PSEG Nuclear, LLC
ZEC 2 – Salem II
Docket No: ER20080558

Response to Discovery Request: SII-IUD-0006
Date: 10/1/2020

Question:
Provide results from internal or commissioned dispatch modeling of the impact of the Unit's retirement scenarios.
• Include all assessments of avoided emissions, based on differential (with and without each Unit claimed for ZECs) scenario modeling
• Include all work papers and modeling inputs and outputs
• If no such modeling has been conducted, include an explanation and computation of avoided emissions from retention of the Unit.

Attachments Provided Herewith: YES

Response:
Please find attached results from the commissioned dispatch modeling of the impact of the Unit's retirement scenarios performed by PA Consulting ("PA"). To evaluate these questions, PA conducted a forward-looking analysis over the three-year period between June 2022 and May 2025 that assessed the emissions and fuel diversity impacts of retiring one or more of these nuclear generating resources. Specifically, PA modeled the electric system within the Eastern Interconnect under two retirement scenarios (a) "Full Retirement Case" that assumes Hope Creek, Salem 1, and Salem 2 do not operate during the Study Period, and (b) a "Hope Creek Retirement Case" that assumes Hope Creek does not operate during the Study Period. The retirement of the Hope Creek unit is selected as a proxy unit to reflect changes in generation, fuel burn increase, and emissions increase, if one of the three units was to retire. PA compared the results of the Full Retirement Case and Hope Creek Retirement Case against the Base Case to assess the impacts of the nuclear units' retirements.

This independent Report by PA Consulting demonstrates that power sector emissions would materially increase in the near future if the Hope Creek, Salem 1, and/or Salem 2 nuclear generators were to retire, which could have serious human and environmental health impacts.

Emissions

If one of three nuclear generators were to retire, CO2 emissions from New Jersey generators alone would increase by nearly 2.8 million tons from June 2022 through May 2025. For context, this CO2 emission impact is roughly equivalent to having over 180,000 additional passenger vehicles per year driving in New Jersey over the same timeframe. If Hope Creek, Salem 1, and Salem 2 were all to retire, CO2 emissions from New Jersey generators would increase by over

8.9 million tons over the same timeframe, roughly equivalent to having over 570,000 additional passenger vehicles per year driving in New Jersey.

If one out of three generators were to retire, emissions of NOx and SO2 in New Jersey would each increase by about 570 tons and 60 tons respectively from June 2022 through May 2025. If all three nuclear generators were to retire, emissions of NOx and SO2 in New Jersey would each increase by about 2,100 tons and 200 tons respectively over the same timeframe. Similarly, if Hope Creek were to retire, PM10 and PM2.5 emissions in New Jersey would increase by approximately 170 tons and 160 tons, respectively. If all three nuclear generators were to retire, emissions of Hg would increase by over 0.2 lbs while PM10 and PM2.5 emissions would by approximately 550 tons and 525 tons, respectively.

However, power sector emissions would also increase outside of New Jersey, if these nuclear generators were to retire. Because CO2 is a global pollutant, CO2 emission changes over these broader geographic footprints that stem from the retirement of Hope Creek, Salem 1, and/or Salem 2 would directly impact New Jersey. If Hope Creek were to retire, CO2 emissions from generators across the MAAC footprint would increase by nearly 8.4 million tons from June 2022 through May 2025, roughly equivalent to adding over 540,000 passenger vehicles per year over the same timeframe. If Hope Creek, Salem 1, and Salem 2 were to retire, CO2 emissions from generators across the MAAC footprint would increase by nearly 26 million tons from June 2022 through May 2025, roughly equivalent to adding nearly 1,690,000 passenger vehicles per year over the same timeframe.

If one out of three generators were to retire, emissions of NOx and SO2 in the MAAC Region would each increase by about 2,500 tons and 1,170 tons respectively from June 2022 through May 2025. If all three nuclear generators were to retire, emissions of NOx and SO2 in the MAAC Region would each increase by about 9,000 tons and 4,850 tons respectively over the same timeframe. Similarly, if Hope Creek were to retire, Hg emissions in the MAAC Region would increase by over 1.4 lbs while PM10 and PM2.5 emissions would increase by approximately 550 tons and 520 tons, respectively. If all three nuclear generators were to retire, emissions of Hg would increase by over 8.3 lbs while PM10 and PM2.5 emissions would by approximately 1,800 tons and 1,650 tons, respectively.

Fuel Diversity

Within New Jersey, the retirement of Hope Creek increases natural gas generation by almost 10%. This lost nuclear generation is replaced almost entirely by electricity imports (primarily natural gas- and coal-fired) from elsewhere in PJM and neighboring electricity regions, as well as increased natural gas-fired generation within New Jersey. Natural gas-fired generation comprises over 60% of aggregate Study Period generation in New Jersey under the Hope Creek Retirement Case. Within New Jersey, the retirement of Hope Creek, Salem 1, and Salem 2 eliminates nuclear generation from the State. This lost nuclear generation is replaced almost entirely by electricity imports (primarily natural gas- and coal-fired) from elsewhere in PJM and neighboring electricity regions, as well as increased natural gas-fired generation within New Jersey. Natural gas-fired generation comprises about 87% of aggregate Study Period generation

in New Jersey under the Full Retirement Case, an increase of over 35 percentage points from the Base Case.

Increased coal- and natural gas-fired generation within MAAC replace roughly 67% of the approximately 27.6 TWh of nuclear generation lost due to the Hope Creek retirement across the Study Period, with the remainder coming from outside of MAAC. Coal- and natural gas-fired generation are 3.1% higher in the MAAC region across the Study Period, and 1.8% higher on the Peak Winter Day. The combined coal and natural gas share of the MAAC-wide generation mix climbs from 63.2% to 65.8% across the Study Period. Increased coal- and natural gas-fired generation in MAAC replace more than 67% of the 80.6 TWh of nuclear generation lost due to full retirement across the Study Period, with the remaining 33% coming from outside of MAAC. Coal- and natural gas-fired generation are collectively 9.1% higher in the MAAC region across the Study Period, and 7% higher on the Peak Winter Day. The combined coal and natural gas share of MAAC-wide generation climbs from 63.2% to 70.9% of total generation across the Study Period.