Witness OCS – 1D

BEFORE THE PUBLIC SERVICE COMMISSION OF UTAH

IN THE MATTER OF THE PASS-THROUGH APPLICATION OF DOMINION ENERGY UTAH FOR AN ADJUSTMENT IN RATES AND CHARGES FOR NATURAL GAS SERVICE IN UTAH	)))))	DOCKET NO. 17-057-20

DIRECT TESTIMONY

OF

JEROME D. MIERZWA

FOR THE OFFICE OF CONSUMER SERVICES

APRIL 23, 2018

EXETER
ASSOCIATES, INC.
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Columbia, Maryland 21044

DIRECT TESTIMONY OF JEROME D. MIERZWA

I. INTRODUCTION

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Jerome D. Mierzwa. I am a Principal and Vice President with Exeter Associates, Inc. ("Exeter"). My business address is 10480 Little Patuxent Parkway, Suite 300, Columbia, Maryland 21044. Exeter specializes in providing public utility-related consulting services.

Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND EXPERIENCE.

A. I graduated from Canisius College in Buffalo, New York in 1981 with a Bachelor of Science Degree in Marketing. In 1985, I received a Master's Degree in Business Administration with a concentration in finance, also from Canisius College. In July 1986, I joined National Fuel Gas Distribution Corporation ("NFGD") as a Management Trainee in the Research and Statistical Services Department ("RSS"). I was promoted to Supervisor RSS in January 1987. While employed with NFGD, I conducted various financial and statistical analyses related to the company's market research activity and state regulatory affairs. In April 1987, as part of a corporate reorganization, I was transferred to National Fuel Gas Supply Corporation's ("NFG Supply's") Rate Department, where my responsibilities included utility cost of service and rate design analysis, expense and revenue requirement forecasting, and activities related to federal regulation. I was also responsible for preparing NFG Supply's Federal Energy Regulatory Commission ("FERC") Purchased Gas Adjustment ("PGA") filings and developing interstate pipeline and spot market supply gas price projections. These forecasts were utilized for internal planning purposes as well as in NFGD's annual state purchased gas cost review proceedings in Pennsylvania.

In April 1990, I accepted a position as a Utility Analyst with Exeter. In December 1992, I was promoted to Senior Regulatory Analyst. Effective April 1, 1996, I became a Principal of Exeter. Since joining Exeter, I have specialized in evaluating the gas purchasing practices and policies of natural gas utilities, utility class cost of service and rate design analysis, sales and rate forecasting, performance-based incentive regulation, revenue requirement analysis, the unbundling of utility services, and evaluation of customer choice natural gas transportation programs.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. Exeter was retained by the Office of Consumer Services ("OCS") to evaluate the design day criteria and forecast model relied upon by Dominion Energy Utah, formerly Questar Gas Company ("DEU" or the "Company"), to determine the upstream interstate pipeline capacity resources required to meet its sales customers' design day gas supply requirements. Exeter was also requested to evaluate the reasonableness of DEU's proposals to acquire interstate pipeline peak hour services to meet the peak hour requirements of its sales and transportation customers.

Q. HAVE YOU PREVIOUSLY TESTIFIED ON UTILITY RATES IN REGULATORY PROCEEDINGS?

A. Yes. I have provided testimony on more than 300 occasions in proceedings before the FERC and state utility regulatory commissions in Arkansas, Delaware, Georgia, Illinois, Indiana, Louisiana, Maine, Massachusetts, Montana, Nevada, New Jersey, Ohio, Pennsylvania, Rhode Island, Texas, and Virginia, as well as before this Commission. I previously testified before this Commission in Docket No. 14-057-31, in which DEU proposed to implement a transportation customer imbalance charge, and in Docket No. 17-057-09, in which DEU proposed to charge transportation customers for peak hour service.

Q. BEFORE CONTINUING, WHAT IS YOUR EXPERIENCE WITH RESPECT TO EVALUATING THE GAS PROCUREMENT PRACTICES OF NATURAL GAS DISTRIBUTION COMPANIES ("NGDCs") LIKE DEU?

A. Over the last 28 years, I have reviewed and assessed the gas procurement practices of approximately 40 different NGDCs. For many of these NGDCs, I have performed gas procurement reviews on an annual basis. In total, I estimate that I have performed approximately 200 such reviews.

