



FINAL REPORT

FINANCIAL AND OPERATIONAL REVIEW OF JCP&L'S DISTRIBUTION SYSTEM

NJ BPU DOCKET NO: EF15070779

Prepared for:

Jersey Central Power & Light (JCP&L) Company

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TABLE OF CONTENTS

Disclaimer	viii
Executive Summary.....	ix
Background.....	ix
Overall Process and Timeline.....	ix
Summary of Major Conclusions and Recommendations.....	xii
Operational Review	xii
Financial Review.....	xv
Broader Policy Considerations	xvi
A. Operational Review.....	1
A.1 Evaluation of JCP&L's Reliability Programs.....	2
A.1.1 2013-2015 Compliance with the BPU's Reliability Regulations (Outages and Interruptions).....	3
A.1.2 2013-2015 Compliance with the BPU's Reliability Regulations (Reliability Targets)	6
A.1.3 2013-2015 Compliance with the BPU's Reliability Regulations (Processes and Systems).....	9
A.1.4 JCP&L 2013-2015 Compliance with the BPU's Reliability Regulations (Preventive Maintenance)	11
A.1.5 Ability to Meet 2016-2020 BPU Reliability Targets.....	12
A.1.6 Adequacy of JCP&L's Vegetation Management Program	14
A.1.7 Adequacy of JCP&L's Inspection and Maintenance Programs.....	17
A.1.8 Life-cycle Maintenance Philosophy and Practices (Asset Management)	20
A.1.9 Life-cycle Maintenance Philosophy and Practices (Replacement Programs).....	22
A.2 Developing a Resilient System	25
A.2.1 Adequacy of SCADA Communications and Controls	27
A.2.2 Automatic Circuit Tie Schemes	28
A.2.3 Distribution Automation and Smart Grid	30
A.2.4 JCP&L's Practices and Operations in Developing a Resilient Electric System Using Distribution Automation and Other Technology	31
A.2.5 System Hardening and Flood Mitigation.....	32
A.3 Current Restoration Abilities	34
A.3.1 Implementation of the Hurricane Irene and Sandy Order Recommendations	36
A.3.2 Demonstration of ICS, ETR, Meteorology, Internal and External Mutual Assistance ...	37

A.3.3 Added Technologies for Damage Assessment and Customer Communications.....	41
A.3.4 Added Enhancements to Storm-related Websites.....	44
A.4 Distribution Planning Criteria and Load Forecasts	46
A.4.1 Existing and Planned Capacity.....	48
A.4.2 Tools and Methods for Load Forecasting	51
A.4.3 Distributed Solar in Load Forecasts	53
A.4.4 N-1 Planning Criteria	56
A.5 Capital/Investment and Operations & Maintenance (O&M) Spending	58
A.5.1 JCP&L's 2013-2015 CAPEX and OPEX by Project Categories	59
A.5.2 JCP&L's Five-year Forecasted CAPEX and OPEX Through 2020.....	62
A.5.3 JCP&L's CAPEX Decision-making and Level of Input to FirstEnergy Regarding Budgets and Expenditures.....	64
B. Financial Review	65
B.1 Corporate Governance	65
B.1.1 Role and Function of the JCP&L and FE Boards of Directors	66
B.1.2 Role and Function of the JCP&L and FE Boards of Directors	70
B.1.3 Efficacy of JCP&L Management's Focus on the Success of JCP&L	71
B.1.4 Efficacy of FE Support to JCP&L Management's Focus on the Success of JCP&L	72
B.1.5 Effectiveness of Internal Controls, Including Internal Audit Processes.....	72
B.1.6 Conflict or Risk between FE Corporate and/or Affiliate Goals with JCP&L's Business Activities (Risk Management and Internal Controls)	74
B.1.7 Conflict or Risk between FE Corporate and/or Affiliate Goals with JCP&L's Business Activities (Organization Structure)	76
B.1.8 Compliance with the Corporate Separation Requirements of the NJ Affiliate Standards and FERC Code of Conduct	77
B.1.9 FE's Resource Allocation to JCP&L Regulated Activities Versus Non-regulated Activities.....	79
B.1.10 Operational Performance Achieved by JCP&L versus the Other FE Utility Subsidiaries	80
B.1.11 Financial Performance Achieved by JCP&L versus the Other FE Utility Subsidiaries	82
B.1.12 Financial returns achieved by JCP&L versus the other FE utility subsidiaries.....	83
B.1.13 Potential Inconsistencies or Conflicts with the Present Holding Company Structure of FE that Contains Both Distribution Companies and a Generation Company	86
B.2 Capital Allocation among Subsidiaries.....	87
B.2.1 Manner in Which Capital is Allocated Among All the Units of FE	88
B.2.2 Manner in Which JCP&L Receives a Fair Share of This Allocation.....	89

B.2.3 FE's Plan for Its Generation Subsidiary.....	92
B.3 Human Resources, Staffing, Benefits, and Planning	93
B.3.1 Recruiting and Staffing	94
B.3.2 Manner in Which JCP&L Provides for the Continuity of Operations and Sufficiency of Skilled Employees	95
B.3.3 Compensation and Benefits	97
B.3.4 Pension Plans and Post-retirement Benefits	98
B.3.5 Post-retirement Benefits Reconciled with Funds Collected for This Purpose in Rates.	99
B.3.6 Sample Survey of JCP&L Employees	100
B.4 Compliance with Merger Order (BPU Docket No, EM001108701).....	103
B.4.1 Merger Order Provisions to Allocate Sufficient Resources in Terms of Capital to New Jersey	103
B.4.2 Merger Order Provisions to Allocate Sufficient Resources in Terms of Staffing to New Jersey	105
B.5 Review of Financing Activities.....	107
B.5.1 Financing Activity of JCP&L, and the Effects of the Financing Activity of Its Parent and Its Affiliates on JCP&L	110
B.5.2 Financial Performance of JCP&L and the Effects of the Financial Performance of Its Parent and Its Affiliates on JCP&L.....	117
B.5.3 Credit Metrics of JCP&L in Comparison to, and in Contrast with, its Utility Affiliates..	118
B.5.4 Credit Quality of FE and the Potential Impacts on JCP&L.....	123
APPENDIX A. Summary of Recommendations	A-1
APPENDIX B. Data Requested and Received	B-1
APPENDIX C. Interviews, Observations, and demonstrations conducted	C-1
APPENDIX D. Supporting Tabular Data for Financial Comparisons	D-1
APPENDIX E. Employee Survey Additional Details.....	E-1
E.1 Survey Summary	E-1
E.2 Summary of Results.....	E-1
Analysis of the Bargaining Unit.....	E-1
Analysis of Management Level Employees	E-6

FIGURES

Figure 1. Assessment Steps for Each Operational and Financial Functional Area	x
Figure 2. Overall Timeline of Navigant's Review Activities.....	xi
Figure 3. Ground-to-Sky Trim	17
Figure 4. Scope of BCN Cable Replacement Project by Operating Company	25
Figure 5. JCP&L Flood Mitigation	33
Figure 6. Global ETR	39
Figure 7. JCP&L Post-Storm Survey Response (February 2015).....	43
Figure 8. JCP&L IFactor Outage Map.....	45
Figure 9. JCP&L Facebook Web Site Access.....	45
Figure 10. JCP&L My Town Web Site.....	46
Figure 11. JCP&L Historical Peak Demand	49
Figure 12. 2015 Substation Transformer Loading.....	50
Figure 13. 2020 Substation Transformer Loading Forecast.....	50
Figure 14. Impact of Solar on JCP&L System Peak.....	55
Figure 15. 2013-2015 CAPEX & OPEX vs. SAIFI.....	60
Figure 16. 2013-2015 CAPEX & OPEX vs. CAIDI	61
Figure 17. JCP&L Historical and Projected CAPEX and OPEX, 2013-2019.....	63
Figure 18. FE Organization.....	67
Figure 19. FE Utilities Organization	68
Figure 20. Audit and Control Functions.....	75
Figure 21. Code of Conduct Color Coding System	78
Figure 22. Return-on-Equity: Net Utility Operating Income and Rate Base Approach	84
Figure 23. FERC Form 1 Return-on-Equity (based on Net Income)	85
Figure 24. Total Distribution Plant Additions, 2013-2015	90
Figure 25. Distribution Additions as % of Gross Distribution Plant.....	90
Figure 26. Distribution Additions as % of Net Distribution Plant.....	91
Figure 27. Distribution Plant Additions per Retail Customer	91
Figure 28. Distribution Plant Additions as a Percentage of Depreciation	92
Figure 29. JCP&L Employee Survey Summary Results	102
Figure 30. Comparison of Interest Rates on Short Term Instruments of the Type Described in the Utility Money Pool Agreement	113

Figure 31: The Corporate Ratings Criteria Framework 125

Figure 32. “Employee Experience” Bargaining Unit Responses E-3

Figure 33. “Customer Service” Bargaining Unit Responses..... E-4

Figure 34. “Perception of Product” Bargaining Unit Responses..... E-5

Figure 35. “Employee Experience” Management Responses..... E-7

Figure 36. “Customer Service” Management Responses E-8

Figure 37. “Perception of Product Management Responses E-9

Figure 38. Graphical Distributions of Each Question for Management Level Survey Responses E-10

Figure 39. Graphical Distributions of Each Question for Bargaining Unit Survey Responses E-13

TABLES

Table 1. JCP&L Historical CAIDI and SAIFI Results, 2006-2015..... 7

Table 2. 2015 JCP&L CAIDI and SAIFI Results..... 7

Table 3. CMI for Equipment Failure Cause Code 8

Table 4. Tree-Related Sustained Customer Interruptions..... 16

Table 5. 2015 Inspections..... 18

Table 6. Minimum Global ETR Target Timeframes..... 40

Table 7. Capital Blankets 62

Table 8. 2013-2015 JCP&L Operational Performance 81

Table 9. 2013-2015 JCP&L Cost-Related Financial Metrics 83

Table 10. FE-JCP&L Documents Reviewed for this Section..... 108

Table 11. Comparison of JCP&L and the FEU Companies' 2015 Credit Metrics..... 120

Table 12. Credit Metric and Ratings Analysis of Comparable Electric Utilities..... 123

Table 13. Tabular Data Supporting Figure 22. Return-on-Equity: Net Utility Operating Income and Rate Base Approach D-2

Table 14. Tabular Data Supporting Figure 23. FERC Form 1 Return-on-Equity (based on Net Income)D-2

Table 15. Responses to Employee Survey E-1

Table 16. Bargaining Unit Survey Response by Tenure E-2

Table 17. Management Survey Responses by Tenure E-6

GLOSSARY OF ABBREVIATIONS

Acronym	Description
ADMS	Advanced Distribution Management System
AMI	Advanced Metering Infrastructure
ARM	Alternative Regulatory Mechanisms
ASPRs	Annual System Performance Reports
BCN	Bare Concentric Neutral, a Type of Primary Underground Cable
BPU	New Jersey Board of Public Utilities
CAIDI	Customer Average Interruption Duration Index
CAPEX	Capital Expenditures
CEMI	Customers Experiencing Multiple Interruptions
CES	Competitive Energy Services, which includes FE Solutions, FE Nuclear Generation, FE Generation and Allegheny Energy Supply
CMI	Customer Minutes of Interruption
CPI	Consumer Price Index
DA	Distribution Automation
DCC	Distribution Control Center
DER	Distributed Energy Resource
DG	Distributed Generation
DMS	Distribution Management System
DR	Demand Response
ECP	Emergency Communications Plan
EDC	Electric Distribution Company
EE	Energy Efficiency
ELT	Executive Leadership Team
EMS	Energy Management System
ERM	Enterprise Risk Management
ES	Energy Storage
ETRs	Estimated Time of Restoration
FE	FirstEnergy Corporation
FES	FirstEnergy Solutions Corporation
FEU	FirstEnergy Utilities
FFO	Funds From Operation
FISR	Fault Isolation and Service Restoration
FRM	Formula Ratemaking Mechanisms
GAAP	Generally Accepted Accounting Principles
GLMAG	Great Lakes Mutual Assistance Group
IAP	Incident Action Plan
IC	Incident Commander
ICS	Incident Command System
IRM	Infrastructure Replacement Mechanisms

Acronym	Description
IRs	Interconnection Requirements
IVVC	Interactive Volt-Var Control
JCP&L	Jersey Central Power & Light Company, a FirstEnergy Company
JSDs	Job Skill Demonstrations
KPI	Key Performance Indices
L&D	Learning & Development (FEU organization)
LFDMS	Load Forecast Data Management System
MAIT	Mid-Atlantic Interstate Transmission, LLC
MAMAG	Mid Atlantic Mutual Assistance Group
NDT	Non-Destructive Testing
NEM	Net Energy Metering
NJAC	New Jersey Administrative Code
NYMAG	New York Mutual Assistance Group
O&M	Operations & Maintenance
OEM	Office of Emergency Management
OMS	Outage Management System
OPEB	Other Post-Employment Benefits
OPEX	Operational Expenditures
OSHA	Operational Safety and Health Administration
PM	Preventative Maintenance
PRM	Project Risk Management
PSI	Power Systems Institute
QA	Quality Assurance
RODS	Resources on Demand System
ROE	Return on Equity
ROO	Results of Operations
ROW	Right-of-Way
RPA	Request For Project Authorization
RPC	Risk Policy Committee
RTU	Remote Terminal Unit
SACR	Stand-Alone Credit Risk
SAIFI	System Average Interruption Frequency Index
SCADA	Supervisory Control and Data Acquisition
SEE	Southeastern Electric Exchange
SGIG	Smart Grid Investment Grant
UG	Underground
UPR	Unacceptable Performance Reporting
URD	Underground Radial Distribution
VM	Vegetation Management Program
VVO	Volt-Var Optimization
WFD	Work Force Development

DISCLAIMER

This report was prepared by Navigant Consulting, Inc. (Navigant) for Jersey Central Power & Light Company (JCP&L), a FirstEnergy Company. The work presented in this report represents Navigant's professional judgment based on the information available at the time this report was prepared. Navigant is not responsible for the reader's use of, or reliance upon, the report, nor any decisions based on the report. **NAVIGANT MAKES NO REPRESENTATIONS OR WARRANTIES, EXPRESSED OR IMPLIED.** Readers of the report are advised that they assume all liabilities incurred by them, or third parties, as a result of their reliance on the report, or the data, information, findings and opinions contained in the report.

EXECUTIVE SUMMARY

Background

Navigant Consulting, Inc. ("Navigant") was engaged by JCP&L to conduct a Financial and Operational Review of JCP&L's distribution system to respond to certain Orders from the New Jersey Board of Public Utilities ("BPU")¹. This review consisted of an objective, third-party review of JCP&L's operational and financial performance and its relationship with its parent holding company, FirstEnergy Corp. ("FE") in providing safe adequate and proper service to JCP&L's New Jersey customers at reasonable rates. The scope of work required Navigant to review and evaluate the following designated aspects of JCP&L's operational and financial organization, processes and relationships (within the FE holding company system): (1) the Company's reliability programs, (2) the development of a resilient electric system, (3) storm restoration abilities and enhancements, (4) distribution planning criteria for load forecasts to assure sufficient capacity and flexibility, (5) capital investment and operation & maintenance spending; (6) corporate governance; (7) capital allocation among subsidiaries; (8) human resource staffing, benefits and planning; (9) compliance with the BPU's FirstEnergy-GPU Merger Order; and (10) JCP&L's financing activities.

The retrospective aspects of the Financial and Operational Review encompassed the three-year period from 2013-2015 and, with respect to operational planning, any prospective aspects of the review coincided with JCP&L's current five year planning horizon (i.e., 2016-2020) in order to provide a more granular view of the Company's current practices and performance and its planning horizon.

Navigant employed its own structured, experience-based approach for conducting utility management audits to complete this review within the timeframe of January 28, 2016 (award date) to July 27, 2016 (final report delivery).²

Overall Process and Timeline

Following the project award on January 28, 2016, the Navigant team conducted project mobilization. This 1-2 week period included a deeper review of reference information provided with the request-for-proposal. The team also conducted a project kickoff meeting with JCP&L and BPU staff to confirm project scope, schedule, and communication protocols.

¹ See Board Orders issued: March 26, 2015 in BPU Docket No. ER12111052 (the "**Company's 2012 Base Rate Case Order**"), and July 22, 2015 in *I/M/O a Financial and Operational Review of Jersey Central Power & Light Company's Distribution System – Staff Proposal for a Scope of Work to be Issued by Jersey Central Power & Light Company in a Request for Proposals to Consultants* BPU Docket No. EF15070779.

² Please note that Navigant entered into an Agreement for Consulting Services with JCP&L dated January 28, 2016, as amended by the First Amendment dated April 21, 2016 and the Second Amendment dated June 23, 2016 (the "Amended Agreement"), which extended the due date for this draft report to July 1, 2016.

Upon completion of project mobilization, we entered the Assessment phase. For each of the ten functional areas included in the Operational and Financial Review scope, we applied the following eight standard steps in conducting the review:

Figure 1. Assessment Steps for Each Operational and Financial Functional Area



1. **Assessment Planning** – Based on the specific areas of assessment listed in the RFP scope under each of the ten functional areas, our assigned lead developed a detailed assessment plan including the following elements:
 - Hypotheses to be tested
 - Information requirements and information gathering approach
 - Specific analyses and/or work practice observations to be conducted
 - Schedule/time requirements

We then reviewed the assessment plan for each functional area with the JCP&L project manager or designated lead for the functional area to be assessed, to validate and make any adjustments required to conduct an effective review.

2. **Data Request** – Based on the assessment plan, we submitted data requests for any data/information needed prior to our on-site interviews and/or work observations with JCP&L personnel. A complete list of data requested throughout this review is included in Appendix B.
3. **On-site Interviews & Observations** – After receiving and reviewing the data in our initial data request, we worked with the JCP&L project manager to identify the appropriate JCP&L individuals with whom to conduct interviews and/or work practice or system observations in order to carry out our assessment plan and gather the information needed for analysis. A complete list of interviews, observations, and demonstrations conducted during this review is included in Appendix C. Staff members of the BPU were invited to observe all interviews and work practice observations conducted, either in-person or via videoconference.
4. **Analysis and Development of Initial Findings and Conclusions** – Following our information gathering activities in Steps #2 and #3 above, we analyzed the information gathered according to our assessment plan in order to review each of the areas requested in the ten Financial and Operational functional areas specified in the Scope of Work. This analysis included quantitative analysis and qualitative comparison with industry best practices observed through the experience of our team members. Navigant team members developed initial findings and conclusions from this analysis, as well as identified additional information needed for further analysis.
5. **Follow-up Information Gathering** – Based on the additional information identified in Step #4 above, we worked with the JCP&L project manager to request additional data and conducted follow-up interviews needed to complete our analysis and finalize our initial findings and conclusions.
6. **Validation of Findings/Conclusions with JCP&L** – Upon completion of our initial findings and conclusions related to the specific areas to be assessed in the Scope of Work in JCP&L's RFP, we conducted validation sessions with JCP&L personnel and members of the BPU. These sessions were conducted to ensure that our data gathering and analysis activities accurately reflected JCP&L's work practices and business processes, and that our findings and conclusions

Summary of Major Conclusions and Recommendations

Operational Review

From its review of JCP&L operations Navigant concludes that JCP&L has:

- Complied with the BPU's enhanced reliability reporting requirements⁴ and readily met the BPU's reliability targets (*i.e.*, benchmarks and minimums)⁵ for the last 3 years, and is expected to continue to do so prospectively;
- Adopted design, process and technology enhancements to improve the resiliency of its electric system to major storms, with opportunities for additional technology-based upgrades;
- Revised its storm and emergency preparedness procedures, and implemented technologies to improve its ability to restore and predict time to restore service;
- Sufficient existing or planned capacity to meet future electric demand; and
- Appropriate levels of capital and expense spending.

Major⁶ recommendations arising from the Operations Review, which, unless otherwise noted, are provided as recommendations for further improvement in existing systems and processes, include:

1. Formalize asset management processes and practices for JCP&L's Distribution organization. (Recommendation A.1.8-1)

This recommendation includes several steps and activities to be evaluated and potentially implemented based on benefit versus cost considerations that would include the development of:

- a. A mission statement with regard to asset management principles and objectives at JCP&L;
- b. An overall JCP&L and FEU governance of asset management organization and policies;
- c. Organizational responsibilities within JCP&L for implementing asset management practices;
- d. Guiding principles regarding management of assets over their life-cycle;
- e. New or enhanced systems required for performance assessment and condition monitoring of distribution assets;

⁴ N.J.A.C. 14:5-8.1 *et seq.*

⁵ N.J.A.C. 14:5-8.10.

⁶ This subset of recommendations is described as "major" because Navigant believes they will yield the most benefits for JCP&L. All Operational recommendations should be further assessed by JCP&L to ensure that implementation can be planned in a manner that produces benefits in a cost-effective manner, and with appropriate cost recovery. This could include combining these recommendations with efforts already underway or planned at JCP&L and FEU, piloting of recommendations on a smaller scale to demonstrate benefits, and conducting further cost-benefit analysis prior to a decision to implement.

- f. Analytic/predictive methods for equipment diagnostics, failure modes and risk assessment;
 - g. Asset ranking and prioritization methods for capital investment decisions, including risk versus cost trade-offs that would be incorporated into RPA budgeting processes; and
 - h. A continuous improvement process, including post-project review; typically part of the capital management process
- 2. Prepare a Technology Plan that builds upon findings and successes from Department of Energy Smart Grid Investment Grant (SGIG) pilot programs in New Jersey and other FEU operating companies. (Recommendation A.2.3-1)***
- The Plan should outline the role of technology applied to JCP&L's distribution system over the short- and long-term. Consider a collaborative effort with other New Jersey utilities to identify plans consistent with the New Jersey Energy Master Plan goal for emerging technology: "Improve and Enhance the EDC Smart Grid and Distribution Automation Plans" and related objectives such as Microgrid Distributed Energy Resources.
- 3. Conduct a study to evaluate updating LFDMS to account for existing and forecast net metered and large solar installations. (Recommendation A.4.3-1)***
- This includes creation of a database to track solar installations, and if applicable, use of new tools and systems to collect solar profile data to predict net load reduction on distribution feeders and substations.
- 4. Conduct a study to develop specific criterion regarding minimum restoration times for single transformer substations that do not have sufficient tie transfer capacity with adjacent substation(s). (Recommendation A.4.4-1)**
- Conduct study, if needed, to identify substations that have partial tie transfer capability. Study also should include an evaluation of likely mobile substation transport and installation times to identify substations that do not meet the minimum restoration criterion. Develop mitigation plans such as increasing tie transfer capability, changing location of mobile substations or upgrading substation mobile substation connections (and procedures) to achieve minimum restoration targets.
- 5. Enhance the capital budget development process to reduce, where possible, the amount assigned to blankets. (Recommendation A.5.1-1)**
- This should include additional rigor and detail in the development and monitoring of Condition, Forced, and Reliability blanket budgets and spending
- 6. Review and enhance capital budgeting and project prioritization process to determine optimal levels of CAPEX and OPEX to meet reliability and other JCP&L targets and objectives. (Recommendation A.5.2-1)**
- This includes identifying the level of spending to achieve objectives and meet targets. Application of asset management practices outlined in Recommendations A.1.8 and A.1.9 are needed to properly balance CAPEX and OPEX spending.

7. Improve and better document processes and criteria applied to review and approve capital budget requests during portfolio reviews (Recommendation A.5.3-1, 2, and 3)

- a. Document processes and criteria applied to review and approve capital budget requests for each of Rounds 1 through 3. Include processes under which capital investments are prioritized and criteria applied to approve or reject budget requests.
- b. Modify capital budget development (RPA) process such that projects that typically are evaluated but do not reach Round 1 are included in the review process.
- c. Modify the capital budgeting process to place greater focus on identifying spending levels needed to meet reliability and performance targets, and other JCP&L goals and objectives.

The following Operational recommendations, while spread throughout the Final Report, are grouped below in such manner as to promote their review and evaluation by the Company and BPU together on a more integrated and interrelated manner. The following groupings will enable the Company in discussion with BPU to formulate reasonable approaches to studying and assessing the costs and benefits of various options under each major category.

Asset Management⁷

- A.1.4-1: Evaluate the replacement program currently underway for primary underground cable
- A.1.4-2: Conduct a study to determine the benefits of expanding underground equipment inspections
- A.1.8-1: Formalize asset management processes and practices for JCP&L's Distribution organization
- A.1.8-2: Develop procedures, criteria and systems required to assess and rank equipment condition.
- A.1.9-1: Conduct a study to evaluate the cost-effectiveness of initiatives or programs to proactively replace equipment
- A.1.9-2: Conduct a study the use of additional analytical methods and tools to predict equipment failure rates
- A.1.9-3: Develop a comprehensive asset registry for primary underground cable
- A.1.9-4: Consider re-instituting cable injection as a life-extension alternative
- A.1.9-5: Conduct a study that estimates the amount of URD cable that should be replaced over the next 10 years

⁷ Includes long-term improvements to equipment inspection and replacement

Smart Grid / Grid Modernization

- A.2.1-1: Conduct a study to evaluate expansion of SCADA communications, monitoring and controls
- A.2.2-1: Conduct a study to evaluate expansion and acceleration of automatic circuit tie schemes
- A.2.2-2: Conduct a study to evaluate expansion and additional circuit ties to improve transfer capability
- A.2.3-1: Prepare a Technology Plan
- A.2.3-2: Assess role of DMS for advanced applications
- A.2.3-3: Conduct a study to update Communications Plan
- A.2.4-1: Include cyber security for distribution equipment on the Verizon cellular network (as part of Communications Plan update)
- A.2.5-1: Conduct a comprehensive storm hardening study
- A.3.1-1: Pursue implementation of technology to further improve restoration capability
- A.3.3-1: Conduct a study to identify enhancements that are expected to be available from proposed expansion of PowerOn by GE
- A.3.3-2: Determine incremental benefits associated with AMI from a restoration perspective
- A.4.4-1: Conduct a study to develop specific criterion regarding minimum restoration times for single transformer substations

Financial Review

The Financial review of JCP&L operations has concluded that:

- No significant shortcomings exist with the corporate governance of either FE or JCP&L;
- The allocation of capital between JCP&L and the other FE distribution companies is appropriate and no evidence exists that a bias exists which disadvantages JCP&L
- The administration of human resources is reasonable and the compensation provided to JCP&L is at least comparable to other FE distribution companies
- No evidence exists that JCP&L is out of compliance with the merger order
- A review of JCP&L's financial management and operations indicates that the company is behaving reasonably

Major recommendations arising from the Financial Review include:

1. File an annual Results of Operations Report, as may be required by the BPU. (Recommendation B.1.12-1)*

JCP&L does not file an annual jurisdictional results of operations (ROO) report with the BPU, as is required of other FE distribution utilities in other jurisdictions⁸. Currently JCP&L only provides a copy of their FERC Form 1.

2. Investigate the appropriateness of implementing existing BPU policies on infrastructure recovery mechanisms, as well as other Alternative Regulatory Mechanisms (ARM) other than base rate ratemaking. (Recommendation B.1.12-2)*

Properly designed ARMs have the potential to: (1) reduce regulatory lag; (2) provide additional incentives to utilities to operate efficiently; (3) provide a mechanism to target investment in areas which are considered a high priority for investment; and, (4) reduce the costs of regulatory proceedings for both the company and the BPU.

Broader Policy Considerations

While all of the recommendations in this report apply to JCP&L, Navigant believes that several of these relate to broader policy considerations that could apply to other New Jersey Electric Distribution Companies (EDCs) and may be best addressed in conjunction with the BPU and broader State-wide proceedings, such as utility working groups and/or rulemakings. These recommendations, listed below, are noted with an asterisk (*) throughout the body of this report and in Appendix A.

- A.1.1-1: Evaluate cost-effective approaches and process changes for conducting contact voltage measurements
- A.1.5-1: Conduct a study based on a customer satisfaction survey to evaluate customers' expectations for reliability performance and storm restoration performance.
- A.1.6-1: Consider expansion of "ground to sky" clearing requirement
- A.2.3-1: Prepare a Technology Plan
- A.2.3-2: Assess role of DMS for advanced applications
- A.2.3-3: Conduct a study to update Communications Plan
- A.2.4-1: Include cyber security for distribution equipment on the Verizon cellular network (as part of Communications Plan update)
- A.2.5.1: Conduct a comprehensive storm hardening study
- A.3.3-2: Determine incremental benefits associated with AMI from a restoration perspective

⁸ Other FE utility jurisdictions requiring some form of results of operations reporting include Pennsylvania, West Virginia, Maryland, and Ohio.

- A.4.3-1: Conduct a study to evaluate updating LFDMS to account for existing and forecast net metered and large solar installations
- B.1.12-1: File an annual Results of Operations Report, as may be required by the BPU
- B.1.12-2: Investigate the appropriateness of implementing existing BPU policies on infrastructure recovery mechanisms, as well as other Alternative Regulatory Mechanisms (ARM)
- B.2.2-1: Include changes in capital structure as part of periodic reporting requirements to the BPU

Details of conclusions, recommendations, and supporting facts/findings are included in Sections A (Operational Review) and B (Financial Review) of this report. A complete list of recommendations categorized in relation to the Scope of Work is also included in Appendix A.

A. OPERATIONAL REVIEW

Navigant applied the approach and processes described above to each of the five operational areas that the Board requested in the independent assessment of JCP&L's operations. The five areas Navigant reviewed focused on the extent to which JCP&L has met commitments outlined in the BPU's Orders following Hurricane Irene and Sandy⁹, and enhanced reporting requirements outlined in the New Jersey Administrative Code (NJAC) as recently adopted by the BPU.¹⁰ To assess JCP&L's response in meeting these obligations, Navigant conducted a rigorous independent review of JCP&L's distribution system reliability, storm restoration capability, and readiness to meet future electric demand. We also assessed JCP&L's capital and expense budgeting processes, and the extent to which budgets are sufficient to meet reliability targets and operational objectives. The operational budget review overlaps with certain areas evaluated in the Financial Review, and findings related to JCP&L's budget processes and allocation appear in each review.

The five areas Navigant evaluated in the Operational Review include,

- A.1 Evaluation of JCP&L's Reliability Programs*
- A.2 Developing a Resilient System*
- A.3 Current Restoration Abilities*
- A.4 Distribution Planning Criteria and Load Forecasts*
- A.5 Capital/Investment and Operations & Maintenance O&M Spending*

For each of the five areas reviewed, Navigant analyzed JCP&L data and reports, conducted interviews with FirstEnergy Utilities (FEU) and JCP&L personnel, performed field inspections, and compared JCP&L's operational practices with our knowledge of industry best practices. Based on its independent assessment of these factors, Navigant developed conclusions for each of the five areas of review, followed by recommendations to address deficiencies, improve operational practices, and to ensure JCP&L is able to prospectively meet its obligations to the BPU's Orders and reporting requirements.

Each of the conclusions and recommendations presented in our review were developed by an experienced team with significant knowledge of all aspects of electric utility operations. The core project team included three senior practitioners, each with over 25 years' experience in electric utility operations. Each member of the senior team also has held senior management positions with electric utilities covering each of the five topic areas.

To maintain Quality Assurance (QA) and objectivity, Navigant conducted peer review discussions among the project team to test and confirm each of the hypotheses outlined in the work plan. Both the BPU and

⁹ *I/M/O The Board's Review Of The Utilities' Response To Hurricane Irene*, in BPU Docket No. E011090543, dated January 23, 2013 (the "Irene Order"); and the Hurricane Sandy order (*I/M/O The Board's Review of the Utilities' Response to Hurricane Sandy*, BPU Docket No. E012111050, dated May 29, 2013) (the "Sandy Order" (and collectively, the Irene Order and the Sandy Order are also referred to as the "Storm Orders").

¹⁰ See the BPU Order dated February 20, 2013 in BPU Docket No. EO12070650, and as modified by certain later orders dated 9-18-2013, and 1-29-2014 in the same BPU Docket and as later codified on August 15, 2015 in N.J.A.C. 14: 5-8.1 et seq.

JCP&L participated in a day-long validation of preliminary findings to provide each an opportunity to raise questions or offer suggestions on each topic addressed in the Operational Review. A senior member of the Navigant team with significant electric utility operational experience that was not involved in day-to-day work activities also reviewed all findings and conclusions.

A.1 Evaluation of JCP&L's Reliability Programs

JCP&L's reliability metrics, including cause codes and equipment affected, is a key data source to measure the effectiveness of reliability programs. Navigant analyzed key performance metrics versus cost, recognizing the timing of reliability measure can lag performance metric reporting. The quantitative review of reliability metrics was combined with observations on maintenance programs, including vegetation management and work methods to determine if prudent utility practices are adhered to by JCP&L.

For Task A.1, Navigant's review of JCP&L reliability compliance included an evaluation of the methods, data and systems JCP&L uses to record, measure and report reliability metrics for compliance reporting to the BPU and how these metrics are used to support reliability programs and budgets. Specific topics, data and reports that Navigant reviewed and evaluated to derive findings and recommendations included JCP&L's:

- 2013-2015 outage history and cause information contained within the outage management system ("OMS") including a demonstration of OMS, review of JCP&L's root cause analyses of outages discussed during JCP&L reliability meetings, and implementation of the BPU's enhanced reporting requirements;
- 2012-2014 Annual System Performance Reports and 2013-2015 Major Event Reports addressing JCP&L's reliability performance (taking into account the role and impact of JCP&L's reliability programs in mitigating and reducing the frequency and duration of service interruptions (i.e., CAIDI and SAIFI);
- 2013-2015 Inspection and Maintenance Programs as implemented by JCP&L's workforce including the ability of the current workforce to perform all required inspections, maintenance and testing of all facilities and infrastructure under such programs;
- Distribution Vegetation Management Program;
- Distribution Inspection & Maintenance Programs (Capacitors, Reclosers, Circuits and Equipment (overhead and underground)), Poles, Circuit Thermography, Highest Priority Circuits - including the use of customers experiencing multiple interruptions ("CEMI") to formulate circuit action plans;
- Sub-Transmission Inspection & Maintenance Programs (Overhead Circuits and Equipment, Poles, Circuit Thermography);
- Substation Inspection & Maintenance Programs (General Inspections, Protective Relays, Transformers, Batteries, Breakers, Thermography, Underground Networks);
- Life-cycle maintenance philosophy and practices, including the average age and condition of all critical system assets and JCP&L's approach to focus on the condition of the asset.

Following receipt of initial data requests, a series of interviews were held, first with FEU followed by JCP&L to confirm our understanding of reliability metrics and data provided in reports to the BPU and from data requests submitted to JCP&L. Questions Navigant raised during the interviews sought responses to the following topics relating to reliability reporting and compliance, including whether JCP&L has:

1. Met BPU reporting requirements and targets for reliability reporting, including normal and storm events?
2. Consistently applied documented approaches and methods to prepare reliability metrics and reports?
3. Rigorously applied reliability data and metrics to develop capital and expense budgets, and used analyses to support proposed spending?
4. Produced the desired results as documented in prior budgets and supporting justification submitted at that time? Is there a post-project and program assessment process to confirm value/benefits were achieved?
5. Accounted for updates to OMS that may have caused the recording of interruptions to shift over the past 3 to 5 years? Have these changes been documented and reported to the BPU?
6. Appropriately applied CEMI data to address areas subject to frequent interruptions?

Documents, data and reports Navigant reviewed in its assessment of JCP&L's compliance with the BPU's and enhanced reporting and reliability performance include,

- BPU Reliability Reporting and post-storm Orders,
- Annual System Performance Reports (2013 – 2015),
- Distribution outage statistics (Excel database obtained from Outage Management System for 2013 through 2015),
- Unsatisfactory Performance Reports (2013 through 2015),
- Monthly JCP&L Reliability Meeting Materials (2013-2015),
- FirstEnergy Distribution Inspection & Maintenance Practices (Several categories),
- Distribution substation and feeder inspection reports (electronic and hard copy),
- Vegetation management procedures and inspection reports (hard copy), and
- Capital Budgets (2013 to 2015 actual, and 2016 through 2020 forecast).

A.1.1 2013-2015 Compliance with the BPU's Reliability Regulations (Outages and Interruptions)

Conclusion: JCP&L was in compliance with BPU reliability reporting requirements for outages and interruptions during 2013, 2014 and 2015. The BPU required that 11 separate items be tracked and reported. Navigant verified that all 11 items were tracked and reported on schedule. JCP&L compliance with other BPU reporting requirements are addressed in other sections that follow. Given these findings, Navigant expects JCP&L is positioned to continue to be in compliance with the BPU's reporting requirements as presently structured.

Recommendations:

1. Evaluate cost-effective approaches and process changes for conducting contact voltage measurements on underground equipment and enclosures susceptible to human contact during routine inspections. This may include additional training for inspection personnel to perform measurements, which vary depending on the type of equipment used to measure contact voltage. Tests for contact voltage could be conducted periodically. For example, a one-time test or a 5-year interval between tests may be appropriate.*¹¹

Supporting Facts/Findings:

Navigant's review of 2013, 2014 and 2015 Annual System Performance Reports (ASPRs) confirm that JCP&L has met BPU reliability reporting requirements. We did not identify any exceptions reported by JCP&L to the BPU or notification of non-compliance by the BPU in any area or category outlined in the applicable NJAC or BPU Order(s). These include the following requirements set forth in the NJAC under Section 14.5-8.7 (b):

1. § 14:5-8.7 (b) 1. *The electric service reliability performance for the EDC's predefined operating areas in relation to their minimum reliability levels of SAIFI and CAIDI*
2. § 14:5-8.7 (b) 2. *A summary value for each EDC's New Jersey service territory as a whole, in relation to their minimum reliability levels for CAIDI and SAIFI*
3. § 14:5-8.7 (b) 3. *A summary of the EDC's system performance for the calendar year prior to the submittal of the report, accompanied by a graph displaying the data visually*
4. § 14:5-8.7 (b) 4. *A summary of the EDC's system performance for the 10 years prior to the submittal of the report, including the data for the previous calendar year, accompanied by a graph displaying the data visually;*
5. § 14:5-8.7 (b) 5. *Statistical tables and charts for EDC reliability performance in its New Jersey service territory and by each operating area*
6. § 14:5-8.7 (b) 6. *Ten years of trends of CAIDI and SAIFI*
7. § 14:5-8.7 (b) 7. *Ten years of trends reflecting the major causes of interruptions*
8. § 14:5-8.8 (c) 3. *The EDC's new reliability program(s);*
9. § 14:5-8.8 (c) 4. *The EDC's poor performing circuit program including the methodology used for circuit identification and any appropriate corrective actions*
10. § 14:5-8.8 (c) 6. *The EDC's stray voltage program*
11. § 14:5-8.8 (c) 7. *Technology initiatives to improve reliability*

¹¹ Given that inspection requirements set forth under NJAC 8. § 14:5-8.8 (c) apply to other New Jersey utilities, the Board may want to apply our recommendation on stray voltage measurements, if adopted, to other utilities through rulemaking or other processes to ensure it is consistently applied and performed at common testing intervals.

Navigant's conclusions and recommendations are based on findings presented in the following sections.

a) Organizational Structure

The FirstEnergy Utilities (FEU) corporate business unit created an organization (Regulatory & Reliability Reporting) approximately 10 years ago whose sole responsibility is regulatory reporting and compliance, including formal responses to BPU orders and legislative rulemaking. This group has instituted processes to track compliance and prepare reports responding to each of the BPU requirements consistent with those set forth in the NJAC. The group's primary focus on regulatory compliance likely helped JCP&L respond to and meet the BPU's reporting requirements. FEU reports that the EEI views these processes as an industry best practice. Navigant agrees with this observation.

Locally, JCP&L's organizational structure includes groups primarily responsible for addressing reliability and performance issues, including supporting BPU reporting activities administered by FEU's Regulatory & Reliability Reporting organization.¹² JCP&L's Reliability group is responsible for data reported to the BPU, and has demonstrated that it uses the data to implement programs and requirements outlined in the BPU's reliability reporting requirements.

b) Operational Processes

JCP&L has established processes and organizational responsibilities to address power quality, stray voltage issues and other distribution performance issues that may arise or reported by customers. However, JCP&L does not appear to routinely survey for stray voltage, which is common utility practice in urban areas. Navigant is aware that JCP&L and the other NJ EDCs conducted and concluded a pilot contact voltage program at BPU direction.¹³ The results of the pilot may not support an independent inspection program; however, given that all underground equipment currently is inspected annually, the additional time and effort needed for the same inspection personnel to also conduct these safety tests on a periodic basis – for example, every five years – may be warranted.

¹² Although the group is responsible for completing regulatory reports, it does not process outage or related information, relying instead on the PowerOn Outage Management System to provide reliability data for the reporting. Generally, the group collects and tracks information, writes the compliance filings, and identifies information anomalies that are forwarded to the operating companies for resolution, particularly if used in compliance filings or reports. There are distinct advantages with the centralization of this function at FEU, as a team of almost 10 employees has sole responsibility for keeping an up-to-date knowledge of changing regulatory requirements, developing consistent responses, retaining institutional knowledge, use of common resources, and maintaining consistent records.

¹³ See Order issued June 15, 2011 in BPU Docket No. EO10100760.

c) Technology Solutions

JCP&L has implemented new technologies and solutions to improve reliability performance and storm restoration, including outage detection and tracking systems. (Technology initiatives are addressed further in Section A.2 and A.4.)

JCP&L has spent funds between 2013 and 2015, where applicable, for each of the programs cited in the above listing of BPU reporting requirements; and has committed funds in its current proposed capital budget for 2016 through 2019 for these programs.

d) Reliability Funding & Budgets

A large portion of the funding for reliability programs is contained in Programmatic and Specific capital budget categories; however, some funding is contained in blanket accounts, and does not directly appear as line items in the capital budget, RPA system, or capital spending reports (capital funding is addressed in Section A.5.).

A.1.2 2013-2015 Compliance with the BPU's Reliability Regulations (Reliability Targets)

Conclusion: JCP&L has met or exceeded BPU reliability targets since 2012. There are opportunities to use cause code data used to prepare reliability metrics to help meet or exceed these targets in future compliance filings.

Recommendations:

1. Conduct root cause evaluation of outage events assigned to overhead conductor cause codes. Institute a remediation program to address conductor type or construction most susceptible to failure, including spacer cable and splicing repairs performed by outside contractors and utilities following Hurricanes Sandy and Irene. This program could be created as a separate reliability program or incorporated into worst performing circuit or other reliability programs depending on the results of the root cause analysis.

Supporting Facts/Findings:

JCP&L reliability data reported in ASPRs confirm that it has met BPU targets for 2013, 2014, and 2015. The ASPR reports indicate JCP&L reliability metrics as measured by Customer Average Interruption Duration Index (CAIDI) and System Average Interruption Frequency Index (SAIFI) have improved by up to 40 percent since 2012.

Navigant's conclusions and recommendations are based on findings presented in the following sections.

a) Reliability Metrics

Navigant independently reviewed JCP&L interruption statistics obtained from OMS databases and confirmed results are consistent with those reported to the BPU. (See Table 1 of historical CAIDI and SAIFI below, from JCP&L's 2015 ASPR)

Table 1. JCP&L Historical CAIDI and SAIFI Results, 2006-2015

JCP&L		
Year	Actual CAIDI (Minutes)	Actual SAIFI (Outages)
2015	92	0.96
2014	105	1.04
2013	114	1.16
2012	114	1.11
2011	117	0.99
2010	119	1.11
2009	104	1.00
2008	94	1.05
2007	94	1.24
2006	119	1.40

The 2015 performance shown above for JCP&L as a whole exceeds the BPU Minimum Reliability Level of 1.22 outages for SAIFI and 110 minutes for CAIDI. It also exceeds the BPU Benchmark Reliability Level of 1.02 for SAIFI and 101 minutes for CAIDI. BPU Minimum and Benchmark Reliability Levels are also exceeded individually for the Northern and Central regions within JCP&L (see table of 2015 CAIDI and SAIFI results below, from JCP&L's 2015 ASPR)

Table 2. 2015 JCP&L CAIDI and SAIFI Results

	CAIDI			SAIFI		
	Benchmark Reliability Level	Minimum Reliability Level	2015 Actual (Minutes)	Benchmark Reliability Level	Minimum Reliability Level	2015 Actual (Outages)
JCP&L	N/A	N/A	92	N/A	N/A	0.96
JCP&L-Northern	128	151	113	1.18	1.35	1.02
JCP&L-Central	101	110	75	1.01	1.22	0.91

FEU reports that JCP&L's reliability statistics as measured by SAIFI and CAIDI exceed those of the other FE operating companies (see Table 8 in Section B.1 for relative rankings).

b) Reliability Programs

FEU and JCP&L have established programs that focus on reliability improvements, including Worst Performing Circuits, vegetation management, and new programs such as CEMI under its

Highest Priority Circuit Program, consistent with those outlined in the BPU Enhanced Reliability Reporting requirements¹⁴, each of which have contributed to improved reliability performance.

The greatest area of improvement by cause code has been tree trimming, where targeted programs including off right-of-way (ROW) trimming and removal have contributed to significant reductions in SAIFI and CAIDI. Notably, the hours of customer interruption caused by fallen trees or limbs outside the ROW as reported in ASPRs has exceeded those from within the ROW by a factor of 3 to 8 each year since 2013.

c) Outage Data & Cause Codes

Equipment-related outages as measured by hours of customer interruption is the leading cause of outages, ranging from 35 to 40 percent of total hours of interruption. Tree-related outages is the second leading cause of interruptions, ranging from 15 to 20 percent of total hours of interruption.

Table 3 presents 3-year minutes of customer minutes of interruption (CMI) by equipment type for the Equipment Failure cause code, which confirms most equipment-related interruptions are caused by failure or mis-operation of devices on overhead and underground distribution lines.

Table 3. CMI for Equipment Failure Cause Code

Equipment Component	3-Year CMI	Percent
Cutout - Porcelain	7,826,135	8%
Conductor - Bare	7,618,261	8%
Conductor - Spacer / Aerial	7,089,279	7%
Cutout - Polymer	5,603,503	6%
Transformer Substation	4,843,506	5%
Fuse Link	4,768,291	5%
(blank)	4,411,929	5%
Recloser	4,207,243	4%
None/Other OH	4,043,064	4%
Cable - Direct Bury	3,432,983	4%
Supervisory	3,202,213	3%
Crossarm	3,141,006	3%
Jumper/Tap	2,609,843	3%
Transformer - Conv	2,512,028	3%
Conductor Covered	2,509,226	3%
All Other	27,263,296	29%
Total	95,081,806	100%

¹⁴ e. g. NJAC § 14:5-8.8 (c) 4., which requires EDC's to provide responses in their Annual System Performance Reports (ASPR) on actions taken with regard to poor performing circuits.

