiency equipment, building design, and retro-commissioning to enhance the efficiency of existing building and equipment. In all cases, the cost per kWh saved through the program must be less than the cost of building new resources to meet an equivalent increase in kWh demand.

**Q. HAVE YOU EXAMINED THE TOU RATES THAT MR. KOOGLER DESCRIBES BEGINNING AT LINE 19 OF PAGE 4 OF HIS DIRECT TESTIMONY?**

A. Yes. I agree with Mr. Koogler that tariffs are an important component of any demand-side plan. A cornerstone of DVP's demand-side strategy is the use of tariffs. Mr. Koogler states that "The Company believes that tariffs with time-differentiated pricing that more precisely

tracks costs will do the best job of providing customers with the information necessary to make more educated and customer-specific energy efficient decisions."

**Q. HAVE YOU EXAMINED DVP'S TARIFFS TO DETERMINE WHICH ARE TIME-DIFFERENTIATED AND, IF SO, THEN PLEASE IDENTIFY THEM AND EXPLAIN HOW THEY WORK?**

A. Mr. Koogler draws a general distinction between TOU rate schedules and dynamic rate schedules. TOU rates set different prices for pre-established time periods for every day in a season, for example May through September. Dynamic rates are those that can vary across the same hours in a day across different days in a season depending on changes in the marginal cost of generating power. Mr. Koogler cites real-time pricing where different rates are provided for each hour of the day as an extremely dynamic rate.

**Q. WHAT RESIDENTIAL TARIFFS OFFERING TIME DIFFERENTIATED RATES DOES MR. KOOGLER DISCUSS IN HIS TESTIMONY?**

A. According to Mr. Koogler at page 5, lines 1-9 of his testimony, DVP offers two TOU rates to Virginia residential customers on a voluntary basis — Schedule 1S, which has time-differentiated demand charges and time-varying energy rates, and Schedule 1T, which only varies the cost of energy by time period. DVP's response to interrogatory 252, Exhibit DMV-4, shows that there are 8,183 customers on these two rate schedules, and 9,730 customers across four residential rate schedules listed in the Table provided in response to interrogatory 252. One of the other listed demand-side rate schedules is a closed TOU rate and the second is a time-controlled water heater rate with only 183 customers. However, to estimate the full participation in time-differentiated rates, both the number of customers on all rates — both open and closed should be examined. The number of customers on these time-differentiated rates are less than ½

of one percent of all DVP residential customers and less than ½ of one percent of the total energy consumed is purchased at such a rate. Given how small these programs are, they cannot have any material impact on DVP's energy or demand requirements. In other words, these residential TOU rates have essentially no effect on any consumption or peak demand. The participation and energy use in the residential TOU rates are simply too small to have an impact.

**Q. WHAT THEN IS THE RATE UNDER WHICH MOST RESIDENTIAL CUSTOMERS OF DVP TAKE SERVICE?**

A. The vast majority of residential customers must be on Schedule 1 – Basic Residential Rate. This rate is interesting in that it has a declining block structure that encourages higher levels of energy use since the marginal cost of using more energy declines from the first block (the first 800 kWh) to the second block.(usage over 800 kWh). The Schedule 1 rate calls for a $7.00 basic service charge per month and rates for energy supply of:

Billing Months of June – September

First 800 kWh @ 2.233¢ per kWh

Over 800 kWh @ 1.260¢ per kWh

Billing Months of October – May

First 800 kWh @ 2.233¢ per kWh

Over 800 kWh @ 1.260¢ per kWh

This declining block structure for residential customers runs counter to approaches utilities have taken to try to promote energy conservation. Generally, increasing block rates are used where the price per kWh increases as usage increases.

**Q. WHAT COMMERCIAL AND INDUSTRIAL (C&I) TARIFFS DOES MR. KOOGLER DISCUSS IN HIS TARIFF?**

A. Of the 21 C&I schedules and tariffs listed in the attachment to DVP's answer to Piedmont interrogatory 252 (along with 5 riders to those tariffs), Mr. Koogler mentions schedules GS-2T, GS-3, GS-4 and rate schedule 10 from among those that are available to C&I customers. The first three are essentially TOU rates, but schedule 10 would more accurately be classified as a dynamic rate as prices can vary by day (in this case day types). These four rate schedules account for [redacted] or [redacted] of the total energy purchased under the TOU and dynamic rate schedules listed in DVP's answer to interrogatory 252 as being "Demand-Side Management Rate Schedules." A number of these rate schedules are specific to the Commonwealth of Virginia, cities and municipalities, and the federal government. Others are standby generation rates or curtailable service rates. These "other" rate schedules have lower levels of participation and account for much lower kWh sales than the four schedules that I plan to discuss — GS-2T, GS-3, GS-4 and rate schedule 10.