Q. DID THESE REVIEWS GENERALLY INCLUDE AN EVALUATION OF THE NGDC'S DESIGN DAY CRITERIA AND FORECAST MODEL?

A. Yes, these reviews generally involved an evaluation of the NGDC's design day criteria and forecast model.

Q. PLEASE SUMMARIZE YOUR FINDINGS AND RECOMMENDATIONS.

A. My findings and recommendations are as follows:

- The weather criteria of 70 heating degree days ("HDDs"), a 47 mph maximum windspeed, and a 26 mph average windspeed used by the Company to project the design day requirements of its sales customers are unreasonable, overly conservative, and unlikely to ever occur;
- Weather criteria of 70 HDDs, a 17 mph maximum windspeed, and a 9 mph average windspeed are more reasonable and should be used by the Company to determine the upstream interstate pipeline capacity resources needed to meet its sales customers design day requirements;
- The Company's design day forecasting model underestimates the requirements of sales customers and should be revised to include independent variables reflecting the number of sales customers served and energy efficiency and conservation.
- The model should also be developed using more recent winter period daily usage data rather than the annual daily usage data used by the Company which extends back to 2004. Daily usage data from as far back as 2004 is not reflective of the current usage characteristics of the Company's sales

customers. I recommend that daily data from the winter of 2014 to present be used to develop the Company's forecast model;

- Based on my recommended design day weather criteria and revised design day forecasting model, the design day requirements of sales customers are 126,206 Dth less than those projected by the Company, and DEU should adjust the upstream interstate pipeline capacity resources acquired to meet the design day requirements of its sales customers accordingly; and

- While DEU appears to have justified its proposal to acquire 100,000 Dth/day of Kern River Gas Transmission Company ("Kern River") firm peak hour service, the Company has not justified its proposal to acquire an additional 250,000 Dth/day of firm peak hour service from Dominion Energy Questar Pipeline ("DEQP").

Q. PLEASE BRIEFLY DESCRIBE HOW YOUR TESTIMONY IS ORGANIZED.

A. My testimony is presented in four sections, including this introductory section. The second section of my testimony evaluates the reasonableness of the weather criteria utilized by the Company to forecast the design day requirements of its sales customers. The next section addresses DEU's design day forecasting model and the implications of my recommendations concerning the Company's design day weather criteria and forecasting model. The final section of my testimony discusses the reasonableness of the Company's peak hour service contracts.

II. DESIGN DAY WEATHER CRITERIA

Q. BEFORE CONTINUING, PLEASE EXPLAIN WHAT THE TERM "DESIGN DAY" REFERS TO FOR AN NGDC LIKE DEU.

A. A design day is an extremely cold day that an NGDC selects and utilizes for capacity resource planning purposes. An NGDC would typically reserve upstream interstate pipeline capacity resources sufficient to meet the design day gas supply requirements of its sales customers. An NGDC may also reserve capacity to meet the design day balancing requirements of its transportation customers. NGDCs typically develop

forecasting models to determine the requirements of sales customers under design day weather conditions. DEU claims that it is also necessary to secure additional upstream interstate pipeline capacity resources to meet the design day peak hour demands of its sales and transportation customers.

Q. WHAT ARE THE WEATHER CONDITIONS THAT DEU USES TO DETERMINE THE DESIGN DAY REQUIREMENTS OF ITS SALES CUSTOMERS?

A. As explained by DEU witness Mr. David C. Landward in DEU Exhibit 1.0, the design day weather criteria that DEU uses for upstream interstate pipeline capacity planning purposes is a day with an average temperature of -5˚F, or 70 HDDs, a maximum windspeed of 47 mph, and an average windspeed of 26 mph. A day with 70 HDDs last occurred in 1963, and days with 70 HDDs or more have been recorded on seven days since 1929.[1]

Q. ARE THE DESIGN DAY WEATHER CONDITIONS THAT DEU USES FOR UPSTREAM PIPELINE CAPACITY PLANNING PURPOSES REASONABLE?

A. No. In the response to OCS 1.02, DEU provided HDDs, maximum windspeed, and average windspeed data for each winter day (November through March) for the period January 2004 through January 2018—a total of 2,149 observations. To evaluate this data, I calculated the correlation coefficients for HDDs and maximum daily windspeed and also for HDDs and average daily windspeed. In both cases, the correlation coefficient was negative, which indicates that higher levels of HDDs are associated with lower daily maximum windspeeds and lower average daily windspeeds.

[1] DEU's HDDs database extends back to 1929.