Conductor-related damage causes represent approximately 18% of equipment-related interruptions (*i.e.* as measured within the Equipment Failure cause code) as measured by CMI.¹⁵ Cut-outs and fuse links represent 19% of equipment-related interruptions. Each of these values appear to be high based on Navigant's experience working with other utilities. JCP&L has an extensive amount of spacer cable, approximately 2,800 miles, and reports that it has been susceptible to lightning-related interruptions with limited ampacity and reluctance of foreign crews to work hot during outages. Tree-related failures also exacerbates damage to poles and appurtenances equipped with spacer cable. The failure rate of cut-outs also appears high; however, JCP&L provided evidence it is proactively addressing defective cut-outs.

The percent of outages caused by vehicles as measured by hours of customer interruption in 2015 was over 10 percent in 2015, and just under 10 percent for 2013 and 2014. The value appears high compared to interruption statistics based on Navigant's experience working with other utilities.¹⁶

d) Major Outage Events

A review of outage reports and databases indicates the absence of catastrophic events such as lengthy substation or feeder outages, repeated failures, loss of supply to critical facilities or customers, failure of the secondary network, fires or major damage; each of which typically attract undesirable customer and media attention.

A.1.3 2013-2015 Compliance with the BPU's Reliability Regulations (Processes and Systems)

Conclusion: JCP&L processes and systems for reliability reporting are thorough and designed to produce accurate metrics for ASPR reporting, and that are used to develop reliability programs and budgets.

Recommendation:

1. Develop and document formal cause code descriptions and criteria for assigning outage codes to specific events. The documentation should include sufficient detail for training Distribution Control Center (DCC) staff and field crews on the criteria and circumstances under which outages should be assigned to defined cause codes.

¹⁵ CMI caused by conductor failure is approximately 10 percent of total CMI, when conductor failures in the "Line Failure" cause code is combined with conductor failures within the "Equipment Failure" cause code.

¹⁶ However, about 37 percent of poles struck by vehicles that lead to an interruption in service were owned by third parties. Further, 42 percent of the total number of poles on JCP&L's system are owned by third parties. This data suggests a substantial number of interruptions occur on poles owned by third parties and outside of JCP&L's direct control.

Supporting Facts/Findings:

Navigant's conclusions and recommendations are based on findings presented in the following sections.

a) Outage Data Processing

Reliability data obtained via OMS undergoes a 3-level review by JCP&L and FEU: (1) Data is reviewed daily by the JCP&L DCC Supervisor or Distribution Technician; (2) It also is reviewed monthly by JCP&L Reliability's group by engineers and technicians; (3) The final review and documents submitted to the BPU via ASPR is conducted by FEU's Regulatory Compliance & Reporting group.

2. Outage Management System

Navigant interviewed FEU staff responsible for OMS support and development, viewed a demonstration of the GE PowerOn Outage Management System that JCP&L uses to report reliability metrics, and viewed application of the OMS, real-time and on site, by JCP&L DCC personnel. Navigant is familiar with GE's PowerOn OMS used by JCP&L and the other FEU operating companies, as it is a highly reputable, leading industry tool used by utilities throughout North America to track and capture outage data used to derive reliability metrics. Recent enhancements to the OMS made on behalf of FEU and its operating companies include improved partial restoration, and tracking and recording of nested outages,¹⁷ a concern raised by the BPU of OMS capabilities during prior major storms. These and other OMS enhancements should continue to support accurate reporting of reliability data.¹⁸

3. Cause Code Assignments

Effective reliability programs are highly dependent on accurate field reporting of outages by cause and the conditions under which the outage(s) occurred. OMS is set up to allow field crews and Distribution Operations personnel to assign an outage to one of 29 cause codes. Based on Navigant's experience at comparable utilities, a review of outage data and interviews with JCP&L staff, we conclude that JCP&L's use of cause and equipment codes is consistent with industry practices and consistently applied. The number of outages assigned to "Unknown" is below 10 percent for most years, a desirable level. All weather-related outage events must be assigned a specific weather code, which provides reliability engineers with information needed to identify mitigation options. Both cause code and weather assignment are reviewed by JCP&L Distribution Control Center supervisory staff to ensure consistency and accuracy of outage

¹⁷ Incorrect reporting of "Nested" outages can occur when several sections of a distribution feeder experiences interruptions. When the main circuit breaker at the substation is closed, the presence of outages that have not been restored on lateral line segments and distribution transformers may be incorrectly reported as restored. This inaccuracy may cause inaccurate reporting of outage data and false restore messages to customers via FEU's automated Interactive Voice Command (IVC) systems; particularly during major outage events.

¹⁸ Several other OMS enhancements related to outage restoration, particularly during major storms, are discussed in Section A.3.

reporting. JCP&L field crews are provided outage cause code and data entry support via FEU's "Work Management Training" programs. However, there does not appear to be formal training and documentation provided to field crews to assist them in entering outage data from the field, including the criteria they should use to assign weather, cause code, and other outage data for entry into mobile terminal units.

A.1.4 JCP&L 2013-2015 Compliance with the BPU's Reliability Regulations (Preventive Maintenance)

Conclusion: JCP&L has met BPU reporting requirements under NJAC § 14:5-8.7 (c) for preventative maintenance (Vegetation Management is addressed in Section A.1.6).

Recommendations:

1. Evaluate the replacement program currently underway for primary underground cable (Bare Concentric Neutral or BCN). Review and update asset registry for underground conductor, where possible, to confirm cable type, vintage, insulation type, failure history, known defects (based on failure history or industry data for similar cable types), cable sheathing (or absence thereof; e.g. bare concentric neutral), direct buried or in conduit, and initial condition assessment. Update and rank cable condition and failure impact to determine cable most susceptible to failure and number of customers impacted by a failure. Expand underground cable and equipment replacement program to prioritize and proactively replace cable that is most at risk. Develop a five-year plan and capital budget based on the results of the underground cable condition and outage risk assessment based on quantities that should be replaced to avoid accelerated deterioration. Options could include cable injection or cable replacement.
2. Conduct a study to determine the benefits of expanding underground equipment inspections to include visual inspection of equipment and materials inside enclosures, termination boxes and padmount transformers.

Supporting Facts/Findings:

Navigant's review of 2013, 2014 and 2015 ASPRs confirm that JCP&L has met BPU reporting requirements for preventative maintenance (PM). We did not identify any exceptions reported by JCP&L to the BPU or notification of non-compliance by the BPU in any area or category outlined in the NJAC or applicable BPU Order(s). Specific maintenance categories that Navigant reviewed for compliance include:

1. *Distribution Capacitor Inspection & Maintenance*
2. *Distribution Line Recloser Inspection & Maintenance*
3. *Distribution Circuit and Equipment Inspection & Maintenance*
4. *Distribution Pole Inspection & Maintenance*
5. *Substations General Inspection*

6. *Substation Protective Relay Inspection & Maintenance*
7. *Substation Transformer Inspection & Maintenance*
8. *Substation Battery Maintenance Inspection & Maintenance*
9. *Substation Circuit Breaker Inspection & Maintenance*
10. *Substation Underground Network Inspection and Maintenance*

Navigant's conclusions and recommendations are based on findings presented in the following sections.

a) Annual System Performance Reporting

The PM information reported in the ASPRs is thorough and responsive to BPU reporting requirements. Charts and tables display PM activities by equipment category. The ASPR reports indicate JCP&L has achieved 100 percent PM compliance since 2013.

The ASPRs clearly indicate PM completed in the prior year, including a description of PM programs designed to improve reliability, or actions undertaken to address power quality or stray voltage issues.

b) Underground Inspection Program

Consistent with the BPU's Enhanced Reliability Reporting requirements, JCP&L's underground equipment inspection program exceeds industry practices, as virtually all ground-mounted equipment is inspected on a scheduled basis. Some utilities sporadically inspect underground equipment, and in some instances, or only inspect underground equipment when there is evidence of degradation or performance issues; the latter often is justified as equipment that is "run-to-failure".

While underground equipment inspection exceeds industry standards, JCP&L has not implemented a systematic inspection and prioritization of underground radial distribution (URD) cable at risk, including the amount of URD cable that should be replaced to avoid accelerated deterioration. JCP&L cable replacement program has targeted direct-buried BCN cable for replacement [REDACTED]

JCP&L does not conduct non-destructive testing (NDT) for underground cable. [REDACTED]

[REDACTED] Navigant is aware that other utilities also do not perform NDT's, while others have aggressively pursued such tests.

A.1.5 Ability to Meet 2016-2020 BPU Reliability Targets

Conclusion: Navigant did not identify any systemic deficiencies that indicate JCP&L will not be able to meet BPU reliability targets if spending occurs in amounts equal to or greater than those outlined in JCP&L's 2016 to 2020 budget forecast.

Recommendation:

1. Conduct a study based on a customer satisfaction survey to evaluate customers' expectations for reliability performance and storm restoration performance. Evaluate cost-effective reliability programs to achieve customers' expected level of performance if it exceeds BPU targets.*

Supporting Facts/Findings:

JCP&L has provided evidence that reliability and system performance is a priority, as it has a department of engineers, technicians and analysts dedicated to distribution reliability and performance. More generally, FirstEnergy's focus on reliability is supported by policies and a central organization that provides independent technical support and guidance, as well as budgetary review of proposed reliability programs and projects.

In addition to the above observation, Navigant's conclusions and recommendations are supported by findings presented in the following sections.

a) Inspection and Maintenance Programs

JCP&L has instituted inspection and preventative maintenance programs to ensure equipment performs as designed and to proactively detect degradation in equipment performance or condition. Inspection programs include those reported to the BPU in ASPRs.

Historic and proposed annual capital spending includes up to 8 core programs designed to ensure reliability and JCP&L's performance continues to meet or exceed BPU targets.

b) Reliability Measurement and Tracking

JCP&L, with support from FEU, has implemented systems and processes to accurately measure and track reliability performance, and uses the data to support reliability programs and projects. Specific policies and programs that JCP&L has in place to address distribution reliability and performance include:

1. JCP&L conducts regularly scheduled monthly reliability meetings attended by a broad cross-section of JCP&L operations, engineering and support staff to analyze the worst performing 20 circuits from the prior month. Follow-up action is assigned based on findings and recommendations from the meeting.
2. FEU has established a formalized process for defective or unacceptable equipment and processes that virtually anyone in the Distribution organization can use to alert FEU's Standards Department. [REDACTED]

[REDACTED]



3. JCP&L tracks on and off-ROW tree-related outages, which has and should continue to enable the company to target tree-trimming to areas where the greatest benefit can be achieved, such as targeted, out-of-cycle spot trimming.
4. Projects or programs based on changes in design standards or practices should contribute to improved reliability, such as the targeted re-routing of Barrier Island primary overhead lines from off- to on-roadway access and use of stainless steel transformers in areas with high salt content.

A.1.6 Adequacy of JCP&L's Vegetation Management Program

Conclusion: JCP&L's Vegetation Management as implemented by the Company is compliance with the BPU Storm Orders and the BPU's regulations under NJAC Section 14.5 is well managed, and is consistent with industry best practices.

Recommendation:

1. Consider expansion of "ground to sky" clearing requirement to include three-phase primary line sections beyond Zone 1 on feeders with short Zone 1 lengths such as feeders with reclosers located close to the substation). Consider relocating reclosers that are close to substations to locations further out on the feeder to achieve this objective.*¹⁹

Supporting Facts/Findings:

Navigant's review of 2013, 2014 and 2015 ASPRs confirm that JCP&L has met BPU reliability reporting requirements for Vegetation Management. We did not identify any exceptions reported by JCP&L to the BPU or notification of non-compliance by the BPU in any area or category outlined in the NJAC or applicable BPU Order(s). These include the following requirements set forth in the NJAC under Sections 14.5-8.7(c) and 14:5-9.7(c):

1. § 14:5-8.7 (c) 9. *The vegetation management work and planned activities as required in 14:5-9.7*

¹⁹ Similar to other recommendations relating to BPU enhanced reporting regulations under NJAC Section 14, Navigant recognizes that changes we recommend would be applied to other New Jersey EDC's through rulemaking or other regulatory mechanisms.

2. § 14:5-9.7 (c) 1. *The municipality in which work was performed;*
3. § 14:5-9.7 (c) 2. *Identification of the circuit and substation where vegetation management activities were performed;*
4. § 14:5-9.6 (h) 1. *List the transmission lines planned for vegetation management for the next four years in advance (one of the four-year cycles required at 14:5-9.4(b));*
5. § 14:5-9.5 (d) *Each EDC shall provide a copy of its vegetation management standards and guidelines to the BPU as a chapter in the Annual System Performance Report.*
6. *BPU Order to include a summary report and listing of certain tree-related outage incidents that trigger an investigation by an EDC forester*

Navigant's conclusions and recommendations are based on findings presented in the following sections.

a) Vegetation Management Procedures

JCP&L has up-to-date, documented procedures and policies in place for Vegetation Management. These include Vegetation Management Distribution Procedures that apply to all FEU companies, which document company and contractor responsibilities for tree trimming and removal. It includes diagrams and clearing zone specifications within the trimming envelop, and customer notification procedures per NJAC 14:5-9.10. It also includes a points-based scoring system used to assess the quality of contractor work and compliance with documented procedures. JCP&L assesses contractor performance at least twice a year, and has used information from the scoring sheets when evaluating contractor bids for subsequent years' work.

b) Vegetation Management Tracking and Reporting

A dedicated FE organization is in place to track progress of JCP&L's Vegetation Management (VM) program and reporting requirements. The results from JCP&L's VM programs is included in the JCP&L ASPRs. FE tracks VM progress monthly and reaches out to the operating companies, including JCP&L, to assure compliance.

JCP&L has consistently demonstrated 100% compliance with the BPU's mandated 4-year trimming cycle for vegetation management.

c) Quality Assurance

JCP&L audits 100% of the circuits trimmed by contractors via their internal form 1051 to ensure work completed meet specifications. If any trimmed areas are found to be out of specification (poor trim) a process is in place to have the contractor go back and perform additional trim. The audit process ensures that contractor work is in compliance before payment is authorized.

d) Enhanced Trimming Procedures

Per the BPU Hurricane Order (and as codified in recent amendments to the BPU's regulations), JCP&L has instituted an outside of right-of-way trimming program.²⁰ This program has proven effective as it reduced VM-related interruptions caused by danger trees and limbs outside the ROW.²¹ Table 4 confirms the majority of JCP&L's tree-related outages as measured in customer hours of interruption represent a portion of total interruptions.

Table 4. Tree-Related Sustained Customer Interruptions²²

JCP&L ^{(a),(b)}							
Year	Trees Non Prev. ^{(c)(l)}	Trees Prev. ^{(d)(l)}	TREES - SEC/SERVICE ^{(e)(l)(j)}	TREES OFF ROW-LIMB ^{(f)(l)(j)}	Trees Off ROW-TREE ^{(g)(l)(j)}	TREES ON ROW ^{(h)(l)(j)}	Total
2015	N/A	N/A	2,178	98,873	119,211	50,320	270,581
2014	N/A	N/A	10,383	116,691	145,173	117,046	389,293
2013	151065 ^(k)	10940 ^(k)	13,615	95,768	158,352	58,944	488,683

(a) All outage trend data is based on a sustained interruption being defined as an interruption of greater than 5 minutes duration

(b) All trend data are shown in hours of customer interruption

JCP&L has initiated a "ground to sky" clearing requirement on the feeder main line from the breaker up to the first protective device (Zone 1 or Lock-Out Zone). This process was started in 2016 per recent amendments to the BPU's regulations in NJAC 14:5-9.8 (b) 1 and is considered best in class for reliability.²³ The number of tree-related interruptions resulting from feeder breaker lock-outs represents a substantial portion of total tree-related outages, which adds justification to the program. Figure 3 is an example of the type of overhang that new rules implemented in January 2016 are intended to address.²⁴

²⁰ JCP&L previously instituted a form of this approach in a program referred to as corridor widening during the time frame 2009-2012, addressed in the Company's 2012 Rate Case testimony but otherwise beyond the scope of this review.

²¹ Danger trees are identified in pre-trim inspections by JCP&L Forestry staff and contractors.

²² This Table appears in JCP&L 2015 ASPR which explains the transition from prior tree-related outage causation codes to the current set of cause codes under applicable BPU regulations.

²³ Also see Footnote 20.

²⁴ Previously, the BPU considered a more extensive ground-to-sky clearance requirement. However, rules adopted by the BPU in August 2015 provided only for such clearance in the lock-out zone based on input from a working group comprised of interested stakeholders and the NJ EDCs, and with consideration of cost data provided by the EDCs and ascetic considerations from communities.

Figure 3. Ground-to-Sky Trim



Source: 2016 Capital Portfolio Review, August 12, 2015

A.1.7 Adequacy of JCP&L's Inspection and Maintenance Programs

Conclusion: JCP&L Inspection and Maintenance programs, as implemented by the company's workforce, are in compliance with the BPU orders and are well managed.

Recommendations:

1. Develop tracking system of equipment mis-operations or failures for areas where data is not centrally managed or tracked, such as distribution relays.
2. Evaluate benefits of expanding padmount equipment inspection to include interior components (i.e. inside the cabinet) for degradation or conditions that could lead to potential failure.
3. Implement a formal reporting process for engineering review of inspection and maintenance reports. The reports should include key findings from annual inspections and maintenance

activities, including trending analysis of major equipment that has experienced increased maintenance over time. Such information should be used by engineering staff in reliability and capacity planning to assess the need to institute replacement programs or system upgrades.

Supporting Facts/Findings:

Navigant's conclusions and recommendations are based on findings presented in the following sections.

a) PM Organization

JCP&L has assigned staff within its distribution department to track progress of its PM programs and reporting requirements. The results of JCP&L's PM programs are included in its ASPRs. FEU tracks PM progress monthly and reaches out to the operating companies, including JCP&L, to assure compliance.

JCP&L has consistently reported 100% compliance to the BPU mandated PM requirements. A sample report from JCP&L's 2015 ASPR is presented in Table 5. Similar reports indicating 100 percent compliance appear in 2013 and 2014 ASPRs.

Table 5. 2015 Inspections

Company-Wide Programs	Equipment	Inspection Frequency	Total Number of Units	2015 Target (Number of Inspections)	Number of Inspections Completed	% of Target Completed
Distribution	Capacitor – Banks ^(a)	Annually	2,618	2,618	2,618	100%
	Recloser – Sites ^(b)	Annually	612	612	612	100%
Transmission	Aerial	Twice / year	-	2	2	100%
Sub – Transmission	Ground Line Poles ^(c)	10-Year Cycle	20,000	2,264	2,264	100%
Substation	General	Monthly	177	2,124	2,124	100%
	Critical (NERC/RFC) Relay Schemes	5-Year Cycle	602	76	76	100%
	Infrared Inspections	Annually	177	177	177	100%
	Battery	Annually	177	177	177	100%

Navigant reviewed completed inspection reports to confirm the above for assets in each distribution category.²⁵ JCP&L reports that all maintenance resulting from the inspections are

²⁵ Inspection data is manually entered into paper-based forms for capacitors and reclosers. All other inspection data is entered into electronic forms via hand-held devices. JCP&L indicated it plans to convert all inspection forms to electronic entries.

completed prior to year-end – i.e., no maintenance backlog is allowed except for major corrective maintenance, which can be carried over to the following year and not counted in ASPR statistics. Because corrective maintenance often results in extension of asset lives, it often is capitalized. This practice exceeds those applied by most utilities, where some backlog typically exists.

There is a centralized FE engineering organization that provides support to JCP&L. The engineering organization has approximately 42 engineers (not including managers and supervisors who are also engineers but not designated as such) with approximately 12 engineers with a reporting location in the North and 14 with a reporting location in Central New Jersey areas. JCP&L's engineering organization is aware that preventive maintenance and inspections are performed, but they do not routinely receive copies of the inspection reports.

b) PM Practices and Procedures

JCP&L procedures detail three types (i.e., classes) of substation maintenance: [REDACTED]

For distribution feeders, Navigant's review of completed JCP&L PM reports confirmed up to date inspection procedures are in place for capacitors, reclosers, circuits, equipment OH/UG, pole inspections, circuit thermography, and portions of circuits exceeding CEMI reliability thresholds. These procedures are considered by Navigant to be industry best practice.

Similarly, Navigant's review of completed JCP&L PM reports confirm up-to-date inspection procedures are in place for substation general inspections, protective relays, transformers, batteries, breakers, and thermography. These documented procedures, as well as the robustness of inspections conducted, are consistent with leading utility practices.

c) PM Tracking

Although equipment inspection and maintenance data is entered into tracking systems such as Cascade, JCP&L does not regularly track and trend equipment mis-operations or performance anomalies. Rather, JCP&L typically addresses performance issues as they arise. Examples include protective relays and oil circuit breakers. JCP&L indicated that formal tracking is not necessary due to the low number of performance issues for major equipment and actions taken soon after the event has occurred. One example of absence of tracking systems is protective relaying. [REDACTED] but it is difficult to determine if the number is increasing or decreasing.

d) Secondary Network

JCP&L operates a single underground secondary network in Morristown.²⁶ A review of the Morristown underground network inspection data, test procedures and improvement plans indicates JCP&L procedures are consistent with industry best practices. The absence of major interruptions or failures within the network confirms the network has been properly maintained.

A.1.8 Life-cycle Maintenance Philosophy and Practices (Asset Management)

Conclusion: JCP&L has established processes and systems to select and recommend for budget approval specific reliability projects and programs. These programs have proven effective as reliability has improved since 2012. However, the Company has not implemented fully functional asset management practices and systems that Navigant has encountered at other comparable utilities that potentially could accelerate reliability benefits or achieve the same level of reliability at lower cost.

Recommendations:

1. Formalize asset management processes and practices for JCP&L's Distribution organization. This recommendation includes several steps and activities to be evaluated and potentially implemented based on benefit versus cost considerations that would include the development of:
 - a. A mission statement with regard to asset management principles and objectives at JCP&L;
 - b. An overall JCP&L and FEU governance of asset management organization and policies;
 - c. Organizational responsibilities within JCP&L for implementing asset management practices;
 - d. Guiding principles regarding management of assets over their life-cycle;
 - e. New or enhanced systems required for performance assessment and condition monitoring of distribution assets;
 - f. Analytic/predictive methods for equipment diagnostics, failure modes and risk assessment;
 - g. Asset ranking and prioritization methods for capital investment decisions, including risk versus cost trade-offs that would be incorporated into RPA budgeting processes; and
 - h. A continuous improvement process, including post-project review; typically part of the capital management process

2. Develop procedures, criteria and systems required to assess and rank equipment condition (concurrent with the development and implementation of asset management practices). This

²⁶ A secondary network is a highly reliable distribution system operating at 600 volts and below. The network is designed and operated to provide continuous supply to distribution load within the network via a mesh configuration of primary and secondary lines. The networked system can withstand a loss a one or more lines or transformers within the network – referred to as a single or double contingency event – without interruption of load.

could include establishment of health indices for individual assets or assets grouped by class that would be used to determine end-of-life and replacement versus repair decisions. It should start with most critical assets such as substation transformers and breakers, followed by other important distribution assets such as underground cable and pole top reclosers. Implementation should be commensurate with results of cost/benefit analysis, and project prioritization.

Supporting Facts/Findings:

FEU has established 8 “core” reliability programs that each operating company is expected to evaluate and consider in each year’s O&M and Capital budgets. JCP&L’s has met this objective over the past 3 years and included these programs in future budgets. Core programs include:

1. Sectionalizing;
2. CEMI;
3. Worst Performing Feeders;
4. OH Lines;
5. UG cable;
6. Substation enhancements;
7. SCADA; and
8. Underground (UG) networks (Morristown has a single UG secondary network)

Navigant’s conclusions and recommendations are based on findings presented in the following sections.

a) Project Set-Up and Review

FEU’s “Request for Project Authorization” process enables JCP&L engineering and operations staff to propose projects to improve reliability throughout the year. These projects can be entered into the RPA system at any time. Project justification is based on a business case analysis designed to demonstrate net benefits to JCP&L. Reliability performance is a primary benefit category used to justify proposed projects. However, the budgeting process begins with historical spending as an initial target, and then operating companies prepare a budget, based on a rigorous needs assessment. Evidence of a pre-determined budget is supported by the observation and comments received that the last years’ budget is a “starting point” for several budget categories. (See additional detail in Section A.5)

b) Project Approval

FEU and JCP&L follows a **■**-round budget review process to ensure the portfolio of programs and projects submitted by the operating companies are reviewed and have sufficient justification to receive funding approval by FEU senior management. JCP&L typically vets proposed reliability (and other) projects internally before they reach the Round 1 review, with only those projects most likely to be approved proposed for budgetary approval. JCP&L’s engineering and reliability groups indicated that virtually no projects it has recommended for approval been rejected during

the 1st-round review process. While the development of capital budget portfolios goes through an extensive development process within JCP&L prior to Round 1, with ample documentation, some projects and programs that could potentially receive approval are not included in the capital budget portfolio for review by FEU senior management.

c) Condition Assessment and Asset Management

While certain elements of asset management are applied by FEU and JCP&L, a cohesive, risk-based life-cycle approach to managing assets does not appear to be fully documented. There is no documentation or policies that specifically address FEU's or JCP&L's asset management principles or philosophy, and how they should be incorporated into the JCP&L's decision-making processes related to operations and continuous improvement.

Although feeder performance is tracked (e.g. CEMI and worst performing feeders), there does not appear to be a formal tracking systems or trending reports that present changes in asset condition over time for major equipment categories such as circuit breakers, power transformers and protective relays. Navigant's review of JCP&L 2013 to 2015 reliability data indicate interruptions caused by equipment failure or mis-operations is the leading cause of outages. This finding underscores the value of condition-based evaluation and replacement decisions. However, the condition of major equipment such as substation transformers and circuit breakers is not based on health indices, nor is there a risk-based prioritization of assets targeted for replacement.

JCP&L has not established formal training programs based on asset management practices and principles, such as those designed to manage assets over the entire life cycle. There also does not appear to be a formally documented post-implementation review of project or program effectiveness as part of a continuous improvement program.

A.1.9 Life-cycle Maintenance Philosophy and Practices (Replacement Programs)

Conclusion: JCP&L has in place a very comprehensive inspection and maintenance program that has been effective in mitigating the risks associated with reactive replacement programs. However, JCP&L should also consider on a cost-benefits basis the use of some pro-active replacement programs for particular assets whose performance demonstrates systematic adverse trending that could result in reliability impacts.

Recommendations:

1. Conduct a study to evaluate the cost-effectiveness of initiatives or programs to proactively replace equipment where risk of failure or degraded performance and associated impacts is increasing. Equipment for which JCP&L should consider for proactive replacement include underground primary cable, oil circuit breakers (and other breakers that are increasingly becoming obsolete) and electro-mechanical relays. Replacement decisions should be supported by a rigorous assessment of asset condition as a means to prioritize replacements.

2. Conduct a study the use of additional analytical methods and tools to predict equipment failure rates based on asset management principles for individual major equipment such as circuit breakers and substation transformers and by asset classes such underground cable by insulation type, material, sheathing and size; operating and vintage including asset condition.
3. Develop a comprehensive asset registry for primary underground cable, that groups equipment based on cable type, insulation type, insulation size, neutral configuration, burial (direct vs. conduit), location, prior failure history and other relevant condition data that JCP&L can use to identify, rank and prioritize replacements.
4. Consider re-instituting cable injection as a life-extension alternative on cable where the number of splices are low and is a cost-effective alternative to replacement.
5. Conduct a study that estimates the amount of URD cable that should be replaced over the next 10 years based on findings and recommendations outlined in FEU's 2013 *Underground Cable Replacement* Project report. Continue to focus on cable at risk, mostly BCN, to ensure cable replacements are scheduled in manner to phase out obsolete cable. The study should include the total amount of URD by type (See Recommendation No. 3 above as to how cable could be categorized) and the number of miles within each category that should be replaced to systematically reduce the amount of URD cable at risk. The study should include annual cost for these replacements over the next 10 years. JCP&L should revise its long-term capital budget to include funds dedicated to URD cable replacements based on study results and recommendations.

Supporting Facts/Findings:

Navigant's conclusions and recommendations are based on findings presented in the following sections.

a) General Practices

JCP&L has in place a very comprehensive inspection and maintenance program that has been effective in mitigating the risks associated with reactive replacement programs. Navigant observed that JCP&L's capital improvement programs and budgeting processes include corrective action to be taken based on historical reliability and performance data obtained from inspection and maintenance programs cited above. This approach tends to lead to projects being reviewed and prioritized based on short-term risk versus cost. We note the absence of predictive metrics such as failure rates based on an analysis of the relatively short-term risks versus the cost of the proposed projects. Although JCP&L reliability performance exceeds it regulatory-required standards, the Company does not appear to regularly employ the use of predictive metrics such as failure rates based on asset condition and performance, and the use of predictive methods to determine the cost-effectiveness of repair versus replacement decisions. A review of core reliability programs and project budgets for JCP&L does not reveal much proactive

replacement of equipment based on life-cycle economic criterion.²⁷ We also note the absence of formal post-project reviews of actual versus expected performance benefits for previously completed projects.

b) Substations and Overhead Equipment

As noted in our general comments, JCP&L has in place a very comprehensive inspection and maintenance program that has been effective in mitigating the risks associated with reactive replacement programs, including substation equipment. However, there are several equipment categories where Navigant has observed that other electric utilities have proactively replaced existing equipment, particularly those approaching obsolescence or high PM, with modern devices that have improved functionality and lower risk of mis-operation or failure. Although JCP&L's performance exceeds existing BPU reliability standards, consideration should be given to targeted replacement programs. Examples include electro-mechanical relays and oil circuit breakers. JCP&L reports that about [REDACTED] percent of its relays are electro-mechanical with no programs proposed to replace these devices, except for failure.

Other than primary cable failures, there is no criterion or documentation that specifies when equipment should be replaced versus undergo continued maintenance.

c) Underground Cable Replacements

Up to 2014, JCP&L's underground cable replacement program was based on criteria that recommends replacement of cable sections when underground experience [REDACTED] failures. JCP&L sometimes will replace the entire underground loop if failure trends are expected to continue. This replacement criteria is consistent with industry practices.

Prior to 2014, JCP&L had not implemented a formal system-wide replacement program for underground cable or equipment based on asset condition or potential for failure.²⁸ For example, areas where underground cable is unjacketed, high molecular weight or cable types that have experienced multiple failures would be candidates for a long-term replacement program. Proactive replacement would enable JCP&L to "stay ahead" of cable failures and avoid the need to replace large quantities of cable in the future due to recurring failure. [REDACTED]

²⁷ Exceptions to this observation include defective equipment identified through the UPR process or monthly reliability meetings, such as defective cut-outs and manufacturer's defects and buried concentric neutral (BCN) cable replacements.

²⁸ During 2014 and 2015 JCP&L implemented an Underground Cable Replacement Project for bare concentric neutral ("BCN") cable.

As outlined in Figure 4 below from FEU's 2013 *Underground Cable Replacement* Project report, JCP&L has 46 million feet of BCN, with a recommendation to replace 25 million feet, or 54% of total BCN. The currently proposed rate of replacement, according to data received from JCP&L, is approximately 15,000 to 45,000 feet per year, which is a small percentage of the total that the FEU report recommended for replacement.

Figure 4. Scope of BCN Cable Replacement Project by Operating Company

Region	Cable Segments			Cable Feet (1,000,000)			Cost to Repl. (\$M)
	Total	Replace	Percent	Total	Replace	Percent	
JCP&L	112,954	65,964	58%	46	25	54%	942
[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
Total	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]

Figure 6
Scope of BCN Cable Replacement Project by Operating Company

Table Notes:

- The columns titled **Total** represent the total population of URD cable (number of segments or cable footage) for the each Region.
- The columns titled **Replace** represent the estimated population of BCN URD cable (number of segments or cable footage) for the each Region.
- The columns titled **Percent** represent the percentage of the Region's total population of URD cable estimated to be BCN (number of segments or cable footage).

A.2 Developing a Resilient System

For Task A.2, Navigant reviewed JCP&L's commitments and progress made in developing a resilient system, one designed to minimize outages, improve restoration capability and reduce susceptibility to

[Redacted]

damage caused by storms. The review included a detailed assessment of JCP&L's technology plans, storm hardening options and restoration processes designed to enhance resiliency.

Navigant's review of JCP&L's practices and programs for creating a resilient electric system focused on three areas, outlined below.

- a) Using distribution automation and other technology, for which Navigant assessed the following JCP&L programs and initiatives:
 - Smart Grid Pilot,
 - Automatic circuit Tie schemes, including installation of line reclosers with SCADA,
 - Requirement of SCADA on wholesale PJM connected distributed generation projects; Use of SCADA at its substations,
 - Installation of manual and automated feeder tie points,
 - Adaptive relaying strategy,
 - Reconductoring to build stronger circuit ties,
 - Establishment of underground loop schemes for new developments, and
 - Distribution automation control algorithms.
- b) Flood Mitigation Plan for ■ substations outlined in the BPU Hurricane Irene Order, including:
 - Approach(es) applied to mitigate future storm impacts
 - Adequacy of mitigation strategy
- c) JCP&L's circuit protection philosophy, including:
 - JCP&L's circuit protection philosophy and rationalization of that philosophy,
 - Procedures of policy statements documenting the philosophy, and
 - Programs that provide evidence of implementation of the philosophy.

Similar to Review Task A.1 issued data requests, and then conducted a series of interviews with FEU corporate personnel, followed by JCP&L operations personnel, to identify measures undertaken and proposed plans to enhance resiliency. Questions Navigant raised during the interviews sought responses to the following topics:

1. Business decisions applied to support and justify technology and hardening investments to enhance the resiliency of the electric distribution system.
 - How has JCP&L determined the value or the degree of improvement from each improvement?
 - Has JCP&L updated design criteria, design guides, or construction specifications?
 - What value analysis or business cases that have been developed to support the investment?
 - Have the improvements been implemented and have they been effective?

2. JCP&L's philosophy for circuit protection for the distribution system generally, in addition to adapting advanced protection schemes where required.
 - What is the JCP&L philosophy and what is the rationale behind the philosophy?
 - Is the philosophy in line with industry practices and for the conditions at JCP&L?

Documents, data and reports Navigant reviewed in its assessment of JCP&L's resiliency capabilities and programs include,

- BPU Reliability Reporting and Storm Orders
- Annual System Performance Reports (2013 – 2015)
- Capital Budgets (2013 to 2015 actual, and 2016 through 2020 forecast).
- On-site inspection of substation flood mitigation,
- On-site visit of JCP&L DCC and review of supervisory control and data acquisition (SCADA) and OMS systems,
- Distribution System Protection Strategy – General
- FEU Distribution Planning Guidelines (Protection)
- SGIG Distribution Automation Pilot Program – DOE report
- FEU Communications Plan (aka, "Details of the ongoing Communications Infrastructure Plan for all Operating Companies"),
- Distribution primary loop scheme data (SCADA and reclosers)
- CYME distribution load flow studies (list of studies performed)

A.2.1 Adequacy of SCADA Communications and Controls

Conclusion: SCADA communications and control at JCP&L meets or exceeds practices observed by Navigant at other utilities with comparable service territory attributes. Significant adequate backup capability exists for both SCADA and related DCC functions, as full redundancy and back-up can be provided via common OMS and EMS at both Red Bank and Morristown, as well as any of FEU's other operating companies.

Recommendation:

1. Conduct a study to evaluate expansion of SCADA communications, monitoring and controls to equipment to those areas that are not currently part of auto-transfer schemes. This recommendation is addressed further in A.2.3 and A.2.4.

Supporting Facts/Findings:

Navigant's conclusions and recommendations are based on findings presented in the following sections.

a) SCADA Communications and Controls

JCP&L reports it has installed SCADA at about ■ percent of its substations, a higher coverage percentage than all other FEU operating companies.

JCP&L uses line reclosers equipped with SCADA for its automated transfer schemes, which expands SCADA capability beyond the substation at these locations. However, most reclosers that are not part of auto-transfer schemes are not equipped with SCADA communications.

There is no near-term plan to expand SCADA to its distribution system, except in the context of for new auto-transfer schemes.

Section 4.4.13.2 of JCP&L's Interconnection Requirements specifies that the company requires distributed generation (DG) owners with installed capacity of 2,000 kW or higher (individual or in aggregate) to pay JCP&L for the installation of a Remote Terminal Unit (RTU), and communications (cellular) and to enable EMS control from FirstEnergy's Transmission Control Center. JCP&L reports this requirement has been met.

b) Distribution Control Center Operations

Navigant visited JCP&L Distribution Control Centers in Morristown and Red Bank, and confirmed that each monitors SCADA via its Energy Management System (EMS) with full access between North and Central regions, respectively. Navigant concludes that significant adequate backup capability exists for both SCADA and related DCC functions, as full redundancy and back-up can be provided via common OMS and EMS at both Red Bank and Morristown, as well as any of FEU's other operating companies.

A.2.2 Automatic Circuit Tie Schemes

Conclusion: JCP&L has installed automated tie schemes throughout its service territory and these have operated effectively, and reports that it has improved reliability at 27 locations where these schemes have been installed. However, there are opportunities for additional schemes elsewhere on JCP&L's distribution system.

Recommendations:

1. Conduct a study to evaluate expansion and acceleration of automatic circuit tie schemes. Develop a long-term plan for expansion for automated tie schemes, prioritized based on costs versus benefits. These schemes may include advanced central intelligence and automated controls outlined in Recommendation A.2.3.
2. Conduct a study to evaluation expansion and additional circuit ties to improve transfer capability between substations and adjacent feeders. This recommendation is part of Recommendation A.4.1.

Supporting Facts/Findings:

Navigant's conclusions and recommendations are based on findings presented in the following sections.

a) Existing and Proposed Tie Transfer Capability

There are 65 circuits with tie transfer capability on JCP&L's distribution system, 27 of which are automated or have SCADA control. JCP&L reports that the 27 existing automated tie schemes have performed as designed, with few non-operations due to communications failures or equipment mis-operation. JCP&L has not measured the degree to which this distribution automation (DA) improves reliability to confirm benefits. [REDACTED]

[REDACTED] U.

The total number of transfer schemes, while significant, is still a small percentage of the total number of feeders on the JCP&L system (less than [REDACTED] %). Navigant has observed a much larger percentage of tie transfer schemes at other utilities with similar load density and distribution system design.

Few existing auto-transfer schemes have required significant line reconductoring, as JCP&L targets feeders that have sufficient tie transfer capability for automated tie schemes.

b) Automated Transfer Schemes

JCP&L uses line reclosers equipped with SCADA for its automated transfer schemes. There are 3 schemes involving six feeders in various stages of implementation, but no definitive plans exist to further build out transfer schemes using existing or advanced controls. There are no near-term plans to introduce a Distribution Management System (DMS) to augment or enhance existing schemes.³⁰ Advanced control capability and DMS is addressed further in Section A.2.3.

c) Primary Distribution Underground Design Enhancements

JCP&L confirmed that all underground primary lines serving 25 or more customers or 3 to 4 transformers are designed and built with open-loop back-up capability. Each loop section is designed to carry the load of the entire loop. (Note: The UG open-loop schemes do not include automated tie transfers, but are manually switched by line crews for maintenance or outage restoration.)

[REDACTED]

A.2.3 Distribution Automation and Smart Grid

Conclusion: JCP&L has installed a smart grid pilot with advanced communications and controls. However, JCP&L has not formalized plans to expand the pilot program or other related technologies to other areas of its system, or to install a Distribution Management System (DMS).

Recommendations:

1. Prepare a Technology Plan that builds upon findings and successes from Department of Energy Smart Grid Investment Grant (SGIG) pilot programs in New Jersey and other FEU operating companies. The Plan should outline the role of technology applied to JCP&L's distribution system over the short- and long-term. Consider a collaborative effort with other New Jersey utilities to identify plans consistent with the New Jersey Energy Master Plan goal for emerging technology: "Improve and Enhance the EDC Smart Grid and Distribution Automation Plans" and related objectives such as Microgrid Distributed Energy Resources.*
2. Assess role of DMS for advanced applications such as Interactive Volt-Var Control (IVVC), distributed energy resource (DER) integration (monitoring and control), Microgrids, electric vehicle initiatives, Advanced Metering Infrastructure, advanced protection and auto-transfer schemes outlined in Recommendations A.2.2. Budget funds over the next 5 years for pilot programs addressing these potential applications.*
3. Conduct a study to update Communications Plan to include provision for DMS and advanced applications requiring reliable, high-speed communications systems. Access and linkage of AMI data to the OMS would enhance outage detection and restoration capability, and provide data useful for planning studies such as transformer load management.³¹ Evaluate role of DMS in context of SCADA/OMS enhancements, and JCP&L's Communication Plan(s) and Technology Roadmap cited in A.2.2.(b).*

Supporting Facts/Findings:

Navigant's conclusions and recommendations are based on findings presented in the following sections.

a) Pilot Programs

FirstEnergy received DOE grants via SGIG funding to implement 6 pilot programs throughout its operating companies, one each at JCP&L's Northern and Central regions. The JCP&L pilot (\$15 million) focused on distribution automation (Fault Isolation and Service Restoration or FISR) and DER direct control, including a centralized intelligent control system. JCP&L reports the pilots are operating properly with auto-transfer schemes providing desired functionality (e.g. improved CMI

³¹ Similar to other recommendations of general applicability to other EDC's, Navigant expects recommendations that include AMI would also apply to other EDC's, and would be addressed through BPU rulemaking.

and reduced O&M for restoration) and useful information to JCP&L engineers and distribution system operators.

Several years ago, JCP&L started the installation of additional FISR projects. These projects are in various stages of completion. Additional committed funds or developed plans are needed to complete these projects. [REDACTED]

b) Technology Plans and Strategies

Although the matter has been discussed and plans are under development by FEU over the next two to five years; however, at this time JCP&L's long-term technology plan is in initial stages, and does not specifically document smart grid and related automation strategies. Actions are underway to address Advanced Distribution Management System (ADMS) at other FEU operating companies in Ohio to comply with regulatory directives.

c) Distribution Management Systems

Similarly, FE and JCP&L has not committed funds or developed plans to install a DMS in its DCC, nor does FEU's Communications Infrastructure Plan directly reference DMS/DA applications for future build out.

JCP&L at this time does not propose AMI, from which DA applications such as Volt-Var Optimization (VVO) could build upon the communications infrastructure and installation of stand-alone or integrated sensors. (Only FEU's Pennsylvania's operating companies have committed to AMI via its Smart Meter program, which is required under the Pennsylvania Act 129.)

A.2.4 JCP&L's Practices and Operations in Developing a Resilient Electric System Using Distribution Automation and Other Technology

Conclusion: JCP&L has a detailed plan for expanding their fiber optic network for Substation RTUs and substation protective relaying systems. A review of this plan shows it is appropriate for substation equipment.

[REDACTED]

JCP&L also uses PC (Toughbooks) in their service vehicles. The Toughbooks receive communications [REDACTED] JCP&L has installed "hot spots", at key service locations, [REDACTED]

Recommendation:

1. As part of the update the FEU Communications Plan per Recommendation A.2.3, include cyber security for distribution equipment on the Verizon cellular network and evaluate the effectiveness of the Verizon network during times of high usages.*

Supporting Facts/Findings:

Navigant's conclusions and recommendations on resiliency are based on findings presented in the following sections.

a) Communications Planning and Back-Up

As of March 2016, JCP&L has a reported [REDACTED] communications circuits servicing electric system infrastructure. There is a plan to replace this functionality with company-owned fiber, the implementation plan extends to 2020.

JCP&L is installing cellular system based communications for critical systems such as recloser SCADA and some substation SCADA. In addition, cellular service is being used for communication to Toughbook mobile data terminals and iPhones during storms in the event of a loss of Verizon communications. The latter addresses, in part, the BPU's 2015 Bow Echo Storm Order, which requires New Jersey utilities to enhance ETR estimates for "last customers restored" and implement plans for loss of local communications used to collect and convey information used for restoration activities.

A.2.5 System Hardening and Flood Mitigation

Conclusion: JCP&L has implemented a series of system physical and process improvements related to storm hardening, including flood mitigation that has and should continue to improve JCP&L's ability to withstand major storms.

Recommendation:

1. Conduct a comprehensive storm hardening study that incorporates and expands upon successful actions JCP&L previously or currently has undertaken, such as the Barrier Island Rebuild. The assessment should include selection of more robust design and construction standards for overhead lines in areas most susceptible to damage, such as higher class poles and crossarms; selective undergrounding of overhead lines in areas with high reliability exposure; relocation of rear-lot primary overhead lines in areas with reliability exposure, expansion of tie and auto-tie schemes (Recommendation A.2.2), DMS and enhanced monitoring and controls (Recommendation A.2.3). Consider working in concert with other New Jersey utilities to develop common storm hardening options based on past successes and lessons learned. Monitor the effectiveness of flood protection barriers currently in use or proposed during actual storms, and prepare for alternatives in the event of breaching.*

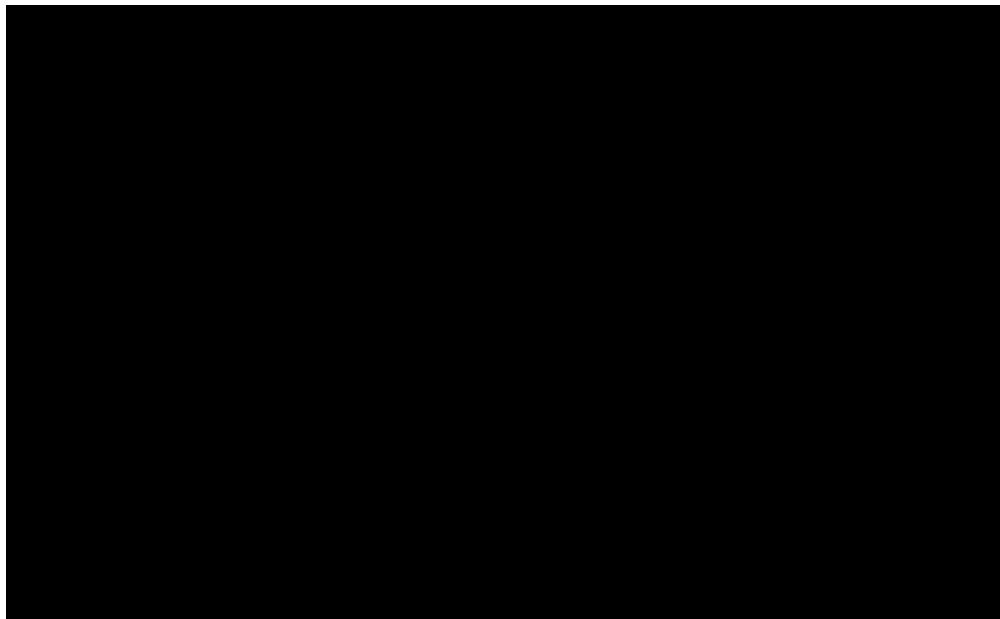
Supporting Facts/Findings:

Navigant's conclusions and recommendations are based on findings presented in the following sections.

a) Flood Mitigation

In order to improve substation flood mitigation, JCP&L completed a number of projects. Based upon individual substation needs and configuration, these projects included: cameras, flood sensors, pumps, flood protection barriers, raising breakers and improving access by regraded roads in sections prone to flooding. JCP&L has spent approximately \$ [REDACTED] million over the last several years and has committed an additional funds to complete all [REDACTED] substations by the end of 2016. Navigant visited substations where upgrades have been completed (see Figure 5 below) and concludes JCP&L's flood mitigation efforts should be effective and represent a good use of funds, as use of permanent barriers such as concrete enclosures or raising the entire substation would be far more costly. Nonetheless, JCP&L should continue to monitor barrier effectiveness during major storms to minimize the potential for gradual or catastrophic breaching.

