EXHIBIT JC-4

BEFORE THE

NEW JERSEY BOARD OF PUBLIC UTILITIES

IN THE MATTER OF THE PETITION OF JERSEY CENTRAL POWER & LIGHT COMPANY PURSUANT TO N.J.S.A. 40:55D-19 FOR A DETERMINATION THAT THE OCEANVIEW 230 KV TRANSMISSION PROJECT IS REASONABLY NECESSARY FOR THE SERVICE, CONVENIENCE OR WELFARE OF THE PUBLIC

Direct Testimony

of

Jeffrey A. Goldberg

Re: Electrical Need

I. INTRODUCTION AND BACKGROUND

Q. Please state your name and business address.

A. My name is Jeffrey A. Goldberg. My business address is 2800 Pottsville Pike, Reading PA, 19612.

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

A. I am employed by FirstEnergy Service Company ("FirstEnergy"), as an Advanced Engineer in the Energy Delivery Planning and Protection ("EDPP") Department assigned to perform certain tasks for the Jersey Central Power and Light Company, ("JCP&L" or the "Company"). My responsibilities include analyzing JCP&L's transmission system to assure the future reliability of the JCP&L system and related systems to which it is interconnected. My job responsibilities also include performing transmission reliability studies to determine compliance with reliability criteria established by the North American Electric Reliability Corporation ("NERC") as well as with reliability and operational performance criteria established by PJM Interconnection, L.L.C. ("PJM") and JCP&L. As part of these responsibilities, in conjunction with PJM, I coordinate with neighboring transmission owners in analyzing the transmission system from a regional perspective. More recently, my duties and responsibilities have been expanded to include analysis and planning for JCP&L's "Energizing the Future" projects, such as the Oceanview 230 kV Transmission Project (the "Project").

Q. Please describe your professional experience and educational background.

A. In May 2003, I began working for FirstEnergy as a JCP&L Regional Engineer, responsible for planning and reliability of the JCP&L distribution system. In

2007, I was promoted to the position of Senior Asset Management Engineer in the Energy Delivery Asset Management ("EDAM") Department. My Asset Management Engineer responsibilities included implementing new programs for field inspection of distribution assets throughout the FirstEnergy service territory. In 2009, I was promoted to my current position -- Advanced Transmission Planning Engineer of the EDPP Department.

I received a Bachelors of Science Degree in Engineering Chemistry from the State University of New York ("SUNY") at Stony Brook (1983), and I received a Bachelors of Science Degree in Electrical Engineering from The College of New Jersey (1994). I am a registered Professional Engineer in the State of New Jersey.

My education, experience and qualifications are fully-set forth in Appendix A to my testimony.

Q. Have you previously testified in a Board of Public Utilities ("Board" or "BPU") proceeding?

A. No.

Q. Have you testified before any government body relating to transmission projects?

A. Yes. In 2010, I testified before the Newton, New Jersey Planning Board relating to a project to install a 230 kV breaker at JCP&L's Newton substation. In 2013, I testified before the Eatontown, New Jersey Planning Board relating to PJM's Regional Transmission Expansion Plan ("RTEP") project b1853, a project to

expand JCP&L's Eaton Crest substation with a 230-34.5 kV transformer and associated equipment.

Q. Would you describe the purpose of your testimony?

A. The purpose of my testimony is to describe the electrical need for the Project. On behalf of JCP&L, I will:

- Provide an overview of JCP&L's service territory and its electric distribution/transmission system;
- Describe the Project;
- Describe JCP&L's involvement in the PJM regional transmission planning process that resulted in a determination that a new, approximately 16-mile long Larrabee – Oceanview 230 kV line, Larrabee substation reconfiguration, and Oceanview substation reconfiguration are needed to assure the electric reliability of JCP&L's transmission facilities and the PJM transmission system;
- Describe alternatives considered; and
- Explain JCP&L's perspective on the electrical need for the Oceanview 230 kV Transmission Project.

Although I will describe the general route of the Larrabee – Oceanview 230 kV line, the details of the specific route proposed by JCP&L are described and supported by JCP&L witness Mr. Timothy B. Gaul in his direct testimony.

Q. Please identify and describe the exhibits to your testimony and summarize the contents of those exhibits.

A. I am sponsoring six exhibits with my direct testimony:

- Exhibit JAG-1 presents the Oceanview Area 230 kV System Diagram, as both the existing configuration and the proposed Project configuration;
- Exhibit JAG-2 presents the Larrabee Area 230 kV System Diagram, as both the existing configuration and the proposed Project configuration;
- Exhibit JAG-3 is a slide from the PJM presentation from the Transmission Expansion Advisory Committee ("TEAC") meeting held June 14, 2012, showing the Project as a Baseline RTEP project;
- Exhibit JAG-4 is a JCP&L response to the November 26, 2012, PJM Notification of Designation of Construction Responsibility for RTEP Projects Approved; and
- Exhibit JAG-5 is a table from PJM's 2012 RTEP Report indicating the Project in service date of June 2017.
- Exhibit JAG-6 shows the approximate geographic area and number of customers at risk if the Project is not constructed. The information presented is based on the results of JCP&L's dynamics analysis.

II. BACKGROUND

Q. Can you provide an overview of JCP&L's service territory and its electric distribution/transmission system?

A. The Company's service territory encompasses approximately 3,300 square miles in two distinct regions: the Central Region in central coastal New Jersey, and the Northern Region, in the heavily-forested northwestern portion of the State. These two regions are served by 14 operating districts. In total, JCP&L provides electric distribution service to approximately 1.1 million residential, commercial and

industrial customers, representing approximately 25% of the metered electric customers in New Jersey. The service territory includes all or parts of 13 counties and 236 municipalities, equaling approximately 45% of the municipalities in the State of New Jersey.

The Company operates and maintains over 35,000 conductor miles of primary distribution circuits, over 1,802 circuit miles (5,406 conductor miles) of sub-transmission circuits, in excess of 330,000 JCP&L-owned poles and approximately 244,000 transformers. JCP&L operates 324 substations, 235 sub-transmission circuits and 1,173 primary distribution circuits.

JCP&L's transmission system provides a mechanism for delivery of bulk electric power to the distribution circuits and sub-transmission circuits within the Company's service territory. The Bulk Electric System ("BES") transmission in the area is designed with three nominal voltages; 500 kV, 230 kV, and 115 kV. There are approximately 60 substations connecting to the BES, with approximately 18 pole-miles of 500 KV circuits, 446 pole-miles of 230 kV circuits, and 138 pole-miles of 115 kV circuits.

III. DESCRIPTION OF PROJECT

Q. Please describe the Project.

A. The Project involves the construction of a new 230 kV transmission line between JCP&L's Larrabee substation and its Oceanview substation, along with the associated upgrades to these substations. The new 230 kV line will be approximately 16.1 miles long and will be constructed along existing JCP&L

right-of-way ("ROW"). JCP&L witnesses John M. Toth and Dave Kozy, Jr. describe the Project in more detail in their direct testimony.

Q. What is the significance of the Project from an electrical perspective?

A. This PJM baseline RTEP project (b2015) is a proposed criteria driven electric reliability transmission enhancement to the JCP&L transmission system consisting of a new 230 kV transmission line, and expansion and reconfiguration of two substations at the terminal ends of the new 230 kV line, all to be constructed by JCP&L. The 230 kV transmission line is required to connect certain electrical points, i.e., transmission substations. Specifically, the line will establish a direct 230 kV path from the highly-networked Larrabee substation in Howell Township, Monmouth County, New Jersey, to the presently dual radially-fed Oceanview substation in Neptune Township, Monmouth County, New Jersey. The proposed Larrabee – Oceanview 230 kV line provides a new 230 kV source into Oceanview substation to supplement the two 230 kV sources that exist today, and will create a networked 230 kV bus at the Oceanview substation.

The Oceanview 230 kV substation reconfiguration is part of the Project. In order to accommodate the new Larrabee – Oceanview 230 kV line, the Oceanview 230 kV substation will be converted to a six breaker ring bus with five breakers initially. The five Oceanview 230 kV ring bus positions will be occupied by two existing Atlantic – Oceanview 230 kV lines, two existing Oceanview 230-34.5 kV transformers, and the one new Larrabee – Oceanview 230 kV line. The Oceanview Area 230 kV System Diagram is shown for illustrative purposes on Exhibit JAG-1.

The Larrabee 230 kV substation reconfiguration is also part of the Project. In order to accommodate the new Larrabee – Oceanview 230 kV line, the Larrabee 230 kV substation will be converted/expanded from a ring bus configuration to a breaker-and-a-half configuration. The Larrabee Area 230 kV System Diagram is shown for illustrative purposes on Exhibit JAG-2.