I conducted an additional analysis for the period January 2004 through January 2018 in which I ranked the 100 days with the highest HDDs and examined the maximum and average daily windspeeds associated with those HDDs. For this 100-day sample, the highest value for the maximum windspeed was 25 mph and the highest value for average windspeed was 9.5 mph. This suggests that the coldest days, as measured by HDDs, are not the days that are anticipated to have the highest maximum daily windspeeds or highest average daily windspeeds.

I also considered another analytical approach to looking at HDDs and windspeeds. In Massachusetts, NGDC's use the variable effective degree days (EDDs) in their design day forecast models. This variable combines the effect of HDDs and average windspeed on customer gas supply requirements. The formula used for EDDs is as follows:

$$EDD = HDD \times (1 + WIND\ MPH/100)$$

The HDDs and average windspeeds observed on the ten highest HDD days since 1941 are presented in Table 1.[2] Also included in Table 1 are the EDDs on these ten coldest days since 1941, maximum and average windspeeds in DEU's service territory were significantly less than the windspeed criteria used in DEU's design day forecast.

[2] Since 1929, days with at least 65 HDDs have been recorded in DEU's service territory on 24 occasions. Maximum and average windspeed data is only readily available since 1941. Of the 24 days since 1929 with at least 65 HDDs, ten of those days have occurred since 1941.

Table 1.
HDDs and Maximum and Average Windspeeds on Ten Coldest Days Since 1941

Date	HDDs	Windspeed Maximum	Windspeed Average	EDDs
January 25, 1949	72	8	4	75
January 12, 1963	72	10	7	77
December 22, 1990	69	15	7	74
January 13, 1963	68.5	12	8	74
January 19, 1963	68	17	9	74
December 10, 1972	67.5	8	4	70
January 23, 1962	67	12	5	70
December 15, 1972	67	10	4	70
December 23, 1990	66	10	7	71
January 22, 1962	65.5	9	5	69

Q. HAVE YOU EVALUATED THE REASONABLENESS OF DEU'S DESIGN DAY CRITERIA FROM THE PERSPECTIVE OF EFFECTIVE DEGREE DAYS?

A. Yes. DEU's 70 HDD and 26 mph average windspeed design day criteria are equal to 88 EDDs using the EDD formula. The Company's design day database extends back to 1974, and since that time, the day with the highest EDDs observed in the Company's service territory was 63 EDDs. There have been no days since 1974 on which the combined impact of temperature and windspeed have come anywhere close to the combined impact of the 88 EDDs upon which the Company forecasts the design day requirements of its sales customers. This also means that the highest observed EDDs is 27 percent less than the EDDs used in the Company's design day calculations, and indicates that the Company's use of 70 HDDs and an average windspeed of 26 mph; i.e., 88 EDDs, to project design day requirements is overly conservative.

Q. BASED ON YOUR ANALYSES, WHAT DO YOU CONCLUDE CONCERNING DEU'S DESIGN DAY WEATHER CRITERIA?

A. Based on my analyses, I conclude that the Company's design day weather criteria, which include both a maximum HDD level plus the highest maximum windspeed and highest average daily windspeed, entails reliance on an extreme set of circumstances that does not have a reasonable likelihood of occurrence.

Q. WHAT ARE THE IMPLICATIONS OF DEU USING DESIGN DAY WEATHER CRITERIA THAT ARE OVERLY CONSERVATIVE?

A. If DEU were to use a design day with a probability of occurrence that was too extreme (i.e., unlikely to ever occur), it would mean that its design day forecast would be unreasonably high and, as a result, its need for capacity resources, including peak hour services, would be overstated. This is because the Company determines its need for peak hour service based on projected design day demands.

Q. WHAT DESIGN DAY WEATHER CRITERIA DO YOU RECOMMEND DEU USE FOR UPSTREAM INTERSTATE PIPELINE CAPACITY PLANNING PURPOSES?

A. Based on the windspeeds observed on the coldest days recorded in DEU's service territory since 1941, as reflected above in Table 1, I recommend that DEU utilize a day with 70 HDDs, a maximum windspeed of 17 mph, and an average windspeed of 9 mph to estimate the design day requirements of its sales customers. These windspeed criteria reflect the highest observed maximum and average windspeeds on the ten coldest days since 1941.

