

DOCUMENT NO. 02550-2018

FPSC - COMMISSION CLERK BEFORE THE
FLORIDA PUBLIC SERVICE COMMISSION

In the Matter of:

DOCKET NO. 20170266-EC
PETITION TO DETERMINE NEED FOR SEMINOLE COMBINED
CYCLE FACILITY, BY SEMINOLE ELECTRIC COOPERATIVE,
INC.

_____/ DOCKET NO. 20170267-EC
JOINT PETITION FOR DETERMINATION OF NEED FOR SHADY
HILLS COMBINED CYCLE FACILITY IN PASCO COUNTY, BY
SEMINOLE ELECTRIC COOPERATIVE, INC. AND SHADY HILLS
ENERGY CENTER, LLC.

_____/

VOLUME 4
PAGES 496 through 732

PROCEEDINGS: HEARING

COMMISSIONERS
PARTICIPATING: CHAIRMAN ART GRAHAM
COMMISSIONER DONALD J. POLMANN
COMMISSIONER GARY F. CLARK

DATE: Thursday, March 22, 2018

TIME: Commenced: 9:00 a.m.
Concluded: 12:15 p.m.

PLACE: Betty Easley Conference Center
Room 148
4075 Esplanade Way
Tallahassee, Florida

REPORTED BY: DEBRA R. KRICK
Court Reporter

APPEARANCES: (As heretofore noted.)

PREMIER REPORTING
114 W. 5TH AVENUE
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1 P R O C E E D I N G S

2 (Transcript follows in sequence from
3 Volume 3.)

4 CHAIRMAN GRAHAM: Well, good morning,
5 everyone.

6 MR. PERKO: Good morning.

7 CHAIRMAN GRAHAM: Good morning. I am glad to
8 see everybody is here on time and ready to roll.

9 We are going to do our best, but we have to
10 finish today. So regardless of how long it takes,
11 we will be here. We will do our best to be as
12 efficient as possible.

13 We are probably going to break -- we will make
14 a determination around 11:30 if we are going to
15 break for lunch at noon, or if we are going to
16 power through. It depends on if it looks like we
17 are getting within an hour or two of getting done,
18 we will power through. If it looks like we can't
19 get done before 2:00, we will break at lunch for --
20 at noon. Does that make sense?

21 MR. PERKO: Yes, sir.

22 CHAIRMAN GRAHAM: And it will be an hour
23 break.

24 MR. PERKO: Great.

25 CHAIRMAN GRAHAM: Because I know my -- my

1 attorney over here to the left will not be happy
2 with me. So that's what we are going to do.

3 Is there anything before we start with the
4 witness Taylor?

5 Staff?

6 MS. DZIECHCIARZ: We are good.

7 CHAIRMAN GRAHAM: Mr. Perko?

8 MR. PERKO: I don't believe so.

9 CHAIRMAN GRAHAM: Mr. Wright?

10 MR. WRIGHT: No, sir.

11 CHAIRMAN GRAHAM: Okay. Mr. Perko, your
12 witness, please.

13 MR. PERKO: Thank you, Mr. Chairman. The
14 petitioners call Mr. Alan Taylor.

15 Whereupon,

16 ALAN TAYLOR

17 was recalled as a witness, having been previously duly
18 sworn to speak the truth, the whole truth, and nothing
19 but the truth, was examined and testified as follows:

20 EXAMINATION

21 BY MR. PERKO:

22 Q Could you please state your name for the
23 record?

24 A My name is Alan Sedway Taylor.

25 Q And, Mr. Taylor, were you sworn in at the

1 **beginning of this hearing yesterday?**

2 A Yes, I was.

3 **Q Mr. Taylor, could you please tell us who your**
4 **employer is, and what your current business address is?**

5 A Sedway Consulting, Incorporated, is my
6 employer. The address is 821 15th Street, Boulder,
7 Colorado, 80302.

8 **Q Mr. Taylor, did you cause to be filed on**
9 **December 21st, 2017, direct testimony consisting of 19**
10 **pages in Docket Numbers 20170266-EC and Docket Number**
11 **20170267-EC?**

12 A Yes, I did.

13 **Q Do you have any corrections to that testimony?**

14 A I do not.

15 **Q Now, if I were to ask you the questions in**
16 **that testimony today, would your answers be the same?**

17 A Yes, they would.

18 MR. PERKO: At this time, Commissioner -- or
19 Mr. Chairman, we would ask that Mr. Taylor's
20 prefiled direct testimony be inserted into the
21 record in both dockets as though read.

22 CHAIRMAN GRAHAM: We will insert Mr. Taylor's
23 prefiled direct testimony in both dockets into the
24 record as though read.

25 (Whereupon, prefiled direct testimonies were

1 inserted.)

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BEFORE THE PUBLIC SERVICE COMMISSION

SEMINOLE ELECTRIC COOPERATIVE, INC.

DIRECT TESTIMONY OF ALAN S. TAYLOR

DOCKET NO. _____

DECEMBER 21, 2017

1 **I. INTRODUCTION AND QUALIFICATIONS.**2 **Q. Please state your name and business address.**

3 A. My name is Alan Taylor. My business address is 821 15th Street, Boulder,
4 Colorado 80302.

5

6 **Q. By whom are you employed and in what capacity?**

7 A. I am President of Sedway Consulting, Inc. (“Sedway Consulting”).

8

9 **Q. Please describe your duties and responsibilities in that position.**

10 A. I perform consulting engagements in which I assist utilities, regulators, and
11 customers with the challenges that they may face in today’s dynamic electricity
12 marketplace. My area of specialization is in the provision of independent
13 evaluation services in power supply solicitations and in the associated
14 economic and financial analysis of power supply options.

15

16 **Q. Please describe your education and professional experience.**

1 A. I earned a Bachelor of Science Degree in energy engineering from the
2 Massachusetts Institute of Technology and a Masters of Business
3 Administration from the Haas School of Business at the University of
4 California, Berkeley, where I specialized in finance.

5

6 I have worked in the utility planning and power procurement consulting area
7 for 30 years, predominantly specializing in integrated resource planning,
8 competitive bidding analysis, utility industry restructuring, market price
9 forecasting, and asset valuation. I have testified before state commissions in
10 proceedings involving resource solicitations, environmental surcharges, and
11 fuel adjustment clauses.

12

13 I began my career at Baltimore Gas & Electric Company (BG&E), where I
14 performed efficiency and environmental compliance testing on the utility
15 system's power plants. I subsequently worked for five years as a senior
16 consultant at Energy Management Associates ("EMA", a firm that was later
17 acquired by ABB), training and assisting over two dozen utilities in their use of
18 EMA's operational and strategic planning models, PROMOD III and
19 PROSCREEN II. During my graduate studies, I was employed by Pacific Gas
20 & Electric Company ("PG&E"), where I analyzed the utility's proposed
21 demand side management ("DSM") incentive ratemaking mechanism, and by
22 Lawrence Berkeley Laboratory ("LBL"), where I evaluated utility regulatory
23 policies surrounding the development of brownfield generation sites.

24

25 Subsequently, I worked at PHB Hagler Bailly (and its predecessor firms) for

1 ten years, serving as a vice president in the firm’s Global Economic Business
2 Services practice and as a senior member of the Wholesale Energy Markets
3 practice of PA Consulting Group, when that firm acquired PHB Hagler Bailly
4 in 2000. In 2001, I founded Sedway Consulting, Inc. and have continued to
5 specialize in economic analyses associated with electricity wholesale markets.
6 Since the founding of Sedway Consulting, I have provided independent
7 evaluation services in over four dozen electric utility conventional and
8 renewable resource solicitations, several of them in Florida where I have
9 testified before the Florida Public Service Commission (“FPSC”) on a number
10 of occasions.

11

12 **II. PURPOSE AND SUMMARY OF TESTIMONY**

13 **Q. What is the purpose of your testimony?**

14 A. Sedway Consulting was retained by Seminole Electric Cooperative, Inc.
15 (“Seminole” or the “Company”) to provide independent monitoring and
16 evaluation services in the utility’s 2016 solicitations for competitive power
17 supplies to meet the Company’s 2021 (and beyond) capacity needs. Sedway
18 Consulting oversaw both the self-build and market alternative solicitation
19 efforts. In the first instance, Sedway Consulting was involved with the
20 monitoring and evaluation of proposals for power island equipment (“PIE”),
21 long-term service agreements (“LTSA”), and engineering, procurement, and
22 construction (“EPC”) services that might be selected – if cost-competitive – in
23 developing a resource that Seminole would own and operate. In the second
24 instance, Sedway Consulting monitored Seminole’s solicitation of market
25 alternatives (i.e., resources that would be owned and operated by others, with

1 capacity and energy being sold to Seminole under power purchase agreements
2 [“PPAs”]). As the principal consultant on the project, I reviewed Seminole’s
3 solicitation processes, performed a parallel and independent economic
4 evaluation of both sets of proposals – those PIE, LTSA, and EPC proposals
5 associated with the self-build solicitation and those PPA proposals submitted
6 in response to the utility’s market alternative solicitation. Ultimately, I
7 concluded that Seminole’s best option for meeting its long-term capacity needs
8 was a combination of resources from both solicitations:

- 9 1. a self-build new natural-gas-fired 1,122 MW (winter capacity) combined-
10 cycle (“CC”) facility at Seminole’s existing Seminole Generating Station
11 (“SGS”) site with an expected in-service date of December 1, 2022 –
12 hereafter referred to as the Seminole CC facility (“SCCF”),
- 13 2. a 30-year PPA for power supplies from a new natural-gas-fired 573 MW
14 (winter capacity) CC facility to be developed, owned, and operated by
15 Shady Hills Energy Center, LLC (a subsidiary of GE Energy Financial
16 Services, Inc.) at a site in Spring Hill, Florida with an expected in-service
17 date of December 1, 2021 – hereafter referred to as the Shady Hills CC
18 facility (“SHCCF”),
- 19 3. a 15-year PPA for power supplies from two existing natural-gas-fired
20 peaking combustion turbines (“CT”) for 346 MW of winter capacity owned
21 by Shady Hills Power Company LLC at essentially the same site where the
22 new 573 MW CC facility will be developed, with a delivery start date of
23 June 1, 2024,
- 24 4. a 20-year PPA for power supplies from a new solar photovoltaic (“PV”) 40
25 MW (nameplate) facility to be developed, owned, and operated by Tillman

- 1 Solar Center LLC (a subsidiary of Coronal Energy) in High Springs,
2 Florida with an expected in-service date of June 1, 2021,
- 3 5. a 15-year PPA for a firm system sale from existing peaking and
4 intermediate resources of Duke Energy Florida (“DEF”) for up to 450 MW
5 each year through 2030 and up to 300 MW each year thereafter, with a
6 delivery start date of January 1, 2021,
- 7 6. a 5-year PPA for a firm system sale from existing resources of Southern
8 Company Services, Inc. (“SCS”) for up to 350 MW each year through May
9 31, 2024 and up to 100 MW for each year thereafter, with a delivery start
10 date of June 1, 2021,
- 11 7. an amendment to an existing PPA with Oleander Power Project Limited
12 Partnership (a subsidiary of Southern Power Company) to extend deliveries
13 of peaking capacity through the end of 2021, and
- 14 8. a decision to remove from service one of the two existing coal-fired units at
15 Seminole’s Seminole Generating Station facility (with a reduction in winter
16 capacity of 664 MW) at the end of 2022.

17

18 Only the first two resources in the above list (SCCF and SHCCF) require
19 FPSC approval and are the primary focus of my Determination of Need
20 testimony. However, the complete portfolio is provided and discussed in my
21 testimony as the entire package of resources, agreements, and decisions were
22 components of the least-cost portfolio and therefore provide necessary context
23 for the selection of the two resources that require approval.

24

25 The purpose of my testimony is to describe my role as an independent

1 monitor/evaluator and present my findings. I will discuss the process and tools
 2 that I used to conduct Sedway Consulting's independent economic evaluation.
 3 Based on the results of my independent evaluation, I concluded that
 4 Seminole's new self-build SCCF and the new SHCCF behind the 30-year
 5 Shady Hills Energy Center PPA are essential components of the least-cost
 6 portfolio in meeting Seminole's long-term capacity needs.

7

8 **Q. Are you sponsoring any exhibits in this case?**

9 A. Yes. I am sponsoring Exhibit No. __ (AST-1) consisting of two documents,
 10 which are attached to my direct testimony:

11 Document No. 1 Resume of Alan S. Taylor

12 Document No. 2 Sedway Consulting's Independent Evaluation
 13 Report

14

15 **III. INDEPENDENT MONITOR/EVALUATOR ACTIVITIES.**

16 **Q. Please describe the role you performed as an independent
 17 monitor/evaluator in Seminole's 2021 RFPs.**

18 A. As the independent monitor/evaluator in Seminole's 2021 RFPs, I reviewed
 19 Seminole's RFPs and associated materials and discussed with the utility the
 20 modeling tools and processes that it intended to use in its evaluation of
 21 proposals. I attended the bid opening processes in Tampa for both the self-
 22 build PIE/LTSA and EPC RFPs and was directly copied on the email
 23 submissions of proposals by bidders in the market alternative/PPA RFP.
 24 Throughout the process, I monitored all email exchanges and virtually all
 25 conference calls between Seminole and the bidders (for all three RFPs:

1 PIE/LTSA, EPC, and market alternatives). Before receiving the market
2 alternative proposals, I requested that Seminole run its detailed production cost
3 model, ABB's Planning and Risk ("PaR") model, and provide production cost
4 results that I could use to calibrate Sedway Consulting's resource evaluation
5 model. I received emailed electronic copies of all market alternative proposals
6 directly from the bidders on or about the Proposal Due Date (May 9, 2016) and
7 evaluated the economic, operational, and pricing information from each
8 proposal. Seminole conferred with me on a number of issues relating to
9 proposal RFP-noncompliance decisions, interpretation of proposal information,
10 clarification requests, and economic evaluation assumptions. Regarding RFP-
11 noncompliance decisions, there were some proposals that did not meet all of
12 the RFP's threshold requirements and were thus disqualified. I concurred with
13 these disqualification decisions. In addition, Seminole provided estimates of
14 self-build project costs and characteristics after the initial PIE/LTSA proposals
15 (which were received on April 18, 2016) were evaluated. These estimates
16 were updated periodically as the selection of the PIE/LTSA counterparty and
17 contract were finalized/negotiated and as the EPC RFP was conducted (with
18 initial proposals received on November 30, 2016, best-and-final-offers on June
19 22, 2017, and the negotiation of a final EPC contract through the summer and
20 fall of 2017). As the evaluation progressed, Seminole and I discussed
21 appropriate courses of action and modeling assumptions. Using Sedway
22 Consulting's Response Surface Model ("RSM") and Revenue Requirements
23 Model ("RRM"), I evaluated Seminole's evolving self-build resource and all
24 qualified market alternative proposals and assessed their overall costs and
25 benefits. I compared Sedway Consulting's ranking and results with those of

1 Seminole to confirm consistency of assumptions and concurrence of
2 conclusions. In addition, I was copied on all email communications between
3 Seminole and the bidders in all three solicitations, monitored virtually all
4 negotiation calls with shortlisted bidders to ensure consistent communication
5 and fair treatment, and participated in Seminole internal discussions regarding
6 qualitative issues and risk factors associated with specific proposals or
7 portfolio combinations of proposals. I made presentations to Seminole's
8 executive team and Board of Trustees regarding Sedway Consulting's
9 independent evaluation process and conclusions, and I documented the
10 evaluation process and results in an independent evaluation report that is
11 attached to my testimony as Exhibit No. __ (AST-1), Document No. 2.

12

13 **Q. Were you were involved in the development of the RFPs?**

14 A. No. Sedway Consulting was retained after the RFPs had been released.
15 However, I reviewed the RFP documents, suggested some minor process
16 revisions (which were adopted by Seminole and communicated to the bidding
17 community), and concluded that the RFPs were reasonable documents for
18 soliciting proposals.

19

20 **Q. Do you believe that Seminole's evaluation process was conducted fairly?**

21 A. Yes. The market alternative proposals and Seminole's self-build resource were
22 evaluated on an equal footing, with consistent assumptions applied to all
23 resource options.

24

1 **IV. DESCRIPTION OF SEDWAY CONSULTING MODELS.**

2 **Q. Please describe Sedway Consulting's RSM model and its use in Seminole's**
3 **resource solicitation.**

4 A. The RSM was the primary model used in Sedway Consulting's independent
5 evaluation of Seminole's resource options and transactions. It is a spreadsheet
6 model that I have used in dozens of solicitations around the country. It is a
7 relatively straightforward tool that allows one to independently assess the cost
8 impacts of different generating or purchase resources for a utility's supply
9 portfolio. Most of the evaluation analytics in the RSM involve calculations
10 that are based entirely on my input of proposal costs and characteristics. A
11 small part of the model examines system production cost impacts and needs to
12 be calibrated to simulate a specific utility's system. In the case of the
13 Seminole market alternatives solicitation, in the weeks prior to the proposal
14 opening, I requested that Seminole execute specific sets of runs with its
15 detailed production cost model. With the results of these runs, I was able to
16 calibrate the RSM to approximate the production cost results that Seminole's
17 PaR detailed production cost model would produce in a subsequent evaluation
18 of any proposals or self-build options that Seminole might receive. Thus, I
19 would not have to rely on Seminole's modeling of a proposal or self-build
20 option; instead, I would be able to insert my own inputs into Sedway
21 Consulting's own model and independently evaluate the economic impact of
22 any particular resource. In short, the RSM provides an independent assessment
23 to help ensure against the inadvertent introduction of significant mistakes that
24 could cause the evaluation team to reach the wrong conclusions.

25

1 **Q. How is the RSM an independent analytical tool if it is based on initial PaR**
2 **results?**

3 A. As I noted above, most of the calculations performed by the RSM are not
4 based on PaR results in any way. There are two main categories of costs that
5 are evaluated in a resource solicitation: fixed costs and variable costs. The
6 costs in the first category – the fixed costs of a proposal – are calculated
7 entirely separately in the RSM, with no reliance on the PaR model for these
8 calculations. The second category – variable costs – has two parts: (1) the
9 calculation of a resource’s variable dispatch rates and, (2) the impact that a
10 resource with such variable rates is likely to have on Seminole’s total system
11 production costs. As with the fixed costs, a proposal’s variable dispatch rates
12 are calculated entirely separately in the RSM, with no basis or reliance on the
13 PaR model. It is only in the final subcategory – the impact that a resource is
14 likely to have on system production costs – that the RSM has any reliance on
15 calibrated results from PaR.

16

17 **Q. Please elaborate on that area of calculations where the RSM is affected by**
18 **the PaR calibration runs.**

19 A. This is the area of system production costs. These costs represent the total
20 fuel, variable operation and maintenance (“O&M”), emission, and purchased
21 power energy costs that Seminole incurs in serving its members’ loads. Given
22 Seminole’s load forecast, the existing Seminole supply portfolio (i.e., all
23 current generating facilities and purchase power contracts), and many specific
24 assumptions about future resources and fuel costs, PaR simulates the dispatch
25 of Seminole’s system and forecasts total production costs for each month of

1 each year of the study period. At the outset of the solicitation project, the RSM
 2 was populated with monthly system production cost results that were created
 3 by the PaR calibration runs.

4
 5 **Q. What did the RSM do with this production cost information?**

6 A. Once incorporated into the RSM, the production cost information allowed the
 7 RSM to answer the question: How much money (in monthly total production
 8 costs) is Seminole likely to save if it acquires a proposed resource, relative to a
 9 reference resource? The use of a reference resource simply allowed a
 10 consistent point of comparison for evaluating all proposals and Seminole's
 11 self-build options. As a reference resource, I used a hypothetical gas-fired
 12 resource with a very high variable dispatch rate associated with a heat rate of
 13 13,000 Btu/kWh. In fact, I could have picked any variable dispatch or heat
 14 rate for the reference resource and obtained the same relative ranking of
 15 proposals out of the RSM. The cost of the reference resource has no impact on
 16 the relative results – it is merely a consistent reference point.

17
 18 **Q. Can you provide a numerical example that shows how the RSM works?**

19 A. Certainly. Assume that a utility has a one-year resource need of 500 MW and
 20 must select one of the two following proposals:

	<u>Proposal A</u>	<u>Proposal B</u>	
21			
22			
23	Capacity:	500 MW	500 MW
24	Capacity Price:	\$9.00/kW-month	\$5.50/kW-month
25	Energy Price:	\$30/MWh	\$40/MWh

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For both proposals, the RSM has already calculated the fixed costs (and represented them in the capacity price) and the variable costs (and represented them in the energy price). Proposal A is more expensive in terms of fixed costs, but Proposal B is more expensive on an energy cost basis. The RSM calculates the final piece of the economic analysis – the different impacts on system production costs – to determine which proposal is less expensive in a total sense for the utility system as a whole.

Assume that the 13,000 Btu/kWh reference unit has a variable cost of \$50/MWh and that the RSM has been calibrated and populated with the following production cost information:

For a 500 MW proxy resource, the utility’s one-year total system production costs are:

- \$900 million for a \$50/MWh energy price reference resource
- \$894 million for a \$40/MWh energy price resource (Proposal B)
- \$876 million for a \$30/MWh energy price resource (Proposal A)

Thus, the energy savings (relative to the selection of a \$50/MWh reference resource) are \$24 million for Proposal A with its \$30/MWh energy price and \$6 million for Proposal B with its \$40/MWh energy price. In its proposal ranking process, the RSM converts all production cost savings into a \$/kW-month equivalent value so that the savings can be deducted from the capacity

1 price to yield a final net cost (in \$/kW-month) for each proposal. Converting
 2 the energy savings in this numerical example into \$/kW-month equivalent
 3 values yields the following:

4

5 $\$24 \text{ million} / (500 \text{ MW} * 12 \text{ months}) = \$4.00/\text{kW-month}$

6 $\$6 \text{ million} / (500 \text{ MW} * 12 \text{ months}) = \$1.00/\text{kW-month}$

7 The RSM calculates the net cost of both proposals by subtracting the energy
 8 cost savings from the fixed costs:

9

	<u>Proposal A</u>	<u>Proposal B</u>	
10			
11	Capacity Price:	\$9.00/kW-month	\$5.50/kW-month
12	Energy Cost Savings:	\$4.00/kW-month	\$1.00/kW-month
13	Net Cost:	\$5.00/kW-month	\$4.50/kW-month

14

15 Proposal B is less expensive. This can be confirmed through a total cost
 16 analysis as well:

17

18 Proposal A will require total capacity payments of \$54 million (= 500 MW x
 19 \$9.00/kW-month x 12 months), and Proposal B will require \$33 million
 20 (= 500 MW x \$5.50/kW-month x 12 months). Thus, Proposal A has fixed
 21 costs that are \$21 million more than Proposal B.

22

23 Proposal A will provide \$18 million more in energy cost savings (= \$24
 24 million - \$6 million); however, this is not enough to warrant paying \$21
 25 million more in fixed costs. Therefore, Proposal B is the less expensive

1 alternative.

2

3 Note that the RSM is described in more detail in the independent evaluation
4 report that is attached to my testimony as Document No. 2 of my
5 Exhibit No. ___(AST-1).

6

7 **Q. With that understanding of the RSM process, what did you do to calibrate**
8 **the RSM to PaR?**

9 A. I reviewed the production cost information that Seminole provided at the start
10 of the project and confirmed that the production costs were, for the most part,
11 exhibiting smooth, correct trends (i.e., they were increasing where they should
12 be increasing and declining where they should be declining). Having verified
13 that the RSM production cost values were “smooth,” I was confident that
14 inputting variable cost parameters into the models for similar proposals would
15 yield similar production cost results. Although the RSM is not a detailed
16 model and could not simulate Seminole’s production costs with PaR’s
17 accuracy, in the end (after accounting for future portfolio composition and
18 future unit revenue requirement methodology differences), the independent
19 RSM evaluation results tracked PaR’s results reasonably well.

20

21 **Q. Once the RSM was calibrated, what was the next step?**

22 A. I was ready to receive and evaluate proposals. Market alternative bidders had
23 been instructed to cc me on the email submissions of their proposals that they
24 were sending to Seminole, and indeed all participants in the RFP did. I read
25 each proposal and participated in discussions with Seminole about interpreting

1 the proposals, identifying areas requiring clarification, and assessing each
2 proposal's compliance with the RFP's Minimum Requirements. Seminole
3 communicated with proposers to seek clarification and corrections to uncertain
4 areas of the proposals, copying me on all email correspondence and
5 encouraging bidders to do the same.

6
7 I incorporated pricing and operational information from each proposal into the
8 RSM. Such information included contract commencement and expiration
9 dates, summer and winter capacity, capacity pricing, heat rates, fuel supply
10 assumptions, variable O&M charges, start-up costs, start-up fuel requirements,
11 expected forced outage hours, and expected planned outage hours. Most of
12 this information was directly inputted into the RSM. After the initial part of
13 the evaluation, Seminole provided Sedway Consulting with its own modeling
14 results so that Sedway Consulting could cross-check all key modeling
15 assumptions and outputs and ensure consistency with the information in the
16 RSM.

17

18 **Q. Were there any costs that were considered in Sedway Consulting's**
19 **analysis that were not predefined through the PaR/RSM calibration**
20 **process described above or were not part of the actual proposals' pricing?**

21 A. Yes, as described in the attached Independent Evaluation Report, there were
22 two categories of costs that could not be predicted prior to the receipt of
23 proposals or appropriately characterized in the pricing structure of proposals –
24 1) cost estimates for transmission network upgrades that might be required to
25 accommodate a proposed resource or combination of resources, and 2) cost

1 estimates for firm gas transportation requirements for gas-fired resources.
2 Both of these cost categories were highly dependent on the location of projects,
3 their point of electrical interconnection, and their natural gas pipeline supply
4 considerations.

5

6 **Q. How were these cost estimates developed?**

7 A. In both cases, Seminole's subject area experts provided these cost estimates
8 after being provided pertinent details about the proposed resources.

9

10 **Q. Were you in a position to independently verify these estimates?**

11 A. No. Sedway Consulting does not have the transmission models or in-depth
12 knowledge of Florida's current or future electric or natural gas infrastructure to
13 develop or verify the estimates of Seminole's subject area experts. However, I
14 found them to be fairly balanced and consistent from a \$/kW standpoint and do
15 not believe that any bidder was inappropriately advantaged or disadvantaged
16 by these estimates. I studied the estimates to see if anything was out of line
17 and concluded that they did not appear to be biased. In addition, I was free to
18 use or modify the estimated costs in any way I deemed appropriate – and
19 indeed did so, in line with evaluation processes that Sedway Consulting has
20 employed in other resource solicitations.

21

22 **Q. Were there any other Seminole estimates that were used in your analysis
23 that were not locked down prior to the receipt of proposals?**

24 A. Yes, in a sense. Sedway Consulting and Seminole had discussed and locked
25 down assumptions about generic resources that Seminole would model as filler

1 resources that would be added to its modeling simulations to address future
2 capacity needs associated with load growth, project retirements, or the
3 expiration of PPAs. Similarly, Sedway Consulting uses filler resource
4 assumptions in the RSM. However, the costs and benefits for these resources
5 were developed by blending the costs and benefits for the top three long-term
6 resources that were received in the solicitations. This process is described
7 more fully in Exhibit No.__(AST-1), Document No. 2, the Independent
8 Evaluation Report.

9 **Q. Please describe the RRM and how it was used.**

10 A. Sedway Consulting's Revenue Requirements Model, or RRM, is another
11 spreadsheet model that I have used in numerous solicitations across the country
12 to calculate annual revenue requirements associate with project-related capital
13 expenditures. It is a much simpler model than the RSM. In the case of
14 Seminole's solicitations, I used the RRM to calculate my independent
15 estimates of annual revenue requirements associated with Seminole's self-
16 build construction costs and of levelized annual transmission costs associated
17 with any resources that were likely to trigger transmission network upgrades
18 (e.g., new resources such as the SCCF, SHCCF, and other new build market
19 alternatives).

20

21 **V. SEDWAY CONSULTING'S FINDINGS AND RESULTS.**

22 **Q. What were the results of Sedway Consulting's RSM and RRM analyses?**

23 A. Using the RSM and RRM, Sedway Consulting was able to compare the
24 economics of Seminole's self-build resource and each of the proposed resource
25 options. That comparison entailed a calculation of the net present value of

1 each option from 2021 through 2051 and accounted for 1) filler resources that
2 would need to “fill in” behind options that expired before 2051 and 2) the cost
3 or revenue valuation of small additional generic seasonal purchases or sales
4 that would align all portfolios with the same projected capacity need. In the
5 near-final results that I presented to Seminole’s Board of Trustees on July 12,
6 2017, the final selected portfolio was found to be \$282 million (cumulative
7 present value of revenue requirements – “CPVRR”) less expensive than the
8 next best portfolio of alternatives. The Board of Trustees approved the plan to
9 finish negotiations with the counterparties of the resources included in the final
10 selected portfolio. The results and the ranking of resources and portfolios are
11 described in Sedway Consulting’s independent evaluation report that is
12 attached as Document No. 2 of Exhibit No. __ (AST-1).

13

14 **Q. What do you conclude about Seminole’s solicitations?**

15 A. I conclude that the resources depicted earlier in my testimony as components
16 of the final selected portfolio represent the best, least-cost resources for
17 meeting Seminole’s 2021-and-beyond capacity needs and concur with
18 Seminole’s decision to move forward with those projects and PPAs. The
19 solicitation process yielded the best results for Seminole’s Members while
20 treating bidders fairly. The RFP was sufficiently detailed to provide necessary
21 information to bidders. The economic evaluation methodology and
22 assumptions were appropriate and unbiased, and the independent evaluation
23 procedures provided a cross-check of Seminole’s proposal representation in
24 PaR and confirmed Seminole’s conclusions. I participated in Seminole’s
25 internal discussions about project and portfolio risks and believe that the final

1 selected portfolio is well balanced from a risk perspective. I monitored the
2 negotiation and communication process with the PIE/LTSA, EPC, and market
3 alterative bidders and can confirm that Seminole conducted a fair and unbiased
4 process. Finally, I conclude that Seminole's selected portfolio – which
5 includes both the SCCF and SHCCF resources as essential components – is at
6 least \$282 million CPVRR less expensive than the next best portfolio of
7 alternatives.

8

9 **Q. Does this conclude your direct testimony?**

10 **A. Yes, it does.**

1 BY MR. PERKO:

2 Q And, Mr. Taylor, did you also have two
3 exhibits attached to that testimony?

4 A I did.

5 Q And I believe those have been identified in
6 the comprehensive exhibit list as Exhibits 26 and 27 for
7 the record, and 50 and 51 in the 267 docket.

8 Mr. Taylor, do you have any corrections to
9 those exhibits?

10 A I do. I have one correction and one
11 clarification.

12 On document two of Exhibit AST-1, on page 11,
13 I referenced Seminole's detailed production cost model,
14 which elsewhere in my testimony I clearly state as being
15 the planning and risk model, PaR Model. But on that
16 page, again page 11, in the second full paragraph that
17 starts the RSM, which is the Response Surface Model, the
18 RSM that estimated system -- Seminole's system
19 production costs, in that sentence toward the end, it
20 refers to, on the third line, a set of runs from EPM
21 Seminole's detailed production cost model. The EPM
22 should be replaced with PaR, the PaR Model, capital P,
23 lower case A, capital R.

24 The second thing is really not a correction,
25 it's just a clarification. If you flip back one full

1 page to page nine of the exhibit, there is a Table A-8,
2 which is titled June 2017 Revised Prices for Short
3 Listed Solar PV Proposals. Everything is correct there,
4 but I discovered, after filing this, that there is a
5 second page -- there is a second Table A-8 on page 16
6 several pages later. And in discussions with counsel
7 and, indeed, with opposing counsel during the
8 deposition, it was agreed that it would introduce more
9 confusion than avoid to go ahead and renumber all of the
10 tables because a lot of the discovery had already been
11 focused on specific tables in this exhibit in this
12 document.

13 So I simply note if there are any questions
14 concerning Table A-8, that the question includes some
15 reference to which page, whether it's the page nine A-8
16 or the page 16 Table A-8.

17 **Q Do you have any other corrections to those**
18 **exhibits?**

19 A I do not.

20 **Q Thank you, Mr. Taylor.**

21 **Have you prepared a summary of your prefiled**
22 **direct testimony?**

23 A Yes, I have.

24 **Q Would you please present that to the**
25 **Commissioners at this time?**

1 A At least some notes that I am prepared to
2 speak from.

3 Good morning, Mr. Chairman and Commissioners.
4 My name is Alan Taylor. I am the President and founder
5 of Sedway Consulting, a firm that specializes in
6 providing independent evaluation services, i.e.,
7 services are basically a consulting branch where I
8 provide an assurance that bidders in power supply
9 solicitations are treated fairly and provided consistent
10 information, is kind of the first element. And
11 secondly, to make sure that a utility's customers are,
12 indeed, receiving the benefits of the best resources
13 that are received in power supply solicitations.

14 My academic background is a blend of
15 engineering and business. I got an undergraduate degree
16 from MIT in Energy Engineering, and an MBA from the
17 University of California Berkeley, where I specialized
18 in corporate finance.

19 I have been in the utility consulting business
20 for over 30 years. I started my career in the area of
21 production cost modeling and system simulations, working
22 for a firm that actually developed the predecessor
23 models to PaR and system optimizer that were used in
24 this case.

25 I also have done a lot of integrated resource

1 planning work through the years, cleaner act compliance
2 planning during the '90s, and then in more recent
3 decades really focusing on competitive bidding
4 solicitations.

5 I have overseen over four dozen power supply
6 solicitations for conventional and renewable resources,
7 and a variety of other products. I have reviewed over
8 1,000 proposals of power supply options, and testified
9 before many commissions around the country, including
10 the Florida Public Service Commission on more than a
11 half dozen occasions in determination of need cases for
12 Florida Power & Light, Tampa Electric, Duke Energy
13 Florida, and its predecessor firms, Florida Progress and
14 Florida Power Corporation, which, to quote those names,
15 kind of shows you how long I have been on the Florida
16 scene here.

