In response to question SI-ZECJ-FIN-22, please find the requested confidential annual cash flows for the period June 1, 2019 through May 31, 2020. See below table of contents.

A. Definition for line items, including background from the ZEC 1 application
B. Comparison analysis of projected results from the ZEC1 application to actual results for the energy year ended May 31, 2020.

A. Line items (including with background from ZEC 1 application):

- Energy Revenue: Generator energy revenue is a product of the PJM locational marginal prices (LMP) and the unit generation.
- Capacity Revenue: Generator capacity revenue is a product of the cleared capacity quantity and the PJM capacity auction price.
- Ancillary Revenue: Generator revenues for providing reactive power voltage support.
- Labor: Represents all labor costs, including overtime and fringe benefits associated with plant operations and outages.
- Materials: Includes materials and tools.
- Outside services: Includes, among other things, contractors and maintenance support.
- Real Estate Tax.
- Support Services and Fully Allocated Overhead: Includes administrative and general expenses including, among other things, costs associated with insurance, costs incurred outside of the site that directly support site activities, and corporate overhead costs.
- Spent fuel: Upon enactment of the Nuclear Waste Policy Act of 1982 (NWPA), the Department of Energy ("DOE") began collecting a charge from nuclear generators for the costs of fulfilling its legal obligation to dispose of the nuclear fuel used to generate power. Most recently, this fee was assessed on a $/MWh basis at a rate of $0.955/MWh. However, when development of Yucca Mountain was discontinued, this fee was suspended by court order in May 2014, at which point PSEG ceased accruing for that expense in its financial statements. Until a disposal solution is identified and a new fee structure is placed in effect, PSEG will not accrue for that expense. But we recognize that the NWPA is still in effect and DOE still has a legal obligation to dispose of nuclear fuel and will need to pay for the costs of whatever that ultimate solution is through a fee on nuclear generators. Accordingly, to approximate this cost, PSEG has included the fee on generation at its suspended rate of $0.955/MWh in its financials supporting this application. We also note that this cost was recognized and included in the NY ZEC process as a reasonable risk factor that nuclear generation owners need to ensure they can cover in order to remain in operation economically.
- Cost of working capital: Nuclear plants require a net investment in working capital. The most significant components of working capital include materials and supplies inventory to ensure reliable operation, long positions in nuclear fuel, and revenue receivables

primarily from the sale of electricity and capacity, offset by accrued expenses and payables necessary to operate the units. In addition, there is a cost related to collateral / margin payments to counterparties for hedging. To determine the cost of working capital, a value of net working capital was determined in the first ZEC application based on the most recent quarterly financial statements available at the time (9/30/18) and that amount was multiplied by PSEG Power's average interest rate (4.74%) to arrive at the forecasted cost of net working capital by unit. That cost was then divided by the forecasted generation for 2019 to determine a $/MWh rate to be used in future periods. This rate was then escalated at 2.5% to determine the cost of working capital for future years. See below for the $/MWh calculation used to derive the cost of working capital.

[redacted]

- Other: Includes regulatory fees, membership fees, facilities and rental costs, office expenses, business travel, etc.
- Fuel capital expenditures: Represents the fuel capital expenditures associated with refueling outages.
- Non-fuel capital expenditures: Spending on long-lived plant equipment required to maintain safe and reliable operations.
- Cost of Operational Risks: 'Operational risks' are defined in the ZEC Act as "the risk that operating costs will be higher than anticipated because of new regulatory mandates or equipment failures and the risk that per megawatt-hour costs will be higher than anticipated because of a lower than expected capacity factor."[1] In the first ZEC application, PSEG submitted its best estimate of the future unit costs as part of its application. However, actual realized operating costs could have turned out higher than projected costs for a variety of reasons despite best practices employed by the operator. In order to reflect the uncertainty at that time in its cost forecast, PSEG included a cost of

[1] L. 2018, c. 16, codified at N.J.S.A. 48:3-87.3 to 87.7.

operational risk in its financial evaluation equal to 10% of total costs, which is consistent with operating cost estimation rules adopted in the FERC-approved PJM tariff.

Operational risk is particularly pronounced for nuclear plants, which are subject to stringent safety and security focused regulatory oversight by the U.S. Nuclear Regulatory Commission (NRC), and can face significant unforeseen regulatory requirements at any time. The NRC is a federal agency established to regulate nuclear activities to ensure protection of public health and safety, security, and protection of the environment. The unit may be required to increase capital expenditures and/or operating costs at the nuclear facilities when there is a change in the Atomic Energy Act, applicable regulations, or the environmental rules and regulations applicable to nuclear facilities. Additionally, if a major component unexpectedly fails, the facility will bear the unanticipated and significant cost of replacing the component. Unexpected equipment failure and nuclear regulatory changes have increased nuclear costs at New Jersey nuclear plants by hundreds of millions of dollars in the last decade.

The upgrades required for all U.S. nuclear plants in response to the nuclear event at the Fukushima Dai-Ichi plant in Japan in 2011 are a recent example of such operational risk. The NRC issued the following orders: 1) Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events; 2) Order to Modify Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation under Sever Accident Conditions; 3) Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation. Additionally, a request for information under 10 CFR § 50.54(f) was issued which required performance of activities for seismic and flooding reevaluations and walk downs, and revaluation of emergency communications systems and staffing levels. These upgrades required expenditures of approximately $105 million at Salem and Hope Creek.