**Q. DO THE PARTICIPANTS IN THE C&I TARIFFS ACCOUNT FOR A SIZEABLE FRACTION OF TOTAL ENERGY USE ACROSS VIRGINIA POWER'S CUSTOMERS?**

A. Yes. As a point of reference, all of the DSM rate schedules provided in response to interrogatory 252 (including the TOU and dynamic rates) account for [redacted] of total DVP energy consumption across both residential and C&I sectors on a 12 month basis using 2006 DVP data. Of the [redacted] of total energy consumption that these DSM rate schedules account for, the four C&I schedules that Mr. Koogler mentions — the GS-2T, GS-3, GS-4 — account for [redacted] of the energy use across all DSM rate schedules (including TOU and dynamic rates, standby generation and curtailable service) offered by DVP. It is thus informative to focus

on examining some specifics of these four C&I rates that account for [redacted] of the total [redacted] of total energy consumption on time differentiated rates. Piedmont asked DVP for any studies of the effectiveness of these rates on kWh consumption, but no studies were provided. As a result, I was only able to prepare an overview analysis of these rates.

**Q. PLEASE DESCRIBE THAT ANALYSIS.**

A. To avoid an overly complex analysis, I focused on the energy supply provisions of these four C&I rates that account for the vast majority of energy use under time-differentiated rates to see how they might promote energy conservation. The information that I analyzed came from the websites at which DVP responded to Piedmont's interrogatory 94. Exhibit DMV-5.

**Schedule GS-2T** rate to C&I customers is:

On Peak kWh charged @ 3.155¢ per kWh

Off-Peak kWh charged @ 0.524¢ per kWh

These price differentials are substantial and could lead to some shifting of energy use away from peak to off-peak periods. However, the defined peak hours in this rate schedule will make it difficult for customers to shift energy use. The definition of peak and off-peak hours are shown below:

1. For the period of June 1 through September 30, 10 a.m. to 10 p.m., Mondays through Fridays.

2. For the period of October 1 through May 31, 7 a.m. to 10 p.m., Mondays through Fridays.

3. All hours not specified above are off-peak.

These on-peak periods are too long, lasting 12 hours in the summer and 15 hours in the shoulder and winter periods. It is unlikely that customers could shift much load in response to these time periods.

**Schedule GS-3** rate to C&I customers is:

On Peak kWh charged @ 0.404¢ per kWh

Off-Peak kWh charged @ 0.272¢ per kWh

While GS-2T has energy prices in the 0.3¢ per kWh range, the energy costs in this rate schedule are so low as to provide little incentive for conservation. These energy prices are less than one half of one cent per kWh even on peak days. Despite the differential in peak and off-peak prices, the absolute level of potential savings is so small that it is unlikely to induce conservation or energy efficiency. This tariff, however, does have reasonably high demand charges that could provide an incentive to reduce seasonal peak demands. The definitions of peak and off-peak hours for GS-3 are the same as for GS-2T:

1. For the period of June 1 through September 30, 10 a.m. to 10 p.m., Mondays through Fridays.

2. For the period of October 1 through May 31, 7 a.m. to 10 p.m., Mondays through Fridays.

3. All hours not specified above are off-peak.

Again, peak is too broadly defined. As a result, there likely will be little shifting of energy use from on-peak to off-peak periods. No studies of this effect were made available by Virginia Power.

**Schedule GS-4** has the same energy costs and peak and off-peak periods as the GS-3 tariff with a similar result that it is unlikely to encourage conservation or energy efficiency.

**Schedule 10** is the one schedule of the four C&I rates that accounts for most consumption under time-differentiated tariffs that could be characterized as offering a dynamic rate. This rate is for large general service customers — 500-kW of demand or more. It represents an innovative rate structure that is based on "called day types." This approach has been used in Europe, and variants have been adopted in the United States such as the TOU/Critical Peak Pricing where critical days are identified and very high kWh rates are imposed during a limited number of hours during the critical day. The specifications of the Schedule 10 Tariff for energy pricing are:

For the period May 1 through September 30:

| Day Classification | On-Peak Period | On-Peak Rate Per kWh | Off-Peak Rate Per kWh |
|---|---|---|---|
| A | 11 a.m.- 9 p.m. | 25.678¢ | 2.859¢ |
| B | 11 a.m.- 9 p.m. | 2.190¢ | 1.425¢ |
| C | 7 a.m.- 10 p.m. | 1.425¢ | 0.974¢ |

(Classification A will apply for no more than 28 days during any calendar year, and classification C will apply for no less than 60 days during any calendar year.)