17 For Seminole, I was the independent evaluator
18 over three RFPs, really. There was the primary one,
19 which was the market alternatives RFP. But I was also
20 the independent evaluator to look at the RFPs that were
21 focused on Seminole's self-build possibilities where
22 they were exploring what the costs might be for Power
23 Island equipment and the long-term service agreements
24 associated with that. And a second RFP associated with
25 the engineering procurement and construction activities

1 for building the balance of the plant and completing the
2 project.

3 So I really had a comprehensive view over the
4 entire process here of both the self-build and the
5 market alternatives.

6 I directly received the proposals in the case
7 of the Power Island and the EPC contracts. I was on
8 site in Tampa to conduct the bid opening. And in the
9 case of the market alternatives, I was -- those were
10 submitted by way of email, and I was cc'ed on all of
11 those emails.

12 I used my own models, the Revenue Requirements
13 Model and the Response Surface Model to conduct my own
14 independent and parallel evaluation. I was free to come
15 up with my own evaluation assumptions and approaches,
16 and, indeed, did so. And I developed my own resource
17 rankings.

18 In addition, I monitored all the
19 communications with bidders over the course of the year
20 plus process, and into the decision-making process. I
21 received pricing updates, and was able also to monitor
22 and assess the Seminole risk analysis process in their
23 development of looking at the qualitative factors of all
24 of the proposals.

25 I developed least cost portfolios under

1 basically three paradigms, and those are identified in
2 my -- in my testimony, and they've also been discussed
3 in the case here.

4 Kind of the first paradigm is assuming that an
5 opportunity for taking one of the coal plants, coal
6 units at SGS is taken out of service. That became known
7 as the Clean Power Plan paradigm.

8 A second one is assuming that that does not
9 occur and, indeed, the two coal units at SGS continue to
10 operate.

11 And a third paradigm with that same structure,
12 but assuming that there was no self-build option on the
13 table as far as Seminole submitting its -- its potential
14 natural gas-fired power plants at that site.

15 I made presentations to Seminole's board on
16 the least cost portfolios that came out of these three
17 different paradigms. And I supported the Board's July
18 decision, July 2017 decision to move ahead with the
19 recommended portfolio. I found it to be a least cost
20 portfolio by at least \$282 million, compared to just
21 building their self-build without removing the coal unit
22 from service, while almost \$500 million, 491 million, to
23 quote my testimony under base case assumptions relative
24 to not building the self-build unit.

25 I say under base case assumptions, because I

1 think these numbers are rather conservative, and I can
2 go into the details later on in my cross-examination, or
3 with responses to the Commissioners.

4 But in general, I believe that the -- the
5 final recommended portfolio is not only a least cost
6 portfolio, but it's also a very balanced portfolio, with
7 a good blend of short-term, medium-term and long-term
8 resources. So I think that -- I think it's a solid
9 recommended plan and one to move ahead with.

10 Thank you.

11 MR. PERKO: At this time, we would proffer the
12 witness for cross-examination.

13 CHAIRMAN GRAHAM: Thank you, Mr. Wright.

14 MR. WRIGHT: Thank you, Mr. Chairman.

15 EXAMINATION

16 BY MR. WRIGHT:

17 Q Good morning, Mr. Taylor.

18 A Good morning.

19 Q We just met, but we've spoken before. I am
20 Schef Wright, and I have the privilege of representing
21 the intervenors in this case.

22 I just wanted to -- Mr. Perko asked you if you
23 had any changes to your testimony. I just wanted to
24 make sure I got the change on -- on your exhibit
25 correct, that's on page 11, and it's around the middle

1 of the page, change EPM to PaR; is that correct?

2 A That is correct.

3 Q Thank you. As you were going through that, I
4 was flipping between your testimony and the exhibit, and
5 I wanted to make sure I got that right.

6 You don't have any other changes to your
7 exhibit or testimony, correct?

8 A That is correct.

9 Q Thank you.

10 In your exhibit, only the highlighted
11 information is considered to be confidential, correct?

12 A Correct.

13 Q Thank you.

14 I would like to ask you some questions about
15 your exhibit at the outset here. And I would like to
16 start with some questions about the solar proposals that
17 Seminole received and that you evaluated, okay?

18 A Okay.

19 Q Table A-2 shows a ranking of those solar
20 proposals, correct?

21 A Correct.

22 Q And it appears to me it's almost entirely by
23 price. It's by price and by proposer, is that right?

24 A Correct.

25 Q You excluded options U1 and V1 because they

1 failed to provide specific prices, correct?

2 A Correct.

3 Q Excluding those two proposals, or bids, will
4 you agree that Seminole received approximately 3,000
5 megawatts of proposals for solar PPAs?

6 A Subject to check, I will accept your number.

7 Q Thank you.

8 And that would not be a duplicative number?
9 For example, you have got, say, the second one in the
10 list, solar B1 name plate capacity, 75 megawatts, six
11 proposals, that was one plant with six different
12 proposals for that unit; is that correct?

13 A That's correct.

14 Q Okay. Understanding that the pricing
15 information, per se, is competitive, will you agree that
16 the proposers, or bidders, offered approximately
17 650 megawatts of solar capacity and associated energy at
18 a levelized price less than about \$45 a megawatt hour?

19 A I haven't had a chance to check your math
20 there. And I don't know, given the confidential --
21 confidential information provided in the far column,
22 what I would really be allowed to state here, so I will
23 have to defer to your arithmetic and avoid disclosing
24 confidential information.

25 Q Okay. You may be aware, we can cite

1 confidential information in the brief. Although, with
2 respect to this, I don't really intend to other than the
3 \$45 a megawatt hour.

4 I could go down and add up the proposals by
5 megawatts that have a price less than \$45 in the
6 corresponding right-hand column without any other
7 identification, and that would be a number that would
8 represent what I said, correct?

9 A That's correct.

10 Q Okay. And the same question, my arithmetic --
11 I wanted to ask the same question with respect to solar
12 offers at levelized prices less than \$50 a megawatt
13 hour. I came up with about 2,300 megawatts. Does that
14 look about right to you?

15 A I will accept your arithmetic, subject to
16 check.

17 Q Thank you.

18 Do you know whether Seminole disqualified any
19 bidders other than U1 and V1?

20 A In the solar area? No, I don't believe they
21 did.

22 Q Okay. Are you familiar with the cost of solar
23 in the general solar market space?

24 A Yes, I am.

25 Q Are they generally declining?

1 A Yes, they are.

2 **Q Is the same true for the cost of solar with**
3 **battery storage?**

4 A I would say those costs have been declining,
5 too, yes.

6 **Q Thank you.**

7 **I believe in the stack of red folders to your**
8 **left, and possibly on top, you should find what has been**
9 **marked and admitted as Exhibit 115. It's the Quantum**
10 **Pasco's updated proposals submitted in October of 2016.**

11 A Yes.

12 **Q You have seen -- have you seen this document**
13 **before?**

14 A I presume that I have. There were many
15 documents that crossed the transom during this project.

16 **Q Yes, sir.**

17 A But this looks consistent with the pricing
18 that Quantum submitted under a formal price refresh that
19 Jason Peters issued on November 17 of 2016; and, indeed,
20 asked all of the short listed bidders if they wanted to
21 refresh their prices, that they could do so by the end
22 of November, November 30th of 2016. And, indeed,
23 Quantum chose to do so, and these prices are in line
24 with that.

25 **Q It's no secret from the -- from our pleadings**

1 that the Quantum Pasco plant is a 121-megawatt combined
2 cycle plant, do you understand that to be the case?

3 A Yes, I do.

4 Q Is it correct that you evaluated it as -- and
5 I am waiving a teeny bit of confidential information
6 here -- you evaluated Rockland Pasco, or Quantum Pasco,
7 as your coded proposal number F1? If you would look at
8 Table A-12, I think that will help you out.

9 A That is correct. Rockland Pasco is coded F1.
10 It's in line 13 at the bottom of that table of ranking
11 of the final short listed proposals.

12 Q Thank you.

13 And it appears to me that you evaluated that
14 proposal as a 20-year PPA, is that correct?

15 A That is correct.

16 Q Did you evaluate the purchase option that was
17 also offered by Quantum Pasco, or Rockland Pasco?

18 A Yes, I did.

19 Q Okay. Why is that not reported anywhere?

20 A The tables that are in my independent
21 evaluation report are condensed tables. There were
22 literally dozens and dozens of different options here,
23 and I presented the best option from each bidder in
24 providing condensed consolidated tables.

25 Q So you -- if I understand your Table A-12, you

1 evaluated as the best proposal from, in your opinion,
2 from Quantum Pasco being the PPA starting on June 1,
3 2021?

4 A That's correct. The earlier COD, commercial
5 operation date, or delivery start date proposals, were
6 not in a position to provide any needed capacity for
7 Seminole. So even though they had cheaper pricing in
8 your confidential exhibit with earlier start dates,
9 economically they were not as good as the one starting
10 in June of 2021, when Seminole's need occurred.

11 Q Okay. Do the capacity payment prices in
12 Quantum's proposal have an escalation rate?

13 A I don't recall. I don't believe they do.

14 Q Okay. The Quantum Pasco proposal that you --
15 that you evaluated had a capacity payment, as shown on
16 the first page of the proposal there, that is a
17 confidential number. I just want to do an order of
18 magnitude comparison of those capacity payments to the
19 purchase price.

20 If I wanted to do that, I could take the
21 capacity payment for 20 years, and simply multiply it by
22 240 months, times the number of megawatts involved;
23 couldn't I?

24 A That would be the notional value of the
25 contract, but not at present value.

1 **Q Correct.**

2 **And then I could compare that to the -- again,**
3 **recognizing it's a notional value, I could compare that**
4 **to the offered purchase price for the -- for the unit as**
5 **of 2021; correct?**

6 A No. When comparing PPAs to purchases, there
7 are a variety of things that need to be taken into
8 consideration. It's not just a straight arithmetic
9 notional or nominal contract payments under the PPA
10 versus a purchase price.

11 **Q What else, then?**

12 A There are operational considerations for a
13 utility to actually purchase an existing asset, there
14 needs to be a thorough due diligence to see how the
15 asset was actually built and how it's been maintained
16 over the years, and what they are actually buying at
17 that price. Is it a unit that's been run into the
18 ground and is not going to last much longer? Or is it
19 in prime operating condition?

20 So there are a lot of things that go into
21 assessing whether the purchase price makes sense or not.

22 **Q Did you make any such evaluation of those**
23 **other cost items you just mentioned?**

24 A No. I assumed that the facility really would
25 continue to operate for the 20-year period, and kind of

1 gave it the best look at that.

2 **Q And that was consistent with the -- with**
3 **Quantum rock land's representation that they would**
4 **deliver the power for 20 years, correct?**

5 A It's a different answer to a different
6 question. Obviously, if Seminole were to purchase the
7 Pasco facility, they would need to perform the due
8 diligence on an existing facility and see how it was.

9 I took them at face value on the PPA that,
10 indeed, for a 20-year term, they would be willing to
11 sign up for delivering power under a 20-year PPA.
12 Although, that's also subject to some degree of concern,
13 given that the facility is not -- is not new.

14 **Q You just mentioned due diligence. Did you do**
15 **any such due diligence with respect to the Quantum**
16 **purchase offer?**

17 A No. Beyond the economic evaluation, and
18 recognizing that there were risks associated with
19 purchasing an old generating unit. But there was no
20 site visit, or any sort of thorough due diligence on
21 that power supply option.

22 **Q Did Seminole indicate to you whether they had**
23 **done any due diligence on the purchase option?**

24 A I think they ran through kind of a risk
25 analysis of what would be entailed with buying a

1 facility. They did that with all offers where bidders
2 came to the table with existing assets and offered them
3 up for purchase prices.

4 So there was some level of due diligence done
5 in assessing whether it made sense to add an existing
6 resource to Seminole's portfolio, and what the
7 characteristics and age of that existing facility were.

8 **Q They didn't do a site visit, or anything**
9 **further, correct? Or if you know -- are you aware of**
10 **any? Let me ask the question that way.**

11 A I am not. I know with some of the purchase
12 options, they did do a site visit. I don't know whether
13 they did that for Pasco.

14 **Q Thank you.**

15 **CHAIRMAN GRAHAM: Are you okay this morning,**
16 **Mr. Wright?**

17 MR. WRIGHT: I am fine, Mr. Chairman. I
18 have -- I do have this tendency to brush the
19 microphone with the papers in front of me, and I
20 was trying to save the court reporter's ears, and
21 everybody else, from the static of that, and this
22 just fell off. But I am fine. Thank you for
23 asking.

24 BY MR. WRIGHT:

25 **Q I would like to ask you about the escalation**

1 rates that you used in your report. If you could please
2 look at the -- your document two, beginning at the
3 bottom of page 11.

4 A I am there.

5 Q Okay. And there, you make the statement that
6 Sedway Consulting was using direct market information as
7 guidance for what future capacity might cost; correct so
8 far?

9 A Correct.

10 Q And then you go on to state, all capacity
11 related costs were escalated at a modest rate of one
12 percent per year, paren, which was assumed to be a
13 reasonable assumption for rate of inflation minus future
14 potential for technology cost reductions, close paren,
15 period; correct?

16 A Correct.

17 Q Okay. Did that -- did that represent your
18 best judgment of the correct escalation rate to use for
19 these analyses?

20 A I considered it a conservative low estimate.
21 The market information I used was used to develop the
22 starting point as far as a net capacity price for new
23 resources. The one percent was not taken from the
24 market. Generally I see PPAs and other agreements that
25 escalate at higher than the one percent.

1 But the one percent was something I chose,
2 largely to make sure that there was a -- a backdrop for
3 evaluating all of the transactions that was toward the
4 low end. If, indeed the solicitation yielded a
5 conclusion that long-term resources, such as Seminole's
6 self-build, or the Shady Hills CCF resource would make
7 sense for Seminole's customers, I wanted to make sure
8 that I was erring on the side of taking short-term
9 transactions, and not loading the back end with any
10 costs that could be challenged as being excessive.
11 Instead, I erred on the side of actually having lower
12 costs on the back end.

13 So for example, a 10-year, or 15-year, or
14 five-year proposal would be filled in with this modest
15 escalation assumption with some fairly low costs.
16 Indeed, I think, on balance, probably the risks are that
17 costs will be higher than that, but I wanted to err,
18 again, on the said of being conservative.

19 **Q Thank you for that explanation. I did ask you**
20 **a specific question that could be answered yes or no.**

21 **Did you use your best professional judgment in**
22 **using that escalation rate for the purposes of your work**
23 **for Seminole in this case?**

24 A My best professional judgment was used, yes,
25 in making a very conservative estimate, though.

1 Q Thank you.

2 And you reference the one percent being the
3 inflation rate minus what we might call a technology
4 adjust, correct?

5 A Correct.

6 Q And what would you -- what inflation rate did
7 you consider in that calculation that led you to the one
8 percent?

9 A One percent was kind of a ballpark number; but
10 in ballpark terms, probably an inflation rate of around
11 two percent.

12 Q And that's consistent with the fed's target
13 for inflation?

14 A That is.

15 Q And that's consistent with general market
16 participants and sources of inflation forecasting for
17 the next 15, 20 years?

18 A That is consistent.

19 I think that there has been a long period here
20 of very tame inflation, and that's been terrific. But I
21 think that there are risks that were central to this
22 analysis, and the decision-making around the least cost
23 portfolio, where delaying resource acquisition into the
24 middle or the later part of the next decade does run a
25 significant risk that the low inflation that we've

1 experienced for the last 10 or 15 years may actually not
2 be the case.

3 In the forecasting realm, we refer to mean
4 reversion, or reverting back to a more standard trend
5 line. And certainly, in the history of the last 30
6 years, we've seen much higher rates than the one to two
7 percent of inflation that we've seen recently.

8 Q Thank you.

9 I would like to ask you a few questions
10 continuing on. The first one actually relates to -- the
11 general question relates to the -- questions relate to
12 the number of bids and the portfolios, and I just want
13 to get framework set with respect to the nonsolar
14 bidders, or bidder project combinations. And they are
15 going to begin, I believe, with your Table A-8 for DEF
16 BA -- Balancing Authority Area proposals on page 16 of
17 your evaluation. Are you with me?

18 A I am there.

19 Q Okay. When I did the arithmetic, it looked to
20 me that there is something in the order of 6,500, or
21 perhaps more, megawatts of proposals in the DEF
22 Balancing Authority Area?

23 A There are several proposals that are listed
24 independently in this list that actually are mutually
25 exclusive. For example, on rows nine and 10, those

1 facilities could not be built on top of each other.
2 They are, indeed, for the same site. In fact, row
3 number 11 as well. So that would be duplicating some of
4 the megawatts in the table to not recognize the fact
5 that some of the list is mutually exclusive.

6 Q Okay. And similarly, then, I would guess that
7 the proposals shown in lines seven and eight also appear
8 to be mutually exclusive?

9 A That is correct.

10 Q Okay. So will you agree, subject to somebody
11 doing the arithmetic, that even accounting for those
12 possibly duplications the number is probably still on
13 the order of 4,500 or 5,000 proposed -- megawatts of
14 proposals from the DEF BAA?

15 A I will defer to your arithmetic subject to
16 check.

17 Q Thank you.

18 Same question for the proposals -- the six
19 proposals in the FPL BAA. It looks to me to be about
20 1,500 megawatts, treating rows two and rows four as
21 potentially duplicative; does that look right to you?

22 A That looks right to me.

23 Q And in the Seminole North -- the SSN is
24 Seminole North, correct?

25 A That's correct.

1 Q In the Seminole North BAA, it looks like there
2 were, probably again allowing for removal of duplication
3 on the order of -- on the order of 2,000 megawatts?

4 A I will defer to your math subject to check.

5 Q But one and -- one and four are -- or one --
6 are proposals one and four duplicative?

7 A Yes, they are. They are mutually exclusive.

8 Q Okay. And the same would be true of two,
9 three, five and six, they are mutually exclusive?

10 A There are some combinations within those that
11 were allowed, but they are a little bit more complicated
12 than can be represented in the table here.

13 Q Okay. So it could be -- it could be 2,000 or
14 more?

15 A Correct.

16 Q Thank you.

17 And then I want to ask the same question with
18 respect to the SERC proposals. It looks to me like one
19 through three are mutually exclusive?

20 A Correct.

21 Q And I don't see any others in there that
22 appear to be mutually exclusive, correct?

23 A Correct. Only to note that the last one, the
24 proposal coded C2 was for long-term energy deliveries
25 from a wind facility in Kansas, so that was

1 disqualified.

2 Q Got it. Thank you.

3 So taking -- accounting for the duplicative
4 proposals in one through three, and removing the wind
5 proposal, it's still probably on the order of 2,200 to
6 2,500 megawatts of proposals from the SERC region?

7 A I defer to your math, subject to check.

8 Q Thank you.

9 Turning on to Table A-13 -- we'll start there.
10 You identified and analyzed three portfolios for
11 Seminole, correct?

12 A I developed my own portfolios based off of
13 these three paradigms, and I was free to test whether
14 those were least cost portfolios by swapping in and out
15 various resources that were toward the top of my
16 rankings. But ultimately what was presented to the
17 Board was the distilled information from that analysis
18 in the form of these least cost portfolios under the
19 three specific paradigms.

20 Q Okay. And those are the Clean Power Plan, as
21 shown in Table A-13, the SGS two-by-one, as shown in
22 A-14, and the limited build risk is shown in Table A-15?

23 A That is correct.

24 Q Are these portfolios identical to the three
25 portfolios as shown in Ms. Diazgranados' testimony and

1 **exhibits?**

2 A Basically yes. They are -- I will stop short
3 of identical. There were minor variations in some years
4 where, in my modeling, I was showing 25 megawatts more
5 or less than certain surplus capacity transactions. But
6 they are basically the same exact resources that were
7 selected from the self-build and market alternatives RFP
8 options.

9 Q Thank you. I thought they were. I just
10 wanted to -- wanted to make sure.

11 And are the values shown -- you show a net
12 cost value. You don't show a total CPVRR number for
13 each portfolio, correct?

14 A That is correct.

15 Q Okay. Ms. Diazgranados' did show total CPVRR
16 numbers, correct?

17 A Yes. RSM reports a net cost number rather
18 than a total system revenue requirement number.

19 Q And the question I just want to ask for
20 clarity is this: These net cost values are also -- are
21 they also reported for the period 2018 to 2051, or 2021
22 to 2051?

23 A 2021 to 2051.

24 Q Thank you.

25 A In net present value terms to midyear 2017.

1 **Q And again -- and you did use Seminole's**
2 **discount rate of six percent for that analysis?**

3 A I did.

4 **Q Thank you.**

5 **So you did not evaluate or analyze what**
6 **Seminole has named the no-build risk all PPA portfolio**
7 **did you?**

8 A I did not until recently.

9 **Q Okay. So when you did your report, you**
10 **didn't?**

11 A It was not included in my testimony, and it
12 was not done prior to the deposition, no.

13 **Q Okay. Thank you.**

14 **You didn't evaluate any different start or**
15 **in-service dates for the SCCF in your analysis, did you?**

16 A I did not beyond the elements during the
17 course of the evaluation, where originally, at the start
18 of the project, the self-build was seen as a possibility
19 for being brought into service in mid-2021. As the
20 evaluation continued, and there were enough delays, and
21 further consideration of the options that were on the
22 table, it became clear that that probably was going to
23 be too ambitious to try and bring the resource in by
24 June of 2021. So I ultimately ended up moving out to
25 June of 2022 and ultimately, at the end, to December 1st

1 of 2022.

2 **Q And it's that assumption that you just stated**
3 **that's included in your Table A-13, correct?**

4 A That is correct.

5 **Q Okay. The same question for the Shady Hills**
6 **Combined Cycle Facility. You did not evaluate any**
7 **different start or in-service dates for the Shady Hills**
8 **combined cycle, did you?**

9 A Again, same sort of consideration I did.
10 Originally, the proposal was for bringing in Shady Hills
11 by June 1st of 2021. And with the passage of time, it
12 was recognized that that would probably need to slide to
13 December 1st of 2021.

14 We also looked at -- the evaluation team
15 looked at circumstances where that might have to slide
16 to the summer of the following year, but, indeed,
17 ultimately the contract was concluded for a
18 December 1st, 2021, in-service date.

19 **Q Okay. So other than the differences of up to**
20 **a year, you didn't evaluate any different start dates**
21 **for either Seminole or Shady Hills, did you?**

22 A That's correct. Those offers were only good
23 up to those particular in-service dates. It would have
24 been speculative to think about what sort of costs might
25 be associated with those options in later years.

1 **Q** **In your analyses, the only portfolio that was**
2 **assigned a cost savings value, or a credit for shutting**
3 **down one of Seminole's coal plants was the Clean Power**
4 **Plan portfolio, correct?**

5 A As represented in my testimony, yes.

6 As I say, I have done some further analysis on
7 a no-build scenario that also was predicated on shutting
8 down one of the coal units, and confirmed my general
9 expectation, from looking at the ranking results, that,
10 obviously, if you put in more expensive resources, you
11 are going to get a more expensive portfolio.

12 MR. WRIGHT: Mr. Chairman, I am not going to
13 move to strike that answer, but I am going to
14 object to any further attempts by the witness to
15 give supplemental testimony as to what he's done
16 since filing his testimony, and since the
17 deposition.

18 CHAIRMAN GRAHAM: Mr. Taylor, do you
19 understand that?

20 THE WITNESS: I do.

21 CHAIRMAN GRAHAM: Thank you.

22 BY MR. WRIGHT:

23 **Q** **The cost savings value that you used in Table**
24 **A-13 for removing SGS-1 from service is greater than the**
25 **difference in portfolio net costs between the CPP**

1 portfolio than the SGS two-by-one portfolio, correct?

2 A Given that it's confidential information, I am
3 not sure if I am in a position to confirm or deny that.

4 Q Okay. I can -- if I wanted to make that
5 comparison, I could cite, with appropriate confidential
6 protections, the values shown in row 10 of your Table
7 A-13 and compare it to a calculation of the difference
8 as shown in Ms. Diazgranados' testimony, couldn't I?

9 A We used two different modeling systems. I
10 think the comparison appropriate for here would be my
11 totals that are on line 12 of Table A-13 and line nine
12 of Table A-14, that you were referring to originally.

13 Q Okay. In your analyses over time, you looked
14 at 30 years CPVRRs, correct?

15 A That is correct.

16 Q Did you give any extra weight, or apply any
17 different escalation of discount rates to -- to any
18 years in the analysis?

19 A I did not.

20 MR. WRIGHT: If I could just have a minute.

21 This may be all I have for Mr. Taylor on his direct
22 testimony, Mr. Chairman.

23 CHAIRMAN GRAHAM: Okay.

24 BY MR. WRIGHT:

25 Q I think I have one more brief question for you

1 about your experience.

2 On the first page of your exhibit, in the
3 first entry under professional experience, it says that
4 you have conducted numerous competitive bidding project
5 evaluations for conventional generating resources,
6 renewable facilities, energy storage, energy efficiency
7 projects, and so on; correct?

8 A Correct.

9 Q I just wanted to ask you, have you done any
10 such competitive bidding work with respect to energy
11 storage over the last three or four years?

12 A A lot. Yes.

13 Q When you say a lot, can you put a parameter on
14 the number of such projects you have been involved with?

15 A Over the last three or four years, I have
16 probably reviewed over 100 proposals for energy storage
17 projects.

18 Q Okay. And 100 proposals in how many bid
19 processes?

20 A Five or six.

21 Q Great. Thanks very much.

22 MR. WRIGHT: That's all I have for Mr. Taylor
23 on direct examination, Mr. Chairman.

24 CHAIRMAN GRAHAM: Thank you, Mr. Wright.

25 Staff?

1 MS. DZIECHCIARZ: Staff has no questions.

2 Thank you, Mr. Chairman.

3 CHAIRMAN GRAHAM: Commissioners.

4 Commissioner Polmann.

5 COMMISSIONER POLMANN: Thank you, Mr.

6 Chairman.

7 Good morning, Mr. Taylor.

8 THE WITNESS: Good morning.

9 COMMISSIONER POLMANN: In your introductory
10 remarks, you made reference to the three paradigms.
11 Could you please remind me -- I have taken some
12 notes here, but I am not sure I captured all your
13 words. One was the Clean Power Plan. I believe
14 that was -- you were characterizing the selected
15 plan. Could you just -- I am going to lead in some
16 questions here, just remind me the words you used
17 for the others?

18 THE WITNESS: Absolutely.

19 As you mentioned, the first one was the Clean
20 Power Plan, which simply had as a foundation
21 Seminole's existing system minus one of the coal
22 units at SGS.

23 The second paradigm was leaving that coal unit
24 in operation. So having two coal units at SGS, and
25 what would be the least cost plan for meeting the

1 needs without the removal of service for that coal
2 unit. And that ended up being the least cost plan,
3 that was the natural gas, self-build, two-on-one
4 combined cycle, the SCCF, with some additional PPAs
5 as far as some bridging capacity.

6 The third paradigm was that same foundational
7 assumption as the second paradigm, again, two coal
8 units in operation, but now assuming that
9 Seminole's self-build options, both it's two-on-one
10 and one-on-one combined cycle were eliminated from
11 consideration; and therefore, whatever market
12 alternative proposals, the best combination of
13 market alternative proposals would be meeting
14 Seminole's need.

15 COMMISSIONER POLMANN: Okay. Thank you.

16 And in your remarks, you stated support for
17 the Board's choice of what has become the proposed
18 plan, is that correct?

19 THE WITNESS: That's correct.

20 COMMISSIONER POLMANN: Now, when you stated
21 support, does that mean that you agree in
22 essentially all regards with the proposed plan? So
23 what do you mean by support? Is that that you
24 agree with everything? And I mean that essentially
25 yes or no.

1 THE WITNESS: Yes, I do.

2 COMMISSIONER POLMANN: Okay. You have
3 represented yourself here as an independent --
4 independent evaluator. Were you asked to make a
5 recommendation and -- let me just leave it there.
6 Was part of your assignment to make a
7 recommendation as to a plan?

8 THE WITNESS: That's generally understood, as
9 being the independent evaluator, that I am allowed
10 to perform my own independent evaluation and come
11 up with what I think is the best plan for
12 customers. So, yes.

13 COMMISSIONER POLMANN: Okay. So in the sense
14 of you supporting the choice, did you recommend
15 this choice?

16 THE WITNESS: I did.

17 COMMISSIONER POLMANN: Thank you.

18 The petitioner has stated, and it's -- it's
19 been stated directly in introductory remarks, and
20 then I have asked some questions about it, but it's
21 been stated that the selected plan is the most
22 cost-effective and risk-managed. I have -- I have
23 interpreted this to mean that the selected plan is
24 the most risk-managed, and that's -- that's a
25 phrase I have inquired about.

1 So the concept of most risk-managed, do you
2 agree with that -- that this plan, the proposed
3 plan, is, in fact, best with regard to
4 risk-managed?

5 THE WITNESS: I do. I think it's a balanced
6 portfolio of different terms. And I think that the
7 decision to consider removing one of the coal units
8 from service is also a good strategic decision.

9 COMMISSIONER POLMANN: So in your evaluation,
10 is it true that you developed an opinion on risk
11 in -- in some total --

12 THE WITNESS: Yes.

13 COMMISSIONER POLMANN: -- broad sense?

14 THE WITNESS: Yes, that's a fair statement.

15 COMMISSIONER POLMANN: In that process, did --
16 did you have any adverse opinion of reducing the
17 fuel mix diversity? And I mean that in the sense
18 of reducing the degree to which the utility is
19 using coal and, as a result, increasing the use of
20 natural gas? Does that -- does that contribute
21 in -- within your opinion as being an adverse
22 circumstance, reduction of coal and increase of
23 natural gas?

24 THE WITNESS: It does not. And I have been
25 listening to your comments through the hearing, and

1 entirely understand the -- the concerns about fuel
2 diversity.

3 Seminole, I think, has tried to make the case,
4 and appropriately so, that their natural gas supply
5 is well positioned for being in a -- in a strong
6 position to assure reliability. But in my mind,
7 the fuel diversity issue really hinged on the
8 direction that I see the industry going. And cross
9 the country, I have seen a lot of utilities
10 retiring coal plants early and replacing them with
11 natural gas-fired generation and additional
12 renewable, or energy storage resources. And I
13 think that's the direction that the industry is --
14 is basically transitioning.

15 So what I see here is actually a good move in
16 the direction of fuel diversity, albeit, I do
17 recognize that in the near term, a pure comparison
18 of circumstances in 2023 show a reduction in the
19 fuel supply kind of issues that you have been
20 bringing up, but I think that by replacing one of
21 the coal units with natural gas-fired generation,
22 that's very flexible, Seminole would be in a better
23 position to adopt and incorporate new renewable
24 technology, particularly lower solar PV cost
25 projects, wind and energy storage on to its system

1 than it would be if it continued to rely on coal,
2 because coal-fired resources are fairly inflexible
3 as far as their ability to shut down at night, for
4 example, and start back up in the morning. So you
5 have got to carry these units through the night,
6 and they don't have the ramp rates that natural
7 gas-fired generation has.

8 So it's kind of a long-winded response, but I
9 wanted to make clear too that my focus on fuel
10 diversity was recognizing where this preferred
11 recommended portfolio, this Clean Power Plan could
12 take Seminole and allow it to be in a position to
13 incorporate new renewable technologies.

14 COMMISSIONER POLMANN: Did your analysis
15 consider the magnitude of the load that could be --
16 that is currently and could be, in the future met,
17 by coal as a base-load, as compared to the
18 base-load being met by natural gas?

19 THE WITNESS: The fundamental assumptions that
20 were in the RSM actually were that the two coal
21 units would be continuing to operate. So the
22 modeling results that I present in my testimony are
23 based on that presumption.

24 I think that that's one reason why my numbers,
25 the differentials between the with and without

1 coal, are actually smaller than Seminole's, because
2 they did a full dispatch model of what the next 30
3 years would look like if two coal units were in
4 operation versus one coal unit.

5 As I alluded to in my previous response, some
6 of that results in uneconomic dispatch because coal
7 units can't be shut down at night. So there are
8 circumstances where, if minimum loads are too low,
9 and the coal units have to stay on line to be able
10 to service the next day's loads, then they have to
11 be run at their halfway point, basically their
12 turn-down point, through the night uneconomically.
13 That was not captured in my results, and that
14 actually was captured in Seminole's results.

15 COMMISSIONER POLMANN: So is it your opinion
16 that Seminole has an excess of base-load capacity
17 that is unnecessary in an economic sense?

18 THE WITNESS: It may be. I did not study the
19 hourly load profiles, the 8760 profiles that were
20 in the PaR model, but I think that many utilities
21 across the country are coming to this conclusion,
22 and I sense that the same sort of implications
23 were -- were shown in Seminole's dispatch results.

24 COMMISSIONER POLMANN: Did your analysis
25 consider the uncertainty of pricing in natural gas

1 supply?

2 THE WITNESS: It did not. I did not run any
3 sensitivities. The Response Surface Model itself
4 was calibrated under base case circumstances, so I
5 would have had to develop different sets of models
6 in order to run the sensitivities. That was really
7 left to the Seminole team.

8 COMMISSIONER POLMANN: Did your analysis in
9 any way consider uncertainty in fuel pricing at
10 all?

11 THE WITNESS: Not in the quantitative modeling
12 concept. And I probably should make that qualifier
13 to my previous statement.

14 Certainly, in my mind, from a qualitative
15 standpoint, I was thinking about what the
16 implications might be. But you are absolutely
17 right, my modeling assumptions were just one base
18 case set of assumptions as far as coal and gas
19 prices.

20 COMMISSIONER POLMANN: So with regard to
21 the -- to my prior question on risk, and you stated
22 that you believed this being the best case plan,
23 and your support for the Board's choice, your
24 analysis with regard to choice -- to cost was not a
25 full analysis taking into account an uncertainty in

1 cost complete with -- in the sense that Seminole
2 did an analysis that had a sensitivity with regard
3 to -- to fuel costs?

4 THE WITNESS: That is -- that is correct.

5 COMMISSIONER POLMANN: If you understood my
6 question.

7 THE WITNESS: Yes. My analysis -- these are
8 simply base case numbers that are in my testimony.
9 I did not conduct or have really the opportunity to
10 conduct a sensitivity short of going back to
11 Seminole and asking them to recalibrate all of the
12 runs associated with a new round of RSM.