IV. PLANNING PROCESS AND ELECTRICAL NEED FOR THE PROJECT

Q. Is JCP&L required to plan the transmission system to meet mandatory reliability standards?

A. Yes, pursuant to Section 215 of the Federal Power Act, FERC has certified NERC as the electric reliability organization to develop and enforce mandatory reliability standards, subject to FERC review and approval. The FERC-approved NERC reliability standards are mandatory. Failure to comply with the standards can result in serious penalties.

PJM, a FERC-approved Regional Transmission Organization ("RTO"), is responsible for ensuring the reliability of the electric transmission system under its functional control and coordinating the movement of wholesale electricity in all or parts of 13 states, including New Jersey. PJM is responsible for assuring compliance with NERC planning and operating standards for the bulk electric system (i.e., above 100 kV) within its control area. NERC reliability standards require that the bulk electric system be designed to operate under approved thermal and voltage criteria during anticipated peak loading conditions and in consideration of credible outages of elements on the bulk electric system.

Q. Please describe the relationship of JCP&L's transmission facilities to the PJM transmission system.

A. JCP&L is a PJM Transmission Owner ("TO") serving 1.1 million customers, and a member of the PJM RTO. As a PJM TO, all JCP&L transmission BES facilities are planned and operated by PJM. Furthermore, each TO agrees to remediate all identified BES reliability criteria violations in accordance with the NERC reliability standards, PJM planning criteria, and its own planning criteria.

Q: Could you please describe PJM's role in overseeing transmission system planning within the PJM footprint?

A: Yes. PJM is the regional transmission Planning Authority and Transmission Planner for the JCP&L Transmission Zone, which encompasses the geographic area served by JCP&L. In this capacity, PJM applies an analytical approach to identify the need and timing for transmission system upgrades to preserve the reliability of the electricity grid. The PJM Regional Transmission Expansion Planning ("RTEP") process is a comprehensive series of detailed analyses to ensure reliability under the applicable NERC, PJM and TO (i.e., JCP&L) reliability criteria.

Through the RTEP process, PJM performs multiple analyses including a five-year baseline analysis to assess (current year plus five years) compliance with PJM and TO reliability criteria and identifies transmission upgrades needed to meet near-term demand growth for customers' electricity needs. The RTEP process uses the PJM load forecasts which take into consideration demand response and energy efficiency levels, existing generation, and new resources

stemming from interconnection requests for new generating plants and merchant transmission facilities.

Q. Can you describe the planning criteria used in assessments performed by JCP&L?

A. Yes, the JCP&L transmission system must meet all applicable NERC, PJM, and TO transmission planning criteria ("planning criteria") that apply to transmission systems. Using NERC standards as a guide, the following criteria must be met during normal conditions and when NERC-defined outages occur on the bulk electric system. These outage conditions and associated criteria are defined in NERC standards as follows:

- NERC Category A, system performance under normal (No Contingency) conditions, provides that the planning authority and transmission planner (in this case, PJM) shall demonstrate, in collaboration with JCP&L through a valid assessment, that its portion of the interconnected transmission system is planned such that, with all transmission facilities in service and with normal operating procedures in effect, the transmission network can be operated to supply projected customer demands and projected firm transmission services at all demand levels. This is the normal day-to-day condition and configuration of the bulk electric system.
- NERC Category B contingencies are events resulting in the loss of any single generating unit, transmission line, transformer, circuit breaker, capacitor or single pole of a bi-polar DC line. These events shall not cause the thermal loading of any bulk electric system facility to exceed its

seasonal emergency rating. In addition, for NERC Category B contingencies, voltages must remain within a prescribed maximum deviation and within the emergency minimum or maximum voltage limits. Category B contingencies are also known as N-1 contingencies, where N is the total number of transmission components in the network under study. Planning criteria allow for a plus-or-minus 8 percent voltage deviation and 0.92 per unit as the minimum voltage and 1.05 per unit as the maximum voltage for facilities within the networked bulk electric system at a 230 kV nominal voltage.

- NERC Category C contingencies are events resulting in the loss of any double-circuit bulk electric system transmission line (i.e., common structure), bi-polar DC line, faulted circuit breaker, bus section, or the combination of a single generating unit, transmission line, transformer, circuit breaker or capacitor followed by the loss of another single generating unit, transmission line, transformer, circuit breaker or capacitor (i.e., N-1-1). For these contingencies, thermal loading shall not exceed the seasonal emergency rating of any networked facility; violate either the maximum deviation or the emergency minimum or maximum voltage criteria. Similar to the NERC Category B, planning criteria allow for plus-or-minus 8 percent voltage deviation and 0.92 per unit as the minimum voltage and 1.05 per unit as the maximum voltage for 230 kV facilities within the networked bulk electric system.

- In addition, the transmission planning criteria stipulates that for any NERC Category B or C event, the associated loss of load will be limited to less than 300 MW.

Q. As part of its RTEP process, did PJM identify a reliability criteria violation in regard to the Atlantic – Oceanview 230 kV lines?

Yes. Initially in 2010, JCP&L studied the 34.5 kV system in the Oceanview area, and identified that the loss of both Oceanview 230-34.5 kV transformers could potentially result in a wide area voltage collapse on the 34.5 kV system in the Oceanview area. Then, during the 2011 RTEP process, PJM identified a reliability criteria violation of a NERC Category C contingency for the N-1-1 outage of the Atlantic – Oceanview (X2024 and Y2025) 230 kV lines. JCP&L confirmed this contingency may result in more than 300 MW of load loss, which would violate the TO Planning Criteria. The JCP&L-proposed Project was confirmed by PJM that it adequately addresses the reliability criteria violation.

Q. Has PJM included the Project in its RTEP?

A. Yes. PJM has assigned RTEP number b2015 to the Project as a baseline upgrade in the JCP&L zone as shown in Exhibit JAG-4. PJM presented the Project at the June 14, 2012 TEAC meeting. As indicated in the June 14, 2012 PJM presentation, PJM announced the NERC Category C contingency violates planning criteria and established a June 1, 2016 PJM need date.

Q. JCP&L has a target in-service date of June 1, 2017. Is the June 1, 2017 in-service date agreeable to PJM?

Yes. On February 22, 2013, JCP&L in response to a November 26, 2012, PJM Notification of Designation of Construction Responsibility for RTEP Projects Approved, submitted a projected June 1, 2017 in-service date, (see Exhibit JAG-3). As indicated in the Table 8.12 from the PJM 2012 RTEP Report, PJM has accepted June 1, 2017 as the target in-service date, (see Exhibit JAG-4).

Q. Did JCP&L identify planning criteria violations in the Oceanview area when performing planning assessments?

A. Yes, in 2011 both PJM and JCP&L identified a voltage drop violation at the Atlantic substation and potential local voltage collapse on the system near the Oceanview substation with a potential loss of load exceeding 300MW resulting from the NERC Category C contingencies.

Q. Please describe the assessment performed to identify the need for the Project?

A. During the PJM 2011 RTEP N-1-1 analysis for study year 2016, an 8.46 % voltage drop violation was seen at the Atlantic 230 kV bus. See the table below for details.

Bus Name	Base Voltage (pu)	Contingency Voltage (pu)	Vdrop(%)	Contingency Description	Violation
Atlantic 230 kV	1.0230	0.9384	8.46	1) Loss of Atlantic-Oceanview (X2024) 2) Loss of Atlantic-Oceanview (Y2025)	Drop
Atlantic 230 kV	1.0229	0.9383	8.46	1) Loss of Atlantic-Oceanview (Y2025) 2) Loss of Atlantic-Oceanview (X2024)	Drop

In collaboration with PJM, JCP&L confirmed the voltage drop violation at Atlantic substation. In addition, due to the loss of the 230 kV sources to the Oceanview substation, JCP&L determined that the potential local loss of load

could exceed 300 MW. After study and evaluation it was determined the best overall solution was to construct a new 230 kV line into the Oceanview substation.

Q. Besides the voltage drop criteria violation stated above, what is the impact to the JCP&L service territory for the studied N-1-1 contingency X2024 and Y2025 230 kV lines?

A. The loss of the X2024 and Y2025 230 kV lines creates a local area voltage collapse on the underlying 34.5 kV system centered at Oceanview substation, with loss of load exceeding 300 MW. Based on JCP&L's dynamics analysis, Exhibit JAG-6 illustrates the extent of the area impacted in accordance with the identified substations affected. There are approximately 103,025 customers served by the affected substations based on active connected customer meters in December 2013. The table below lists the affected substations and associated customer counts.