Figure 5. JCP&L Flood Mitigation



b) System Protection

JCP&L has installed [REDACTED] electronic reclosers throughout their service area. In addition, JCP&L has installed automated feeder-tie recloser schemes to improve reliability for [REDACTED] of their circuits. Tie-reclosers provide an alternate source, for certain load pockets, which will reduce the duration of customer outages. JCP&L estimates they have spent approximately \$ [REDACTED] million on reclosers over the last several years.

c) Design and Construction Standards

In the Barrier Island area, JCP&L has been performing a specifically targeted multi-year project to raise distribution facilities and convert back lot construction from primary and secondary to secondary only. Transformers are also being relocated to the ends of the blocks to allow for easier access to perform work and restore service, if necessary. JCP&L spending as of May of 2016 for the Barrier Island redesign and rebuild is approximately \$ [REDACTED] million.

JCP&L has constructed a new 34.5kV line from Eaton Crest substation to the Woodbine substation near Oceanport and Long Branch. This project provides a new sub-transmission support and alternate sources for use during contingency situations to the Long Branch and Eatontown area. JCP&L estimates it has spent approximately \$ [REDACTED] million on this project.

Hardening improvements include changes in design for distribution facilities susceptible to storm-related damage such as relocation of primary lines in inaccessible areas and use of stainless steel transformers in areas adjacent to the shore.

d) System and Process Enhancements

Process and system-related improvements, including damage and hazard assessment, are addressed in Section A.3.

A.3 Current Restoration Abilities

For Task A.3, Navigant reviewed JCP&L's commitments and progress made improving its current restoration ability. Navigant's review of JCP&L's emergency and storm restoration practices, procedure and capabilities focused on three areas, outlined below.

- a) Navigant assessed JCP&L's current restoration capabilities through a review of:
 - JCP&L's implementation of the Hurricane Irene and Sandy Order Recommendations,
 - Documentation of all specific commitments made to the BPU,
 - Documentation and implementation tracking reports of all actions in progress or completed, and
 - Schedules for completion of any remaining items
- b) JCP&L's demonstration of its Incident Command System ("ICS") capabilities; Estimated time of Restoration ("ETRs"); meteorology; internal and external mutual assistance via:
 - Demonstration of the ICS during a desktop drill
 - Review of ICS documentation and implementation of these procedures, and
 - Interviews with all primary named position-holders in JCP&L's ICS system
- c) JCP&L's added technologies for damage assessment and customer communications, including:
 - Descriptions of all technologies for damage assessment and customer communications,

- Written procedures for damage assessment and customer communications,
 - Documentation of drills conducted for damage assessment and customer communications, and
 - Demonstration of all technologies for damage assessment and customer communications along with descriptions of the transactional capacity for each technology.
- d) JCP&L's added enhancements to storm-related websites via a demonstration of:
- Storm-related website capabilities and enhancements, and
 - Accessibility, clarity and accuracy of information provided, and data flow for storm-related web sites.

Following receipt of initial data requests, which included applicable procedures and documents, a series of interviews were held, first with FEU personnel followed by JCP&L personnel to confirm our understanding of JCP&L compliance actions taken and documented in reports to the BPU. Navigant also witnessed demonstrations of OMS, web site portals, communications technologies, and damage/hazard assessment tools and related systems JCP&L currently uses during restoration. It included attending a demonstration of JCP&L's ICS capabilities via a "desk top" storm drill exercise held on May 18, 2016 ("Sandy Overlay" drill).

Questions Navigant raised during the interviews, demonstrations and drill sought responses to the following, including whether JCP&L has developed and documented improvements as a result of the Irene and Sandy experience and the requirements of the BPU Storm Orders, i.e.,

- Have the improvements been implemented and do they appear to be effective?
- Have the improvements been demonstrated in drills and live exercises to have the desired capability and capacity to restore service effectively and quickly?

Documents, data and reports Navigant reviewed in its assessment include:

- BPU Reliability Reporting and post-storm Orders,
- BPU 2016 Storm Echo Order,
- FEU and JCP&L responses to 92 recommendations outlined in the BPU's Storm Orders,
- JCP&L Emergency Plan and related documents,
- Major event reports (2013 to 2015),
- Incident Action Plan (IAP) reports,
- ETR documentation and dashboard metrics, and
- Sandy Overlay drill documentation.

A.3.1 Implementation of the Hurricane Irene and Sandy Order Recommendations

Conclusion: JCP&L has effectively implemented the requirements of the BPU's Sandy and Irene Orders related to Hurricane Irene and Sandy.

Recommendation:

1. Pursue implementation of technology, recloser tie schemes and storm hardening options outlined in Recommendations A.2.1 through A.2.5 to further improve restoration capability.
2. Continue to conduct regularly scheduled meetings to address prior, current and prospective BPU Orders relating to emergency planning and storm response. Include as an agenda item proposed actions that should be considered to further enhance procedures and systems based on industry best practices and available technology or solutions. These meetings would include representatives from JCP&L engineering and operations, and FEU emergency planning personnel; with support from counsel as required to address regulatory matters as they arise.

Supporting Facts/Findings:

Navigant's conclusions and recommendations are based on findings presented in the following sections.

a) JCP&L Compliance with BPU Post-Storm Orders

Upon receipt of the BPU Orders following Hurricane Irene and soon thereafter, Hurricane Sandy, FirstEnergy and JCP&L quickly assembled a dedicated team (including a "Working Committee") for the sole purpose of implementing the requirements of the BPU's Orders. The team included an individual solely responsible for overseeing and coordinating all aspects for the implementation, up until mid-2014, when JCP&L determined that it had fully responded to each of the BPU's 92 recommendations. Supporting this individual was FEU's Regulatory Compliance & Reporting organization, whose responsibilities, in addition to those outlined in A.1 – Reliability Reporting, include responding to state utility commission Orders, Rulemakings and other regulatory reporting obligations.

The team created a tracking system was created to track progress for each of the BPU's 92 recommendations. The team also coordinated any activities that involved cross-FEU work; for example, FEU's Vegetation Management group was responsible for providing input to or complying with NJAC VM reporting and post-storm responses to the BPU Storm orders, including hazard trees and tree-related outages, and development of specifications for addressing hazard trees. Once the initial implementation of the BPU's Orders was complete, responsibility for reliability and storm preparedness activities was transferred to JCP&L for ongoing implementation activities.

The Working Committee established a defined approach for each item in the Sandy and Irene Storm Orders, monitored by the implementation team. In several instances, FEU and JCP&L interacted with BPU staff in developing solutions or establishing the scope of the solution. The

team also coordinated certain responses with other utilities where there were common interests, such as enhanced outage reporting via web sites access.

JCP&L also formed a Governance Council responsible for BPU Order oversight, and to ensure compliance and that requirements within the Order are fully implemented, documented and sustained on an ongoing basis. [REDACTED]

b) Quality Assurance of JCP&L Responses to BPU Orders

Navigant's review of FEU and JCP&L documentation showed each implementation item was tracked for progress and completion. As items were tracked, if they were not progressing as planned, management action was taken to redirect the working teams where necessary.

JCP&L provided documentation and all notifications in response to the Irene and Sandy Order as required by the BPU. Through the interviews that have been conducted at both FE and JCP&L and the data that has been provided to Navigant, we have been provided evidence of implementation for each of the items in the Sandy and Irene Orders. As noted in Section 3.1.a, JCP&L formed a Governance Committee in 2015 to ensure ongoing compliance with the BPU's Storm Order.

A.3.2 Demonstration of ICS, ETR, Meteorology, Internal and External Mutual Assistance

Conclusion: JCP&L's demonstrated capabilities in ICS, ETR management, meteorology, and internal and external mutual assistance are consistent with practices that Navigant observes in similar utilities.

Recommendations:

1. Implement additional exercises/drills proposed in 2016.
2. Institute a process to measure and track global ETR performance (as opposed to compliance with procedures only).

Supporting Facts/Findings:

Navigant's conclusions and recommendations are based on findings presented in the following sections

a) ICS Procedures

In response to the BPU's post-storm Order, JCP&L adopted and instituted an Incident Command System for storm and emergency restoration.³² JCP&L has fully implemented ICS and has

³² The ICS was first adopted by JCP&L and is being implemented by all other FEU operating companies.

conducted drills and activated the ICS for several storms to facilitate restoration. Emergency Plans and Communication Plans have been prepared to support JCP&L ICS structure. Our review of these Plans and related processes indicates appropriate ICS documentation exists and is being properly maintained and updated. For example, role rosters for ICS staffing are maintained continuously. JCP&L conducted initial ICS training for key roles; as assignments to those roles change, ongoing training is planned or has occurred.

In several instances, JCP&L has chosen to activate ICS for smaller level storms, although each did not necessarily require an ICS level of oversight, in order to rehearse the organization in ICS processes; frequent activation is desirable for an organization that has recently adopted an ICS structure. As part of its assessment, Navigant reviewed 8 post-ICS Execution reports for events and storms occurring between February 2014 and October 2015, each of which included detailed outage and restoration statistics, lessons learned and follow-up action items.³³ The reports are thorough, with a clear set of action items outlined for each event.

BPU-1 Order required JCP&L by June 2013 to conduct an exercise to simulate the impact of an interruption of 75% or greater number of customers. In that exercise (June 20, 2013), JCP&L demonstrated storm restoration systems and processes could successfully meet the threshold, with BPU staff/commission present. In addition, since ICS was new, JCP&L first conducted a series of smaller exercises, by function, leading up to this exercise. JCP&L has also conducted annual drills as required in 2014 and 2015.

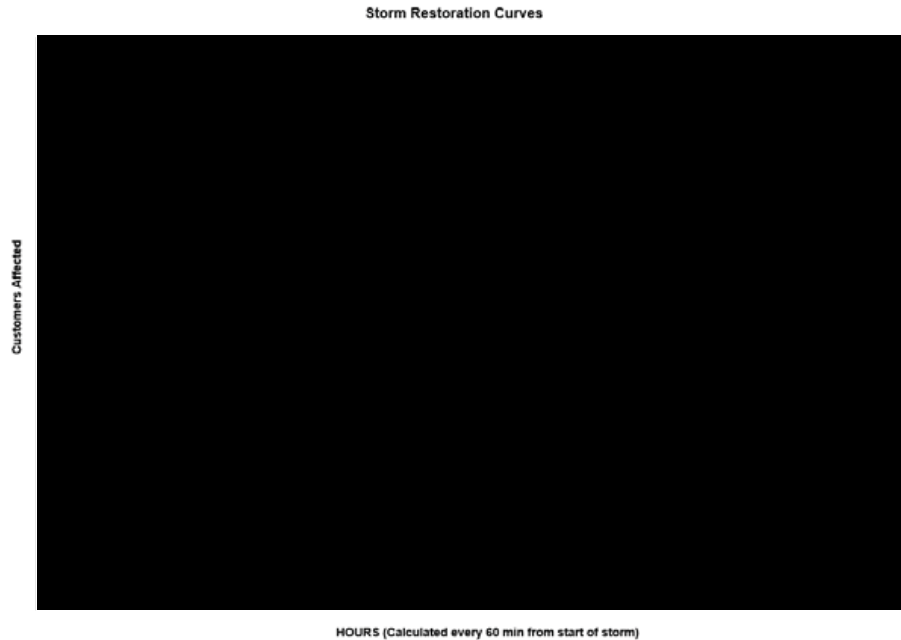
In addition to prior exercises between 2013 and 2015, Navigant observed the recent 2016 "Sandy Overlay" exercise and determined that this drill also satisfies BPU requirements. JCP&L is also planning an additional exercise this fall (e.g. the Bow Echo overlay that hit Atlantic City Electric) to test communication technologies, and will conduct additional exercises to test out mutual assistance and mobile substation transport and installation procedures (a total of 3 exercises planned in 2016). Given the above, Navigant concludes that JCP&L has conducted or participated in drills above and beyond requirements set forth in the BPU Storm Orders.

b) Estimated Time of Restoration

FirstEnergy has established a dual process for managing ETR's. FirstEnergy has developed ETRs for normal events (also referred to as "Blue Sky" events) and Global ETRs during major storms. FirstEnergy has established default ETR times, 2.5 hours on-peak to 3 hour off-peak default times for Blue Sky events. Both Blue Sky and Global ETR processes are designed to achieve 98 percent accuracy. Three approaches are available to derive Global ETRs to estimate ETRs during major storms: (1) Historical curves (Figure 6Figure 6 presents the curves used by JCP&L and other FEU operating companies; (2) Crew Hours (tool in OMS), based on number of outage orders and crew availability, and (3) Global ETR Tool that uses data from the OMS to estimate ETRs both at the system and district level.

³³ The 8 events include 7 actual storms and one drill.

Figure 6. Global ETR



JCP&L’s DCC’s in Morristown and Red Bank are responsible for establishing ETRs. The DCC’s assign ETRs using default values and custom ETRs when more accurate restore times are available from field crews.³⁴ The DCC’s also can move from default to Global ETRs when there are more than █ open outage orders in a district, or █ in Central or Northern regions. The second process shifts responsibility for developing Global ETRs during major storms from the DCC to an ETR Unit Leader within the Planning and Analysis group when the ICS is activated.³⁵ FirstEnergy has established minimum response times (see Table 6) for conveying Global ETRs to customers via its iFactor web site and IVRs based on the severity of storms, documented in Blue Sky & Storm ETR Development procedures.

³⁴ All ETR entries are managed through the OMS, which has full capability to assign global ETRs to the entire JCP&L service territory or to each of the 13 districts.

³⁵. During storms the Incident Commander has the option of activating the ETR manager role under the storm ICS structure. The responsibilities of that role include the gathering and analysis of outage information, trouble magnitude, work progress, and resources to develop ETRs. In May 2015, FirstEnergy’s Workforce Development organization developed a course for all FEU employees assigned as ETR Unit Leaders on their respective roles and responsibilities during major storms.

Table 6. Minimum Global ETR Target Timeframes

Incident Duration (hrs.)	Target Timeframe
0-8	2 hrs. or less
9-16	5 hrs. or less
17-24	8 hrs. or less
25-36	18 hrs. or less
37-48	20 hrs. or less

JCP&L measures ETR accuracy for Blue Sky events via Key Performance Indices (KPI) reported in Metric Dashboards. The KPIs for Blue Sky events are tracked with regard to predicted restore times. For 2013 through 2015, JCP&L reported that it achieved Blue Sky accuracy of greater than 96 percent, exceeding the 95 percent target performance. However, for Global ETR's, JCP&L only tracks compliance with ETR procedures on minimum response times, but does not currently track storm ETR accuracy (but understands the need to do so). A study has been started to develop storm ETR reporting. JCP&L also is proposing enhancements related to ETRs, including communications back-up used to collect and transmit information to restoration personnel during storms and localized ETRs to predict "last customer" restore times.³⁶ Prior enhancements to the OMS on nested outages appears to have reduced the number of incorrectly reported system restore messages to customers via the IVR.

c) Pre-Storm Planning and Weather Prediction

JCP&L has a dedicated in-house meteorology department that provides specific information to the FE operating companies. This department is staffed for all hours and provides continuous information to JCP&L's DCC and operating personnel on pending weather events and potential severity, including damage prediction. This capability exceeds the capability of many utilities who outsource this function. The meteorology department provides a centralized function to FE and they monitor weather patterns from several weather data services to form their own forecast of weather events. Upon development of a forecast that contains the possibility of a weather event, the expected type, magnitude, and timing of the event are communicated to JCP&L. JCP&L then initiates plans in anticipation of the event.

³⁶ *Bow Echo Weather Event: Review of the Response and Restoration of Electric Utility Outages*, BPU Docket No. E015080984, June 23, 2015,

d) Mutual Assistance

FEU and JCP&L have an integrated centralized system for managing internal and external mutual assistance. FE has dedicated resource for the management of mutual assistance resources across its operating companies. Mutual assistance is requested through authorization from the Incident Commander to the FE dedicated resource. FE then determines the best combination of internal or external resource to deploy in response to JCL&L's request. Resources available are treated as a pool across FE that can be re-deployed across operating companies if necessary. The processes for mutual assistance are well-documented and JCP&L participates in several mutual aid organizations, including four regional organizations and EEI.³⁷

1. Great Lakes Mutual Assistance Group (GLMAG)
2. Mid Atlantic Mutual Assistance Group (MAMAG)
3. New York Mutual Assistance Group (NYMAG)
4. Southeastern Electric Exchange (SEE)

FEU purchased and uses of the Resources on Demand System (RODS) for management of external mutual aid crews. This system is deemed to be consistent with industry best practice.

A.3.3 Added Technologies for Damage Assessment and Customer Communications

Conclusion: JCP&L's implementation of additional technologies for damage assessment and customer communications is on par with leading practices observed by Navigant at similar utilities.

Recommendations:

1. Conduct a study to identify enhancements that are expected to be available from proposed expansion of PowerOn by GE and implement those most likely to provide enhanced outage identification and restoration capability.
2. Determine incremental benefits associated with AMI from a restoration perspective to support a future business case for AMI.*

³⁷ For larger storms, EEI National Response Event process can be used to contact utilities throughout the U.S. and Canada for assistance.

Supporting Facts/Findings:

Navigant's conclusions and recommendations are based on findings presented in the following sections

a) Damage and Hazard Assessment

In response to the BPU Storm Orders, JCP&L has instituted procedures and systems to improve damage and hazard assessment. Procedural changes include establishment of a Quarantine Process for assessing damage and managing restoration in areas experiencing intense damage. The Quarantine process shifts damage assessment and restoration from the DCC to the Incident Commander (IC) and ETR Unit Leader during storm or emergency events. The process appears effective as it removes the responsibility for managing major outage restoration in defined areas to personnel who can more effectively manage internal and mutual aid crews.³⁸

In response to the BPU's Order on technology improvements, FirstEnergy has deployed a series of enhancements, including smart phone and Toughpad devices for Hazard Assessment and Damage Assessment crews. Approximately 800 FEU employees knowledgeable on distribution operations have been issued Toughpads and assigned damage assessment responsibilities per JCP&L's emergency procedures. Using these devices, crews can record damage and offer an assessment of the response that is required. The smartphone technology allows for taking pictures of damage locations and sending them back to be further analyzed.

Damage assessments are processed by assigned personnel and assigned for appropriate action. JCP&L has trained and equipped employees for the specific role of damage assessment. Upon being deployed, they are assigned an assessment area. Once damage location information is transmitted back to the DCC, the information is consolidated and analyzed in the context of magnitude of work, available resources, and priority of restoration.

b) Facilities Security

JCP&L has deployed sensors and cameras for assessment of condition and damage at substations that are susceptible to flooding. The cameras are accessible by Substation and engineering management employees for remote monitoring as needed. JCP&L is anticipating that they may move that capability to the DCC at some point in the future. Presently, DCC has SCADA-provided high level alarms indicating water levels at stations susceptible to flooding.

c) Customer Communications and Community Engagement

Customer communications channels include call center through customer service representatives, IVR communications, Social Media, and Web presentment. JCP&L has implemented recent improvement on communicating ETR information via use of the above channels as well municipal webpages, IVR, texting, email, mobile website and mobile

³⁸ Typically, quarantined areas include multiple full-feeder outages in a relatively small area, such as feeders served from a single substation. For these feeders, the entire line is tagged out and not restored until most or all line sections have been repaired and available for re-energization.

applications. It includes “My Town” web site access to detailed outage information within individual townships. The IVRs call center are updated with the latest information from the OMS on a continuous basis. FE has centralized the Social Media monitoring and response and has trained and dedicated several employees to that function.

For major storms, FirstEnergy has developed an Emergency Communications Plan (ECP) in response to the BPU’s Order that documents in significant detail roles and responsibilities of communications staff and community/media liaisons applied to a “triggering event” such as a major storms. These include communication channels through government EOCs and local governments. JCP&L conducts annual drills with Office of Emergency Management (OEM) representatives from each of the 13 counties located within its service territory.

Up to 17 total staff is available to JCP&L to support media communications from FirstEnergy, two located in New Jersey. The ECP includes post-storm survey questions for community leaders, stakeholders and emergency staff. A survey conducted in early 2015 following a January storm yielded generally favorable comments regarding JCP&L pre-storm planning and outage restoration information provided during the updates. A typical response to the survey is presented in Figure 7.

Figure 7. JCP&L Post-Storm Survey Response (February 2015)

PAGE 1

Q1: Were we proactive in contacting you about our efforts to prepare for the recent storm ?	Yes
Q2: We JCP&L personnel readily available to respond to your questions and concerns before, during and after your recent power outage ?	Yes
Q3: Did your Area Manager provide timely and accurate updates regarding when your power would be restored ?	Yes
Q4: Did you receive our Storm Update emails	Yes
Q5: Did we respond in a timely manner to your request to remove trees and downed power lines from major roadways in your municipality?	<i>Respondent skipped this question</i>
Q6: Do you believe your office received more calls or fewer calls from your constituents related to JCP&L service during this outage compared with past outages ?	Fewer
Q7: JCP&L uses many methods to communicate with its external stakeholders before, during and after a storm. Which of the following do you find helpful ?	Area Managers, Text Messages
Q8: What did we do well during this severe weather event ?	Area manager was in contact with me and our OEM team.
Q9: In what areas do we need to improve our responses to major weather events ?	<i>Respondent skipped this question</i>
Q10: Community name and Contact	Nolan Higgins, Mayor Freehold Borough

Navigant also confirmed that virtually all JCP&L employees are assigned roles during major storms, including damage and hazard assessment.

A.3.4 Added Enhancements to Storm-related Websites

Conclusion: JCP&L's storm related websites are on par with industry leading practices.

Recommendations:

None.

Supporting Facts/Findings:

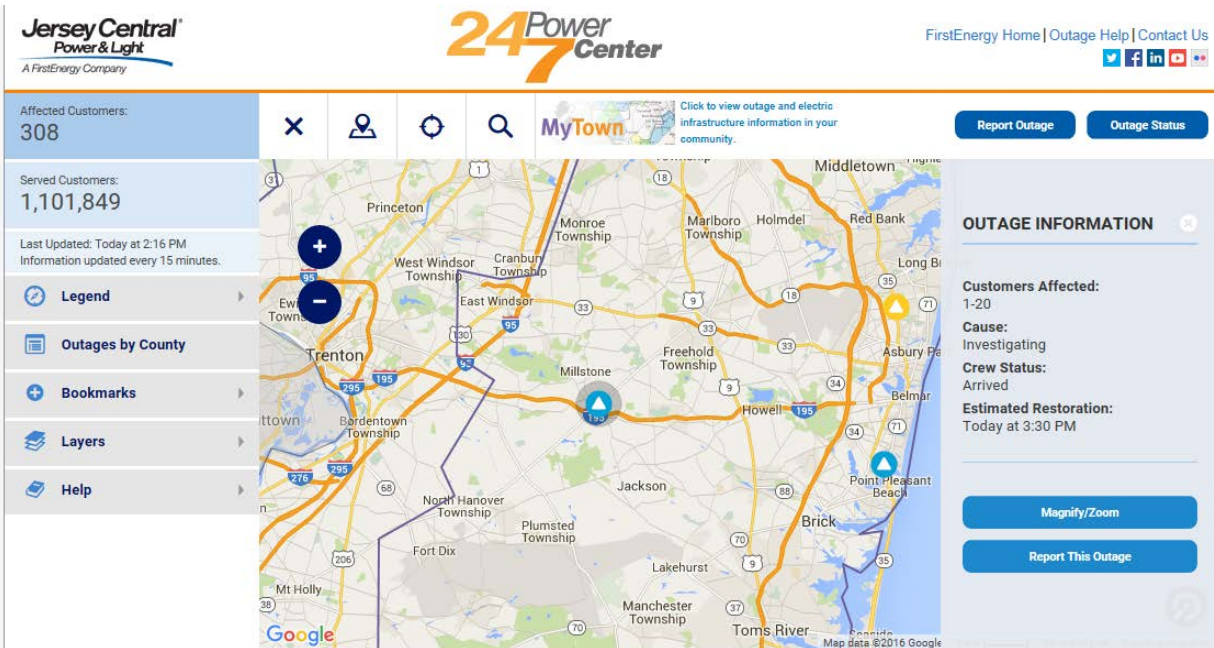
Navigant's conclusions and recommendations are based on findings presented in the following sections.

a) Web Site Enhancements

Navigant witnessed a demonstration of (and independently accessed via JCP&L's web site) the iFactor³⁹ outage mapping tool that FirstEnergy has implemented for reporting outage information and ETRs. The iFactor product is in use by the majority of utilities that have web-based outage mapping in the U.S. JCP&L customers also can access outage data and restoration times (ETRs) reported in JCP&L's *24/7 Power Center* web site via mobile applications. Information available from iFactor is highlighted in Figure 8.

³⁹JCP&L 24/7 reporting system based on iFactor's Storm Center™.

Figure 8. JCP&L iFactor Outage Map

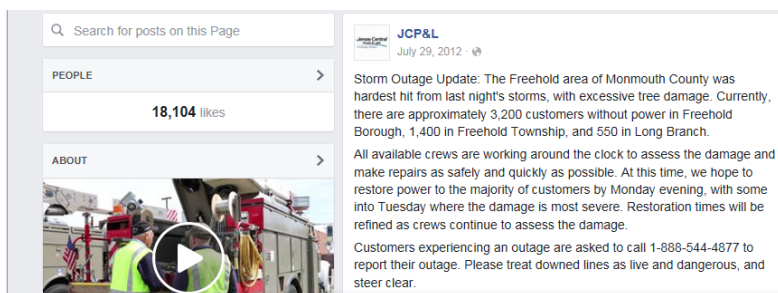


Source: JCP&L 24/7 Power Center Web Site, June 27, 2016.

Per Figure 8, key features and data reported in JCP&L's 24/7 Power Center and iFactor include

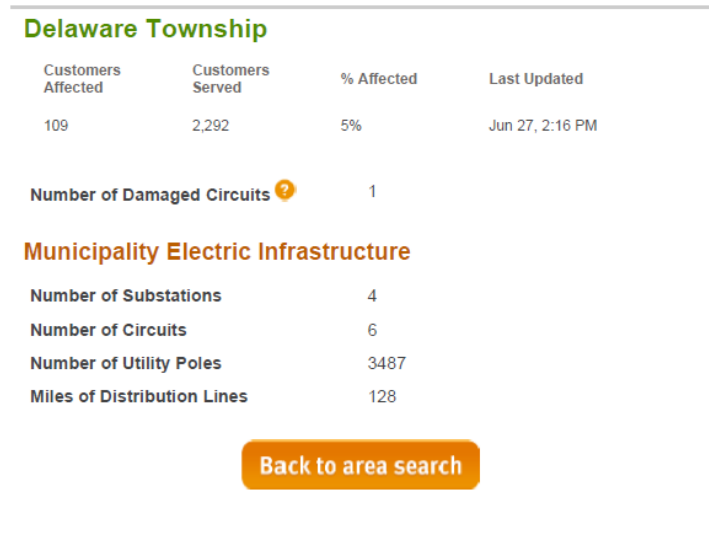
- Web-based outage mapping includes crew status, ETR, and number of customers,
- The 24/7 Power Center outage map is updated as new information becomes available,
- Electrical safety information and instructions for reporting outages,
- Access to outage information via social media site such as JCP&L postings to Twitter and Facebook, as well as web-based community news outlets (Figure 9), and
- My Town" features that lists outage information by township or county (Figure 10).

Figure 9. JCP&L Facebook Web Site Access



Source: <https://www.facebook.com/JCPandL/posts/125238087621192>

Figure 10. JCP&L My Town Web Site



Source: JCP&L 24/7 Power Center Web Site, June 27, 2016.

Based on the above assessment, Navigant's is able to confirm that JCP&L outage and storm communication systems, and information contained therein to notify customers on outage information and restoration status, is consistent with leading utility practices and is in compliance with the BPU's Storm Orders on customer communications during outages and major storms.

A.4 Distribution Planning Criteria and Load Forecasts

JCP&L's ability to reliably serve current and future load is dependent on accurate forecasts and planning of distribution delivery systems to provide adequate supply under normal and outage conditions.

For Task A.4, Navigant's review of JCP&L planning and forecasting methods. Navigant also attended a demonstration of the Load Forecast Data Management System (LFDMS) model JCP&L uses to forecast distribution load. Specific topics, data and reports that Navigant reviewed and evaluated to derive findings and recommendations for distribution planning criteria and load forecasts included JCP&L's,

(a) 2013-2015 distribution planning criteria:

- Application of FE/JCP&L Design and Planning Guidelines, focusing on criterion applied to determine the timing for the upgrade, replace and add new distribution and substation facilities
- Consistency with FEU Guidelines, highlighting differences in JCP&L criterion

- Incorporation of reliability programs in capacity planning activities, including coordination with Reliability group
 - Prior (3-year) and future (1/5-year) capacity planning documents/reports, including analysis of feeders and substations nearing capacity limits
- (b) Load growth projections and how it assures sufficient capacity and flexibility is available to meet system load requirements:
- Feeder and substation load forecasting methods and procedures
 - How extreme weather and other variances in load growth are factored in peak demand forecasts, and how these are considered in capacity planning decisions
- (c) How Distributed Energy Resources (DER) is factored into load forecasts and capacity planning activities; includes distributed generation (DG), energy efficiency (EE), energy storage (ES) and demand response (DR):
- DER program documentation, including initiatives designed to defer capacity upgrades
 - Methods to determine the amount of DER to achieve circuit and substation reliability consistent with traditional upgrades
 - Methods and assumptions for factoring DER contribution to feeder and substation peak forecasts, including approach to derive effective load carrying capability
- (d) Approach and extent to which advanced methods and technologies are incorporated into the capacity planning process versus traditional expansion options:
- Equipment loading limits, including options for increasing (or decreasing) maximum loading based on equipment condition, on-line monitoring and design
 - Role of automation, and enhanced visualization and monitoring capability to minimize potential overloads and maximize utilization/capability of equipment (e.g. power transformers)

Questions Navigant raised during the interviews and demonstrations sought responses to the following, including whether JCP&L:

1. Has complied with the BPU's regulations and enhanced reporting requirements for distribution capacity planning?
2. Added sufficient capacity over the past 3 years so as to avoid equipment failures and interruptions caused by overloads?
3. Planned a sufficient amount of distribution capacity over the next 5 years to minimize potential equipment overloads and customer interruptions?
4. Fully considered cost-effective DER in its capacity planning activities?
5. Documented capacity additions that have been deferred by DER and whether future capacity additions may be deferred via DER, including targeted DER to distribution lines and substation where the cost of capacity upgrades is highest?
6. Plans to implement enhanced monitoring, visualization and automation technology to minimize potential for overloads and maximize the capability of existing equipment to meet growth?

Documents, data and reports Navigant reviewed in its assessment include:

- BPU Reliability Regulations as adopted from the NJAC and BPU post-storm Orders,
- Interruption data by equipment cause code (w/ Overload listed as source of interruption),
- Major interruption/event reports with equipment overloads as reason for interruption,
- Equipment failure reports or logs listing overload as reason for failure, and
- 1 & 5-Year Distribution spending forecast and plans.
 - Capital budget (capacity additions)
 - Load Forecast & Capacity Expansion Plan
 - Distributed Energy Resource forecast
 - 1 & 5-Year DG/DSM/DR Plan and forecasts
 - Automation and Smart Grid plans

A.4.1 Existing and Planned Capacity

Conclusion: JCP&L has sufficient existing or planned distribution substation and line capacity to meet projected load growth over the next █ years based on current planning criteria and expansion plans.

Recommendations:

1. Update Distribution Planning Guidelines to include recommendations outlined in Sections A.4.2 through A. 4.4, and Item 2 below.
2. Update and document practices for installation of pole top reclosers, including methods and criteria for optimizing location based on customers per zone, reliability data and potential for use as part of a tie-transfer scheme.

Supporting Facts/Findings:

Navigant's conclusions and recommendations are based on findings presented in the following sections.

a) Capacity Outlook

JCP&L's planning documents include capacity additions designed to meet future growth. The amount of additional capacity needed to meet growth is low as JCP&L demand has declined since 2006 (see Figure 11), resulting in surplus capacity on many lines and substations.⁴⁰

⁴⁰ JCP&L reports that it installed several new Modular Substations in the mid-2000's in anticipation of continued long-term robust load growth that did not materialize following the economic downturn in 2007.

Figure 11. JCP&L Historical Peak Demand



The following two charts confirm there is sufficient substation capacity for virtually all substations up to 2020.⁴¹ Figure 12 presents the percent loading for JCP&L substations for 2015. Most transformers are loaded at less than 70 percent of rated capacity at the time of the station peak in 2015, with many at 50 percent or less, with none overloaded. The percent loadings shift slightly in 2020 (Figure 13), with one substation transformer overloaded (4kV station) and 6 at 90 percent or higher. These tables demonstrate that JCP&L has substantial substation capacity available to serve future demand and provide back-up capacity to adjacent stations (assuming sufficient feeder tie transfer capability is in place).

⁴¹ The charts display actual and projected loadings for each substation transformer. It excludes any capacity reserved to provide back-up feeders and transformers from adjacent substations. Navigant was unable to ascertain the number of single- vs. multiple-transformer substations based on the information received.

Figure 12. 2015 Substation Transformer Loading

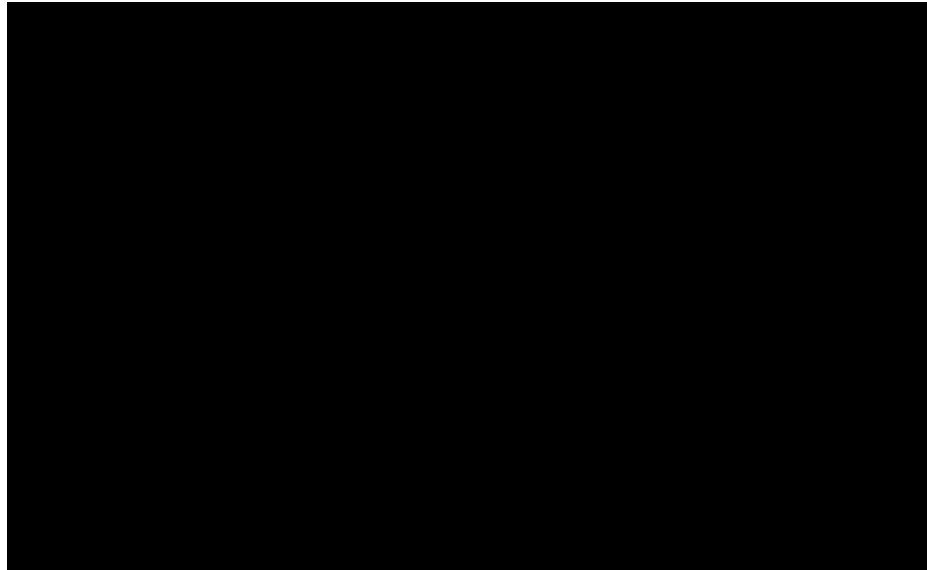
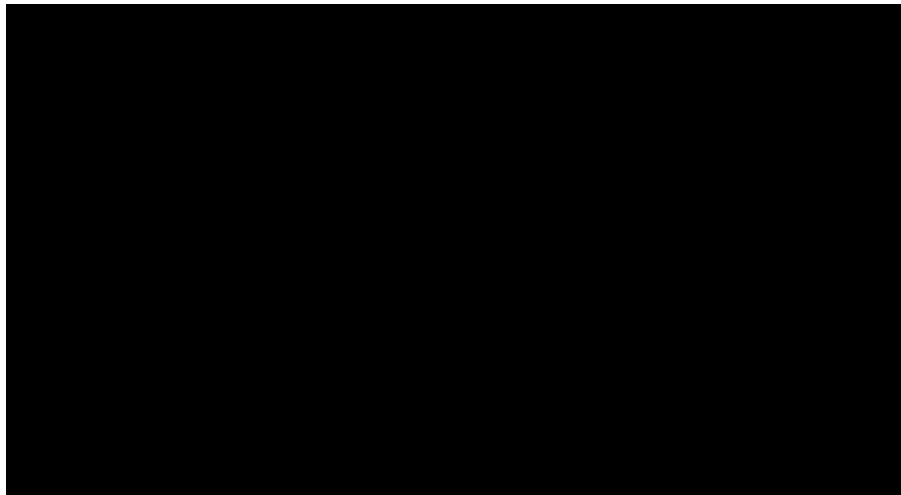


Figure 13. 2020 Substation Transformer Loading Forecast



There is a limited need for localized capacity in some areas where new load will be installed, particularly for larger residential, commercial or industrial complexes that will tax the capability of existing equipment to meet the new demand. Several of the larger commercial complexes, typically 5 to 10 MW or larger, are directly served by JCP&L's 34.5kV subtransmission system.

b) Equipment Overloads

The number of customer interruptions caused by overloads is typically between █ and █ percent, and of these, many are distribution line transformers or laterals (as opposed to substation transformer overloads). The low number of equipment overloads supports a conclusion that the JCP&L distribution system is not susceptible and has been effectively managed to avoid overloads; reduced peak load growth also has contributed to higher capacity margins. █

[REDACTED]

c) Area Planning

JCP&L annually prepares a report titled *Local Transmission/Distribution System Assessment and Future Outlook* that examines load and capacity for each town or township, identifying new development projects and the capability of existing distribution facilities to meet demand, issued prior to the Summer peak season (the report also addresses reliability and maintenance issues). The report is thorough, using methods consistent with practices observed at utilities implementing best practices. The Plan assesses capacity and reliability, outlining upgrades or improvements to address capacity deficits or reliability performance issues. The level of rigor applied to analyze capacity and reliability appears consistent for each district.

The number of new line and substation projects, excluding blankets and reimbursable projects, that JCP&L proposes to add to meet growth for the next five years is modest. [REDACTED]

[REDACTED]

Further, JCP&L will evaluate reconfiguration and load balancing options before adding new substations or feeders, as these are lower cost options. Navigant agrees with JCP&L's approach.

d) Protection - Reliability

The Planning organization has a general description for the location of pole top reclosers. JCP&L's Distribution Planning Guidelines do not include a standard or procedure that optimizes the location of where reclosers should be installed such as specifying the "number of customers per zone" or other means to determine the location of recloser from the substation breaker. The recloser location is not specified although it is used as the basis for the "Lock Out Zone" for vegetation management. This omission is significant, as Navigant witnessed a few instances where the lock-out zone (Zone 1) was very short due to the presence of a recloser just beyond the substation exit feeder.

A.4.2 Tools and Methods for Load Forecasting

Conclusion: JCP&L applies rigorous tools and methods to forecast distribution load growth at the substation and circuit level. FirstEnergy Utilities has developed standardized approaches to planning and forecasting to support operating companies and ensure consistent practices across the company. These processes appear thorough and consistently applied by JCP&L.

[REDACTED]

Recommendations:

1. Conduct a study to evaluate the benefit of modifying LFDMS to include an option to forecast feeder and substation loads based on regional demographic or economic data.
2. Develop processes and tools to reconcile substation peak forecast to JCP&L composite peak forecast. Update coincidence and diversity factors as part of the reconciliation process.

Supporting Facts/Findings:

Navigant's conclusions and recommendations on JCP&L forecasting methods and tools are based on findings presented in the following sections, which included a demonstration of the LFDMS tool FEU operating companies use to forecast distribution loads.

a) Planning and Design Guidelines

FEU's centralized planning organization, located in Akron, is responsible for developing Distribution Design and Planning Guidelines, and procuring tools used by planning engineers in each region. FEU updates the Distribution Planning and Design Guidelines every 3 to 5 years based on user input – the last update was made in 2015. The planning and design guidelines are thorough, with methods and criterion consistent with industry practices for comparable utilities.

b) Planning Tools

The primary tool used to develop load forecasts and analyze distribution performance by all operating companies is the LFDMS and CYME (which is another power engineering software product). LFDMS is used to develop feeder load forecasts while CYME is an engineering power flow model to assess feeder performance such as thermal loadings and voltage levels under a range of loading and operating conditions. CYME is the standard distribution model used at FEU and JCP&L over the past 5 years and is one of the leading distribution load flow simulation tools used throughout North America. JCP&L uses CYME to evaluate the impact of future loads on feeder loadings and voltage performance, as well as numerous other uses such as evaluation of tie transfer capability and DG System Impact studies.

The LFDMS model analyzes historic and future loading data and produces reports that indicate when new capacity is needed. While accuracy of model output is a function of availability and accuracy of input data, mostly new load, the level of detail in these inputs and analytical methods applied is sound and consistent with commonly accepted forecasting principles.

The forecast of load at the distribution level is highly dependent on accurate input from estimates of new housing starts and related economic data for new commercial and industrial load. LFDMS data is obtained from monthly manual inputs from substation demand meter readings that are entered into the Cascade substation maintenance tracking tool. Planners compare LFDMS results to EMS and PI Historian data for validation. The process appears effective, as data is reviewed for accuracy.

FEU and JCP&L jointly prepare a system-wide peak forecast for the entire JCP&L service territory; however, JCP&L does not link or reconcile the non-coincident peak forecast prepared for

individual substation or feeders with the system peak forecast due to the highly localized and diversity associated with individual assets. This approach is appropriate as distribution capacity planning should reflect needs at specific locations as opposed to system-wide trends.

JCP&L applies an 80/20% likelihood (one in 5 year event) of summer temperature/weather normalization as determined by the NOAA weather station nearest to the substation location to predict annual peak loads. This normalization is intended to account for higher than normal weather events that impact substation and feeder peaks. This practice is consistent with good utility practice.

The LFDMS model is robust, as the planning engineer can select from one of five modeling approaches in LFDMS to preparing a load forecast for each circuit, the selection of which is based on the experience and judgement of the planning engineer. These include:

[REDACTED]

The LFDMS model is well-documented, as it clearly outlines model application, data requirements and user options. The accuracy of the load forecast for each feeder is nonetheless dependent on the skill and judgement of the planning engineers in their respective districts. JCP&L's planning engineers demonstrated strong technical knowledge and forecasting skills, obtained via years of experience and knowledge of the JCP&L system and area loads.

A.4.3 Distributed Solar in Load Forecasts

Conclusion: JCP&L has a large amount of solar capacity compared to other FE operating companies, but solar capacity generally is not recognized in JCP&L's planning and forecasting processes.

Recommendation:

1. Conduct a study to evaluate updating LFDMS to account for existing and forecast net metered and large solar installations. This includes creation of a database to track solar installations, and if applicable, use of new tools and systems to collect solar profile data to predict net load reduction on distribution feeders and substations.*

Supporting Facts/Findings:

Navigant's conclusions and recommendations are based on findings presented in the following sections.

a) Distribution Generation and Interconnection Requirements

Currently, JCP&L has more connected solar (400+ MW) than all other FE operating companies combined. Per the State's Master Energy Plan, connection of new solar capacity is expected to continue to grow. Some of the existing solar are larger units, up to 3 to 5 MW or larger, mostly in

large commercial complexes. In these locations, solar owners reimburse JCP&L for connection, protection and system upgrades, where applicable, per JCP&L's Interconnection Requirements (IRs).

JCP&L conducts system impact studies, when required, as outlined in its Interconnection Requirements. System Impact studies are needed when the size or type of distributed generator indicates potential need for improvements or upgrades to address performance, loading or protection issues. The process has been effective, as outage reports received have not attributed any interruptions, overloads or other undesirable performance impacts to DG output or operations. However, distribution system impacts and the need to conduct system impact studies may increase as more DG is added to the JCP&L system. Further, an increase of DG capacity can result in system impacts and costs that may not be assigned to DG owners, particularly for net energy metering (NEM) where JCP&L ratepayers would be responsible for the cost of upgrades or mitigation of DG impacts.

b) Solar Impacts

There currently is about 425 MW of solar capacity installed on JCP&L's system, about 280 MW of which is behind-the-meter (utilizing net energy metering, or NEM); the remaining 145 MW is connected directly to the distribution grid.⁴³ For most feeders, solar has not had a significant impact on feeder performance or capacity planning. Solar capacity is not a direct input to LFDMS – manual adjustments are required to account for existing solar. Existing solar and other renewable output is embedded in the load forecast created via LFDMS by virtue of lower net loads due to solar output at the time of the feeder or substation peak. However, the amount of embedded solar has been modest as most JCP&L substations are not near capacity limits, so the omission of solar in LFDMS has not been a concern.