13 What I think is important to note is that
14 these base case assumptions also do not include any
15 costs for carbon taxes, or any sort of regulation
16 costs that might occur in that regard in the
17 future. And around the country, I think more and
18 more utilities are recognizing that at some point
19 during the remainder of the first half of this
20 century, there could very well be some sort of
21 costs in place there. So I consider these numbers
22 kind of conservative, at least that side of the
23 picture.

24 COMMISSIONER POLMANN: Thank you, Mr. Taylor.

25 That's all I have.

1 CHAIRMAN GRAHAM: Redirect?

2 MR. PERKO: No redirect, Mr. Chairman.

3 CHAIRMAN GRAHAM: Thank you.

4 Exhibits.

5 MR. PERKO: Mr. Chairman, we would move in
6 Exhibit Nos. 26, 27, 50 and 51.

7 CHAIRMAN GRAHAM: Seeing no objection, we will
8 enter 26, 27, 50 and 51 into the record.

9 (Whereupon, Exhibit Nos. 26-27 & 50-51 were
10 received into evidence.)

11 (Witness excused.)

12 MR. PERKO: I believe that concludes our
13 direct case, Mr. Chairman.

14 CHAIRMAN GRAHAM: Okay. And, Mr. -- we can --
15 Mr. Wright, your first witness?

16 MR. WRIGHT: Yes, Mr. Chairman. The
17 intervenors, Quantum Pasco, Michael Tulk and
18 Patrick Daly call Dr. Paul Sotkiewicz.

19 Whereupon,

20 PAUL SOTKIEWICZ

21 was called as a witness, having been previously duly
22 sworn to speak the truth, the whole truth, and nothing
23 but the truth, was examined and testified as follows:

24 EXAMINATION

25 BY MR. WRIGHT:

1 Q Good morning, Dr. Sotkiewicz.

2 A Good morning, Schef.

3 Q Welcome back to Tallahassee.

4 A Go Gators.

5 Q Here, here.

6 Dr. Sotkiewicz, did you pre -- please state
7 your name and business address for the record?

8 A My name is Paul Michael Sotkiewicz. I am the
9 President and Founder of E-Cubed Policy Associates.
10 Business address is 5502 Northwest 81st Avenue,
11 Gainesville, Florida, 32653.

12 Q Dr. Sotkiewicz, did you prepare and cause to
13 be filed in this docket revised, or corrected direct
14 testimony on February 14th, 2018, consisting of 37
15 pages?

16 A Yes, I did.

17 Q Okay. If I were to ask you -- let me go ahead
18 and move the supplemental in. Did you also prepare and
19 cause to be filed in this proceeding supplemental direct
20 testimony on March 12, 2018, consisting of three pages?

21 A Yes, I did.

22 Q If I were to ask you the -- do you have any
23 changes or corrections to make to either of those
24 testimony documents?

25 A No, I do not -- or excuse me, I have one typo

1 to change on my initial filing direct testimony.

2 **Q Please tell us what that change is?**

3 A It's on page 19, line two, it's a typo. It
4 currently reads: After requirements 4,603 megawatts.
5 It should read 4,063 megawatts, to be consistent with, I
6 believe it's Exhibit PS-5 that I submitted in that
7 testimony.

8 **Q Thank you.**

9 **Do you have any corrections to make to any of**
10 **your exhibits?**

11 A Not at this time, no, sir.

12 **Q Thank you.**

13 **If I were to ask you the same questions**
14 **contained in your prefiled direct testimony, your**
15 **corrected direct testimony today, would your answers be**
16 **the same?**

17 A Yes, they would.

18 **Q And if I were to ask you the same questions**
19 **contained in your supplemental direct testimony today,**
20 **would your answers be the same?**

21 A Yes, they would.

22 **Q And do you adopt this as your sworn testimony**
23 **to the Florida Public Service Commission for this**
24 **proceeding?**

25 A Yes, I do.

1 MR. WRIGHT: Mr. Chairman, I ask that Dr.
2 Sotkiewicz's corrected direct testimony and his
3 supplemental direct testimony be entered into the
4 record as though read.

5 CHAIRMAN GRAHAM: We will enter his corrected
6 direct testimony and his supplemental testimony
7 into the record as though read.

8 (Whereupon, prefiled direct testimonies were
9 inserted.)

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1 purchased power agreement options and through an asset sale. Michael Tulk and
2 Patrick Daly are “member-consumers” of Withlacoochee River Electric Cooperative,
3 Inc. (“WREC”), which is one of the member cooperatives of Seminole, the principal
4 petitioner in these dockets. As member-consumers of WREC, Mr. Tulk and Mr.
5 Daly will have to pay the rates that result from the wholesale power furnished to
6 WREC by Seminole, including the costs of the power plants that are the subject of
7 these consolidated need determination dockets.

8
9 **Q. Please summarize your educational background and your employment**
10 **experience.**

11 **A.** I received a Bachelor of Arts Degree in History and Economics from the University
12 of Florida in 1991. I received a Master of Arts Degree in Economics from the
13 University of Minnesota in 1995 and a Doctor of Philosophy Degree in Economics
14 from the University of Minnesota in 2003.

15 Prior to founding E-Cubed Policy Associates, LLC, I have worked as a staff
16 economist in the Office of Economic Policy, and later on the staff of the Chief
17 Economic Advisor at the United States Federal Energy Regulatory Commission
18 (“FERC”), served as the Director of Energy Studies at the Public Utility Research
19 Center (“PURC”), University of Florida, and been a Senior Economist, Chief
20 Economist, and Senior Economic Policy Advisor for PJM Interconnection, LLC
21 (“PJM”). Since founding E-Cubed, my clients have included organized wholesale
22 market operators New York Independent System Operator (“NYISO”) and the
23 Alberta Electric System Operator (“AESO”) in Canada; industry trade associations

1 Electric Power Supply Association (“EPSA”), New England Power Generator
2 Generators Association (“NEPGA”) and the American Petroleum Institute (“API”);
3 and merchant generation developers, natural gas mid-stream companies, and
4 merchant transmission developers.

5 During my tenure as Director of Energy Studies at PURC, I advised and provided
6 executive education in Latin America and the Caribbean, Southeast Asia, and
7 Southern Africa. I also served as a private consultant to the Public Utilities
8 Commission of Belize and the Florida Department of Environmental Protection
9 (“FDEP”) regarding their State Implementation Plan for the Clean Air Interstate Rule
10 (“CAIR”).

11 Including my dissertation work on the impact of public utility commission
12 regulation on the cost-effectiveness of the Title IV SO₂ Trading Program, I have over
13 20 years of experience in working in the power industry and power sector regulation.

14 I have authored and co-authored numerous articles and chapters of books relating
15 to electric policy issues, electric markets, energy and electric utility economics, and
16 environmental policy impacts on the electricity market and electricity regulation.

17

18 **Q. Please summarize your experience relating to electric system planning.**

19 **A.** I have worked extensively in analyzing the impacts of environmental policy on
20 power generation compliance choices, potential exit of generation and the effect on
21 reserve levels, and the entry of new generation associated with environmental
22 policies. This body of work includes modeling compliance with the Title IV SO₂
23 Trading Program as part of my doctoral dissertation examining choices between

1 installation of scrubbers, fuel switching, and allowance purchases or sales. It also
2 includes modeling joint sulfur dioxide and nitrogen oxide compliance for the CAIR
3 as part of my work for the FDEP in its State Implementation Plan for CAIR.

4 While at PJM, this work continued with leading and co-authoring analyses of the
5 impacts of Waxman-Market climate bill in 2008, the Mercury and Air Toxics
6 Standards (“MATS”), and the recent Clean Power Plan.

7 Also, while at PJM, I co-authored work on transmission cost allocation as it
8 relates to transmission planning and cost causality for new transmission upgrades.

9 Additionally, as the Chief Economist at PJM, it was my responsibility to provide
10 advice on the capacity market construct that had the purpose of ensuring resource
11 adequacy and provide expertise regarding the costs of potential new generation as
12 well as the cost of keeping existing generation in service, and advice on load
13 forecasting as needed.

14

15 **Q. Please summarize your experience testifying in regulatory proceedings.**

16 **A.** As the Chief Economist at PJM, I supplied testimony in high profile cases related to
17 energy market pricing during operating reserve shortages and testimony in support of
18 what is known as the Cost of New Entry (“CONE”) for simple cycle and combined
19 cycle gas turbines. The CONE testimony covers the cost of building new simple and
20 combined cycle gas turbines in different areas of the PJM footprint with the help of
21 EPC contractors and the consultants retained by PJM, The Brattle Group.

22 In the 2014 CONE proceeding, FERC relied upon my prepared testimony to
23 approve PJM’s filed CONE numbers. The FERC decision was appealed by a group

1 of generation owners to the DC Circuit Court of Appeals, and the FERC ruling
2 relying on my testimony was just recently upheld by the DC Circuit.

3 Prior to PJM, I provided oral testimony before an Administrative Law Judge in
4 the FDEP CAIR proceeding in 2006 in support of the FDEP proposed State
5 Implementation Plan.

6 Since founding E-Cubed, I have provided written testimony in the recent DOE
7 NOPR proceeding requesting special compensation for generation with on-site fuel
8 storage, and concurrent with this proceeding, I will be filing testimony in a case in at
9 FERC regarding an update to a market power screen in ISO New England.

10

11 **Q. Are you sponsoring any exhibits with your testimony?**

12 **A.** Yes. I am sponsoring the following exhibits:

13 Exhibit PS-1 Resume' of Paul M. Sotkiewicz, Ph.D.;

14 Exhibit PS-2 Summary of Seminole's Winter Peak Forecast Errors, 2005-
15 2016;

16 Exhibit PS-3 Summary of Seminole's Summer Peak Forecast Errors, 2005-
17 2016;

18 Exhibit PS-4 Summary of Seminole's Total Energy Requirements Forecast
19 Errors, 2005-2016;

20 Exhibit PS-5 Seminole Gap Chart (Seminole Exhibit JAD-2);

21 Exhibit PS-6 Peak Load, Energy, and Number of Customers History and
22 Forecast Tables from Seminole's Ten Year Site Plans, 2005-
23 2016;

- 1 Exhibit PS-7 Seminole’s Existing Generating Facilities and Purchased Power
2 Resources, Excerpt from Seminole’s 2017 Ten Year Site Plan;
3 Exhibit PS-8 Seminole’s Revised Economic Analysis Results of Portfolios
4 (Seminole Exhibit JAD-6);
5 Exhibit PS-9 Specifications of FPL’s Proposed Dania Beach Clean Energy
6 Center, Schedule 9 from FPL’s 2017 Ten Year Site Plan;
7 Exhibit PS-10 Seminole’s 2017 Specifications for Planned Combined Cycle
8 Facilities as stated in Seminole’s 2017 Ten Year Site Plan,
9 Schedule 9 for SGS CC Unit 1 and Unnamed Generating
10 Station CC Unit 2;
11 Exhibit PS-11 Combined Cycle Costs for 2010-2016, U.S. Energy Information
12 Administration, contained in presentation by Paul M.
13 Sotkiewicz, Ph.D. to Harvard Electricity Policy Group, March
14 31, 2017; and
15 Exhibit PS-12 FPL Specifications and Escalation Rates associated with a 1,163
16 MW Combined Cycle Unit with In-Service Date of June 1,
17 2022, FPL Tariff Sheets No. 10.311 and No. 10.311.1.
18

19 **II. PURPOSE AND SUMMARY OF TESTIMONY**

20 **Q. What is the purpose of your testimony in this proceeding?**

21 **A.** I have been engaged by Quantum Pasco Power, L.P., to analyze and provide my
22 professional opinions regarding (1) whether Seminole Electric Cooperative’s claims
23 regarding its projected need for additional generating capacity, including Seminole’s

1 assertions regarding the timing of any such need, are reasonable and appropriate; (2)
2 whether Seminole's choices of the Seminole Combined Cycle Facility and the Shady
3 Hills Combined Cycle Facility represent the most cost-effective alternatives
4 available to meet the needs of the end-use member-consumers (i.e., the retail
5 electricity purchasers) who are served by the distribution cooperatives, including
6 WREC, who receive their power supply from Seminole; (3) whether the resources
7 proposed by Seminole are in the best interests of those end-use consumers,
8 specifically including consideration of the risks that Seminole's proposals will
9 impose on those end-use consumers; (4) whether better choices are available to
10 Seminole; and (5) whether Seminole's proposed resources are in the public interest.

11

12 **Q. What issues do you address in your testimony?**

13 **A.** Seminole and Shady Hills have asked the Florida Public Service Commission
14 ("PSC" or "Commission") to grant determinations of need for two new electrical
15 power plants, the Seminole Combined Cycle Facility ("SCCF"), with a projected
16 "net nominal" capacity of 1,050 megawatts ("MW") (1,122 MW of winter peak
17 capacity according to Seminole's exhibits, and 1,183 MW "gross nominal"), and the
18 Shady Hills Combined Cycle Facility ("SHCCF"), which has a projected winter peak
19 capacity of 573 MW. Both the SCCF and the SHCCF are subject to the mandatory
20 jurisdiction of the Florida Electrical Power Plant Siting Act and the PSC's need
21 determination statute, Section 403.519, Florida Statutes (the "Need Statute"). The
22 Need Statute sets forth several specific criteria that the PSC must consider in making
23 its decisions on such petitions for determinations of need. Those criteria are:

- 1 a. the need for system reliability and integrity;
- 2 b. the need for adequate electricity at a reasonable cost;
- 3 c. the need for fuel diversity and supply reliability;
- 4 d. whether a proposed power plant is the most cost-effective alternative
5 available for meeting the needs of the petitioning utility; and
- 6 e. the extent to which renewable resources and conservation measures that
7 might mitigate the need for additional power plants are utilized to the
8 extent reasonably available.

9 Consistent with the statutory criteria, my testimony mainly addresses Seminole's
10 alleged need for the proposed SCCF and SHCCF relative to its "need for system
11 reliability and integrity" and its "need for adequate electricity at a reasonable cost,"
12 touching briefly on fuel diversity and supply reliability, as well as the issue of
13 whether these proposed power plants, both individually and collectively, represent
14 the "most cost-effective alternatives" for meeting Seminole's alleged needs. My
15 testimony also addresses whether the construction of the proposed power plants is in
16 the best interests of the end-use consumers who will be called upon to pay for the
17 plants. To the same point and effect, my testimony addresses Seminole's proposals
18 in relation to the risks that Seminole's decisions will impose on the end-use
19 consumers of the power that Seminole sells to its member cooperatives; this issue is
20 particularly noteworthy given Seminole's claim that it has selected the best "risk-
21 managed" resource plan or portfolio for meeting its needs.

22 Given the Commission's overarching interest in protecting consumers, and in
23 ensuring the appropriate development of a coordinated power supply grid,

1 specifically including the avoidance of uneconomic duplication of generating
2 resources, my testimony also addresses the interests of the consumers who would be
3 obligated to pay for the proposed plants – and the public interest generally, including
4 whether the plants would represent uneconomic additions to the grid if they were
5 brought on-line on the in-service dates proposed by Seminole.

6
7 **Q. Please summarize the main conclusions of your testimony.**

8 **A.** Because Seminole’s forecasting errors have historically been extremely large, it is
9 my opinion that the Commission should deny both the petition for determination of
10 need for the SCCF and the petition for determination of need for the SHCCF.

11 Indeed, the *average error* of Seminole’s winter peak forecasts five years into the
12 future, as measured using Seminole’s own Ten Year Site Plans since 2005, *1,420*
13 *MW*, has been greater than Seminole’s asserted “Need Gap” projected in its filings
14 through 2024, *1,336 MW*. Moreover, previous instances of over-forecasting have
15 resulted in Seminole being 500-600 MW over their reliability requirement through
16 2020 if the load forecast is accurate out to 2020. Seminole has ample capacity,
17 considering its owned generating resources and its long-term power purchase
18 agreements (through 2024), to meet reasonably projected peak demands through at
19 least 2024 with only minimal additions of purchase power resources.

20 Moreover, Seminole’s own analyses show that the most cost-effective portfolio –
21 by approximately \$136 Million on a Cumulative Present Value Revenue
22 Requirements (“CPVRR”) basis – for meeting even its overstated future needs is
23 what Seminole calls the “No Build Risk: All-PPA Portfolio,” when evaluated over a

1 10-year time horizon or analysis period. This shows that the All-PPA Portfolio is
2 likely to be cost-effective for even longer than 10 years, quite possibly even 15 years
3 or more, before any fuel cost savings would possibly catch up with the tremendous
4 additional capital costs associated with the SCCF and the SHCCF.

5 This further shows that Seminole's proposed plan – to build the SCCF and
6 SHCCF – would impose substantial risks on the consumers who would have to pay
7 for Seminole's decisions.

8

9 **Q. Please state your main conclusions regarding the proposed power plants**
10 **relative to the criteria in the Need Statute that you address.**

11 **A.** 1. Seminole does not need either the SCCF or the SHCCF, as of their proposed in-
12 service dates, to meet the needs of the consumers who would be obligated to pay for
13 those plants for system reliability and integrity.

14 2. Seminole does not need either the SCCF or the SHCCF, as of their proposed in-
15 service dates, to meet the needs of the consumers who would be obligated to pay for
16 those plants for adequate electricity at a reasonable cost.

17 3. Seminole does not need either the SCCF or the SHCCF, as of their proposed in-
18 service dates, to meet the needs of the consumers who would be obligated to pay for
19 those plants for fuel diversity and supply reliability. In fact, taking a coal plant out
20 of service, while probably desirable in some respects, is contrary to the need for fuel
21 diversity.

1 4. Seminole’s proposals to add the SCCF and SHCCF to its generating resources do
2 not represent the most cost-effective alternative for meeting the needs of the
3 consumers who would be obligated to pay for those plants.

4 Indeed, adding these two projects in the times proposed will impose significantly
5 greater risks on those consumers than if Seminole were to continue using the
6 resources it has available through at least 2024.

7

8 **Q. Do you have a recommendation for the Commission on the petitions for need**
9 **determinations for the SCCF and the SHCCF?**

10 **A.** Yes. My recommendation is that the Commission should deny both petitions as
11 proposed by Seminole and Shady Hills. While it may be desirable for Seminole to
12 eventually add physical generating capacity to its resource mix, Seminole cannot
13 credibly show that it needs approximately 1,700 MW of new gas-fired capacity to
14 meet its needs based on its record of dramatic and systematic over-forecasting bias
15 for peak loads and total energy. In fact, Seminole’s own analyses show that adding
16 the SCCF and the SHCCF would be uneconomic – as compared to an All-PPA
17 Portfolio – until sometime after 2027. The Commission should invite Seminole to
18 correct its forecasting methodologies and come back to the Commission with
19 appropriate need petitions in the future. This will benefit the end-use consumers
20 who would be called upon to pay for these plants by reducing risks and reducing
21 costs well into the future; the Commission should keep clearly in mind that
22 Seminole’s own analyses show that an All-PPA Portfolio has significantly lower
23 costs – CPVRRs – than Seminole’s proposed portfolio for at least the first 10 years

1 of Seminole’s planning horizon, i.e., until sometime after 2027. Deferring the SCCF
2 and the SHCCF, including deferring decisions to construct them, will not only allow
3 Seminole to improve its forecasting methodologies, but it will also allow Seminole to
4 take advantage of additional improvements in generating technologies and to plan for
5 developments affecting other variables – e.g., carbon taxation or greenhouse gas
6 regulation, additional penetration of conservation and end-use solar measures, and
7 battery storage for solar generation alternatives – and potentially avoid the need to
8 build new capacity before committing to a multi-billion dollar resource plan on the
9 basis of flawed load forecasting.

11 **III. SEMINOLE’S NEED FOR ADDITIONAL GENERATING CAPACITY**

12 **Q. Considering the factors in the Need Statute, does Seminole need either or both**
13 **the SCCF or the SHCCF at the proposed in-service dates for those power**
14 **plants?**

15 **A.** No. Seminole’s need forecasting has been systematically and consistently biased
16 upward for years, such that Seminole cannot credibly show a reliability need for
17 either plant. Further, Seminole’s own analyses show that Seminole’s total power
18 supply costs would be lower for at least the first 10 years of its planning horizon if it
19 were to use what it calls the “No Build Risk: All-PPA Portfolio,” so Seminole cannot
20 credibly claim to need either plant to meet consumers’ needs for adequate electricity
21 at a reasonable cost. For the same reasons, Seminole has not credibly shown and
22 cannot credibly show that either project represents the most cost-effective alternative

1 to meet the needs of the consumers who must pay the costs of power supplied by
2 Seminole.

3

4 **A. Need for System Reliability and Integrity**

5 **Q. Please describe your understanding of Seminole’s asserted need for additional**
6 **generating capacity and of Seminole’s proposals to meet that need, including**
7 **construction of the proposed Seminole Combined Cycle Facility (“SCCF”), the**
8 **proposed Shady Hills Combined Cycle Facility (“SHCCF”), and certain**
9 **purchases from a few wholesale suppliers.**

10 **A.** Seminole asserts that it “needs” approximately 901 MW of additional generating
11 capacity resources by December 2021, and 1,265 MW (total) by December 2022, in
12 order to maintain reliable service. Seminole further asserts that this alleged need will
13 increase to 1,698 MW by 2026. (These projections are shown in Exhibit MPW-2,
14 page 49 of 153, to the testimony of Michael P. Ward.)

15 In addition, Seminole asserts that, in its view, the best way to meet its projected
16 needs is by self-building the Seminole Combined Cycle Facility (1,122 MW of
17 winter peak capacity), with an in-service date of December 2021, and by having
18 Shady Hills Energy Center, LLC, build and operate the Shady Hills Combined Cycle
19 Facility (573 MW of winter peak capacity), with Seminole buying the output of the
20 SHCCF for 30 years, with an in-service date of December 2022, plus additional
21 PPAs with GE Shady Hills for peaking purchases, peaking and intermediate
22 purchases from Duke Energy Florida, and an additional purchase from a confidential
23 supplier. This information is shown in the Sedway Evaluation Report, Exhibit No.

1 AST-1, page 22, Table A-13, which is an exhibit to the testimony of Seminole's
2 witness Alan S. Taylor. Since the combined capacities of the SCCF and the SHCCF
3 are significantly greater than Seminole's alleged "need gap" until 2025 or 2026,
4 Seminole further asserts that it will close one of its coal-fired generating units and
5 meet its projected needs with a combination of five power purchase agreements
6 (PPAs) with four different counter-parties, with amounts of capacity ranging from
7 172 MW to 350 MW and terms ranging from 5 years to 23 (or 15) years. (This
8 information is presented in Table A-13, found at page 22 of the Sedway Consulting
9 Independent Evaluation Report.)
10

11 **Q. Do you agree with Seminole's assertions regarding the timing of its claimed**
12 **need and the amount of that need for additional generating capacity?**

13 **A.** No, I do not. Seminole has consistently and significantly overstated its projected
14 peak demands, both for summer and winter, and also its energy needs. Given that a
15 lead period of 5 years for the permitting and construction of the SCCF and the
16 SHCCF is reasonable, I looked at how accurate Seminole's forecasts of summer peak
17 demand, winter peak demand, and energy requirements have been both 4 years into
18 the future and 5 years into the future. Analysis of Seminole's record of overstating
19 projected peak demands and energy requirements shows that:

- 20 a. Seminole has consistently and systematically over-forecast its winter
21 peak demands, 5 years into the future, by an average of 1,420 MW, or
22 41%, and by an average of 1,114 MW, or almost 32%, 4 years into the

1 future. Seminole's Winter Peak forecast errors are shown in tabular and
2 graphic formats in my Exhibit No. ____ (PS-2).

3 b. Seminole has consistently and systematically over-forecast its summer
4 peak demands 5 years into the future by an average of 679 MW, or 20%,
5 and 4 years into the future by an average of 513 MW, or 15%.

6 Seminole's Summer Peak forecast errors are shown in tabular and
7 graphic formats in my Exhibit No. ____ (PS-3).

8 c. Seminole has also consistently and systematically over-forecast its
9 energy requirements 5 years into the future by an average of 3,870 giga-
10 watt hours ("GWH"), or 25%, and 4 years into the future by an average
11 of 2,973 GWH, or 19%. Seminole's forecast errors for its total energy
12 requirements are shown in tabular and graphic formats in my Exhibit No.
13 ____ (PS-4).

14 These consistent, systematic, and dramatic over-estimates demonstrate that
15 Seminole's forecasting cannot be used a basis for supporting the need for the
16 combined capacity of SCCF and SHCCF. It is particularly telling that Seminole is a
17 winter peaking utility, but its winter peak forecasting errors have averaged 1,420
18 MW, which is more than Seminole's projected "Winter Need Gap" of 1,336 MW for
19 2024, as shown in my Exhibit No. ____ (PS-5), which is a copy of Exhibit No. JAD-
20 2 presented by Seminole's witness Julia Diazgranados, who is the utility's Director
21 of Treasury and Planning. What is even more striking is that there has been a
22 downward trend in the actual winter and summer peak loads since 2009,
23 corresponding to the end of the last recession, which is a trend that has widely been

1 seen across the United States, yet Seminole's new forecast is for peak load to start
2 growing again as it had prior to the last economic downturn. In other words, if
3 Seminole's current forecast has the same average error in MW that its forecasts made
4 from 2005 through 2012 (the 4-years-out projection for 2016 was made in 2012)
5 exhibited, Seminole would not need any new capacity until 2025. In fact, this
6 average forecast error of 1,420 MW is nearly the total amount of capacity proposed
7 for the SCCF and the SHCCF combined.

8 The forecasting errors, both in units (MW and GWH) and in percentages, are
9 presented in my Exhibits Nos. PS-2 through PS-4. They are based on data obtained
10 from Seminole's Ten Year Site Plans from 2005 through 2016; the source schedules
11 from those 2005-2016 Site Plans are provided as Exhibit No. ____ (PS-6) to my
12 testimony.

13
14 **Q. What impacts would using more realistic peak demand projections have on**
15 **Seminole's projected need?**

16 **A.** If Seminole were to use more appropriate assumptions, e.g., by reducing its projected
17 winter peak demands by the approximate amounts of its average forecasting errors,
18 as shown by Seminole's own Ten Year Site Plans, it would be readily apparent that
19 Seminole does not need either the SCCF in 2021 or the SHCCF in 2022. At most,
20 Seminole might need 200 to 300 MW of additional winter capacity in that time
21 frame, which it could easily meet with additional power purchases, at costs
22 dramatically less than the costs of the SCCF and the SHCCF.

23

1 **Q. How do you believe this need could be met?**

2 **A.** Seminole presently owns 2,178 MW of its own generation resources, the two coal
3 units at Seminole's Palatka site (1,329 MW winter), and the 8 units at the Midulla
4 Generating Station in Hardee County (849 MW winter). Additionally, Seminole has
5 (or will have as of 1/1/2021) approximately 1,603 MW of winter capacity available
6 through purchased power resources through at least 2024. (These data are reported
7 in Seminole's 2017 Ten Year Site Plan, Schedule 1 and Table 1.2, which are
8 provided here as Exhibit No. ____ (PS-7) to my testimony.) Thus, Seminole has
9 about 3,780 MW of capacity under control through at least 2024, with winter peaks
10 that are currently in the range of 3,500 MW. Adding a 15 percent reserve margin
11 onto Seminole's estimated 2017 3,523 MW winter peak (as reported in its current
12 Ten Year Site Plan) indicates total need of about 4,051 MW, which is about 270 MW
13 above its resources under control through 2024. This small amount of additional
14 need could easily be met by PPAs (or tolling agreements). For example, Tables A-8
15 and A-12 in the Sedway Evaluation Report (Exhibit AST-1 to Mr. Taylor's
16 testimony) show that there were literally hundreds of MW – in fact, more than 2,000
17 MW – of additional capacity offered to Seminole at apparently favorable costs, based
18 on the rankings in those tables. These include an additional 343 MW available from
19 the project coded as L-1, which was actually chosen to meet 172 MW of Seminole's
20 proposed requirements; 235 MW from the project coded as O-1; 482 MW from the
21 project coded as A-4; another 484 MW from the project coded as D-1; up to 1,000
22 MW from the project coded A-5; and others.

1 In the best interests of consumers and in the public interest, the Commission
2 should reject both the need determination petition for the SCCF and the need
3 determination petition for the SHCCF. Much better, more economic, and less risky
4 opportunities are available for Seminole to meet the needs of the end-use consumers
5 it serves – and who would be called upon to pay for Seminole’s mistakes.

6
7 **Q. What else does Seminole’s record of forecasting need, and the amount of**
8 **capacity that Seminole has procured, show?**

9 **A.** Exhibit JAD-2 to the testimony of Julia Diazgranados (included as Exhibit No. ____
10 (PS-5) to my testimony) shows the direct results of Seminole’s continuing
11 forecasting errors, and thus directly shows how much unneeded capacity Seminole
12 has been maintaining, presumably at the expense of its member cooperatives and the
13 end-use consumers who ultimately bear the costs of Seminole’s mistakes.

14 Ms. Diazgranados’s Exhibit JAD-2, titled “Seminole Need Gap Chart,” shows the
15 following:

- 16 a. In 2017, Seminole’s “Total (Winter) Capacity Need Including Reserve
17 Requirements” (underlining by the witness) was approximately 4,063 MW, but
18 Seminole’s resources totaled approximately 4,600 MW. Consumers were
19 apparently paying for more than 500 MW of unneeded capacity.
- 20 b. In 2018, Seminole projects a Total Capacity Need, Including Reserve
21 Requirements, of 3,986 MW, with consumers still paying for approximately 4,600
22 MW of resources.

1 c. In 2019, Seminole again projects a Total Capacity Need, Including Reserve
2 Requirements, of ^{4,063}~~4,603~~ MW, with consumers still paying for approximately 4,600
3 MW of resources.

4 d. In 2020, Seminole projects a Total Capacity Need, Including Reserve
5 Requirements, of 4,138 MW, with consumers having to pay for approximately
6 4,750-4,800 MW of capacity, such that consumers will still be paying for 600-
7 plus MW of excess capacity.

8 The Commission should, of course, remember this is based on Seminole's
9 historically inaccurate forecasts. In short, the consumers who depend on Seminole
10 for bulk power supply have been paying for too much capacity for too long – the
11 Commission should not allow Seminole to make it worse by adding 1,700 MW of
12 unneeded, uneconomic capacity.

13

14 **B. Need for Adequate Electricity at a Reasonable Cost**

15 **Q. Do you believe that the needs of Seminole, and of the end-use consumers who**
16 **will be called upon to pay for Seminole's decisions, for adequate electricity at a**
17 **reasonable cost, would be met by the proposed SCCF and SHCCF?**

18 **A.** No, I do not. Seminole's proposed plan to build and pay for the SCCF and the
19 SHCCF would impose tremendous costs and risks on the consumers who will have
20 to pay for Seminole's decisions. Seminole did not provide annual revenue
21 requirements for either the SCCF or the SHCCF as part of its filings, but using
22 reasonable assumptions, it is safe to say that the additional capital revenue
23 requirements would easily exceed \$100 million or more per year. Since Seminole

1 does not need these units for reliability purposes, it clearly does not need them to
2 meet a need for adequate electricity.

3 Moreover, as explained below and elsewhere in my testimony, Seminole's own
4 analyses show that Seminole's proposals will be more expensive for its customers
5 over *at least* the first 10 years of Seminole's planning horizon, through at least 2027,
6 and for at least some time thereafter. Given the large gap - \$136 million - in
7 CPVRRs between the All-PPA Portfolio and Seminole's proposed plan through
8 2027, I believe that it is highly likely that the savings (allegedly to be provided by
9 more efficient generating technology at the SCCF and the SHCCF) would not catch
10 up to the extra capital and operating costs of those units until sometime after 2030.

11

12 **Q. What impacts would using more realistic projections of Seminole's energy**
13 **requirements have on Seminole's projected need?**

14 **A.** Energy requirements – the amount of energy load that a system must serve –
15 generally do not impact the need for reliability in terms of having sufficient capacity
16 to meet peak demands. However, energy requirements have a direct impact on the
17 economics of generating resource choices, because the more an efficient plant runs,
18 the more fuel savings it will produce, but the less it runs, the less savings it will
19 produce. In this situation, Seminole's over-forecasting of its energy requirements
20 will result in overstated fuel cost savings that would allegedly result from adding
21 more efficient resources.

22 This is critical in this context, because Seminole's own analyses, presented in
23 Exhibit No. JAD-6, which is included with my testimony as Exhibit No. ____ (PS-

1 8), shows that the energy savings that would allegedly be provided by the SCCF and
2 SHCCF do not catch up to the significant additional capital and capacity costs of
3 adding approximately 1,700 MW of capacity for at least 10 years. Ms.
4 Diazgranados's Exhibit JAD-6 shows that, even after the first ten years of its
5 proposed planning horizon, i.e., through 2027, the "No Build Risk" All-PPA
6 Portfolio" is approximately \$136 million less in CPVRRs than Seminole's proposed
7 plan. This clearly demonstrates that the fuel savings don't catch up until sometime
8 after 2027, and the availability of cost-effective purchased power options in this time
9 frame should tell the Commission to reject Seminole's SCCF and SHCCF as
10 proposed: at best, they might become economic if they were brought on line at later
11 dates, but not in 2021 and 2022.

12

13 **Q. Are there any other factors regarding either the SCCF or the SHCCF that cast**
14 **doubt on whether they would actually contribute to consumers' needs for**
15 **adequate electricity at a reasonable cost?**

16 **A.** Yes. In the first instance, Seminole has not furnished projected revenue
17 requirements by year for either project, on either a public or confidential basis. This
18 makes any detailed analysis difficult, at best, although the summary information
19 presented by Ms. Diazgranados clearly shows that postponing both units is in the
20 best interests of Seminole and the end-use consumers ultimately served by
21 Seminole's power supply. Seminole did furnish a total cost estimate for the SCCF,
22 but I believe that that estimate is suspiciously low. Further, Seminole has not even

1 furnished the Tolling Agreement by which it asserts it would obtain the SHCCF's
2 capacity.