The price per kWh is very high for a day classified as an "A" day which should provide a strong incentive for customers to reduce use during peak hours on that day. For perspective, only [redacted] customers are on this rate accounting for [redacted] annually or [redacted] of DVP's total retail sales. So, even a relatively large adjustment in energy use by customers on this rate would have little effect on DVP's overall energy consumption and peak demand. The impacts will also depend upon the number of "A" days declared.

**Q. DR. VIOLETTE, CAN YOU SUMMARIZE YOUR ANALYSIS OF THE EFFECTIVENESS OF DVP'S TIME-DIFFERENTIATED RATE SCHEDULES IN PROMOTING ENERGY CONSERVATION AND REDUCING PEAK DEMAND?**

A. These tariffs are not effective at inducing energy conservation. The very low energy costs — less than ½ of a cent — for C&I customers in Schedules GS-3 (which has the most participants) and GS-4 make it difficult for any customer to justify investments in energy efficient behavior or equipment. An examination of these rates shows that they are unlikely to promote energy conservation.

**Q. YOU STATE THAT THESE RATES ARE INEFFECTIVE IN PROMOTING ENERGY CONSERVATION, BUT ARE THEY EFFECTIVE AT PROMOTING PEAK DEMAND REDUCTIONS?**

A. Because these rates include on-peak and off-peak demand charges, there might be some resulting reduction in peak demand. However, information that DVP provided in response to interrogatory 253, Exhibit DMV-6, shows that the total estimated reduction in peak demand is only [redacted] from all time-differentiated rates available to C&I customers (including rates under some schedules not discussed earlier such as standby and curtailable service schedules, but not including demand reduced in response to the PJM Interconnection's (PJM) Load Response program). With a high DVP peak demand of 19,375 MW (occurring on August 3, 2006), the [redacted] is a reduction of [redacted] off of the peak. To put this in perspective, other successful utility DSM programs that use time-differentiated rates, standby generation and curtailable loads have achieved reductions of between 7% and 20% of their peak demands. Four benchmark utility examples are MN Power (Minnesota) which has 20% of its peak demand in these DSM tariff categories; Alliant Energy (Iowa) has 13% of its peak; Xcel Minnesota has 10% of its peak

demand in these DSM activities; and, Florida Power and Light has 6.6% of its peak accounted for by DSM related activities and tariffs.

Further, an IEA study that Summit Blue performed in 2005 indicated on a sector level that about 30% of the utilities that reported DR program impacts in the residential sector are able to reduce their residential system peak demands by slightly more than 10% through these programs. On the C&I side, about 20% of the utilities surveyed reported program impacts of 15% or more of their C/I peak demands. The average DSM/DR program impact as a percentage of C/I peak demand for the utilities was an 8% reduction.

**Q. COULD DVP ACHIEVE THESE HIGHER LEVELS OF PARTICIPATION AND LOAD REDUCTION?**

A. Yes. These comparative figures indicate that DVP could easily and substantially expand upon its [redacted] of load reduction. Of the four rate schedules examined in the C&I sector, the only one to produce a significant reduction in peak demand was schedule 10 with [redacted]. Schedules GS-2T, GS-3 and GS-4 did not make the list provided by DVP as providing load reductions. This list was composed mostly of the specialized curtailable and standby rates in the C&I sector with the some of these tariffs accounting for as little as [redacted] of peak demand reduction. From this, it can be assumed that the time-differentiated rates — GS-2T, GS-3, and GS-4 — that account for a large fraction of energy consumption under these rates do not contribute much to peak demand reductions — less than [redacted] — even though all of these tariffs incorporate time-differentiated demand charges. Two specific customers on curtailable service account for [redacted] of this [redacted] peak reduction.

DVP could use third-party aggregators with extensive experience in achieving load reductions in the segments with greater numbers of customers (mass-market and

commercial/light industrial customers) or they can decide to provide these services in-house (as Duke Power has done).

**Q. DR. VIOLETTE, COULD DVP ACHIEVE GREATER ENERGY CONSERVATION AND PEAK LOAD REDUCTIONS THROUGH ITS TARIFFS THAT ENCOMPASS TIME-DIFFERENTIATED RATES, STANDBY GENERATION AND CURTAILMENT SERVICES.**

A. Yes. DVP could increase its energy conservation and peak load reductions by thousands of MWs, possibly up to a factor of 10, based on the information provided by DVP. This would require a revamping and updating of DVP's tariffs. With respect to energy conservation, there are a number of reasons for why these rates are not likely to encourage energy conservation. In the residential sector, the number of participants and their energy use is simply too small to have any effect. On the C&I side, the very low — less than ½ of a cent per kWh — energy charges to the largest participants (i.e., GS-3 and GS-4) cause any savings from reducing energy use to be too small to affect significantly the participant's demand.