Item	Substation	Customers
1	Allenhurst	3,502
2	Allenwood	2,663
3	Asbury	5,526
4	Atlantic Highlands	1,379
5	Avon	1,857
6	Bath Ave	5,101
7	Belmar	5,427
8	Bennett	876
9	Bradley Beach	7,228
10	Branchport	3,402
11	Corlies Ave	369
12	Elberon	1,586
13	Fort Monmouth	1
14	Glendola	6,012
15	Green Grove	6,528
16	Hamilton	1,403
17	Highlands	1,592
18	Jersey Shore Medical	1
19	Jumping Brook	1
20	Locust Grove	770
21	Long Branch	4,245
22	Manasquan	4,231
23	Monmouth Beach	2,981
24	Neptune	2,914
25	Oceanview	826
26	Poplar	8,315
27	Rumson	2,450
28	Spring Lake Hgts	4,995
29	Stockton	1,210
30	Stone Church	4,110
31	Wall Church	1,826
32	West End	3,246
33	Whitesville	3,343
34	Woodbine	3,109
	Grand Total	**103,025**

Q. What load forecast was used in the 2011 assessment?

A, The load forecast used in the 2011 assessment was the PJM Load Forecast Report dated January 2011. For the study year 2016, the JCP&L 50/50 summer peak load level was forecast at 6,942 MW.

Q. How does this load level compare to subsequent load forecasts?

A. The PJM Load Forecast Report January 2012 lists the 2016 JCP&L 50/50 summer peak load level at 6,696 MW. The PJM Load Forecast Report January 2013 lists the 2016 JCP&L 50/50 summer peak load level at 6,637 MW.

Q. Do the reduced forecasted load levels in 2016 in PJM's 2012 and 2013 Load Forecast Reports indicate the Project is no longer necessary?

A. No. Even though the PJM load forecast has been reduced from the level used in the 2011 assessment, the violations identified in the 2011 assessment will still arise in 2016. JCP&L has performed an independent analysis that it modeled with a 6,588 MW load level and found that the NERC C contingency will cause a violation at this load level. The PJM 2013 Load Forecast Report indicates the JCP&L 50/50 summer peak load level in 2017 will be 6,704 MW.

Q. Did JCP&L consider alternatives to the Project? If so, can you describe the electrical alternatives?

A. Yes. Alternatives were considered to resolve the potential local voltage collapse resulting from the loss of the Atlantic – Oceanview (X2024 and Y2025) 230 kV lines. Alternatives were evaluated on their ability to address immediate and future needs in the Oceanview area. Alternatives considered included:

1. Add three new 34.5 kV lines from Larrabee to Oceanview; or
2. Add a new 230 kV line from Atlantic to Oceanview; or
3. Add a new 230 kV line from Red Bank to Oceanview.

Q. Why were these alternatives not selected?

A. The following is an explanation of why each of the alternatives was not selected:

<u>Alternative 1: Add three new 34.5 kV lines from Larrabee to Oceanview</u>

The Oceanview area load pocket would require at least three additional networked 34.5 kV lines to support the approximate 125 MVA of load normally served by the X2024 and Y2025 230 kV lines. However, the three 34.5 kV lines would not mitigate the low voltage issues, would create greater line loss due to the circuit length, and would increase fault duty at the Larrabee and Oceanview 34.5 kV buses beyond the equipment ratings. Finding feasible routes for the three 34.5 kV lines would also be more difficult than routing than the Project's single 230 kV line. Further study of a more viable 34.5 kV solution was dismissed as infeasible from both a construction and community impact perspective.

Alternative 2: Add a new 230 kV line from Atlantic to Oceanview

A third 230 kV line from Atlantic to Oceanview was considered as a possible solution. Although the third 230 kV line addresses the planning criteria violations of the loss of the Atlantic – Oceanview (X2024 and Y2025) 230 kV lines, this solution is not a desirable solution since all three 230 kV lines serving Oceanview would emanate from Atlantic substation. Introducing an additional source from Larrabee substation provides a stronger and more reliable network solution.

Alternative 3: Add a new 230 kV line from Red Bank to Oceanview

A Red Bank to Oceanview 230 kV line was considered as a possible solution. Although a Red Bank to Oceanview 230 kV line addresses the planning criteria violation of the loss of the Atlantic – Oceanview (X2024 and Y2025) 230 kV lines, this solution is not a desirable solution from a transmission line siting perspective.

Q. Based on the foregoing discussion, can you summarize the electrical need for the Project?

A. Yes. The Project is a PJM baseline RTEP project. The Project is needed to resolve planning criteria violations for electrical reliability purposes. Specifically, these facilities are needed to address identified criteria violations that can occur for the simultaneous loss of the existing two Atlantic – Oceanview 230 kV lines which are routed on common double-circuit towers, hence the loss of all 230 kV sources into Oceanview substation resulting in significant customer load loss.

Q. Based on your reviews and assessments, have you formed an opinion regarding the need for the Project?

A. Yes. The Project is needed to avoid the identified voltage drop violations at the Atlantic substation and potential local voltage collapse for the identified NERC C (N-1-1) contingency. Failure to construct the line by the proposed June 1, 2017 in-service date could result in extended interruption of electric service to a large block of customers due to the loss of the Atlantic – Oceanview (X2024 and Y2025) 230 kV transmission lines.

Q. Have there been previous events involving the loss of 230 kV supply to the Oceanview substation?

A. Yes, there have been two events that affected Oceanview and other substations in the area. On December 9, 2008 there was an event at Oceanview substation and on August 30, 2010 there was an event at Atlantic substation.

On December 9, 2008 the Oceanview 230-34.5 kV transformer Bank 1 failed which created a fault on the Atlantic – Oceanview Y2025 230 kV line

causing it to trip. In addition, the Atlantic 230 kV ring bus breaker "XY" failed to open, so the Atlantic – Oceanview X2024 230kV line also tripped. The resulting outage created an area voltage collapse affecting more than 173,000 customers with over 560 MW of load loss. If the Project had been in-service when this event occurred, there would not have been a voltage collapse and zero customers would have been affected.

On August 30, 2010, a Coupling Capacitor Voltage Transformer ("CCVT") failed catastrophically at the Atlantic substation. The failed CCVT damaged an adjacent wavetrap. A CCVT measures voltage on the 230 kV conductors and transforms it to a lower voltage for use with substation relay instrumentation. A wavetrap is a piece of substation equipment used for substation to substation communication over the 230 kV conductors. Failure of the CCVT on the H1022 line terminal caused a trip of the Freneau – Atlantic (H1022) 230 kV line and the Larrabee – Atlantic (R1032) 230 kV line. The Atlantic 230 kV ring bus was opened in two places, creating two independent 230 kV buses, eliminating all 230 kV sources at Atlantic substation, Red Bank substation, and Oceanview substation. The resulting outage created an area voltage collapse affecting approximately 181,000 customers. If this Project had been in service when this event occurred, there would not have been a voltage collapse and zero customers would have been affected.

Q. Would the construction of other PJM RTEP or generation projects proposed to be constructed either before or after the completion of the Project impact the need for the Project?

A. JCP&L's Atlantic Ring Bus Reconfiguration Project, RTEP b1689, completed in 2012, directly addressed the specific contingency mechanism of a single faulted line, either X2024 or Y2025, with a stuck XY 230 kV breaker at Atlantic substation. However, it does not address a potential double-circuit tower outage of the Atlantic – Oceanview (X2024 and Y2025) 230 kV lines (N-2), or the outage of the X2024 230 kV line followed by the outage of the Y2025 230 kV line or vice versa (N-1-1), which would have similar reliability consequences. The proposed Project is necessary to address double-circuit tower and N-1-1 issues noted above. There are not any other proposed RTEP or generation projects that would eliminate the need for the Project.

Q. Can Demand Response ("DR") or Energy Efficiency ("EE") programs be considered to defer or eliminate the need for the Project?

A. No, DR and EE are used in the planning process and do not mitigate these concerns. PJM already incorporates EE and DR into its forecast and analysis. PJM offers three types of Load Response:

- Emergency Capacity (DR)
- Emergency Energy Only
- Economic

Only the Emergency Capacity (DR) product is modeled in PJM planning studies. Emergency Capacity (DR) is an emergency procedure initiated by PJM and compliance is mandatory.

PJM anticipates that only DR and EE resources that clear through the Reliability Pricing Model process will be available for their committed planning year(s). Beyond the commitment period (3 years), DR and EE amounts are held

constant. Forecasted DR and EE are summarized in the tables in the PJM Load Forecast Report.

Q. How will the electric service reliability to customers within JCP&L's retail service territory be affected if the Oceanview 230 kV Transmission Project is not constructed?

A. Based on findings in the PJM 2011 RTEP analysis and the JCP&L analysis, the loss of both the X2024 and Y2025 230 kV lines results in a potential local voltage collapse in the Oceanview area. This could result in a service outage for approximately 103,025 JCP&L customers. The planning studies have indicated a potential local loss of load that would exceed the planning criteria limit under modeled case conditions. The Project resolves the criteria concerns within the area and is necessary to provide safe and reliable service to customers.