3

4 **Q. Do you believe that Seminole's projected cost for the SCCF is reliable?**

5 **A.** No, I do not. Seminole's projected cost of \$727,000,000 for the SCCF combined
6 cycle plant equates to approximately \$648 to \$692 per kW at the end of 2021. (The
7 reason for the range given is that Seminole's petition indicates that the SCCF will
8 have 1,050 MW of net nominal capacity, while the Sedway Consulting analysis of
9 portfolios indicates that the SCCF will have winter capacity of 1,122 MW.) There is
10 a readily available yardstick against which this can be measured, and that is Florida
11 Power & Light Company's ("FPL") projected cost for what is essentially the same
12 unit, FPL's proposed Dania Beach Clean Energy Center, which is projected to come
13 on-line in June of 2022. FPL's projected costs must be considered a good yardstick
14 because FPL has an extensive fleet of advanced-technology combined cycle plants,
15 and obviously much greater experience building and operating such plants than
16 Seminole. FPL's projected cost for the Dania Beach Clean Energy Center is \$764
17 per kW, which is approximately 13 percent greater than Seminole's projected cost.
18 My Exhibit No. ____ (PS-9) includes the cover sheet and the descriptive summary
19 Schedule 9 from FPL's 2017 Ten Year Site Plan with this information. Using the
20 greater capacity value of 1,122 MW for the SCCF indicates the lower cost per kW,
21 i.e., \$648 per kW, which appears to be comparable to FPL's value of \$764 per kW
22 for 1,163 MW of capacity. This lower cost value, \$648 per kW, is approximately

1 15.2 percent less than FPL's value. The \$692 per kW value is based on the 1,050
2 MW capacity value, which is still approximately 9.4 percent less than FPL's value.

3 Additionally, the installed cost of new advanced combined cycle plants reported
4 by the U.S. Energy Information Administration ("EIA"), while not increasing in real
5 terms during the 2010 to 2016 period, are reportedly in excess of \$1000/kW, which
6 makes the cost of the SCCF facility seem quite low relative to other similarly
7 situated projects.

8 With the short time available to prepare my testimony, I have not had an
9 opportunity to evaluate Seminole's estimates in detail, nor to examine any contracts
10 that Seminole may have for the engineering, procurement, and construction of the
11 SCCF.

12 What I can say at this point is that Seminole's claimed costs for the SCCF are
13 suspect when compared to a known, reliable estimate from FPL. Additionally,
14 Seminole's cost estimates in its 2017 Ten Year Site Plan for its own, albeit smaller,
15 planned combined cycle plants were much greater, \$942 per kW for its planned SGS
16 CC Unit 1 with an in-service date of May 2021 and \$980 per kW for its planned
17 Unnamed Generating Station CC Unit 2 with an in-service date of December 2022,
18 values that are much closer to the EIA values previously referenced. (These
19 schedules are provided here as Exhibit No. ____ (PS-10). It is also worth noting that
20 Seminole told the Commission that it was planning to construct both of these units
21 less than a year ago, in its 2017 Ten Year Site Plan that was filed with the
22 Commission on April 1, 2017.

1 Seminole's track record at forecasting its peak demands and energy requirements
2 casts additional doubt on its ability to accurately predict power plant costs, especially
3 without any information on the contract terms and conditions regarding the ability
4 for the vendors and original equipment manufacturers ("OEMs") to pass on any
5 additional costs to Seminole that may arise.

6
7 **Q. Should the Commission give special attention to this issue in this case, because**
8 **the petitioning utility is Seminole Electric Cooperative?**

9 **A.** These concerns regarding Seminole's projected costs for the SCCF are especially
10 significant for the Commission's consideration of Seminole's petitions in these
11 consolidated dockets, because the PSC has no jurisdiction over any cost overruns
12 that Seminole may experience. In other words, if the PSC were to sign off on the
13 SCCF, or the SHCCF, or both, the end-use member-consumers of Seminole's
14 member cooperatives would be entirely at the mercy of Seminole's projections and
15 management; consumers would have no redress whatsoever before the Commission
16 or any other agency or court to protect them from any overruns from the costs
17 claimed by Seminole.

18 These facts further reinforce my concerns with Seminole's petitions in these
19 consolidated dockets: Seminole's proposals, if allowed to proceed, would impose
20 tremendous risks on the end-use consumers who would ultimately have to pay for
21 the SCCF and the SHCCF. In my opinion, the risks of the Commission rejecting the
22 petitions for the SCCF and the SHCCF are dramatically less than the risks of
23 allowing Seminole to proceed.

1 **Q. Do you have comparable concerns regarding the SHCCF?**

2 **A.** Yes, but those concerns may be allayed by reviewing the Tolling Agreement,
3 whenever it is made available to us through the discovery process. As of now, it is
4 difficult to understand why or how a smaller combined cycle unit would have costs
5 as low as a larger CC unit like FPL's Dania Beach Clean Energy Center, and so it is
6 difficult to understand how or why, if at all, a private sector company like GE would
7 agree to pricing that could be favorable compared to other options, but as I said,
8 these are concerns that may be allayed by reviewing the Tolling Agreement.

9

10 **C. Need for Fuel Diversity and Supply Reliability**

11 **Q. What impact, if any, do you believe that Seminole's proposed plans to add the**
12 **SCCF and the SHCCF and close one of Seminole's coal plants would have on**
13 **fuel diversity and supply reliability?**

14 **A.** In the relevant time frame, it is clear that closing one of Seminole's coal units at the
15 SGS would impact fuel diversity in that Seminole's portfolio would be even more
16 heavily invested in natural gas. With regard to supply reliability, a shift toward more
17 natural gas likely does not cause any issues as new pipeline capability via the Sabal
18 Trail Pipeline to bring natural gas from the Marcellus and Utica shale plays in
19 Pennsylvania, West Virginia, and Ohio has recently gone into service. However,
20 given the availability of hundreds of MW of additional capacity through PPAs (as
21 discussed above and shown in the exhibits to Mr. Taylor's testimony), if Seminole
22 opts to close one of its coal units, it would be most economical to replace such
23 capacity for at least several years with additional PPAs and understand there would

1 be no fuel supply reliability issue if those options included gas-fired facilities, and
2 they would have lower fuel costs according to Seminole's fuel price forecast, and
3 certainly lower fixed O&M costs than any one of the Seminole coal units.

4

5 **D. Conclusions Regarding the Need for the SCCF and the SHCCF**

6 **Q. What is your professional opinion as to whether Seminole needs the SCCF or**
7 **the SHCCF, or both, to meet the needs of the end-use consumers who will have**
8 **to bear the costs of Seminole's and the Commission's decisions?**

9 **A.** Seminole does not need either the SCCF or the SHCCF to meet consumers' needs
10 for reliable service or for reasonably priced electricity. Seminole has much more
11 economical options available.

12

13 **IV. COST-EFFECTIVENESS**

14 **Q. In your experience, how do utilities plan for new generating resources?**

15 **A.** Generally, utilities determine whether they need additional capacity for reliability
16 purposes. Occasionally, new plants or resources are considered if their addition will
17 result in lower costs to consumers. After reliability needs are addressed, the utility
18 will generally evaluate numerous options to determine which is most cost-effective,
19 taking cost risk and other risk factors into account.

20

21 **Q. Do you believe that either the proposed SCCF or the proposed SHCCF**
22 **represents the most cost-effective alternative to meet Seminole's need for**

1 **reliability and bulk power supply for its member cooperatives and their end-use**
2 **member-consumers at the “lowest feasible cost?”**

3 A. No, I do not. Seminole’s own analyses show that whatever fuel savings may accrue
4 from the SCCF and SHCCF, which are allegedly more efficient than other available
5 resources, will not outweigh the additional capital and operating costs of those units,
6 on a CPVRR basis, until sometime after 2027. Again, this is clearly demonstrated by
7 the fact that Seminole’s All-PPA Portfolio, even using Seminole’s own dubious
8 forecasts, is significantly more cost-effective than Seminole’s proposed plan until
9 sometime after 2027. This is a painfully obvious demonstration that Seminole would
10 be better off to postpone construction of these expensive units.

11

12 **Q. Isn’t it true that most Florida utilities use a 30-year time horizon for evaluating**
13 **the cost-effectiveness of major power plant commitments on a CPVRR or**
14 **NPVRR basis? If so, why should the Commission reject Seminole’s proposal to**
15 **use a 30-year analysis period in these cases?**

16 A. Yes, it is true that most utilities use a 30-year time horizon, or analysis period, for
17 evaluating the cost-effectiveness of proposed major expenditures, typically power
18 plants.

19 However, the dramatic, consistent, and persistent errors in Seminole’s forecasts
20 all militate toward using a shorter analysis period in these cases. In the simplest
21 terms, if Seminole continues to overstate its peak load and total energy forecasts, as
22 it has in virtually every cycle for the past twelve (12) years, postponing the major
23 commitments and expenditures that Seminole is proposing in these dockets would

1 give Seminole valuable and needed time to better understand its future needs. From
 2 the perspective of retail consumers, this is obviously the sensible course of action,
 3 and the course that is in the best interests of the end-use member-consumers who
 4 would ultimately bear the costs that Seminole proposes to incur.

5 Furthermore, a utility such as Seminole could still plan 30 years out, but break the
 6 30-year horizon up into smaller periods, e.g., 2018-2027, 2028-2037, and 2038-2047,
 7 where shorter-term options could be used in the near term and large capital
 8 investments could be undertaken later, if determined to be cost-effective at that time.
 9 Such an option should lead to even lower costs than Seminole has shown for its
 10 evaluated options, but Seminole chose not to evaluate such an option, it seems.

11

12 **Q. What impact would deferring or postponing decisions to commit to the SCCF**
 13 **or the SHCCF, or both, have on the cost-effectiveness of long-term power**
 14 **supply for the end-use consumers who will have to pay for Seminole's resource**
 15 **decisions?**

16 **A.** Deferring or postponing decisions to commit to the SCCF or the SHCCF, or both, for
 17 at least several years, would improve the cost-effectiveness – measured in CPVRRs
 18 – of such projects, even if Seminole's forecasts were to turn out to be relatively
 19 accurate. In other words, delay will improve the CPVRRs of these options, if they
 20 are ever determined to be needed and economic. This is because Seminole's
 21 discount rate of 6 percent is significantly greater than current, reasonable, and known
 22 escalation rates in the cost of new combined cycle capacity; said differently, any cost
 23 escalation would be more than offset by present value savings as measured by

1 Seminole's discount rate of 6 percent. Nationally, combined cycle costs have been
2 flat or slightly declining during the 2010 to 2016 period according to the United
3 States Energy Information Administration. This is shown in Exhibit No. ____ (PS-
4 11) to my testimony. Within Florida, FPL's "annual escalation rate associated with
5 the plant cost of the Company's Avoided Unit," which is a "1,163 MW Combined
6 Cycle Unit with an in-service date of June 1, 2022 and a heat rate of 6,120 Btu/kWh"
7 is 2.0%, and FPL's corresponding annual escalation rate for O&M costs is 2.50%.
8 This information is shown in my Exhibit No. ____ (PS-12), which consists of copies
9 of FPL's Tariff Sheet No. 10.311 and Sheet No. 10.311.1. The fact that these
10 escalation rates are realistically projected, by a utility with tremendous expertise and
11 experience with these matters, to be significantly less than Seminole's discount rate
12 demonstrates that deferring these decisions will reduce CPVRR impacts.

13
14 **V. BEST INTERESTS OF CONSUMERS, INCLUDING RISK FACTORS**

15 **Q. What does Seminole claim regarding its consideration of risk factors in its**
16 **planning processes?**

17 A. Seminole, through the testimony of Ms. Diazgranados (at page 9), asserts that
18 "Seminole's staff performed risk analysis on both individual alternatives and each of
19 the remaining portfolios," and that Seminole "produced scorecards for each portfolio
20 which not only took into account a weighted risk rating but also a strategic rating"
21 and other factors. However, as far as I can determine, Seminole has not provided
22 any details of its asserted "weighted risk rating" in its filings, so I cannot tell what
23 risk factors Seminole may have considered or how they applied them.

1 Seminole, again through Ms. Diazgranados’s testimony (at page 5), then claims
2 that its chosen plan – adding the SCCF and SHCCF, with some PPAs – is “[t]he
3 “most cost-effective, risk-managed resource plan for Seminole to meet the future
4 needs of our Members” and presumably those Members’ end-use member-
5 consumers.

6
7 **Q. As an experienced energy, utility, and regulatory economist, how would you
8 examine risk from the perspective of consumers?**

9 **A.** From the perspective of the consumers who will have to bear the consequences of
10 the utility’s decisions, I would first and foremost examine the reliability and cost
11 risks of alternatives. I would also examine the flexibility that any option affords the
12 utility to deal with uncertainties and future contingencies. In this case, I believe that
13 any of the alternatives, particularly Seminole’s proposed plan and the “No Build
14 Risk: All-PPA Portfolio” identified and supposedly considered by Seminole, will
15 meet Seminole’s realistic reliability needs.

16 That leaves me to examine the cost risks and flexibility of alternative plans. Here,
17 the cost risk tells me, and should tell the Commission, that Seminole should have
18 chosen the All-PPA Portfolio or something a lot like it, with only PPAs for the next 7
19 to 10 years, or longer. This is obvious, because at best, even Seminole’s own
20 analyses show that the fuel cost savings from the SCCF and the SHCCF, if they
21 materialize at all, would not outweigh the additional capital and operating costs
22 associated with those units until sometime after 2027.

1 Further, using an All-PPA Portfolio for the next 7 to 10 years (or longer) would
2 give Seminole the opportunity to carefully evaluate its flawed forecasting processes
3 and methodologies and try to get those right and incorporate the results into
4 improved, more accurate forecasts. It would also give Seminole the opportunity to
5 observe the track record of the new H-class technology and to see whether additional
6 improvements in generating technologies come about, e.g., further improvements in
7 combustion turbine-combined cycle technology, solar with battery storage, and other
8 options. It would, of course, also give Seminole the opportunity to gather additional
9 information about the electricity demands of its ultimate end-use consumers, as those
10 evolve with new opportunities for energy conservation and end-use renewable
11 generation opportunities.

12 It is important to note that choosing the All-PPA Portfolio for the next 7 to 10
13 years (or longer) would not result in Seminole forever giving up the opportunity to
14 add a plant like the SCCF, or the SHCCF, at some point in the future. I believe that
15 it is completely safe to say that GE and any other major manufacturer of generating
16 equipment, e.g., combustion turbines, heat recovery steam generators, and steam
17 turbine generators, would be more than happy to sell Seminole or any other utility
18 that equipment for an in-service date in the middle or late 2020s. I further believe
19 that it is completely safe to say that entities like GE Shady Hills would be happy to
20 make proposals to sell power from new facilities like the SHCCF under long-term
21 PPAs, or tolling agreements, beginning in that time frame.

22 The Commission should also note that delay will improve the CPVRRs of these
23 options, if they are ever determined to be needed and economic. This is because

1 Seminole's discount rate of 6 percent is significantly greater than current, reasonable,
2 and known escalation rates in the cost of new combined cycle capacity. For
3 example, as shown in my Exhibit No. ____ (PS-12), FPL's escalation rates for both
4 plant costs (2.0% per year) and O&M costs (2.50% per year) are significantly less
5 than Seminole's discount rate of 6.0%. The fact that these costs are realistically
6 expected, by a utility with significant expertise on these matters, to escalate at rates
7 significantly less than Seminole's discount rate demonstrates that deferring these
8 decisions will reduce CPVRR impacts.

9
10 **Q. What value do you attribute to the "optionality" characteristics of Seminole**
11 **choosing an All-PPA Portfolio for the next several years?**

12 **A.** If Seminole were to proceed with an All-PPA Portfolio, it would preserve options for
13 itself, and for the consumers who must pay for Seminole's decisions, to choose
14 smaller resources rather than larger ones, with shorter or medium term financial
15 commitments, as compared to the 30-year-plus commitment to the SCCF and the 20-
16 year commitment to the SHCCF under the proposed Tolling Agreement. There are
17 simply lower risks associated with a portfolio of smaller, shorter PPAs, than with
18 long-term commitments like the SCCF and the SHCCF. Further, proceeding with
19 the All-PPA Portfolio and deferring decisions on long-term projects like the SCCF
20 and the SHCCF preserves additional options for Seminole to take advantage of
21 improvements in generating technologies, including potential further improvements
22 in combustion turbine or combined cycle technologies and improvements in other
23 generating and power supply technologies such as solar with battery storage.

1 And again, Seminole’s own analyses show that the All-PPA Portfolio is more
2 cost-effective than Seminole’s proposed SCCF-SHCCF plan until at least some time
3 after 2027. Thus, the Commission should not worry that deferral will result in
4 increased costs to the consumers who will be paying for these decisions.

5
6 **Q. The PSC is also responsible to supervise the bulk power supply grid to avoid the**
7 **uneconomic duplication of generating facilities. What, if anything, can you say**
8 **about this factor relative to the SCCF and the SHCCF?**

9 **A.** Given the significant amount of capacity – hundreds of MW – offered to Seminole
10 from existing generating resources, mostly if not entirely in Florida, and again given
11 the fact that Seminole’s All-PPA Portfolio is more cost-effective than the
12 SCCF/SHCCF portfolio until sometime after 2027, it is apparent that, at least over
13 the next 10 years, the construction of the SCCF and the SHCCF would result in the
14 uneconomic duplication of generating resources, not only for the end-use consumers
15 who will have to pay for the new plants but also for Florida as a whole. The
16 statutory reference here is to Section 366.04(5), Florida Statutes, which explicitly
17 vests the Commission with the jurisdiction over the grid to assure adequate and
18 reliable power supplies and the avoidance of further uneconomic duplication of
19 generation and other facilities. I am not presenting a legal argument here: I am
20 simply making the point that the Commission, as a matter of good economic sense
21 and sound public policy as articulated by the Florida Legislature, has the authority to
22 prevent uneconomic duplication of generating resources, and it is my opinion that the
23 Commission should do exactly that in these consolidated cases.

**VI. ADVERSE EFFECTS OF DENYING OR GRANTING
THE REQUESTED NEED DETERMINATIONS**

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Q. Seminole asserts that there would be adverse consequences of the Commission denying its petitions for determination of need for the SCCF and the SHCCF.

Do you agree with Seminole’s assertions?

A. No, I do not. Seminole asserts that there would be adverse effects on reliability and the cost of power supply if the Commission were to deny the need petitions for the SCCF and the SHCCF. To the contrary, denying these need petitions will ensure that the consumers who must bear the consequences of these decisions – both Seminole’s and the Commission’s decisions – will be better off economically until at least sometime after 2027. The amount of the benefits to consumers will ultimately depend on the actual levels of peak demands and energy requirements, but even if Seminole’s forecasts are accurate – which is extraordinarily unlikely given its abysmal track record – Seminole’s own analyses show that customers would be better off with an All-PPA Portfolio, by \$136 Million through 2027. If Seminole’s forecasts are overstated, like its forecasts from the past twelve years, consumer savings will likely be even greater, because the PPA costs of meeting lower power supply requirements in this next decade would be even less.

Q. So are you saying that there would actually be benefits to consumers of denying the need petitions for the SCCF and the SHCCF?

A. Yes. The benefits would be at least the savings of \$136 Million in CPVRRs from Seminole using the All-PPA Portfolio until at least the mid-2020s – until sometime after 2027 if Seminole’s projections are accurate, probably longer.

- 1 4. Seminole’s proposals to add the SCCF and SHCCF to its generating resources do
2 not represent the most cost-effective alternative for meeting the needs of the
3 consumers who would be obligated to pay for those plants.
- 4 5. Indeed, adding these two projects in the times proposed will impose significantly
5 greater risks on those consumers than if Seminole were to continue using the
6 resources it has available through at least 2024.
- 7 6. Seminole’s forecasting methodologies are so flawed that they are not reliable for
8 decisions that would commit billions of dollars of consumers’ money for future
9 power supply options.
- 10 7. The All-PPA Portfolio, or a similar variant using only PPAs to meet Seminole’s
11 needs (to the extent even necessary) over the next 7 to 10 years (or longer), would
12 minimize risks to consumers and be in the best interests of Seminole’s consumers
13 and the public interest generally.
- 14 8. If the Commission were to grant the need petitions requested here for the SCCF
15 and the SHCCF, there would be adverse consequences to the consumers who
16 depend on Seminole for their bulk power supplies. Stated differently, there would
17 be benefits to consumers of denying Seminole’s petitions for the SCCF and the
18 SHCCF.

19

20 **Q. What is your specific recommendation to the Commission with respect to the**
21 **petitions for determination of need for the SCCF and the SHCCF?**

22 A. My recommendation is that the Commission should deny both petitions as proposed
23 by Seminole and Shady Hills. While it may be desirable for Seminole to eventually

1 add physical generating capacity to its resource mix, Seminole cannot credibly show
2 that it needs approximately 1,700 MW of new gas-fired capacity (or any other kind
3 of capacity) to meet its alleged needs, which are based on its dramatically flawed
4 forecasting record. The Commission should invite Seminole to correct its
5 forecasting methodologies and come back to the Commission with appropriate need
6 petitions in the future. This will benefit the end-use consumers who would be called
7 upon to pay for these plants by reducing risks and reducing costs well into the future.

8 The Commission should keep clearly in mind that Seminole's own analyses show
9 that an All-PPA Portfolio has significantly lower costs – CPVRRs – than Seminole's
10 proposed portfolio for at least the first 10 years of Seminole's planning horizon.

11 Waiting will allow for additional improvements in generating technology and for
12 Seminole to correct its forecasting methodologies and to plan for other variables –
13 e.g., carbon taxation or greenhouse gas regulation, additional penetration of
14 conservation and end-use solar measures, and battery storage for solar generation
15 alternatives – before committing to a multi-billion dollar resource plan on the basis
16 of flawed forecasting.

17 Accordingly, the Commission should deny the petitions for determination of need
18 for the SCCF and the SHCCF as proposed.

19

20 **Q. Does this conclude your testimony?**

21 **A.** Yes, it does.

**IN RE: PETITION FOR DETERMINATION OF NEED FOR SEMINOLE COMBINED
CYCLE FACILITY, DOCKET NO. 20170266-EC**

**IN RE: JOINT PETITION FOR DETERMINATION OF NEED FOR SHADY HILLS
GENERATING FACILITY, DOCKET NO. 20170267-EC**

**ON BEHALF OF QUANTUM PASCO POWER, L.P.,
MICHAEL TULK, AND PATRICK DALY**

SUPPLEMENTAL DIRECT TESTIMONY OF PAUL M. SOTKIEWICZ, Ph.D.

1 **Q. Please state your name, employer, and business address.**

2 **A.** My name is Paul Sotkiewicz, and I am the Founder and President of E-Cubed Policy
3 Associates, LLC. My business address is E-Cubed Policy Associates, LLC, 5502
4 N.W 81st Avenue, Gainesville, Florida 32653.

5

6 **Q. Have you previously submitted direct testimony in this proceeding?**

7 **A.** Yes. I submitted direct testimony on January 29, 2018, and I submitted corrected
8 testimony on February 14, 2018.

9

10 **Q. What is the purpose of your supplemental testimony?**

11 **A.** The purpose of my supplemental testimony is to address certain corrections to the
12 direct testimony and exhibits of Seminole Electric Cooperative, Inc.'s ("Seminole")
13 witness Julia Diazgranados.

14

15 **Q. When did you first learn of the corrections to Ms. Diazgranados's direct**
16 **testimony?**

1 A. I learned of the corrections on February 28, 2018, via an e-mail from Seminole's
2 counsel.

3

4 **Q. Please describe your understanding of the corrections to Ms. Diazgranados's**
5 **direct testimony.**

6 A. As I understand it, one of the ABB software products used by Seminole, the
7 Planning and Risk (PaR) model, was not producing correct results that included
8 properly calculated startup costs, such that those startup costs were not included in
9 the Seminole's analyses of the All-PPA Portfolio using Seminole's "new financial
10 forecast model." I further understand that this problem occurred previously, and that
11 ABB does not have a proposed "fix" for the problem at this time. In any event, Ms.
12 Diazgranados's changes reflect what Seminole asserts to be correctly calculated
13 startup costs.

14

15 **Q. Do the corrections to Ms. Diazgranados's direct testimony change any of the**
16 **conclusions or opinions set forth in your direct testimony?**

17 A. No.

18

19 **Q. Please explain why your conclusions are not changed.**

20 A. My conclusions are unchanged for two reasons. First, because I continue to strongly
21 doubt the accuracy of Seminole's load forecasts. These load forecasts have been
22 biased upward (over-forecast) for nearly a decade, and in spite of Seminole's
23 assertions to the contrary and asserted corrections, are still biased toward over-

1 forecasting load historically. Given these historical forecast errors in one direction
2 and a new forecasting methodology and new inputs that remain unproven and for
3 which we have no empirical evidence of forecast errors 3, 4, or 5 years out, I
4 continue to doubt that Seminole needs anything like the amount of capacity proposed
5 for the SCCF and the SHCCF. Secondly, even with the changes reported by Ms.
6 Diazgranados, the All-PPA Portfolio is still more cost-effective than Seminole's
7 chosen CPP Portfolio over the first ten years, by \$69 Million in CPVRRs according
8 to the revised figures rather than by \$136 Million in CPVRRs as shown in the Need
9 Study and Ms. Diazgranados's testimony as filed. Further, delaying the in-service
10 dates of the SCCF and the Tolling Agreement will almost certainly improve the
11 CPVRR and thus rate impacts to customers. This CPVRR improvement occurs
12 because Seminole's discount rate is significantly greater than the escalation rates
13 assumed by Seminole and by Mr. Taylor, and significantly greater than the
14 escalation rates generally expected in the U.S. economy and in the cost of electric
15 generating equipment specifically. In summary, my conclusions remain unchanged
16 because the All-PPA Portfolio is more cost-effective than all other portfolios over
17 the first ten years of Seminole's planning horizon, because delaying the major
18 commitments of the SCCF and SHCCF will reduce CPVRRs and customer rate
19 impacts as well as reducing customer risk, and because I continue to doubt that
20 Seminole needs the amounts of capacity proposed until later in the 2020s.

21

22 **Q. Does this conclude your supplemental testimony?**

23 **A.** Yes, it does.

1 MR. WRIGHT: Thank you.

2 And just for housekeeping, I note that his
3 Exhibits PS -- I am sorry --

4 BY MR. WRIGHT:

5 Q You also -- you also prepared or assembled, in
6 some cases, and caused to be filed exhibits consisting
7 of 12 exhibits designated as PS-1 through PS-1212
8 accompanying your prefiled direct testimony?

9 A Yes, I did.

10 Q Thank you.

11 And you don't have any changes or corrections
12 to make though those, correct?

13 A No, sir, I do not.

14 Q Thank you.

15 MR. WRIGHT: Just for housekeeping, Mr.
16 Chairman, those have been marked as Exhibits 52
17 through 63, and I will move them in when he is
18 done.

19 CHAIRMAN GRAHAM: Okay.

20 MR. WRIGHT: Thank you.

21 BY MR. WRIGHT:

22 Q Dr. Sotkiewicz, you now have the opportunity
23 to provide a summary of up to five minutes of your
24 testimony to the Commission.

25 A Thank you.

1 Good morning, Commissioners, good morning, Mr.
2 Chairman. I thank you for having us here to plead our
3 case.

4 My name is Dr. Paul Michael Sotkiewicz, the
5 President and Founder of E-Cubed Policy Associates, LLC.
6 I have over 20 years of experience in the energy
7 industry, formerly serving as the Chief Economist and
8 the Senior Economic Policy Adviser to the PJM
9 Interconnection, LLC, which is the largest centrally
10 dispatched power system in the western hemisphere.
11 Prior that I was the Director of Energy Studies at the
12 University of Florida in the Public Utility Research
13 Center. And then prior to that, I served as a Staff
14 Economist at the United States Federal Energy Regulatory
15 Commission, where I worked on wholesale market design
16 issues related to the New York Independent System
17 markets, PJM Interconnection, California Independent
18 System Operator markets in the ISO New England markets.

19 I have a Bachelor's Degree in History and
20 Economics from the University of Florida, and a Master's
21 Degree and Ph.D. and Economics from the University of
22 Minnesota.

23 Seminole has not reliably shown any conclusive
24 need for building the proposed Seminole Combined Cycle
25 Facility or Shady Hills facility via a 30-year

1 commitment under the tolling agreement. This nearly
2 1,700 megawatts new combined cycle capacity is not
3 needed here in Florida.

4 First, I have shown in my testimony that the
5 average load forecast error three, four and five years
6 out remains extremely large and biased towards
7 over-forecasting. In particular, five years out, given
8 the publicly available data in the ten year site plans,
9 Seminole's ex-ante forecast error, meaning the error
10 looking at what the forecast set and then looking at the
11 realization of their peak load five years later, was
12 39 percent five years out, and 30 percent four years
13 out.

14 This fact alone calls into question the need
15 for new facilities such as the SCCF and SHCCF. And
16 Seminole's member cooperatives and member consumers who
17 ultimately pay their bills are already paying for
18 Seminole's historical over-forecasting today that has
19 resulted in overcapacity on the Seminole system.

20 In 2017, there is approximately 500 megawatts
21 of extra capacity that customers are already paying for.
22 In 2018, 2019 and 2020, there is four -- they are
23 forecast to be paying for an extra 600 megawatts of
24 extra capacity, over which is required to meet
25 Seminole's 15 percent reliability target -- 50 percent

1 reserve margin reliability target.

2 Secondly, through 2024, Seminole, by my
3 estimation, would only need an additional 270 megawatts
4 of capacity to meet the winter 2024 peak load and
5 reserve margin targets given what they have under
6 contract to control through that time period, as shown
7 in their 2017 Ten Year Site Plan. This amount is
8 available through PPAs during that period, as has been
9 shown in -- in Mr. Taylor's testimony.

10 Clearly, SCCF and SHCCF need not go into
11 service in 2021 or 2022 as proposed. This shows that
12 the delay of just two years, or three years, depending
13 on which facility we are speaking of, could save --
14 could save Seminole's members money by using power
15 purchase agreements to meet the need gap if there is, in
16 fact, any incremental need gap given the load forecast
17 errors that I have previously cited through 2024.

18 The third, the no-build risk all PPA
19 portfolio, which Seminole has evaluated, still remains
20 after the adjustments that have been made, the lower
21 cost choice 10 years in the planning horizon. Lower
22 cost of the shorter term all PPA portfolio confirms the
23 value of waiting to build the SCCF and SHCCF facilities
24 since there are lower cost options available over the
25 early years of the horizon.

1 Fourth, Seminole's assumed discount rate, a
2 proxy for its cost of capital to finance and build these
3 facilities it questioned in these cases, is
4 approximately two to three times higher than the
5 projected cost increases for any Duke combined cycle
6 facilities over the reasonably foreseeable future.

7 Because the cost of capital is greater than
8 the inflation rate of the new build kind cycle
9 resources, it would be lower cost on a net present value
10 basis to consumers, as measured by the CPVRRs, to wait
11 and build the new facilities and bring them on line 10
12 years or more out in the planning horizon.

13 The clear conclusion is that waiting several
14 years before building SCCF, or binding member co-ops and
15 the retail level member customers to a 30-year tolling
16 agreement with SHCCF can only reduce the costs to
17 Seminole's member cooperatives.

18 Fifth, Seminole has not accounted for the
19 value of the option to wait for updated information
20 before making such large and irreversible decisions for
21 capital investment that Seminole and its member
22 cooperatives must live with for the next 30 years.

23 Seminole has the ability today, as we speak,
24 to choose a lower cost portfolio of PPAs over the near
25 term horizon. PPAs that would roll off in a much

1 shorter time period than the cost of the SHCCF and SCCF
2 would be over 30 years.

3 CHAIRMAN GRAHAM: Sir, thank you for your
4 summary.

5 Mr. Wright.

6 MR. WRIGHT: Thank you, Mr. Chairman. We
7 tender Dr. Sotkiewicz for cross-examination.

8 CHAIRMAN GRAHAM: Thank you.

9 Mr. Perko.

10 EXAMINATION

11 BY MR. PERKO:

12 Q Good morning, Dr. Sotkiewicz. Did I get it
13 right?

14 A Close enough.

15 Q I apologize if I mispronounce it.

16 Now, you talked a lot about load forecasting
17 in your testimony. On page four, you state that as
18 Chief Economist at PGM, it was your responsible to,
19 among other things, provide advice as needed -- provide
20 advice on load forecasting as needed; is that correct?

21 A That is correct.

22 Q And you provided such advice about once a
23 year, isn't that correct?

24 A That is correct, as we were going through the
25 load forecast methodology.

1 Q Okay. You were not responsible for preparing
2 load forecasts at PGM, is that correct?

3 A That is correct.

4 Q And you have never actually prepared or been
5 responsible for preparing a load forecast for an
6 electric utility, is that correct?

7 A That is correct.

8 Q So and you have not prepared an alternative
9 load forecast in this case, is that correct?

10 A I have not.

11 Q And you have never worked -- in fact, you have
12 never worked with any rural electric cooperatives on
13 load forecasting in the past?

14 A I have not.

15 Q And you don't consider yourself to be an
16 expert in the field of load forecasting, do you?

17 A No, I do not.

18 Q Now, you also talk in your testimony, you
19 didn't mention in your summary about Seminole's cost
20 estimates for the SCCF. I would like to switch to that.

21 You are not an engineer, is that correct?

22 A I am not an engineer.

23 Q And you -- when you compared the cost of the
24 Seminole Combined Cycle Facility with that of FPL's
25 Dania Beach Energy Center, you didn't independently

1 analyze the cost of the Seminole facility; is that
2 correct?

3 A I did not independently analyze the cost of
4 the Seminole facility.

5 Q And you did not independently analyze the cost
6 of the Dania Beach facility, is that correct?

7 A I did not.

8 Q In fact, you have never been responsible for
9 estimating the cost of a specific new generation
10 project, isn't that correct?

11 A Could you please rephrase the question?

12 Q You have never been responsible for estimating
13 the cost of a specific new generation project, isn't
14 that correct?

15 A Not a specific one, no.

16 Q You would agree with me, wouldn't you, that
17 the geographic location of a combined cycle facility can
18 affect its cost vis-a-vis another facility within a
19 different geographic area, wouldn't you?

20 A The geographic region in which a facility is
21 constructed can change the cost of the facility versus a
22 base case.

23 Q But in preparing your testimony, you didn't
24 conduct any comparison of the geographic locations of
25 the Seminole facility or the -- and the Dania Beach

1 facility, did you?

2 A I did not.

3 Q And you would agree with me that the cost of
4 labor in a specific geographic area can affect the cost
5 of a particular project, wouldn't you?