III. DESIGN DAY FORECAST MODEL

Q. PLEASE BRIEFLY DESCRIBE THE FORECASTING MODEL DEVELOPED BY DEU TO PROJECT THE DESIGN DAY REQUIREMENTS OF ITS SALES CUSTOMERS.

A. DEU forecasts the design day demands of its sales customers by estimating the statistical relationship between daily demand and explanatory variables which the Company contends are known to affect those demands. To accomplish this, multivariable regression analysis of historical daily firm sales data since 2004 was conducted by the Company using the following independent variables:

- HDDs;
- Maximum windspeed;
- Average windspeed;
- Day of the week;
- Winter holiday indication; and
- Prior day demand.

Q. WHAT WERE THE COMPANY'S ESTIMATED DESIGN DAY DEMANDS OF SALES CUSTOMERS FOR THE WINTER OF 2016/2017, USING THEIR DESIGN DAY WEATHER CRITERIA AND DESIGN DAY FORECASTING MODEL?

A. As identified on page 5, line 98 of DEU Exhibit 1.0, the estimated design day demands of sales customers for the winter of 2016/2017 were 1,316,588 dekatherms (Dth).

Q. WERE YOU ABLE TO VERIFY THE 2016/2017 WINTER SEASON DESIGN DAY PROJECTION USING THE COMPANY'S FORECASTING MODEL?

A. No, I was not. In response to discovery request OCS 3.1, Mr. Landward was also not able to verify the Company's projection because it was prepared by an individual no

longer employed by the Company. In response to OCS 3.1, Mr. Landward presented a sales customer design day forecast of 1,342,345 Dth for the 2017/2018 winter season using the Company's design day forecasting model and design day weather criteria.

Q. HAVE YOU EVALUATED WHETHER THE COMPANY'S DESIGN DAY FORECASTING MODEL PRODUCES A REASONABLE ESTIMATE OF SALES CUSTOMERS' REQUIREMENTS USING ACTUAL WEATHER CONDITIONS?

A. Yes, I did, and my evaluation indicated that it would not. To assess the forecasting capabilities of the Company's design day model, I compared the estimate produced by the Company's design day model utilizing actual weather for the core winter months (December – February) for the 2014/2015 through 2017/2018 winter seasons.[3] This evaluation indicated that, for each day during this period, and for the 100 coldest days during this period, the Company's design day model under-forecasted actual demands nearly 80 percent of the time.

Q. WHAT RESULTS WOULD BE DEEMED TO BE DESIRABLE AND WHAT RESULTS WOULD BE DEEMED TO BE PROBLEMATIC FROM YOUR COMPARISON?

A. The desirable results from this comparison would be that the model's "projections" are close to the actuals, that is, the errors are not so large as to make the projections without practical value. Second, the projections should not exhibit any appreciable bias, that is, the amount of the over-projection should be approximately equal to the amount of the under-projection. Just as importantly, the frequency of over-projections and under-projections should be approximately equal. Problematic results would include large errors or projections that are biased toward either over- or under-projection. Thus, the

[3] Data for February 2018 were not available and, therefore, excluded from the analysis.

Company's results are problematic since its design day model showed a bias toward under-projections.

Q. WHY IS IT LIKELY THAT THE COMPANY'S MODEL TENDED TO FREQUENTLY UNDERESTIMATE ACTUAL DEMANDS?

A. The Company's regression analysis relies on data from 1974 to present to forecast sales customer requirements. Since 1974, the number of customers served by DEU has increased from 772,793 to 1,035,155, or nearly 34 percent. However, the number of sales customers served by the Company is not included as an independent variable in the Company's design day model.

Q. DO YOU HAVE OTHER CONCERNS WITH THE COMPANY'S DESIGN DAY FORECAST MODEL?

A. Yes. The Company's design day forecast model does not account for changes in customer usage due to energy conservation efforts and energy efficiency. Such changes could be accounted for by including a trend-independent variable.

Q. HAVE YOU EVALUATED THE IMPACT OF INCLUDING INDEPENDENT VARIABLES TO ACCOUNT FOR THE NUMBER OF SALES CUSTOMERS SERVED AND ACCOUNT FOR CONSERVATION AND ENERGY EFFICIENCY?

A. Yes. I have revised the Company's regression analysis to include independent variables to account for the number of sales customers and to represent conservation and energy efficiency. In revising the Company's regression analysis, I have limited the use of daily data to the core winter months of 2014/2015 through 2017/2018. I limited the revised analysis to this period to reflect the most recent usage characteristics of the Company's sales customers. The coefficients of this model are presented in Table 2.