Q. Does this conclude your direct testimony?

A. Yes, it does.

Appendix A

Jeffrey A. Goldberg

Education

1983	SUNY Stony Brook, BS Engineering Chemistry
1994	The College of New Jersey, BS Electrical Engineering

Experience

1996-2003	Burns & Roe, Inc. – Electrical Engineer, Power Plants Design, Infrastructure
2003-Present	FirstEnergy Corp – JCP&L Regional Engineer, Asset Management, Transmission Planning

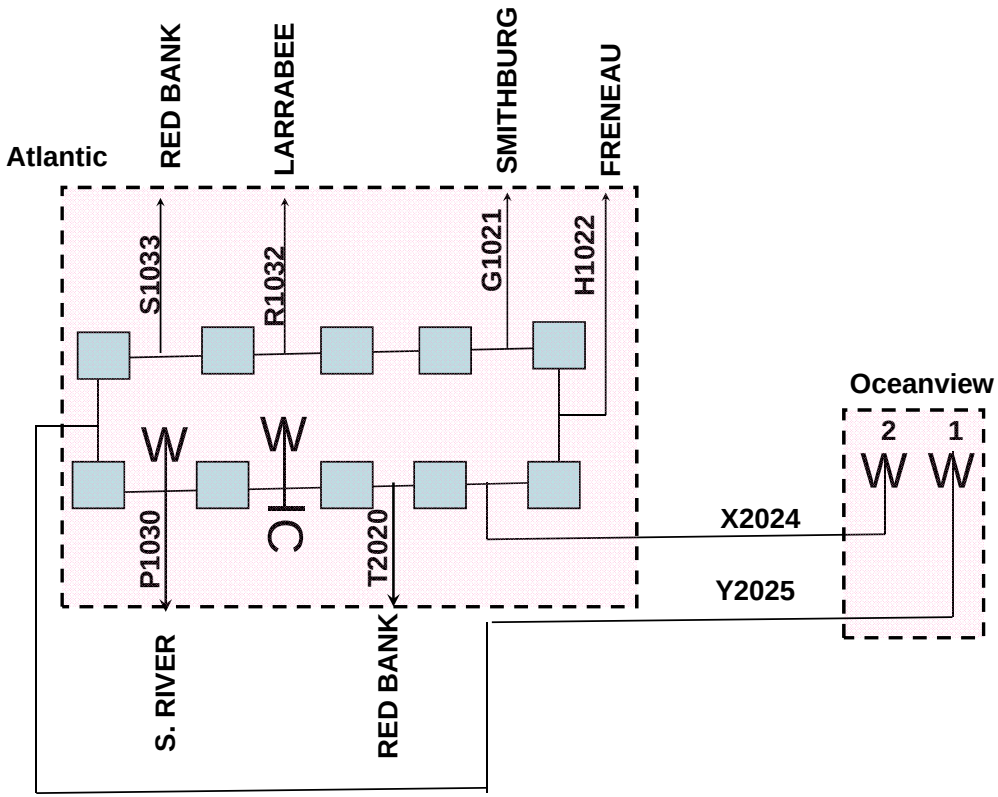
PE License

2002	New Jersey PE License 43748

Exhibit JAG-1

Oceanview 230 kV Substation Reconfiguration

EXISTING CONDITIONS



PROPOSED SOLUTION

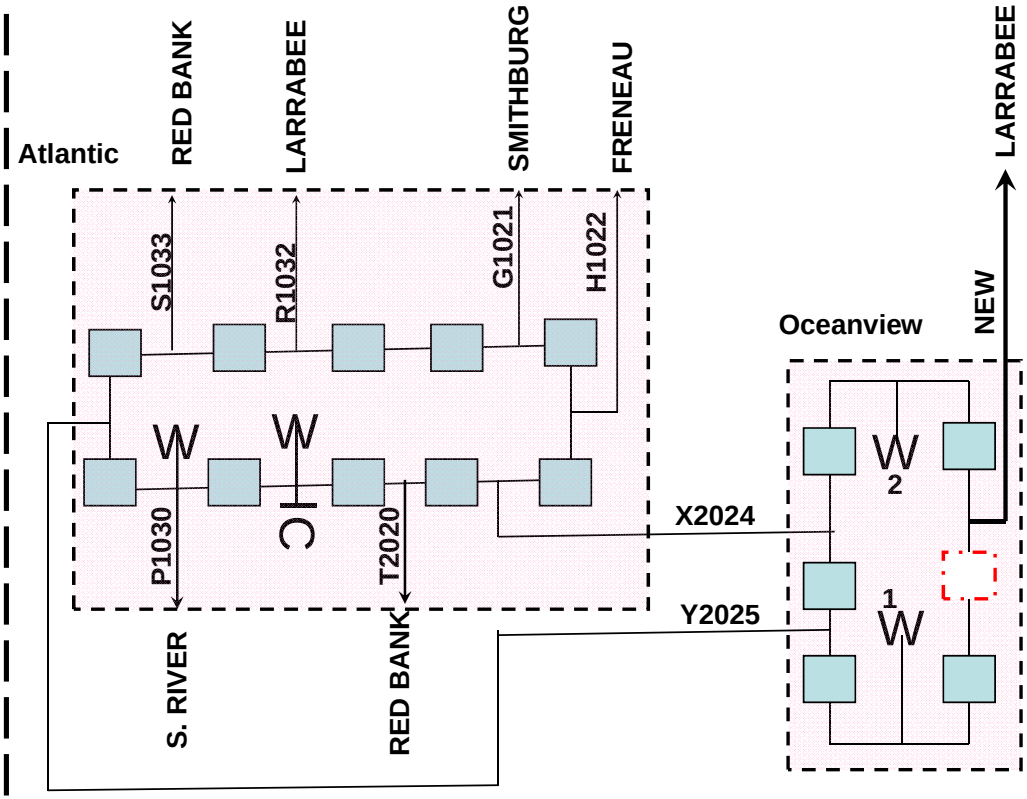
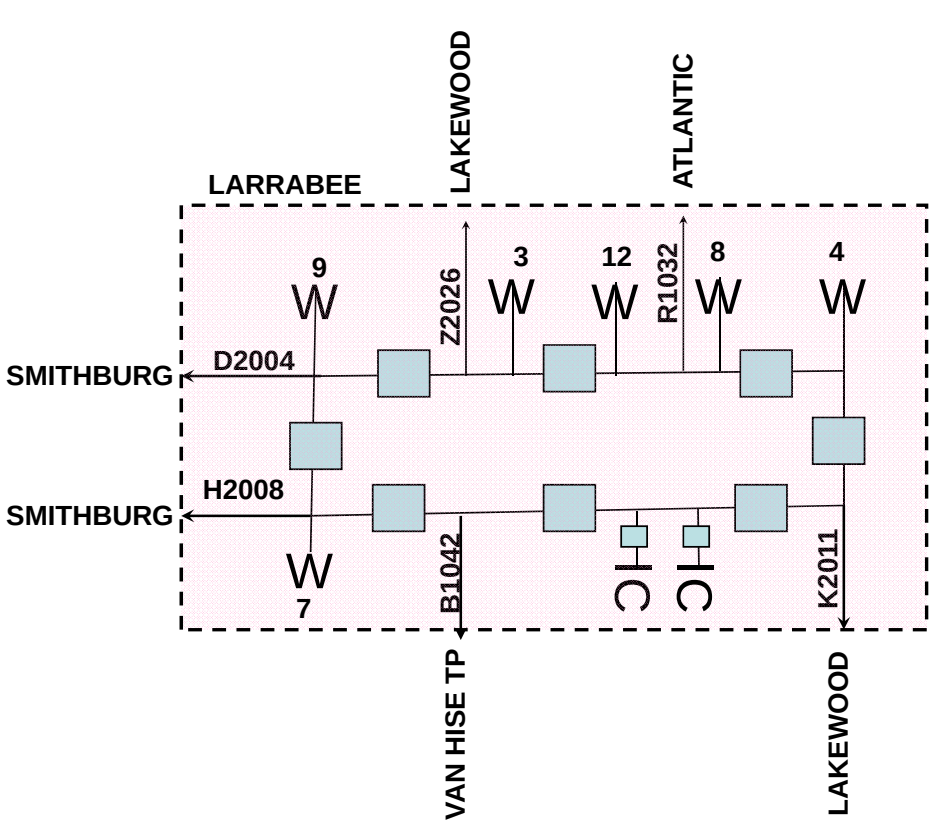