6 A Yes, I can.

7 Q But in preparing your testimony, you did not
8 make any comparison of the labor rates in the areas
9 where the Dania Beach facility and the Seminole facility
10 are to be constructed, did you?

11 A I did not.

12 Q You would agree with me that the time to
13 construct can also affect the cost of a particular
14 combined cycle facility, isn't that correct?

15 A Excuse me, could you -- could you repeat the
16 question?

17 Q You would agree with me that the time to
18 construct -- the construction schedule can also affect
19 the cost of a particular combined cycle facility?

20 A The time to construct could affect the cost if
21 it is beyond the normal time period, and there is a rush
22 to bring the facility into commercial operation.

23 Q And that's because the shorter the timeframe,
24 generally the more premium there is on -- on the
25 construction labor?

1 A Usually, based on overtime.

2 Q Okay. But you didn't compare the construction
3 **schedules between the Seminole facility and the Dania**
4 **Beach facility when you prepared your testimony, did**
5 **you?**

6 A No, I did not.

7 Q Now, there are also design factors that could
8 **affect the relative cost of two generation facilities,**
9 **isn't that correct?**

10 A There are design factors that could affect
11 that, certainly.

12 Q But other than their size, you didn't
13 **investigate any differences in the design between the**
14 **Dania Beach or Seminole facilities, did you?**

15 A The only difference that I noted between the
16 Dania Beach facility and the Seminole facility is the
17 ability to have dual fuel -- dual fuel capability at the
18 facilities.

19 Q That's -- that's the only design consideration
20 **that you considered?**

21 A That is correct.

22 Q Now, you have never testified before the
23 **Florida Public Service Commission, is that correct?**

24 A No, I have not; but I have testified -- I have
25 served as an advisor to the Energy 2020 Study

1 Commission, which had members of the Public Service
2 Commission involved.

3 Q But you have never testified in a -- in a
4 Public Service Commission need proceeding?

5 A No, I have not.

6 Q And you have never, prior to this case, been
7 called upon to actually apply any of the statutory
8 criteria for need cases?

9 A When you say -- when you suggest statutory
10 criteria, do you mean as a member of Public Service
11 Commission staff?

12 Q At all.

13 A In terms of the statutory criteria from
14 cost-effectiveness, I have applied that in my job as
15 Chief Economist at PJM, I have applied that in my work
16 as the Director of Energy Studies at PERC, and applied
17 that when I was a member of FERC staff, yes.

18 Q Now, the PGM facilities aren't subject to the
19 Florida Public Service Commission jurisdiction, are
20 you -- are they?

21 A No, they are not.

22 Q And, in fact, prior to this case, your
23 familiar -- your familiarity with how the Commission has
24 applied the statutory need criteria in the past was
25 based on what you read in the trade press, isn't that

1 **correct?**

2 A That is correct.

3 **Q Thank you.**

4 MR. PERKO: I have no further questions.

5 CHAIRMAN GRAHAM: Staff.

6 MS. DZIECHCIARZ: Staff has no questions.

7 Thank you.

8 CHAIRMAN GRAHAM: Commissioner Polmann.

9 COMMISSIONER POLMANN: Thank you, Mr.
10 Chairman.

11 Morning, Doctor.

12 THE WITNESS: Good morning, Commissioner.

13 COMMISSIONER POLMANN: Is it correct that your
14 analysis focused on a 10-year period as opposed to
15 the period that was analyzed by Seminole, up to 30
16 or 33 years?

17 THE WITNESS: The analysis with respect to the
18 cost for the CPVRRs between the all PPA portfolio
19 and -- and building of the SCCF and SHCCF combined
20 cycle facilities was based on Seminole's own work,
21 looking at the all PPA portfolio 10 years out,
22 which was reported in their -- in their need
23 determination filing, as well as the 30-year out
24 CPVRRs. And so we could do that comparison. And
25 on the 10-year horizon, the all PPA portfolio as

1 shown by Seminole is actually lower cost.

2 COMMISSIONER POLMANN: In my review of your
3 direct testimony, you used the phrase through at
4 least 2027, I believe, on multiple occasions.
5 Could you please elaborate on the significance of
6 that particular phrase for us?

7 THE WITNESS: The reason I used the phrase at
8 least through 2027 is that was what we knew with
9 certainty, given what was filed by Seminole in its
10 need determination filing. What we didn't know at
11 the time -- what we don't know is what the cost of
12 rolling over those PPAs would be, and actually
13 siting new PPAs in actuality would look like after
14 10 years. It could be the case that power purchase
15 agreements beyond 10 years could still be lower
16 cost than building the -- the combined cycle
17 facilities in question in this case, and so that's
18 why I used that phrase.

19 COMMISSIONER POLMANN: All right. Thank you
20 sir.

21 That's all I have.

22 CHAIRMAN GRAHAM: Redirect, Mr. Wright?

23 MR. WRIGHT: Just a couple, Mr. Chairman.

24 Thank you.

25 FURTHER EXAMINATION

1 BY MR. WRIGHT:

2 Q Mr. Perko asked you a question about preparing
3 analysis of cost of combined cycle and combustion
4 turbine costs of your units, do you remember that?

5 A Yes, sir.

6 Q I believe you answered that you didn't have
7 specific experience. My question for you is do you have
8 general experience with those estimates?

9 A Yes, I do.

10 Q And in what context, and for what purpose,
11 have you had that experience?

12 A That experience comes from my time working at
13 PJM as the Chief Economist, both in 2011 and 2014. PJM,
14 as a regular matter, estimates what they call the cost
15 of new entry, or CONE, for both combined cycle
16 facilities and combustion turbine facilities over
17 different locations within the PJM footprint. Some are
18 in very dense urban areas, such as New Jersey. Some are
19 in rural areas in the midwestern states in part of the
20 PJM footprint.

21 We have worked with -- with the Brattle Group
22 and with different EPC contractors, in one case CH2M
23 Hill, in another case we worked with Sargent & Lundy to
24 come up with a -- a cost basis, a cost of new entry for
25 these combined cycle facilities and combustion turbine

1 facilities in a generic location in these -- these
2 general geographic areas. So while they are not very
3 specific, they are -- they are, you know, good estimates
4 as to what it would cost to build these facilities.

5 As a general rule within the cost of those
6 facilities, we would also include the cost of gas
7 laterals. And usually with these facilities, there is
8 more than one lateral built to go to multiple pipelines
9 in those cases.

10 We also included the cost of transmission
11 interconnection, and that would include upgrades to make
12 sure that the facilities were deliverable to the entire
13 PJM system. And as I understand from testimony in this
14 hearing, those costs were not included in the cost of
15 the generation plant itself sited by Seminole in its
16 need determination. And then including those costs
17 would actually increase the costs that have previously
18 been reported.

19 MR. PERKO: Mr. Chairman, I am not going to
20 move to strike that, but again, I think we are
21 getting into supplementing testimony here. And
22 what's good for the goose is good for the gander.

23 CHAIRMAN GRAHAM: Mr. Wright.

24 MR. WRIGHT: He said he is not going to move
25 to strike.

1 CHAIRMAN GRAHAM: I understand. Continue.

2 MR. WRIGHT: Oh, thank you, Mr. Chairman.

3 BY MR. WRIGHT:

4 Q You also mentioned, I believe in response to a
5 question from Mr. Perko, that you have applied
6 cost-effectiveness as a -- as a criterion for new power
7 plants. Did I get that right?

8 A That is correct.

9 Q And was that done in your work at PJM?

10 A That is correct.

11 Q And in what context did you do that at PJM?

12 A In the context of choosing what would be the
13 reference resource to be used in PJM's reliability
14 pricing model, which is its capacity market model, and
15 in looking at what the lowest cost resource would be in
16 terms of the net cost of new entry, which would include
17 not only the fixed cost of building that plant, but also
18 include the net energy market revenues that that plant
19 could earn in economic dispatch in the PJM markets.

20 And so doing the trial between fixed costs
21 and -- and variable costs and energy market revenues, we
22 would choose the lowest cost resource to be the
23 reference resource in that case.

24 Q And was the pricing imposed by or approved by
25 PJM then based on that work?

1 A That is correct.

2 Q Thank you.

3 Commissioner Polmann asked you some questions
4 about 10 years versus 30 years. My simple question for
5 you is, is your opinion regarding the -- your ultimate
6 opinion regarding the cost-effectiveness of choosing a
7 different option applicable to 30 years or only to 10
8 years?

9 A It's -- it's applicable to -- to 10 years, but
10 the 30 -- the 30-year issue ignores the idea that there
11 is optionality to wait to make this decision, rather
12 than building facilities right now and having them for
13 30 years. And so -- so my analysis in my discussion in
14 my testimony about the optionality issue rests on the
15 idea that one doesn't have to look 30 years out in the
16 planning period, and the 10 years is just convenient
17 because Seminole reported that in their need
18 determination case.

19 Q Okay.

20 MR. WRIGHT: Thank you, Mr. Chairman. That's
21 all the redirect I have.

22 CHAIRMAN GRAHAM: All right. Exhibits. Looks
23 like I have Exhibits 52 through 63. Any
24 objections?

25 MR. PERKO: No objection.

1 CHAIRMAN GRAHAM: Okay, we will enter those
2 into the record.

3 (Whereupon, Exhibit Nos. 52-63 were received
4 into evidence.)

5 CHAIRMAN GRAHAM: Okay.

6 MR. WRIGHT: Thank you. And May Dr.
7 Sotkiewicz be excused?

8 CHAIRMAN GRAHAM: Yes.

9 MR. WRIGHT: Thank you.

10 CHAIRMAN GRAHAM: Thanks.

11 (Witness excused.)

12 CHAIRMAN GRAHAM: Okay, Mr. Perko, redirect --
13 or rebuttal.

14 MR. WRIGHT: Mr. Chairman. I know it's before
15 two hours, but I am going to have a moderate amount
16 of cross for Mr. Wood, and I need a break before
17 we -- before I get into that if I may.

18 CHAIRMAN GRAHAM: All right. We will take a
19 five-minute break.

20 MR. WRIGHT: Thank you, sir.

21 (Brief recess.)

22 CHAIRMAN GRAHAM: Okay. Mr. Perko, your
23 rebuttal witness.

24 MR. PERKO: Thank you, Mr. Chairman.

25 Seminole calls for rebuttal Mr. Kyle Wood.

1 CHAIRMAN GRAHAM: Mr. Wood, welcome back.

2 THE WITNESS: Thank you.

3 Whereupon,

4 KYLE D. WOOD

5 was recalled as a witness, having been previously duly
6 sworn to speak the truth, the whole truth, and nothing
7 but the truth, was examined and testified as follows:

8 EXAMINATION

9 BY MR. PERKO:

10 Q Good morning, Mr. Wood.

11 You previously testified at this hearing, is
12 that correct?

13 A Yes, sir.

14 Q And you were sworn at the beginning in the
15 hearing?

16 A Yes, sir.

17 Q I would just remind you that you remain under
18 oath.

19 Mr. Wood, did you prepare to be filed in this
20 case, on February 19th, rebuttal testimony consisting of
21 nine pages?

22 A I did.

23 Q Do you have any corrections to that testimony?

24 A I do.

25 Q Could you identify that at this time?

1 A Yes, sir. Page five, line 15, the change is
2 the word biannually to biennially.

3 Q Thank you.

4 With that one correction, if I were to ask you
5 the same questions today, would your answers be the
6 same?

7 A Yes, sir.

8 MR. PERKO: At this time, Mr. Chairman, I
9 would request that Mr. Wood's rebuttal testimony be
10 inserted into the record as if read?

11 CHAIRMAN GRAHAM: We will insert Mr. Wood's
12 rebuttal testimony into the record as though read.

13 (Whereupon, prefiled rebuttal testimony was
14 inserted.)

15

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1 BEFORE THE PUBLIC SERVICE COMMISSION
2 SEMINOLE ELECTRIC COOPERATIVE, INC.
3 REBUTTAL TESTIMONY OF KYLE D.WOOD
4 DOCKET NOS. 20170266-EC and 20170267-EC
5 FEBRUARY 19, 2018

6

7 **Q. Please state your name and address.**

8 A. My name is Kyle Wood. My business address is 16313 North Dale Mabry
9 Highway, Tampa, Florida 33688-2000.

10

11 **Q. Have you previously submitted direct testimony in this proceeding?**

12 A. Yes.

13

14 **Q. Are you sponsoring any exhibits to your rebuttal testimony?**

15 A. Yes. I am sponsoring the following exhibits, which were prepared by me or
16 under my supervision and are attached to this rebuttal testimony:

- 17 • Exhibit No. __ (KDW-2) - Seminole's current forecasting methodology
18 and model/variable selection process;
- 19 • Exhibit No. __ (KDW-3) - Comparison of historical error rates based
20 on Sotkiewicz approach;
- 21 • Exhibit No. __ (KDW-4) - Historical Seminole error rates based on
22 corrected Sotkiewicz approach; and
- 23 • Exhibit No. __ (KDW-5) – Seminole 2017 Load Forecast Error
24 Analysis.

25

1 **Q. What is the purpose of your rebuttal testimony?**

2 A. The purpose of my testimony is to rebut Quantum Pasco Power, L.P.'s witness
3 Dr. Sotkiewicz' claims regarding Seminole's load forecasting error.

4

5 **Q. On page 11 of his direct testimony, Dr. Sotkiewicz states that "[t]he**
6 **Commission should invite Seminole to correct its forecasting**
7 **methodologies" Has Seminole made any improvements to its**
8 **forecasting methodology over the past few years?**

9 A. Yes. In 2014, Seminole invested in state-of-the art statistical analysis software
10 to move load forecasting data and models from "SAS on the mainframe" to
11 "SAS on Windows PC." This improvement in technology allowed Seminole
12 to re-examine and enhance the load forecasting process, including forecast
13 methodology.

14

15 In January 2015, Seminole ended its practice of forecasting usage-per
16 consumer and transitioned to modeling and forecasting total energy
17 requirements. Seminole also ended its practice of modeling and forecasting
18 load factor in order to calculate demand based on the product of usage per
19 consumer, forecasted consumers and forecasted load factor. Seminole's new
20 methodology is to model and forecast demand as a dependent variable in an
21 econometric model with regressors including load factor, weather, and
22 economic growth trends. In addition to updating technology and methodology,
23 Seminole also invested in acquiring weather data from 25 weather stations in
24 Florida and Georgia, an increase from only 8 stations previously employed.

1 The weather station selection process was also updated to a state-of-the-art
2 weather station selection methodology.

3
4 In the 2016 load forecast study, Seminole joined Itron's Energy Forecasting
5 Group. The aim was to incorporate Itron data (based on the EIA National End-
6 Use Modeling System) into energy and demand models to control for trends in
7 building shell efficiency, end-use appliance saturation, and efficiency. In order
8 to do this, Seminole incorporated Itron's Statistically Adjusted End-use (SAE)
9 approach into Seminole's own methodology. Seminole adjusted the SAE
10 approach to fit total level models and to forecast economy variables as
11 separate, independent variables in regression models. In addition, Seminole
12 replaced data representative of the entire South Atlantic Census region with
13 Member specific data. These data included Member residential appliance
14 saturation survey statistics and commercial end-use intensity by industry
15 weighted by service area employment.

16
17 Finally, in the 2017 load forecast study, Seminole developed incremental,
18 additional behind-the-meter distributed solar generation forecasts for Members
19 and their end-use consumers. Seminole incorporated this distributed solar
20 generation forecast with the intent to reduce Seminole's expected energy and
21 demand requirements in the future.

22
23 Exhibit No. __ (KDW-2) provides a detailed description of Seminole's current
24 forecasting methodology and model/variable selection process.

25

1 **Q. Does the analysis of forecasting error that Dr. Sotkiewicz presents on**
2 **pages 14 through 16 of his testimony provide any useful information**
3 **regarding the accuracy of Seminole's current load forecasting**
4 **methodology?**

5 A. No. Dr. Sotkiewicz analyzes the forecasts presented in Ten Year Site Plans
6 from 2005 through 2013, none of which reflect Seminole's current load
7 forecasting methodology. As I discussed previously, Seminole revised its
8 methodology beginning in January 2015 (reflected in the 2016 Ten-Year Site
9 Plan) and has continuously enhanced the forecast each year thereafter.

10

11 In addition, Dr. Sotkiewicz portrays Seminole's forecast error without
12 historical context or comparison. Dr. Sotkiewicz begins calculating forecast
13 errors in 2008 at the onset of the Great Recession. In fact, the majority of this
14 analysis is associated with an unforeseen decline in the housing market and a
15 weak economic recovery. As a point of comparison, many utilities across
16 Florida struggled with load forecast errors during this period of time.

17 Ultimately, it is not reasonable to assume the error in Seminole's 2017 forecast
18 study will be similar to previous forecast errors associated with the effects of
19 the Great Recession.

20

21 **Q. Have you identified any other problems with Dr. Sotkiewicz's error**
22 **analysis?**

23 A. Yes. Dr. Sotkiewicz's error analysis does not fully account for the exit of Lee
24 County Electric Cooperative (LCEC) from the Seminole-Member system,
25 which began in 2010 and was complete in 2014. Seminole did not begin

1 reflecting information of LCEC's exit until the 2008 Ten Year Site Plan
2 (TYSP). Until that time, the forecasts reflected in Seminole's TYSP's
3 included forecasts to serve LCEC's total requirements for the entire forecast
4 period. Dr. Sotkiewicz failed to take this into account when he included the
5 forecasts presented in the 2005, 2006 and 2007 TYSPs in his error analyses.

6
7 Second, Dr. Sotkiewicz incorrectly assumes that the load forecast studies
8 produced in the TYSPs are generated in the same exact year, between January
9 and March, before the TYSP is produced in April. Based on this incorrect
10 assumption, Dr. Sotkiewicz begins counting "1 year out" 1-year after each
11 TYSP is produced. However, Seminole's load forecast studies are generated a
12 year in advance of being reported in the TYSP. As a result of this erroneous
13 assumption, Dr. Sotkiewicz's analysis greatly overstates Seminole's historical
14 forecast errors. These miscalculations are exacerbated in the 2005, 2006 and
15 2007 TYSPs because Seminole produced load forecast studies ~~biannually~~ ^{biennially} (DK)
16 before 2008. In other words, the 2005 TYSP reflects the 2003 load forecast
17 study and the 2006 and 2007 TYSPs both reflect the 2005 load forecast study.

18
19 **Q. Have you performed any analyses to provide a point of comparison to the**
20 **error rates that Dr. Sotkiewicz presents for Seminole?**

21 A. Yes. Putting aside the fundamental flaws with Dr. Sotkiewicz's analytical
22 approach, I applied the same methodology that he utilized to calculate
23 historical error rates for Duke Energy Florida (Duke) and Tampa Electric
24 Company (TECO) over the same time period. These two utilities are both
25 winter peaking, similar to Seminole. In addition, approximately 75% of

1 Seminole's Member loads are located in Duke's balancing area and much of
2 Duke's service territory is geographically similar to Seminole's Members. In
3 terms of relative size, TECO's consumer base and total load requirements are
4 similar to Seminole.

5

6 **Q. How do the error rates that you calculated for the other utilities compare**
7 **to the error rates that Dr. Sotkiewicz presents for Seminole?**

8 A. Although Dr. Sotkiewicz's error analysis is incorrect and overstates
9 Seminole's forecast errors, we replicated his methodology for Duke and
10 TECO's forecast errors to compare against Seminole. As shown in Exhibit
11 No. __ (KDW-3), under Dr. Sotkiewicz's approach, the error rates for all three
12 utilities are similar. For example, Winter Net Firm Demand forecast error "5
13 years out" based on Dr. Sotkiewicz's approach ranges from 39%-42% for
14 Seminole, Duke and TECO. I should emphasize that, in presenting these
15 results, I do not mean to imply or suggest that Dr. Sotkiewicz's approach
16 calculates the true forecast error for any of the three utilities. I am simply
17 providing the results for comparative purposes to show that the error analysis
18 that he presented for Seminole does not support his suggestion that Seminole's
19 forecasting error is "abysmal" relative to other utilities during the period in
20 question.

21

22 **Q. Have you performed an analysis to assess how the error rates presented in**
23 **Dr. Sotkiewicz's testimony for Seminole would be affected if the flaws of**
24 **Dr. Sotkiewicz's forecasts were corrected?**

1 A. Yes. I first identified the load forecast study produced in each one of
 2 Seminole's TYSP since 2005. I then identified the forecast origin of each
 3 study, i.e. the last historical data point used to feed the forecast model, and
 4 counted each consecutive "year out" from the origin. For example, the forecast
 5 origin of the 2003 load forecast study is December 2002 and "1 year out" is the
 6 winter of 2003/2004. The table below shows each year out for Winter Net Firm
 7 Demand, Summer Net Firm Demand and Net Energy for Load, respectively.

8	2003 Load Forecast Study
9	2005 Ten Year Site Plan
10	<u>Winter Net Firm Demand</u>
11	Forecast Origin December 2002 (i.e. 2002/2003)
12	"1 Year Out" is 2003/2004
13	"2 Years Out" is 2004/2005
14	"3 Years Out" is 2005/2006
15	"4 Years Out" is 2006/2007
16	"5 Years Out" is 2007/2008
17	"6 Years Out" is 2008/2009 ("3 Years Out" in Sotkiewicz Analysis)
18	"7 Years Out" is 2010/2011 ("4 Years Out" in Sotkiewicz Analysis)
19	"8 Years Out" is 2011/2012 ("5 Years Out" in Sotkiewicz Analysis)
20	
21	2003 Load Forecast Study
22	2005 Ten Year Site Plan
23	<u>Summer Net Firm Demand</u>
24	Forecast Origin December 2002
25	"1 Year Out" is 2004
26	"2 Years Out" is 2005
27	"3 Years Out" is 2006
28	"4 Years Out" is 2007
29	"5 Years Out" is 2008 ("3 Years Out" in Sotkiewicz Analysis)
30	"6 Years Out" is 2009 ("4 Years Out" in Sotkiewicz Analysis)
31	"7 Years Out" is 2010 ("5 Years Out" in Sotkiewicz Analysis)
32	
33	2003 Load Forecast Study
34	2005 Ten Year Site Plan
35	<u>Net Energy for Load</u>
36	Forecast Origin is December 2002
37	"1 Year Out" is 2004
38	"2 Years Out" is 2005
39	"3 Years Out" is 2006
40	"4 Years Out" is 2007
41	"5 Years Out" is 2008 ("3 Years Out" in Sotkiewicz Analysis)

1 "6 Years Out" is 2009 ("4 Years Out" in Sotkiewicz Analysis)

2 "7 Years Out" is 2010 ("5 Years Out" in Sotkiewicz Analysis)

3

4 The approach that I utilized is consistent with the methodology used by the
5 Commission to evaluate forecast error in at least one prior need determination
6 proceeding in Order No. PSC-2016-0032-FOF-EI issued in Docket No.
7 20150196-EI.

8

9 **Q. What were the results of your corrected error analysis?**

10 A. As shown in Exhibit No. __ (KDW-4), when updated to reflect (1) actual
11 forecast origin, (2) the exit of LCEC from the Seminole System, and (3)
12 available data reflecting Seminole's recent Winter Net Firm Demand, the
13 corrected version of Dr. Sotkiewicz's approach yields a historical forecast error
14 of approximately 21%, which is approximately half of the 39% error rate
15 presented in Dr. Sotkiewicz's testimony based on his flawed analysis. In
16 presenting these results, I emphasize that this corrected version of Dr.
17 Sotkiewicz's analysis based on studies conducted from 2003 through 2015
18 does not reasonably estimate forecast error associated with Seminole's current
19 forecast, because as I discussed previously, Seminole's forecasting
20 methodology has been improved since 2015. I simply present these results to
21 show that Dr. Sotkiewicz's estimate of Seminole's historical forecast errors is
22 overstated by more than 85%.

23

24 **Q. Have you performed any analyses to evaluate Seminole's current forecasts**
25 **since 2015?**

1 A. Yes. Seminole has developed ex-post forecast error analyses on load forecast
2 studies since 2015. Seminole’s “after-the-event” evaluation of model error
3 with observed (actual) explanatory variable data removes the error associated
4 with long-term forecasts of weather and economy, providing valuable insight
5 into model improvements. Seminole conducts this analysis with all available
6 information one year after the forecast origin. In other words, we re-forecast
7 the model with actual, observed data, rather than the forecast data. This
8 provides an indication of whether load forecast error is due to Seminole’s
9 forecasting methodology or simply due to the fact that weather and economy
10 forecasts are never perfect. Seminole conducts this analysis on a monthly
11 resolution, which provides a higher temporal resolution than focusing on one
12 individual observation such as the winter or summer peak, or annual energy.

13
14 Since 2015, Seminole has conducted ex-post analyses., Seminole calculates the
15 error between actual load and ex-post load forecasts for each month and the
16 Mean Absolute Percentage Error (MAPE) across all months. MAPE is a
17 widely-used error measure in business forecasting, including load forecasting.

18
19 **Q. What were the results of your ex post forecast analysis?**

20 A. The monthly MAPE for the 2017 ex post analysis ranged from 2.3% to 3.5% in
21 the demand model and 1.8% to 2.3% in the energy model. The results of the
22 ex-post forecast analysis are shown in Exhibit No. __ (KDW-5).

23
24 **Q. Does this conclude your testimony?**

25 A. Yes.

1 BY MR. PERKO:

2 Q Mr. Wood, did you attach four exhibits labeled
3 KDW-2 through KDW-5 to your rebuttal testimony?

4 A Yes, I did.

5 MR. PERKO: And for the record, those are on
6 the comprehensive exist list as Exhibits 64 through
7 67.

8 BY MR. PERKO:

9 Q Mr. Wood, do you have any corrections to those
10 exhibits?

11 A I do.

12 Q Could you please identify at this time?

13 A Exhibit KDW-4, page one through three, at the
14 bottom, there is a footnote, it says biannually. I
15 would like to change that to be biennially.

16 Q Okay. Any other changes?

17 A Yes, sir. KDW-5, page one of one, at the
18 bottom there is a note, I would like to change where it
19 says January 201 to January 2018.

20 Q Thank you.

21 Are there any other changes to your exhibits?

22 A No.

23 Q Mr. Wood, have you prepared a summary of your
24 rebuttal testimony?

25 A I have.

1 **Q Would you please present that to the**
2 **Commissioners at this time?**

3 A Good morning, Chairman and Commissioners.

4 I will address the testimony by the
5 Intervenor's expert witness regarding the accuracy of
6 Seminole's load forecast and its methodology. Their
7 expert witness testified that Seminole's load forecast
8 is, quote, "abysmal," and the Commission should invite
9 Seminole to change its methodology. But as explained in
10 my rebuttal testimony, there are a number of problems
11 with his analysis.

12 First and foremost, Dr. Sotkiewicz, his
13 analysis only considers load forecasts developed by
14 Seminole through 2012. Seminole changed its load
15 forecasting methodology in 2015. His analysis of error
16 predated that change, and has no bearing on the accuracy
17 of Seminole's current load forecast.

18 Like other utilities, Seminole experienced
19 forecast error due to the magnitude of the great
20 recession and the onset of federally regulated energy
21 efficiency codes and standards. I witnessed these
22 effects firsthand as a forecaster, and took it upon
23 myself to improve Seminole's methodology in 2015.

24 First, I changed the methodology to
25 independently estimate total energy and total demand.

1 This is key, because as a wholesaler, surgery does not
2 have the data necessary to process end use models. In
3 the past, Seminole relied solely on monthly accounting
4 data from members to develop end use models. These data
5 include billing adjustments that undoubtedly biased
6 models. Our new approach uses hourly meter data, and no
7 longer relies on monthly accounting data alone.

8 Secondly, I rely on population projections
9 from the University of Florida's Bureau of Business and
10 Economic Research as a primary growth driver variable in
11 our forecast models. I do consider other party sources,
12 but I use them with greater reserve.

13 Third, in 2016, I included historical and
14 projected impacts of energy efficiency codes and
15 standards into forecast models. This underlying data
16 and methodology is provided by Itron.

17 We made other changes as well. We upgraded
18 our forecast computing platform from the mainframe to
19 the PC. We invested in more weather data, and increased
20 the number of weather stations we rely on from eight to
21 25. We use state-of-the-art weather station selection
22 algorithms to determine the best weather data from each
23 member territory.

24 This past year, we developed a
25 behind-the-meter solar generation forecast to reduce

1 Seminole's power requirements based on the expected
2 amount of renewable generation.

3 We have proven the accuracy of our revised
4 load forecast methodology through ex-post analysis,
5 which shows a mean absolute percentage error around
6 three percent. In addition, we are no longer
7 overestimating load.

8 In all, the methodology has been significantly
9 improved. It is more data-driven. It is more robust.
10 It is more scrutinized.

11 I believe in our process, and I believe this
12 forecast reasonably reflects our future.

13 Thank you.

14 MR. PERKO: We tender the witness for
15 cross-examination.

16 CHAIRMAN GRAHAM: Thank you.

17 Mr. Wright.

18 MR. WRIGHT: Thank you, Mr. Chairman.

19 EXAMINATION

20 BY MR. WRIGHT:

21 Q Good morning, Mr. Wood.

22 A Good morning.

23 Q I would like to ask you to look at page five
24 of your direct testimony.

25 CHAIRMAN GRAHAM: Rebuttal testimony.

1 MR. WRIGHT: I did say direct. I did mean
2 rebuttal. Thank you.

3 BY MR. WRIGHT:

4 Q Page five of your rebuttal. At lines four and
5 five, you make a statement that Dr. Sotkiewicz failed to
6 take the Lee County departure into account when he
7 included the forecasts for the 2005, '06 and '07 ten
8 year site plans in your error analyses, correct?

9 A Correct.

10 Q And if you go to your Exhibit KDW-4, page one
11 of three.

12 A Okay.

13 Q You adjusted those for Lee County Electric,
14 correct, the values shown in your table?

15 A I made an adjustment for the 2005 load
16 forecast.

17 Q Only 2005?

18 A Yes.

19 Q Okay. You didn't make an adjustment for 2003?

20 A No.

21 Q No, okay, because that -- that was in there.

22 So if you took out the adjustment for 2005,
23 the reported average error would actually increase,
24 wouldn't it?

25 A I believe it would.

1 Q Thank you.

2 Now, is it your understanding that Dr.
3 Sotkiewicz relied on Seminole's forecast as stated in
4 its ten year site plans in preparing his analyses?

5 A Yes, he did.

6 Q Those -- those were the values shown in your
7 site plans, correct?

8 A I am sorry --

9 Q We -- we can skip -- skip that question.
10 You go on to criticize him because those
11 numbers are -- your assertion is -- is that -- is that
12 the values are prepared earlier such that you say Dr.
13 Sotkiewicz incorrectly counts one year out, correct?

14 A Yes, he does.

15 Q Well, how would he know other than to use
16 what's shown in the company's ten year site plans to the
17 Public Service Commission?

18 A I do not think that he took into consideration
19 the time -- the lead time that it takes to develop a
20 load forecast and produce that in a ten year site plan.

21 Q On page six, you make the statement that you
22 don't mean to imply or suggest that Dr. Sotkiewicz's
23 approach calculates the true forecast error for any of
24 three utilities, Duke, Seminole or TECO; correct?

25 A What page, please?

1 Q Page six, line 16 is where the phrase is.

2 A Yes, with regards to presenting Dr.
3 Sotkiewicz's analysis as he prepared it for Duke and
4 TECO.

5 Q Or Seminole, correct?

6 A Correct.

7 Q Okay. My question for you really is this:
8 What is true forecast error?

9 A True forecast error would take into
10 consideration the time load forecast is prepared.

11 Q Is true forecast -- is the appropriate metric
12 for true forecast error, in your mind, a comparison for
13 the actual value observed versus the forecast value?

14 A With regards to my statement, true forecast
15 error, I am referring to the time that it takes to
16 prepare a load forecast.

17 Q That, I think, goes to when you -- you suggest
18 we ought to start counting. My question for you is
19 simply the metric question.

20 If you wanted to calculate true forecast
21 error, wouldn't you look at the forecasted value versus
22 the actual value observed for the year addressed by the
23 forecast?

24 A I believe that an analysis of forecast error
25 would take an ex-ante approach into consideration.

1 Q When you say an ex-ante approach, isn't that
2 the same as what I said, you look at the actual value,
3 say, for 2016, and compare it to the value forecast in
4 2011, and that's the comparison of the ex-ante forecast
5 from 2011 to the actual value, and the difference
6 between those two values is true forecast error?

7 A That is an analysis of forecast error, yes.

8 Q Do you mean something different when you say
9 true forecast error?

10 A Referring to my rebuttal testimony, when I
11 refer to true forecast error, it's taken into
12 consideration when a load forecast is developed.

13 Q Okay. So off by a year in your testimony,
14 correct?

15 A I am sorry?

16 Q Dr. Sotkiewicz was counting based on -- Dr. --
17 in your opinion, Dr. Sotkiewicz was analyzing that
18 metric, but off by a year because he didn't, in your
19 opinion, take account of the time to prepare the
20 forecast?

21 A Dr. Sotkiewicz's analysis is off by many
22 years. If we look at the first year of his forecast
23 error analysis, he is off by six years -- or he is off
24 by three years.

25 Q Please explain that. Are you looking on page

1 seven now?

2 A Yes, I am.

3 Q Okay. And is that because it's -- the
4 forecast origin was -- was much earlier, and that was a
5 year that in which there were -- when the company was
6 doing every other year load forecast studies?

7 A That's correct.

8 Q Okay, but he looked at the Ten Year Site Plan
9 for 2005 as reported in -- in the company's Ten Year
10 Site Plan and then compared it to the values in, I guess
11 it would have been '08, '09 -- the observed values for
12 '08, '09 and '10, correct?

13 A I will turn to his analysis to confirm.

14 I am looking at Exhibit KDW-3, page one of
15 nine. His analysis is one year off with regard to other
16 years, besides the load forecast developed in 2005 and
17 2003.

18 Q My question was, does his number compare the
19 2010 forecast value -- or actual value to the 2005
20 forecast value as shown in the company's Ten Year Site
21 Plan?