Prospectively, solar and other distributed resources may have a more significant impact on JCP&L feeders. [REDACTED]

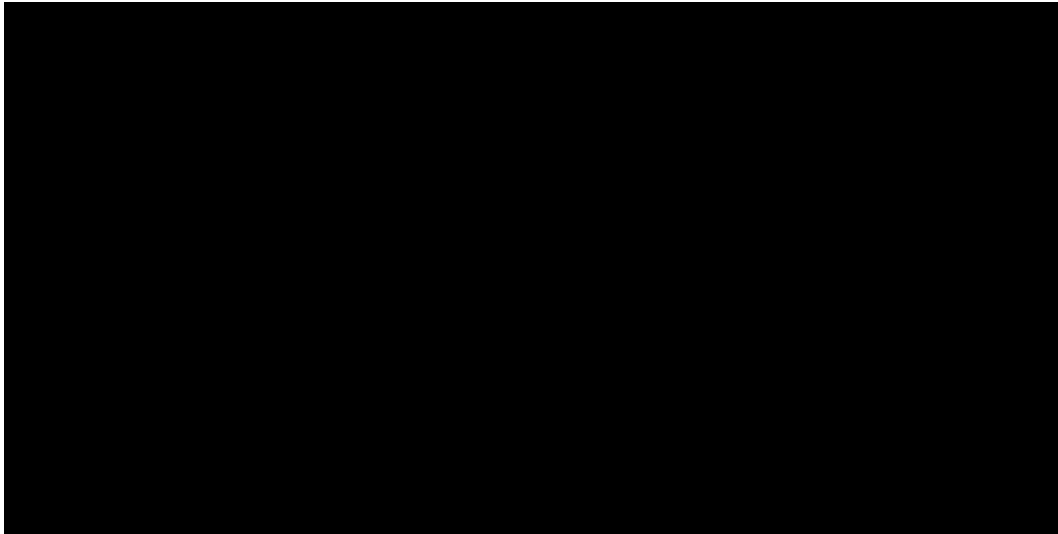
[REDACTED] Similar estimates could be made at the substation or feeder level, underscoring the significance of solar impacts as greater amounts are added to JCP&L's system.⁴⁴

⁴³ Solar capacity as December 31, 2015.

⁴⁴ The potential impact of solar may have greater significance due the increase in New Jersey's NEM cap from 2.5 percent of the system peak to 2.9 percent of total energy; the latter translates roughly to about 10 percent of the system peak.

Figure 14. Impact of Solar on JCP&L System Peak

**JCP&L MW Load- Peak- July 20, 2015
With 280 MW of PV Net Metering**



In some areas of JCP&L's service territory, a large amount of solar has been installed on some feeders (larger solar typically is installed on 34.5kV feeders). Since increasing amounts of solar may impact capacity planning decision prospectively, adjustments to LFDMS may be appropriate. Further, JCP&L planning criteria have generally not been adjusted, except from a load forecast perspective for larger DG, to accommodate or coordinate with load transfer and automated loop schemes. Due to the absence of distribution SCADA, there is little real time data available to distribution operators to track or manage DER and DG smaller than 2 MW.

Additionally, solar and other DG has not resulted in any changes or adjustments in how JCP&L evaluates or plans for new feeder or substation capacity.⁴⁵ Similarly, JCP&L has not implemented or proposed any programs, including pilots, to target solar or other distribution resources to feeders to defer capacity or other feeder benefits, nor has it assigned firm capacity capability to solar.⁴⁶

⁴⁵ Existing solar is embedded in load forecast as a net load reduction based on actual output at the time of the feeder and substation peak. Some JCP&L planners account for larger DG, typically 1 MW or greater, during the planning process.

⁴⁶ Most utilities do not assign firm distribution capacity to solar or other renewable sources due to intermittent output and the radial configuration of distribution lines, which typically operate at 99.99 percent availability or higher. Some capacity may be deferred due to net peak load reductions from existing DG, but many distribution planners account for the presence of existing DG in capacity planning decisions, particularly for large DG.

A.4.4 N-1 Planning Criteria

Conclusion: JCP&L has established an “n-1” single planning criteria for distribution substations, but the time required to restore supply in the event of a substation outage or transformer failures can vary significantly due to the number of feeder ties and reliance on mobile substations in some locations. Since 2013, JCP&L’s application of its “n-1” criterion has been effective, as there have been few instances of substation transformer failures that have required use of mobile substations. JCP&L has not established a minimum criterion for transport and connection of a mobile transformer, which suggests the potential for a lengthy restoration if delays arise during transport and installation.

Recommendations:

1. Conduct a study to develop specific criterion regarding minimum restoration times for single transformer substations that do not have sufficient tie transfer capacity with adjacent substation(s). Conduct study, if needed, to identify substations that have partial tie transfer capability. Study also should include an evaluation of likely mobile substation transport and installation times to identify substations that do not meet the minimum restoration criterion. Develop mitigation plans such as increasing tie transfer capability, changing location of mobile substations or upgrading substation mobile substation connections (and procedures) to achieve minimum restoration targets.
2. Conduct a study in conjunction with above Recommendations that evaluate options to meet future growth or to enhance substation back-up capability.

Supporting Facts/Findings:

Navigant’s conclusions and recommendations are based on findings presented in the following sections.

a) Substation Design and Loading Criteria

Distribution capacity planning and forecasting criteria and methods are outlined in FEU's Distribution Design & Planning Guidelines. FEU has adopted company-wide planning practices that all OPCOs, including JCP&L, are expected to follow. [REDACTED]

The use of smaller distribution substation transformers is intended to provide greater flexibility as loads are located closer to the substation, with increased tie transfer capability. [REDACTED]

b) Contingency Back-up

FE's distribution planning criteria is based on meeting an n-1 standard (i.e. load can be restored upon the loss of any single element) that is met either by feeder ties to adjacent substation; or in the case of insufficient or absence of feeder ties, mobile substations. Distribution substations are generally not compliant with n-1 criteria as generally adopted or defined by utilities (immediate back-up is available when a contingency occurs), but is considered n-1 compliant by JCP&L because load can be manually restored via feeder ties and a mobile transformer can be installed in the event of a transformer failure.

During contingencies, transformers can be loaded up to their emergency ratings. The emergency rating for existing transformers vary based on condition, but is about 125% (16 MVA and 28 MVA for Mod Sub transformers) for all new transformers, which is now built into FEU's specification for supplier bids. This is consistent with good utility practice.

JCP&L has not established a minimum time for mobile transformer transport and connection. Navigant's experience suggest a minimum of 12 hours typically is required, with up to 24 hours or longer if transport is inhibited by weather, or if a device must be supplied by another FE operating company. JCP&L maintains a sufficient number [REDACTED] of mobile transformers in its service territory to back up most substations.

c) Reliability and Consistency with Industry Practices

The number of substation transformer failures has been low (4), and only one has required installation of a mobile substation. However, a loss of a JCP&L transformer results in an interruption in service to all customers until loads are transferred to feeders from adjacent substations or until a mobile substation is installed.

Transformer size and FEU's single transformer design criteria is consistent with some utilities with service territories comparable to JCP&L. Navigant also is aware of other similar utilities that install larger and/or multiple transformers, which provide immediate back-up in the event of a loss of the other unit. FEU and JCP&L planning and design criteria is based on maintaining maximum flexibility, including improved tie transfer capability, via smaller, but a larger quantity of substations. Navigant acknowledges FEU's planning philosophy, recognizing the trade-off in potentially longer restoration times. We also are aware that because of the significant amount of spare capacity at most JCP&L substations – [REDACTED] – substation design and planning criterion is a longer term issue and except for contingency back-up concerns raised earlier, it has minimal significance for the evaluation timeframe in this Review.

A.5 Capital/Investment and Operations & Maintenance (O&M) Spending

For Task A.5, Navigant reviewed JCP&L's capital and expense budgeting process, and its approach to determine the amount of spending required to reliably serve its customers and to meet BPU commitments. It included a detailed review of JCP&L's budgets, systems used to determine budget requirements, and review and approval process. It includes an assessment of distribution-related 2013-2015 capital expenditures ("CAPEX") and operational expenditures ("OPEX") and proposed spending through 2020 to confirm that the focus of these expenditures reflects the appropriate balance necessary to meet shorter term system performance mandates while sustaining the achievement of reliability performance targets over the longer term, taking into account both costs and benefits through our review of:

- a) JCP&L's 2013-2015 CAPEX and OPEX by project categories (i.e., reliability, infrastructure, new business); the assessment will include a review of JCP&L's:
 - Spending details by program, and for major project categories, major single investments and targeted programs designed to meet BPU requirements for the next 5 years
 - Spending levels for the above categories for the prior 3 years
- b) Methods and documentation that address justification and supporting analysis for capital and expenses spending; the assessment will include a review of JCP&L's:
 - Methods and tools to prioritize and select capital projects and levels of spending for expense budgets
 - Documentation and description of JCP&L systems and processes used to evaluate the effectiveness of spending programs and projects, and how these are used for post-implementation assessment
- c) JCP&L's CAPEX decision-making and level of input to FirstEnergy regarding budgets and expenditures,⁴⁷ including in comparison to other FirstEnergy operating companies for purposes of addressing whether the capital budgeting process is a bottom-up or top-down process; the assessment will include a review of JCP&L's:
 - Documentation prepared by FEU for CAPEX and OPEX program and project selection and evaluation (in addition to those developed by JCP&L)
 - Consistency with prior testimony and prior audit recommendation applicable to BPU performance targets and reporting requirements
 - Level of budget variances by program and project categories, including documentation and justification of variances and associated impacts on program objectives
 - Procedures designed to address emerging projects and other unanticipated spending

⁴⁷ For example, those described in the Strah/Lynch and UMS Testimonies in JCP&L's 2012 Base Rate Case and the June 20 Schumaker Management Audit Report.

Questions Navigant raised during the interviews sought responses to the following, including whether JCP&L:

1. Has complied with the BPU's reliability regulations and enhanced reporting requirements with regard to CAPEX and OPEX spending?
2. Allocated a sufficient level of spending proposed for the next 5 years to meet the BPU's directives and requirements for reliability, storm response, resiliency, capacity planning and related objectives?
3. Has adopted methods to determine optimize CAPEX and OPEX budgets to maximize distribution reliability, efficiency and performance?
4. Instituted a post-assessment process to assess the effectiveness of CAPEX and OPEX programs and project to provide feedback and opportunities for improvement?
5. Expects to curtail capital or expense spending due to corporate spending caps, and if so, how this may affect programs related to the BPU's performance and reporting requirements?
6. Applied methods to develop CAPEX and OPEX budgets consistent with methods used by other FEU utilities?

Documents, data and reports Navigant reviewed in its assessment included,

- BPU Reliability Regulations
- 2013 through 2015 CAPEX and OPEX spending levels, by program and major project categories
- CAPEX and OPEX budgets through 2020, by program and major project categories
- List of projects eliminated from considerations for historic and proposed budgets
- 2013-2015 reliability and performance data versus spending by program and project categories
- Documentation, reports and analysis used to assess projects and programs, and actions taken to enhance budgeting and project selection processes
- Documentation, reports and analysis describing preparation of budget

A.5.1 JCP&L's 2013-2015 CAPEX and OPEX by Project Categories

Conclusion: JCP&L's level of spending over 2013-2015 has resulted in improved reliability results, however, the ability to sustain this trend into the future may be enhanced with improvements to the capital prioritization process.

Recommendations:

1. Enhance the capital budget development process to reduce, where possible, the amount assigned to blankets. This should include additional rigor and detail in the development and monitoring of Condition, Forced, and Reliability blanket budgets and spending.

2. Apply asset management practices and processes outlined in Recommendations A.1.8 and A.1.9 to optimize spending levels and the amount assigned to CAPEX and OPEX.

Supporting Facts/Findings:

Navigant’s conclusions and recommendations are based on findings presented in the following sections.

a) Capital and O&M Spending (2013 - 2015)

Capital spending for JCP&L distribution ranged from a peak of \$ [REDACTED] million in [REDACTED] (including continued re-building costs from Irene and Sandy) to a low of \$ [REDACTED] million in [REDACTED]. Distribution Operations and Maintenance expense has ranged from \$ [REDACTED] million in [REDACTED] to \$ [REDACTED] million in [REDACTED]. During this time, reliability metrics of SAIFI and CAIDI have improved 17%-19% on relative terms, as shown Figure 15 and Figure 16 below.

Figure 15. 2013-2015 CAPEX & OPEX vs. SAIFI

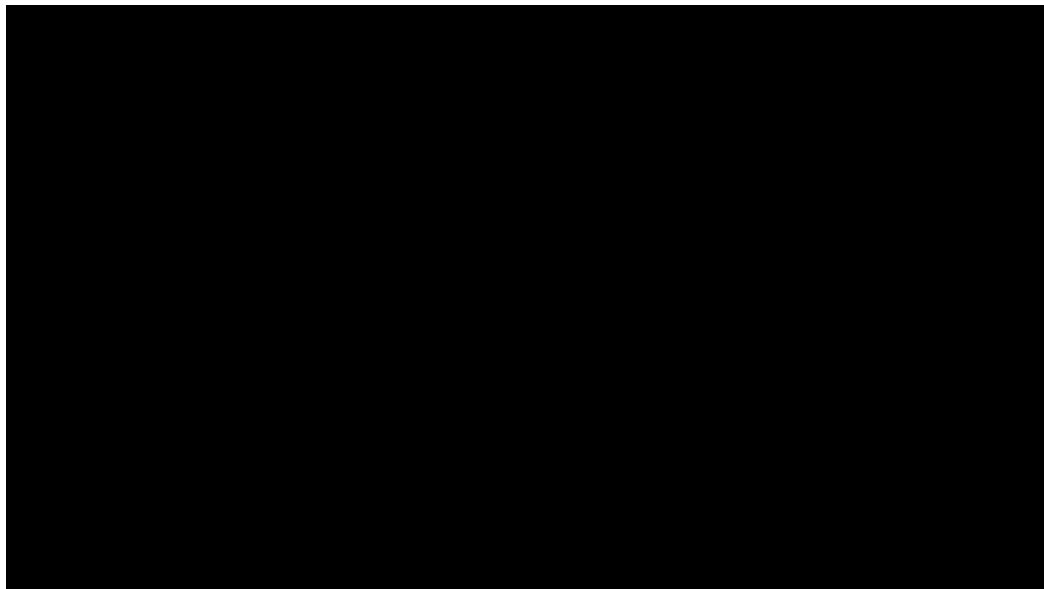
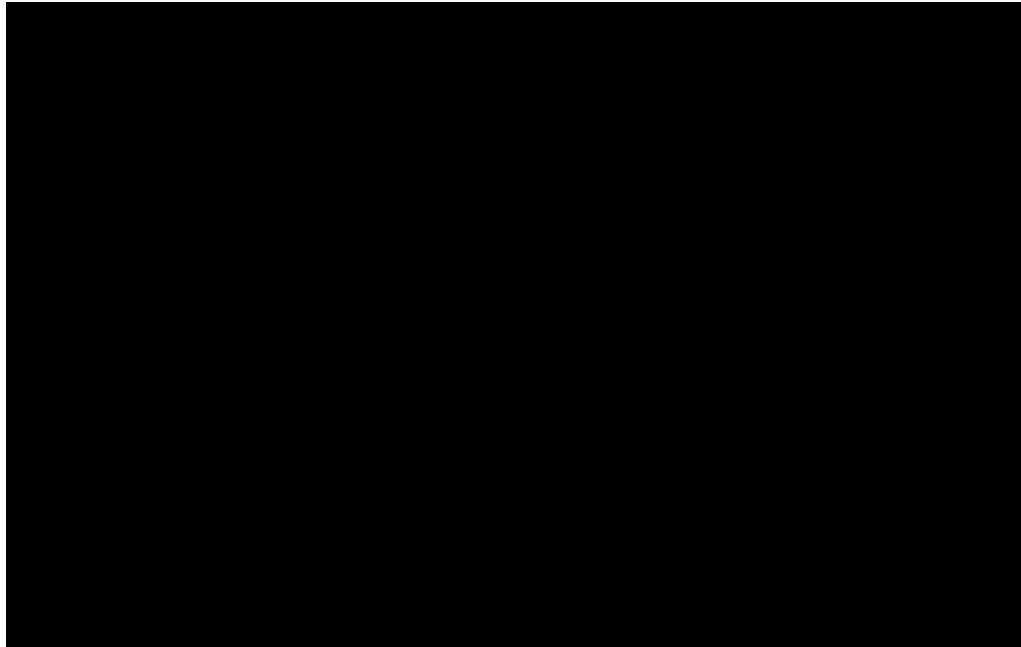


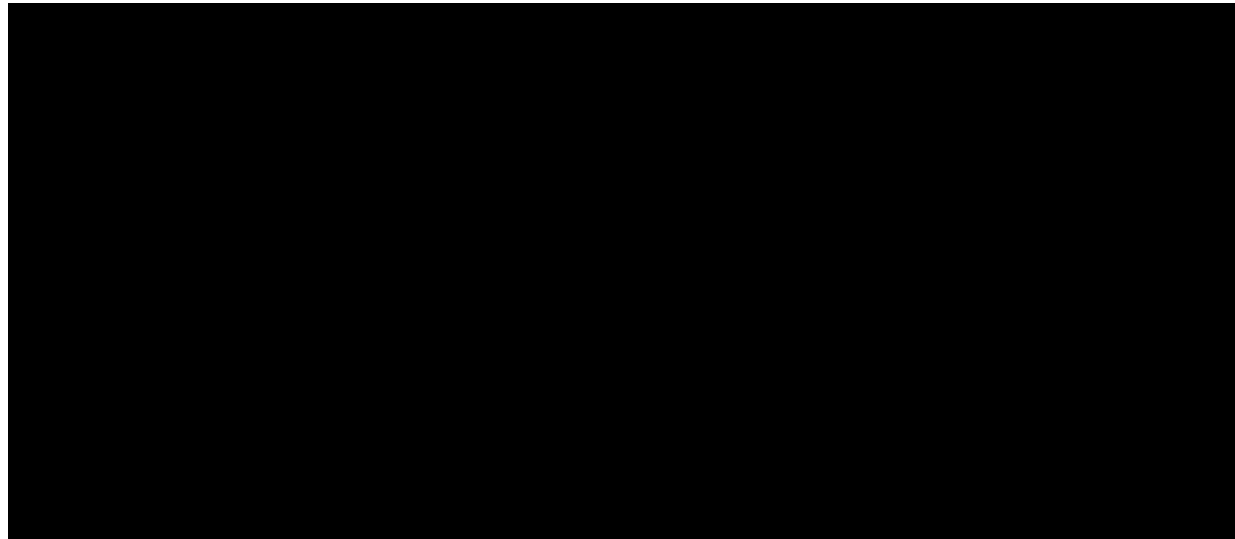
Figure 16. 2013-2015 CAPEX & OPEX vs. CAIDI



b) Capital Budget Allocation

Review of JCP&L's [REDACTED] capital prioritization presentations for budget years 2013-2016 shows that between [REDACTED] of the annual capital portfolio budget is allocated to capital "blanket" accounts, which in Navigant's view is relatively high and can result in less directed, proactive capital spend targeted towards specific problem areas if not tightly controlled. Relatively little capital is allocated to specific reliability-focused programs and projects. Table 7 presents capital blankets for 2014 through 2016. Up to [REDACTED] percent is assigned to three categories, Forced, Condition, and Reliability. There may be an opportunity to shift a portion of the condition blanket to programmatic investments or to create segments within the blanket to major equipment components or categories such as substation equipment, overhead and underground lines, or for major equipment categories (e.g. power transformers, breakers, line transformers). Similar segments could be created for the Forced blanket. Greater segmentation of spending categories would enable JCP&L to better track and manage spending, and to provide additional detail in the budget review and authorization process.

Table 7. Capital Blankets



A.5.2 JCP&L's Five-year Forecasted CAPEX and OPEX Through 2020

Conclusion: JCP&L's forecasted CAPEX from 2016-2019⁴⁸ appear to be reasonable to maintain reliability targets through this timeframe⁴⁹. Operational improvements (through improved asset management) will be needed to achieve reduced OPEX spending levels projected in 2016-2019 while adequately maintaining the system.

Recommendations:

1. Review and enhance capital budgeting and project prioritization process to determine optimal levels of CAPEX and OPEX to meet reliability and other JCP&L targets and objectives. This includes identifying the level of spending to achieve objectives and meet targets. Application of asset management practices outlined in Recommendations A.1.8 and A.1.9 are needed to properly balance CAPEX and OPEX spending.

⁴⁸ Navigant did not receive complete CAPEX and OPEX spending forecasts for 2020 because JCP&L management is in the process of performing its quarterly update of the company's corporate plans, which will include 2020.

⁴⁹ This assumes the projected reduction in spending due to the separation of the Mid-Atlantic Interstate Transmission LLC (MAIT) assets beginning January 1, 2017 is appropriate (a full review of CAPEX and OPEX reduction due to the anticipated separation of the MAIT assets was outside the scope of Navigant's review).

Supporting Facts/Findings:

Navigant's conclusions and recommendations are based on findings presented in the following sections.

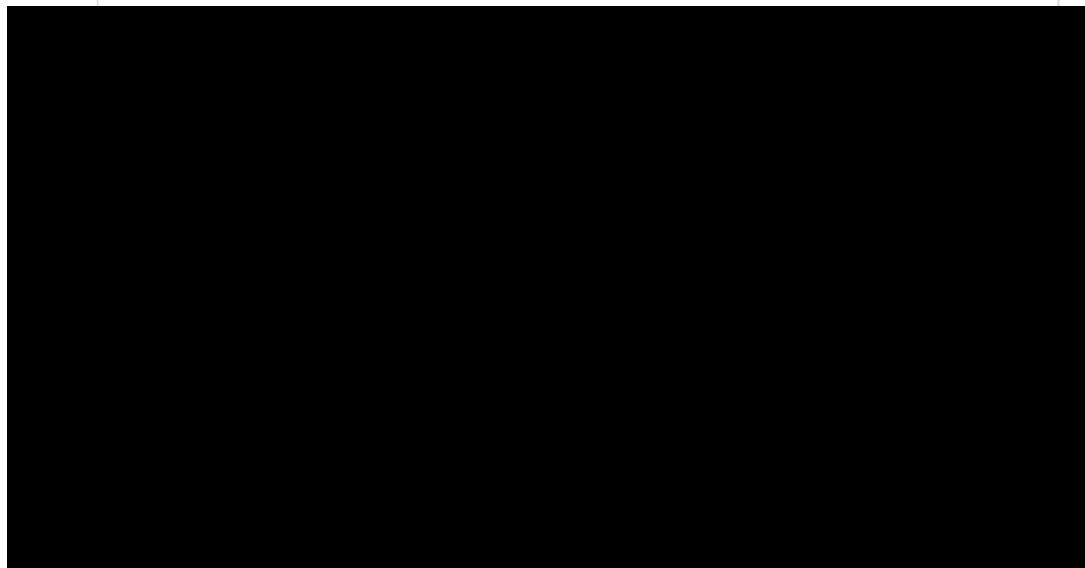
a) O&M Budget Forecast

Annual Distribution OPEX from 2013-2015 averages █████ million per year. When adjusted for separation of the MAIT assets after 2016, OPEX averages █████ million per year in 2016-2019, a reduction of █████ from 2015 to 2019. (See Figure 17)

b) Capital Budget Forecast

Projected CAPEX drops significantly from 2016 to 2017 due to separation of the MAIT assets, and then increases █████ for 2018-2019. Capital programs (largely focused on reliability) are projected to be maintained relatively constant at █████ million from 2017-2020. Identified specific capital projects drop from ~████ million in 2016 and 2017 to █████ million in 2018 to █████ in 2019-2020. While it is expected that specific capital project needs are less known beyond 2-3 years, JCP&L's capital prioritization process must allow for truly needs-based capital budgeting in those years in order to fund appropriate capital investments to maintain or further enhance reliability. (See Figure 17)

Figure 17. JCP&L Historical and Projected CAPEX and OPEX, 2013-2019



OPEX could be reduced with improved Asset management to optimize the balance between CAPEX and OPEX; (e.g., OPEX could potentially be lowered by improved management of end of life of assets and corresponding capital re-investment without increasing reliability risk).

A.5.3 JCP&L's CAPEX Decision-making and Level of Input to FirstEnergy Regarding Budgets and Expenditures.

Conclusion: JCP&L undergoes a structured process for CAPEX decision-making (both advance budgeting as well as emergent spending decisions within an operational year) that is standardized across all FE utility operating companies. Additional benefits may be possible with further improvements to the process.

Recommendations:

1. Document processes and criteria applied to review and approve capital budget requests for each of Rounds 1 through 3. Include processes under which capital investments are prioritized and criteria applied to approve or reject budget requests.
2. Modify capital budget development (RPA) process such that projects that typically are evaluated but do not reach Round 1 are included in the review process.
3. Modify the capital budgeting process to place greater focus on identifying spending levels needed to continue to meet reliability and performance targets, and other JCP&L goals and objectives.

Supporting Facts/Findings:

Navigant's conclusions and recommendations are based on findings presented in the following sections.

a) Capital Budget Approval Process

JCP&L follows the corporate-led capital budgeting process which includes ■ Rounds of formal presentation and review, with significant input from knowledgeable FE-corporate staff (in the form of a "technical review committee") to provide input regarding the most appropriate use of capital. The involvement of the technical review committee also provides a common perspective across all FEU operating companies to ensure that each operating company is treated fairly regarding capital allocation.

While the process appears to have been consistently applied over the 2013-2015 timeframe, no controlled procedural documents are in place to govern the process and ensure it will be consistently applied in the future.

b) Capital Project Prioritization

The annual capital prioritization process includes an initial target spending level based on historical spend to initiate the process. This initial target could introduce bias such that truly need-based projects directed at reliability improvement may not be introduced in Round 1 of the annual process due to the perception that funding will not be available. Over time, this can result in less directed, proactive project and program spending and more reactive spending funded out of blanket budgets during the course of a budget year.

B. FINANCIAL REVIEW

Navigant was also engaged to perform a review of certain linkages between the distribution utility, JCP&L, the generation subsidiary, and the relationships with the parent holding company, FirstEnergy Corporation. The following areas of focus were identified as part of the scope of the Financial Review.

1. Corporate Governance
2. Capital Allocation among Subsidiaries
3. Human Resources, Staffing, Benefits and Planning
4. Compliance with BPU's FE-GPU Merger Order, and
5. Financing Activities

In order to address the financial scope of review, Navigant initially submitted approximately 50 data requests related to the financial scope of work, including requests for interviews with key personnel in each of the areas under review. Navigant then performed interviews with key personnel including members of the JCP&L Board of Directors, members of the FE Board of Directors, the Chief Financial Officer and Treasurer of FEU, the President of FEU, the Controller for JCP&L and others. Following these interviews, additional data requests were submitted (if required) and further analysis was performed of the data collected. (Complete lists of data requested and received, and interviews conducted, are included in Appendices B and C.)

The work performed, conclusions reached, and Navigant recommendations for each of these scope areas are provided in the following sections.

B.1 Corporate Governance

As part of the Financial Scope, Navigant was asked to address a number of questions that were identified by the BPU regarding governance of JCP&L, including the following:

- B.1.(a) Evaluate the role and function of the JCP&L and FE Boards of Directors in reasonably addressing the financial requirements of JCP&L, relative to JCP&L's operational and financial performance and in the best interests of JCP&L customers;
- B.1.(b) Evaluate the efficacy of JCP&L management's focus on the success of JCP&L, with appropriate support from FE management;
- B.1.(c) Evaluate the effectiveness of internal controls, including internal audit processes;
- B.1.(d) Identify the specific short-term and long-term goals and objectives of JCP&L, its parent and its affiliates and determine whether there is any material conflict or risk between FE corporate and/or affiliate goals with JCP&L's business activities associated with providing safe, adequate and proper service to its customers;
- B.1.(e) Assess FE's resource allocation to JCP&L-regulated activities versus to the non-regulated activities of JCP&L, FE and its affiliates, including compliance with the corporate separation requirements of the NJ Affiliate Standards and FERC Code of Conduct;
- B.1.(f) Describe how the needs of FE's utility subsidiaries, particularly JCP&L, are addressed by the Board of Directors of the corporation;

- B.1.(g) Describe how the operational performance of, and financial returns achieved by, JCP&L compare with the other FE's utility subsidiaries;
- B.1(h) Evaluate whether there are any inconsistencies or conflicts with the present holding company structure of FE that contains both distribution companies charged with providing safe, adequate and proper service at a regulated return and a generation company seeking to maximize profits in competitive markets. Evaluate whether the incentive for FE Generation to maximize profits in competitive markets could have deleterious impacts on JCP&L which is charged with providing safe, adequate and proper service at a regulated return.

In order to address the questions presented above, and to assess the effects of FE governance upon the provision of safe, reliable electric service to JCP&L customers at a reasonable cost, Navigant performed a number of work steps including, but not limited to reviews of the following:

- JCP&L and FE goals and objectives
- FE and JCP&L organization charts
- FE and JCP&L Board Articles of Incorporation, By-laws, Policies, and Procedures
- Service Agreement for services provided to JCP&L through the FE Services organization
- Methods for supporting the observance and enforcement of FERC codes of conduct and BPU rules of conduct for Affiliates
- FE Accounting policies and procedures
- FE Services cost allocation methodology
- FE and JCP&L risk management policy, process and internal controls
- FE internal audit planning process and relevant internal audit reports
- FEU Operations and Financial Metrics
- JCP&L Operational and Financial Metrics

B.1.1 Role and Function of the JCP&L and FE Boards of Directors

Conclusion: The FE Board of Directors provides a framework in which JCP&L and its affiliate distribution utilities can be effective in meeting the needs of the JCP&L customers, while not imposing on or interfering with the management of JCP&L meeting its objectives. The FE Board of Directors, among other things, focuses on strategic issues that include maintaining a balance between regulated and unregulated issues, while allowing the FE Utilities and specifically JCP&L, to focus on tactical issues of providing safe, reliable and economic electric service.

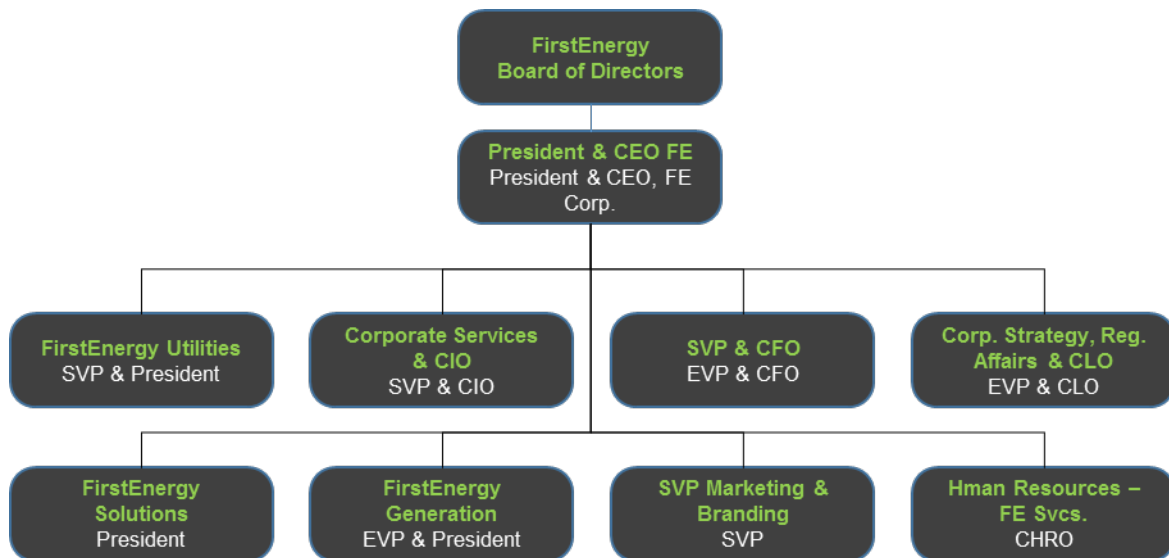
Recommendations:

1. None.

Supporting Facts/Findings:

Based upon a review of the FE organizational chart⁵⁰, the FE Board of Directors has oversight of a number of organizations including both regulated, unregulated and support services organizations as shown below in Figure 18. As can be seen, FirstEnergy Utilities, which is the regulated component of utilities within FE (of which JCP&L is part) is comprised of the regulated distribution and transmission utilities, apart and separate from the generation division, the unregulated business activities and service organizations.

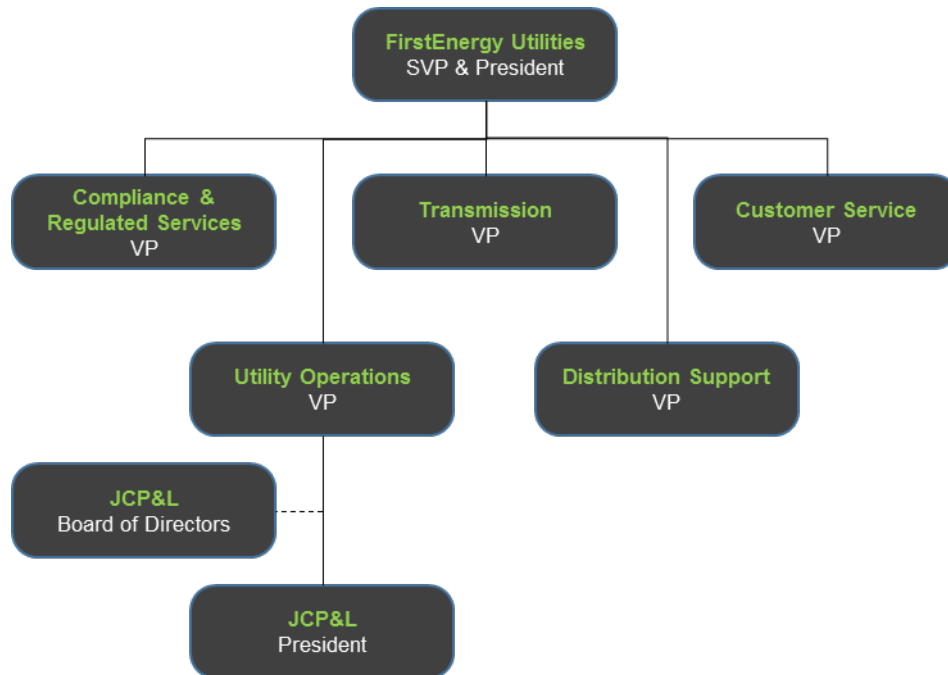
Figure 18. FE Organization



As can be seen in Figure 19, JCP&L is part of FEU which includes all regulated functions including distribution, transmission and the customer service and billing functions.

⁵⁰ Data Request B-100

Figure 19. FE Utilities Organization



JCP&L is apart and separate from other distribution utility subsidiaries, but receives support from various FE service organizations, as well as FEU support organizations as required. JCP&L has its own Board, which reviews JCP&L reliability, costs, budgets and other issues, and which interacts with the FE Board through the President of FEU.

The FE Board, among other things, focuses on setting strategic goals and metrics, including those that will support financial ratings, operational performance, and compliance with applicable rules. Key areas of focus at the FE Board level include:

1. Balance between regulated and non-regulated businesses
2. The effect of the economy and changes in the marketplace for the businesses that they oversee
3. Compliance with applicable codes of conduct
4. Provision of safe and reliable service
5. Interactions with the investment community

For the most part, the FE Board does not specifically approve budgets of individual distribution utilities, but rather reviews the plans of FEU which includes the financial results of plans developed for individual distribution utilities, and the impacts of those plans at a macro level on the FE goals and objectives. The JCP&L Board does approve the JCP&L operating budgets.

The FE Board focuses on providing a framework for its individual companies to be successful in meeting the needs of their customers, and meeting shareholders' objectives. The FE Board provides policies that

are followed by all FE companies related to Corporate Governance, Business Code of Conduct, Conflicts of Interest, and Corporate Political Activity Policy.

The Corporate Governance Policies⁵¹ addresses a number of issues related to governance of the FE board including:

- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]

Other policies that have been established by the Board that provide guidance for the management and employees of FE and its subsidiaries include Board Code of Conduct, a FE Code of Business Conduct (for employees), and a Conflict of Interest policy.

The FE Board uses five Committees to assist in the oversight of issues related to the FE family of companies. Those committees include:

1. Corporate Governance Committee
2. Finance Committee
3. Compensation Committee
4. Audit Committee
5. Nuclear Committee

Of these Committees, of significant importance is the work of the Finance Committee, which is focused on the longer term financial health of FE and its subsidiaries, including JCP&L. The Finance Committee Charter states that the Finance Committee will be made up of no fewer than three members from the FE Board and that the majority (50% + 1) will be independent members. The most relevant of this Committee's responsibilities related to Navigant's scope of work include the following:

- Review the capital structure policies, long- and short-term debt levels, dividend policy, issuances of securities, exposure to fluctuation in interest rates, share repurchase programs and other financial matters deemed appropriate by the Board.
- Approve terms of sales of securities in those instances where the Board has delegated such powers to the Committee.
- Review the financial forecasts, operations and maintenance budgets and capital budgets.

⁵¹ Corporate Governance Policies, revised September 15, 2015

- Review the membership of the Investment Committee for the pension fund investment and employee savings plans.
- Review the corporate insurance coverage.
- Report regularly to the FE Board concerning its activities, including reviewing and, where appropriate, recommending FE Board approval, of the major financial commitments and other major corporate strategic plans

The FE Board typically meets █ times a year and focuses on strategic issues and performance related to safety, reliability, customer satisfaction and financial stability. Linkage between the JCP&L Board of Directors and the FE Board of Directors is provided through the President of FEUFEU, who also serves as a Board member for JCP&L, and participates in reviews of the related financial plans and budgets with the Finance Committee, representing the interests of JCP&L, as well as the other FE Utilities.

B.1.2 Role and Function of the JCP&L and FE Boards of Directors

Conclusion: Both the FE and the JCP&L Boards' composition and level of involvement in operational and financial governance are appropriate and in line with the role of governance as defined in the Corporate Governance Policies and the charters of the committees. The FE Board of Directors is especially strong due to its members being independent, their level of experience and their diversity of industry experience and geography.

Recommendations:

1. Give consideration to more fully defining the role of the JCP&L Board and, in particular, the level of activity of the external board members.

Supporting Facts/Findings:

The current FE Board of Directors is comprised entirely of independent Directors, with the exception of the FE CEO. All members have significant experience as executives and Board members with recognized companies within the service territories of FE Utilities, with FE or other electric utilities, or as recognized experts in their related fields. The backgrounds of these board members include Hershey, Salomon Brothers, Ernst & Young, Entergy, NRG, Ontario Power, Anderson companies and others.

Under the Articles of Incorporation, the JCP&L Board of Directors may be comprised of from five to eleven members and currently is comprised of the President of FEU, Vice President of Utility Operations for FEU, and President of JCP&L, along with two external members. This composition provides the JCP&L Board with in-depth knowledge of the needs of JCP&L and assures that JCP&L's capital and O&M budget needs are incorporated into the overall FEU budget and five-year financial plan.

The JCP&L Board meets on a monthly basis following a prescribed agenda that is focused on primary issues such as O&M budgets, capital budgets and other areas of particular interest including reliability, customer service, overtime, absenteeism, and other operational matters.

The two independent, external Board members participate in the monthly JCP&L Board meetings. One Board member has been with the JCP&L Board since 1983 and retired from the New Jersey Division of

Consumer Affairs. The other independent Board Member is a former Board member of FE and a former Vice President of Human Resources at Goodyear. It is expected that their roles are, in addition to their fiduciary responsibilities, to represent the interests of JCP&L customers and JCP&L employees.

B.1.3 Efficacy of JCP&L Management's Focus on the Success of JCP&L

Conclusion: The JCP&L management team is focused on the success of JCP&L and spends the majority of their time, efforts and focus addressing issues specific to JCP&L services and customers.

Recommendations:

1. None

Supporting Facts/Findings:

The JCP&L management team is led by the President of JCP&L who reports to the Vice President of FE Utilities Operations. He is supported by a JCP&L Manager of Human Resources, a JCP&L Vice President of External Affairs, and a JCP&L Vice President of Operations. This group's sole focus is on the distribution and customer service operations of JCP&L with support from FE and FE Utilities support functions in addressing finance, accounting, legal and other support activities. The JCP&L management team participates in the preparation of a [REDACTED] year financial plan⁵², reviews operating metrics prepared for JCP&L⁵³, reviews operating metrics [REDACTED]⁵⁴, manages budgets and projects, and maintains the electric distribution system.

Significant effort is also expended by JCP&L management and staff in the planning and justification for all capital projects required to meet the needs of the JCP&L electric system through a [REDACTED]-round project analysis and justification process as discussed in the Operational Assessment and described in Data Response B-72.

The management team prepares quarterly updates and participates in monthly meetings with the JCP&L Board as to their current performance to plan and to discuss future plans. JCP&L's executive management team also presents annually to the FE Board concerning financial and operational performance, as well as briefing the Board on emerging issues.

In addition to its main focus on operations, the management team is also involved in representing JCP&L in the communities that it serves, as well as maintaining good union and employee relations.

⁵² Data Request B-168

⁵³ Data Request B-87

⁵⁴ Data Request B-88

B.1.4 Efficacy of FE Support to JCP&L Management's Focus on the Success of JCP&L

Conclusion: The support provided by FE is specific in purpose and supports the processes and decisions being made by JCP&L management.

Recommendations:

1. None

Supporting Facts/Findings:

FE and certain FEU support organizations provide all non-T&D related services and other support services to JCP&L through a service agreement, which has been approved by the BPU⁵⁵. This service agreement identifies the services to be provided, the allocation cost categories to be used, and the metric or unit of measure to be used for allocations of cost. This service agreement and allocation methodologies have been previously reviewed by Schumaker & Co. in 2011⁵⁶. Based upon a review of that report, changes that have been made to the Cost Allocation Manual⁵⁷ since that time are consistent with Schumaker recommendations. Navigant believes that the service agreement, cost allocation methodologies, and combination of direct charges and settlements for services provided are appropriate.

Some support services provided to JCP&L are also appropriately being provided on site for services that are unique to JCP&L and New Jersey requirements (services such as legal, regulatory and accounting as appropriate). As an example, FE Regulatory, Legal and FE Business Services' on-site personnel are dedicated to JCP&L. In the case of Business Services, that organization only acts as a facilitator and support for budgeting and accounting services to assure that activities at JCP&L and the costs incurred are being accounted for appropriately, and that accounting policies are being followed.

The standardized systems, processes and support services provided by FE Corporate are beneficial to JCP&L in terms of consistency, clarity, timeliness and accuracy. The costs charged to JCP&L for these services are well documented, and are provided at a significantly lower cost than if those services were provided by JCP&L for itself as a stand-alone organization.

B.1.5 Effectiveness of Internal Controls, Including Internal Audit Processes

Conclusion: FE and JCP&L have effective internal controls in place in support of their accounting and reporting for the business activities, including affiliate relationships, cost allocations for services rendered, regulatory compliance and other matters.

⁵⁵ Data Response B-91, Attachment 1

⁵⁶ Data Response B-99

⁵⁷ Data Response B-159

Recommendations:

1. None

Supporting Facts/Findings:

The existence of internal controls for publicly traded companies is critical because it provides the underpinnings of the level of reliance that can be placed on financial reporting, as well as directly affecting the level of effort that an independent auditor must undertake to reach an opinion on a company's financial statements. Since the implementation of the Sarbanes-Oxley Act of 2002, all publicly traded companies have been required to establish an integrated framework of internal control⁵⁸. This framework establishes the environment in which accounting records are to be maintained, and requires company management to take certain responsibility related to the financial statements. It also establishes that certain requirements be placed upon the independent auditor of a company, including the issuance of an opinion concerning internal controls in place at the company being audited. As part of the Annual Audit of FE performed by the independent Auditor, PWC is required to perform a review of the internal controls in place to not only determine what level of reliance it can place upon the books and records of FE and JCP&L, but must also comment on the adequacy of internal controls through their Internal Controls Opinion. Navigant reviewed that opinion which states that adequate internal controls are in place at FE and JCP&L.

To further gain an understanding of the internal controls in place, Navigant also reviewed the listings of accounting policies and controls in place, both for FE Corporate and Energy Delivery⁵⁹. This listing appears to be complete in establishing a framework to assure consistent accounting treatment of costs incurred. From an execution of policy standpoint, the use of FE service company employees to provide the accounting and business services support to each of the operating companies helps to provide a consistent application of these policies and controls.

Another important part of the internal control framework is the role that an internal audit function plays. Navigant interviewed the internal audit management as well as members of management and the Boards concerning risk assessment and the use of Internal Audit staff. Subsequently Navigant requested and reviewed a listing of internal audits performed by Internal Audit during the review period of 2013 through 2015⁶⁰. The subject areas audited indicates a wide spectrum of subjects that have been reviewed, based upon an assessment of risks. As a follow-up to a review of the list of audits, Navigant requested copies of the audits performed for each of the following:

1. A review of specific audit reports on affiliate transactions and accounting indicates that FE follows a robust code of conduct that is widely communicated and followed.

⁵⁸ Internal Control—An Integrated Framework, issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO)

⁵⁹ Data Response B-169

⁶⁰ Data Response B-97

2. A further review of a specific audit report concerning transmission and information systems capital projects indicates that capitalization policies are being followed in the application of accounting practices.

Navigant believes that internal controls at FE and JCP&L are strong and provide a basis for reliance upon any financial statements presented by the management of these companies.

B.1.6 Conflict or Risk between FE Corporate and/or Affiliate Goals with JCP&L's Business Activities (Risk Management and Internal Controls)

Conclusion: FE's approach to the evaluation of risks and the extent to which internal controls are used to mitigate those risks is comprehensive and consistent with practices at other publicly traded utilities.

Recommendations:

1. Conduct a study to evaluate whether the current Risk Management process is allowing sufficient consideration to be given to operational risks at the distribution utility level.