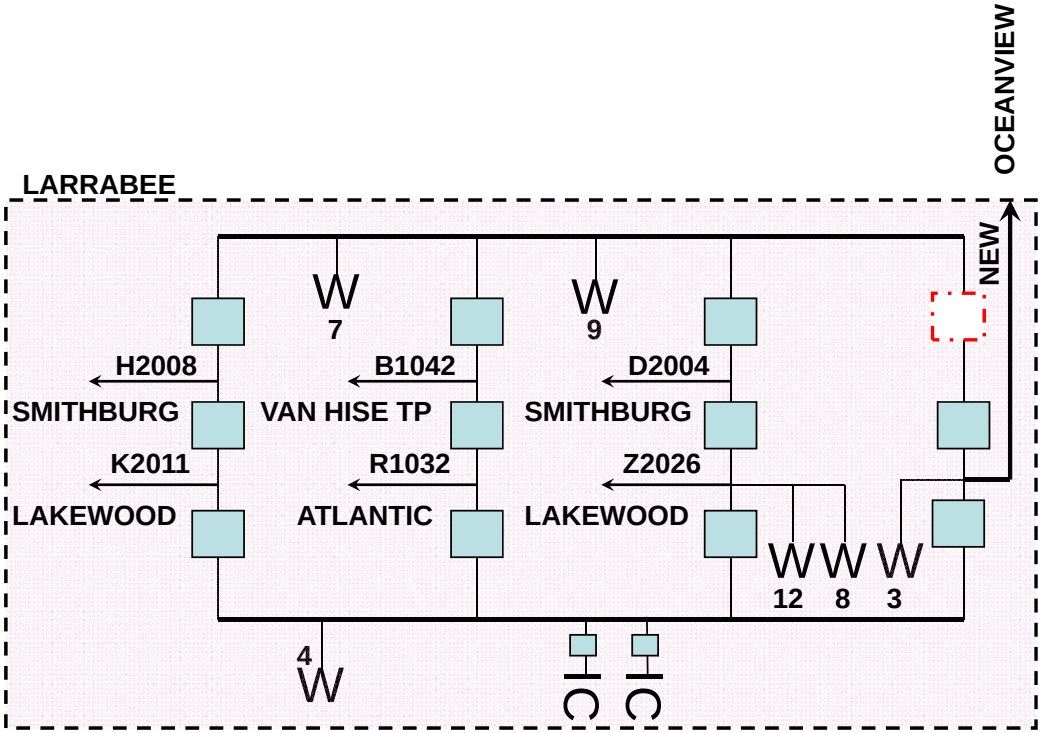
Exhibit JAG-2

Larrabee 230 kV Substation Reconfiguration

EXISTING CONDITIONS



PROPOSED SOLUTION



JCPL Transmission Zone

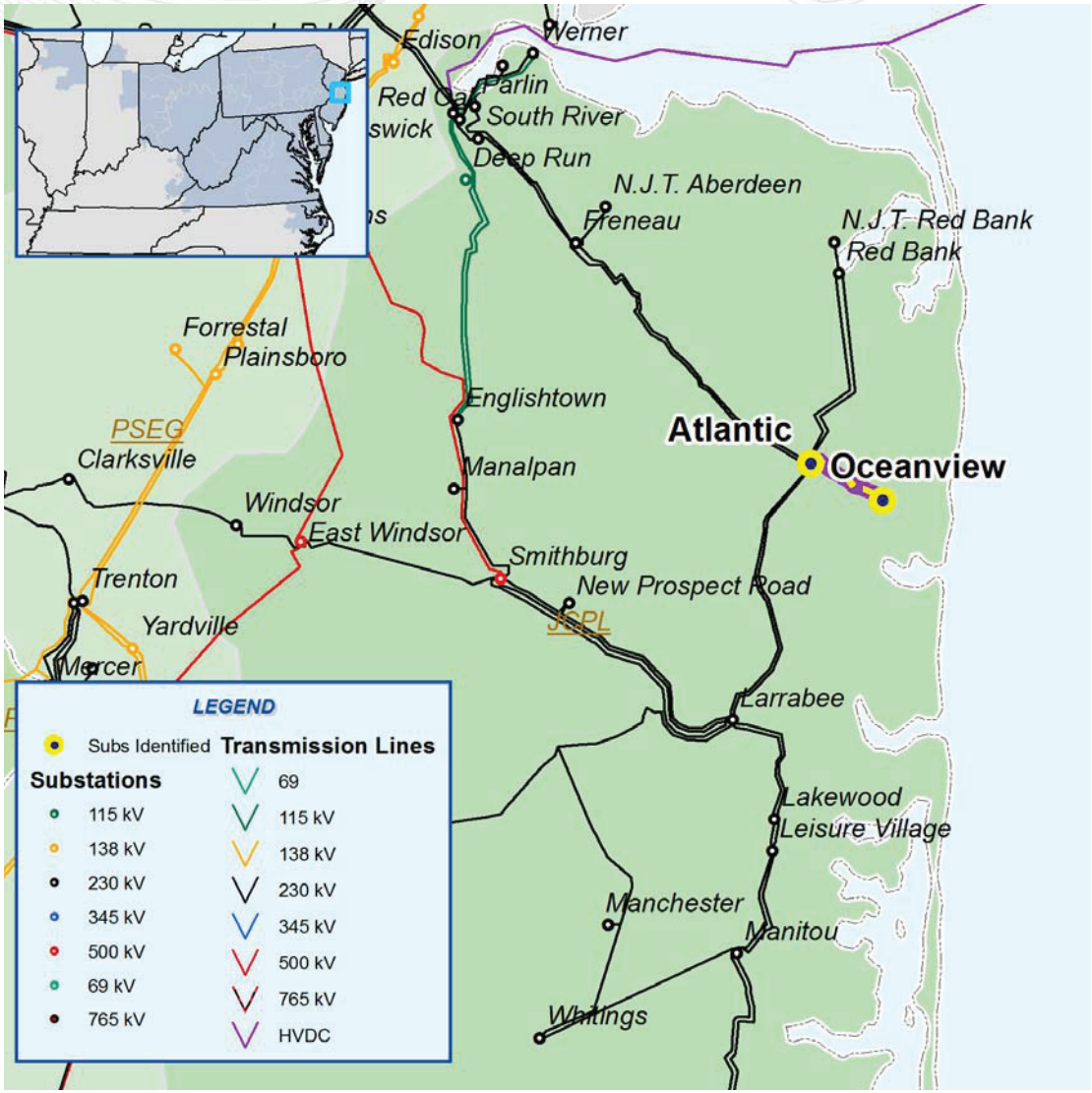
Exhibit JAG-3

- N-1-1 Voltage Violation:
- Voltage drop violation and potential loss of more than 300 MW load in the Atlantic 230 kV area for the loss of the Atlantic – Ocean View 230 kV circuits ‘X2024’ & ‘Y2025’.
- Proposed Solution:

  - Build a new 230 kV circuit from Larrabee to Oceanview (B2015).
- Estimated Project Cost:

  $ 78.333 M
- Expected IS Date:

  6/1/2016



Exhibit

FirstEnergy

76 South Main Street
Akron, Ohio 44308

James R. Haney
Vice President

330-384-2454
Fax: 330-384-5909

February 22, 2013

Paul McGlynn
Director, System Planning
PJM Interconnection
955 Jefferson Drive
Norristown, Pa 19403-2497

Re: November 26, 2012 PJM Notification of Designation of Construction Responsibility for RTEP Projects Approved

Dear Mr. McGlynn:

In accordance with Section 4.2 of the Consolidated Transmission Owners Agreement, FirstEnergy and its transmission-owning affiliates operating in the APS, ATSI, JCP&L, Met-Ed, and Penelec transmission zones acknowledge receipt of the above-referenced notification and accept designation of construction responsibility for the Baseline Upgrade projects identified in the notification subject to the modifications noted in the attached schedule. These projects will be constructed by the designated FirstEnergy transmission owner and/or an affiliate.

Please note proposed modifications to several in-service dates, construction costs and FirstEnergy transmission zone are specified in the attached scheduled. Should you have any questions or need additional information, please contact Jeff Mackauer directly at 330.761.4316.