22 A He does, but he asserts that it is five years
23 out, or even less than that, which is incorrect.

24 Q Thank you.

25 All right. The white paper attached to your

1 **testimony, when was that prepared?**

2 A I believe that was prepared two weeks before
3 my deposition, approximately one to two weeks before my
4 deposition. I don't recall the date of my deposition,
5 maybe March 7th, if I recall correctly.

6 Q **Thanks.**

7 **So was it prepared after you saw Dr.**
8 **Sotkiewicz's testimony?**

9 A Yes, it was.

10 Q **Thank you.**

11 **In your work, do you keep track of national**
12 **energy growth usage -- electricity growth trends?**

13 A I have looked at it in the past, but I don't
14 keep up with it regularly.

15 Q **So do you know whether the EIA projected**
16 **electricity consumption growth rates are greater than or**
17 **less than Seminole's?**

18 A As -- on a national average, no, I am not
19 familiar with what that current number is.

20 Q **Seminole's member cooperative, Sumter**
21 **Electric -- what used to be Sumter Electric, I think**
22 **it's called SECO, is that correct?**

23 A Yes, it is.

24 Q **And they serve The Villages, correct?**

25 A That's correct.

1 Q Do you know -- do you know whether the --
2 that's basically a retirement community, isn't it?

3 A The Villages? Predominantly, yes.

4 Q Do you know what affect, if any, the fact that
5 that's a retirement community, has on the growth rates
6 for Sumter Electric?

7 A In what regard? Growth rates in what regard?

8 Q In per household energy consumption, do you
9 know whether retirees use more or less than other
10 typical customers outside retirement communities?

11 A I would have to say that all depends.

12 Q Okay. Do I understand your testimony
13 correctly, that you prefer an ex-post analysis of
14 forecast error?

15 A I prepare an ex-post analysis to show the
16 forecast error of our most recent methodology, which we
17 started in 2015.

18 Q And you don't have enough information to do
19 three, four and five years out ex-ante forecast error
20 analysis for those forecasts, do you?

21 A I do.

22 Q Five years out?

23 A Three years out.

24 Q Okay. You talk in your testimony about using
25 monthly error analysis?

1 A I do.

2 Q Okay. Is it correct that Seminole plans to
3 meet its annual peak demand?

4 A Yes, that's correct.

5 Q You referred to something, I think a monthly
6 mean absolute percentage error; is that right?

7 A I am sure I refer to that.

8 Q My question for you is simply did you do any
9 analysis of annual mean average before percentage error?

10 A In what regards, please?

11 Q Well, you said you did monthly NAPES. Did you
12 do annual NAPES?

13 A Yes.

14 Q If one were going to -- let's take a look at
15 your, let's say, KDW-4 again. If you were to do an
16 absolute percentage error, you would simply make all the
17 signs positive in those tables and -- and add them up,
18 correct, and then divide by the number of years?

19 A Yes.

20 Q Thank you.

21 MR. PERKO: If I could just ask for the
22 record, were you referring to KDW-4 or 5?

23 MR. WRIGHT: I was referring to KDW-4. Yes, I
24 was referring to KDW-4, where there are --

25 MR. PERKO: Thank you.

1 MR. WRIGHT: -- there is a table of percentage
2 values shown, a couple of which are negative.

3 MR. PERKO: I just wanted to make sure I
4 understood.

5 MR. WRIGHT: Okay.

6 BY MR. WRIGHT:

7 Q **Does Seminole plan for weather normalized peak**
8 **demands, Mr. Wood?**

9 A You can say that, yes.

10 Q **I am not trying to get back into your direct**
11 **testimony. This is just a predicate question.**

12 **We talked yesterday, in your direct testimony**
13 **you indicated that the predicted peak for this year was**
14 **3,398 megawatts, and the predicted peak for winter peak**
15 **for 2027 was 3,909 megawatts, correct?**

16 A Close enough.

17 Q **I think those are the numbers, but tell me if**
18 **you --**

19 A I would have to check. I believe that the
20 number for 2027 may be different, but okay.

21 Q **My real question was, are those weather**
22 **normalized peaks?**

23 A Yes.

24 Q **Your -- your error rates as shown as KDW-4,**
25 **with your corrections for Dr. Sotkiewicz, excluding the**

1 duplication is 20-and-a-half percent, and for including
2 the duplication is a littlest than -- well, it's about
3 18 percent, correct; five years out?

4 A That's correct.

5 Q Okay. You will agree that 20 percent of, say,
6 3,800 megawatts, say a 3,800-megawatt peak is something
7 like 760 megawatts, correct?

8 A Subject to check.

9 Q So if I wanted to take a look at the 2027
10 forecast, I could take the number from your direct
11 testimony and multiply it by 0.2? It's a simple
12 arithmetic calculation, isn't it?

13 A I am sorry, could you please repeat the
14 question?

15 Q A 20-percent error on a 3900-megawatt
16 projected peak is about 780 megawatts, correct?

17 A Subject to check.

18 Q What you would have to check for that?

19 A I would want to do my own calculation.

20 Q How does that compare to the capacity of the
21 Sem-- of the Shady Hills facility?

22 MR. PERKO: I'm going to object, it's beyond
23 the scope, Your Honor. He is getting into the
24 Shady Hills facility. We are talking about load
25 forecasting. He can do the math. He can provide

1 this comparison in his brief. We don't need to
2 waste time with a witness for this type of
3 cross-examination.

4 CHAIRMAN GRAHAM: Mr. Wright.

5 MR. WRIGHT: It goes -- my question -- my
6 question goes to the relevance of the forecast
7 error shown in the witness' testimony, Mr.
8 Chairman.

9 Given Mr. Perko's statement, I agree with him.
10 I can do the math and put it in my brief, and
11 that's what I will do, and I will move on. How's
12 that?

13 CHAIRMAN GRAHAM: Thank you. You took the
14 words right out of my mouth.

15 BY MR. WRIGHT:

16 **Q In your forecasting work for your rebuttal**
17 **testimony, did you examine errors in forecast inputs**
18 **such as population growth projections?**

19 A Part of my analysis does take into
20 consideration the errors in the variables that I use,
21 yes.

22 **Q From information presented in the company's**
23 **ten year site plans, is it possible to know with**
24 **specificity what the values for the peak demands**
25 **associated with Lee County Energy Co-Op were?**

1 A Not specifically.

2 Q So the -- asked and answered.

3 You mentioned, I think, that you took it on
4 yourself to update the company's forecasting processes,
5 correct?

6 A That's correct.

7 Q Before doing that, did you provide ex-ante
8 error analyses of your -- of the company's prior
9 forecasts to other -- to, say, senior management within
10 Seminole?

11 A I did not.

12 Q Was it the fact that you experienced historic
13 forecast errors what led you to undertake to update the
14 forecasting methodology?

15 A Yes, that's correct.

16 Q Are you aware that the last -- the great --
17 what was called the great recession ended at the end of
18 2009?

19 A I am sorry, can you repeat that, please?

20 Q Yeah. Are you aware that the great recession,
21 or the last significant U.S. recession, ended at the end
22 of 2009?

23 A I believe it ended in June 2009.

24 Q Thank you.

25 So how, if at all, would that have had an

1 **impact on forecasts prepared in 2010 or 2011?**

2 A I would say that it had a significant impact.
3 The great recession not only caused forecast error in
4 Seminole's load forecasting, but also forecast error for
5 the utilities in the state of Florida, and other
6 utilities nationally. I would also say that it caused
7 forecast error for third parties, including even the
8 sources that we use in our forecast methodology.

9 And just to expand further, the great
10 recession was, in a way, quite catastrophic in terms of
11 a weak recovery, which lasted for many years. And I
12 would say, among the forecasting community, it was quite
13 difficult to know when the economy would return to
14 its -- its past trends.

15 **Q I just want to return briefly to a question --**
16 **a conversation that we had about ex-ante forecast error**
17 **analysis.**

18 **You don't have to be a load forecasting expert**
19 **to compare forecast value to an ex-ante projected -- to**
20 **an observed value, do you?**

21 A I would say to do it accurately, you would
22 need to know more about the load forecast process.

23 **Q Well, if -- let's say a member of the Florida**
24 **Public Service Commission staff wanted to look at it,**
25 **they could look at -- they would look at the forecast**

1 **value versus the actual value, correct?**

2 A That's correct. And I have -- I have taken a
3 look at that, and I have replicated the work done by the
4 Public Service Commission, and I also agree with their
5 analysis.

6 **Q Is an ex-post back cast appropriate for**
7 **long-term generation planning?**

8 A I would say that it's appropriate for
9 long-term load forecasting.

10 **Q Is -- is a forecast that tests well ex-post**
11 **certain to provide good ex-ante results?**

12 A I would say, in load forecasting nothing is
13 certain.

14 **Q Is it correct that forecast -- you used**
15 **forecast data in your modeling, in your forecast**
16 **modeling, correct?**

17 A I used historical data in my forecast
18 modeling.

19 **Q Do you use projected population growth in your**
20 **forecast model?**

21 A In that context, yes.

22 **Q Do you use projected GDP growth in Florida in**
23 **your forecast model?**

24 A I use projected GDP growth in the member
25 statistical area for each member.

1 Q Thank you.

2 Do you use other forecast data inputs in your
3 modeling?

4 A Yes, sir.

5 Q Income, for example, or household income,
6 something like that?

7 A Yes, sir.

8 Q Thank you.

9 You would agree that if there are errors in
10 the input parameters, that would lead to ex-ante -- that
11 could lead to ex-ante error in the forecast, correct?

12 A Yes, I can agree with that.

13 Q You could always get lucky and they could
14 cancel out, and you would be right on the money, right?

15 A It's happened before.

16 Q Are we still feeling the effects of the
17 recession in terms of load growth, Mr. Wood?

18 A I would say that all depends on which member
19 territory we are speaking of.

20 Q So I would interpret that answer to mean that,
21 yes, in some member service areas, and no in others; is
22 that an accurate interpretation of your statement?

23 A Yes.

24 CHAIRMAN GRAHAM: Mr. Wright, are you done
25 with this witness?

1 MR. WRIGHT: No, sir.

2 CHAIRMAN GRAHAM: We need to move along.

3 MR. WRIGHT: I am trying to, Mr. Chairman.

4 Thank you.

5 CHAIRMAN GRAHAM: Is there something your
6 helpers can do to organize you a little bit better?

7 MR. WRIGHT: Mr. Chairman, I believe they have
8 done the best they can. They have, however, given
9 me multiple lists to go with my lists, and I am
10 trying to work through to make sure I don't miss
11 anything.

12 I will -- I will tell you that I think I am
13 close to done with my cross of Mr. Wood, and I am
14 doing my best.

15 CHAIRMAN GRAHAM: Thank you.

16 MR. WRIGHT: Thank you.

17 BY MR. WRIGHT:

18 Q Do you consider a 20-percent forecast error
19 acceptable for planning purposes?

20 A I say that all depends.

21 Q On what?

22 A On the fact that the 20-percent forecast error
23 reflects a period of time when load forecasting was
24 quite difficult. It reflects the impact of the great
25 recession and the effect of federally regulated energy

1 efficiency codes and standards -- the onset of.

2 **Q As a general proposition, when you are making**
3 **a \$13 billion decision, do you think a 20-percent**
4 **forecast error is acceptable?**

5 A Again, I believe that answer all depends.

6 **Q And again, on what? If you want to stand by**
7 **your previous answer, that's okay, but I think it's a**
8 **fair question. On what?**

9 A Well, it depends on many things. I think that
10 it's different for each utility, first of all.

11 Again, I believe that the 20 percent forecast
12 error that's reflected in my corrected approach to Dr.
13 Sotkiewicz's analysis of forecast error reflects a time
14 period when it was very difficult to forecast due to the
15 great recession, and the onset of federally regulated
16 codes and standards.

17 **Q Do you agree that the implementation of smart**
18 **thermostats makes load forecasting more difficult?**

19 A I would say that all depends.

20 **Q Again, on what?**

21 A I think there is many factors involved. To
22 speak specifically to Seminole and its members, Seminole
23 has undergone a pilot program to analyze the effects of
24 the Smart Thermostat Program, and when that program is
25 developed and analyzed, I will know more about the

1 effect on Seminole and its member system.

2 Q If Dr. Hong testified -- and I will explore
3 this with him, but if Dr. Hong testifies that smart
4 thermostats makes load forecasting more difficult, would
5 you dispute that?

6 A Dr. Hong may be speaking on a different sense
7 than I am. Again, I am speaking in the sense that
8 Seminole is currently undergoing a pilot program with
9 its members, and will analyze the effects of the Smart
10 Thermostat Program.

11 Q Thanks very much.

12 MR. WRIGHT: That's all I have, Mr. Chairman.

13 CHAIRMAN GRAHAM: Thank you.

14 Staff.

15 MS. DZIECHCIARZ: Thank you, Mr. Chairman.

16 Staff has just a few questions.

17 CHAIRMAN GRAHAM: Sure.

18 EXAMINATION

19 BY MS. DZIECHCIARZ:

20 Q Good morning, Mr. Wood.

21 A Good morning.

22 Q Would you mind taking out Exhibit 112
23 proffered by staff yesterday? It would not be in a red
24 folder. And let me know when you find it. I have an
25 extra copy if -- if you don't see it there.

1 A Is this the staff exhibit titled "Winter Peak
2 Demand Forecast Changes in Seminole's Load Forecast?"

3 Q That's correct. Yes.

4 A Okay. I have it. Thank you.

5 Q Okay. So as a refresher, the first table in
6 the exhibit, which is labeled Winter Peak Demand
7 Forecast for 2020 through 2023, it shows Seminole's
8 forecast, sorry, through 2020 to 2023 of the net winter
9 peak demand as provided in Seminole's 2014 through 2017
10 ten year site plans, and its 2017 load forecast study.
11 Then the second table is the Year-Over-Year Change in
12 Winter Peak Demand Forecast. The third is labeled the
13 Year-Over-Year Percent Change in Winter Peak Demand
14 Forecast. And finally the farthest column on the right
15 shows the major enhancements cited in your Exhibit
16 KDW-2; is that correct?

17 A That's correct.

18 Q Okay. Thank you.

19 If I could draw your attention, please, to row
20 six.

21 Reviewing the data in this row, in combination
22 with the data in row 10, it appears to indicate that the
23 majority of the reduction in the winter peak demand
24 since the 2014 Ten Year Site Plan first appeared in the
25 2015 Ten Year Site Plan; is that correct?

1 A That's correct.

2 Q And row six indicates that Seminole identified
3 no major enhancements in its forecasting methodology, as
4 reflected again in your Exhibit KDW-2, which was
5 attached to your direct testimony. Do you agree that
6 your exhibit does not reflect any major load forecast
7 methodo-- methodological change in Seminole's 2015 Ten
8 Year Site Plan forecast?

9 A I would agree with that, yes.

10 Q And did Seminole, in fact, incorporate any
11 enhancements, major or minor, in its winter peak demand
12 forecast appearing in Seminole's 2015 Ten Year Site
13 Plan?

14 A It, in fact, did. In 2014, the manager of
15 load forecasting at the time was retiring, and I assumed
16 possibility for Seminole's load forecasts at that time.

17 I worked within the framework that we had in
18 place at the time, and underwent a series of changes to
19 the current methodology, which is reflected in this
20 change in load forecast here. I -- I found multiple
21 things that I believed needed to be changed within that
22 framework, and that's what's reflected here in the
23 difference.

24 Q Can you explain what multiple things?

25 A Yes.

1 So in the past, the load forecast was based on
2 an end use model. I had -- I had found that there were
3 multiple variables in that end use model that, in my
4 professional opinion, should not be in those models, and
5 I removed those variables. The end use model drives
6 growth in the load forecast -- in the 2014 load
7 forecast.

8 In addition, I made changes to the loss factor
9 forecast that would have resulted in the total energy
10 model, and I also made changes to the load factor model
11 that we used at the time that we used to calculate
12 winter demand. So it was a calculation of load factor
13 and energy.

14 In the load factor model, there were multiple
15 variables that I believed, in my professional opinion,
16 should not be in that model. I also added additional
17 variables.

18 **Q And would you classify these enhancements as**
19 **major?**

20 A I would -- I would classify it as a major --
21 major change to the current -- to the methodology that
22 we were using at that time, yes.

23 **Q Were -- were these enhancements that you just**
24 **cited the reason for the significant reduction in the**
25 **winter peak demand in the 2015 Ten Year Site Plan?**

1 A Yes, that's correct.

2 Q Okay. Thank you.

3 If you could please turn your attention to row
4 seven, which shows the winter peak demand forecast
5 reduction in the 2016 Ten Year Site Plan for the three
6 winter seasons in question.

7 The major enhancements shown in the column on
8 the right of this page, such as state-of-the-art weather
9 station selection process, are those significant drivers
10 of the reduction in winter peak demand in the three
11 winter seasons shown?

12 A I would say that's a significant enhancement
13 in accuracy, yes.

14 Also, what else is stated here, I would say
15 that the fact that we replaced SAS from the mainframe to
16 the PC was quite significant.

17 And just to mention one more thing. The major
18 enhancement is totally changing the methodology between
19 the 2014 and 2015 load forecast study.

20 Q Thank you.

21 And now if you look at row nine, please. Is
22 it correct that the behind-the-meter distributed solar
23 forecast in the 2017 load forecast was -- load forecast
24 summary -- was the first time this forecast was
25 incorporated into Seminole's winter peak demand

1 forecast?

2 A That's correct.

3 Q And was the inclusion of this behind-the-meter
4 distributed solar forecast a driver in the winter
5 forecast demand reductions in the three winter seasons
6 shown?

7 A It was not.

8 Q Okay. And if you look at row eight, is it
9 correct that there was no decrease in the winter peak
10 demand forecast in Seminole's 2017 Ten Year Site Plan?

11 A Yes. That's correct.

12 Q Is it correct to conclude that the inclusion
13 of residential and commercial end use intensity
14 variables did not contribute to a decrease in Seminole's
15 winter peak demand forecast for the three winter seasons
16 shown in our exhibit?

17 A With respect to that particular load forecast,
18 yes.

19 Q And if you would turn to Exhibit KDW-4, page
20 one of three. And you may know this offhand, so I will
21 just start.

22 Is it correct that this page shows Seminole's
23 average historical winter peak demand forecast error
24 rate, excluding duplicates, of 20.56 percent for
25 forecasts five years out?

1 A Yes, for the 2003 through 2015 load for -- or
2 I am sorry, for the 2003 through 2013 load forecast
3 studies.

4 Q Okay. And in your rebuttal testimony, you
5 state that your corrected version of Dr. Sotkiewicz's
6 analysis does not reasonably estimate forecast error
7 associated with Seminole's current forecast, is that
8 correct? And I can -- it's on page eight if you would
9 like to take a look.

10 A Yes, that's correct.

11 Q And is that because Seminole's forecasting
12 methodology has been improved since 2015?

13 A Yes, that's correct; and greatly enhanced.

14 Q Okay. Again, looking at Exhibit KDW-4, page
15 one of three, is it correct that Seminole had a tendency
16 to over-forecast its winter peak demand contained in its
17 2005 through 2016 ten year site plans?

18 A Yes, that's correct.

19 Q And what are the factors you attribute to this
20 tendency to over-forecast winter demand during this
21 historical period?

22 A I would say the majority of the error was
23 caused by the great recession and the onset of federally
24 implemented energy efficiency codes and standards.

25 Q Would you also say that the absence of

1 **enhancements that came later also attributed to the**
2 **greater rate?**

3 A Absolutely. Yes.

4 Q **Okay. I have no more questions. Thank you.**

5 A Thank you.

6 CHAIRMAN GRAHAM: Commissioners.

7 Redirect?

8 MR. PERKO: No redirect.

9 CHAIRMAN GRAHAM: Okay. Exhibits.

10 MR. PERKO: We would move Exhibits 64 through
11 67 at this time.

12 CHAIRMAN GRAHAM: Any objections?

13 We will move 64 through 67 into the record.

14 (Whereupon, Exhibit Nos. 64-67 were received
15 into evidence.)

16 MR. PERKO: Seminole calls Dr. Tao Hong.

17 CHAIRMAN GRAHAM: You would like to excuse
18 this witness?

19 MR. PERKO: Oh, I'm sorry. Yes.

20 CHAIRMAN GRAHAM: Mr. Wood, you are excused.
21 Thank you.

22 (Witness excused.)

23 CHAIRMAN GRAHAM: Question, I just want to
24 make sure if I understood, are we going to -- what
25 are we doing with David Kezell? Is he going to be

1 stipulated or --

2 MR. PERKO: I think it's at the pleasure of
3 the Commission at this point if any of the
4 Commissioners had questions for him.

5 CHAIRMAN GRAHAM: Mr. Wright.

6 MR. WRIGHT: Thank you, Mr. Chairman.

7 Yeah, I just wanted to confirm what we've
8 already told Mr. Perko, and that is that we do not
9 intend to cross Mr. Kezell on his rebuttal
10 testimony and accordingly, we would be willing to
11 stipulate his testimony and exhibits in on rebuttal
12 if that suits y'all.

13 CHAIRMAN GRAHAM: Staff?

14 MS. DZIECHCIARZ: Staff has no questions.
15 That's fine.

16 CHAIRMAN GRAHAM: Commissioners. Then it
17 sounds like he is stipulated.

18 MR. PERKO: Thank you.

19 CHAIRMAN GRAHAM: Would you like him to be
20 excused?

21 MR. PERKO: I guess I would move his rebuttal
22 testimony --

23 MS. DZIECHCIARZ: Sorry, can I interrupt. Can
24 we wait to move his testimony until after Dr. Hong
25 so that it can be in order?

1 MR. PERKO: Certainly.

2 MS. DZIECHCIARZ: Thank you.

3 CHAIRMAN GRAHAM: Okay. All right. Mr.
4 Wright, how many questions do you think you have
5 for Mr. Hong and Mr. Taylor? 30 minutes each?

6 MR. WRIGHT: Mr. Chairman, I think I will tell
7 you candidly, I think no more than that for either
8 witness, but in my career, I have -- I have had
9 serious forecast error with respect to my forecast
10 cross time. That's the best I can tell you.

11 CHAIRMAN GRAHAM: Well, that's fine. I am
12 just trying to make a determination if we are going
13 to break for lunch at noon or power through, and it
14 looks to me like we are just going to power
15 through. I told everybody I would make the
16 determination --

17 MR. WRIGHT: Yeah, I think -- I think that's a
18 great plan. Perhaps you can revisit the decision
19 after Dr. Hong.

20 CHAIRMAN GRAHAM: Okay. Sounds good. Thank
21 you.

22 Your rebuttal witness, sir.

23 MR. PERKO: Thank you.

24 Seminole calls Dr. Tao Hong.

25 Whereupon,

1 TAO HONG

2 was called as a witness, having been previously duly
3 sworn to speak the truth, the whole truth, and nothing
4 but the truth, was examined and testified as follows:

5 EXAMINATION

6 BY MR. PERKO:

7 Q Could state your name for the record?

8 A My name is Tao Hong.

9 Q And, Dr. Hong, have you been sworn at the
10 beginning of this hearing?

11 A Yes.

12 Q I would remind you that you are still under
13 oath.

14 A Yes.

15 Q Dr. Hong, could you please tell us your
16 current employer and/or employers and your current
17 business address?

18 A So I am with Hong Analytics, LLC. My business
19 address is 1507 Willow Oak Pond Lane, Charlotte, NC,
20 28270.

21 Q And, Dr. Hong, did you cause to be filed in
22 this proceeding -- in dockets 20170266-EC and
23 20170267-EC rebuttal testimony consisting of 10 pages on
24 February 19th, 2018?

25 A Yes.

1 **Q Do you have any corrections to that testimony?**

2 A Yes. So on page seven, line 11, so there is a
3 typo, the resulting actual percent error, there is
4 supposed to be a mean before absolute.

5 And then the abbreviation, there is supposed
6 to be an N before APE, so it should read as: The
7 resulting monthly Mean Absolute Percentage Errors (NAPE)
8 range from.

9 **Q Do you have any other corrections to your**
10 **testimony?**

11 A No, sir.

12 MR. PERKO: At this time -- I am sorry.

13 BY MR. PERKO:

14 **Q Dr. Hong if I were to ask -- with that one**
15 **correction, if I were to ask you the questions in your**
16 **testimony today, would your answers remaining the same?**

17 A Yes.

18 MR. PERKO: At this time, Mr. Chairman, we
19 would ask that Dr. Hong's rebuttal testimony be
20 inserted into the record as if read.

21 THE WITNESS: We will insert Dr. Hong's
22 rebuttal testimony with the errata inserted into
23 the record as though read.

24 (Whereupon, prefiled rebuttal testimony was
25 inserted.)

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BEFORE THE PUBLIC SERVICE COMMISSION
SEMINOLE ELECTRIC COOPERATIVE
REBUTTAL TESTIMONY OF
TAO HONG, PH.D.
DOCKET NOS. 20170266 and 20170267-EC
FEBRUARY 19, 2018

Q. Please state your name and address.

A. My name is Tao Hong. My address is 1507 Willow Oak Pond Ln, Charlotte, NC 28270.

Q. By whom are you employed and in what capacity?

A. I am employed by the University of North Carolina at Charlotte (“UNC Charlotte”) as Associate Professor and Research Director of Systems Engineering and Engineering Management Department, Director of BigDEAL (Big Data Energy Analytics Laboratory), NCEMC Faculty Fellow of Energy Analytics, and associate of the Energy Production and Infrastructure Center. I am Owner and Chief Data Scientist of Hong Analytics, LLC, which is a private consulting firm that I founded in 2015.

Q. What are your responsibilities in your positions with UNC Charlotte?

A. I teach undergraduate and graduate level courses offered by the Systems Engineering and Engineering Management Department. I conduct research mostly in the area of load forecasting. I provide professional services within and outside the university.

1 **Q. What services do you provide through Hong Analytics, LLC?**

2 A. I provide training and consulting services to industry organizations. My
3 primary practice area is load forecasting. I have served more than 100
4 organizations worldwide. Most of them are energy companies.

5

6 **Q. Have you worked with Seminole Electric Cooperative, Inc., (“Seminole”)**
7 **prior to your involvement in this case?**

8 A. Yes. I helped Seminole set up a short term load forecasting system in 2017.

9

10 **Q. Please describe your professional experience prior to joining UNC**
11 **Charlotte?**

12 A. Prior to joining UNC Charlotte, I was a Senior Industry Consultant at SAS
13 Institute Inc., where I led research, development, consulting, marketing and
14 sales of the forecasting vertical of the energy business unit. I was a Principal
15 Engineer at Quanta Technology, where I led forecasting related consulting
16 projects and tasks. I was an adjunct instructor at North Carolina State
17 University, teaching load forecasting and demand response related topics at
18 both Electrical & Computer Engineering Department and the Institute for
19 Advanced Analytics.

20

21 **Q. Please describe your educational background.**

22 A. I received a Bachelor of Engineering degree in Automation from Tsinghua
23 University in Beijing, an M.S. degree in Electrical Engineering, an M.S. degree
24 with co-majors in Industrial Engineering and Operations Research, and a Ph.D.
25 degree with co-majors in Operations Research and Electrical Engineering from

1 North Carolina State University. My master thesis was on long term spatial
2 load forecasting. My doctoral dissertation was on short term electric load
3 forecasting.

4

5 **Q. What are your major areas of expertise?**

6 A. My major areas of expertise are in forecasting and optimization. I have
7 applied various statistical and optimization techniques to the development of
8 algorithms and tools for utility applications of analytics. Most of my work is in
9 the area of energy forecasting.

10

11 **Q. Please describe any memberships or leadership roles you hold in any
12 professional organizations.**

13 A. I am the Founding Chair of the IEEE (Institute of Electrical and Electronics
14 Engineers) Working Group on Energy Forecasting. I am a Director at Large of
15 the International Institute of Forecasters. I am the General Chair of Global
16 Energy Forecasting Competitions. In addition, I am an editor of IEEE
17 Transactions on Smart Grid, associate editor of International Journal of
18 Forecasting and Journal of Modern Power Systems and Clean Energy, and
19 editorial board member of IEEE Power and Energy Magazine.

20

21 **Q. Do you teach outside of your position at UNC Charlotte?**

22 Yes. I currently teach five courses outside UNC Charlotte: “Fundamentals of
23 Utility Analytics: Techniques, Applications and Case Studies;” “Introduction
24 to Energy Forecasting;” “Electric Load Forecasting: Fundamentals and Best
25 Practices;” “Long Term Load Forecasting;” and “Electric Load Forecasting:

1 Advanced Topics and Case Studies.” Hundreds of working professionals from
2 more than a dozen countries have taken these courses.

3

4 **Q. What, if any, peer-reviewed articles and professional reports have you**
5 **published.**

6 A. As of February 2018, I have published more than 40 papers, including 21
7 scholarly journal papers, 15 conference papers, 6 magazine articles, and a 171-
8 page report “Load Forecasting Case Study” commissioned by the Eastern
9 Interconnection States’ Planning Council and sponsored by National
10 Association of Regulatory Utility Commissioners. According to Google
11 Scholar, my papers have been cited more than 1,000 times since 2013. My
12 curriculum vitae, which is attached as Exhibit No. __ (TAO-1), includes a
13 listing of all my publications.

14

15 **Q. Have you won any awards in your field?**

16 A. Yes. I have won the following awards in the recent five years:

- 17 • Charlotte Business Journal Energy Education Leader of the Year
18 (2017)
- 19 • IEEE PES Power Systems Planning and Implementation Technical
20 Committee Prize Paper Award (2016, for the paper “Long Term
21 Probabilistic Load Forecasting and Normalization With Hourly
22 Information” published by IEEE Transactions on Smart Grid)
- 23 • IEEE PES PSPI Technical Committee Working Group Recognition
24 Award (2015, for developing and teaching the IEEE Tutorial “Energy
25 Forecasting in the Smart Grid Era”)

- 1 • IEEE PES Technical Council Distinguished Service Award (2014, for
2 organizing Global Energy Forecasting Competition 2012)

3

4 **Q. Are you sponsoring any exhibits?**

5 A. Yes. I am sponsoring the following exhibits, which were prepared by me or
6 under my supervision and are attached to this pre-filed testimony:

- 7 • Exhibit No. __ (TAO-1) - Tao Hong Curriculum Vitae; and
8 • Exhibit No. __ (TAO-2) - Paper entitled “Long Term Probabilistic
9 Load Forecasting and Normalization With Hourly Information.”

10

11 **Q. What is the purpose of your rebuttal testimony?**

12 A. The purpose of my testimony is to rebut Quantum Pasco Power, L.P.’s witness
13 Dr. Sotkiewicz’s claim on page 15 in his direct testimony that “Seminole’s
14 forecasting cannot be used a basis for supporting the need for the combined
15 capacity of SCCF and SHCCF.” I will briefly discuss fundamental flaws in
16 Dr. Sotkiewicz’s analysis of Seminole’s forecasting error. I will comment on
17 the error analysis presented in Mr. Wood’s rebuttal testimony, which I believe
18 is a better way to evaluate Seminole’s current load forecasting methodology.
19 Finally, I will discuss my review of Seminole’s forecasting methodology and
20 the resulting models used to generate Seminole’s current load forecasts. Based
21 on my independent review of Seminole’s forecasting methodology, forecasting
22 system, forecasting process, and the resulting models and forecasts, I believe
23 Seminole’s approach to load forecasting is reasonable. The models and
24 forecasts are useful for supporting the determination of need.

25

1 **Q. In your opinion, is the error analysis presented on pages 14 through 16 of**
2 **Dr. Sotkiewicz's testimony an appropriate way to evaluate Seminole's**
3 **current load forecast?**

4 A. No. As discussed in detail in Kyle Wood's rebuttal testimony, Dr.
5 Sotkiewicz's error analysis has three fundamental flaws. First, it is based on
6 data that pre-dates significant changes in Seminole's forecast methodology
7 and, therefore, does not provide any relevant information concerning
8 Seminole's current load forecast. Second, it does not give proper
9 consideration of Lee County Electric Cooperative's departure from Seminole.
10 Third, Dr. Sotkiewicz's analysis does not consider the lead time of the
11 forecasting and planning processes. Because it takes about a year to develop
12 the forecast and then the site plan, the year x site plan is using the forecast
13 produced in year $x-1$. As a result, the "three years out" forecast in Dr.
14 Sotkiewicz's analysis is in fact a "four years out" forecast. In general, the
15 longer the forecast horizon is, the more uncertainty and errors are to be
16 expected. For this reason, Dr. Sotkiewicz's analysis greatly exaggerates the
17 error in Seminole's historical forecasts.

18
19 **Q. Is there a better way than Dr. Sotkiewicz's method to analyze Seminole's**
20 **load forecast errors?**

21 A. Yes. Given the recent changes in Seminole's forecast methodology, there are
22 two additional steps that provide more useful information than the historical,
23 annual approach that Dr. Sotkiewicz attempted. First, ex post forecasts can be
24 used to tell the accuracy of the model without being distracted by the forecast
25 errors of the predictors. An ex post forecast is the forecast generated with the

1 perfect knowledge of future values of the predictors. For instance, an ex post
 2 forecast of next year's load assumes that we know the actual weather and
 3 economy condition. Second, evaluation of the forecast accuracy on a higher
 4 temporal resolution, such as monthly forecasts, can tell the performance of the
 5 model at high granularity and reduce the lucky or unlucky factor at the annual
 6 resolution. The ex post forecast analyses provided in Mr. Wood's rebuttal
 7 testimony includes these two approaches.

8

9 **Q. What do you conclude from your review of the additional analyses**
 10 **presented in Mr. Wood's rebuttal testimony?**

11 **A.** The resulting monthly ^{Mean} Absolute Percentage Errors (^{DK} "APE") range from 2.3% ^{NAPE} ^{DK}
 12 to 3.5% in the demand model and 1.8% to 2.3% in the energy model. I
 13 consider these error rates to be reasonably low. For instance, in one of my
 14 papers that won the prize paper award from IEEE Power and Energy Society's
 15 Power Systems Planning and Implementation Committee, the average Mean
 16 Absolute Percentage Error ("MAPE") was 3.3% for monthly peak demand and
 17 1.5% for monthly energy. A copy of that paper is attached as Exhibit No. __
 18 (TAO-2).