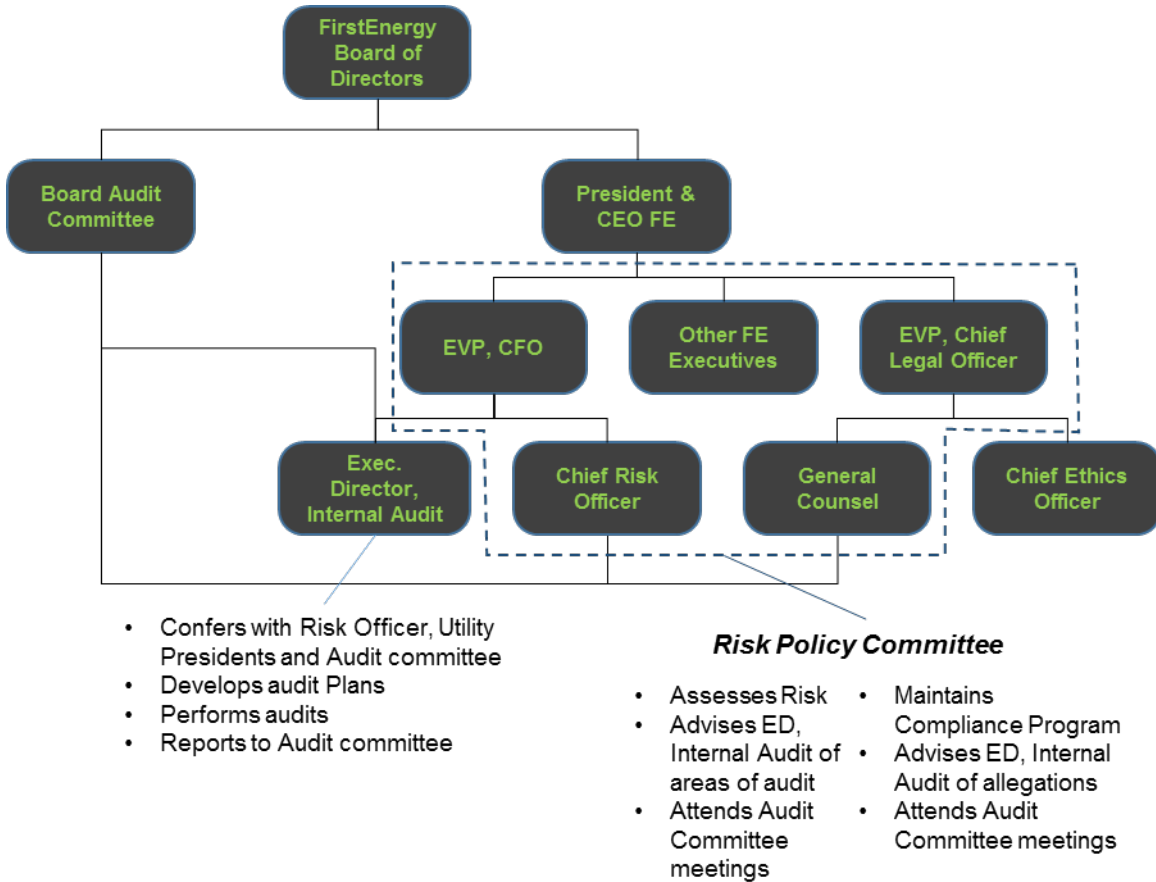
Supporting Facts/Findings:

Internal controls are in place in most organizations to provide for mitigation of risks identified by the organization. Accordingly, the framework in which risks are evaluated and the process for implementation of controls is also an important consideration. As part of this review and to evaluate internal controls, Navigant also evaluated the processes used to accomplish this.

The management of FE utilizes a Risk Policy Committee to assess risks and develop mitigation strategies. The Committee is comprised of the Chief Risk Officer, the General Counsel and executives from the various subsidiaries.

The organizational structure and interactions between key officers, the Audit Committee and the Board of Directors (as shown in Figure 20 below) are appropriate to effectively identify and evaluate risks and provide a basis for establishment of internal controls and risk areas that should be audited.

Figure 20. Audit and Control Functions



Source: FirstEnergy Data Response B-93 (including updates) and interview notes

Navigant also reviewed the FE Risk Universe⁶¹ used by the Risk Policy Committee and the Executive Director of Internal Audit to develop his Annual Audit Plans. The Risk Universe is extensive and includes the following categories and subcategories:

- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]

⁶¹ Data Response B-163

A review of the subcategories of each indicates that the scope of this assessment is quite extensive and would appear to cover all areas of risk facing FE and JCP&L.

With respect to project risks, Project Risk Management (PRM) is a systematic and structured analysis of project risks, and is required on all major capital projects. PRM is tailored to the requirements of the project and Enterprise Risk Management adjusts the process to match the specific project challenges. Projects over [REDACTED] or projects that may adversely affect multiple business units should have a quantitative and detailed project risk assessment performed by the Business Unit(s) Project Team, facilitated by Enterprise Risk Management.

While the Risk Management organization does not have responsibility to manage operational risks, it is informed about the operational risk mitigation actions through interviews during the risk identification process with Internal Audit and through the Risk Policy Committee (RPC). Enterprise Risk Management (ERM) provides framework around identifying and reporting risks and risk mitigation strategies. ERM also provides workshops to the businesses to ensure that all risks are appropriately captured and best practices are shared.

Navigant's observation is that management of operational risks for the distribution companies at the enterprise level may yield additional sharing of best practices and risk identification across the FEU operating companies.

B.1.7 Conflict or Risk between FE Corporate and/or Affiliate Goals with JCP&L's Business Activities (Organization Structure)

Conclusion: The organization of FEU as one regulated organizational group within FE, separate and apart from other unregulated subsidiaries, provides adequate mitigation to the level of risks associated with the generation and retail energy unregulated subsidiaries.

Recommendations:

1. None

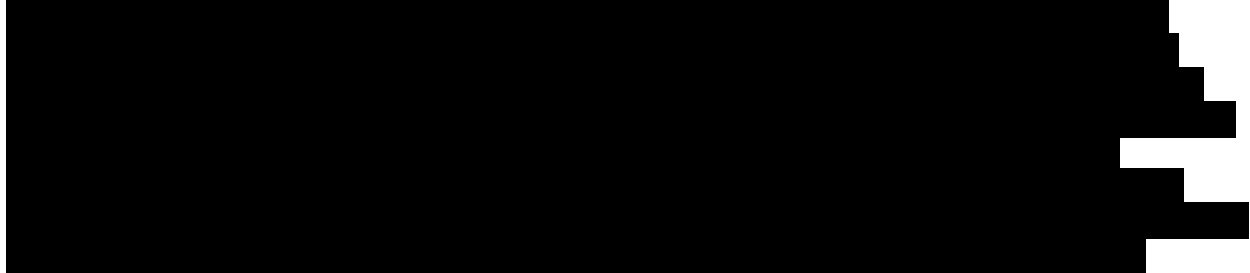
Supporting Facts/Findings:

As discussed in B.1.1, the organization of the FE utilities into one business unit affords both separation and protection to the FE Utilities, including JCP&L. Examples of this include the fact there are specific provisions of ring-fencing that have been implemented to provide this protection. In a 2015 ring-fencing study performed by KPMG⁶², 30 potential ring-fencing measures were identified, of which 28 already had been deployed in New Jersey.

Further indication that conflicts or risk have been mitigated include observations from the interviews with the Chief Financial Officer and other members of the FE Board and management team. FE Board and executive management communications to the investor and regulatory observers have made it clear that FE is transitioning from a focus on generation and deregulated operations to a focus on traditional

⁶² Data Response B-128

transmission and distribution utilities activities. This trend is consistent with what Navigant generally has observed in the utility space.



B.1.8 Compliance with the Corporate Separation Requirements of the NJ Affiliate Standards and FERC Code of Conduct

Conclusion: FE and JCP&L follow both FERC Standards of Conduct and New Jersey rules related to affiliate relations, fair competition, accounting and reporting requirements.

Recommendations:

1. None

Supporting Facts/Findings:

Navigant reviewed a number of documents to determine whether JCP&L is meeting its obligations under both the New Jersey affiliate rules and under the FERC Code of Conduct. JCP&L has filed their plans for compliance for the years 2013 through 2015⁶³ with the New Jersey BPU. In addition, JCP&L is required to perform a Benchmarking Study⁶⁴ of their support services every three year and made available for the BPU. This was completed in 2015 and Navigant's review of it includes the conclusion that the Study is in compliance with the rules. Additionally, Navigant believes that the Benchmarking Study was comprehensive and was based on in-depth analysis and documentation of the services being provided to JCP&L, the source of the charges, the amounts charged, and a fair assessment of the costs.

At the FE level, a comprehensive program for affiliate restrictions and FERC code of conduct is institutionalized as a part of every-day business⁶⁵. All employees are trained and expected to abide by the code of conduct. The program follows a color coded identification system as shown in Figure 21 below.

⁶³ Data Response B-102

⁶⁴ Data Response B-158

⁶⁵ Data Response B-103

Figure 21. Code of Conduct Color Coding System

classification	code	color
Inactive Employee	0	White
Regulated Employee	1 – Reg	Tan
Transmission Function Employee	1T – Reg TFE	Yellow
Generation Support Employee	2 – Gen	Purple
Shared Services Employee	3 – SS	Orange
Shared Senior Officers	30 – SSO	Green
Regulated Marketing Function Employee	4M – Reg MFE	Red
Competitive Marketing Function Employee	5M – Com MFE	Blue

This color coding scheme is used in a number of ways including incorporation of the color of an individual's grouping on their business cards, on their employee's Identification Badges, in the corporate phone directory. In addition, the Navigant team noticed that reminders are posted in halls and by elevators.

The program uses a comprehensive classification and color-coding program to:

1. Categorize employees' business unit
2. Establish communications protocols
3. Establish training protocols that assure that the organizations' employees are aware of the requirements of the codes of conduct
4. Prescribes who they are allowed to communicate with, and
5. Describe how to stay in compliance with the codes and rules.

Navigant reviewed the individual training programs⁶⁶ associated with this program. Based upon interviews with JCP&L management and FE's Chief Ethics Officer, employees are required to take ethics and compliance training annually. Employees are also annually required to certify that they are in compliance with the rules. If they are aware of any non-compliance, employees have available an employee hot-line and given the opportunity to report any such non-compliance.

Navigant observed that, as part of on-site visits at FE and JCP&L, it is apparent that these policies and procedures are in place and being followed as part of everyday operations at the sites visited.

⁶⁶ Data Response B-103, Attachment 2

B.1.9 FE's Resource Allocation to JCP&L Regulated Activities Versus Non-regulated Activities

Conclusion: JCP&L receives sufficient support resources from FE to meet its goals and objectives. Costs charged to JCP&L for corporate services from FE support staff are reasonable and follow a robust and appropriate methodology.

Recommendations:

1. None

Supporting Facts/Findings:

As discussed previously, Navigant has reviewed the Service Agreement, the Cost Allocation Manual and the Benchmarking Study performed by FE and believe that costs are being properly assigned or allocated to JCP&L under the provisions of those documents. Based upon a review of previous compliance plan filings before the BPU, the methodologies for cost assignment and allocation are in compliance with previous BPU orders. In addition, interviews of FE employees supporting JCP&L in various functions consistently responded that costing for services is done first through direct assignment if the work being performed is specifically for JCP&L, followed by allocations following the various allocation categories in use at FE.

As discussed previously, the Cost Allocation Categories are appropriate and provide assurance that there are sufficient categories that align with the FE organization and JCP&L support needs, and provide for allocations among those organizations that are receiving services from organizations that incur costs that cannot be directly assigned. The cost allocators used to allocate categories of cost, and as associated with work groups and work activities, are also appropriate.

In addition, Navigant reviewed the 2011 Schumaker Audit, and finds that the recommendations included in that report have been implemented, including service agreements which have been formalized, processes for reviewing and changing the allocations have been implemented, and a review of the methodology and allocators is performed at least annually.

Navigant also reviewed an internal audit performed by JCP&L in 2014 of the cost allocation methodologies and determined from that review that recommendations from the Schumaker Audit have been implemented, and that the methodology used for cost allocation is appropriate.

Finally, after reviewing the required Benchmarking Study completed in 2015, the costs charged for services and support provided to JCP&L are well documented, appear to offer significant cost savings, as well as providing consistent application of policies and support in providing quality services.

B.1.10 Operational Performance Achieved by JCP&L versus the Other FE Utility Subsidiaries

Conclusion: JCP&L's operational performance has improved during the 2013-2015 review period, is currently meeting FE target levels, and is generally better than the other FE utilities on a variety of metrics.

Recommendations:

1. Document assumptions related to the metrics established as targets if assumptions related to the basis for target levels change from year to year. Comparisons of certain metrics from year to year, and the basis for the color coding of metric achievement is unclear in some cases.

Supporting Facts/Findings:

In order to both determine how FE and JCP&L measure their operational and financial performance, as well as how JCP&L compares to the other FE distribution utilities, Navigant reviewed two primary sets of documents for the periods of 2013 to 2015. The first is a set of Financial Performance reports⁶⁷ specific to JCP&L that measures three key metrics: Direct Capital/Settled Capital Costs; Direct/Settled Non-Capital; and Overtime.⁶⁸ A second performance report is prepared by FE and compares performance of each of the FE Utilities to their targets and each other.

[REDACTED]

- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]

The Executive Leadership Team (ELT) Metric Targets are requested by Corporate Business Services annually and provided by the Corporate Metric Owner to Corporate Business Services for inclusion in the ELT Metric Package. The Corporate Metric Owner would maintain any documentation of assumptions and the basis for target level changes from year to year.

In this report, the metrics are color coded to compare performance to the annual established targets. Green is greater than 2.5% better than target, White is at target to 2.5% better than target, Yellow is better / worse than target to 2.5% worse than target, and Red is greater than 2.5% worse than target.

⁶⁷ Data Response B-87

⁶⁸ Data Response B-88

Presented below in Table 8 are a few key metrics showing how JCP&L is performing compared to target, and their rank is out of the ten FE distribution utilities.

Reliability/Operational metrics of JCP&L have improved during the review period as compared to the other FE utilities, with essentially all JCP&L operational results being rated as at or above target.

Table 8. 2013-2015 JCP&L Operational Performance

Metric	2013	2014	2015	2015 Rank (out of 10 FE Opco's)
SAFETY				
[Redacted]	[Red]	[Red]	[Green]	[Black]
RELIABILITY				
SAIDI	131.95	109.32	88.04	2 nd
CAIDI	114.05	104.75	91.97	1 st
SAIFI	1.16	1.04	0.96	4 th
[Redacted]	[Green]	[Green]	[Green]	[Black]
[Redacted]	[Green]	[Green]	[Green]	[Black]
[Redacted]	[Green]	[Green]	[Green]	[Black]
[Redacted]	[Red]	[Red]	[Green]	[Black]

Greater than 2.5% better than targeted value
 Within range of targeted value
 Up to 2.5% worse than targeted value
 Over 2.5% worse than targeted value

For six of the ten metrics above, JCP&L ranks at median or better in performance compared to the other nine FE operating companies. Improvement has occurred in the Safety and Reliability categories, while Customer Satisfaction measures are about the same or slightly improved. As can be seen in the right hand column above, JCP&L results are measured against other FE Utilities and compare well, except in Meter Reading categories.



B.1.11 Financial Performance Achieved by JCP&L versus the Other FE Utility Subsidiaries

Conclusion: JCP&L's cost-related financial performance, although improving, has fluctuated during the 2013-2015 review period. JCP&L has regularly exceeded targets for settled capital and O&M costs.

Recommendations:

1. See recommendations from the Operational Assessment, Sections A.1.8, A.1.9, and B.5.

Supporting Facts/Findings:

Based on information Navigant received, it appears that JCP&L is primarily tracking four cost-related financial metrics, as shown in Table 9 below. The JCP&L reports include some details and that help to understand or at least identify areas that are influencing the results. These financial metrics that are used by JCP&L are part of a detailed metrics package containing approximately 40 metrics encompassing the performance areas of Safety, Reliability, Customer Satisfaction, Employee Workforce, Claims and Work Management. These Metrics are reviewed at the regional level each month. The Performance Report for JCP&L is part of the larger Corporate Performance Report, which contains each Operating Company's individual report as well as additional Corporate consolidated metrics and a summary which compares each Operating Company.

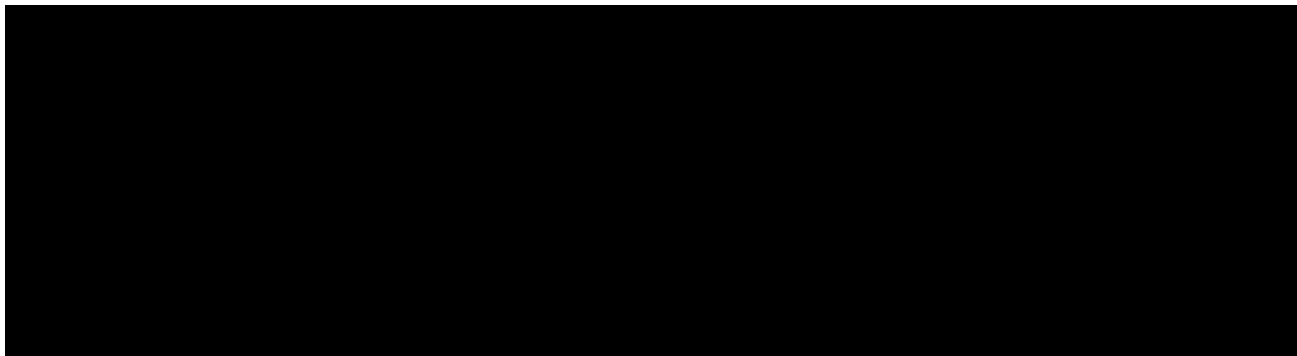
In addition, there are a number of other metrics that are tracked at the FE level that show individual company contributions to those metrics. Primary metrics that are tracked at the FE level include:

- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]

These reports provide both a year to date actual compared to forecast line and are updated and forecasted quarterly. On many of the reports, detailed comparisons are made among the FEU operating companies where appropriate. Navigant expects that FEU management uses these reports to compare the companies and determine causes or remedies for continuing areas of concern.

It would seem that these financial metrics for JCP&L are slightly improving, but continue to be an area of concern. As shown below, in 2015, of the four cost-related financial performance metrics tracked by JCP&L, three were slightly better (less than 2.5% better) than the targeted results. In 2014, three of the four metrics were greater than 2.5% worse than the targeted results.

Table 9. 2013-2015 JCP&L Cost-Related Financial Metrics



B.1.12 Financial returns achieved by JCP&L versus the other FE utility subsidiaries

Conclusion: Depending on the Return on Equity (ROE) calculation approach⁷⁰, JCP&L's ROE is either the lowest of all ten distribution utilities for 2013-2015 or is among the lowest for the same time period. Ultimately, this means it will cost more for JCP&L to borrow money going forward and be harder to access capital markets than other FE utility subsidiaries.

Recommendations:

1. File an annual Results of Operations Report, as may be required by the BPU. . JCP&L does not file an annual jurisdictional results of operations (ROO) report with the BPU, as is required of other FE distribution utilities in other jurisdictions⁷¹. Currently JCP&L only provides a copy of their FERC Form 1.*
2. Investigate the appropriateness of implementing existing BPU policies on infrastructure recovery mechanisms, as well as other Alternative Regulatory Mechanisms (ARM)⁷² other than base rate ratemaking. Properly designed ARMs have the potential to: (1) reduce regulatory lag; (2) provide additional incentives to utilities to operate efficiently; (3) provide a mechanism to target investment in areas which are considered a high priority for investment; and, (4) reduce the costs of regulatory proceedings for both the company and the BPU.*

⁷⁰ Navigant's ROE comparisons are shown on a GAAP basis, and based on publicly available information. These comparisons do not reflect differences in calculation of allowed return in various jurisdictions.

⁷¹ Other FE utility jurisdictions requiring some form of results of operations reporting include Pennsylvania, West Virginia, Maryland, and Ohio.

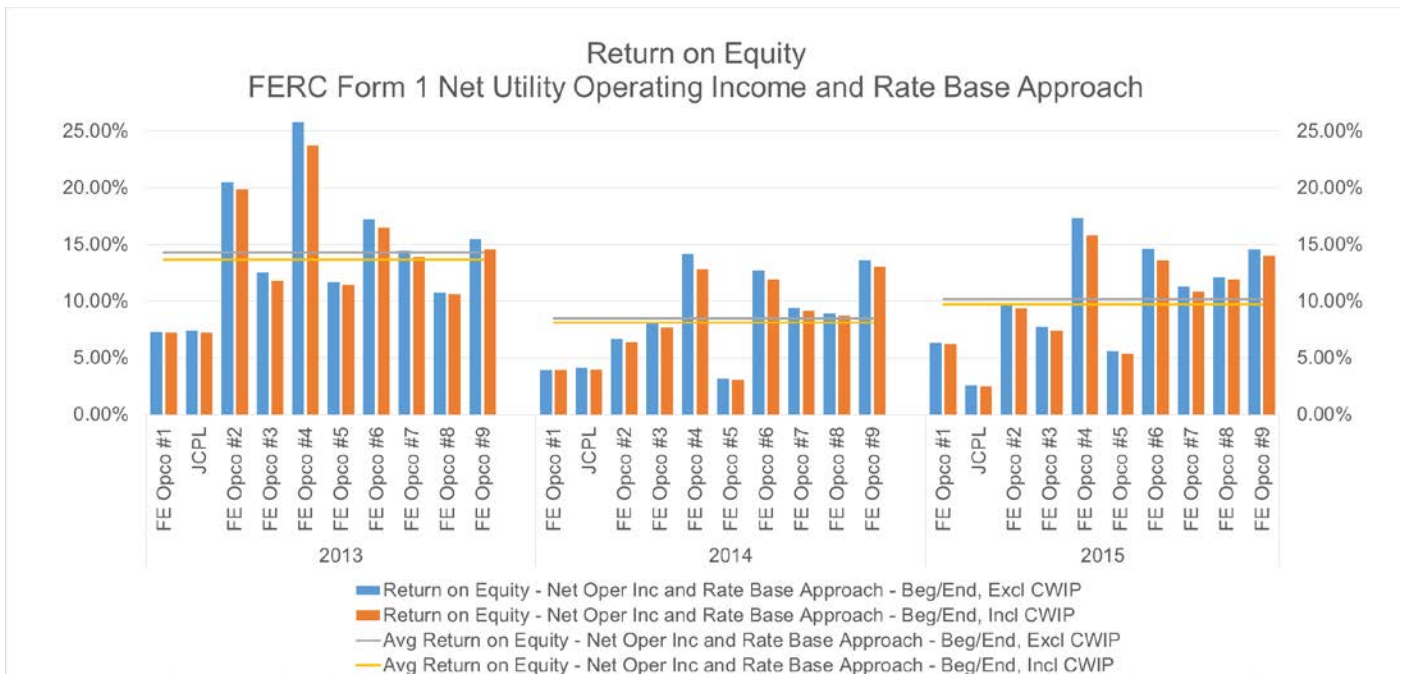
⁷² Alternative Regulatory Mechanisms (ARM) include a host of designs which allow a utility to recover costs outside of a traditional rate case or provide for periodic adjustments to tariffs without a cost of service review. Examples APM include: (1) infrastructure replacement mechanisms; (2) revenue decoupling; (3) CPI-x regulation; (4) Formula Ratemaking.

Supporting Facts/Findings:

Since there is not a regulatory results of operations report required from or provided by JCP&L that Navigant could use to compare to the reports filed by other FE operating utilities, Navigant prepared a number of financial comparisons using FERC Form 1 reports and annual financial results presented under Generally Accepted Accounting Principles (GAAP). Provided below are a number of those comparisons.

As can be seen in Figure 22, JCP&L has the lowest or nearly the lowest returns for the 2013 through 2015 time period and is significantly below the average return of the group of FE distribution utilities.

Figure 22. Return-on-Equity: Net Utility Operating Income and Rate Base Approach⁷³



For purposes of this ROE calculation, input values were obtained from FERC Form 1 results. ROE was calculated as:

$$\frac{(\text{Net Utility Operating Income} - \text{Interest on Long Term Debt})}{(\text{Average Rate Base} \times \text{Average Equity Capital Structure \%})}$$

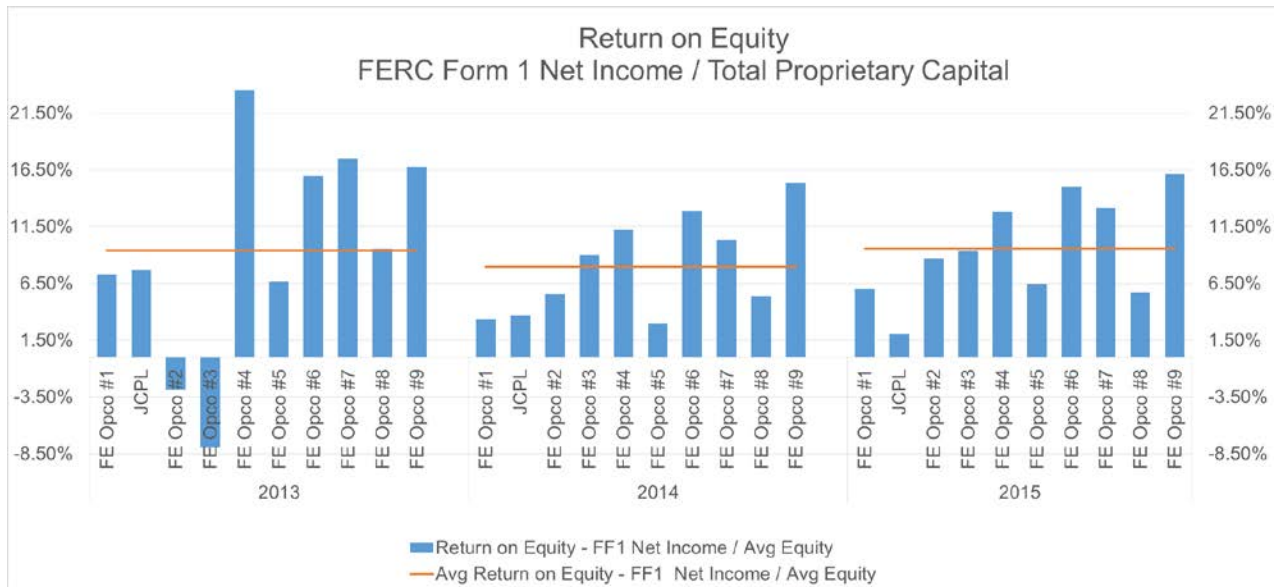
⁷³ Tabular data for this analysis is shown in Appendix D.

This method is consistent at a high level with jurisdictional results of operations reports filed by FE utilities outside of New Jersey. Each jurisdiction may have additional detailed differences in how ROE is calculated. Many rate base components can also vary depending on jurisdiction. For purposes of this analysis, the following items were included in rate base.

- Rate Base Additions: Net utility plant, accumulated depreciation and amortization, fuel stock, materials and supplies, prepayments, other regulatory assets, miscellaneous deferred debits, accumulated deferred income taxes (asset)
- Rate Base Deductions: Customer deposits, miscellaneous current and accrued liabilities, customer advances for construction, accumulated deferred investment tax credits, other deferred credits, other regulatory liabilities, accumulated deferred income taxes (liabilities)

Navigant also prepared an analysis of Net Income as a percentage of equity (Total Proprietary Capital) using values from the FERC Form 1 reports. As can be seen in Figure 23, once again JCP&L shows some of the lowest results of the FEU family of distribution utilities. JCP&L is in the middle for 2013, 3rd lowest in 2014, and lowest in 2015.

Figure 23. FERC Form 1 Return-on-Equity (based on Net Income)⁷⁵



[REDACTED]

⁷⁵ Tabular data for this analysis is shown in Appendix D.

There are a number of other financial metrics that could be used to measure the financial performance of JCP&L, and those will be discussed more in Section B.5 of the report where it addresses Financing. However, as a preview and based upon a review of Moody's and S&P credit rating reports, JCP&L's metrics are "weak but adequate". For example,

- Coverage ratios for its debt are lower than the median of the FE companies.
- JCP&L ranks last in pretax interest coverage relative to the other FirstEnergy distribution utilities.
- JCP&L ranks 3rd to last in: Adjusted Cash Flow Coverage; Adjusted Cash Flow-to-Debt; and EBITDA-to-Interest.

Navigant believes that the transparency of JCP&L's financial results to the BPU could be significantly improved through an annual report of the results of operations, as the other FE utilities are required to do under applicable regulations in their respective states.

Without a jurisdictional results of operations report applicable to NJ regulatory treatments, it is not possible to measure JCP&L's regulatory performance or compare JCP&L to other FE utilities from a state regulatory perspective.

Alternative Regulatory Mechanisms such as Infrastructure Replacement Mechanisms (IRM) or Formula Ratemaking Mechanisms (FRM) have become increasingly common in the last several years. An appropriately-structured formula ratemaking or Alternative Regulatory approach can allow JCP&L to improve its earnings and returns while efficiently adjusting, maintaining, and modernizing its capital base and efficiently managing its operating expenses. An alternative regulation that provides for JCP&L to retain some of the value (i.e., its expected future discounted net cash flow) helps ensure that the company takes an appropriately long-term view in making its efficiency decisions. This practice is common among other regulatory jurisdictions, but in some cases, there is a specific purpose for the reports in that they are filed in conjunction with some aspect of the regulatory environment in those jurisdictions. Examples include existence of formula ratemaking, or a distribution cost recovery rider, or for reconciliation of specific items like fuel clause and other adjustment factors. Navigant understands that such an effort was undertaken in recent years with all of the EDCs, but that agreement could not be reached as to what would be appropriate. This may be an issue that could be addressed through a proposed rulemaking process.

B.1.13 Potential Inconsistencies or Conflicts with the Present Holding Company Structure of FE that Contains Both Distribution Companies and a Generation Company

Conclusion: The FE holding company structure, and JCP&L's place in that structure, is typical for investor-owned electric utility holding companies with regulated and unregulated operating companies. Such a structure typically provides benefits for subsidiaries such as JCP&L. The establishment of certain policies, procedures, controls and safeguards mitigate the level of risk, while providing significant advantages to both FE and the operating utilities. While FE's current structure of having unregulated generating companies, retail solutions or other types of providers as part of the portfolio of companies may impact the credit rating of FE, it would not directly impact the provision of reliable electric service within regulated companies, but may increase the cost of capital and ultimately rates to customers.

Recommendations:

1. None

Supporting Facts/Findings:

Navigant has reviewed the organization of FE, and interviewed key executive both in FE and JCP&L. Based upon that review Navigant does not find any inconsistencies or conflicts of interest as a result of the current holding company structure of FE. Many other holding companies, including some of the best rated utilities in the U.S. including Exelon, AEP, Xcel, NextEra (FPL Group), Entergy and many others. The existence of non-regulated entities and the use of service companies is common among best practice utilities. Many holding companies use the service company structure for meeting the administrative needs of their jurisdictionally regulated utilities. Accordingly, significant synergies can be achieved through the use of service companies for back office operations, and customer care functions.

In each of the examples given above, there are also a number of guiding principles, policies, practices and processes that can be used to insure that such conflicts do not arise. Examples include the following:

- Ring-fencing—Navigant observed that JCP&L has completed a ring-fencing study, as required in the last base rate case (ER12111052), which was conducted by KPMG and filed on December 30, 2015. Standards of Conduct for FERC are clearly established, communicated and followed within all FE utility subsidiaries.
- Affiliate Rules for JCP&L are clearly established, communicated and followed by JCP&L and other FE utility subsidiaries.
- FE, and through extension, JCP&L have a number of code of conduct and conflict of interest policies, and significant internal controls, accounting policies and practices that support those policies.
- FE and JCP&L's resource allocation and cost accounting principles and practices are well documented and followed consistently among the subsidiaries.

Based upon the above, and after discussion with FE Board members, and executive management of FEU and JCP&L, Navigant does not believe any such conflicts exist.

B.2 Capital Allocation among Subsidiaries

Capital allocation is the process by which a holding company determines how much capital should be invested at each subsidiary. Providing reliable and efficient electric service to customers over long periods of time requires thorough planning and investment. As such, the methodology employed by a large electric power company for allocating capital resources to projects is a critical process.

Navigant was tasked with reviewing and analyzing the process for capital allocation among the FE subsidiaries in order to be able to perform the following:

- (a) Describe the manner in which capital is allocated among all the units of FE;
- (b) Describe the manner in which JCP&L receives a fair share of this allocation;

- (c) Describe how JCP&L's needs for capital are evaluated relative to the other FE distribution companies and FE's unregulated subsidiaries;
- (d) Describe the appropriateness of JCP&L's allocations of FE capital investment, given JCP&L's strong performance and returns; and
- (e) Evaluate FE's plan for its generation subsidiary in light of its financial performance (including its credit ratings), heavy reliance on coal for generation, low natural gas prices, the need to comply with the EPA Clean Power Program and determine the impact of such plans on JCP&L.

In order to address the items listed above and assess the effects of FE capital allocation on its ability to provide safe, reliable electric service to JCP&L customers at a reasonable cost, Navigant performed a number of work steps including, but not limited to reviews of the following:

- Reviewed the organizational structure of FE to understand holding company and subsidiary relationships
- Interviewed finance personnel to gather information and understand capital allocation policies and procedures
- Quantified historical and planned levels of capital allocation among the units of FE by comparing authorized capital budget versus actuals capital spending
- Compared subsidiary capital allocation against respective customer count, rate base, revenue, and other metrics to show investment levels relative to high level gauges of per unit investment required
- Analyzed holding company level earnings and reinvestment in the regulated subsidiaries
- Reviewed NJ Affiliate standards as they relate to capital allocation
- Reviewed FERC Code of Conduct as it relates to capital allocation
- Reviewed FE operations policies to determine if capital allocation is sufficient to meet safety and reliability goals and requirements
- Compared the level of investment to external investment targets as established by the distribution planning and asset management processes
- Reviewed capital allocation policies to determine if regulatory compliance for generation, such as Clean Power Plan, influence capital investment program in distribution subsidiaries

B.2.1 Manner in Which Capital is Allocated Among All the Units of FE

Conclusion: Based upon interviews, capital allocation among the FE operating distribution utilities is largely a needs-based approach, with the exception of the initial target number provided by FEU (See Operational Review Section A.5). All FE operating utilities, including JCP&L, forecast their capital requirements over a five-year period, which serves as the basis for the capital funding requirements for each year of the plan. A three-round capital project optimization process is used to determine the next year's capital budget in order to provide safe and reliable service.

Recommendations:

1. None

Supporting Facts/Findings:

FE does not allocate capital to the individual utilities. The FE role is to provide capital resources as required to meet the approved business plans of the individual utilities, whether it be equity infusion, short-term financing, or long-term debt.

Interviewees state that FE does not establish targets for capital availability but rather serves the purpose of funding the requested capital funds. Sources for that funding may include:

- Cash Flow from Operations
- Regulated money pool as one source to fund short-term capital requirements
- Debt issuance
- Equity infusion
- Rate increases (decision made at the JCP&L level, with input from FE Regulatory)

The previous year's five-year financial plan serves as a starting point for capital expenditure budgets, as well as the prior year capital budget.

1. The JCP&L Financial Plan includes capital additions ranging from [REDACTED] to [REDACTED] million per year. In some years, those capital expenditures can be covered through internal cash generation from operations, and may not be in other years.
2. Prior year budgets include capital addition blanket work orders for various kinds of additions, as well as specific budgets for multi-year projects (see Operational Review Section).
3. JCP&L management and FEU apply a robust, three-round capital project prioritization process to identify the required capital budget that is ultimately adopted as part of the FEU budget, which is approved by the FE Board of Directors. (see Operational Review Section A.5).

B.2.2 Manner in Which JCP&L Receives a Fair Share of This Allocation

Conclusion: JCP&L receives its fair share of the capital allocation through the use of a vigorous and iterative process of project identification, qualification and prioritization within JCP&L prior to any review at the FE level. Please refer to the Operational Findings to understand the Project Prioritization Process.

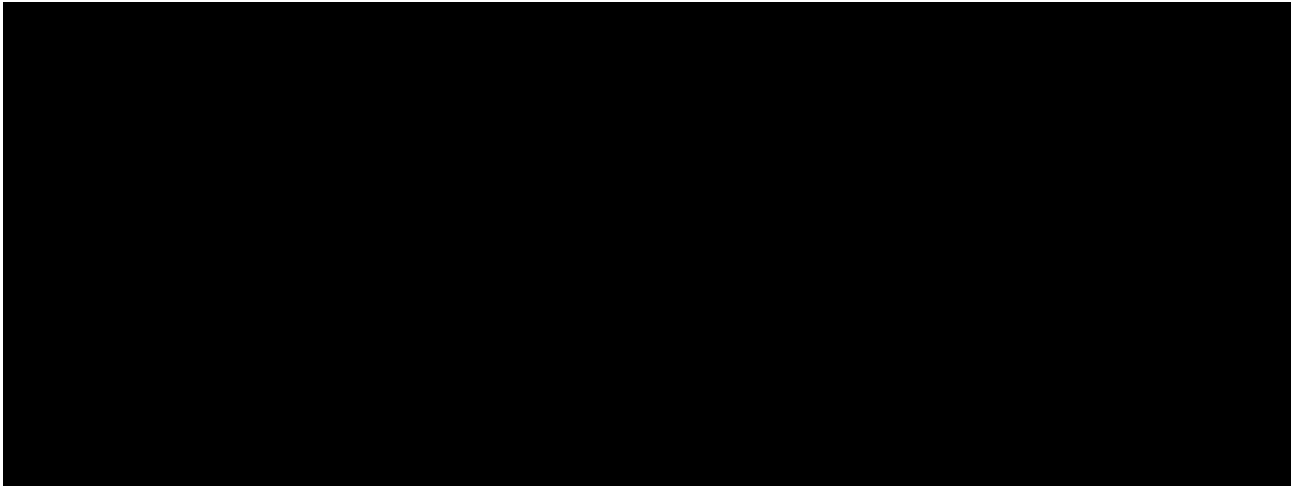
Recommendations:

1. Include changes in capital structure of JCP&L (and other electric distribution companies) by actions taken at the FE level (or in the case of other electric distribution companies their corporate parent / affiliates) as part of periodic reporting requirements to the BPU, if these transactions are not already included in other required reporting. Consider an alternative regulatory process that would improve the incentive structure for JCP&L with regard to capital expenditure.*

Supporting Facts/Findings:

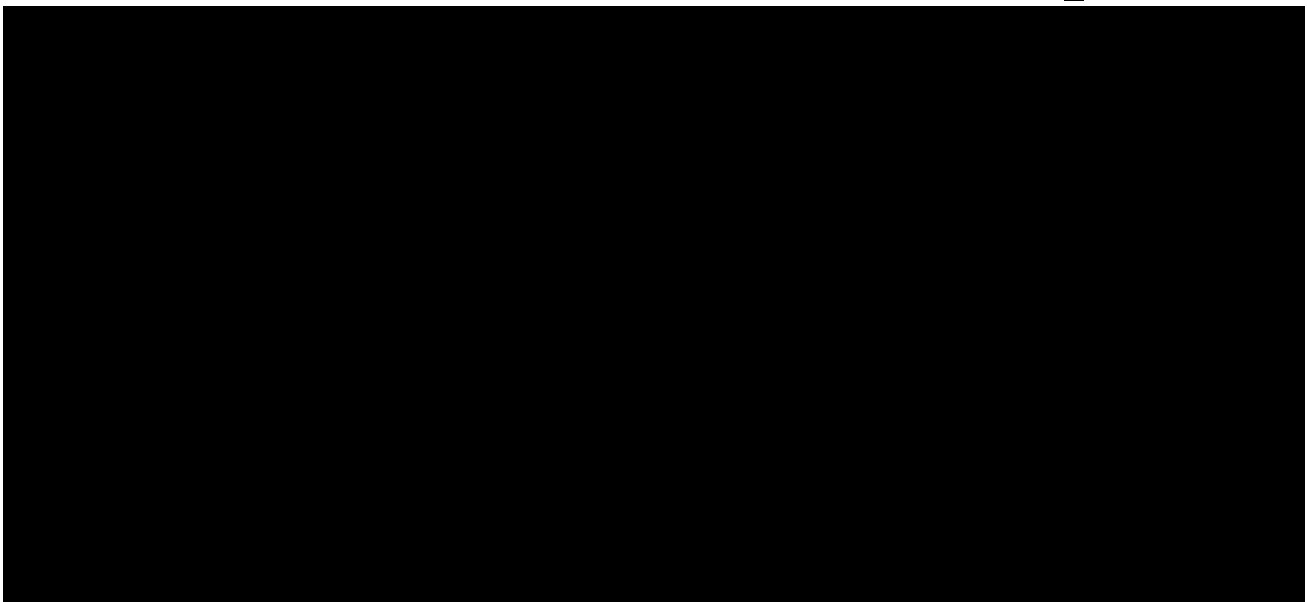
During the review periods of 2013 through 2015, JCP&L had the largest dollar amount of capital additions of any of the FE distribution utilities as shown in Figure 24 through Figure 28 below. The capital additions are excluding any major storm repairs, and thus reflect routine system maintenance and improvement as their capital expenditures.

Figure 24. Total Distribution Plant Additions, 2013-2015



JCP&L's capital additions as a % of existing plant and per retail customer vary relative to other FE Distribution Utilities, but JCP&L's results are not a noticeable outlier.

Figure 25. Distribution Additions as % of Gross Distribution Plant



[Redacted text]

Figure 26. Distribution Additions as % of Net Distribution Plant

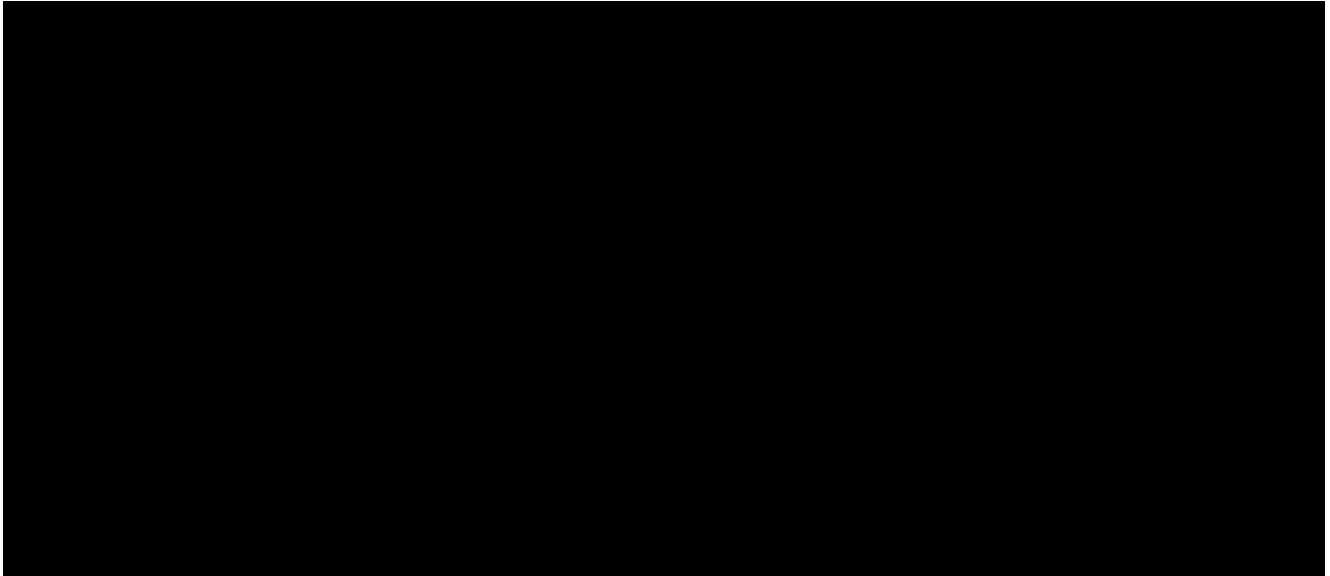


Figure 27. Distribution Plant Additions per Retail Customer

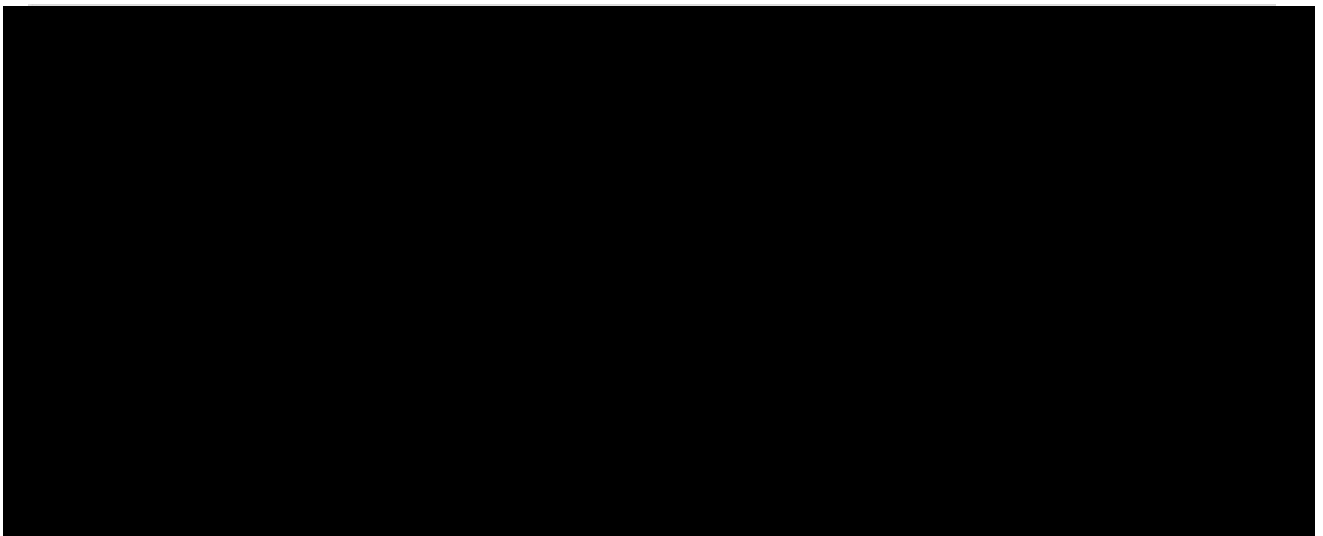
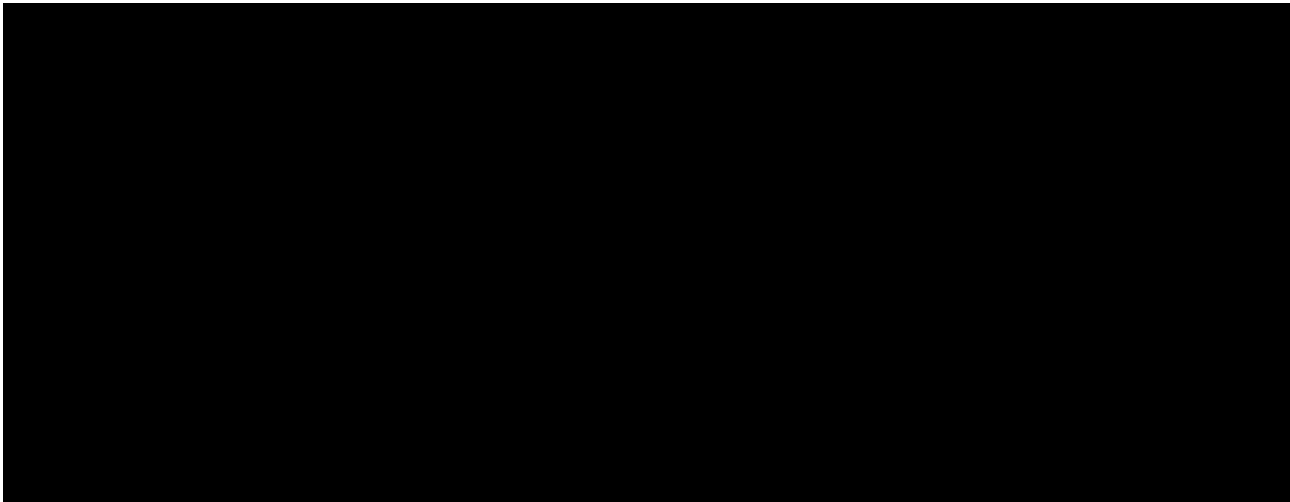


Figure 28. Distribution Plant Additions as a Percentage of Depreciation



Based upon the positive results that have been indicated through a review of JCP&L performance reports, it would appear that JCP&L is investing adequate funds to provide safe and reliable service to JCP&L customers.

