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**STATE OF NEW JERSEY
BOARD OF PUBLIC UTILITIES**

In the Matter of the Application of PSEG Nuclear, LLC and Exelon Generation Company, LLC For the Zero Emission Certificate Program - Salem Unit 1

Docket No. ER20080557

In the Matter of the Application of PSEG Nuclear, LLC and Exelon Generation Company, LLC For the Zero Emission Certificate Program - Salem Unit 2

Docket No. ER20080558

In the Matter of the Application of PSEG Nuclear, LLC For The Zero Emission Certificate Program – Hope Creek

Docket No. ER20080559

CROSS EXAMINATION QUESTIONS ON DIRECT TESTIMONY OF DANIEL CREGG ON BEHALF OF THE PJM POWER PROVIDERS GROUP (P3)

Question No. 1

Please refer to the Direct Testimony of Daniel Cregg. In your experience, does risk have both upside and downside implication for company finances? If only downside, why is this true?

Question No. 2

Please refer to the Direct Testimony of Daniel Cregg. Are upside or downside risks explicitly included in financial statements submitted to the SEC in Form 10-K and Form 10-Q? If not, explain why not. If so, explain how these appear in financial statements.

Question No. 3

Please refer to the Direct Testimony of Daniel Cregg. Do Generally Accepted Accounting Principles (GAAP) allow for the inclusion of upside and downside risk not realized into financial statements? If not, explain why not.

Question No. 4

Please refer to the Direct Testimony of Daniel Cregg. Does the Zero Emissions Credit Act (ZEC Act) explicitly exclude the inclusion of upside risks in analyzing nuclear unit finances? If so, please provide the specific language and section providing this exclusion. If not, please explain why PSEG has omitted upside risk in its discussion of risk?

Question No. 5

Please refer to the Direct Testimony of Daniel Cregg. Is the accounting under the ZEC Act consistent with GAAP and accounting conventions in SEC filings of financial statements?

Question No. 6

Please refer to the Direct Testimony of Daniel Cregg. Are there any categories of risks for unrealized events that can be monetized according to GAAP? If so, what are these?

Question No. 7

Please refer to the Direct Testimony of Daniel Cregg. In your experience have you ever been part of utility rate case or proceeding that allowed a utility to "cover the costs of risk" that have not actually happened? If so, and the risks never occurred were the monies refunded to ratepayers?

Question No. 8

Please refer to the Direct Testimony of Daniel Cregg. In PSEG's opinion, if costs are known with absolute certainty, would it ever be financially optimal to offer the nuclear units in the energy or capacity market to include a 10% adder to costs in a competitive market? If not, why not? Please explain the risks of offering a 10% adder if costs are known with certainty.

Question No. 9

Please refer to the Direct Testimony of Daniel Cregg at page 3 of 30, line 5 to page 4 of 30 line 3: How much of the realized energy revenue rate is lower due to lower prices in the forward markets versus lower capacity factors for the units? Please provide a breakdown in \$/MWh and percentage terms for reductions due to price differences and due to lower capacity factors.

Question No. 10

Please refer to the Direct Testimony of Daniel Cregg at page 4 of 30 lines 4-12: Why choose the PECO zone? Why not use PJM Western Hub? Are the basis differentials from PECO and Western Hub such that the bus prices at Salem and Hope Creek are the same? If not the same result, which hub results in the lowest bus price at the nuclear units?

Question No. 11

Please refer to the Direct Testimony of Daniel Cregg at page 5 of 30, lines 1 to page 6 of 30, line 1 including what is labeled Figure 6:

- a. Why are near term projected capacity prices so low compared to history? Is it new generation entry? Reduced demand? What is this driver for such low prices?
- b. What are the factors driving convergence in capacity prices between MAAC, EMAAC, and the PJM RTO as shown in Figure 6 for the 2022/2023 to 2025/2026 Delivery Years?

Question No. 12

Please refer to the Direct Testimony of Daniel Cregg at page 6 of 30, lines 2-12: What assumptions were used for the Capacity Emergency Transfer Limits (CETL) and Capacity Emergency Transfer Objectives (CETO) for the 2022/2023 through the 2025/2026 Delivery Years? Have the price estimates factored in the effect of the minimum offer price rule (MOPR) on prices? If so, how was this modeled? What is the source of generator offers used by PSEG?

Question No. 13

Please refer to the Direct Testimony of Daniel Cregg at page 7 of 30, lines 6-9: Based on what theory is it reasonable to expect the ORDC and fast start pricing have been accounted for in forward prices? Other than a small sample of simulations, is there other information that could change this expectation? How would generator retirements, leaving the market with less capacity, affect prices under ORDC? How would a bounce back in demand from COVID-19 affect these prices?