19

20 **Q. Are you familiar with the forecasting methodology and load forecasting**
 21 **models that Seminole used to develop the load forecasts presented in this**
 22 **proceeding?**

23 **A.** Yes. I have reviewed the files that document Seminole's forecasting
 24 methodologies, such as the assumptions, data inputs, and variable selection
 25 processes. I have also reviewed Seminole's forecasting models and the

1 resulting forecasts. In addition, I have reviewed portions of Seminole's site
2 plans that are related to load forecasting. The period of my review dates back
3 to 2003. Therefore, I am familiar with the long term load forecasting practice
4 and the major improvements made over past few years at Seminole.

5

6 **Q. Do you have an opinion regarding the reasonableness of Seminole's**
7 **forecasting methodology and load forecasting models that Seminole used**
8 **to develop the load forecasts?**

9 A. Yes. I believe Seminole's approach is reasonable. The factors being considered
10 in Seminole's modeling and forecasting efforts are comprehensive. The
11 resulting models and forecasts are reasonable for use in these proceedings.
12 As a best-known statistician and time series forecasting guru, George Box,
13 once stated: "all models are wrong, but some are useful." Seminole's forecasts
14 in the early 2010s were higher than the actuals. This is not surprising
15 considering the fact that no one could have predicted the end date of the Great
16 Recession that occurred during the period that Dr. Sotkiewicz analyzed. Even
17 many credible economy forecasts are still overestimating the recovery. On top
18 of the great uncertainties in economy, the weather beyond two weeks is hard to
19 predict. Therefore, I do not believe that the best method is to look at a long
20 term load forecasting model and the forecasts at annual resolution from the
21 aspect of ex ante forecast accuracy. Instead, looking at the ex post forecast
22 accuracy at a higher resolution, i.e., monthly, is a better method.
23 I am also impressed by the improvement of Seminole's forecasting practice.
24 During the past few years, Seminole's forecasting practice has been improved
25 significantly. For instance, they upgraded their forecasting system from

1 mainframe to Windows. They adopted a state-of-the-art weather station
2 selection methodology to capture the weather patterns more accurately than
3 before. They included end use modeling to capture the new usage patterns.
4 Finally, I would also like to acknowledge that Seminole's current forecasting
5 practice, like most other utilities, still has room for further improvement. For
6 instance, the resolution of the data they are working with can be further
7 increased to hourly data. The long term forecasts can be generated in
8 probabilistic format and evaluated probabilistically. Through the review of
9 Seminole's practice, I believe they are moving toward this direction. They
10 recently installed SAS® Energy Forecasting, a solution that can generate
11 probabilistic load forecasts using hourly data.

12

13 **Q. Do you agree with Dr. Sotkiewicz's opinion that "Seminole's forecasting**
14 **cannot be used a basis for supporting the need for the combined capacity**
15 **of SCCF and SHCCF"?**

16 A. No. I do not agree with Dr. Sotkiewicz's opinion that "Seminole's forecasting
17 cannot be used a basis for supporting the need for the combined capacity of
18 SCCF and SHCCF." (The quote is copied word-by-word from page 15 of his
19 direct testimony.)

20 The keyword "forecasting" in this statement and many other forecasting-
21 related terminologies throughout his testimony have been misused and
22 sometimes ambiguous. "Forecasting" means the process of figuring out how
23 the future will look like. To be precise in communication, we typically use
24 "forecasting" together with another word, such as "methodology," "system,"
25 "process," and "model." On the other hand, "forecast" means how the future

1 will look like, which the result of a forecasting process. Dr. Sotkiewicz
2 misused “forecasting” and “forecast” many times in his testimony, making it
3 difficult for a professional forecaster to interpret what he really meant.
4 Due to the ambiguousness of Dr. Sotkiewicz’s original statement, I would like
5 to answer the question from the following aspects:

- 6 • Seminole’s forecasting methodology is sound and reasonable.
- 7 • Seminole’s forecasting system, which was upgraded from a mainframe
8 computing environment in 2014, is up-to-date.
- 9 • Seminole’s forecasting process is properly managed and traceable.
- 10 • Seminole’s forecasting models have considered the important factors
11 for system planning purposes and are reasonable.
- 12 • Seminole’s forecasts are reasonable and useful for supporting the need
13 for the combined capacity of SCCF and SHCCF.

14

15 **Q. Does this conclude your rebuttal testimony?**

16 A. Yes.

1 BY MR. PERKO:

2 Q Dr. Hong, did you attach two exhibits to your
3 rebuttal testimony that were labeled TOA-1 and TOA-2?
4 And for the record, they are listed on the comprehensive
5 exhibit list as Exhibits 68 and 69?

6 A Is that TAO-1 or --

7 Q TAO. I apologize.

8 A Yes.

9 Q Do you have any corrections to those exhibits?

10 A No.

11 Q Dr. Hong, have you prepared a summary of your
12 rebuttal testimony?

13 A Yes, I did.

14 Q Could you please present that to the
15 Commissioners at this time?

16 A Okay. Good morning, Chairman and
17 Commissioners. My name is Tao Hong. I am here as the
18 witness to present the findings based on my review of
19 Dr. Sotkiewicz's direct testimony and Seminole's
20 forecasting process.

21 I am the owner and chief data scientist of
22 Hong Analytics. I hold a Ph.D. degree with co-majors in
23 Operations Research and Electrical Engineering from
24 North Carolina State University. I have been practicing
25 load forecasting for more than 10 years. Currently I am

1 the chair of IEEE Working Group on Energy Forecasting.
2 I am on the editorial board of several top journals,
3 such as IEEE Transactions on Smart Grid and the
4 International Journal Forecasting. I have published
5 more than 40 technical papers related to load
6 forecasting, including a long-term load forecasting
7 paper that won the IEEE Power System Planning and
8 Implementation Committee Prize Paper award, and a
9 171-page report "Load Forecasting Case Study" sponsored
10 by NARUC. NARUC means National Association of
11 Regulatory Utility Commissioners.

12 I have reviewed Dr. Sotkiewicz's direct
13 testimony, Seminole's ten year site plans and the other
14 documents supporting their load forecasting process. I
15 believe Dr. Sotkiewicz's error of Seminole's load
16 forecast had fundamental flaws that exaggerate
17 Seminole's forecast errors. The error analysis
18 presented in Mr. Wood's rebuttal testimony is a better
19 way to evaluate Seminole's forecast -- current load
20 forecasting methodology.

21 Based on my independent review of Seminole's
22 forecasting methodology, forecasting system, forecasting
23 process, the resulting models and forecasts, I found
24 that Seminole has significantly improved its forecasting
25 methodology such as using the state of art weather

1 station selection methodologies and new data and
2 forecasting systems since 2015. I believe Seminole's
3 approach to load forecasting is reasonable. Seminole's
4 current models and forecasts are useful for the purpose
5 of need determination.

6 **Q That concludes your summary?**

7 A Yes, that concludes my summary.

8 MR. PERKO: At this time, we would proffer the
9 witness for cross-examining.

10 CHAIRMAN GRAHAM: Sure.

11 Mr. Wright.

12 MR. WRIGHT: Thank you, Mr. Chairman.

13 EXAMINATION

14 BY MR. WRIGHT:

15 **Q Good morning, Dr. Hong.**

16 A Morning.

17 **Q Nice to see you.**

18 A Nice to see you, too.

19 **Q Thank you.**

20 A Yeah, we just met in the restroom yesterday.

21 **Q Yes, we did. Nice to see you. Thanks.**

22 **I am going to be as efficient as I can. Most**
23 **of my questions will be yes or no questions.**

24 A Okay.

25 **Q If you can give a yes or no answer, that will**

1 be great. If you need to explain, you are allowed that
2 latitude by the Commission, okay?

3 A Sure.

4 Q Have you testified before this commission
5 before?

6 A Nope.

7 Q Have you testified before any public utility
8 regulatory authority before?

9 A Nope.

10 Q Did you do any work for Seminole in preparing
11 any Seminole Electric Cooperative ten year site plan?

12 A Nope.

13 Q Have you done any work in preparing a ten year
14 site plan for any other Florida utility?

15 A Nope.

16 Q For the Florida Reliability Coordinating
17 Council?

18 A Nope.

19 Q Have you prepared load forecasts for any
20 reliability corporation?

21 A Nope.

22 Q For any RTO or ISO?

23 A Nope.

24 Q So you haven't prepared -- since you haven't
25 done ten year site plans, you haven't prepared load

1 forecasts for any Florida utility or the FRCC; correct?

2 A Nope. Correct.

3 Q Thank you. Thanks for paying attention to the
4 call of the question.

5 Do you work with utility generation dispatch
6 models such as PROMOD or PLEXOS?

7 A Nope.

8 Q If you have an electric utility service area
9 for which you are trying to develop a load forecast and
10 you have got a 10-percent implementation rate of smart
11 thermostats in that service area, does it make it easier
12 or harder to provide an accurate forecast?

13 A I think it would be harder.

14 Q Are you familiar with a price elasticity of
15 demand for electricity?

16 A Yes, I know about it.

17 Q Have you developed load forecast models that
18 incorporate price elasticity of demand?

19 A For some of them, yes.

20 Q Do you incorporate short-term elasticity?

21 A That means --

22 Q I am sorry?

23 A What do you mean by short-term?

24 Q We had an interesting discussion in your
25 deposition. How do you define short-term?

1 A My short-term is 14 days. Within 14 days is
2 short-term.

3 **Q Thank you.**

4 **And what is long-term?**

5 A Long-term -- roughly, there are two ways to
6 categorize long-term in load forecasting. So roughly
7 speaking again in my definition, which is adopted by
8 many people in this community, long-term means 14 days
9 ahead -- beyond 14 days is long-term, but there is
10 another way to quantify long-term, is beyond three to
11 five years.

12 **Q Thank you.**

13 **Have you developed load forecasting models**
14 **that incorporate short-term and long-term price**
15 **elasticities of demand in a given model?**

16 A So for within 14 days, no. Beyond -- you
17 know, in the long-term sense, in a few years for some of
18 them, yes.

19 **Q Do you know whether Seminole's load forecast**
20 **model that's used in this case includes a long-term**
21 **price elasticity of demand variable?**

22 A Not on top of my head. I don't remember.

23 **Q Do you know what economic growth variable**
24 **Seminole uses in its load forecast?**

25 A Yeah. I -- I know some -- I know some of them

1 as I remember.

2 **Q I am sorry, I did not understand --**

3 A So I remember some -- some of the economic
4 growth variable.

5 **Q That's my question. Can you tell us what you**
6 **remember?**

7 A GDP, population.

8 **Q Do you know whether Seminole uses any**
9 **add-backs for demand response measures in its load**
10 **forecasting?**

11 A Add-backs means -- what do you mean by
12 add-backs?

13 **Q If you have a demand response measure, that --**
14 **would it be your understanding that that would reduce**
15 **load that might otherwise be seen?**

16 A Not necessarily. So when you have the
17 amount -- when you have this -- this program, depending
18 upon how the programs were set. So they may decrease
19 load. They may increase load. They may decrease
20 energy. They may increase energy.

21 **Q Do you know whether Seminole's member co-ops**
22 **use any programs that -- that increase demand?**

23 A I don't -- I don't remember. I don't remember
24 a specific co-op member with demand response program,
25 but increase -- I don't remember.

1 Q If you were forecasting firm peak demand,
2 wouldn't you want to take account of demand response
3 impacts?

4 A Please define firm peak demand. What do you
5 mean by firm peak demand?

6 Q Do you have a working definition of firm peak
7 demand?

8 A Well, my definition is something, you know,
9 can be controlled -- you know, can be affected by the
10 demand side program.

11 Q What is the utility for firm peak demand or
12 gross peak demand?

13 A That's out of my expertise.

14 Q Okay. Thank you.

15 Have you examined actual forecast errors as
16 compared to actual observed values for any utility on a
17 three years out, four years out or five years out basis?

18 A No.

19 Q Would you consider a 20-percent forecast error
20 to be acceptable?

21 A It depends.

22 Q On what?

23 A Well, if I were telling you -- right now we
24 are talking about long-term forecasting right, right?

25 So I gave you an easier example. So if you were telling

1 you to forecast a mega city, a big, huge city for two
2 months ahead, okay, you think 20 percent error is a big
3 error?

4 **Q I get to ask the questions.**

5 A Yes. That's part of -- I am a professor,
6 right? So this is --

7 So when you do this forecast, it really
8 depends on so many factors. So as I said, if you are
9 forecasting a mega city, a huge city which similar load
10 as Seminole, okay, three gig, roughly a three-gig peak.
11 And say next month, forecasting next two months peak
12 load, you may see an 80-percent error. That seem to be
13 a big number, okay.

14 But if I were telling you the city of New
15 York, New York City during Hurricane Sandy, if I were
16 telling you that's a Houston, City of Houston during
17 hurricane, major hurricane, then the error is not big.
18 It really depends -- depends on so many factors.

19 **Q Wouldn't you agree that it depends on -- on**
20 **the application to be made of the forecast?**

21 A I don't understand the question. What do you
22 mean by the application made to the forecast?

23 **Q If you are going to use the forecast to make a**
24 **major multi-billion dollar planning decision, wouldn't**
25 **the forecast error percentage be of great interest to**

1 **the decision-makers?**

2 A Yes, the forecast error will be interesting --
3 will be important in the decision-making process.

4 Q **And would you agree that for a multi-billion**
5 **dollar investment, a 20-percent forecast error would be**
6 **significant?**

7 A Again, it depends. They don't -- they don't
8 use one number directly in their decision-making
9 process. There is a -- there is a risk management
10 process in the decision-making process where people
11 account uncertainties, they account forecast errors. So
12 maybe in some decision-making process, they expect big
13 forecasting errors, and then that's part of the game,
14 forecast error.

15 Q **Did Seminole use the SAS software to prepare**
16 **the forecast that was filed with this commission in**
17 **these dockets?**

18 A Which year? I am sorry. For which -- which
19 forecast?

20 Q **The forecast that has been presented by**
21 **Seminole in these dockets, this case that we are sitting**
22 **here in.**

23 A For the -- for the most recent one? For the
24 most recent ten year site plan?

25 Q **No. For the forecast that's presented to the**

1 **Commission in these dockets.**

2 A Means what? Ten year site plan, 2017?

3 Q **Seminole based its projection -- Seminole**
4 **hasn't filed it's next ten year site plan, correct?**

5 A If next one is 2018, I guess they didn't.

6 Q **Okay. Did Seminole use the SAS software to**
7 **prepare the load forecast that was presented to the**
8 **Commission in this case?**

9 A Yes.

10 MR. WRIGHT: Mr. Chairman, I -- hi. Mr.
11 Chairman, I want to show the witness a copy of his
12 deposition from -- taken a couple weeks ago.

13 MR. PERKO: Typically, depositions are used
14 for impeachment, Your Honor, if the witness -- if
15 counsel believes the witness said something that he
16 didn't say in his deposition. Is that the purpose
17 or --

18 MR. WRIGHT: That is, indeed, the purpose.

19 MR. PERKO: Then ask the question, counsel.

20 MR. WRIGHT: Okay.

21 BY MR. WRIGHT:

22 Q **In your deposition, I asked you: "Did**
23 **they" -- meaning Seminole -- "use the SAS program to**
24 **prepare the forecast that they filed with the Florida**
25 **Public Service Commission in these dockets, do you**

1 know?"

2 Answer: "No. No."

3 I said: "Thank you."

4 You said: "No, because they can't. No.
5 There is no time."

6 You just said they did use it. Which is true?

7 A Yeah, they didn't -- they didn't use -- I
8 think they are two things. One is the SAS energy
9 forecasting software, which is a more comprehensive one
10 that they are in the process they are trying to use it
11 in the future. Another one is a general style software.
12 So the general style software is SAS platform, which
13 they are using. So SAS energy forecasting, which will
14 take them years to fully adopt.

15 Q Okay. So -- so the SAS software that they are
16 in the process of implementing was not used in this
17 case, correct?

18 A For SAS energy forecasting solution, they
19 didn't use it.

20 Q Thank you.

21 In terms of analyzing the accuracy of forecast
22 results, do you agree that it's appropriate to use a
23 comparison of forecast versus actual values five years
24 out as a reasonable measure of the accuracy of the
25 forecast?

1 A If you are saying in long-term load
2 forecasting context, I do not agree.

3 **Q Okay.**

4 MR. WRIGHT: Excuse me, Presiding Officer, I
5 am very nearly done with Mr. Hong. I need to find
6 a couple of things.

7 COMMISSIONER POLMANN: Thank you, Mr. Wright.

8 BY MR. WRIGHT:

9 **Q Will you agree that a forecast that tests well**
10 **ex-ante does not guarantee -- sorry, that tests well on**
11 **an ex-post analysis, does not assure accurate ex-ante**
12 **results?**

13 A Correct. Nothing will assure accurate ex-ante
14 result.

15 **Q Thank you.**

16 **How much are you being paid to testify and do**
17 **the work you are doing in this case?**

18 A 600 bucks an hour.

19 **Q And how much are you up to as of today?**

20 A I don't remember exactly how many hours, but
21 probably 80 hours, 80, 90 maybe.

22 **Q Okay. Thank you very much.**

23 MR. WRIGHT: That's all I have for Dr. Hong.

24 CHAIRMAN GRAHAM: Staff.

25 MS. DZIECHCIARZ: Staff has no questions.

1 Thank you, Mr. Chairman.

2 CHAIRMAN GRAHAM: Commissioners?

3 Redirect?

4 MR. PERKO: Just a couple.

5 FURTHER EXAMINATION

6 BY MR. PERKO:

7 Q Dr. Hong, I believe Mr. Wright asked you if
8 you had ever performed load forecast for an RTO and a
9 reliability corporation, but I don't think he asked you
10 if you have ever performed load forecasts for an
11 electric utility. Have you performed load forecasts for
12 a electric utility?

13 A Yeah, I help many -- many utilities to do
14 their work, do their load forecasting work, many.

15 Q Thank you.

16 MR. PERKO: No further questions.

17 CHAIRMAN GRAHAM: Okay. Exhibits.

18 MR. PERKO: We would move Exhibits 68 and 69.

19 CHAIRMAN GRAHAM: We will move Exhibits 69 and
20 69 for Dr. Hong.

21 (Whereupon, Exhibit Nos 68 & 69 were received
22 into evidence.)

23 CHAIRMAN GRAHAM: Dr. Hong, thank you for your
24 testimony.

25 Would you like to excuse this witness?

1 MR. PERKO: Yes, please.

2 CHAIRMAN GRAHAM: Dr. Hong, you are excused.

3 THE WITNESS: Thank you.

4 (Witness excused.)

5 CHAIRMAN GRAHAM: Okay. Now, David Kezell's
6 exhibits.

7 MR. PERKO: Those would be 70 through 73, so
8 we would move those at this time.

9 CHAIRMAN GRAHAM: Mr. Wright, any objections
10 to those exhibits?

11 MR. WRIGHT: No, sir.

12 CHAIRMAN GRAHAM: Okay. We will move Exhibit
13 70, 71, 72, 73 into the record.

14 (Whereupon, Exhibit Nos. 70-73 were received
15 into evidence.)

16 MR. PERKO: And I guess, Chairman,
17 Mr. Kezell's rebuttal testimony, we would also ask
18 that that be inserted into the record as if read.

19 CHAIRMAN GRAHAM: We will insert that into the
20 record as though read, correct?

21 MR. PERKO: Thank you.

22 (Whereupon, prefiled rebuttal testimony was
23 inserted.)

24

25

1 BEFORE THE PUBLIC SERVICE COMMISSION
2 SEMINOLE ELECTRIC COOPERATIVE, INC.
3 REBUTTAL TESTIMONY OF DAVID KEZELL
4 DOCKET NOS. 20170266-EC and 20170267
5 FEBRUARY 19, 2018
6

7 **Q. Please state your name and address.**

8 A. My name is David Kezell. My business address is 16313 North Dale Mabry
9 Highway, Tampa, Florida 33688-2000.
10

11 **Q. Have you previously submitted direct testimony in this proceeding?**

12 A. Yes.
13

14 **Q. Are you sponsoring any exhibits to your rebuttal testimony?**

15 A. Yes. I am sponsoring the following exhibits, which were prepared by me or
16 under my supervision and are attached to this rebuttal testimony:

- 17 • Exhibit No. __ (DK-5) - Excerpts from Site Certification Application
18 for DBEC;
- 19 • Exhibit No. _ (DK-6) - Excerpt from DBEC Air Permit;
- 20 • Exhibit No. __ (DK-7) - Excerpt from SCCF draft Air Permit; and
- 21 • Exhibit No. __ (DK-8) - USDOE/EIA report entitled “Capital Cost
22 Estimates for Utility Scale Electricity Generating Plants” (appendices
23 omitted).

24

25 **Q. What is the purpose of your rebuttal testimony?**

1 A. The purpose of my testimony is to rebut Quantum Pasco Power, L.P.'s witness
2 Dr. Sotkiewicz' claim, at pages 22 through 24 of his testimony, that
3 Seminole's projected cost for the Seminole Combined Cycle Facility ("SCCF")
4 is "unreliable."

5

6 **Q. Please summarize your rebuttal testimony.**

7 A. I am confident that Seminole's projected cost for the SCCF is more than
8 adequate to execute the project because it is based in large part on a fixed price
9 contract for power island equipment and an anticipated fixed price contract for
10 engineering, procurement and construction ("EPC") services. In attempting
11 to question Seminole's cost projection by comparing it to estimates for FPL's
12 Dania Beach Energy Center ("DBEC") and other estimates for generic units,
13 Dr. Sotkiewicz fails to recognize that costs for individual combined cycle
14 projects necessarily vary due to a number of company-specific, design-
15 specific, and site-specific factors. Dr. Sotkiewicz provides no valid reason to
16 doubt the accuracy of the reported SCCF installed cost estimate.

17

18 **Q. What was your involvement in the development of the projected costs for**
19 **the SCCF discussed in Dr. Sotkiewicz's testimony?**

20 A. As Seminole's Director of Engineering and Capital Development, I was
21 responsible for developing the projected costs for the SCCF that are presented
22 in section 4.1.10 of Seminole's Need Study (Exhibit No. __ (MPW-2)) and
23 discussed in Dr. Sotkiewicz's testimony.

24

1 **Q. Please describe your experience in developing projected costs for electric**
2 **generating facilities.**

3 A. Seminole regularly establishes cost estimates for various electric generating
4 facilities as part of an on-going effort to stay abreast of industry developments
5 and evaluate potential future projects. We utilize various cost estimating
6 techniques ranging from estimates generated from Thermoflow, Inc. software
7 packages to specifically commissioned estimates prepared by power
8 engineering consulting organizations. We have also worked directly with
9 various EPC firms to get indicative estimates or to check the accuracy of
10 estimates that we have already generated.

11

12 I have personally been involved in project cost estimating for over 25 years.
13 Prior to joining Seminole, I was responsible for the construction management
14 arm of a multi-national consulting engineering company. For eight years, I
15 was regularly responsible for generating or reviewing cost estimates for power
16 facilities in this country and abroad.

17

18 **Q. How did you develop the projected costs for the SCCF?**

19 A. The cost estimate for the SCCF started with indicative estimates from
20 organizations like Fluor and Kiewit Power Engineers. We later obtained an
21 all-in EPC estimate developed by the construction arm of Black & Veatch.
22 Seminole added its own project development and other Owner's cost to this
23 estimate to come up with early versions of what became the SCCF project cost.
24 As we bid and contracted for power island equipment, we substituted the actual
25 contract value for the estimated value for this cost element. The competitive

1 bidding process for the EPC work for SCCF has resulted in pricing that is
2 considered very accurate. Several small scope items are still in the process of
3 being finalized but we are confident that the current EPC price is within one
4 percent of what the eventual agreed-upon contract price will be. In this fashion,
5 Seminole has incrementally removed uncertainty in the estimate and our Direct
6 Construction Cost and Total Installed Cost numbers have been made
7 increasingly accurate over a period of more than two years. The power island
8 equipment and EPC contracts together will comprise approximately 80% of the
9 SCCF Total Installed Cost.

10

11 **Q. On page 22 of his testimony, Dr. Sotkiewicz states that FPL's proposed**
12 **Dania Beach Energy Center ("DBEC") is "essentially the same unit" as**
13 **the SCCF and "must be considered a good yardstick" to compare with**
14 **Seminole's projected costs for the SCCF. Do you agree with those**
15 **assertions?**

16 A. No, I do not. Although both the SCCF and DBEC will utilize similar GE
17 Frame 7H combustion turbine technology, it is not appropriate to assume that
18 the costs of the two projects should be the same. That is because the
19 combustion turbines themselves may differ in their performance and costs for
20 individual combined cycle projects will vary due to a number of company-
21 specific, design-specific, and site-specific factors.

22

23 **Q. On page 22 of his testimony, Dr. Sotkiewicz compares the \$764/kW value**
24 **for DBEC with a \$648/kW value for SCCF. Are these the most**
25 **appropriate comparison points?**

1 A. No, the value he calculated for SCCF does not create an apples-to-apples
2 comparison with the DBEC value. The \$764/kW value for DBEC is derived
3 from an anticipated installed cost of \$888M divided by the plant's anticipated
4 **summer** output of 1,163 MW; whereas the \$648/kW value cited for the SCCF
5 was calculated based on the SCCF's anticipated winter output. For a true
6 apples-to-apples comparison with DBEC, the summer output value should be
7 used for the SCCF. In other words, the anticipated installed cost of \$727M
8 should be divided by the plant's anticipated **summer** output of 1,108 MW
9 resulting in a value of \$656/kW. Using this value, the SCCF estimate is
10 \$108/kW or 14.2% lower than the DBEC estimate.

11

12 **Q. Have you identified any project-specific factors that may account for the**
13 **disparity in projected costs for the SCCF and DBEC?**

14 A. Yes. A cursory perusal of publicly available information regarding the DBEC
15 reveals many significant project differences that can adequately account for the
16 disparity in the \$/kW values for DBEC and SCCF. These differences are
17 summarized as follows:

18 • **Allowance for Funds Used During Construction** (“AFUDC”) - A large
19 and obvious difference between the cost estimates for the two facilities is
20 in the anticipated AFUDC or “allowance for funds used during
21 construction.” As shown on page 7-1 of FPL's Site Certification
22 Application (“SCA”), which is attached as page 9 of Exhibit No. __ (DK-
23 5), DBEC anticipates a value of \$103 million while SCCF anticipates \$45
24 million for a difference of \$58 million. In \$/kW terms, the DBEC
25 Schedule 9 attached to Dr. Sotkiewicz's testimony indicates a value of

1 \$89/kW while the SCCF's Schedule 9 provided in response to Staff
 2 discovery indicates a value of \$40/kW. This item alone accounts for
 3 \$49/kW or more than 45% of the \$108/kW differential between the two
 4 plants. This discrepancy is largely due to the fact that FPL's projected
 5 AFUDC includes both interest during construction ("IDC") and a return on
 6 equity ("ROE") component. Because Seminole is not an investor-owned
 7 utility, the projected AFUDC for the SCCF only includes IDC; it does not
 8 include an ROE component.

- 9 • **Dual-Fuel vs. Single Fuel Design** -The DBEC is a dual fuel facility
 10 (natural gas backed up by fuel oil) while the SCCF is a single fuel facility
 11 (natural gas only). DBEC has existing fuel oil tanks but will require other
 12 items to deliver and combust it that will not be required by SCCF. I
 13 estimate that the difference in cost for adding the dual fuel firing capability
 14 (fuel oil forwarding pumps, combustion turbine modifications, controls
 15 modifications, etc.) at DBEC is approximately \$7 million.
- 16 • **Differences in Gas Turbines** - The DBEC's output is approximately 55-
 17 60 MW higher than SCCF. The nominal generating capacity of each of
 18 the DBEC gas turbines is 430 MW, while the nominal generating rate for
 19 each of the SCCF gas turbines is 384 MW. As shown on page 8 of the
 20 DBEC Air Permit No. PSD-FL-442, which is attached as Exhibit No. __
 21 (DK-6), the heat rate for the DBEC is 4,015.4 MMBtu/hr on natural gas.
 22 By comparison, as shown on page 7 of the SCCF draft Air Permit No.
 23 PSD-FL-443 , which is attached as Exhibit No. __ (DK-7), the heat rate for
 24 the SCCF is 3,514 MMBtu/hr on natural gas. The higher heat input into
 25 the DBEC gas turbines will require the DBEC heat recovery steam

- 1 generators (“HRSGs”) and the entire steam production and condensing
2 system to be designed and constructed to allow for the greater quantity of
3 steam production available from the exhaust gasses. This difference in
4 heat input and resultant steam output would likely result in more structural
5 steel supporting the HRSGs, more alloy steel heat transfer tubing in the
6 HRSGs, a larger steam turbine, a larger condenser, and commensurately
7 larger boiler feedwater and condensate pumping and piping systems. I
8 estimate the increased cost for DBEC to be approximately \$10 million.
- 9 • **Construction Schedule** - The DBEC is anticipated to start construction in
10 2020 and be commercially operable in June, 2022 for a maximum apparent
11 construction period of 30 months. The SCCF construction period allows
12 for up to 36 months. This relatively faster schedule at DBEC increases the
13 contractor’s schedule performance risk and of having liquidated damages
14 assessed for late delivery of the completed plant. Some increased profit
15 margin will probably be included in the EPC pricing for DBEC relative to
16 SCCF to account for this increased schedule performance risk.
 - 17 • **Per Diem Costs** - Site management professionals and some quantity of
18 craft laborers will likely be brought in from a significant distance for both
19 projects. These “travelers” are typically compensated in part with an
20 appropriate per diem to cover their housing, meal and incidental expenses.
21 A review of the U.S. Government’s standard General Service
22 Administration (“GSA”) rates ([https://www.gsa.gov/travel/plan-book/per-](https://www.gsa.gov/travel/plan-book/per-diem-rates/per-diem-rates-lookup)
23 [diem-rates/per-diem-rates-lookup](https://www.gsa.gov/travel/plan-book/per-diem-rates/per-diem-rates-lookup)) for both areas reveals that the average
24 GSA per diem cost for the Fort Lauderdale (DBEC) area is \$216/day and
25 the same cost for the Palatka (SCCF) area is \$144/day for a differential of

1 \$72/day. DBEC anticipates an average of 290 workers throughout its
2 construction period. If half of that number of workers receive per diem for
3 two years at both sites, the resultant difference in per diem cost between
4 DBEC and SCCF would be $\$72/\text{day} * 145 \text{ people} * 730 \text{ days} = \7.6M .
5 The number of people and the durations could be higher. The actual per
6 diems paid to the workers will likely be lower than the GSA rates, however
7 the difference in living costs between the two locations is significant.

- 8 • **Demolition of Existing Infrastructure** - There are two existing 2x1
9 combined cycle power plants in the location where the DBEC is planned to
10 be constructed. Demolition of 4 combustion turbines, four HRSGs, four
11 exhaust stacks, two steam turbine generators, two condensers and all of
12 their appurtenant equipment, buildings and underground facilities will be
13 required for DBEC. The SCCF is planned to be constructed on property
14 that will simply require the removal of trees, grubbing and grading.
15 Photographs available on maps.google.com show that the FPL site has an
16 additional twelve simple cycle combustion turbines and all of their
17 appurtenant equipment that will also have to be removed or demolished to
18 make room for the facility envisioned in the DBEC renderings. The cost of
19 removing this substantial installation may also be included in the DBEC
20 estimate.
- 21 • **Site Differences** - The DBEC is located in a highly developed, congested
22 urban/suburban area with limited open space on the property for
23 construction laydown. In fact, the DBEC will utilize multiple
24 discontinuous portions of land on the existing FPL property (SCA, Figure
25 5.4-1) for laydown. SCCF's single laydown area will allow for easier on-

- 1 site fabrication and construction coordination. The probability of double or
2 triple-handling of delivered material and equipment at DBEC is higher than
3 at SCCF. Furthermore, most of the DBEC laydown areas are in AE or AH
4 flood zones which will require additional fill material (SCA, page 5-2) and
5 land preparation which will not be required at SCCF.
- 6 • **Construction Parking** - It is not clear that construction parking at DBEC
7 will be onsite at all. If not, craft personnel will have to be bussed or
8 otherwise provided with transportation from their staging/parking area to
9 the site. This circumstance, if necessary, would result in not only the
10 transportation cost but likely also in decreased worker productivity with its
11 resultant cost impact. Craft parking is available onsite at SCCF.
 - 12 • **Environmental Mitigation** - The existing FPL facility supports important
13 habitat for the threatened West Indian Manatee population in the area. FPL
14 is planning to take steps to maintain the facility's capability as a warm
15 water manatee refuge. In fact, as shown on page 11 of Exhibit No. ____
16 (DK-5), part of the industrial wastewater permit application included in the
17 DBEC SCA application states that "FPL will construct a thermal refuge to
18 protect manatees seeking warm water during cold weather conditions. The
19 refuge will be available during the Unit 7 project construction phase, when
20 the thermal discharge from the plant is temporarily discontinued and
21 critical cold weather conditions are possible." Providing such a thermal
22 refuge, with its associated costs, will not be required for SCCF.
 - 23 • **Cooling Water Infrastructure** - The DBEC facility will require cooling
24 water interconnections with associated valves and piping to both the
25 existing on-site cooling system and a new supplemental cooling tower.

1 The SCCF will connect to only one cooling system, a new cooling tower.
2 The relatively greater complexity of the DBEC cooling water system will
3 add cost that SCCF will not experience.

4
5 **Q. Is the information you cited from the Site Certification Application**
6 **(“SCA”) for the DBEC and the various air permits publicly available?**

7 A. Yes. The SCA for the DBEC is readily available to the public at the website of
8 the Florida Department of Environmental Protection’s (“FDEP’s”) Siting
9 Office
10 ([http://publicfiles.dep.state.fl.us/Siting/Outgoing/FPL_Lauderdale_PA89-](http://publicfiles.dep.state.fl.us/Siting/Outgoing/FPL_Lauderdale_PA89-26/Dania_Beach_Energy_Center/)
11 [26/Dania_Beach_Energy_Center/](http://publicfiles.dep.state.fl.us/Siting/Outgoing/FPL_Lauderdale_PA89-26/Dania_Beach_Energy_Center/)). Likewise, the air permitting materials are
12 publicly available through a search function located on the website of FDEP’s
13 Division of Air Resources Management
14 (<https://fldep.dep.state.fl.us/air/emission/apds/default.asp>).