Rather than focusing on actual capital expenditures of the various FE distribution utilities, other factors such as major projects (AMI, grid modernization, etc.) density, reliability, age of plant and other operational factors will influence these types of comparisons. Navigant did not perform this type of in depth comparison, except as to the extent of those items identified previously in the Operational Review scope of this review.

As noted earlier, an appropriately-structured regulatory approach can improve the incentive structure for JCP&L's capital spending. An appropriately-structured Alternative Regulatory approach would help improve JCP&L's capital allocation and overall efficiency.

B.2.3 FE's Plan for Its Generation Subsidiary

Conclusion: JCP&L and the other FE Distribution Utilities' capital requirements do not appear to be affected by any requirements that may be placed upon the merchant generation subsidiaries related to the Clean Power Plan or other capital requirements.

Recommendations:

1. None

Supporting Facts/Findings:

FE management has communicated both publicly, through investor communications, and directly to Navigant through the interview process, that its focus for the future will be to maintain power plants with a

minimal investment, and place less focus on the generation or unregulated businesses. [REDACTED]

[REDACTED]

FE ownership in generation assets in a separate subsidiary is not uncommon, and where there is no evidence that capital is constrained, JCP&L will be rated on its own merit.

Activities being undertaken in Ohio [REDACTED]

[REDACTED] is not likely to have an effect on JCP&L capital requirements or access to capital funds.

In order to assure that the same level of due diligence is applied to capital planning and spending in the Generation subsidiary, FE has made an organizational change. This change involves the creation of a position (VP of Asset Management) at the FE Finance level to institute project identification and prioritization processes similar to those followed at JCP&L to be applied to all subsidiaries within FE, including Generation.

B.3 Human Resources, Staffing, Benefits, and Planning

The management of human resources staffing, benefits and planning is a major component of how well an organization meets its goals and objectives. Accordingly, as part of the scope of this Financial Review, the BPU and JCP&L identified a number of questions that Navigant has addressed as part of this scope.

As part of the Financial Scope, Navigant was asked to address a number of questions that were identified by the BPU regarding governance of JCP&L, including the following:

- B.3.(a) Recruiting and Staffing – Describe JCP&L's recruiting and staffing plans and preparations to address future staffing requirements, in light of JCP&L's aging workforce and with some key employees nearing retirement;
- B.3.(b) Describe the manner in which JCP&L provides for the continuity of operations and sufficiency of skilled employees;
- B.3.(c) Compensation and Benefits – Describe (i) how FE's New Jersey workers are treated relative to its other FE operating companies, and (ii) how workers are categorized or tiered, in terms of benefits while employed and post-retirement;
- B.3.(d) Describe the circumstances under which post-retirement benefits or the extension of those benefits are or may be changed and how this is reconciled with funds collected for this purpose in rates;
- B.3.(e) Conduct a representative sample survey of both union and non-union JCP&L employees, regarding JCP&L operations and identify employee concerns that may exist.

In order to address the questions presented above, and to assess the effects of FE governance upon the provision of safe, reliable electric service to JCP&L customers at a reasonable cost, Navigant performed a number of work steps including, but not limited to reviews of the following:

- FE and JCP&L organization charts
- Position descriptions
- Staffing counts between exempt and non-exempt for 2013 through 2015
- Staffing plans and strategies
- Training plans
- Comparisons of Union Contracts
- Comparisons of pensions and benefits programs

In addition, Navigant performed interviews with key HR management personnel including the Manager of Human Resources for JCP&L, reporting to the President of JCP&L, FEU Director of Regional Workforce Development, FEU Business Partner to JCP&L, and FE Executive Director of Human Resources.

B.3.1 Recruiting and Staffing

Conclusion: JCP&L employs a robust process for staffing and workforce planning to assure continuity of operations and sufficiency of skilled workers, especially in light of JCP&L's aging workforce.

Recommendations:

1. None

Supporting Facts/Findings:

Based upon interviews and a review of documents provided related to work force planning and strategies, a 3-year workforce plan is prepared and formally reviewed annually for bargaining and non-bargaining employees. Workforce Development develops a first draft of the 3-year Plan template based on "known" data points such as demographics, current staffing levels, typical attrition (Retirements, internal transfers and external transition) for review by OPCO's. Information is entered into standard templates at the JCP&L level. At JCP&L, the HR Manager works with the three JCP&L Operations Directors and the VP of Corporate Affairs to complete the JCP&L workforce plan.

JCP&L's HR Manager relies on the Plan to determine JCP&L staffing needs by job classification, which may result in ramping up the hiring and/or training process. The first year of the plan is more detailed, examining month-to-month attrition, business conditions, and a "blend" of project work load and basic operations; whereas, on a long-term basis, the plan examines long-term trends. The 3-year workforce plan uses a 3-year planning horizon because many job categories require three to five years of lead time

■ [REDACTED]

for hiring and training. Staffing plans by job category are produced monthly for the first year, quarterly for the remaining four years.

Historically, the workforce plan has been developed in the 4th quarter each year. Moving forward, the plan is to prepare the staffing plan earlier so it can be included in the budgeting process. A Dashboard exists for monthly real-time visibility, and includes tracking staffing plan forecast versus actual (e.g. open requisitions). Knowledge management and planning is viewed as part of employee development, with consideration in the 5-year Plan for subject matter experts' knowledge transfer and lead-time requirements.

The staffing analysis process includes all significant aspects of workforce planning, hiring, and monitoring, including:

1. Planning includes a review of age demographics, attrition forecasting, and the development of a staffing plan by job family, followed by approval of the plans by executive management.
2. Staffing augmentation requests are supported with a hierarchy approval process that incorporates workload justification.
3. Staffing Strategies documents provide established recruitment activities, selection process testing (if applicable), post-hire training and development, and compensation.
4. Monthly staffing headcounts, including additions/subtractions, transfers, attrition, and open hire requisitions are tracked by HR, which provides management with a continuous understanding of current headcounts and plans to ensure staffing levels are maintained to the identified budgeted headcounts.

The Staffing Strategies documents provide specific guidelines for sourcing, progression, training and development of key positions such as Distribution System Operators, Distribution line workers, meter installers, relay/instrument & controls Technicians, substation electricians, transmission system operators, transmission line workers, underground technicians. The Staffing Strategies also provide guidelines for sourcing, progression, compensation, training and development for engineering positions.

B.3.2 Manner in Which JCP&L Provides for the Continuity of Operations and Sufficiency of Skilled Employees

Conclusion: FE and JCP&L have a robust skills development and training program that also serves as a valuable recruiting tool for future employees of FE and JCP&L, both in professional (exempt) positions and in field operations.

Recommendations:

1. Develop and implement formal processes and systems for knowledge management for professional (exempt) positions demonstrating progress over a reasonable time period. These do not appear to exist, other than the use of an "acting manager" role, and through learning on the job from more seasoned employees.

Supporting Facts/Findings:

JCP&L relies on FE Utilities Work Force Development for training programs and support. There are formal training programs and facilities supported by FEU for training and skills development.

- Training for bargaining unit employees includes both "skills" training (general technical skills) and "systems" training (specific to JCP&L's system/technology/designs).
- The facility in Farmingdale, NJ has 6 full-time instructors for Lines & Substations, 7-8 for Metering & Relaying and 1-2 full-time instructors for system training, plus one employee who supports this facility and others.
- Training includes curriculum lists with detailed agendas, Job Skill Demonstrations (JSDs), progression tests and refresher incumbent training by function.
- Trainers included supplemental support and instruction from retirees.

FE no longer relies on traditional apprenticeship programs for new line/substation bargaining unit personnel. All new inexperienced employees in these positions are hired through the Power Systems Institute (PSI) program, which includes formal training in partnership with local community colleges (Raritan and Brookdale Community Colleges for JCP&L).

Journeyman experienced linemen positions are still hired via the open market postings (outside of PSI), but applicants are required to go through a skills-based and written evaluation, background check. If hired, the candidates are then required to participate in a two-week Work Force Development (WFD) boot camp which includes safety and Occupational Safety and Health Administration (OSHA) training.

The PSI program (developed by FE) initially had a slow start, but is now successful. This program now allows JCP&L to choose from a large number of qualified graduates to fill open positions. PSI was introduced to JCP&L after the FE-GPU merger. The PSI requires four semesters, (21 months) including a paid internship between semesters 2 and 3. Starting this year, a 3-week "shadowing" assignment will be offered during the winter break between semesters 1 and 2. Attendees spend 2-1/2 days in the classroom, 2-1/2 days training each week at a JCP&L/FE training facilities during semesters 3 and 4. All graduates are awarded a 2-Year Associates in Science degree. After hiring, PSI graduates undergo another 3.5 years of job skills development as continued training at FE.

Each FEU operating company is responsible for meter and relay training and mechanic training, so it is not part of the PSI program. Bargaining unit employees must meet annual re-certification for their respective job classifications. Non-bargaining employee training includes extensive web-based training coordinated through FEU (Corporate handles IT/Cyber-Security training). Local HR groups handle Ethics training programs. FEU WFD also assists with special project training (e.g., OSHA rules), and engages bargaining unit personnel to come up with training methodology and change management plans.

In 2015, JCP&L also started an annual "Safety Fair", which was modeled after another FEU distribution utility and is supported by FEU WFD. Retirees are used as contractors to conduct three days of training and during which approximately 600 people can be re-certified for various items. FEU WFD also maintains all annual required OSHA courses and certifications. Customer service representative training in NJ is done in-house and supported by WFD.

As new technologies are introduced new training programs, described as "Gap Training" are developed and offered. FEU relies on feedback from OPCO's to develop these programs, and these happen as new equipment and technologies are introduced.

Non-bargaining unit employee training includes training for all employees as well as specialized training for Supervisors and above. Corporate Learning & Development (L&D) manages this training, which includes a variety of web-based training classes. JCP&L HR also supports Corporate L&D in broad based training. This has included an Ethics refresher in 2015 (requested by FEU), IT Cybersecurity training, and FERC code of Conduct training. Another example is the "map my career" training associated with a new performance management process that was recently rolled out.

B.3.3 Compensation and Benefits

Conclusion: JCP&L employees are treated fairly in relationship to the treatment of employees at other FE distribution utilities.

Recommendations:

1. None

Supporting Facts/Findings:

A comparison of union contracts and wages provided by FE Human Resources⁷⁸ indicates that JCP&L employees are paid [REDACTED]

[REDACTED] This is consistent with cost of living differences from region to region.

Based upon review of certain data responses⁷⁹, benefit programs offered across the company are standardized and the same in all companies, except as required by union contract differences or specific state laws. [REDACTED]

Compensation and benefits of exempt employees is consistent across the FE distribution utilities, being comprised as base salary, benefits, short-term incentive awards, and long-term incentive awards.

- A review of JCP&L officer salaries, as shown in FERC Form 1s, indicate that the base salaries (without incentive compensation) to be reasonable, or even on the low side when compared to similar positions at larger distribution utilities approaching the size of JCP&L.
- These lower base salaries may be influenced by the existence of incentive compensation
 - [REDACTED]

⁷⁸ Response to Data Request B-119

⁷⁹ Response to Data Request B-118

o [REDACTED]

B.3.4 Pension Plans and Post-retirement Benefits

Conclusion: Pension and Benefit programs are treated consistently across the various distribution utilities and the handling of Other Post-Employment Benefits (OPEB) for retirees are consistent with approaches used in the industry.

Recommendations:

- 1. None

Supporting Facts/Findings:

Based upon a review of the FE Pension Policy⁸², pension plans for new employees have been phased out over the last few years at all FE operating companies and are addressed as each union contract has been renewed. In the industry, cash accounts and 401K plans are the trend for retirement structures.

Pensions and benefits of acquired companies as applied to retirees, have been maintained consistently across the distribution companies, either through grandfathering or through cash payouts, or subsidies, as is the case for JCP&L.

Pension funding targets are set at approximately [REDACTED] of accrued liability, and a review of the existing targets finds that those pension funds⁸³ range from [REDACTED] to [REDACTED] across the FE operating companies, with JCP&L being in the middle of the range, slightly above target. Separate funds are not maintained for each operating company's pension plan, but are accounted for by FE. Protection of these pension obligations are protected through Federal laws.

[REDACTED]

⁸² Response to Data Request B-118, Attachment 53

⁸³ Response to Data Request B-184

B.3.5 Post-retirement Benefits Reconciled with Funds Collected for This Purpose in Rates

Conclusion: JCP&L, like many investor-owned utilities, does not reconcile post-retirement benefit obligations with funds collected in rates for this purpose. However, JCP&L has provided filings to the BPU concerning post retirement obligations agreed to as part of the FE-GPU Merger stipulation.

Recommendations:

1. None

Supporting Facts/Findings:

Reconciliation of benefits funded through rates to actual benefits paid is a complex process dependent upon a number of assumptions. Retirement benefits are dependent upon:

- How they were treated in previous rate proceedings,
- How they were accrued on the financial statements, and
- How they are funded.

Until recently, regulators have not required reconciliation to be performed as to the amount previously collected through rates, although there have been instances where a pension adjustment mechanism has been adopted as part of a settlement process. While there are instances where this may be appropriate, it would be dependent upon the circumstances associated with many of the following factors.

- Post-retirement benefits that are accrued for accounting purposes during a current period are based upon an estimate using an accrual factor following an actuarial based methodology.
- The application of the actuarial methodology to estimate future liability for post-retirement benefits is applied on an annual basis, and that accrual will change from year to year.
- As rate adjustments are requested, these accrued costs may or may not be reflected in rates, depending on the treatment of those costs in the regulatory filing.
- A company's actual funding of those liabilities is a separate issue from what has been reflected on the books, or what has received rate treatment.

Since the accrual is based upon actuarial estimates of survivors, and assumes certain levels of inflation, companies typically will underfund those liabilities so that the capital is not "trapped", recognizing that those liabilities are not imminent in their entirety and that the utility has time to make adjustments to the funding for those liabilities. If post-retirement benefits in rates are collected from the actuarial amount, the amounts collected through rates may in most cases, be insufficient to reflect the full liability for OPEBs.

However, with the passage of certain accounting pronouncements related to the recording of OPEBs, more attention is beginning to be focused on the treatment of these costs for regulatory purposes.

B.3.6 Sample Survey of JCP&L Employees

Conclusion: Based on an employee survey, on average, JCP&L employees do not have significant concerns regarding the system reliability, storm restoration, future system planning, spending levels, overall goals and objectives, employee workload & resources, career advancement, and financial soundness of the company. Some level of concern was expressed by bargaining unit employees related to the importance of employee satisfaction to JCP&L and the amount of communications provided to JCP&L employees by FirstEnergy.

Recommendations:

1. Regularly perform an employee survey which addresses upon employee satisfaction, perceptions about JCP&L's commitment to customers and other critical areas of concern, and institute a formalized process for addressing concerns expressed in the employee survey. This survey should be performed periodically (e.g., on 18- or 24-month cycles) for a minimum of 2 cycles so that JCP&L can assess the information learned from employees, how best to implement improvements related to these, and the overall value of regular employee satisfaction surveys.

Supporting Facts/Findings:

FE currently has processes and forums in place to gather employee feedback and share their concerns, such as the following:

- Local labor/management meetings provide the forum for union employee concerns to be heard by local leadership;
- All hands meetings provide an opportunity for employees to hear from leadership and ask questions;
- Exit interviews are conducted with HR and provide a forum to keep a pulse on employee concerns (albeit exiting employees);
- Safety Celebrations happen throughout the year, where leadership attends these events to recognize performance and is accessible to employees;
- HR attends company health fairs and conducts annual open enrollment meetings with employees, providing a venue for employees to ask questions and express concerns;
- New leaders who graduate from our New Supervisor/Manager Program have time with the President, VP of Ops and HR Manager to discuss further training/educational needs, where the new leaders have the opportunity to ask questions and express concerns, which are shared with the business unit through HR Business Partners;
- Employees are able to submit concerns to the Employee Concerns Line, which is an anonymous phone line. All calls are researched and addressed accordingly; and
- Surveys and pulse checks are conducted on an ongoing basis throughout the year on a variety of topics such as the new career management process, healthy living program survey, communications surveys, etc.

Survey participation rates were relatively high for both management and bargaining unit employee groups. All JCP&L employees were given an opportunity to participate in the survey

- 225 management employees out of 372 invited (60%) participated via an e-mail invitation and link to an online survey tool administered by Navigant.
- 754 bargaining unit employees out of 1112 invited (68%) participated in the survey via employee meetings and paper responses sent directly back to Navigant.

Employees were asked to respond to 17 statements on a 5-point scale ranging from “strongly disagree” (=1) to “strongly agree” (=5).

21 management and 108 bargaining unit also submitted free-form responses to the question “Are there any questions that were not asked that you feel should have been?” Navigant viewed the responses on this question manually, and did not identify any areas of significant concern.

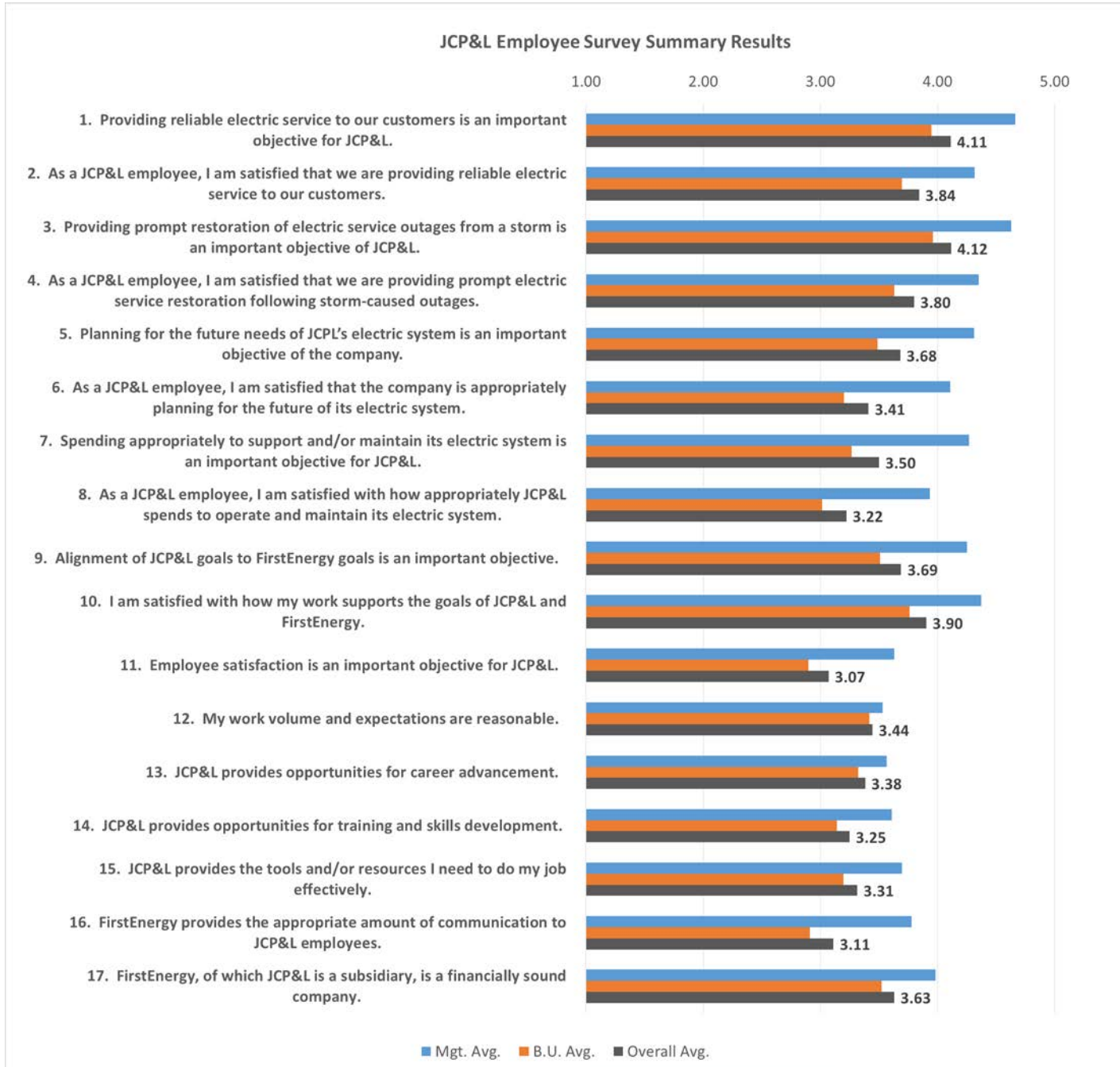
The high response rate to the survey from management and bargaining unit employees suggest that a bias does not exist in the results of the survey. A low response rate would potentially indicate a biased response, either positive or negative. However, the 60% and 68% response rate were great enough to reject the hypothesis that the results were biased.

The results of the survey were generally favorable with management employees generally producing scores which were more positive than bargaining unit employees. However, hypothesis testing of the results indicated that for any question the differences in the scores for any given question were not statistically significant. Therefore, we can reject the null hypothesis that a difference exists in the results of the survey for management versus bargaining unit employees.

Navigant also calculated correlations between the responses of all question in the survey in order to determine if the survey results were reliable. Specifically, questions which were similar in nature were expected to contain responses which were highly correlated. The cross-tabulation matrix produced from the responses resulted in a finding that the results were reliable and respondents provided consistent results.

A summary chart of the average responses to the survey questions is shown below in Figure 29. Complete graphical results of the survey questions and results are included in Appendix E.

Figure 29. JCP&L Employee Survey Summary Results



B.4 Compliance with Merger Order (BPU Docket No, EM001108701)

Navigant was asked to address a number of questions that were identified by the BPU including the following:

- B.4 (a) Assess compliance with continuing merger conditions that obligate FE/JCP&L to allocate sufficient resources both in terms of capital and staffing to New Jersey to enable the reliable operation of JCP&L;
- B.4 (b) Examine how FE and JCP&L are meeting such continuing obligations to allocate sufficient resources to New Jersey and to fulfill historic obligations to ratepayers and employees.

In order to address the items above, Navigant performed a number of working steps. These steps included the following:

- Identified merger order commitments applicable to adequate staffing and capital resources that enable the reliable operation of JCP&L.
- Requested and reviewed JCP&L reports that have been filed with the BPU related to merger commitments.
- Requested and reviewed performance reports related to reliable operations and customer service of JCP&L.
- Requested and reviewed reports and descriptions of staffing programs.
- Requested and reviewed reports identified in the Operations section above.
- Reviewed results of the employee survey.

B.4.1 Merger Order Provisions to Allocate Sufficient Resources in Terms of Capital to New Jersey

Conclusion: JCP&L has met all of its Merger Stipulation commitments related to allocation of sufficient capital resources for the reliable operation of JCP&L during the review period of 2013-2015.

Recommendations:

1. None.

Supporting Facts/Findings:

Attachment A to the merger order contains 51 specific commitments. Of the 51 commitments, 8 of the commitments either directly or indirectly address capital allocations. The commitments that most directly deal with capital allocation are commitments 14, 17, and 40. A summary of these commitments is shown below.

- # 14: JCP&L customers will not be subject to financial costs, risks or consequences from subsidiaries Ohio Edison, Penn Power, or other FE nuclear or fossil generation operations.

- # 40: FE commits that NJ will receive are least equal or where appropriate, additional funding priorities as compared with Pennsylvania and Ohio with regard to electric system upgrades, capital projects, staffing and maintenance programs in the new corporate structure.
- #17: JCP&L must maintain a capital structure, dividend policy, and use its best efforts to achieve financial ratios consistent with investment grade debt ratings as reported by Moody's and S&P. Any lowering of debt ratings below investment grade or credit downgrades made by major rating agencies must be reported to the BPU.

The focus of Navigant's review regarding the merger order and historic obligations to rate payers was to ensure that JCP&L and or FE have taken adequate steps to ensure overall reliable operation of JCP&L.

As stated previously, JCP&L has met or exceeded BPU reliability targets since 2012, although some cause code categories may present opportunities for improvement. JCP&L reliability data reported in ASPRs confirm that it has met BPU targets for 2013, 2014, and 2015. The ASPR reports indicate JCP&L reliability metrics as measured by CAIDI and SAIFI have improved by up to 40 percent since 2012. Navigant independently reviewed JCP&L interruption statistics obtained from OMS databases and confirmed results are consistent with those reported to the BPU.

While JCP&L did have the highest total capital additions (See Section B.2.2) in distribution assets for the 2013-2015 time period, it is important to note that other factors such as density, reliability, age of plant and other operational factors will influence these types of comparisons. With regards to capital funding priorities, and as discussed in the Operational Assessment and Section B.1.3, significant effort is expended by JCP&L management and staff for the planning and justification for all capital projects to meet the needs of the JCP&L electric system through a 3-round project analysis and justification process. Each FE business unit independently develops a capital portfolio at the project level and prioritizes projects based on several classifications including the two highest classification priorities of "mandatory" and "maintain". Other project classifications are considered discretionary. Mandatory projects are non-discretionary and are always funded. Maintain projects support and sustain existing performance levels and generally are always funded, unless capital is constrained. Navigant sees no evidence that financial costs, risks or consequences from other FE subsidiaries impact JCP&L's proposed mandatory projects. Given the reliability results discussed in previous sections of this report, Navigant sees no evidence that capital constraints (if they have existed) for "maintain" projects have impacted reliability.

In addition to the independent project prioritization process at each business unit, and as previously mentioned in section B.1.7, ring-fencing activities have been implemented that provide some level of protection of the FE utilities from the risks associated with the unregulated activities. In a 2015 ring-fencing study by KPMG, 30 potential ring-fencing measures were identified, of which 28 already had been deployed in New Jersey. As previously discussed in Section B.2.1, capital allocations are not made from FE to JCP&L but rather FE's role is to provide capital sources as required to meet the approved business plans of the individual utilities, whether it be equity infusion, short-term financing, or long-term debt.

In a data request to JCP&L, Navigant requested that JCP&L provide any merger commitment reporting filed with the BPU concerning compliance with the requirements/stipulations of the Merger Order. For the 2013-2015 time period the only reporting required was related to a quarterly report of non-utility generator cost mitigation efforts, rate case filing requirements, ratings downgrade report, and a notification of a relocation of a call center due to flooding. The ratings downgrade report was the only filing most related to the merger commitments related to capital resources.

On Aug 5, 2013, JCP&L filed a letter with BPU informing them of a Fitch ratings downgrade for both JCP&L and FE for Issuer Default Ratings and Senior Unsecured Credit Ratings. JCP&L filed a mitigation plan to address the down grade. The plan essentially stated that the down grade had very little to no impact on a recent debt issuance and that JCP&L had ample resources from which to draw from if needed including the money pool shared by FE and the FE utilities.

Based on these findings, JCP&L and FE have processes in place to ensure sufficient capital is available to address reliable operation of JCP&L. JCP&L has also complied with commitments to notify the BPU if debt rating downgrades occur.

B.4.2 Merger Order Provisions to Allocate Sufficient Resources in Terms of Staffing to New Jersey

Conclusion: Based upon performance, JCP&L has complied with the merger commitments during the review period 2013-2015 that obligate FE/JCP&L to allocate sufficient staffing resources to enable the reliable operation of JCP&L.

Recommendations:

1. None.

Supporting Facts/Findings:

The merger commitments most directly related to adequate staffing for the reliable operation of JCP&L include the following items.

- #25 Requires that "FirstEnergy further commits that an adequate number of positions staffed with people familiar with New Jersey's and JCP&L's rates, regulatory, reliability, engineering and labor relations matters shall be maintained."
- #27 Regional management will have the responsibility to maintain staff at district offices sufficient to maintain reliability and service in compliance with BPU requirements and orders.
- #41 All call center operations no matter where situated will be staffed by representatives trained and capable to provide customers with at least the same quality of customer service as they do today. Such representatives will be trained and be familiar with JCP&L's service territory issues, New Jersey regulations, Board policy, JCP&L tariffs and the New Jersey Customer Choice Program. JCP&L agrees to notify the Board and Ratepayer Advocate at least 90 days prior to relocation of any such call center.
- #31 FirstEnergy will maintain two New Jersey regional headquarters for JCP&L, staffed by an adequate number of senior-level regional decision-makers who are familiar with New Jersey and in-state issues.
- #33 JCP&L agrees that it will discuss with Board Staff any proposal to consolidate, relocate or close an existing district office (which is an office to which work crews report) in New Jersey prior to implementation.

- #37 FirstEnergy will commit its resources and workforce to directly and quickly address JCP&L storm restoration problem areas on a priority basis over non-FirstEnergy companies.
- #31 Regional presidents in charge of service quality and reliability and their regional directors will be located in New Jersey.
- #33 FirstEnergy is committed to improving JCP&L's reliability and customer service performance. JCP&L will continue its programs in compliance with the Board's Phase I, Phase II and Phase III Orders entered in its outage and reliability investigations (BPU Dkt. Nos. EX99100763, EA99070485 and EX99070483), and will be subject to and follow the Board's Interim Electric Distribution Service Reliability and Quality Standards, set forth at N.J.A.C. 14:5-7.

Ultimately, Navigant's focus with regards to these staffing commitments was to determine if JCP&L's reliability targets, customer service and safety targets were being met, if a comprehensive staffing and workforce planning process exists, and if there is any significant stress on the employee workforce as it currently stands to provide reliable JCP&L operation. The "Interim" standards discussed in commitment 33 have been updated since the merger, and JCP&L compliance with these updated standards was discussed previously in the Operations Section of the report. Customer service and safety targets, were also previously discussed in Section B.1.10 and or the Operations sections of this report.

JCP&L maintains two regional headquarters in Morristown and Red Bank New Jersey. A regional president in charge of service quality and reliability is located in New Jersey. During 2013, JCP&L added new area managers and reporting locations to improve communications at a more local level. Area managers are stationed at ten⁸⁴ office locations located throughout many different counties in New Jersey.

As previously mentioned, there were only a few required filings with the BPU that were related to merger commitments during the 2013 to 2015 time period. The filings did include a notification to the BPU in 2014 that a customer payment center was to be relocated due to damage from flooding results from Hurricane Irene. Given there were no other reports or notifications filed with the BPU with regards to consolidation, relocation or closure of an existing district office (which is an office to which work crews report), it appears there were no district office closings during 2013-2015.

The staffing process was discussed at length in section B.3. A comprehensive staffing plan process exists, which includes an annual ■■■-year forecast and current year quarterly reviews. The staffing plan is designed to support workload and alignment to budgeted headcounts and includes projected attrition and hires. FE and JCP&L have a robust skills development and training program that also serves as a valuable recruiting tool for future employees of FE and JCP&L, both in management and in field operations.

From an employee perspective, the results of the employee survey show employees are either neutral or somewhat agree that JCP&L provides opportunities for training and skills development, and the tools and resources to do their jobs effectively. The employee survey also shows that employees are neutral or somewhat agree that employee satisfaction is an important objective for JCP&L and that work volume

⁸⁴ As of October 10, 2013.

and expectations are reasonable. Based on this survey there does not appear to be any significant stress on the employee workforce to provide for the reliable operation of JCP&L.

For storm restoration, FE and JCP&L have an integrated centralized system for managing internal (i.e., affiliates within FE system) and external mutual assistance. FE has dedicated resources for the management of mutual assistance resources across its operating companies. Mutual assistance is requested through authorization from the Incident Commander to the FE dedicated resource. FE then determines the best combination of internal or external resources to deploy in response to JCP&L's request. Resources available are treated as a pool across FE and can be re-deployed across operating companies if necessary.

The Incident Commander uses the Resources on Demand System for management of external mutual aid crews. This system is arguably the industry best practice. Navigant sees no reason to believe that the Incident Commander would send resources to non-FE utilities in the event of a major regional storm impacting JCP&L.

Based on JCP&L's staffing plan and process, reliability results, appointments of management to various district offices, employee survey results, and the storm restoration process, JCP&L has sufficient staffing resources to allow for the reliable operation of JCP&L.

B.5 Review of Financing Activities

This section discusses the results of Navigant's research and analysis regarding certain issues related to JCP&L's financing activities. The issues that Navigant investigated were:

- B.5.1. Review the financing activity of JCP&L, and the effects of the financing activity of its parent and its affiliates on JCP&L;
- B.5.2. Review the financial performance of JCP&L and the effects of the financial performance of its parent and its affiliates on JCP&L;
- B.5.3. Review the credit metrics of JCP&L in comparison to, and in contrast with, its utility affiliates; and
- B.5.4. Regarding credit quality of FE and the potential impacts on JCP&L:
 - a. Evaluate whether JCP&L's credit quality has become intertwined with that of the parent company with negative implications for the utility taking into account, among other things, recent JCP&L credit actions by the rating agencies.
 - b. Determine the suitability of ring-fencing to insulate JCP&L from any negative effects of the parent company on JCP&L.

Our research materials included the documents provided by the firm that are listed in Table 10. Navigant also utilized information from SNL,⁸⁵ Bloomberg LLC, Moody's Investor Services,⁸⁶ SEC Edgar, and other

⁸⁵ SNL is a subsidiary of S&P Global. See, <http://www.snl.com/>.

⁸⁶ See, Moody's at moodys.com.



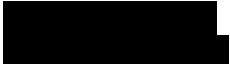


sources as described in the footnotes. Navigant also discussed these issues and our preliminary findings with FE's CFO, its Corporate Treasurer and with key subject-matter experts within FE and JCP&L.

The analytical steps are described in the relevant subsections below. The analyses involved comparing JCP&L's credit metrics to those of the FEU companies and to other utilities using a systematic and data-driven approach. The purpose of the analyses was to determine how JCP&L compared to its sister companies and to utilities generally as would reasonably be perceived by the credit markets.

Navigant's analyses in this section are data driven. Like the data themselves, the analyses reflect what has happened, not what might happen in the future. Our analyses provide useful benchmarks of where JCP&L has come from since 2013 and where it stands today (as of the latest data, which in most cases is end-of-year 2015) with regard to its finances. In contrast, capital markets inherently are forward-looking, insofar as firm value is determined by the amount, timing, and certainty of future cash flows and creditworthiness depends upon an assessment of the timely payment of interest and repayment of principal. Accordingly, our analyses provide neither a cost of equity computation nor a credit opinion, both of which are forward-looking exercises that are beyond the scope of the requests made here.

Table 10. FE-JCP&L Documents Reviewed for this Section

Item	Brief Description
B-113	ALJ Rate Order in BPU Docket No. ER12111052
	<u>Debt Offering Memoranda (CONFIDENTIAL)</u>
	[REDACTED]
	2013 JCP&L
B-126	[REDACTED]
	2015 JCP&L
	[REDACTED]
B-128	KPMG 2015 Ring Fencing Study
	<u>2013-2015 Financing Activities for FEU Companies (CONFIDENTIAL)</u>
	Money Pool Agreement
	JCP&L-BPU Money Pool Order (2013)
	FE 2013 Amendment
B-129	FE 2013 Amendment 2
	FE 2014 Amendment
	FE Credit Agreement
	JCP&L-BOA PPA
	JCP&L-BOA MLA
	[REDACTED]

Item	Brief Description
B-130	2013-2015 Rating Profiles for FEU Companies
B-131	<p><u>Data Regarding Securitization of FEU Companies Before and Since the Merger</u> 2002 JCP&L Transition Funding LLC 2006 JCP&L Transition Funding Final Prospectus</p> 
B-132	(same as B-126)
B-133	<p><u>Issuance Cost of Debt Letters or Reports</u> 2013 JCP&L</p>  <p>2015 JCP&L</p>  
B-185	<p><u>JCP&L Credit Reports and Ratings Guidance Reports (Proprietary & Confidential)</u></p> 

B.5.1 Financing Activity of JCP&L, and the Effects of the Financing Activity of Its Parent and Its Affiliates on JCP&L

In this section, we first describe JCP&L's recent financing activity. Then we describe the potential effects of the financing activities of FE and FEU on JCP&L. The main findings from our research on this topic are:

- JCP&L has issued \$750,000,000 in long term debt during the 2013-2015 period. Much of the debt had to do with funding storm-related expenses;
- JCP&L participates in the FE Utility Money Pool, which is cost effective;
- JCP&L's financing decisions are appropriately centralized;
- There is some evidence that FE's financing activities affect JCP&L. At times historically, S&P has reduced JCP&L's credit rating due to its core affiliation with FE. Moody's has declined to take that step, and in fact, has gone the other way of rating JCP&L above FE;
- There is no evidence that the financing activities of the other FEU companies affect JCP&L.

B.5.1.1 JCP&L Issuance of \$750 Million in Long-term Financing Since 2013

Conclusion:

JCP&L's 2013 and 2015 debt funding primarily had to do with repaying borrowings from the Utility Money Pool that were made to fund restoration costs from Hurricane Irene and Hurricane Sandy. The effect of this increase in debt on JCP&L's leverage ratio has not been out of line with other electric utilities. JCP&L's participation in the FE Utility Money Pool for short term financing provides cost savings and the ability to time entry into the long-term bond market more efficiently.

Recommendations:

1. None.

Supporting Facts/Findings:

The FEU companies have raised approximately \$1 billion in debt between 2013 and 2015. Of this, JCP&L has accounted for about \$750 million (25% of total).

- JCP&L had two bond offerings. The first was a \$500 million offering in August 2013 and the second was a \$250 million offering in 2015 for a total of \$750 million.⁸⁷

⁸⁷ "Offering Memorandum: \$500,000,000 Jersey Central Power & Light 4.700% Senior Notes due 2024, August 14, 2013, at Response to B-126, Attachment 3; and "Offering Memorandum: \$250,000,000 Jersey Central Power & Light 4.300% Senior Notes due 2026, August 11, 2015, at Response to B-126, Attachment 7.

- [REDACTED]

According to the JCP&L prospectuses, the purposes of the bond offerings were to (1) provide funding for storm-related damages; (2) reduce JCP&L's borrowing from the Utility Money Pool (which, itself, also was partly a function of the spending to repair storm-related damages). As a result of the debt issues, JCP&L's 2015 leverage ratio is approximately 48% (as of 12/31/15), which is just below the median for Electric Utilities & Diversified Utilities median of 51%.⁸⁸

B.5.1.2 JCP&L participation in the FE Utility Money Pool for short term financing

Conclusion:

Participation in the FE Utility Money Pool has been advantageous to JCP&L

Recommendations:

1. None

Supporting Facts/Findings:

JCP&L participates in FEU (i.e., the regulated company) Utility Money Pool.⁸⁹ The Utility Money Pool serves several purposes. First, it is a cash management tool that provides working capital. Second, it allows the FEU companies to better time⁹⁰ and optimally-size placements.⁹¹

⁸⁸ Median 2015 leverage (Debt/[Debt+Equity]) of Electric Utilities was 50.87% and of Diversified Utilities was 50.57%. Source: SNL. Computations by Navigant.

⁸⁹ [REDACTED]

⁹⁰ [REDACTED]

⁹¹ Navigant has been told that the Money Pool saved JCP&L substantial interest payments during its \$750 million Irene (2011) and Sandy (2012) rebuild and was a critical source of cash to fund restoration efforts. We also understand that, presently, on average, the money pool costs JCP&L approximately [REDACTED] basis points for its \$ [REDACTED] million in borrowings, versus a cost of [REDACTED] basis points if JCP&L were to set up its own credit facility.

According to the Utility Money Pool Agreement, JCP&L has the option (but not the obligation) to participate in the Utility Money Pool of FE for short-term loans.⁹² JCP&L can opt out if market rates are lower.

However, it is unlikely that rates would be lower. The rate at which FEU companies may borrow from the Utility Money Pool rate depends upon whether the funds were obtained internally from subsidiaries that contributed excess cash or externally from borrowing in the credit market (as would be necessitated if there is a net aggregate draw on the account) or a weighted average of internal and external fund rates.⁹³ For internal funds, the borrowing rate is determined by what a bank would pay for money market deposits or the 30 day LIBOR rate. This rate is less than what a bank would charge to an FEU company for short term corporate borrowing, as shown in Figure 30.

Figure 30 uses publicly-available information to demonstrate that borrowers from the money pool, such as JCP&L are likely to pay less than they would otherwise pay in the short-term markets.

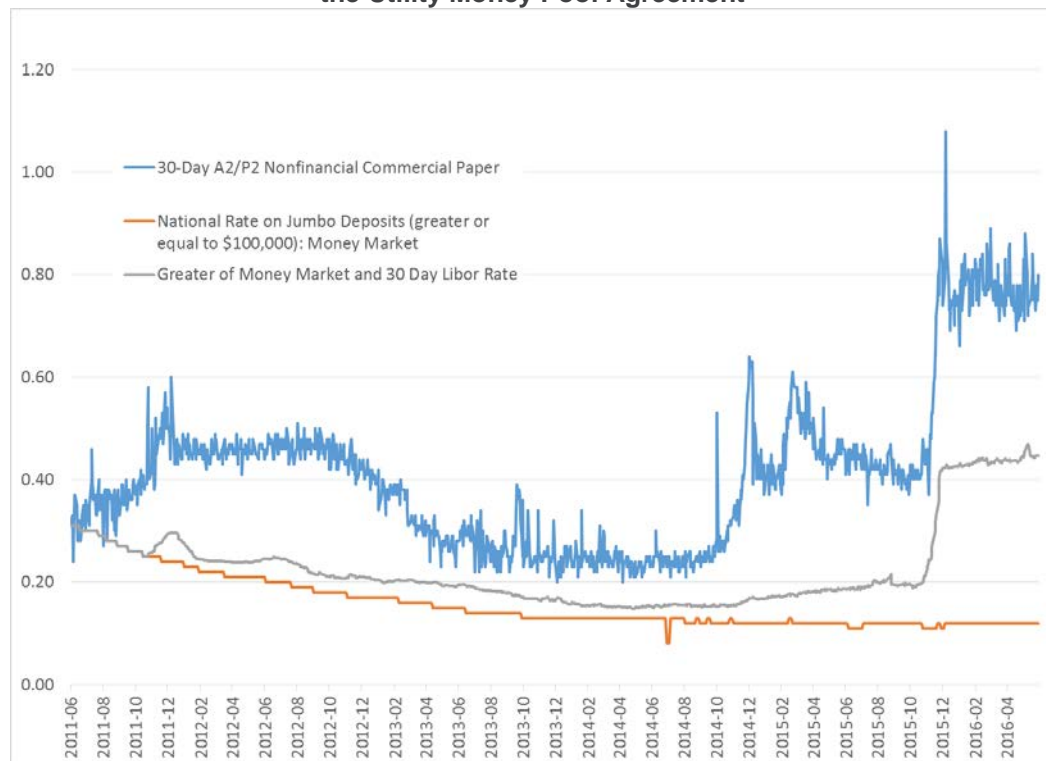
To create this figure, we obtained proxies for the short-term borrowing and lending rates from the Federal Reserve of St. Louis' FRED database.⁹⁴ Figure 30 is only illustrative because we do not know precisely the rate at which JCP&L could borrow (i.e., the true blue line). Accordingly, we must estimate this borrowing rate. We believe that for illustrative purposes, and for understanding the types of rates that are involved in the Agreement, Figure 30 will prove useful.

⁹² Revised and Restated Money Pool Agreement, §1.04(c), at Response to B-129 Attachment 1. "No Party shall be required to effect a borrowing through the Utility Money Pool if such Party determines that it can (and is authorized to) effect such borrowing at lower cost directly from banks or through the sale of its own commercial paper."

⁹³ Revised and Restated Money Pool Agreement, §1.05(a) and (b), at Response to B-129 Attachment 1.

⁹⁴ The Commercial Paper interest rate is series RIFSPNA2P2D60NB (<https://fred.stlouisfed.org/series/RIFSPNA2P2D60NB>). The Money Market interest rate is series MMNRJD (<https://fred.stlouisfed.org/series/MMNRJD>). The source of the data is the Federal Reserve of St. Louis.

Figure 30. Comparison of Interest Rates on Short Term Instruments of the Type Described in the Utility Money Pool Agreement



The blue line in the figure represents a typical rate at which a mid-rated (A2/P2) firm could borrow money in the capital markets, which may be optimistic for JCP&L at present.⁹⁵ The rate is for a 30 day loan for mid-rated non-financial firms.⁹⁶ The 30-day borrowing was selected because it matches the term that is referenced in the Agreement’s LIBOR rate. In most instances, borrowing terms greater than 30 days would have a time premium and therefore a rate higher than the 30-day rate. Also, it may be the case that JCP&L is not a mid-rated firm (Moody’s website, from which we obtained ratings data, does not display a short-term credit rating for JCP&L), and it is possible that the rate paid in the market by JCP&L would be higher.

⁹⁵ We understand that the differential might be as much as [redacted] basis points ([redacted] basis points for external borrowing versus [redacted] basis points for borrowing from the Utility Money Pool), although we have not independently verified that differential.