Question No. 14

Please refer to the Direct Testimony of Daniel Cregg at page 7 of 30, line 18 to page 8 of 30, line 4:

- a. How do PSEG nuclear O&M expenses compare to NEI averages? Is PSEG in the first quintile (lowest 20%) for costs? Second? Third? Fourth? Last?
- b. How do these O&M costs compare to those used by ICF in their Integrated Planning Model used by EPA in their policy analyses?

- c. Have these costs been coming down as has been the industry trend?
- d. How much in \$/MWh is the cost of fuel? Does PSEG have long term contracts or hedges for uranium and fuel rod assembly services?
- e. What are the annual capital expenses each year over the past 10 years? How much is this in \$/MWh? Taking out Fukushima related capex, how much were capital expenses in \$/MWh?

Question No. 15

Please refer to the Direct Testimony of Daniel Cregg at page 8 of 30, line 13 to page 9 of 30, line 4: But these do not show up in financial statements as they are not incurred? Or is this a future liability in financial statements submitted to the SEC?

Question No. 16

Please refer to the Direct Testimony of Daniel Cregg at page 9 of 30 line 5 through page 10 of 30, line 11:

- a. What is the probability of revenues coming in lower than forecast? What is the probability of revenues coming higher than forecast? Does PSEG account for the upside to revenues or just downside?
- b. So, are you saying PSEG is not maximizing expected returns? If so, is that what investors want? Are PSEG and its investors risk averse?
- c. Are you familiar with real options theory? If so, please describe your understanding of real options theory. Would you agree that it makes sense to not make an irreversible decision like retirement until you have better information about actual realizations of risk? If not, why not?
- d. Is it not PSEG's job to guard against such cost increases related to operational risk? Would you agree that PSEG is better positioned to manage those risks than taxpayers in New Jersey? If so, why shift the risk to them? If not, explain why not.

Question No. 17

Please refer to the Direct Testimony of Daniel Cregg at page 10 of 30, lines 12-20: Would you agree that regulated utilities face less risk than merchant generation? Would you agree regulated utilities have lower asset betas (as defined in the context of the capital asset pricing model) than merchant generation? Thus, would you agree then adjusting for that risk, returns for regulated utilities should be lower than merchant generation?

Question No. 18

Please refer to the Direct Testimony of Daniel Cregg at page 11 of 30, lines 7-9: Is this to suggest PSEG is having trouble attracting capital due to its nuclear assets including issuing debt that investors will buy? Do the payments for ZEC's not provide the same protection against downside risk as the regulated utility?

Question No. 19

Please refer to the Direct Testimony of Daniel Cregg at page 11 of 30, lines 9-15: Does you answer suggest PSEG investors will take a loss and write down to retire when there are still positive returns being earned and no downside risks have been realized? Explain the retirement decision in this case and why it is economically rational.

Question No. 20

Please refer to the Direct Testimony of Daniel Cregg at page 12 of 30, lines 1-9: How does the 10% work regarding risks like Fukushima? 9/11? a hurricane? or other costs? Is it possible costs could be 10% lower as well? If not, why not?

Question No. 21

Please refer to the Direct Testimony of Daniel Cregg at page 12 of 30, line 10 to page 13 of 30, line 15:

- a. Would a straight 10% adder be permitted according to GAAP and SEC guidelines for financial statements reflecting costs and not just incurred costs? If not, why not? If so, explain why this is permitted and provide citations showing this is permitted.
- b. Please explain when the cost-based offer including a 10% adder is used in PJM. Have the PSEG nuclear units ever been operated on their cost-based offers? If so, how many hours per year on average? Does PSEG include the 10% adder in nuclear cost-based offers? Have the PSEG nuclear units ever been marginal, setting energy price using a cost-based offer with a 10% adder?

Question No. 22

Please refer to the Direct Testimony of Daniel Cregg at page 14 of 30, lines 1-20: Please explain the instances where the 10% adder in capacity market offers is utilized. Have the PSEG nuclear units ever submitted offers at the market seller offer cap for the capacity market using the 10% adder?

Question No. 23

Please refer to the Direct Testimony of Daniel Cregg at page 15, lines 1-10: Do the operational risks not show up in the submitted financial statements because it does not comport to GAAP or financial statements submitted to SEC in 10-Q and 10-K filings?

Question No. 24

Please refer to the Direct Testimony of Daniel Cregg at page 15, lines 11-15: Do the calculated operating risks fall below the 10% adder threshold or above the 10% adder threshold?