Sincerely,

Jim Haney
Vice President
Compliance & Regulated Services

Enc.
cc: Carl Bridenbaugh
Rick O'Callaghan
Jeff Mackauer
John Syner
Michelle Henry

Exhibit JAG-4

PJM Construction Responsibility Designation - FE Zone
November 26, 2012 Letters

Letter Page	Zone	Upgrade ID	Description	PJM Projected In-service date	Cost Estimate	Planning Comments on Information contained in pdf file
1	ATSI	NA	Cover Letter	-	-	-
2	ATSI	b1814	Replace Pleasant Valley 138 kV breaker 194-B-3	6/1/2015	0.18	ok
3	ATSI	b1815	Replace West Ravena 138 kV breaker 59-B-15	6/1/2015	0.18	Comp'eted 12/28/2012
4	ATSI	b1820	Replace the Ironville 138 kV breaker '33-B-13208'	6/1/2016	0.18	ok
5	~~ATSI~~	~~b2042~~	~~Add (6) 138 kV breakers + relaying at Leroy Center~~	~~6/1/2015~~	~~3.3~~	Duplicate to b1938
6	~~ATSI~~	~~b1926~~	~~Build a new Harmon– Brookside + Harmon – Longview 138 kV line~~	~~6/1/2015~~	~~9.2~~	PJM informed via e-mail on January 22, 2013 that this project is no longer required and will be cancelled and presented at a future TEAC meeting This project is no longer needed because the AEP Ghost Town Project alleviated the need.
7	ATSI	b1938	~~Place~~ Add (6) 138 kV breakers + relaying on ~~a portion of the~~ the 138 kV at Leroy Center 345/138 kV ~~project into service by summer 2015~~	6/1/2015	8.3 ~~3.3~~	Updated Description. This project is also a duplicate of b2042. b2042 to be cancelled. Cost estimate updated by design group; original estimate was high level budgetary estimate.
8	ATSI	b1937	Build a new Leroy Center 345/138 kV substation by looping in the Perry - Harding 345 kV line	6/1/2016	35.0 ~~46.0~~	Cost estimate updated by design group; original estimate was high level budgetary estimate.
9	ATSI	b1936	Build new Allen Jct - Midway - Lemonye 345 kV line (48 miles of open tower position)	6/1/2016	33.0 86.3	Cost estimate updated by design group; original estimate was high level budgetary estimate.
10	~~ATSI~~	~~b1935~~	~~ATSI AEP 138 kV Substation on near territory border + 138 kV from new substation to Longview approx. 8 miles~~	~~6/1/2015~~	~~17.7~~	PJM informed FE via e-mail on January 22, 2013 that this project is being deferred and a rescoped solution including b1958 and a smaller reconductor project resolves the criteria issues and enables deferral until driven by future generation interconnection projects PJM will cancel as a baseline project.
11	ATSI	b1934.2	New 345/138 kV transformer at Niles	6/1/2015	14.6	Spread costs between parts
12	ATSI	b1934.1	Loop 40.2 miles of 345 kV into Niles substation of the Highland - Shenango 345 kV line	6/1/2015	0.3	Updated Description and spread costs between parts.
13	ATSI	b1934	Build a new 345/138 kV Substation at Niles	6/1/2015	14.9 ~~32~~	Cost estimate updated by design group; original estimate was high level budgetary estimate also spread costs between parts
14	ATSI	b1933	Replace 336.4 ACSR SCCIR at Richland to upgrade the Richland - Naomi 138 kV line	6/1/2015	0.04	ok
15	ATSI	b1932	Change the transformer tap settings on the Maclean 138/69 kV transformers	6/1/2015	0.05	ok
16	ATSI	b1931	Reconductor Cloverdale - Harmon #2 and #3 138 kV lines with 795 ACSS or greater conductor 6 miles total + Terminal upgrades	6/1/2015	5.6 ~~3.6~~	Cost estimate updated by design group; original estimate was high level budgetary estimate
17	ATSI	b1930	Increase design temperature limitation on the Avery - Hayes 138 kV line by raising the existing structures	6/1/2015	0.13	ok
18	ATSI	b1929	Install a 138/69 kV transformer at the Avery station	6/1/2015	3.2	ok
19	ATSI	b1913	Convert Eastlake units 1, 2, 3, 4 and 5 to synchronous condensers	6/1/2015	100	ok
20	ATSI	b1927	Create a new Five Points Area 345/138 kV substation by looping in the Lemoyne - Midway 345 kV line	6/1/2015	30	ok
21	~~ATSI~~	~~b1976~~	~~Reconductor ATSI portion of South Canton – Harmon 345 kV line~~	~~6/1/2015~~	6	PJM informed via e-mail on January 22, 2013 that this project is no longer required and will be cancelled and presented at a future TEAC meeting This project is no longer needed because the AEP Ghost Town Project alleviated the need.
22	ATSI	b1925	Create a new Harmon 345/138/69 kV substation by looping in the Star - South Canton 345 kV line	6/1/2015	39.6 46	Cost estimate updated by design group; original estimate was high level budgetary estimate.
23	ATSI	b1924	Build a new Mansfield - ~~Northfield~~ Glenwillow Area 345 kV line	6/1/2015	137.3 ~~184.5~~	Updated Description to Glenwillow. Cost estimate updated by design group; original estimate was high level budgetary estimate.
24	ATSI	b1923	Create a new ~~Northfield~~ Glenwillow Area 345 kV switching station by looping in the Eastlake - Juniper 345 kV line and the Perry - Inland 345 kV line	6/1/2015	15.0 ~~37.5~~	Updated Description to Glenwillow Cost estimate updated by design group; original estimate was high level budgetary estimate.

Exhibit JAG-4

PJM Construction Responsibility Designation - FE Zone
November 26, 2012 Letters

Letter Page	Zone	Upgrade ID	Description	PJM Projected In-service date	Cost Estimate	Planning Comments on information contained in pdf file
25	ATSI	b1922	Install a 2nd 345/138 kV transformer at the Bayshore station	6/1/2014	9.9 ~~7.2~~	Cost estimate updated by design group; original estimate was high level budgetary estimate.
26	ATSI	b1921	Install a 2nd 345/138 kV transformer at the Allen Junction station	6/1/2014	11.1 ~~7.2~~	Cost estimate updated by design group; original estimate was high level budgetary estimate.
27	ATSI	b1920	Re-conductor the Galion - GM Mansfield - Ontario - Cairns 138 kV line with 477 ACSS	6/1/2014	11.4 ~~9.6~~	Cost estimate updated by design group; original estimate was high level budgetary estimate.
28	ATSI	b1919	Re-conductor the Galion - Leaside 138 kV line with 336 ACSS	6/1/2014	4.9	ok
29	ATSI	b1918	Upgrade terminal equipment on the Avon - Crestwood 138 kV line	6/1/2013	0.3	ok
30	ATSI	b1917	Install a 138 kV circuit breaker at the Inland Q-11 station	6/1/2013	0.9	ok
31	ATSI	b1916	Install a 345/138 kV transformer at the Inland Q-11 station	6/1/2013	5.2 ~~7.2~~	Cost estimate updated by design group; original estimate was high level budgetary estimate.
32	ATSI	b1915	Install a 50 MVAR capacitor bank at the Maclean 138 kV station	6/1/2013	1.0 ~~3.0~~	Cost estimate updated by design group; original estimate was high level budgetary estimate.
33	ATSI	b1914	Convert Lakeshore 18 to a synchronous condenser	6/1/2015	20	ok
34	ATSI	b1928	Install a 50 MVAR capacitor at Hayes 138 kV	6/1/2015	1.5	ok
35	ATSI	b1939	Reconductor the Barberton - West Akron 138 kV line with 477 ACSS or greater (7.3 miles) + Terminal upgrades at Barberton	6/1/2016	2.9 ~~4.23~~	Cost estimate updated by design group; original estimate was high level budgetary estimate.
36	ATSI	b1977	Build new Toronto 345/138 kV substation by looping in the Sammis - Wylie Ridge 345 kV line and tie in four 138 kV lines	6/1/2017	51.2 ~~41.8~~	Cost estimate updated by design group; original estimate was high level budgetary estimate.
37	ATSI	b1977.1	Build a new Toronto-Harmon 345kV line	6/1/2017	225.2 ~~218.3~~	PJM has informed FE via the December TEAC and an e-mail on December 18th to suspend development activities on this project until PJM can finalize its analysis as part of the 2013 RTEP. Cost estimate updated by design group; original estimated was high level budgetary estimate.
38	ATSI	b1978	Reconductor Inland - Clinic Health Q-11 138 kV line	6/1/2015	1.1	ok
39	ATSI	b1981	Replace relay on the Highland - G589 138 kV line	~~12/31/2012~~ 6/1/2013	0.05	FE adjusted ISD due to workload and prioritization.
40	ATSI	b1982	Reconductor the Hoyldale - Newcastle 138 kV lines #1 and #2 with 795 ACSS	6/1/2015	7.5 ~~4.8~~	Cost estimate updated by design group; onginal estimate was high level budgetary estimate.
41	ATSI	b1983	Add 150 MVAR SVC and a 100 MVAR capacitor at New Castle	6/1/2015	31.7	ok
42	ATSI	b1984	Install a 50 MVAR capacitor at the Boardman 138 kV bus	6/1/2015	1.7	ok
43	ATSI	b1959	Build a new West Fremont-Groton-Hayes 138kV line	6/1/2018	45	ok