Table 2. OCS Revised Regression Model			
	Coefficient	**Estimate**	**T-Statistic**
1	Intercept	(987,278.90)	(2.15)
2	HDDs	(2,081.66)	(0.39)
3	HDD^2	572.74	2.18
4	HDD^3	(9.85)	(1.70)
5	HDD^4	0.06	1.33
6	Prior Day Demand	0.24	12.28
7	Friday	(19,043.70)	(4.57)
8	Weekend	(13,724.30)	(4.25)
9	Maximum Wind Gust (mph)	529.65	1.06
10	Mean Windspeed (mph)	1,470.02	0.89
11	HDD*Mean Windspeed	151.06	2.66
12	Holiday	(32,197.75)	(3.97)
13	Number of Customers	1.16	2.45
14	Trend	(15,456.09)	(1.45)
15	Adjusted R-squared Value: .9660		

Q. HAVE YOU EVALUATED WHETHER THE REVISED REGRESSION MODEL PRODUCES A REASONABLE ESTIMATE OF ACTUAL SALES CUSTOMER REQUIREMENTS USING ACTUAL WEATHER DATA?

A. Yes. Similar to my evaluation of the Company's design day forecast model, I compared the estimate produced by the revised design day model to actual requirements utilizing actual weather. This analysis indicated an approximate 50/50 split on the number of days the model underestimated and overestimated demands.

Q. WHAT ARE THE PROJECTED DESIGN DAY DEMANDS OF SALES CUSTOMERS USING THE REVISED REGRESSION MODEL AND THE COMPANY'S DESIGN DAY WEATHER CRITERIA?

A. Using the revised regression model and Company's design day weather criteria would increase the design day forecast for the winter of 2017/2018 from 1,342,345 Dth to 1,432,761 Dth—an increase of 90,416 Dth.

Q. HOW WOULD THE DESIGN DAY FORECAST CHANGE IF YOUR RECOMMENDED WEATHER CRITERIA WERE REFLECTED IN THE REVISED DESIGN DAY FORECAST MODEL?

A. Utilizing the 70 HDD, 17 mph maximum wind, and 9 mph average windspeed criteria in the revised regression model would reduce the projected design day requirements of sales customers to 1,216,139 Dth, or by 216,622 Dth, which is 126,206 Dth less than the Company's forecast for the 2017/2018 winter season.

Q. WHAT ARE THE IMPLICATIONS OF YOUR FINDINGS CONCERNING DEU'S DESIGN DAY WEATHER CRITERIA AND FORECAST MODEL?

A. The implications of my findings are that for the winter of 2017/2018, DEU would have required 126,206 Dth less in daily upstream interstate pipeline capacity resources to reliably meet its sales customers' requirements. DEU would similarly require less in daily capacity resources to reliably meet its sales customers' requirements in the future. Based on the current maximum FERC-approved rate for DEQP firm transportation capacity (Rate Schedule T-1) of $5.22804 Dth/day per month, a reduction of 126,206 Dth/day in DEU's upstream capacity would reduce annual purchased gas costs by $8.0 million ($5.28804 x 12 months x 126,206 Dth/day).

Q. ARE YOU RECOMMENDING THAT THE REVISED DESIGN DAY FORECASTING MODEL AND YOUR RECOMMENDED DESIGN DAY WEATHER CRITERIA BE USED TO DETERMINE DEU'S PEAK DESIGN DAY IN THE FUTURE?

A. Yes. However, I am not suggesting that the revised design day model presented in my testimony could not be further improved upon. In evaluating further changes to its design day model, DEU should compare the performance of its model under recent actual weather conditions to ensure the model's estimates are reasonable.

IV. PEAK HOUR SERVICES

Q. PLEASE PROVIDE A BRIEF HISTORY OF DEU'S CONTRACTING FOR PEAK HOUR SERVICES.

A. To address a claimed need for services to accommodate the peak hour demands of its sales and transportation customers, DEU entered into a firm peak hour service contract for 100,000 Dth with Kern River for the 2017/2018 winter season. In Docket No. 17-057-09, DEU filed an application to collect a portion of the costs associated with the Kern River contract from transportation customers. In Docket No. 17-057-09, the Company indicated that in a February 28, 2017 Integrated Resource Plan ("IRP") workshop, it revealed that it intended to contract with DEQP for additional peak hour service. DEU subsequently contracted with DEQP for 250,000 Dth of peak hour service effective November 15, 2017. In Docket No. 17-057-09, the Commission initially denied DEU's application to assess transportation customers a portion of the costs associated with the Kern River peak hour contract, and deferred the determination of the prudence of the Kern River peak hour service contract to the instant proceeding, where similar prudence issues are being addressed concerning the DEQP peak hour service contracts.