⁹⁶ The rating A2/P2 is described by S&P as “capacity for timely payment is satisfactory. However the relative degree of safety is not as high for the issues as for issues designated as A-1/P-1.” (See, Short Term Ratings, at http://94.101.144.194/MagellanDemoStatic/tp/c10400/cc_0_82_0_0_31_10400_u12844_36_2.htm.) At present, Moody’s does not provide a short-term borrowing credit rating for JCP&L.

As noted, the Utility Money Pool Agreement (at Section 1.05(a)) specifies that the rate charged under the Utility Money Pool for internally-generated funds be the greater of the 30-day LIBOR rate and the Money Market Rate. The figure shows the Money Market rate (orange line) and the combined line (grey line), which, for all practical purposes since 2011, has been the 30-day LIBOR rate. The grey line therefore shows what a borrower would be charged by the Utility Money Market Pool.

The grey line lies below the blue line. This means that the borrowing rate for internally-provided funds (funds from other FEU companies) is lower than the borrowing rate available in the capital markets. In any event, and as noted, the open market is available to JCP&L if it wishes to utilize it at a lower cost.⁹⁷

In 2013, JCP&L borrowed \$200 million from the Utility Money Pool. Using the data that supports Figure 30, and despite the fact that the spread between the LIBOR rate and the Commercial Paper rate was small, JCP&L saved \$80k from its participation in the Utility Money Pool.

FE also is in the process of receiving approvals to move transmission-related assets from the FEU companies into a separate subsidiary called Mid-Atlantic Interstate Transmission, LLC (MAIT) that will be jointly owned by the FEU companies.⁹⁸ According to FE, some of the purposes of MAIT are (*inter alia*) to provide increased transparency to investors and ensure that all transmission-related debt is issued from a single entity rather than from each FEU operating company.⁹⁹ One ancillary benefit is lower short-term debt costs for JCP&L by improving the credit quality of the Utility Money Pool and putting the FEU companies in a better position to increase reliability.¹⁰⁰ MAIT's involvement in the Utility Money Pool would improve the overall credit quality. The overall effect of the MAIT transaction on FE is a positive, according to Moody's.

The effect on JCP&L (outside of the beneficial effect on the Utility Money Pool's rate charged to borrowers) depends upon the balance of the net cash flows that result from reduction in rate-base assets and the increase in cash flows from treatment of those assets under Federal regulation.¹⁰¹

The Utility Money Pool allows JCP&L to issue debt in larger issuances, which may translate into lower borrowing costs for JCP&L. The Utility Money Pool also helps JCP&L better select its timing of entry into the bond market. FE states that one of the purposes of the recent long-term debt offering is to pay down

⁹⁷ JCP&L has received authorization from the BPU to participate in the Utility Money Pool. See, "Order Modifying Order Dated July 24, 2002," In the Matter of the Verified Petition of Jersey Central Power & Light Company for Authorization Pursuant to NJSA 48:3-7.2 for Approval to Participate in the FirstEnergy Corp. IntraSystem Money Pool, State of New Jersey: Board of Public Utilities, Docket No. EF02030185, Amendment No. 7, [REDACTED]

⁹⁸ Corina Rivera Linares, "FirstEnergy continues efforts on MAIT subsidiary, Energizing the Future program," TransmissionHub, April 27, 2018, at <http://www.transmissionhub.com/articles/2016/04/firstenergy-continues-efforts-on-mait-subsi-dary-energizing-the-future-program.html>. In addition, FE has obtained permission from FERC and awaits rulings from certain of the state regulatory commissions. See, [REDACTED]

⁹⁹ "Joint Application of Mid-Atlantic Interstate Transmission, LLC, Metropolitan Edison Company and Pennsylvania Electric Company (Public Version), Before the Pennsylvania Public Utility Commission, Docket No. A-2015-, June 19, 2015 (hereafter MAIT PA Application), ¶¶ 2-4, 11-12 (noting that the FEU companies will have certain voting rights but that FET (FirstEnergy Transmission Company) will operate, manage, and control MAIT).

¹⁰⁰ MAIT PA Application, ¶4.

¹⁰¹ [REDACTED]

the money pool. This implies that the money pool functions as a means of (1) permitting balances to increase to a level where bond financing was economical; and (2) providing flexibility in the timing of the debt issuance.

B.5.1.3 Centralization of Decisions Regarding JCP&L's Financing

Conclusion: JCP&L's financing decisions are centralized, although the responsibility of the debt lies with JCP&L. Absent the synergies produced by the centralized treasury function, JCP&L would have incurred higher costs and potentially faced more unhedged risks. Such centralization is appropriate for a modern multi-location firm for a number of reasons including:

- Increased need for corporate treasuries to be strategic in their outlooks regarding corporate risk management rather than only serving administrative functions;
- Increased need for coordination in light of increased regulation such as Sarbanes-Oxley and other regulatory and market constraints that have emerged as a result of the 2008 financial crisis;
- Provide for shared, dedicated resources—both human and financial—across the corporation, which improves processes and reduces costs.

Recommendations:

1. None.

Supporting Facts/Findings:

FE centralizes the financing operations and decisions of its subsidiaries. Dividends, debt issuances, debt repurchases, equity infusions, and interest hedges are based upon JCP&L's needs, its current financial position, market factors, existing JCP&L credit obligations (e.g., leverage and coverage requirements in covenants of existing bonds), and regulatory limitations (e.g., on dividend payments by JCP&L to FE under N.J.A.C 14:4-4.7c &d).

Centralization of the treasury function in a diversified company such as FE is typical for larger firms with multiple locations.¹⁰² A 2008 survey of multi-location firms identified what the surveyors considered to be core treasury or corporate finance functions for modern multi-location (the survey was multinational) entities. These functions were:

- Cash management;

¹⁰² See, e.g., Elyse Weiner and Michael Fossaceca, "Evolutions in Treasury Centralization," *Treasury & Risk*, June 13, 2013, at <http://www.treasuryandrisk.com/2013/06/13/evolutions-in-treasury-centralization>.

- Liquidity planning and control;
- Management of interest, currency and commodity risks;
- Procurement of finance and financial investments;
- Contacts with banks and rating agencies;
- Corporate finance.¹⁰³

Based on Navigant's discussions with FE executives, these functions are among those that are centralized within FE.

Such centralization provides the ability to develop personnel who specialize in providing treasury services. The 2008 financial crisis heightened the need for the treasury function to focus on liquidity and financial risk management for the entire firm.¹⁰⁴ Capital markets and regulatory constraints imposed by the crisis have made it necessary for corporate treasuries to be more strategic in their approach rather than managerial or administrative. Corporate treasuries must understand and manage risk across the organization as it arises from the operating environment and the financial environment.

A centralized treasury function facilitates the production of a data flow that can better provide an overall view of the company's cash position and exposure to risk on a timely basis.¹⁰⁵ This can provide the firm with greater visibility regarding the company's overall risk position and increases its ability to manage or hedge some of those risks. Regulation also has increased pressures for centralization of corporate treasury functions. For example, under Sarbanes-Oxley, the CEO and CFO are required to sign quarterly financial statements. Accordingly, there is a need for sophisticated systems that produce timely, accurate, and reliable numbers that are being attested to. It is not clear that such requirements can be implemented in a multi-location firm absent coordination and centralization of the functions involved.¹⁰⁶

In addition to better risk management, there are operational efficiencies from a more centralized treasury function. Centralization permits improved management of treasury personnel work flow and timing for financing needs of the individual operating companies. Not every FEU company requires funding at precisely the same time, so work for the individual FEU companies can be performed by a common

¹⁰³ These core functions were determined based on a survey of 142 "The Functions of a Corporate Treasury," Treasury Management International, at <http://www.treasury-management.com/article/4/121/1053/the-functions-of-a-corporate-treasury.html>.

¹⁰⁴ Petr Polak, David Robertson and Magnus Lind, "The New Role of the Corporate Treasurer: Emerging Trends in Response to the Financial Crisis," International Research Journal of Finance and Economics ISSN 1450-2887 Issue 78 (2011), (hereafter *Polak, Robertson and Lind*), noting that "The crisis saw the end of a credit expansion initiated in the 1980s by the deregulation of the financial markets. Increased focus on liquidity and financial risk management changed the role of the treasurer dramatically." The embedded risk also included term contracts.

¹⁰⁵ *Polak, Robertson and Lind*, p. 58. Although the Robertson and Lind paper applies to multinationals, its reasoning on this issue would appear to apply to a multi-jurisdiction company as well.

¹⁰⁶ Jeffrey Struzenski, "Centralize Treasury Management to Reduce Risk, increase Control," Financial Executive, March 2006, p. 60. We did not research whether or how such requirements could be implemented at FE and JCP&L absent centralization. Our conclusions rely on the literature as described here.

dedicated team that also gains human capital expertise in utility finance. Such process improvements reduce the costs for all of the FEU companies since the same staff can provide financing services to the different operating companies without each company having to retain specialized and dedicated staff.

Navigant understands that corporate financing decisions for JCP&L also receive oversight by JCP&L. Dividends from JCP&L are initiated by the JCP&L Corporate Secretary and recommended by the JCP&L Treasurer and ultimately approved by the JCP&L Board. The KPMG Ring Fencing study concluded that despite this oversight, an additional constraint in the form of a dividend restriction based on coverage ratios "may have merit."¹⁰⁷ In any event, JCP&L has not paid an upstream dividend since 2013.

B.5.2 Financial Performance of JCP&L and the Effects of the Financial Performance of Its Parent and Its Affiliates on JCP&L

Conclusion:

JCP&L's financial performance is largely dependent upon the performance of its own operations and on regulatory outcomes.¹⁰⁸

- There are examples of transactions by FE that have (or may have) affected JCP&L, but these are notable primarily because they are so few and relatively marginal in their effects.
- A review of JCP&L's ROE is shown in Section B.2.10. A review of JCP&L's financial performance with regard to JCP&L's credit metrics is discussed later in B.5.

Recommendations:

1. None.

Supporting Facts/Findings:

JCP&L's financial performance is basically determined by JCP&L's own performance. We base this conclusion on our review of the various credit opinions that were provided in Response to [REDACTED]. For the most part, the credit opinions and letters focus on JCP&L's own performance and its treatment under regulation. At the margin there were three FE actions that were seen to have an effect on JCP&L.

- The first is the availability to JCP&L of the Utility Money Pool. As discussed earlier, the Utility Money Pool serves to reduce short-term borrowing costs as well as long-term borrowing costs by allowing better timing and sizing of market placements.

¹⁰⁷ "JCP&L Ring-Fencing Study," KPMG, December 18, 2015, (hereafter *KPMG Ring Fencing Study*), at Response to B-128 Attachment 1, p. 65.

¹⁰⁸ See also §B.5.4.1.

- The second involved FE's FES subsidiary and FES's reliance on sales to weather sensitive customers,¹⁰⁹ as discussed in section B.5.4.1 (Adjustments for Group Risk). [REDACTED]

- The third involves the MAIT transaction. [REDACTED]

From our review and consideration of the effect that these three items might impose on JCP&L, we conclude that JCP&L's financial performance largely is a function of its own operations within its territory and in the regulatory treatment that it receives. Moreover, the Utility Money Pool has had an unambiguously beneficial effect on JCP&L. The impact of the FES activity appears to have been addressed, and MAIT holds the potential of a beneficial impact.

B.5.3 Credit Metrics of JCP&L in Comparison to, and in Contrast with, its Utility Affiliates

B.5.3.1 Comparison of JCP&L's Credit Metrics to Those of the Other FEU Companies

Conclusion: We found no indication that financing by other FEU companies has any impact on JCP&L's financing.

- JCP&L's leverage ratio is within a range of reasonableness given JCP&L's ability to service debt compared to the other FE companies.

¹⁰⁹ FirstEnergy 10-K (2014), p. 99. Also, John Funk, "FirstEnergy Solutions to lose 70 people as its parent company abandons some retail markets," August 12, 2014, at http://www.cleveland.com/business/index.ssf/2014/08/firstenergy_solutions_to_lose.html. Also, Andrew Maykuth, "FirstEnergy Solutions Dropping PECO Customers," philly.com, September 30, 2015, at http://articles.philly.com/2015-09-30/business/66990937_1_firstenergy-solutions-customers-firstenergy-corp.

[REDACTED]

- JCP&L is less able to support additional debt than the median FEU company as measured by various coverage ratios. Coverage ratios are substantially affected by regulation, not by the FEU companies.

Recommendations:

1. None.

Supporting Facts/Findings:

As of year-end 2015, JCP&L used less leverage than the median FEU company. However, JCP&L's coverage ratios were also lower than the median FEU company. Both are shown in Table 11. To create Table 11, Navigant evaluated the FEU companies against the key credit metrics described by KPMG as being relevant to creditors.¹¹² These metrics are shown in Table 11, along with JCP&L's ranking relative to the other FEU companies.¹¹³ The table shows that JCP&L ranks last (10th) in four of the 7 metrics. JCP&L is below the median in all of the coverage metrics. JCP&L is better than the median (3rd) only in its leverage ratio as measured by the Debt to Capital ratio.

Navigant concludes:

- JCP&L's credit metrics are less robust than its sister FEU companies' metrics. This indicates that JCP&L's credit rating would be a function of these metrics and not the capital activity of the other FEU companies.
- JCP&L's issue, based on the analysis of the 2015 data, is that it has too little cash flow, not that it has too much debt.

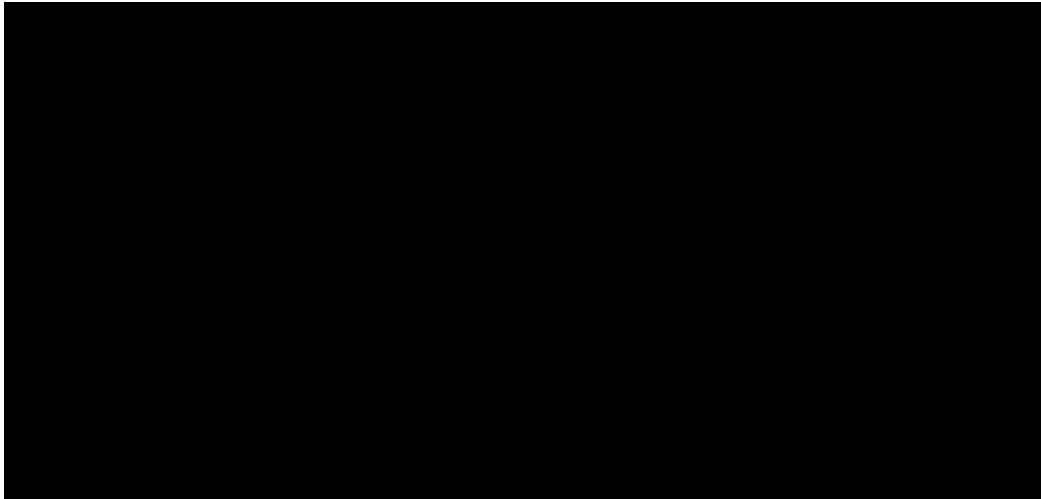
[REDACTED]

¹¹² KPMG Ring Fencing Study, at Response to B-128, p. 59.

¹¹³ The data are from SNL. EBIT, EBITDA, and Return on Capital represent Navigant's computations of the relevant financial statistics from the SNL statistics. Accordingly, they may vary from other published sources.

[REDACTED]

Table 11. Comparison of JCP&L and the FEU Companies' 2015 Credit Metrics



Since the other FEU companies are rated no higher than BBB- overall by S&P, and no higher than BBB for senior unsecured bonds, there is no evidence that JCP&L's bond rating is lower than what might be expected relative to the other FE utility affiliates given its weaker credit metrics. Moreover, comparing JCP&L's credit metrics to the benchmarks provided by KPMG in its Ring Fencing study (at page 59) indicates that JCP&L's metrics are more similar to lower-rated bonds than they are to higher rated bonds.

We conclude that JCP&L's level of debt as measured by its leverage ratio is not unreasonable, and is typical of a U.S. electric utility.¹¹⁵ [REDACTED] The recent increase in leverage is related to storm-driven spending.

While JCP&L's 2015 leverage ratio is typical and unremarkable, [REDACTED]

¹¹⁵ JCP&L's 2015 debt-to-capital ratio was 49%, whereas the industry median was 51%. See, fn. 88. [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

that JCP&L's credit metrics would themselves suggest a higher rating for JCP&L, but-for its association with FE.

Table 12. Credit Metric and Ratings Analysis of Comparable Electric Utilities

Name	EBIT Coverage	EBITDA Coverage	CFO to Debt	Return on Debt + Equity	EBITDA to Sales	Debt to Debt + Equity	Debt to EBITDA	Moody's Rating
Black Hills Colorado Electric Utility Company LP	1.55	2.62	15%	4.0%	21%	54%	7.90	Baa1
Commonwealth Edison Company	1.60	3.51	24%	3.3%	28%	48%	6.64	Baa1
MidAmerican Energy Company	1.32	3.80	28%	2.3%	36%	50%	7.48	A1
Potomac Electric Power Company	1.31	2.75	14%	3.4%	18%	54%	7.66	Baa1
Public Service Company of New Mexico	1.94	3.24	13%	5.2%	24%	56%	6.49	Baa2
Rochester Gas and Electric Corporation	1.62	2.25	27%	7.1%	30%	56%	5.68	Baa1
Jersey Central Power & Light Company	1.48	2.59	11%	4.1%	20%	49%	6.93	Baa2
Upper Peninsula Power Company	1.85	3.66	19%	3.2%	17%	43%	6.82	WDR
Median	1.57	2.99	17%	3.7%	23%	52%	6.87	
JCP&L	1.48	2.59	11%	4.1%	20%	49%	6.93	
JCP&L v. Median of Comps	Worse	Worse	Worse	Better	Worse	Better	Worse	

B.5.4 Credit Quality of FE and the Potential Impacts on JCP&L

B.5.4.1 Evaluation of Whether JCP&L's Credit Quality has Become Intertwined with That of the Parent Company with Negative Implications for the Utility

Conclusion: JCP&L's credit rating is largely independent of—and not intertwined with—that of the parent company or the FEU companies and so generally does not create negative implications for JCP&L's credit rating.

Recommendations:

1. None.

Supporting Facts/Findings:

Navigant reviewed 16 JCP&L credit opinions, research notes, and ratings actions by S&P, Moody's, and FitchRatings that were issued during the February 2013 through March 31, 2016 period. We also reviewed the KPMG Ring Fencing study that described KPMG's take on the agencies' approaches and conclusions. Finally, we reviewed the methodologies as applied to U.S. electric utilities that are available from the ratings agencies themselves to help investors better understand ratings opinions.¹²²

From our review, as well as from analyses of credit metrics (described in earlier responses), Navigant concludes:

- JCP&L's credit rating is determined primarily by JCP&L's stand-alone credit risk ("SACR") having to do with its own credit metrics and rating agencies' opinions regarding the potential for timely payment of interest and principal according to the methodologies that are provided by these agencies.
- Regulatory risk is a critically important component of stand-alone risk and total credit risk.¹²³
- Group risk—the risk from being in a group of firms that may have greater risk than the target firm—may result in a notch up or down (or no change at all),¹²⁴ but not a letter-grade change, with the exception of the KPMG analysis that is described below.

This third bullet point, which describes how JCP&L's association with FE might affect JCP&L's credit rating, provides the direct response to the issue in this section. However, the first two points provide critical perspective, and so are described first.

Figure 31 illustrates how S&P integrates different types of risk to arrive at the SACR (or what S&P calls the Stand-Alone Credit Profile or SACP) and then modifies the SACR to arrive at the overall credit

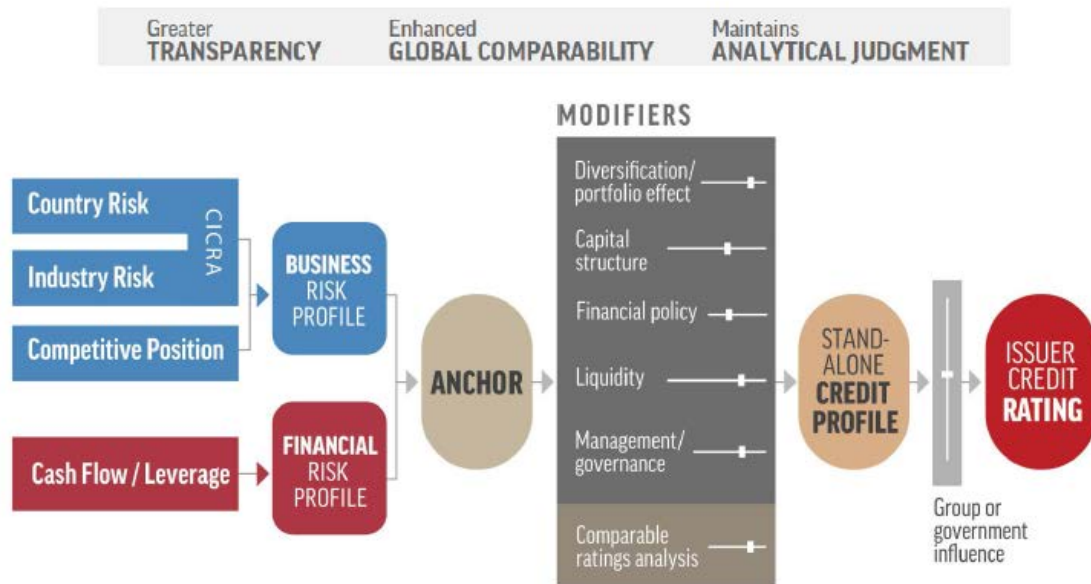
¹²² See, "Ratings Methodology: Regulated Electric and Gas Utilities," Moody's Investors Service, December 13, 2013, at https://www.moodys.com/researchdocumentcontentpage.aspx?docid=PBC_157160. "Criteria | Corporates | Utilities: Key Credit Factors for the Regulated Utilities Industry," S&P Global Ratings, November 19, 2013, at https://www.standardandpoors.com/en_US/web/quest/article/-/view/type/HTML/id/1444976. "Rating U.S. Utilities, Power and Gas Companies," FitchRatings, March 11, 2014, at <https://www.fitchratings.com/site/re/735155>.

¹²³ This does not mean that regulatory risk is always negative or excessive or that JCP&L necessarily operates in a state with above-average risk. It simply means that regulation imposes a risk that creditors consider when evaluating whether credit repayments will be timely and full.

¹²⁴ A notch represents a move from (say) Baa2 to Baa1 or from BBB- to BBB.

rating.¹²⁵ This is similar to schematics presented by Moody's.¹²⁶ The schematic illustrates the areas that we are describing. Our intent is to address only highlights and show where these highlights help address the issue of this section, and not to start from the left and finish at the right.¹²⁷

Figure 31: The Corporate Ratings Criteria Framework



Stand-Alone Credit Rating & the Role of Regulation. The stand-alone credit rating is determined first by an “anchor” rating that depends on the assessment of business and industry risks. For utilities, the anchor rating is influenced considerably by regulation, since this affects business fundamentals of revenues and costs. Regulation affects business risk through mandated changes in business practices and it affects financial risk primarily through the impact on operating cash flow, most notably through prices and revenues.

¹²⁵ The schematic is from a presentation by S&P's Todd A. Shipman to the California PUC on May 21, 2015 and is available at [http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/About_Us/Organization/Divisions/Policy_and_Planning/Thought_Leaders_Events/150521_SlidesSPCPUCMay2015_2Shipman\(1\).pdf](http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/About_Us/Organization/Divisions/Policy_and_Planning/Thought_Leaders_Events/150521_SlidesSPCPUCMay2015_2Shipman(1).pdf).

¹²⁶ A similar schematic, attributed to S&P, appears in the KPMG Ring Fencing Study, at Response to B-128 Attachment 1, p. 44.

¹²⁷ A good discussion of the schematic is found in the KPMG Ring Fencing Study, at Response to B-128 Attachment 1, p. 44.

[REDACTED]

[REDACTED]

[REDACTED] "The regulatory framework/regime's influence is of critical importance when assessing regulated utilities' credit risk because it defines the environment in which a utility operates and has a significant bearing on a utility's financial performance."¹³⁵ [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

¹³⁵ "Criteria | Corporates | Utilities: Key Credit Factors For The Regulated Utilities Industry, S&P Global Ratings, November 19, 2013, ¶ 21, at https://www.globalcreditportal.com/ratingsdirect/renderArticle.do?articleId=1218928&SctArtId=197133&from=CM&nsi_code=LIME&sourceObjectId=8339577&sourceRevId=6&fee_ind=N&exp_date=20231120-04:46:03.

[REDACTED]

The major conclusion is that regulatory risk is the main driver of the credit rating for an electric utility such as JCP&L.

Adjustment for Group risk. Turning next to the question at hand, regarding the influence of holding companies or other operating companies on the target firm, Navigant concludes that for JCP&L the effect is relatively small when it exists. This indicates that JCP&L is evaluated substantially independently of its association with FE and the other FE companies.

A fair reading of the ratings methodologies and the credit opinions is that a utility's credit rating is determined substantially by its own business and financial risks, and that these factors in turn depend fundamentally upon the utility's regulatory environment. The effect (if any) of the utility's association with a parent holding company (i.e., a Group adjustment) is seen by way of a notch adjustment that we will described here. Such an adjustment is shown in Figure 31 as an adjustment for "Group or Government Influence."

While the three ratings agencies consider the potential for a Group adjustment, Moody's has declined to make any such adjustments during the 2013-2016 (to date) period in the documents that Navigant reviewed.

- [REDACTED]
- [REDACTED]
- [REDACTED]

To summarize the credit opinions regarding Group rating adjustment:

- [REDACTED]
- [REDACTED]

¹³⁸ In 2015, MWH sold by FES declined by 29.2%, primarily as a result of FES's phase-out of its Direct sales business, which it characterized as a weather-sensitive load. The Direct business (the largest of FES's sales channels) declined by 46.4%. See, FirstEnergy 2015 10-K, pp. 103-104.

- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED] As noted above, FES changed its strategic direction and reduced its exposure to the more weather-sensitive line of business.¹⁴⁴

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

¹⁴⁴ FirstEnergy 10-K (2014), p. 99. Also, John Funk, "FirstEnergy Solutions to lose 70 people as its parent company abandons some retail markets," August 12, 2014, at http://www.cleveland.com/business/index.ssf/2014/08/firstenergy_solutions_to_lose.html. Also, Andrew Maykuth, "FirstEnergy Solutions Dropping PECO Customers," philly.com, September 30, 2015, at http://articles.philly.com/2015-09-30/business/66990937_1_firstenergy-solutions-customers-firstenergy-corp.

- [REDACTED]
- [REDACTED]
- [REDACTED]
- Typically, a Group adjustment—when it occurs—reflects a notch adjustment (i.e., a + or -). KPMG conducted an analysis that concluded that JCP&L's association with FE historically had resulted in JCP&L being 1.6 notches lower. In theory, such a negative relationship would have caused JCP&L's overall credit rating to be BBB rather than its SACR A-.
 - KPMG arrived at this conclusion by reviewing 8 credit metrics over 9 years.¹⁴⁸ KPMG did not modify the analytical results (appropriately, in our view). Thus, while KPMG characterized its results as providing an "issuer credit rating"¹⁴⁹ (or what we refer to as the SACR), in terms of Figure 31 the results more appropriately might be considered "anchor" ratings. This is because the ratings are the result of a mechanical review of key credit metrics and are not adjusted for downstream Modifiers that feed into the determination of the SACR. As a result, KPMG confounds SACR Modifiers with its Group effect. That issue aside, Navigant concurs with the main thrust of the KPMG analysis.¹⁵⁰
 - KPMG notes that the results of its 2001-09 historical analysis might not apply today because of the numerous ring-fencing measures that were added during this period. Accordingly, it might be possible that in light of the ring-fencing steps taken over the

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

¹⁴⁸ KPMG Ring Fencing Study, at Response to B-128, pp. 58-59.

¹⁴⁹ KPMG Ring Fencing Study, at Response to B-128, pp. 58-59.

¹⁵⁰ Navigant did not, however, audit the KPMG analysis.

years, S&P may ultimately modify [REDACTED]

- JCP&L participates in an overall Risk Policy Committee, which has a responsibility to evaluate risk, including financial risk, from an FE perspective. This central committee influences financing at JCP&L. A centralized risk policy committee can provide its learnings from the other operating companies to JCP&L.

B.5.4.2 Suitability of Ring-Fencing to Insulate JCP&L from any Negative Effects of the Parent Company on JCP&L

Conclusion: Given the implementation of ring-fencing measures, it is unlikely that additional ring-fencing measures will substantially increase JCP&L's insulation from any negative effects of its parent company.¹⁵²

Recommendations:

1. Consider discussing with S&P whether (and what) additional ring-fencing measures might materially increase JCP&L's insulation from negative effects of its parent company.

Supporting Facts/Findings:

Navigant's review and analysis indicates that JCP&L's credit rating is determined substantially from its own stand-alone credit rating and is only marginally (if at all) affected by Group features such as JCP&L's association with FE and the FEU companies.

In a 2015 ring-fencing study by KPMG, 30 potential ring-fencing measures were identified, of which 28 already had been deployed in New Jersey. KPMG's main conclusion is that JCP&L "may be able to enhance its ring-fencing measures by instituting a liquidity metric such as a dividend payout limitation that considers generally accepted liquidity measurement guidelines or notice standard."¹⁵³ We understand that JCP&L has submitted a written dividend policy in the context of its 2010 BPU Management Audit. JCP&L last paid a dividend of \$70 million in 2013, and there are no scheduled dividend payments before

[REDACTED]

¹⁵² Navigant concurs with the KPMG conclusion: "[T]he codified ring-fencing measures already established and deployed in New Jersey are comprehensive and robust, both absolutely and relative to other states, and further ring-fencing is unlikely to produce any improvement in JCP&L's stand-alone credit rating at this time." (KPMG Ring Fencing Study, Response to B-128, p. 12.)

¹⁵³ KPMG Ring Fencing Study, (Response to B-128 Attachment 1, p. 13).

2017. In fact, to improve financial metrics, FE Contributed \$250 million of equity to JCP&L in April 2016 to repay \$300 million of debt that matured in May 2016.

Given its status as a regulated utility, this implies (and the research indicates) that JCP&L's credit rating is largely determined by regulatory actions—most notably rate cases that can swing credit opinions by letter grades. [REDACTED] Moreover, a review of credit rating reports suggests that a Group effect is on the order of one notch (or 1.6 notches, according to the KPMG review, during a period when ring-fencing measures were being implemented). Additional ring-fencing measures may provide incremental help, but it is not clear whether they will have any economic value.

S&P provides a different opinion. [REDACTED] It is possible that this opinion no longer holds insofar as (1) JCP&L has in place a number of ring fencing measures; and (2) S&P's concerns may be more focused on regulatory risk.

[REDACTED]

[REDACTED]

¹⁵⁴ "Summary: Jersey Central Power & Light Co.," Standard & Poor's Ratings Service, March 13, 2014, at Response to B-185 Attachment 10, p 5.

APPENDIX A. SUMMARY OF RECOMMENDATIONS^{155 156}

ID	Recommendation
A.1.1-1	Evaluate cost-effective approaches and process changes for conducting contact voltage measurements on underground equipment and enclosures susceptible to human contact during routine inspections. This may include additional training for inspection personnel to perform measurements, which vary depending on the type of equipment used to measure contact voltage. Tests for contact voltage could be conducted periodically. For example, a one-time test or a 5-year interval between tests may be appropriate.*
A.1.2-1	Conduct root cause evaluation of outage events assigned to overhead conductor cause codes. Institute a remediation program to address conductor type or construction most susceptible to failure, including spacer cable and splicing repairs performed by outside contractors and utilities following Hurricanes Sandy and Irene. This program could be created as a separate reliability program or incorporated into worst performing circuit or other reliability programs depending on the results of the root cause analysis.
A.1.3-1	Develop and document formal cause code descriptions and criteria for assigning outage codes to specific events. The documentation should include sufficient detail for training Distribution Control Center (DCC) staff and field crews on the criteria and circumstances under which outages should be assigned to defined cause codes.
A.1.4-1	Evaluate the replacement program currently underway for primary underground cable (Bare Concentric Neutral or BCN). Review and update asset registry for underground conductor, where possible, to confirm cable type, vintage, insulation type, failure history, known defects (based on failure history or industry data for similar cable types), cable sheathing (or absence thereof; e.g. bare concentric neutral), direct buried or in conduit, and initial condition assessment. Update and rank cable condition and failure impact to determine cable most susceptible to failure and number of customers impacted by a failure. Expand underground cable and equipment replacement program to prioritize and proactively replace cable that is most at risk. Develop a five-year plan and capital budget based on the results of the underground cable condition and outage risk assessment based on quantities that should be replaced to avoid accelerated deterioration. Options could include cable injection or cable replacement. (AM)
A.1.4-2	Conduct a study to determine the benefits of expanding underground equipment inspections to include visual inspection of equipment and materials inside enclosures, termination boxes and padmount transformers. (AM)

¹⁵⁵ While all of the recommendations in this report apply to JCP&L, Navigant believes that several of these relate to broader policy considerations that could apply to other New Jersey Electric Distribution Companies (EDCs) and may be best addressed in conjunction with the BPU and broader State-wide proceedings, such as utility working groups and/or rulemakings. These recommendations are noted with an asterisk (*) throughout the body of this report and in Appendix A.

¹⁵⁶ All Operational recommendations should be further assessed by JCP&L to ensure that implementation can be planned in a manner that produces benefits in a cost-effective manner. This could include combining these recommendations with efforts already underway or planned at JCP&L and FEU, piloting of recommendations on a smaller scale to demonstrate benefits, and conducting further cost-benefit analysis prior to a decision to implement. Operational recommendations in the Asset Management grouping described in the Executive Summary are followed with "(AM)", and those in the Smart Grid/Grid Modernization grouping are followed with "(SG)".

ID	Recommendation
A.1.5-1	Conduct a study based on a customer satisfaction survey to evaluate customers' expectations for reliability performance and storm restoration performance. Evaluate cost-effective reliability programs to achieve customers' expected level of performance if it exceeds BPU targets.*
A.1.6-1	Consider expansion of "ground to sky" clearing requirement to include three-phase primary line sections beyond Zone 1 on feeders with short Zone 1 lengths such as feeders with reclosers located close to the substation). Consider relocating reclosers that are close to substations to locations further out on the feeder to achieve this objective.*
A.1.7-1	Develop tracking system of equipment mis-operations or failures for areas where data is not centrally managed or tracked, such as distribution relays.
A.1.7-2	Evaluate benefits of expanding padmount equipment inspection to include interior components (i.e. inside the cabinet) for degradation or conditions that could lead to potential failure.
A.1.7-3	Implement a formal reporting process for engineering review of inspection and maintenance reports. The reports should include key findings from annual inspections and maintenance
A.1.8-1	<p>Formalize asset management processes and practices for JCP&L's Distribution organization. This recommendation includes several steps and activities to be evaluated and potentially implemented based on benefit versus cost considerations that would include the development of: (AM)</p> <ul style="list-style-type: none"> a) A mission statement with regard to asset management principles and objectives at JCP&L; b) An overall JCP&L and FEU governance of asset management organization and policies; c) Organizational responsibilities within JCP&L for implementing asset management practices; d) Guiding principles regarding management of assets over their life-cycle; e) New or enhanced systems required for performance assessment and condition monitoring of distribution assets; f) Analytic/predictive methods for equipment diagnostics, failure modes and risk assessment; g) Asset ranking and prioritization methods for capital investment decisions, including risk versus cost trade-offs that would be incorporated into RPA budgeting processes; and h) A continuous improvement process, including post-project review; typically part of the capital management process
A.1.8-2	Develop procedures, criteria and systems required to assess and rank equipment condition (concurrent with the development and implementation of asset management practices). This could include establishment of health indices for individual assets or assets grouped by class that would be used to determine end-of-life and replacement versus repair decisions. It should start with most critical assets such as substation transformers and breakers, followed by other important distribution assets such as underground cable and pole top reclosers. Implementation should be commensurate with results of cost/benefit analysis, and project prioritization. (AM)

ID	Recommendation
A.1.9-1	Conduct a study to evaluate the cost-effectiveness of initiatives or programs to proactively replace equipment where risk of failure or degraded performance and associated impacts is increasing. Equipment for which JCP&L should consider for proactive replacement include underground primary cable, oil circuit breakers (and other breakers that are increasingly becoming obsolete) and electro-mechanical relays. Replacement decisions should be supported by a rigorous assessment of asset condition as a means to prioritize replacements. (AM)
A.1.9-2	Conduct a study the use of additional analytical methods and tools to predict equipment failure rates based on asset management principles for individual major equipment such as circuit breakers and substation transformers and by asset classes such underground cable by insulation type, material, sheathing and size; operating and vintage including asset condition. (AM)
A.1.9-3	Develop a comprehensive asset registry for primary underground cable, that groups equipment based on cable type, insulation type, insulation size, neutral configuration, burial (direct vs. conduit), location, prior failure history and other relevant condition data that JCP&L can use to identify, rank and prioritize replacements. (AM)
A.1.9-4	Consider re-instituting cable injection as a life-extension alternative on cable where the number of splices are low and is a cost-effective alternative to replacement. (AM)
A.1.9-5	Conduct a study that estimates the amount of URD cable that should be replaced over the next 10 years based on findings and recommendations outlined in FEU's 2013 <i>Underground Cable Replacement</i> Project report. Continue to focus on cable at risk, mostly BCN, to ensure cable replacements are scheduled in manner to phase out obsolete cable. The study should include the total amount of URD by type (See Recommendation No. 3 above as to how cable could be categorized) and the number of miles within each category that should be replaced to systematically reduce the amount of URD cable at risk. The study should include annual cost for these replacements over the next 10 years. JCP&L should revise its capital budget to 2020 to include funds dedicated to URD cable replacements based on study results and recommendations. (AM)
A.2.1-1	Conduct a study to evaluate expansion of SCADA communications, monitoring and controls to equipment to those areas that are not currently part of auto-transfer schemes. This recommendation is addressed further in A.2.3 and A.2.4. (SG)
A.2.2-1	Conduct a study to evaluate expansion and acceleration of automatic circuit tie schemes. Develop a 5-year plan for expansion for automated tie schemes, prioritized based on costs versus benefits. These schemes may include advanced central intelligence and automated controls outlined in Recommendation A.2.3. (SG)
A.2.2-2	Conduct a study to evaluate expansion and additional circuit ties to improve transfer capability between substations and adjacent feeders. This recommendation is part of Recommendation A.4.1. (SG)
A.2.3-1	Prepare a Technology Plan that builds upon findings and successes from Department of Energy Smart Grid Investment Grant (SGIG) pilot programs in New Jersey and other FEU operating companies. The Plan should outline the role of technology applied to JCP&L's distribution system over the short- and long-term. Consider a collaborative effort with other New Jersey utilities to identify plans consistent with the New Jersey Energy Master Plan goal for emerging technology: "Improve and Enhance the EDC Smart Grid and Distribution Automation Plans" and related objectives such as Microgrid Distributed Energy Resources.* (SG)

ID	Recommendation
A.2.3-2	Assess role of DMS for advanced applications such as Interactive Volt-Var Control (IVVC), distributed energy resource (DER) integration (monitoring and control), Microgrids, electric vehicle initiatives, Advanced Metering Infrastructure, advanced protection and auto-transfer schemes outlined in Recommendations A.2.2. Budget funds over the next 5 years for pilot programs addressing these potential applications.* (SG)
A.2.3-3	Conduct a study to update Communications Plan to include provision for DMS and advanced applications requiring reliable, high-speed communications systems. Access and linkage of AMI data to the OMS would enhance outage detection and restoration capability, and provide data useful for planning studies such as transformer load management. ¹⁵⁷ Evaluate role of DMS in context of SCADA/OMS enhancements, and JCP&L's Communication Plan(s) and Technology Roadmap cited in A.2.2.(b).* (SG)
A.2.4-1	As part of the update the FEU Communications Plan per Recommendation A.2.3, include cyber security for distribution equipment on the Verizon cellular network and evaluate the effectiveness of the Verizon network during times of high usages.* (SG)
A.2.5-1	Conduct a comprehensive storm hardening study that incorporates and expands upon successful actions JCP&L previously or currently has undertaken, such as the Barrier Island Rebuild. The assessment should include selection of more robust design and construction standards for overhead lines in areas most susceptible to damage, such as higher class poles and crossarms; selective undergrounding of overhead lines in areas with high reliability exposure; relocation of rear-lot primary overhead lines in areas with reliability exposure, expansion of tie and auto-tie schemes (Recommendation A.2.2), DMS and enhanced monitoring and controls (Recommendation A.2.3). Consider working in concert with other New Jersey utilities to develop common storm hardening options based on past successes and lessons learned. Monitor the effectiveness of flood protection barriers currently in use or proposed during actual storms, and prepare for alternatives in the event of breaching.* (SG)
A.3.1-1	Pursue implementation of technology, recloser tie schemes and storm hardening options outlined in Recommendations A.2.1 through A.2.5 to further improve restoration capability. (SG)
A.3.1-2	Continue to conduct regularly scheduled meetings to address prior, current and prospective BPU Orders relating to emergency planning and storm response. Include as an agenda item proposed actions that should be considered to further enhance procedures and systems based on industry best practices and available technology or solutions. These meetings would include representatives from JCP&L engineering and operations, and FEU emergency planning personnel; with support from counsel as required to address regulatory matters as they arise.
A.3.2-1	Implement additional exercises/drills proposed in 2016.
A.3.2-2	Institute a process to measure and track global ETR performance (as opposed to compliance with procedures only).
A.3.3-1	Conduct a study to identify enhancements that are expected to be available from proposed expansion of PowerOn by GE and implement those most likely to provide enhanced outage identification and restoration capability. (SG)
A.3.3-2	Determine incremental benefits associated with AMI from a restoration perspective to support a future business case for AMI.* (SG)

¹⁵⁷ Similar to other recommendations of general applicability to other EDC's, Navigant expects recommendations that include AMI would also apply to other EDC's, and would be addressed through BPU rulemaking.

ID	Recommendation
A.4.1-1	Update Distribution Planning Guidelines to include recommendations outlined in Sections A.4.2 through A. 4.4, and Item 2 below. (SG)
A.4.1-2	Update and document practices for installation of pole top reclosers, including methods and criteria for optimizing location based on customers per zone, reliability data and potential for use as part of a tie-transfer scheme
A.4.2-1	Conduct a study to evaluate the benefit of modifying LFDMS to include an option to forecast feeder and substation loads based on regional demographic or economic data.
A.4.2-2	Develop processes and tools to reconcile substation peak forecast to JCP&L composite peak forecast. Update coincidence and diversity factors as part of the reconciliation process.
A.4.3-1	Conduct a study to evaluate updating LFDMS to account for existing and forecast net metered and large solar installations. This includes creation of a database to track solar installations, and if applicable, use of new tools and systems to collect solar profile data to predict net load reduction on distribution feeders and substations.*
A.4.4-1	Conduct a study to develop specific criterion regarding minimum restoration times for single transformer substations that do not have sufficient tie transfer capacity with adjacent substation(s). Conduct study, if needed, to identify substations that have partial tie transfer capability. Study also should include an evaluation of likely mobile substation transport and installation times to identify substations that do not meet the minimum restoration criterion. Develop mitigation plans such as increasing tie transfer capability, changing location of mobile substations or upgrading substation mobile substation connections (and procedures) to achieve minimum restoration targets.
A.4.4-2	Conduct a study in conjunction with above Recommendations that evaluate options to meet future growth or to enhance substation back-up capability.
A.5.1-1	Enhance the capital budget development process to reduce, where possible, the amount assigned to blankets. This should include additional rigor and detail in the development and monitoring of Condition, Forced, and Reliability blanket budgets and spending.
A.5.1-2	Apply asset management practices and processes outlined in Recommendations A.1.8 and A.1.9 to optimize spending levels and the amount assigned to CAPEX and OPEX.
A.5.2-1	Review and enhance capital budgeting and project prioritization process to determine optimal levels of CAPEX and OPEX to meet reliability and other JCP&L targets and objectives. This includes identifying the level of spending to achieve objectives and meet targets. Application of asset management practices outlined in Recommendations A.1.8 and A.1.9 are needed to properly balance CAPEX and OPEX spending.
A.5.3-1	Document processes and criteria applied to review and approve capital budget requests for each of Rounds 1 through 3. Include processes under which capital investments are prioritized and criteria applied to approve or reject budget requests.
A.5.3-2	Modify capital budget development (RPA) process such that projects that typically are evaluated but do not reach Round 1 are included in the review process.
A.5.3-3	Modify the capital budgeting process to place greater focus on identifying spending levels needed to meet reliability and performance targets, and other JCP&L goals and objectives.
B.1.2-1	Give consideration to more fully defining the role of the JCP&L Board and, in particular, the level of activity of the external board members.
B.1.6-1	Conduct a Study to evaluate whether the current Risk Management process is allowing sufficient consideration to be given to operational risks at the distribution utility level.

ID	Recommendation
B.1.10-1	Document assumptions related to the metrics established as targets if assumptions related to the basis for target levels change from year to year. Comparisons of certain metrics from year to year, and the basis for the color coding of metric achievement is unclear in some cases.
B.1.12-1	File an annual Results of Operations Report, as may be required by the BPU. JCP&L does not file an annual jurisdictional results of operations (ROO) report with the BPU, as is required of other FE distribution utilities in other jurisdictions ¹⁵⁸ . Currently JCP&L only provides a copy of their FERC Form 1.*
B.1.12-2	Investigate the appropriateness of implementing existing BPU policies on infrastructure recovery mechanisms, as well as other Alternative Regulatory Mechanisms (ARM) ¹⁵⁹ other than base rate ratemaking. Properly designed ARMs have the potential to: (1) reduce regulatory lag; (2) provide additional incentives to utilities to operate efficiently; (3) provide a mechanism to target investment in areas which are considered a high priority for investment; and, (4) reduce the costs of regulatory proceedings for both the company and the BPU.*
B.2.2-1	Include changes in capital structure of JCP&L (and other electric distribution companies) by actions taken at the FE level (or in the case of other electric distribution companies their corporate parent / affiliates) as part of periodic reporting requirements to the BPU, if these transactions are not already included in other required reporting. Consider an alternative regulatory process that would improve the incentive structure for JCP&L with regard to capital expenditure.*
B.3.2-1	Develop and implement formal processes and systems for knowledge management for professional (exempt) positions demonstrating progress over a reasonable time period. These do not appear to exist, other than the use of an "acting manager" role, and through learning on the job from more seasoned employees.
B.3.6-1	Regularly perform an employee survey which addresses upon employee satisfaction, perceptions about JCP&L's commitment to customers and other critical areas of concern, and institute a formalized process for addressing concerns expressed in the employee survey. This survey should be performed periodically (e.g., on 18- or 24-month cycles) for a minimum of 2 cycles so that JCP&L can assess the information learned from employees, how best to implement improvements related to these, and the overall value of regular employee satisfaction surveys.
B.5.4.2-1	Consider discussing with S&P whether (and what) additional ring-fencing measures might materially increase JCP&L's insulation from negative effects of its parent company.