Exhibit JAG-4

PJM Construction Responsibility Designation - FE Zone
November 26, 2012 Letters

Letter Page	Zone	Upgrade ID	Description	PJM Projected In-service date	Cost Estimate	Planning Comments on information contained in pdf file
1	APS	NA	Cover Letter	-	-	
2	APS	b1816.2	Adjust the control settings of all existing capacitors at Mt Airy 34.5kV, Monocacy 138kV, Ringgold 138kV served by Potomac Edison's Eastern 230 kV network to ensure that all units will be on during the identified N-1-1 contingencies	6/1/2013	0.05	ok
3	APS	b1816 1	Replace 50FD Fault Detector relay at Carroll substation relaying at the Mt. Airy substation on the Carroll - Mt Airy 230 kV line and change the CT ratio at Mt Airy	6/1/2013	0.1	The TEAC dated January 10, 2013 rescoped this project description to be more specific
4	APS	b1816.3	Replace existing unidirectional LTC controller on the No 4, 230/138 kV transformer at Carroll substation with a bidirectional unit	6/1/2013	0.05	ok
5	APS-ME	b1816.4	Isolate and bypass the 138 kV reactor at Germantown Substation	6/1/2013	0.05	Corrected PJM Zone assignment
6	APS	b1816.6	Replace 336.4 ACSR conductor on the Catoctin - Carroll 138 kV line using 556 5 ACSR (26/7) or equivalent on existing structures (12.7 miles), 800 A wave traps at Carroll and Catoctin with 1200 A units, and 556 5 ACSR SCCIR (Sub-conductor) line risers and bus traps with 795 ACSR or equivalent	6/1/2013	7 4 ~~4 3~~	Cost estimate updated by design group; original estimate was high level budgetary estimate
7	APS	b0347 33	Replace Meadow Brook 138kV breaker 'MD-1'	~~6/1/2011~~ 12/1/2013	0.19	June 1, 2011 is in the past FirstEnergy is currently budgeting/project scheduling for year 2013 and beyond and would propose a date of December 1, 2013
8	APS	b0347.34	Replace Meadow Brook 138kV breaker 'MD-2'	~~6/1/2011~~ 12/1/2013	0.19	June 1, 2011 is in the past. FirstEnergy is currently budgeting/project scheduling for year 2013 and beyond and would propose a date of December 1, 2013
9	APS	b1822	Replace the 1200 A wave trap, line risers, breaker risers with ~~1600~~ 2000 A capacity terminal equipment at Reid 138 kV SS	6/1/2015	0.1	Updated Description to clarify 2000A capacity
10	APS	b1823	Replace the 800 A wave trap with a 1200 A wave trap at Millville 138 kV substation	6/1/2015	0.05	ok
11	APS	b1833	Replace the 1200 A line side and bus side disconnect switches with 1600 A switches, replace bus side, line side, and disconnect leads at Lime Kiln SS on the Doubs - Lime Kiln 2 (231) 230 kV line terminal	6/1/2016	0.15	ok
12	APS	b1832	Replace the 1200 A line side and bus side disconnect switches with 1600 A switches, replace bus side, line side, and disconnect leads at Lime Kiln SS on the Doubs - Lime Kiln 1 (207) 230 kV line terminal	6/1/2016	0.15	ok
13	APS	b1826	Change the CT ratio at Double Toll Gate 138 kV SS on MDT line	6/1/2013	0.05	ok
14	APS	b1824	Reconductor Granid Point - Guilford 138kV line approximately ~~7 2 8~~ miles of 556 ACSR with 795 ACSR	6/1/2016	3.75	Updated Description.
15	APS	b1825	Replace the 800 Amp line trap with 1200 Amp line trap at Butler 138 kV Sub on the Cabot East 138 kV line	6/1/2012	0.05	Completed 6/8/2012
16	APS	b1827	Change the CT ratio at Double Toll Gate 138 kV SS on MBG line	6/1/2013	0 05	ok
17	APS	b1828.1	Reconductor the Bartonville - Stephenson 3.03 mile 138 kV line of 556 ACSR with 795 ACSR	6/1/2016	1.85	ok
18	APS	b1828.2	Reconductor the Stonewall - Stephenson 2.08 mile 138 kV line of 556 ACSR with 795 ACSR	6/1/2016	1.25	ok
19	APS	b1829	Replace the existing 138 kV 556.5 ACSR substation conductor risers with 954 ACSR at the Redbud 138 kV substation, including but not limited to the line side disconnect leads	6/1/2016	0.05	ok
20	APS	b1830	Replace 1200 A wave trap and 1024 ACAR breaker risers at Halfway 138 kV substation, and replace 1024 ACAR breaker risers at Paramount 138 kV substation	6/1/2016	0.1	ok
21	APS	b1835	Reconductor 14.3 miles of 556 ACSR with 795 ACSR from Old Chapel to Millville 138 kV and upgrade line risers at Old Chapel 138 kV and Millville 138 kV and replace 1200 A wave trap at Millville 138 kV	6/1/2016 6/1/2015	9 3 ~~7.8~~	PJM advanced ISD to 6/1/2015 at the TEAC held on November 5, 2012. FE concurred with this advancement. Cost estimate updated by design group; original estimate was high level budgetary estimate
22	APS	b1836	Replace 1200 A wave trap with ~~1600~~ 2000A wave trap at Reid 138 kV SS	6/1/2016	0.1	Updated Description to clarify 2000A capacity
23	APS	b1838	Replace the 1200 A Bedington 138 kV line air switch and the 1200 A 138 kV bus tie air switch at Nipetown 138 kV with ~~1600~~ 2000A switches	6/1/2016	0.1	Updated Description to clarify 2000A capacity
24	APS	b1839	Install additional 33 MVAR capacitors at Grand Point 138 kV SS and Guildford 138 kV SS	6/1/2016	2	ok

Exhibit JAG-4

PJM Construction Responsibility Designation - FE Zone
November 26, 2012 Letters

Letter Page	Zone	Upgrade ID	Description	PJM Projected In-service date	Cost Estimate	Planning Comments on information contained in pdf file
25	APS	b1840	Extend ~~Install a new~~ Buckhannon - Glen Falls Weston 138 kV line to West Milford Substation and construct ring bus at West Milford	6/1/2016	13.5 ~~17.5~~	ok
26	APS	b1941	Loop the Homer City-Handsome Lake 345 kV line into the Armstrong substation and install a 345/138 kV transformer at Armstrong	6/1/2014	20.8 ~~27.8~~	Cost estimate updated by design group; original estimate was high level budgetary estimate.
27	APS	b1942	Change the CT ratio at Millville to improve the Millville - Old Chapel 138 kV line ratings	6/1/2015	0.05	ok
28	APS	b1964	Convert Moshannon substation to a 4 breaker 230 kV ring bus	6/1/2014	6.5	ok
29	APS	b1965	Install a 44 MVAR 138 kV capacitor at Luxor substation	6/1/2014	1.5	ok
30	APS	b1986	Upgrade the AP portion of the Elrama - Mitchell 138 kV line by replace breaker risers on the Mitchell 138 kV bus on the Elrama terminal	6/1/2015	0.05	ok
31	APS	b1987	Reconductor the Osage-Collins Ferry 138 kV line with 795 ACSS. Upgrade terminal equipment at Osage and Collins Ferry	6/1/2015	1.8	ok
32	APS	b1988	Raise structures between Lake Lynn and West Run to eliminate the clearance de-rates on the West Run - Lake Lynn 138 kV line	6/1/2015	0.32	ok
33	APS	b1989	Raise structures between Collins Ferry and West Run to eliminate the clearance de-rates on the Collins Ferry - West Run 138 kV line	6/1/2015	0.32	ok
34	APS	b1837	Replace 750 CU breaker risers with 795 1024 ACSR at Marlowe 138 kV and replace 1200 A wave traps with 1600 A wave traps at Marlowe 138 kV and Bedington 138 kV	6/1/2013	0.6	Updated Description.
35	APS	b1902	Replace line trap at Stonewall on the Stephenson 138 kV line terminal	6/1/2014	0.08	ok
1	PENELEC	NA	Cover Letter	-	-	-
2	PENELEC	b1621	Replace the Erie South 115 kV breaker 'Union City'	6/1/2016	0.15	ok
3	PENELEC	b1994	Convert Lewis Run-Farmers Valley to 230 kV using 1033 5 ACSR conductor. Project to be completed in conjunction with new Farmers Valley 345/230 kV transformation	~~6/1/2015~~ 12/31/2015	18.3 ~~46.8~~	Cost estimate updated by design group; original estimate was high level budgetary estimate. FE current construction schedule is targeting a 12/31/2015 ISD due to delays in routing, siting, and permitting.
4	PENELEC	b1943	Construct a 115 kV ring bus at Claysburg Substation Bedford North and Saxton lines wil no longer share a common breaker	6/1/2015	5.25	ok
5	PENELEC	b1996.4	Change CT Ratio at Ridgway	6/1/2015	0.3 ~~0.0~~	Cost estimate provided by design group
6	PENELEC	b1997	Replace 600 Amp Disconnect Switches on Dubois-Harvey Run-Whetstone 115 kV line with 1200 Amp Disconnects	6/1/2015	0 2	ok
7	PENELEC	b1996 3	Replace Wave Trap at Ridgway.	6/1/2015	0.3 ~~0.0~~	Cost estimate provided by design group
8	PENELEC	b1996.2	Reconductor Ridgway and Whetstone 115 kV Bus.	6/1/2015	0.2	ok
9	PENELEC	b1996.1	Replace 600 Amp Disconnect Switches on Ridgeway-Whetstone 115 kV line with 1200 Amp Disconnects	6/1/2015	0.5	ok
10	PENELEC	b1995	Change CT Ratio at Claysburg	6/1/2015	0.002	ok
11	PENELEC	b1993	Rearrange Relocate the Erie South and Wayne 345 kV line terminals at Erie West Substation	6/1/2015	1.9 ~~13~~	Updated description to better describe project scope. Cost estimate updated by design group; original estimate was high level budgetary estimate.
12	PENELEC	b1992	Reconductor Cambria Slope-Summit 115kV with 795 ACSS Conductor	6/1/2015	4.8	ok
13	PENELEC	b1991	Construct Farmers Valley 345/230 kV and 230/115 kV substation. Loop the Homer City-Stolle Road 345 kV line into Farmers Valley	6/1/2015	41.2 ~~29.5~~	Cost estimate updated by design group, original estimate was high level budgetary estimate
14	PENELEC	b1990	Install a 25 28.9 MVAR 115 kV Capacitor at Grandview	6/1/2015	0 9	Updated Capacitor size
15	PENELEC	b1967	Replace the Blairsville 138/115 kV transformer	6/1/2014	4.2	ok
16	PENELEC	b1966	Replace the 1200 Amp Line trap at Lewistown on the Raystown-Lewistown 230 kV line and replace substation conductor at Lewistown	12/1/2013	0.15	ok
17	PENELEC	b1944	Reconductor Eclipse substation 115 kV bus with 1033 kcmil conductor	6/1/2013	0.15	ok
18	PENELEC	b1998	Install a 75 MVAR 115 kV Capacitor at Shawville	6/1/2015	1.5	ok
19	PENELEC	b1945	Install second 230/115 kV autotransformer at Johnstown	6/1/2015	4 5	ok