15
16 **Q. On page 23 of his testimony, Dr. Sotkiewicz refers to “the installed cost of**
17 **new advanced combined cycle plants reported by the U.S. Energy**
18 **Information Administration (“EIA”)” in support of his suggestion that**
19 **“the cost of the SCCF facility seem[s] quite low relative to other similarly**
20 **situated projects.” Do you believe that the EIA figure is a valid point of**
21 **comparison?**

22 A. No. The U.S. EIA estimate of \$1000/kW is a broad-brushed generic estimate
23 typically used for comparisons between different generating plant types. As
24 stated in the excerpt from the EIA’s report attached as Exhibit No. ____ (DK-9):

1 **“The estimates provided in this report are representative of a generic**
2 **facility located in a region without any special issues that would alter its**
3 **cost. However, the cost of building power plants in different regions of the**
4 **United States can vary significantly.”** (Emphasis added).

5
6 Although the EIA report includes some location-based cost adjustments for
7 certain areas, including Tallahassee and Tampa, these adjustments do not
8 account for the type of project-specific impacts that I discussed previously. As
9 clearly demonstrated by the DBEC/SCCF comparison, location and other
10 project-specific costs do vary substantially. The power equipment and EPC
11 markets are also healthy, competitive markets that respond quickly to market
12 conditions with appropriate price adjustments. Furthermore, the EIA estimate
13 of \$1000/kW was originally based upon significantly smaller power plants that
14 had a lower power output than current advanced class combined cycle
15 facilities. The higher output of modern facilities without a commensurate
16 increase in pricing has resulted in the \$1000/kW estimate being higher than
17 current advanced class combined cycle market conditions would support and
18 of dubious current value.

19
20 **Q. On page 23 of his testimony, Dr. Sotkiewicz also refers to estimates of**
21 **smaller combined cycle units that Seminole included in its 2017 Ten Year**
22 **Site Plan. Do you consider those figure to be valid points of comparison?**

23 A. No. Seminole’s 2017 Ten Year Site Plan estimates of \$942/kW and \$980/kW
24 for facilities at the Seminole Generating Station (“SGS”) and an unnamed
25 location respectively were based upon 1x1 configurations with summer output

1 levels of 593 MW. The corresponding construction cost for these facilities is
2 approximately \$559 million and \$581 million respectively, with the difference
3 being accounted for in greater uncertainty regarding the cost of linear facilities
4 at the unnamed site. A 1x1 configuration is inherently more expensive on a
5 \$/kW basis for two simple reasons: First, the contractor's costs for
6 engineering, mobilization, demobilization, etc. are very similar for either 1x1
7 or 2x1 configurations. Therefore, these costs are spread across a lesser amount
8 of megawatts for the 1x1 configuration. Second, a 2x1 facility is benefitted by
9 several cost efficiencies. For example, as for a 1x1, it still only requires one
10 steam turbine generator, one condenser, and one cooling tower. These items
11 are larger for a 2x1 but their costs do not double. These previously anticipated
12 generic facilities and the proposed SCCF differ little in their configuration but
13 substantially in their output. This dramatically increased output of the SCCF is
14 the primary driver of the significant difference in the \$/kW values. Further
15 reducing the SCCF \$/kW estimate is the well-documented increased
16 modularity of the advanced class 7HA.02 turbines. General Electric succeeded
17 in making a step change reduction in the complexity of erecting these new
18 models by manufacturing and delivering them in discrete modules. The
19 generic models were based upon earlier, smaller gas turbine technology that
20 does not bring this added modularity benefit. This difference in technology
21 has resulted in reduced erection costs for the SCCF that further reduce the
22 \$/kW ratio for facilities based upon these large combustion turbines.

23

24 **Q. Does Dr. Sotkiewicz cite to any valid reason to question Seminole's**
25 **projected costs for the SCCF?**

1 A. No. I am confident that the anticipated construction and installed costs as
2 presented for the SCCF in the Petition for Determination of Need and in the
3 associated Schedule 9s are accurate. There are sound reasons for the
4 differences in the \$/kW values discussed herein and Dr. Sotkiewicz provides
5 no valid reason to doubt the accuracy of the reported SCCF installed cost
6 estimate.

7

8 **Q. Does this conclude your testimony?**

9 A. Yes.

1 CHAIRMAN GRAHAM: Okay.

2 MR. WRIGHT: Mr. Chairman.

3 CHAIRMAN GRAHAM: Yes, sir.

4 MR. WRIGHT: May I please ask that we take a
5 comfort break?

6 CHAIRMAN GRAHAM: Sure. Five minutes.

7 MR. WRIGHT: That would be great.

8 CHAIRMAN GRAHAM: All right.

9 MR. WRIGHT: And I am confident that we will
10 be able to power through.

11 CHAIRMAN GRAHAM: Take a five-minute break.

12 (Brief recess.)

13 CHAIRMAN GRAHAM: All right, guys. I think we
14 are all comfortable.

15 MR. PERKO: A little cold, but other than
16 that --

17 CHAIRMAN GRAHAM: All right. Mr. Perko.

18 MR. PERKO: Thank you, Mr. Chairman.

19 At this time, we would recall Mr. Alan Taylor
20 for rebuttal.

21 CHAIRMAN GRAHAM: Okay.

22 Whereupon,

23 ALAN S. TAYLOR

24 was recalled as a witness, having been previously duly
25 sworn to speak the truth, the whole truth, and nothing

1 but the truth, was examined and testified as follows:

2 EXAMINATION

3 BY MR. PERKO:

4 Q I guess it's still morning. Good morning,
5 Mr. Taylor.

6 A Good morning, Mr. Perko.

7 Q Are you the same Alan Taylor that testified
8 earlier in these proceedings?

9 A I am.

10 Q I would remind you that you are under oath,
11 sir.

12 A Yes.

13 Q Mr. Taylor, did you cause to be filed on
14 February 19th, 2018, rebuttal testimony consisting of
15 seven pages in Docket Numbers 20170266-EC and
16 20170267-EC?

17 A I did.

18 Q Do you have any corrections to that testimony?

19 A I do.

20 Q Could you please identify those for the --

21 A Yes. The numbers that were stated in the
22 rebuttal testimony were correct upon filing, but have
23 since been updated, so I want to make them consistent
24 with what's in the record now from Ms. Diazgranados'
25 updated testimony.

1 Specifically on page two, line four, there is
2 a number represented for the all PPA portfolio as having
3 costs that are \$136 million less. That you actual
4 number now is \$69 million.

5 Again, further down that page, page two, line
6 19, that number is also represented, the \$136 million
7 lower CPVRR estimate should read \$69 million.

8 **Q Are there any other corrections to your**
9 **rebuttal testimony?**

10 A Yes. Two more, excuse me.

11 **Q I am sorry.**

12 A On page three, in the question in the middle
13 of the page, that starts: "Seminole's analysis
14 indicates that their recommended portfolio is
15 \$388 million." That 388 million should be \$530 million
16 less expensive on a 30-year CPVRR basis.

17 And further on in the question, on line 17 --
18 that previous change was on line 14. Again, down on
19 line 17, the \$136 million number, again, should be
20 69 million.

21 **Q Are there any other corrections?**

22 A There are none, no.

23 **Q Thank you.**

24 **With those corrections, Mr. Taylor, if I were**
25 **to ask you the questions in your rebuttal test--**

1 **prefiled rebuttal testimony today, would your answers be**
2 **the same.**

3 A Yes, they would.

4 MR. PERKO: At this time, Mr. Chairman, we
5 would ask that Mr. Taylor's rebuttal testimony be
6 inserted into the record as if read.

7 CHAIRMAN GRAHAM: We will insert Mr. Taylor's
8 prefiled rebuttal testimony into the record as
9 though read.

10 (Whereupon, prefiled rebuttal testimony was
11 inserted.)

12

13

14

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1 BEFORE THE PUBLIC SERVICE COMMISSION
2 SEMINOLE ELECTRIC COOPERATIVE, INC.
3 REBUTTAL TESTIMONY OF ALAN S. TAYLOR
4 DOCKET NOS. 20170266-EC AND 20170267-EC
5 FEBRUARY 19, 2018

6

7 **Q. Please state your name and address.**

8 A. My name is Alan Taylor. My business address is 821 15th Street, Boulder,
9 Colorado 80302.

10

11 **Q. Have you previously submitted direct testimony in this proceeding?**

12 A. Yes.

13

14 **Q. What is the purpose of your rebuttal testimony?**

15 A. The purpose of my testimony is to rebut Quantum Pasco Power, L.P.'s ("Pasco
16 Power") witness Dr. Sotkiewicz' claims in his direct testimony that: (1) the
17 new plants do not meet customer needs for adequate electricity at a reasonable
18 cost because the No New Build - All-PPA Portfolio has lower CPVRRs than
19 Seminole's proposed portfolio through 2027; and (2) the fact that Seminole's
20 discount rate is greater than current escalation rates should cause Seminole to
21 defer developing or acquiring new resources.

22

23 **Q. What does Dr. Sotkiewicz conclude regarding comparing the CPVRRs of**
24 **Seminole's proposed portfolio to the No New Build - All-PPA Portfolio?**

1 A. Dr. Sotkiewicz concludes that the No New Build – All-PPA Portfolio
2 represents a superior choice relative to Seminole’s proposed portfolio because
3 Seminole’s evaluation results indicate that the CPVRR of the No New Build –
4 All-PPA Portfolio is ~~\$136 million~~ ^{\$69 million} ^(DK) less for the initial 10-year time horizon.

5
6 **Q. Do you agree with these conclusions?**

7 A. No. First, it is important to recognize that the difference in CPVRR estimates
8 which Dr. Sotkiewicz references is not truly a 10-year comparison. While the
9 referenced information is for the 2018-2027 time period, Seminole issued its
10 RFP and performed its evaluation of responses to address needs that begin in
11 2021. All portfolios that were evaluated were the same for the pre-2021 time
12 period and only differed in 2021 and beyond. Seminole and Sedway
13 Consulting both conducted a full evaluation of supply portfolios over a time
14 period that extended 30 years, from 2021 through 2051. Thus, the 2027 date is
15 only six or seven years into that 30-year study period and amounts to a rather
16 near-term point of comparison.

17
18 Second, while I agree that Seminole witness Julia Diazgranados’ testimony
19 depicts the ~~\$136 million~~ ^{\$69 million} ^(DK) lower CPVRR estimate for the No Build Risk – All
20 PPA Portfolio (relative to Seminole’s recommended portfolio) over the initial
21 six or seven years of the 30-year study period, I do not believe that this
22 justifies selecting the No Build Risk – All PPA Portfolio. Incidentally, the No
23 Build Risk - All PPA Portfolio does not include the Quantum Pasco Power
24 facility.

25

1 **Q. Is it typical to consider a 30-year planning horizon for evaluation of new**
 2 **generation?**

3 A. Yes, in my experience in Florida and across the country, the evaluation of new
 4 resources is performed over the time frame of the expected life of the
 5 generation options under consideration. For new generation, that time frame is
 6 typically around 30 years. In fact, within Florida, I have provided independent
 7 evaluation services in numerous RFPs issued by Florida Power & Light, Duke
 8 Energy Florida, and Tampa Electric over the last decade, and every evaluation
 9 focused on the CPVRR of evaluated portfolios of resources over a 25-year to
 10 35-year planning horizon in determining the least-cost plan for the utilities'
 11 customers.

12

13 **Q. Seminole's analysis indicates that their recommended portfolio is**
 14 **~~\$388 million~~ ^{\$530 million} ^{DK} less expensive on a 30-year CPVRR basis than the No Build**
 15 **Risk – All-PPA Portfolio. Dr. Sotkiewicz suggests that the No Build Risk**
 16 **– All-PPA Portfolio is better because its estimated CPVRR savings over**
 17 **the initial six or seven years are ~~\$136 million~~ ^{\$69 million} ^{DK}. Why do the results show**
 18 **different portfolios as being least-cost for different time horizons?**

19 A. There are a variety of factors, but the most significant one is the simple fact
 20 that traditional revenue requirement accounting for utility- or cooperative-
 21 owned generation yields a declining stream of payments over the life of an
 22 asset, whereas most PPA pricing structures are flat or escalating over time.
 23 Because Seminole's recommended portfolio includes the SCCF that will be
 24 owned by Seminole, the declining revenue requirements associated with that
 25 resource causes the early years of total portfolio costs to be higher than

1 portfolios that do not include that resource. However, a self-build-versus-PPA
2 comparison of cost streams only in the initial years can yield an incomplete
3 and incorrect conclusion about which resource is in the customers' best
4 interests over the long term.

5

6 **Q. Did Seminole's analysis also consider a shorter-term horizon?**

7 A. Yes, and appropriately so. As the independent evaluator, I monitored and
8 paralleled Seminole's evaluation process. The cooperative's evaluation team
9 took numerous risks and perspectives into consideration, one of which was
10 near-term rate impacts (i.e., near-term revenue requirements) of each evaluated
11 portfolio. Thus, even if a portfolio's long-term 30-year CPVRR benefits
12 advocated for it selection as a least-cost option, Seminole's evaluation team
13 presented its Board of Trustees and executive management with near-term
14 CPVRR information and factored that into its overall portfolio scoring process.
15 In addition, I made presentations to the Board of Trustees where I described
16 the general risks and benefits of short-term versus long-term transactions and
17 PPA versus self-build resources. In the end, I believe that Seminole
18 incorporated a great deal of information into its decision-making process, did
19 not rely solely on the 30-year CPVRR as the portfolio selection metric, and
20 ultimately selected a balanced portfolio that was a blend of new and existing
21 resources in the form of PPAs and cooperative-owned assets, along with the
22 strategic decision to remove from service of one of its coal units. I concurred
23 that the recommended portfolio was superior to the No Build Risk – All-PPA
24 Portfolio because the latter did not represent a balanced plan, exposed

1 Seminole to greater risks, and was projected to be more expensive over the
2 long-term.

3

4 **Q. In your opinion, was Seminole’s analysis consistent with industry
5 practice?**

6 A. Yes.

7

8 **Q. Regarding Dr. Sotkiewicz’s conclusions about discount rates and
9 escalation rates, please define “discount rate.”**

10 A. A discount rate is an estimated percentage rate that accounts for the time value
11 of money and is used to present value a stream of future costs or cash flows
12 (i.e., to put them into a single value that represents the equivalent value of
13 those future cash flows in present terms). For electric utility power
14 procurement analyses, I often see companies use discount rates for present
15 value calculations that are equivalent to their costs of capital.

16

17 **Q. What discount rate did Seminole use in its analysis of SCCF and SHCCF?**

18 A. Six percent – approximately its cost of capital (i.e., its cost of debt).

19

20 **Q. How does a “discount rate” compare to an “escalation rate”?**

21 A. An escalation rate is measure of how a particular cost (e.g., facility
22 construction cost, operating and maintenance cost) is expected to change from
23 year to year. Escalation rates are usually close to a general inflation rate and
24 are invariably significantly less than discount rates.

25

1 **Q. Do you agree with Dr. Sotkiewicz's comparison of Seminole's discount**
2 **rate to escalation rates?**

3 A. No. Dr. Sotkiewicz states that because Seminole's discount rate (at 6%) is
4 higher than reasonable escalation rates for combined cycle facility construction
5 costs (in the 2.0%-2.5% range) deferring project investments will reduce
6 CPVRR impacts. While this is mathematically true in a theoretical sense, it
7 ignores the real world considerations that were factored into Seminole's power
8 supply decisions. Specifically, although general inflation has been low for so
9 long that it is tempting to view it as a permanent macroeconomic condition,
10 there has been a great deal of monetary stimulus undertaken by the Federal
11 Reserve and other nations' central banks over the last decade that could
12 translate into significant price inflation for the materials and labor that go into
13 constructing power plants. Thus, in practice, the theoretical benefits of
14 deferring capital investment can be negated by an unexpected rise in
15 escalation/inflation rates.

16

17 And again, aside from discount rate and escalation rate issues, Seminole's
18 recommended portfolio is a balanced, risk-managed combination of new and
19 existing facilities, and PPAs and self-build resources. It avoids over-reliance
20 on out-of-peninsular-Florida resources and achieves important economic and
21 environmental benefits associated with removing one of Seminole's coal units
22 from service in 2023. The No Build Risk – All-PPA Portfolio does not share
23 these desirable attributes.

24

- 1 **Q. Does this conclude your testimony?**
- 2 **A. Yes.**

1 BY MR. PERKO:

2 Q Mr. Taylor, have you prepared a summary of
3 your rebuttal testimony?

4 A Yes, I have.

5 Q Would you please present that to the
6 commissioners at this time?

7 A Yes. Mr. Chairman, Commissioners, I
8 appreciate the opportunity to provide a summary of my
9 rebuttal testimony.

10 First of all, just to make sure we are all on
11 the same page, Mr. Sotkiewicz refers is a 10-year time
12 period as far as some initial savings in his rebuttal
13 testimony. This is a time period that goes out to the
14 year 2017. And because the need and all of the
15 resources start in the year 2021, technically we are
16 really only looking at a very short-term time period of
17 about six to seven years. So I just want to make sure
18 that we are in agreement that this really is only these
19 comparisons out to 2027 are only a six- or seven-year
20 timeframe.

21 And although I agree that Ms. Diazgranados'
22 updated testimony shows a \$69 million short-term
23 benefit, or differential, between the so-called no-build
24 risk all PPA portfolio and the recommended plan, I don't
25 think that this warrants foregoing the \$530 million

1 benefits over the 30-year CPVRR timeframe.

2 That's -- that 30-year timeframe is the
3 general timeframe that I have seen presented and used as
4 the basis for selections in all of the Florida
5 determination of need cases that I have testified in
6 over the last 15 years. I have seen ranges for the
7 CPVRR of as narrow as 25 years, and as far out as 35
8 years; but again, this 30-year time period is fairly
9 typical.

10 Also, I think that the differential that's
11 been noted here is been typical when preparing PPAs and
12 self-build options that have declining revenue
13 requirement patterns. That's typical as far as the
14 standard project accounting rules for self-build
15 resources.

16 And these reflected capacity costs you can
17 actually see this depicted in my main testimony in
18 Figure A-1 on page 13, the declining nature of a
19 standard PPA -- excuse me, the declining term of a
20 standard self-build resource versus the escalating kind
21 of profile that is typical to PPAs.

22 I don't think that a short-term comparison of
23 a PPA or self-build is appropriate because it can yield
24 an incomplete and incorrect conclusion about what's best
25 for customers over the long-term.

1 I also note that I did monitor the risk
2 analysis discussions and participated in the Seminole
3 board meetings, and can confirm that the short-term
4 effects of competing portfolios were, indeed, included
5 as part of the overall selection decision.

6 Dr. Sotkiewicz also makes an odd comparison in
7 his rebuttal -- in his direct testimony, excuse me -- as
8 far as the escalation rates and discount rates where he
9 claims that because escalation rates are less than a
10 discount rate, that waiting to commit to development
11 decisions will always yield net present value savings.
12 In an abstract sense, that is mathematically true. In a
13 practical sense, that's really not the case.

14 Delaying decisions results, invariably, in
15 reused options. Some of the lowest cost options that
16 might be available for a utility team often are removed
17 from consideration by delaying the decision. And,
18 likewise, the remaining options may rise on the rising
19 tide of inflation that overall then results in a very
20 much higher cost for ratepayers.

21 So the recommended plan is least cost over the
22 30-year period. And I think it's balanced and
23 risk-managed. It's -- the no-build risk all PPA
24 portfolio is about half-a-billion dollars more
25 expensive. It's not balanced, and it fails to represent

1 a desirable direction for Seminole's customers.

2 That concludes my summary.

3 MR. PERKO: Mr. Chairman, we would proffer the
4 witness for cross-examination.

5 CHAIRMAN GRAHAM: Mr. Wright, your witness.

6 MR. WRIGHT: Thank you, Mr. Chairman.

7 EXAMINATION

8 BY MR. WRIGHT:

9 Q Good morning.

10 A Good morning.

11 Q At page three of your testimony, and I think
12 you mentioned this in your summary just now, you state
13 that it is typical to look at a 30-year time horizon for
14 long-term planning decisions; correct?

15 A Correct.

16 Q Isn't it typical for utilities to evaluate
17 different start dates for different resources over the
18 planning horizon in attempting to identify the optimal
19 portfolio for minimizing costs subject to reliability
20 requirements over the time horizon?

21 A No, I would not agree. If those later
22 delivery dates are not actually included as options that
23 have been presented by the bidder or the developer in a
24 particular solicitation. The only time I have seen
25 resources considered for later delivery dates in the

1 time horizon are really for generic resources that are
2 not offered as actual bids in the solicitation.

3 Q And those would be generic resources that the
4 utility believes would be available to it if it decided
5 to build the unit, say, three years out, five years out,
6 seven years out; correct?

7 A Perhaps, yes.

8 Q Is that a yes?

9 A I don't know that it's necessarily building
10 resources. In some cases, it can be looking at the
11 possibility of PPAs that might be signed in the future.
12 But again, these are just assumptions. They are not
13 actual bids in hand.

14 Q In your experience, are they assumptions that
15 the utility uses upon which to make its decisions?

16 A Yes, but the selection decisions themselves
17 are really selecting among the resources that are known
18 and firm commitments in front of the utility.

19 Q A minute ago you said that there are -- you
20 asserted that there are reduced -- there are costs due
21 to reduced options by not picking a certain option
22 that's available at a point in time and waiting until
23 later; is that a fair characterization of what you said?

24 A Yes.

25 Q Won't you agree that there are also increased

1 options by deferring a decision on a multi-billion
2 dollar investment for a few years?

3 A There may be.

4 Q Is it fair to say that the risks cut both ways
5 in that regard, Dr. -- Mr. Taylor?

6 A Yes.

7 Q Thank you.

8 Your articulated concern about possible
9 additional escalation, does that change your testimony
10 regarding the appropriate use of the one-percent
11 escalation rate --

12 A No --

13 Q -- in your analyses?

14 A I believe that my -- my one-percent as
15 articulated earlier this morning represented a -- a
16 reasonable, but a lower bound kind of assumption that
17 was conservative.

18 Q Okay. Do you agree that the cost of
19 combustion turbine units and combined cycle units have
20 generally been flat to declining since 2010?

21 A Yes. In this macro economic low inflation
22 situation, if that, at a macro economic level, changes,
23 then those costs, I believe, would be rising with a
24 generate of a higher inflation rate.

25 Q Do you keep up with the trade press with

1 regard to generation planning?

2 A Yes.

3 Q Okay. And from your remarks earlier about
4 your experience with storage, I'll bet you keep up with
5 press regarding storage, correct?

6 A Yes, I do.

7 Q I have heard it said that -- that the cost of
8 storage and the cost trajectory of storage is, today,
9 approximately where solar was in 2008. Do you think
10 that's a fair characterization?

11 A I don't know, but I think that storage costs
12 are certainly coming down. I would -- I would confirm
13 that.

14 Q And will you agree that they are likely to
15 continue coming down, or at least that -- will you agree
16 that the general market expectation that they will
17 continue to come down over the next several years?

18 A I would say absent macro economic inflationary
19 pressures, that on a -- a real basis, if you will, that
20 they are still expected to come down, yes.

21 Q Okay. Are you aware of consideration being
22 given by major utilities to using solar with storage
23 instead of building combustion turbines for peaking
24 capacity?

25 A I am overseeing a number of solicitations in

1 California where that's being pursued, but largely
2 because of California requirements for the utilities to
3 seek energy storage. It's not necessarily that they are
4 competing with CTs out there. It is that the Commission
5 has required the investor-owned utilities to procure to
6 certain amounts of megawatts of storage over the -- the
7 near term horizon.

8 **Q Are you aware of any public comments by**
9 **utility folks in Florida to that effect?**

10 A No, I am not.

11 **Q Okay. Do you consider the potential over the**
12 **next few years of energy -- solar with energy storage to**
13 **replace combustion turbines as peaking capacity?**

14 A I don't know, but I think that the recommended
15 portfolio, because it is developing more flexible
16 gas-fired generation into Seminole's portfolio, will
17 provide an opportunity for Seminole to consider the
18 incorporation of renewable and renewable plus storage
19 technologies through the next decade as those become
20 potentially available and composite competitive.

21 **Q To the extent they become cost competitive,**
22 **they would, in fact, put downward pressure on market**
23 **prices for combustion turbines, wouldn't they?**

24 A Potentially. The battery storage systems that
25 I have seen in California have tended to be four-hour

1 duration battery storage systems. That's the minimum
2 duration that's required in order to be declared
3 resource adequacy capacity in California. And
4 combustion turbines certainly can run more than four
5 hours. So to the extent that there might be situations
6 where a resource would be called into service for more
7 than four hours, the CT would continue to have an
8 operational advantage.

9 **Q Aren't there companies that are working on**
10 **storage with longer duration depth?**

11 A Certainly any sort of inverter can be backed
12 up with more storage capacity at a cost.

13 **Q The analyses presented in your evaluation**
14 **report are predicated on the assumed escalation rate of**
15 **one percent, and the assumed discount rate of six**
16 **percent as provided by Seminole, correct?**

17 A Yes. The one-percent applies to the backfill
18 assumptions.

19 **Q It is inherently necessary to use a discount**
20 **rate in any analysis of CPVRRs, is it not?**

21 A That is correct.

22 **Q You referred to the \$530 million cost**
23 **differential a little while ago?**

24 A Yes.

25 **Q That -- that number includes the confidential**

1 number that we talked about earlier with respect to the
2 coal unit savings shown on line 10 of Table A-13,
3 correct?

4 A Yes. And I would also note that it includes
5 all of the costs for the self-build that are in Table
6 A-13, including all transmission related costs and the
7 gas lateral costs. I think there was some uncertainty
8 earlier in the day about that. All of those costs are,
9 indeed, in the self-build there, too.

10 Q Okay.

11 MR. WRIGHT: Mr. Chairman, I just need a
12 minute. I am close to done. I am just double
13 checking to make sure I don't miss something.
14 Thank you.

15 CHAIRMAN GRAHAM: Okay.

16 MR. WRIGHT: Thank you for your indulgence,
17 Mr. Chairman. Thank you for your time, Mr. Taylor.
18 Nice to see you.

19 THE WITNESS: Thank you.

20 CHAIRMAN GRAHAM: Staff.

21 MS. DZIECHCIARZ: Staff has no questions.

22 Thank you.

23 CHAIRMAN GRAHAM: Commissioners.

24 Commissioner Polmann.

25 COMMISSIONER POLMANN: Hello again, sir.

1 THE WITNESS: Hello.

2 COMMISSIONER POLMANN: Did your analysis
3 evaluation and, ultimately, your recommendation
4 consider the outstanding debt on the coal
5 facility -- coal-fired facility that will be taken
6 out of service?

7 THE WITNESS: It did in the sense that that
8 debt repayment schedule was assumed to be exactly
9 as it is right now.

10 COMMISSIONER POLMANN: So -- so the costs
11 associated with repaying that debt is -- is
12 included in your assessment?

13 THE WITNESS: Yes, it is.

14 COMMISSIONER POLMANN: And is the fact that
15 that debt burden remains, but that facility will
16 not be used and useful, does that cloud your
17 opinion? Is that a negative aspect of your
18 evaluation?

19 THE WITNESS: I don't think so. I mean, from
20 my standpoint, I considered the debit related cost
21 to be a sunk cost. And utilities across the
22 country have been reevaluating their coal-fired
23 facilities, and whether they make sense on a going
24 forward basis, accepting the sunk costs as sunk
25 costs, whether they need to be retired or continue

1 operation.

2 And I think that the removal of service here
3 of this coal-fired facility is it's -- it is the
4 correct move to make. It is standard with the
5 industry trend. And I -- I think that if Seminole
6 weren't able to do that in the interest of
7 continuing the state's fuel diversity issues, that
8 would place Seminole at kind of a rate
9 differential, or a burden on those customers for
10 hanging on to an asset that I really think should
11 be replaced with more and cleaner natural gas-fired
12 equipment.

13 COMMISSIONER POLMANN: Do you know what the
14 remaining useful life of that facility is, and can
15 you tell me what that is?

16 THE WITNESS: I don't. I feel like somewhere
17 out in the 2040s timeframe was kind of the expected
18 retirement date, but I don't have the exact number.

19 COMMISSIONER POLMANN: Okay. Thank you, sir.

20 CHAIRMAN GRAHAM: Commissioner Clark.

21 COMMISSIONER CLARK: On that same line of
22 questioning. The operational cost analysis of that
23 existing coal plant, what -- what is the biggest
24 variable that would make it not practical to keep
25 it running? Is it the variable cost of operation

1 and maintenance? Because if you look at your fuel
2 cost of coal versus gas, you know, per MMBTU, it's
3 not a substantial difference. So it's strictly the
4 O&M costs that's making the biggest difference?

5 THE WITNESS: In my numbers it's only the O&M
6 costs. So I should emphasize that the
7 differentials that I came up with between the
8 portfolios, and the number that's, for example, in
9 Table A-13 on line 10, is, indeed, only the
10 personnel related savings of removing one of the
11 coal units from service.

12 So the ongoing operations -- the going forward
13 costs there do not include any sort of fuel
14 benefits to. So I think there are fuel benefits
15 that aren't recognized in my numbers because of the
16 dispatch affects that might occur during nighttime
17 hours, when a coal fired resource can only be
18 backed down so far before you have to absolutely
19 take it off-line, and you can't really do that with
20 a coal unit as far as taking it off-line at 10:00
21 or 11:00 at night only to start it up again at 6:00
22 in the morning. You can do that with natural gas
23 combined cycle facilities by bottling them up, the
24 heat recovery steam generator, and you have a lot
25 more flexible operational considerations for those.

1 COMMISSIONER CLARK: You can back your
2 combined cycle unit down to 20, 25 percent,
3 somewhere in that range?

4 THE WITNESS: Correct.

5 COMMISSIONER CLARK: Okay.

6 THE WITNESS: Or take it off-line all
7 together, but keep the heat recover steam generator
8 bottled up so that when you restart in the morning,
9 it's referred to as a hot start, and the facility
10 is already pretty much ready to go, and the cost of
11 bringing it back on-line are relatively low.

12 COMMISSIONER CLARK: Thank you.

13 CHAIRMAN GRAHAM: Redirect?

14 MR. PERKO: Just one question, Mr. Chairman.

15 FURTHER EXAMINATION

16 BY MR. PERKO:

17 **Q Along the lines of what Commissioner Clark was**
18 **asking you about, the fuel savings portion of it.**
19 **Assuming that the coal price and natural gas price were**
20 **relatively similar on the -- on an MMBTU basis, would**
21 **there also potentially be savings due to the increased**
22 **efficiency of a combined cycle unit versus a coal unit**
23 **in terms of heat rate?**

24 A Yes, there would.

25 **Q So that could generate -- the difference in**

1 that, bringing on that more efficient unit can also
2 result in fuel savings?

3 A Absolutely.

4 Q Okay. And was that accounted for in
5 Ms. Diazgranados' analyses?

6 A Yes, because that would be captured in the
7 production cost model part.

8 Q Thank you.

9 MR. PERKO: Nothing further.

10 CHAIRMAN GRAHAM: And I don't think there is
11 any exhibits.

12 MR. PERKO: No exhibits.

13 CHAIRMAN GRAHAM: Okay. Mr. Taylor, would you
14 like to go home?

15 THE WITNESS: I would.

16 CHAIRMAN GRAHAM: The witness is excused.

17 (Witness excused.)

18 CHAIRMAN GRAHAM: Okay. Additional procedures
19 and concluding matters.

20 MR. PERKO: Mr. Chairman, if I could, just out
21 of paranoia. I believe I identified with the
22 witnesses the specific sections of the need study
23 that's Exhibit 3 and 29, I believe, and entered
24 those in the record at the time, but if I could
25 just enter that document in its entirety, I don't

1 believe there are any objections, just to make sure
2 the record is clear that the entire document is in
3 the record.

4 CHAIRMAN GRAHAM: We actually entered that
5 entire document into the record from the very
6 beginning. I was allowing you to specify more
7 specificity as we were going through, I guess for
8 ease of doing briefs, but that -- that entire, I
9 believe it's 3 and 29 --

10 MR. PERKO: Yes, sir.

11 CHAIRMAN GRAHAM: -- are both into the record.

12 MR. PERKO: Thank you for that confirmation.

13 CHAIRMAN GRAHAM: Okay. Mr. Wright.

14 MR. WRIGHT: I just wanted to make it clear
15 that I had honestly forgotten that the whole
16 exhibit was admitted. I just wanted to make it
17 clear we didn't have any objection to it coming in
18 en masse, as it were.

19 That's all. Thanks.

20 CHAIRMAN GRAHAM: All right. So hearing
21 transcripts will be complete by March 27th, 2018.
22 And briefs should be no longer than 40 pages for
23 both dockets, and are due April 4th. You guys got
24 to a week do it.

25 MR. WRIGHT: How lucky can we get?

1 I just want to ask one clarifying question,
2 Mr. Chairman. You said for both dockets. It's one
3 brief for both dockets? One brief, correct?

4 CHAIRMAN GRAHAM: Okay. I didn't know --
5 because I wasn't prehearing officer, I didn't know
6 if it was two briefs, but the total is 40 pages, or
7 one brief. Sounds like one brief.

8 MR. WRIGHT: Just making sure. Thank you.

9 COMMISSIONER CLARK: One.

10 CHAIRMAN GRAHAM: Yeah, one brief. Yeah --
11 no, no, everybody is saying one. I take it you
12 guys had that discussion.

13 COMMISSIONER CLARK: Yes, sir.

14 CHAIRMAN GRAHAM: Okay. Any other matters to
15 address in this hearing? Nothing?

16 Okay. That being said, we are adjourned. I
17 thank you very much, and everybody travel safe.

18 MR. PERKO: Thank you.

19 MR. WRIGHT: Thank you.

20 (Whereupon, the proceedings were concluded at
21 12:15 p.m.)

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CERTIFICATE OF REPORTER

STATE OF FLORIDA)
COUNTY OF LEON)

I, DEBRA KRICK, Court Reporter, do hereby
certify that the foregoing proceeding was heard at the
time and place herein stated.

IT IS FURTHER CERTIFIED that I
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and that this transcript constitutes a true
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I FURTHER CERTIFY that I am not a relative,
employee, attorney or counsel of any of the parties, nor
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financially interested in the action.

DATED this 27th day of March, 2018.



DEBRA R. KRICK
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