**Q. DO YOU HAVE ANY FINAL COMMENTS ON THE TOU/DYNAMIC TARIFFS DISCUSSED BY MR. KOOGLER?**

A. Yes. When these rates were designed in the late 1980s and early 1990s they employed a number of concepts that were then innovative. But these tariffs need to be updated if they are to be effective in promoting energy efficiency and reducing peak demand as called for in Senate Bill 1416 (the Reregulation Bill) as passed by the 2007 General Assembly and amended and signed by Governor Kaine. This legislation directs the Virginia State Corporation Commission to determine whether a 10% reduction in electric energy use can be achieved by 2022 relative to

a base year of 2006. DVP's current time-differentiated rates will prevent it from attaining that otherwise very achievable goal.

**Q. DR. VIOLETTE, ARE YOU AWARE THAT OTHER WITNESSES FOR PIEDMONT ARE PROVIDING TESTIMONY THAT THE LOAD TO BE SERVED BY THEPROPOSED LOUDOUN LINE IS LARGELY OUTSIDE OF NORTHERN VIRGINIA, ELSEWHERE IN PJM?**

A. Yes, I am. And insofar as that is the case, then DSM measures addressing consumption and peak demand in those other intended service areas of the Loudoun Line will also affect the need for the Loudoun line. In particular, recently expanded DR initiatives of PJM — referred to as the Load Response program — from New Jersey in the north to North Carolina in the south are likely to reduce demand throughout PJM and with it the need for the Loudoun line and west-to-east transfer capability generally.

**Q. IS THERE REASON TO BELIEVE THAT THE PJM INITIATIVES WILL REDUCE DEMAND IN THE GREATER MID-ATLANTIC POWER MARKET?**

A. Yes there is. In recent PowerPoint presentations, PJM and its consultants have been bullish about the prospects of PJM-wide DSM to reduce load and particularly peak demand, which occurs primarily in eastern PJM. Recently expanded PJM Load Response opportunities are described in the PowerPoint presentation attached as Exhibit DMV-7. Page 3 of that PowerPoint shows the growth in participation in PJM Economic Load Response in terms of MWh and payments. Economic Load Response is "designed to provide an incentive to customers or curtailment service providers (CSP) to reduce consumption when PJM [locational marginal price] prices are high." Notably, Economic Load Response has grown from 6, 727 MWh in 2002 to 218,009 MWh for only the first half of 2007. With the newly implemented

PJM Load Response offerings, the availability of DR throughout PJM is projected to continue growing; reducing consumption and peak demand that the Loudoun line may be intended to serve.

**Q. DO INDIVIDUAL UTILITY MEMBERS OF PJM, SUCH AS DVP, PARTICIPATE IN ECONOMIC LOAD RESPONSE?**

A. Utilities in PJM and other organized electricity markets are developing programs that would specially assist their customers in participation in these region transmission organizations (RTO) initiatives including some incentives for equipment and metering that would enhance a customer's ability to effectively participate in the RTO's load response and other DR programs. This would provide another area of opportunity for DVP to work to reduce future load and peak demand growth.

**Q. DR. VIOLETTE, PLEASE REPRISE YOU PRINCIPAL CONCLUSIONS FROM THE DSM ASSESSMENT AND THIS TESTIMONY.**

A. First, there is substantial potential for energy efficiency and demand response in DVP's service territory.

Second, by implementing the five programs proposed in the DSM Assessment, DVP could easily reduce energy use by 10% in 10 years over what would otherwise have been the case, and reduce peak demand 1% per year for 10 years. Other jurisdictions have set and achieved more aggressive targets.

Third, investments not made on the demand-side now may be lost forever as growing energy needs are met through higher-cost supply and transmission investments. However, regulators need to take actions that level the playing field between demand-side and supply-side investments from the utility's perspective. These include:

a) Set targets for demand-side resources such as a minimum 1% in energy use and peak demand annually over what would otherwise have occurred.

b) Address financial disincentives for utility investment in demand-side resources that appropriately align the financial interests of the utility with the provision of a least cost plan.

c) Provide positive incentives for demand response programs, innovative rates, and advance metering technology that will allow for the development of a demand-side power plant that will provide meaningful and reliable MWs of demand and MWh of energy reductions.

Fourth, the time-differentiated rates discussed in Mr. Koogler's testimony do not encourage investment in DSM and, in fact; result in a number of critical impediments.

Fifth, demand-side resources whether they are implemented through tariffs or through programs with discrete activities are reliable and comparable to supply-side resources in this regard.

Sixth, PJM is increasing the opportunities for customers and CSPs to buy and sell Load Response throughout PJM. As these regional DR programs continue to grow, consumption and peak load will continue to be moderated, if not even reduced.

**Q: THANK YOU, DR. VIOLETTE, NO FURTHER QUESTIONS.**