Question No. 25

Please refer to the Direct Testimony of Daniel Cregg at page 15 to page 16 line 5:

- a. Do you believe that Levitan considers operational risk to be zero because there is both upside and downside risk?
- b. Is the ZEC Act assessment of risk as portrayed by PSEG consistent with economic and statistical ideas of risk where there is a distribution of outcomes, some of which are below the expected value and some above the expected value? If the answer is yes, explain why.

Question No. 26

Please refer to the Direct Testimony of Daniel Cregg at page 16 of 30, lines 6-14: If the Salem and Hope Creek units have sunk costs that can still be recovered from expected revenues, in part or in whole, from continuing to operate, is it economically and financially rational to remain in commercial operation? Would investors agree that it is better to make, a 5% return to continue operating or 0% by shutting down? Explain why or why not.

Question No. 27

Please refer to the Direct Testimony of Daniel Cregg at page 16 of 30, lines 17-21: Would you agree that prevention of forced outages are within the control of the plant operator through good maintenance and operating practices and that it is appropriate for this to be managed and mitigated by the plant owner? Explain why or why not.

Question No. 28

Please refer to the Direct Testimony of Daniel Cregg at page 17 of 30, lines 7-12: This implies that nuclear is low cost, and if it tripped offline would result in higher prices and costs. Then why do these nuclear units need subsidies if they are so low cost? Why don't the higher cost units replacing a nuclear unit that trips off-line also need subsidies for all the same reasons?

Question No. 29

Please refer to the Direct Testimony of Daniel Cregg at page 17 of 30, line 13 to page 18 of 30, line 21:

- a. At what prices were the PSEG nuclear units hedged in the energy market as reported in SEC filings in the past 4 years?
- b. You state PSEG uses Western Hub for hedging in the forward energy market, yet earlier in your testimony you state that PSEG uses PECO for forecasting energy prices. Why this difference? Explain why you do not use Western Hub to forecast prices since that is used for hedging.
- c. You state that FTRs are used to hedge basis differential in terms of congestion. What is the congestion difference between PJM Western Hub and the generator busses for the Salem and Hope Creek nuclear units in the last 3 years? What is the comparable marginal loss differential in the last 3 years?

Question No. 30

Please refer to the Direct Testimony of Daniel Cregg at page 19 of 30, lines 1-21:

- a. How much is capacity performance risk in \$/MWh terms in expectation? Please identify the number of capacity performance hours in the last three years for the Salem and Hope Creek Units? Do you agree that this risk is best managed through good maintenance practices? If not, why not? Please explain the upside risk of bonus payments for over-performing during a capacity performance event.
- b. Would the Salem and Hope Creek units face MOPR clearing risk if it was not subsidized? Have the Salem and Hope Creek units ever offered into a Base Residual Auction and not cleared because the offers reflected the “cost of risk”?
- c. Please provide the default multi-unit nuclear plant nuclear unit floor prices as posted by PJM and the PJM Independent Market Monitor as examples. Are these prices below the historic clearing prices for EMAAC? Is PSEG saying its net avoidable costs (before RPM revenues) are above these levels?

Question No. 31

Please refer to the Direct Testimony of Daniel Cregg at page 20 of 30, lines 1-10:

- a. Please verify that nuclear units are not as flexible as other types of resources as stated in the testimony.

- b. Please verify that other merchant generators of different technologies face operational and market risks as well as acknowledged in testimony.
- c. Please verify that all merchant generators have the ability to hedge as PSEG has stated it does for Salem and Hope Creek.
- d. Would you agree the argument for a subsidy is that nuclear not being as flexible as other resources, which does not help system balancing and reliability, is the reason for the subsidy? Explain why or why not
- e. Would you agree that the subsidy targets a generation technology that provides fewer reliability services is a reason to subsidize it? Explain why or why not.
- f. Would you agree that the subsidy picks a technology winner over other more valuable technologies from a reliability perspective to better manage other renewables New Jersey wants such as wind and solar? Explain why or why not.

Question No. 32

Please refer to the Direct Testimony of Daniel Cregg at page 20 of 30, lines 11-19:

- a. Can you verify the statement has been presented to investors as plainly or unequivocally as it is in the testimony in a PSEG SEC 10-K, 10-Q, or 8-K filing? Please provide the exact quote and where in the filing it can be found. If no such statement exists in an SEC filing, please explain why there are inconsistencies between SEC filings and the statement in the testimony.
- b. Would PSEG shut down the Salem and Hope Creek units if the ZEC was only \$9.99/MWh? Would it shut down the units at \$9/MWh? Would it shut down the units at \$5/MWh?