Q. HAS DEU SHOWN THAT ANY LEVEL OF PEAK HOUR SERVICE IS PRUDENT AND IN THE PUBLIC INTEREST?

A. Yes, to a certain extent. In Docket No. 17-057-09, I indicated that based on the rebuttal testimony of DEU witness Michael L. Platt, some level of peak hour service is warranted. In Docket No. 17-057-09, Mr. Platt presented an analysis (DEU Exhibit 3.4R) of transportation customers and regulator stations feeding cities that would fall below operational pressures and risk losing service on a peak day if peak hour service was not available. Mr. Platt has presented a similar analysis in this proceeding (DEU Exhibit 2.3) and I remain convinced that some level of peak hour service is in the public interest.

Q. HAS DEU JUSTIFIED THE NEED FOR A TOTAL OF 350,000 DTH IN PEAK HOUR SERVICE FROM KERN RIVER AND DEQP?

A. No. Also consistent with my position in Docket No. 17-057-09, I believe DEU has not justified the need for an additional 250,000 Dth of peak hour service from DEQP for several reasons.

First, as previously explained, the design day demands of DEU's sales customers are overstated by 126,206 Dth. The Company's response to OCS 1.07 indicates that for every additional 1,000 Dth of design day demand, peak hour demands increase by an estimated 350 Dth. To determine the precise impact of a reduction in design day demands on the Company's firm peak hour service needs requires the use of the Company's system models. Based on the 126,206 Dth reduction to the Company's design day forecast I have recommended, I estimate that the Company's need for firm peak hour service would be reduced by 44,000 Dth (126,206 Dth/1,000 x 350 Dth) from what the Company has claimed.

Second, as indicated in the response to OCS 4.04 in Docket No. 17-057-09, the Company has the ability to use approximately 180,000 Dth of line pack to partially

address its peak hour service needs.[4] In the response to OCS 4.03 in Docket No. 17-057-09, the Company claimed that without the ability to use line pack, its peak hour service requirement would be closer to 450,000 Dth.[5] With the use of line pack (180,000 Dth/day), Kern River peak hour service (100,000 Dth/day), and the acquisition of DEQP peak hour service (250,000 Dth/day), the Company will have resources of 530,000 Dth/day to meet peak hour demands. This exceeds the claimed requirement of 450,000 Dth/day, which I have already demonstrated is overstated by at least 44,000 Dth/day. It is not clear that the use of line pack has been adequately considered by the Company in determining its need for peak hour services.

Q. HAS DEU DEMONSTRATED THAT THE PEAK HOUR CONTRACTS WITH DEQP ARE NEEDED, PRUDENT AND IN THE PUBLIC INTEREST?

A. For these reasons stated above, I believe that DEU has failed to demonstrate the prudence of securing the additional service contracts providing peak hour services from DEQP.

Q. TO WHAT EXTENT HAS DEU STUDIED VARIOUS AVAILABLE ALTERNATIVES TO ADDRESS POSSIBLE PEAK HOUR SERVICE REQUIREMENTS?

A. DEU's witness William F. Schwarzenbach III addresses the alternatives to meet peak-hour demand shortfalls in his pre-filed direct testimony. At lines 226 through 232 of his testimony he explains the various possible solutions that the Company considered. He has also supplied Confidential DEU Exhibit 3.7, a slide presentation taken from the IRP workshop conducted on February 28, 2017, and Confidential DEU Exhibit 3.8 in support of his testimony.

[4] OCS 4.04 attached to testimony as OCS Exhibit 1.1.
[5] OCS 4.03 attached to testimony as OCS Exhibit 1.2.

Q. DO YOU AGREE WITH DEU'S CONCLUSIONS REGARDING THE MOST COST EFFECTIVE OPTION FOR ADDRESSING POSSIBLE PEAK HOUR SERVICE REQUIREMENTS?

A. Based on the studies presented, Mr. Schwarzenbach states "The Firm Peaking Services are the most reliable and cost effective solutions based on this evaluation." I take no issue with this conclusion.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes, it does.