Since September 11, 2001, NRC has issued many security-related Orders to Nuclear Plants. These orders included measures to protect against an insider terrorist attack; waterborne, airborne, and land-based assaults, as well as threats from a vehicle bomb. The specific security measures generally include increased patrols, augmented security forces and capabilities, additional security posts, installation of additional physical barriers, vehicle checks at greater stand-off distances, enhanced coordination with law enforcement and military authorities, and more restrictive site access controls. The post 9/11 security requirements cost approximately $140 million for Salem and Hope Creek.

NRC research on High Energy Arc Faults is presently underway. Addressing this type of fault has the potential to result in significant impact on operating costs. The NRC has added this concern to their "Generic Safety Issue (GSI)" process. Prior GSI issues included #191 which entailed containment sump viability and resulted in expenditures of approximately $26 million for the Salem Units. Similarly, the on-going U.S. Department of Commerce section 232 uranium investigation is an example of a prospective operating risk that could result in actual operating costs in excess of those projected.

An example of a costly equipment failure is the unexpected steam generator replacement in 2008 which required expenditures of approximately ~$266 million at Salem Unit 1. In addition, the cumulative impact of even relatively modest capital projects required to address unforeseeable equipment failure issues can be quite significant.

Unexpected outages for repairs not only increase the total unit costs, but can also dramatically increase the per MWh cost. Nuclear facility costs are largely fixed—that is, they remain largely the same even if plant output declines. As a result, reduced output alone can translate to a significant increase in the cost per MWh of output. Moreover, while nuclear facilities generally are highly reliable, when an unplanned nuclear outage does occur, it can be prolonged.

The cost increase on a per MWh basis related to a reduced capacity factor is proportional to the reduction in output. Specifically, actual costs equal projected costs multiplied by 1 / (1 – reduction in capacity factor). For example, if a unit's projected costs are $500 million and projected output is 10 million MWh, this translates to a cost of $50/MWh ($500 million / 10 million MWh). If instead, that facility's output is reduced by 10 percent to 9 million MWh, then costs become $55.55/MWh ($500 million / 9 million). Given a 10 percent reduction in output, actual costs per MWh turn out to be 11.1 percent higher than projected.

To account for the cost of these risks, PSEG uses a cost of operational risks of 10 percent of projected operating costs. Using a 10-percent adder to account for the risk of higher-than-expected costs is consistent with the approach taken by PJM Interconnection L.L.C. ("PJM"), as approved by FERC, to determine a facility's avoidable costs, for both energy and capacity bids. In the PJM Open Access Transmission Tariff (OATT) section relative to Avoidable Cost Rate for capacity bids, PJM specifies an operating cost gross-up adjustment factor of 10% "to provide a margin of error for understatement of costs."[2] In the PJM OATT section relative to energy offer price caps, PJM allows a 10 percent adder.[3] FERC has not only approved these adjustment factors but also specifically commented, "[T]he 10 percent adder is allowed for determining these ex ante bids in order to account for uncertainty in the values of the costs utilized in computing those cost-based offers before all costs are known."[4] Additionally, in the New York ZEC program, the estimated operational risks provided by the nuclear plant owner was also 10 percent of total costs. The pricing structure developed by the New York Public Service Commission accounted for this risk. [5]

Cost of Market Risks: The following provides an overview of the methodology utilized by PSEG to assess the cost of market risks avoided by ceasing operations. Market risks are risks associated with the uncertainty of revenues, as opposed to operational risks which are associated with the uncertainty of costs. The legislation specifies that "'market risks' shall include, but need not be limited to, the risk of a forced outage and the associated costs

[2] PJM Open Access Transmission Tariff, Attachment DD, Section 6.8(a).
[3] PJM Open Access Transmission Tariff, Attachment K, Appendix, Section 6.4.
[4] *PJM Interconnection, L.L.C.*, 153 FERC ¶ 61,289, P 30 (Dec. 11, 2015)
[5] *See* CENG Comments in response to the Notice Soliciting Comments and Providing for Technical Conference and Public Statement Hearings issued by the State of New York Public Service Commission on January 25, 2016 in Case 15-E-0302.

arising from contractual obligations, and the risk that output from the nuclear power plant may not be able to be sold at projected levels," which highlights that market risks can be broken down into two fundamental categories: forced outage risk and price volatility risk.

The first category of market risks, forced outage risk, reflects the risk that actual generation will fall short of forecasted generation, resulting in lower than expected revenues and/or a mismatch between previously contracted sales and actual generation so that the generation owner will have to "cover" its contracted sales during outages by purchasing energy in the spot market at prices potentially much higher than the contracted price, or hedged price.

The second category of market risks, price volatility risk, reflects the risk that the forecasted generation output from the nuclear power plant may not be able to be sold at projected prices - or forward prices. This risk arises from the fact that nuclear generators cannot sell large volumes at forward prices at the unit location, and the spot price at delivery at the unit location has the potential to vary dramatically from prior forward prices at the market trading hub.

At the time of the first ZEC application PSEG estimated the total overall cost of market risks, including both forced outage risk and price volatility risk, while also taking into account the risk mitigated by PSEG Power's hedging practice, to be [redacted]. For more detailed description of market risk please reference response to ZEC1 application SI-IUD-0001.

[redacted]

[redacted]

[redacted]

- **<u>ZEC Revenues</u>**
  - Generation (MWh) during the energy year ending 5/31/2020, multiplied by $10/MWh, plus interest. Revenues for the period were received on August 28, 2020.