Question No. 33

Please refer to the Direct Testimony of Daniel Cregg at page 20 of 30, line 21 through page 21 of 30, line 4: Is this only for forward looking statements? Do these risks appear in financial statements regarding profits and losses in SEC filings? What is the shape of the distribution of risks? Normal distribution or other type? Please specify the distribution of outcomes and any skewness to the distribution of outcomes. Does PSEG truncate the distribution to only examine the expected value and outcomes that differ from expected value to look at only financial downside? If there is no truncation, why not account for the outcomes that would benefit financial performance?

Question No. 34

Please refer to the Direct Testimony of Daniel Cregg at page 21 of 30, lines 10-17: What is the historic equivalent forced outage rate under demand (EFORd) of the Salem and Hope Creek Units? How does it compare to PJM nuclear fleet as a whole in PJM as reported by the PJM Independent Market Monitor which is close to 1% in recent years?

Question No. 35

Please refer to the Direct Testimony of Daniel Cregg at page 21 of 30, line 18 to page 22 of 30, line 9 including graphic on page 22 of 30:

- a. Given the previous statement about using PJM Western Hub to hedge energy prices, why not use hub to generator bus rather than going Hub to PECO zone, and then PECO zone to generator bus? Explain the rationale for these two steps.
- b. Is the measure of volatility just the statistical variance in prices, or if done jointly, co-variance?
- c. How is the variance or covariance measured? Across the year? Is it different for peak and off-peak periods? Does the variance capture observation that are greater than the average (expected value) of prices?

Question No. 36

Please refer to the Direct Testimony of Daniel Cregg at page 22 of 30, lines 10-14: If the variance is based on prices above or below the expected value, does that not mean there is also a \$9.05/MWh upside risk as well that could lead to higher revenues? If not, explain why not? Were the variances truncated as well to only look at the observations below the average?

Question No. 37

Please refer to the Direct Testimony of Daniel Cregg at page 23 of 30, lines 1-7 including chart:

- a. Does this chart indicate that prices could be higher than the forward expectation?
- b. Please indicate in the chart if spot and forward prices are averaged over the three-year period indicated, if not how were the three prices computed?
- c. Please provide information on the three-year periods looking at forward 12 months, 6 months, and 3 months prior to the start of the period.
- d. Please explain the downward bias in realized prices versus forward prices from 2008-2010 period forward? Is this an effect on modeling in the wake of the great recession that may be over-forecasting energy demand? Explain why or why not.

Question No. 38

Please refer to the Direct Testimony of Daniel Cregg at page 24 of 30, line 7-17: Given the expected forward price at \$24.70/MWh, would the Salem and Hope Creek units clear under MOPR? Would they clear at an energy price of \$22/MWh? Would they clear at an energy price of \$20/MWh? Would they clear at an energy price of at \$18/MWh? Would they clear at an energy price of at \$16/MWh?

Question No. 39

Please refer to the Direct Testimony of Daniel Cregg at page 25 of 30, lines 5-11: Does this market risk account for upside risk as well? If not, why not?

Question No. 40

Please refer to the Direct Testimony of Daniel Cregg at page 26 of 30, lines 1-8:

- a. Does this mean PSEG expects to report a loss in its financial statements filed with the SEC and to investors in the ZEC 2 period? Has PSEG indicated this in any SEC filing that it expects these nuclear assets to lose money as indicated by the testimony?
- b. By keeping the plants open does this indicate an expectation of receiving upside risk such as higher energy prices due to the Regional Greenhouse Gas Initiative (RGGI)?

Question No. 41

Please refer to the Direct Testimony of Daniel Cregg at page 27 of 30, lines 1-6: Can you verify this statement has been presented to investors as plainly or unequivocally as it is in the testimony in a PSEG SEC 10-K, 10-Q, or 8-K filing? Please provide the exact quote and where in the filing it can be found. If no such statement exists in an SEC filing, please explain why there are inconsistencies between SEC filings and the statement in the testimony.

Question No. 42

Please refer to the Direct Testimony of Daniel Cregg at page 27 of 30, lines 15-20: What is the credit rating of PSEG compared to merchant generators cited in the Brattle Report? What is the asset beta of PSEG relative to the merchant generation cited in the Brattle Report? Given these differences, if PSEG's values were inserted into the Capital Asset Pricing Model, please provide what that return on equity would be.

Question No. 43

Please refer to the Direct Testimony of Daniel Cregg at page 28, lines 13-21: Would these risk costs be reported as incurred costs in a financial statement filed with the SEC and be considered incurred costs under GAAP?