Exhibit JAG-4

PJM Construction Responsibility Designation - FE Zone
November 26, 2012 Letters

Letter Page	Zone	Upgrade ID	Description	PJM Projected In-service date	Cost Estimate	Planning Comments on information contained in pdf file
1	ME	NA	Cover Letter	-	-	-
2	ME	~~b1816.5~~	~~Replace SCCIR (Sub-conductor) at Hunterstown Substation on the No. 1, 230/115 kV transformer~~	~~6/1/2013~~	~~0.1~~	PJM informed via e-mail on January 11, 2013 that this project is no longer required and has been cancelled due to revised rating.
3	ME	b2023	Construct a new North Temple - Riverview - Cartech 69 kV line (4.7 miles) with 795 ACSR	6/1/2015	6.9 ~~4.82~~	Cost estimate updated by design group, original estimate was high level budgetary estimate
4	ME	b2024	Upgrade 4/0 substation conductors at Middletown 69 kV	6/1/2014	0.03	ok
5	ME	b2025	Upgrade 4/0 and 350 Cu substation conductors at the Middletown Junction terminal of the Middletown Junction - ~~Wood Street Tap~~ Swatara 69 kV line	6/1/2014	0.02	Updated revised location name .
6	ME	b2026	Upgrade an OC protection relay at the Baldy 69 kV substation	6/1/2014	0.05	ok
7	ME	b1999	Replace limiting wave trap, circuit breaker, substation conductor, relay and current transformer components at Northwood	6/1/2015	0.9	ok
8	ME	b2000	Replace limiting wave trap on the Glendon - Hosensack line	6/1/2015	0.05	ok
9	ME	b2001	Replace limiting circuit breaker and substation conductor transformer components at Portland 230kV	6/1/2015	0.4	ok
10	ME	b2002	Northwood 230/115 kV Transformer upgrade	6/1/2015	4	ok
1	JCPL	NA	Cover Letter	-	-	-
2	JCPL	b1853	Install new 135 MVA 230/34.5 kV transformer with one 230 kV CB at Eaton Crest and create a new 34.5 kV CB straight bus to feed new radial lines to Locust Groove and Interdata/Woodbine	6/1/2014	19.4 ~~17.9~~	Cost estimate updated by design group; original estimate was high level budgetary estimate.
3	JCPL	b1854	Readington I737 34.5 kV Line - Parallel existing 1250 CU UG cable (440 feet)	6/1/2012	0.35	Completed 5/25/12
4	JCPL	b1855	Oceanview Substation - Relocate the H216 breaker from the A bus to the B bus	~~6/1/2012~~ 6/1/2013	0.09	FE adjusted ISD due to workload and prioritization.
5	JCPL	b1856	Madison Tp to Madison (N14) line - Upgrade limiting 250 Cu substation conductor with 795 ACSR at Madison sub	6/1/2012	0.08	Completed 5/22/12
6	JCPL	b1857	Montville substation - Replace both the 397 ACSR and the 500 Cu substation conductor with 795 ACSR on the 34.5 kV (M117) line	6/1/2012	0.01	Completed 5/09/12
7	JCPL	b1858	Reconductor the Newton - Mohawk (Z702) 34.5 kV line with 1.9 miles of 397 ACSR	6/1/2013	1.2 ~~0.71~~	Cost estimate updated by design group; original estimate was high level budgetary estimate
8	JCPL	b2003	Construct a Whippany to Montville 230 kV line (6.4 miles)	~~6/1/2015~~ 6/1/2017	28.8 ~~37.5~~	Cost estimate updated by design group; original estimate was high level budgetary estimate. FE current construction schedule is targeting a 6/1/2017 ISD. Currently developing route. Siting/permitting/ROW planned for 2013-2015, Construction planned for fall 2016 thru March 2017
9	JCPL	b2015	Build a new 230 kV circuit from Larrabee to Oceanview	~~6/1/2016~~ 6/1/2017	66.8 ~~78.33~~	Cost estimate updated by design group; original estimate was high level budgetary estimate. FE current construction schedule is targeting a 6/1/2017 ISD. Currently developing route. ISD assumes ROW is able to be acquired in a timely manner.

Exhibit JAG-5

Table 8.12: Major 2012 RTEP Upgrades in New Jersey (greater than $5 million)

		System Upgrade Drivers												
		Baseline Upgrades					Network Upgrades			Supplemental Upgrade				
	Upgrade	Baseline Load Growth / Deliverability & Reliability	Congestion Relief - Economic	Operational Performance	Generator Deactivation	TO Criteria Violation	Generation Interconnection	Merchant Transmission Interconnection	Long-term Firm Transmission Service	Criteria Compliance other than for Baseline	Date	Cost (M)	TO Zone(s)	2012 TEAC Review
1	Install new 135 MVA 230/34.5 kV transformer with one 230 kV CB at Eaton Crest and create a new 34.5 kV CB straight bus to feed new radial lines to Locust Groove and Interdata/Woodbine					▲					June 2014	17.9	JCPL	3/8/2012
2	Construct a Whippany to Montville 230 kV line (6.4 miles)				▲						June 2015	37.5	JCPL	4/27/2012
3	Build a new 230 kV circuit from Larrabee to Oceanview	▲									June 2017	78.33	JCPL	6/14/2012
4	Reconductor the Mickleton - Gloucester 230 kV parallel circuits with double bundle conductor	▲									June 2017	10	PSEG	9/13/2012
5	Re-configure the Brunswick 230 kV and 69 kV substations	▲									June 2017	47	PSEG	10/12/2012
6	At Deep Run, install 115 kV line breakers on the B2 and C3 115 kV lines	▲									June 2015	10.7	JCPL	10/12/2012
7	Construct Jackson Rd. 69 kV substation and loop the Cedar Grove - Hinchmans Ave into Jackson Rd. and construct Hawthorne 69 kV substion and build 69 kV circuit from Hinchmans Ave - Hawthorne - Fair Lawn					▲					June 2016	105	PSEG	10/12/2012
8	Reconfigure the Linden, Bayway, North Ave, and Passaic Valley S.C. 138 kV substations. Construct and loop new 138 kV circuit to new airport station	▲									June 2017	250	PSEG	10/12/2012
9	Construct back to back HVDC converter at Hudson	▲									June 2015	300	PSEG	10/11/2012
10	Reconductor Athenia-Bergen 230kV line						T107				June 2012	50	PSEG	11/5/2012
11	Reconductor Baywy4-6 - Federlsq 230kV line						T107				June 2012	55	PSEG	11/5/2012
12	Replace Essex 230/138kV transformer #2						T107				June 2012	13.5	PSEG	11/5/2012
13	Essex 230kV Three Breaker Bay Expansion less one breaker						T107				December 2015	5.58	PSEG	11/5/2012
14	Reconductor the Q-1343 u/g cable and terminal equipment Cuthbert						S107				June 2015	20	PSEG	11/5/2012

Exhibit JAG-6

Affected Customers– Loss of the X2024 and Y2025 230 kV Lines