¹⁵⁸ Other FE utility jurisdictions requiring some form of results of operations reporting include Pennsylvania, West Virginia, Maryland, and Ohio.

¹⁵⁹ Alternative Regulatory Mechanisms (ARM) include a host of designs which allow a utility to recover costs outside of a traditional rate case or provide for periodic adjustments to tariffs without a cost of service review. Examples APM include: (1) infrastructure replacement mechanisms; (2) revenue decoupling; (3) CPI-x regulation; (4) Formula Ratemaking.

APPENDIX B. DATA REQUESTED AND RECEIVED

Item No.	Scope Item	Data Request	Date Requested	Information Type	Date Received	Documents Received
1	A.1	Board's reliability regulations and Board's enhanced reporting requirements (from NJAC Code and/or BPU Orders)	2/4/2016	document(s)	2/16/2016	A-001 Including All Attachments
2	A.1	Any reliability regulations that were in effect in 2013-2014 and prior to the November 2015 reliability regulations were put into effect.	2/4/2016	document(s)	2/16/2016	A-002
3	A.1	Any filed compliance documents responding to Board reliability regulations and enhanced reporting requirements (ASPRs for 2013, 2014, 2015, Quarterly reliability reports for 2013-2015, any other filed documents)	2/4/2016	document(s)	2/16/2016	A-003, and 2 more files
4	A.1, A.2, A.3	PERFORMANCE REVIEW OF EDCS IN 2011 MAJOR STORMS (Report by EPP)	2/4/2016	document(s)	2/16/2016	A-004 Including Attachment
5	A.1, A.2, A.3	Board Orders related to Irene and Sandy storms	2/4/2016	document(s)	2/16/2016	A-005
7	A.1	FE Procedural documentation for collecting data and reporting reliability performance indices. (including audit process)	2/4/2016	document(s)	2/28/2016	A-007 Incl All Attachments (CONFIDENTIAL)
11	A.1	Monthly JCP&L Reliability Meeting Materials July/January 2013-2015 (powerpoint and meeting minutes)	2/4/2016	document(s)	2/16/2016	A-011 Incl All Attachments (CONFIDENTIAL)
12	A.1	Procedural documentation related to root cause analysis (RCA) and corrective actions	2/4/2016	document(s)	2/16/2016	A-012 Including Attachment (CONFIDENTIAL)
13	A.1	Procedural documentation related to reliability programs (e.g., adaptive relaying, automatic circuit tie schemes, pole inspection, equipment condition inspection/replacement programs, cable replacement, etc.)	2/4/2016	document(s)	2/22/2016	A-013 Incl All Attachments (CONFIDENTIAL)

Item No.	Scope Item	Data Request	Date Requested	Information Type	Date Received	Documents Received
14	A.1	Performance reports related to reliability programs (e.g., vegetation management, adaptive relaying, automatic circuit tie schemes, pole inspection, equipment condition inspection/replacement programs, cable replacement, etc.) - may be part of monthly reliability meeting documentation (?)	2/4/2016	document(s)	2/22/2016	A-014 Incl All Attachments (CONFIDENTIAL)
15	A.1	Procedural documentation, annual plan, performance reports, and audit documentation related to vegetation management.	2/4/2016	document(s)	2/22/2016	A-015 Incl All Attachments (CONFIDENTIAL)
18	A.1	Example documents for RCA's (or UPR – unsatisfactory performance reports) performed in 2013-2015 (number and areas to be discussed)	2/4/2016	document(s)	2/22/2016	A-018 Incl All Attachments (CONFIDENTIAL)
19	A.1	2013-2015 Major Event Reports	2/4/2016	document(s)	2/16/2016	A-019
20	A.1	Procedural documentation (including inspection forms) on Distribution Inspection & Maintenance Programs (Capacitors, Reclosers, Circuits and Equipment (overhead and underground), Poles, Circuit Thermography, Highest Priority	2/4/2016	document(s)	2/16/2016	A-020 Including All Attachments (CONFIDENTIAL)
22	A.1	Procedural documentation on Sub-Transmission Inspection & Maintenance Programs (Overhead Circuits and Equipment, Poles, Circuit Thermography	2/4/2016	document(s)	2/22/2016	A-022
23	A.1	Procedural documentation on Substation Inspection & Maintenance Programs (General Inspections, Protective Relays, Transformers, Batteries, Breakers, Thermography, Underground Networks)	2/4/2016	document(s)	2/22/2016	A-023 Incl All Attachments (CONFIDENTIAL)
26	A.1	Procedural documentation on life-cycle maintenance philosophy and practices, including the average age and condition of all critical system assets and JCP&L's approach to focus on the condition of the asset	2/4/2016	document(s)	4/4/2016	A-026 Including Attachment
29	A.2	Final report on DOE SGIG feeder automation project	2/4/2016	document(s)	3/7/2016	A-029 Incl All Attachments (CONFIDENTIAL)

Item No.	Scope Item	Data Request	Date Requested	Information Type	Date Received	Documents Received
30	A.2	Procedural documentation (e.g., 1- and/or 5-year plan) on system resiliency and storm hardening (including adaptive relaying strategy, reconductoring, underground loop schemes, distributed automation control algorithms, SCADA, manual tie points, mobile substations, etc.)	2/4/2016	document(s)	3/7/2016	A-030 Incl All Attachments (CONFIDENTIAL)
31	A.2	IAP (Incident Action Plan) example - for most recent snowstorm in January, 2016	2/4/2016	document(s)	2/22/2016	A-031 Incl All Attachments (CONFIDENTIAL)
33	A.2, A.3	List of specific commitments to the Board related to resiliency and restoration (i.e., in response to Irene, Sandy Orders)	2/4/2016	document(s)	2/28/2016	A-033 Including Attachment, and 1 more files
34	A.2, A.3	Project management documentation related to approval and implementation of Sandy and Irene orders	2/4/2016	document(s)	2/22/2016	A-034 Incl All Attachments (CONFIDENTIAL)
35	A.2, A.3	Implementation plans and progress reports for each commitment made to the board related to resiliency and restoration	2/4/2016	document(s)	3/7/2016	A-035 Incl Attachment
36	A.2, A.3	JCP&L's forecast and/or assessment of the effectiveness of each item implemented related to above	2/4/2016	document(s)	3/7/2016	A-036 Incl All Attachments (CONFIDENTIAL)
38	A.2, A.3	Any updated design criteria, design guides, or construction specifications specific to resiliency and restoration	2/4/2016	document(s)	4/4/2016	A-038
40	A.2, A.3	Any value analysis or business cases that have been developed to select any of the listed items related to resiliency and restoration	2/4/2016	document(s)	2/28/2016	A-040
41	A.2	Flood Mitigation Plan for 19 substations	2/4/2016	document(s)	2/16/2016	A-041
42	A.2	A description of JCP&L's circuit protection philosophy and rationalization of that philosophy, and any related procedures/policy documents	2/4/2016	document(s)	2/28/2016	A-042 Incl All Attachments (CONFIDENTIAL)

Item No.	Scope Item	Data Request	Date Requested	Information Type	Date Received	Documents Received
43	A.2	Description of any programs that provide evidence of implementation of the circuit protection philosophy	2/4/2016	document(s)	3/7/2016	A-043 (CONFIDENTIAL)
46	A.3	Corporate procedure documentation related to Incident Command System (ICS)	2/4/2016	document(s)	3/28/2016	A-046 Incl All Attachments (CONFIDENTIAL)
47	A.3	Training Plan and training records (i.e., individuals trained, drills conducted) related to ICS from 2013-present	2/4/2016	document(s)	4/5/2016	A-047 Incl All Attachments (CONFIDENTIAL)
51	A.3	Any post-ICS execution reports from 2013-present	2/4/2016	document(s)	3/7/2016	A-051 Incl All Attachments (CONFIDENTIAL)
52	A.3	Corporate procedure documentation related to Estimated Time of Restoration (ETR)	2/4/2016	document(s)	3/2/2016	A-052 Incl All Attachments (CONFIDENTIAL)
55	A.3	Corporate procedure documentation related to Mutual Assistance	2/4/2016	document(s)	3/2/2016	A-055 Incl All Attachments (CONFIDENTIAL)
57	A.3	Corporate procedure documentation related to Meteorology	2/4/2016	document(s)	3/2/2016	A-057 Incl Attachment (CONFIDENTIAL)
60	A.3	Corporate procedure documentation related to Damage Assessment	2/4/2016	document(s)	3/7/2016	A-060 Incl All Attachments (CONFIDENTIAL)
61	A.3	Corporate procedure documentation related to Customer Communications	2/4/2016	document(s)	3/7/2016	A-061 Incl All Attachments (CONFIDENTIAL)
65	A.4	Distribution planning design criteria/guidelines in effect for 2013-present (including those specific to DERs and advanced technologies)	2/4/2016	document(s)	2/28/2016	A-065 Incl All Attachments (CONFIDENTIAL)
69	A.4	2013, 2014, and 2015 Distribution System Plans	2/4/2016	document(s)	2/16/2016	A-069 Incl All Attachments (CONFIDENTIAL)
70	A.4	Feeder and substation load forecasting methods and procedures (including impacts of DERs and advanced technologies)	2/4/2016	document(s)	2/22/2016	A-070 Incl All Attachments (CONFIDENTIAL)
72	A.5, B.2	Procedural documentation related to capital and O&M prioritization and budgeting process.	2/4/2016	Documents	4/1/2016	A-072 Incl Attachment (CONFIDENTIAL)

Item No.	Scope Item	Data Request	Date Requested	Information Type	Date Received	Documents Received
73	A.5, B.2	Capital and O&M project portfolio listings for Rounds 1, 2, and 3 for 2013, 2014, 2015, and 2016 budget years, including projects proposed/reviewed/funded.	2/4/2016	document(s)	2/28/2016	A-073 Incl All Attachments (CONFIDENTIAL & REDACTED)
74	A.5, B.2	Example JCP&L project justifications for 2013, 2014, 2015, and 2016 budget years (to be requested after Navigant review of portfolio list)	2/4/2016	document(s)	2/22/2016	A-074
75	A.5, B.2	List of capital and O&M projects that were actually implemented in 2013, 2014, and 2015 budget years	2/4/2016	document(s)	3/7/2016	A-075 Incl Attachment (CONFIDENTIAL)
76	A.5, B.2	Example budget variance reports used during the course of a budget year.	2/4/2016	document(s)	2/16/2016	A-076
84	B.1	Copies of the JCP&L & FE Board of Directors Articles of Incorporation, bylaws, or associated documentation.	2/4/2016	Documents	2/16/2016	B-084 Incl All Attachments
85	B.1	Bios for JCP&L Board, including at large members.	2/4/2016	Documents	3/2/2016	B-085 Incl Attachment
87	B.1	Any JCP&L financial performance metrics or scorecards used to manage the organization.	2/4/2016	Documents	2/16/2016	B-087 Incl All Attachments (CONFIDENTIAL)
88	B.1	Any FE distribution subsidiary financial performance metrics or scorecards used to manage those organizations.	2/4/2016	Documents	2/16/2016	B-088 Incl All Attachments (CONFIDENTIAL)
89	B.1	Any reports comparing the operations of the FE distribution subsidiaries.	2/4/2016	Documents	2/28/2016	B-089 Incl Attachment (CONFIDENTIAL)
90	B.1	All services that FE provides to support JCP&L distribution operations, including central services, corporate services, and other appropriate services.	2/4/2016	Documents	2/20/2016	B-090
91	B.1	The service agreement documentation For support services identified above.	2/4/2016	Documents	2/20/2016	B-091 Incl All Attachments
93	B.1	FE audit committee reviews of FE management's programs to monitor compliance with policies on business ethics and risk management.	2/4/2016	Documents	2/16/2016	B-093

Item No.	Scope Item	Data Request	Date Requested	Information Type	Date Received	Documents Received
94	B.1	Identify the board members of the Internal Audit committee at FE/JCP&L.	2/4/2016	Documents	2/16/2016	B-094
95	B.1	Copy of the most recent PwC report previously provided to FE regarding Internal Controls.	2/4/2016	Documents	2/16/2016	B-095 Including Attachment
96	B.1	FE internal Audit risk assessment and annual audit plan for JCP&L.	2/4/2016	Documents	3/28/2016	B-096
97	B.1	A listing including brief summaries, of all internal audit activities (financial and operational) related to JCP&L, performed by FE 2013-2015.	2/4/2016	Documents	3/2/2016	B-097 Incl Attachment
99	B.1	Copies of the "Schumaker Review of Affiliates Report Phase 1" and the "Schumaker Comprehensive Management audit Phase 2", prepared 2011.	2/4/2016	Documents	2/20/2016	B-099 Incl Attachment (CONFIDENTIAL)
100	B.1	Copy of the corporate Org Charts for FE and JCP&L.	2/4/2016	Documents	2/16/2016	B-100 Including Attachment (CONFIDENTIAL)
101	B.1	JCP&L & FE Goals and Objectives associated with providing safe and reliable service to customers.	2/4/2016	Documents	2/20/2016	B-101 Incl All Attachments (CONFIDENTIAL)
102	B.1	Copies of audit and compliance procedures pertaining to the NJ Affiliate Standards. Please include all documentation and procedures relating to resource / cost allocation allocation.	2/4/2016	Documents	3/28/2016	B-102 Incl Attachments (CONFIDENTIAL)
103	B.1	Copies of audit and compliance procedures pertaining to the FERC code of conduct. Please include all documentation and procedures relating to resource / cost allocation allocation.	2/4/2016	Documents	2/28/2016	B-103 Incl All Attachments
106	B.1	Any FE distribution subsidiary commission-established financial or performance standards (allowed return on rate base, allowed return of equity, etc) for 2013-2015.	2/4/2016	Documents	3/2/2016	B-106

Item No.	Scope Item	Data Request	Date Requested	Information Type	Date Received	Documents Received
107	B.1	Identify what periodic reporting exists which compares actual to budgeted operations for FE distribution utilities, and provide the reporting for 2013-2015.	2/4/2016	Documents	2/16/2016	B-107
108	B.1	Any FE distribution utility Results of Operations Reports (12 month-ending historical report showing revenues, expenses, return on rate base, return on equity, capital structure, adjustments to unadjusted accounting data, etc) for 2013-2015.	2/4/2016	Documents	3/30/2016	B-108 Incl All Attachments
109	B.1	List of material differences in reporting policies in the different jurisdictions for results of operations reports referred to above.	2/4/2016	Documents	5/19/2016	B-109 Including Attachment
110	B.1; B.5	Copies of the FERC Form 1s for each FE distribution utilities for the years 2013-2015.	2/4/2016	Documents	2/20/2016	B-110 Incl All Attachments
111	B.1, B.5	GAAP financial Statements for each FE distribution utility 2013-2015.	2/4/2016	Documents	2/20/2016	B-111 Incl All Attachments
113	B.2	Copy of the order issued in JCP&L's most recent rate request.	2/4/2016	Documents	2/16/2016	B-113 Including Attachment
114	B.3	Documentation of staffing plans & strategies to meet future requirements for JCP&L.	2/4/2016	Documents	3/30/2016	B-114 Incl All Attachments (CONFIDENTIAL)
118	B.3	Compensation and benefit policies of each FE distribution subsidiary.	2/4/2016	Documents	3/2/2016	B-118 Incl All Attachments (CONFIDENTIAL)
119	B.3	Comparison of the Union Contracts for FE distribution utilities.	2/4/2016	Documents	2/20/2016	B-119 Incl All Attachments (CONFIDENTIAL)
120	B.3	Comparison between change in union/non-union positions from 2013-2015, and going forward for JCP&L.	2/4/2016	Documents	2/16/2016	B-120 Incl All Attachments
121	B.3	Comparison between post-retirement benefit policies for FE distribution companies.	2/4/2016	Documents	5/3/2016	B-121

Item No.	Scope Item	Data Request	Date Requested	Information Type	Date Received	Documents Received
122	B.3	Listing of previous HR surveys to help determine the design of the survey subject and the mechanism Navigant will use.	2/4/2016	Documents	3/3/2016	B-122
124	B.4	Copy of the complete FE-GPU Merger Order and stipulation which authorized the transaction.	2/4/2016	Documents	2/16/2016	B-124 Including Attachment
125	B.4	Overview of the process for staffing analysis & new hires.	2/4/2016	Document/process	2/16/2016	B-125
126	B.4, B.5	Copies of any bond issuances that have taken place over 2013-2015 period for JCP&L and the other distribution utilities of FE.	2/4/2016	Documents	2/16/2016	B-126 Incl All Attachments (CONFIDENTIAL)
127	B.4	Any merger commitment reporting filed with BPU concerning compliance with the requirements / stipulations of the merger.	2/4/2016	Documents	3/3/2016	B-127 Incl All Attachments
128	B.5	Copy of the Ring-Fencing Study filed (KPMG) in December (for analysis and refreshing).	2/4/2016	Documents	2/16/2016	B-128 Incl All Attachments
129	B.5	2013-2015 Financing activities for FE distribution utilities.	2/4/2016	Documents	2/28/2016	B-129 Incl All Attachments (CONFIDENTIAL)
130	B.5	2013-2015 Rating profiles for FE distribution utilities.	2/4/2016	Documents	2/28/2016	B-130 Incl All Attachments
131	B.5	Data or other relevant information regarding securitization for FE distributions utilities before and since the merger.	2/4/2016	Documents	2/28/2016	B-131 Incl All Attachments
132	B.5	Offering prospectus and other associated documents regarding bond issuances for FE distribution utilities.	2/4/2016	Documents	2/28/2016	B-132
133	B.5	Documentation regarding composition of cost in recent issuances of debt.	2/4/2016	Documents	2/16/2016	B-133 Incl All Attachments

Item No.	Scope Item	Data Request	Date Requested	Information Type	Date Received	Documents Received
134	A.1	JCP&L outage statistics (complete database) for 2013 - 2015 by event. Event data includes day, time, feeder number, substation, partial restoration (if applicable), cause code, equipment affected, lateral or full-feeder event, weather code, and other data contained in outage reports.	3/1/2016	Spreadsheet	4/5/2016	A-134 Incl Attachment (CONFIDENTIAL & REDACTED); A-134-Supplemental-Confidential-Attachment
135	A.1	Individual reports prepared for RCA's (or UPR – unsatisfactory performance reports) performed in 2013-2015. Include results of investigation, actions taken (including capital or O&M spending) and final resolution, including any changes in equipment purchasing or design standards resulting from the UPR investigation (Reference Data Request No. 18)	2/4/2016	document(s)	5/17/2016	A-135 (CONFIDENTIAL)
136	A.2	Capital investments and expense, by project or program, for 2013 through 2015 for individual projects assigned to Resilience Category in ASPR reports and listed Data Request No. 30. Include status and actual amounts spent as of December 31, 2015, and explanations for budget variances.	3/3/2016	document(s)	5/19/2016	A-136 Incl All Attachments (CONFIDENTIAL)
137	A.4	3-year actual and 5-year load and capacity forecast, for each feeder and substation using the methodology provided in Data Request No. 70 (Attachment 2) or other applied methodologies. Include actions taken for prior years and proposed upgrades or additions to address overloads and deficiencies, by feeder, by substation.	3/3/2016	document(s)	5/17/2016	A-137 Incl All Attachments (CONFIDENTIAL); A-137-Supplemental-Confidential-Attachment 1, and A-137-Supplemental-Confidential-Attachment 2.
138	A.5	Capital investments and expense, by project or program, for 2013 through 2015 for JCP&L. Include status and actual amounts spent as of December 31, 2015, and explanations for budget variances.	3/3/2016	document(s)	5/19/2016	A-138 (CONFIDENTIAL)
139	A.5	Proposed capital investments and expense, by project or program, for 2016 through 2020 for JCP&L.	3/3/2016	document(s)	5/11/2016	A-139 and Attachment (CONFIDENTIAL)

Item No.	Scope Item	Data Request	Date Requested	Information Type	Date Received	Documents Received
140	A.1	<p>Capacitor Inspection</p> <ul style="list-style-type: none"> - Information received for data request A-14 indicates that JCP&L has 4,813 overhead capacitor locations. Please confirm the quantity of pole top capacitor banks. - Information received for data request A-20 indicates the items to be inspected annually. Provide a digital copy of the actual completed inspection, indicating what was found during the inspection, for calendar year 2015. (i.e. did not operate, blown capacitor tank, blown fuse, etc. - Please provide a list of the follow-up work from the inspection and the date the work was completed 	3/3/2016	document(s)	5/12/2016	A-140 Incl All Attachments (CONFIDENTIAL)
141	A.1	<p>Reclosure Inspection</p> <ul style="list-style-type: none"> - Information received from data request A-20 indicates the items to be inspected annually. Provide a digital copy of the actual completed inspection, indicating what was found during the inspection, for calendar year 2015. - Please provide a list of the follow-up work from the inspection and the date the work was completed. 	3/3/2016	document(s)	5/12/2016	A-141 Incl All Attachments (CONFIDENTIAL)

Item No.	Scope Item	Data Request	Date Requested	Information Type	Date Received	Documents Received
142	A.1	<p>UG Equipment Inspection</p> <ul style="list-style-type: none"> - Response to data request A-14 indicates there are 21,570 pieces of equipment that are inspected annually as part of this program. Please provide a break-down, by quantity, of the equipment. For example: 1000 Pad-mounted transformers, 2500 Pad-mounted sectionalizing equipment, 5000, Hand-holes and pedestals, etc. - Provide a digital copy of the actual completed inspections, indicating what was found during the inspection, for calendar year 2015. - Please provide a list of the follow-up work from the inspection and the date the work was completed 	3/3/2016	document(s)	5/12/2016	A-142 Incl All Attachments (CONFIDENTIAL)
143	A.1	<p>Wood Pole (distribution) Inspection</p> <ul style="list-style-type: none"> - Response to data request A-14 indicates there were 4,048 poles that were inspected in calendar year 2015. - Please provide the total number of wood distribution poles at JCP&L. - Please confirm this is a 10 year cycle and provide a break-down, by quantity, of the number of poles inspected in 2013 and 2014. - Please advise if the inspection is performed in-house or outsource. - Please confirm if the procedure outlined in A-20 is the most up-to-date pole inspection practice. - Provide a copy of the actual completed inspection data, indicating what was found during the inspections, for calendar year 2015. 	3/3/2016	document(s)	5/11/2016	A-143 and Attachments (CONFIDENTIAL)
144	A.1	<p>OH Thermography (distribution) Inspection</p> <ul style="list-style-type: none"> - Response to data request A-14 indicates there were 363 circuits that were inspected in calendar year 2015. - Please provide the total number of OH distribution 	3/3/2016	document(s)	5/11/2016	A-144 and Attachments (CONFIDENTIAL)

Item No.	Scope Item	Data Request	Date Requested	Information Type	Date Received	Documents Received
		<p>circuits at JCP&L</p> <ul style="list-style-type: none"> - Please confirm this is a 4 year cycle and provide a break-down, by quantity, of the number of circuits that were thermography inspected in calendar year 2013 and 2014. - Please advise if the thermography inspections are performed in-house or outsource. - Provide a digital copy of the completed, inspection data, indicating what was found, within each temperature range (>75C, 51 to 75C and 31 to 50C during the inspections, for calendar year 2015. - Provide a copy of the follow-up and completed action for each item found to be within the above temperature ranges. 				
145	A.1	<p>Substation Transformer Inspection</p> <ul style="list-style-type: none"> - Information received for data request A-14 indicates that 906 transformers were inspected in 2015. Please provide a digital copy of the actual completed inspection data, indicating what was found during the inspection, for calendar year 2015. - Please provide a list of the follow-up work from the inspection and the date the work was completed. 	3/3/2016	document(s)	5/11/2016	A-145 and Attachments (CONFIDENTIAL)
146	A.1	<p>Substation Breaker Inspection</p> <ul style="list-style-type: none"> - Information received for data request A-14 indicates that 1,016 breakers were inspected in 2015. Please provide a digital copy of the completed, inspection data, indicating what was found during the inspection, for calendar year 2015. - Please provide a list of the follow-up work from the inspection and the date the work was completed. 	3/3/2016	document(s)	5/11/2016	A-146 and Attachments (CONFIDENTIAL)

Item No.	Scope Item	Data Request	Date Requested	Information Type	Date Received	Documents Received
147	A.1	<p>Network Protection Inspection</p> <ul style="list-style-type: none"> - Information received for data request A-14 indicates that 11 Network Protectors were inspected 2015. Please provide a copy of the completed inspection data, indicating what was found during the inspection, for calendar year 2015. - Provide a copy, of the test data for the "back-feed test" performed on the 3 circuits in 2015. - Please advise what triggered network protector 459 and 458 to be replaced in June of 2015. 	3/3/2016	document(s)	4/2/2016	A-147 Incl All Attachments (CONFIDENTIAL)
148	A.1	<p>Vegetation Management</p> <ul style="list-style-type: none"> - Information received for data request A-15 provided the procedure used to verify that the work was performed in the field. For calendar year 2015, please provided the completed forms as outlined in Attachment 4 - Navigant is requesting to ride-out 3 circuits, trimmed in 2015, that had attachment 4 filled out. - Navigant is requesting to ride-out 1 circuit that is scheduled for trim in 2016. 	3/3/2016	document(s)	3/28/2016	A-148 Incl All Attachments (CONFIDENTIAL)
149	A.1	<p>Assigned asset condition or health scores or values assigned to JCP&L equipment, and the rationale or criteria applied to assign the health scores. It should include the threshold or criterion under which assets are upgraded or replaced based on assigned values.</p>	3/3/2016	document(s)	5/12/2016	A-149
150	B.1	<p>Copy of the Reports and management responses to the following 2014 Internal Audit projects: Audit of affiliate transactions (22901); Waste Management Practices (22975); FiT Assignment Governance and Compliance (23675); Audit of operations and capital for transmission and information technology, as of 12/15/14 (22756).</p>	3/3/2016	document(s)	3/30/2016	B-150 Incl All Attachments (CONFIDENTIAL)

Item No.	Scope Item	Data Request	Date Requested	Information Type	Date Received	Documents Received
151	B.1	Copy of Environmental "Business Practice" document for treated wood disposal (as a typical example of an environmental business practice)	4/14/2016	document(s)	5/13/2016	B-151 Including Attachment (CONFIDENTIAL)
152	B.3	Latest 5-year Staffing Plan, latest Staffing Plan Quarterly Review document, and screenshots of Last Dashboard for Staffing Plan Tracking.	4/14/2016	document(s)	5/20/2016	B-152 (CONFIDENTIAL)
153	B.3	Additional details on the level (%) and types of work contracted out at JCP&L, and the rationale for contracting decisions.	4/14/2016	document(s)	5/19/2016	B-153
154	B.3	Latest training curriculum and agenda for the PSI training program	4/14/2016	document(s)	5/19/2016	B-154 Incl All Attachments
155	B.3	Copy of most recent "Talent Talks" document	4/14/2016	document(s)	5/19/2016	B-155 Incl All Attachments
156	B.1	List of the annual regulatory filings made by JCP&L	4/14/2016	document(s)	5/19/2016	B-156
157	B.1	Copy of latest JCP&L compliance filing with the BPU on Affiliate Rules	4/14/2016	document(s)	5/13/2016	B-157
158	B.1	Copy of the most recent business Services benchmarking study (typically performed every three years)	4/14/2016	document(s)	5/13/2016	B-158 Including Attachment (CONFIDENTIAL)
159	B.1	Copy of current Cost Allocation Manual	4/14/2016	document(s)	5/19/2016	B-159 Incl All Attachments
160	A.2	Description of any update(s) to E-Plan since JCP&L initial response to Board Order	4/14/2016	document(s)	5/12/2016	A-160 (CONFIDENTIAL)
161	A.1	Provide update on whether volume test was performed on customer phone system	4/14/2016	document(s)	5/19/2016	A-161 Including Attachment
162	A.1	Provide excel spreadsheet of all inspection items for circuits inspected in 2014 (244), and tracking sheets listing corrective actions undertaken.	4/14/2016	document(s)	5/19/2016	A-162 Incl All Attachments (CONFIDENTIAL)

Item No.	Scope Item	Data Request	Date Requested	Information Type	Date Received	Documents Received
163	B.1	Copy of current Enterprise Risk Library	4/14/2016	document(s)	5/19/2016	B-163 Including Attachment (CONFIDENTIAL)
164	B.1	Copy of Internal Audit #21795 (Annual Audit of FEU Capital and O&M)	4/14/2016	document(s)	5/13/2016	B-164 Including Attachment (CONFIDENTIAL)
165	B.1	Example scoring system/matrix used to evaluate risks by Internal Audit, Internal Audit Charter document, Anti-Fraud Business Practice, and Table of Contents for Audit Procedures.	4/14/2016	document(s)	5/13/2016	B-165 Incl All Attachments
166	A.1	1) Listing and description (including benefits achieved) of OMS enhancements from 2013-2015, and those proposed for the next 3 years. 2) Roster, including titles and roles, of members of the team working on OMS, DMS roadmapping	4/14/2016	document(s)	5/17/2016	A-166 (CONFIDENTIAL)
167	A.2	Details on physical location of 30 existing or soon to be completed auto-loop schemes.	4/14/2016	document(s)	5/17/2016	A-167 Including Attachment (CONFIDENTIAL)
168	B.1	Most recently completed annual 5-year Financial Plan, and copy of a recent quarterly update of 5-year Financial Plan.	4/14/2016	document(s)	5/19/2016	B-168 Incl All Attachments (CONFIDENTIAL)
169	B.1	A list of procedural documents for finance and accounting practices	4/14/2016	document(s)	5/13/2016	B-169 Incl All Attachments
170	B.3	Recent copy of JCP&L Hiring Plan, showing how hires are tracked.	4/14/2016	document(s)	5/20/2016	B-170
171	B.3	Copy of new supervisor/manager training agenda	4/14/2016	document(s)	5/19/2016	B-171 Including Attachment
172	B.3	Copies of training tracking sheets for Corporate-led and FEU led training	4/14/2016	document(s)	5/19/2016	B-172 Incl All Attachments
173	B.3	Completed copy of Staffing Strategies template for at least one sample job category.	4/14/2016	document(s)	5/19/2016	B-173 Including Attachment (CONFIDENTIAL)

Item No.	Scope Item	Data Request	Date Requested	Information Type	Date Received	Documents Received
174	B.3	JCP&L short-term incentive metrics and payouts for 2013-2015 period	4/14/2016	document(s)	5/13/2016	B-174 (CONFIDENTIAL)
175	B.3	JCP&L long-term incentive payout percentage (total) for 2013-2015 period	4/14/2016	document(s)	5/13/2016	B-175
176	B.1	Copy of most recent FERC compliance report	4/14/2016	document(s)	5/19/2016	B-176 Including Attachment
177	B.1	Listing and short description of NERC Compliance policies, procedures	4/14/2016	document(s)	5/13/2016	B-177 Including Attachment
178	B.1	List of measures/metrics used to evaluate vendors and supply chain performance	4/14/2016	document(s)	5/13/2016	B-178 (CONFIDENTIAL)
179	B.1	Copies of the following: 1.) Integrated Architecture for FE, 2) Screen shot of pages from IT PMO online, 3) Project registry, 4) Technology Road Map, 5) Sample PMO project status report or if available portfolio report	4/14/2016	document(s)	5/13/2016	B-179 Incl All Attachments (CONFIDENTIAL)
180	A.2	1) Details on ongoing Communications infrastructure Plan for all OPCOs. 2) Risk assessment plan of outsourcing the communications of SCADA (reclosers and substations, where applicable) and MDT's in the event of a widespread loss of existing communications systems. 3) Description of transition plan to address Verizon's phasing out of communications systems and support in 2017/18.	4/14/2016	document(s)	5/12/2016	A-180 (CONFIDENTIAL)
181	B.1	Copy of Compliance training matrix; Screen shot of internal web pages related to compliance policies and ethics, including hot-line	4/14/2016	document(s)	5/19/2016	B-181 Including Attachment (CONFIDENTIAL)
182	A.5, B.2	Provide RPA table listing (all Columns/Fields) for all pre-Round 1 2016 budget prepared in 2015, including approval status. Also provide same list after Round 3 CAPEX portfolio review completed.	4/14/2016	document(s)	5/20/2016	No Files Found

Item No.	Scope Item	Data Request	Date Requested	Information Type	Date Received	Documents Received
183	A.5, B.2	Applicable guidance documentation for RPA process, including help screens from RPA system or other procedural documentation.	4/14/2016	document(s)	5/12/2016	A-183 Incl All Attachments (CONFIDENTIAL)
184	B.1	Funding level of pensions for each of the FE distribution companies including JCP&L.	4/14/2016	document(s)	5/13/2016	B-184
185	B.1	1) Copies of most recent bond ratings reports (Fitch, Moody's, and/or S&P); 2) Credit ratings guidance reports (Fitch, Moody's and/or S&P) for the 2013-2016 time period.	4/27/2016 (revised)	document(s)	5/13/2016	B-185 Incl All Attachments (CONFIDENTIAL)
186	A.1	Copies of annual UPR quality metrics for last 3 years.	4/14/2016	document(s)	5/12/2016	A-186
188	A.1	Copies of Vegetation Management contractor quarterly reports	4/14/2016	document(s)	5/11/2016	A-188 and Attachments (CONFIDENTIAL)
189	A.2	Details on substation flood mitigation for substations completed or to be completed by 2016.	4/14/2016	document(s)	5/12/2016	A-189 Incl Attachment (CONFIDENTIAL)
190	A.3	Copy of "after action" report for last major drill.	4/14/2016	document(s)	5/12/2016	A-190 (CONFIDENTIAL)
191	A.3	Copies of recent ETR Accuracy reports (Blue Sky and Global)	4/14/2016	document(s)	5/17/2016	A-191 Including Attachment (CONFIDENTIAL)
192	A.2	Listing of CYME studies performed during 2015 and one example study output.	4/14/2016	document(s)	5/17/2016	A-192 Incl All Attachments (CONFIDENTIAL)
194	A.4	Distribution transformer rating guidelines; Overloaded distribution transformer report from GIS	4/14/2016	document(s)	5/19/2016	A-194 Incl All Attachments (CONFIDENTIAL)
197	A.3	Please provide electronic copies of the written materials that were handed out during the May 18 Sandy Overlay exercise, including the E-Plan document and the materials included in the binder	5/23/2016	document(s)		

**APPENDIX C. INTERVIEWS, OBSERVATIONS, AND
DEMONSTRATIONS CONDUCTED**

Item No.	Data Req. No.	Scope Item	Data Request	Date Requested	Information Type	Date Received	Interview/Observation Conducted
123	I	B.3	Interview with JCP&L HR to determine survey format and target audience.	2/4/2016	Interview	2/25/2016	Planning discussions completed with Katie Blandford and/or Mark Mader on 2/25/16, 3/21/16, and 4/11/16
112	I	B.1; B.2	Interviews with FE management personnel responsible for conducting resource allocation studies across FE distribution subsidiaries.	2/4/2016	Interviews	3/8/2016	Interview completed with Sherry Scheeler and Karen Lawhun on 3/8/16
115	I	B.3	Interview with individuals responsible for developing plans/strategies above.	2/4/2016	Interviews	3/8/2016	Interview completed with Sherry Scheeler and Karen Lawhun on 3/8/16
105	I	B.4	Interviews with individuals responsible for enforcement of compliance policies pertaining to NJ rules.	2/4/2016	Interviews	3/10/2016	Interview completed with Lauren Lepkoski and Mark Mader on 3/10/16
10	I	A.1	Corporate reliability reporting methodologies and audit processes (including quarterly reporting, major event reports, ASPRs)	2/4/2016	interview	3/14/2016	Interview completed with Tiffane Cowan on 3/14/16
37	I	A.2, A.3	Project management / implementation of response to Board orders on Irene and Sandy	2/4/2016	Interview	3/14/2016	Interview completed with Alan Michel on 3/14/16; Interview completed with Tiffane Cowan on 3/14/16
6	I	A.1, A.3	OMS data and demo (including ETR development and communication)	2/4/2016	demo	3/15/2016	interview completed with John Daugherty and Adam Methany on 3/15/16
58	I	A.3	Meteorology process, practices, roles/responsibilities interview (corporate)	2/4/2016	interview	3/15/2016	Interview completed with Brian Kolts on 3/15/16
80	I	A.5	Capital and O&M prioritization process and decision-making within FE Utilities	2/4/2016	interview	3/15/2016	Interview completed with Terry Kuhn on 3/10/16; interview completed with Marlene Barwood on 3/15/16
98	I	B.1	Interview with FE Internal Audit leadership with responsibility of JCP&L internal audit activities.	2/4/2016	Interview	3/15/2016	Interview completed with Jeanine Trumbetta on 3/15/16

Item No.	Data Req. No.	Scope Item	Data Request	Date Requested	Information Type	Date Received	Interview/Observation Conducted
116	I	B.3	Interviews with PSI leadership staff to determine training program qualification requirements.	2/4/2016	Interviews	3/17/2016	Interview completed with Sherry Scheeler and Nikki Ferrell on 3/17/16
117	I	B.3	Interviews with Internal staff responsible for training programs to determine qualification requirements for these programs.	2/4/2016	Interviews	3/17/2016	Interview completed with Sherry Scheeler and Nikki Ferrell on 3/17/16
104	I	B.1	Interviews with Individual(s) responsible for enforcement of compliance policies pertaining to FERC code of conduct.	2/4/2016	Interviews	3/22/2016	Interview completed with Carol Prysevig & Bob Mattiuz (FERC Compliance) on 3/22/16;
92	I	B.1	Interviews with FE support organizations supporting JCP&L (operations, finance, IT, supply chain, legal/regulatory, HR, environmental)	2/4/2016	Interviews	3/23/2016	Interview completed with Bede Portz (Environmental) on 3/8/16; Interview completed with Lauren Lepkoski (Legal) on 3/10/16; Interview completed with Mark Mader (Regulatory) on 3/10/16; Interview completed with Terry Kuhn (Finance) on 3/10/16; Interview completed with Marlene Barwood (Finance) on 3/15/16; Interview completed with Nikki Ferrell on 3/17/16; Interview completed with John Nauer (Supply Chain) on 3/22/16; Interview completed with Christine Walker (HR) on 3/23/16; Interview completed with Scott Infante (IT) on 3/23/16

Item No.	Data Req. No.	Scope Item	Data Request	Date Requested	Information Type	Date Received	Interview/Observation Conducted
24	I	A.1, A.2	Corporate development of Substation Inspection & Maintenance Programs (General Inspections, Protective Relays, Transformers, Batteries, Breakers, Thermography, Underground Networks); Processes, practices, and philosophy for system resiliency and storm hardening (corporate); including new technologies (substations).	2/4/2016	Interview	3/28/2016	Interview completed with Shawn Gehring and Tom Pryatel on 3/28/16
49	I	A.3	ICS process, practices, roles/responsibilities interview (corporate); Mutual Aid process, practices, roles/responsibilities interview (corporate); Damage Assessment process, practices, roles/responsibilities interview (corporate).	2/4/2016	interview	3/28/2016	Interview completed with John Huber on 3/28/2016
67	I	A.4	Distribution planning process, practices, roles/responsibilities interview (corporate) - substations; Load forecasting process, practices, roles/responsibilities interview (corporate) - Substations.	2/4/2016	interview	3/28/2016	Interview completed with Rick O'Callahan on 3/28/16

Item No.	Data Req. No.	Scope Item	Data Request	Date Requested	Information Type	Date Received	Interview/Observation Conducted
9	I	A.1, A.2	Corporate reliability reporting methodologies and audit processes (including quarterly reporting), including UPRs; Corporate Development of Distribution Inspection & Maintenance Programs (Capacitors, Reclosers, Circuits and Equipment (overhead and underground), Poles, Circuit Thermography, Highest Priority Circuits/CEMI); Corporate development of Sub-Transmission Inspection & Maintenance Programs (Overhead Circuits and Equipment, Poles, Circuit Thermography; Processes, practices, and philosophy for system resiliency and storm hardening (corporate); including new technologies (OH/UG);	2/4/2016	interview	3/29/2016	Interview completed with Randy Coleman and Tom Pryatel on 3/29/16
16	I	A.1	Vegetation management compliance and contribution to reliability performance (corporate)	2/4/2016	Interview	3/29/2016	Interview completed with Becky Spach on 3/29/16
27	I	A.1	Corporate development of life-cycle maintenance philosophy and practices, including the average age and condition of all critical system assets and JCP&L's approach to focus on the condition of the asset	2/4/2016	Interview	3/29/2016	Interview completed with Randy Coleman and Tom Pryatel on 3/29/16; interview completed with Shawn Gehring and Tom Pryatel on 3/28/16
81	I	A.5	Capital and O&M prioritization process and decision-making within FE Utilities	2/4/2016	interview	3/30/2016	Interview completed with Mark Julian on 3/30/16
44	I	A.2	Circuit protection philosophy interview (corporate)	2/4/2016	Interview	4/1/2016	Interview completed with Dean Phillips, 4/1/16

Item No.	Data Req. No.	Scope Item	Data Request	Date Requested	Information Type	Date Received	Interview/Observation Conducted
64	I	A.3	Documentation and/or demonstration of storm-related websites	2/4/2016	demo/interview	4/1/2016	Interview completed with Greg Hussing and Tiffany Shepard on 4/1/16
66	I	A.4	Distribution planning process, practices, roles/responsibilities interview (corporate) - OH/UG	2/4/2016	interview	4/1/2016	Interview completed with Dean Phillips, 4/1/16; Interview completed with Randy Coleman and Tom Pryatel on 3/29/16
71	I	A.4	Load forecasting process, practices, roles/responsibilities interview (corporate) - OH/UG	2/4/2016	interview	4/1/2016	Interview completed with Dean Phillips, 4/1/16; Interview completed with Randy Coleman and Tom Pryatel on 3/29/16; Interview completed with Rick O'Callahan on 3/28/16
82	I	A.5	Capital and O&M prioritization process and decision-making within FE-Corporate	2/4/2016	interview	4/1/2016	Interview completed with Jon Taylor on 4/1/16
83	I	A.5	Capital and O&M prioritization process and decision-making within FE-Corporate	2/4/2016	interview	4/1/2016	Interview completed with Bill Boyd on 4/1/16
8	I	A.1	JCP&L OMS usage	2/4/2016	interview/demo	4/4/2016	Interview completed with Rick Czugh on 4/4/2016
39	I	A.2, A.3	Interview on design criteria related to resiliency and restoration; Damage Assessment process, practices, roles/responsibilities interview (JCP&L); Load forecasting process, practices, roles/responsibilities interview (JCP&L) - OH/UG.	2/4/2016	Interview	4/4/2016	Interview completed with Mario Andrie and Don Richards, 4/4/2016
45	I	A.2	Circuit protection philosophy interview (JCP&L)	2/4/2016	Interview	4/4/2016	Interview completed with Mario Andrie and Don Richards, 4/4/2016

Item No.	Data Req. No.	Scope Item	Data Request	Date Requested	Information Type	Date Received	Interview/Observation Conducted
53	I	A.3	ETR process, practices, roles/responsibilities interview (corporate)	2/4/2016	Interview	4/4/2016	Interview completed with Gretchan Sekulich on 4/4/16
62	I	A.3	Customer Communications process, practices, roles/responsibilities interview (corporate)	2/4/2016	interview	4/4/2016	Interview completed with Gretchan Sekulich on 4/4/16
68	I	A.4	Distribution planning process, practices, roles/responsibilities interview (JCP&L) - OH/UG	2/4/2016	interview	4/4/2016	Interview completed with Mario Andrie and Don Richards, 4/4/2016
17	I	A.1	Vegetation management compliance and contribution to reliability performance (regional)	2/4/2016	Interview	4/5/2016	Interview completed with Bob Lee on 4/5/2016
54	I	A.3	ETR process, practices, roles/responsibilities interview (JCP&L)	2/4/2016	Interview	4/5/2016	Interview completed with Mark Jones and Ron Morano, on 4/5/16; Interview completed with Rick Czugh on 4/4/16
63	I	A.3	Customer Communications process, practices, roles/responsibilities interview (JCP&L)	2/4/2016	interview	4/5/2016	Interview completed with Mark Jones and Ron Morano, on 4/5/16
78	I	A.5	Capital and O&M prioritization process and decision-making within JCP&L	2/4/2016	interview	4/5/2016	Interview completed with Mario Andrie and Mark DeCaraoli on 4/5/16
79	I	A.5	Capital and O&M prioritization process and decision-making within JCP&L	2/4/2016	interview	4/5/2016	Interview completed with Jim Fakult and Tony Hurley on 4/5/2016

Item No.	Data Req. No.	Scope Item	Data Request	Date Requested	Information Type	Date Received	Interview/Observation Conducted
21	I	A.1, A.2	Regional reliability reporting processes, including UPRs, and regional reliability programs (vegetation management, adaptive relaying, automatic circuit tie schemes (Paul Chen), pole inspection, equipment condition inspection/replacement programs, cable replacement, etc.); Regional Implementation of Distribution Inspection & Maintenance Programs (Capacitors, Reclosers, Circuits and Equipment (overhead and underground), Poles, Circuit Thermography, Highest Priority Circuits/CEMI); Regional implementation of Sub-Transmission Inspection & Maintenance Programs (Overhead Circuits and Equipment, Poles, Circuit Thermography; Processes, practices, and philosophy for system resiliency and storm hardening (JCP&L); including new technologies (OH/UG).	2/4/2016	Interview	4/12/2016	Interview completed with Mario Andre & Paul Chen on 4/12/16
77	I	A.5	Demo of IT system(s) used for capital prioritization	2/4/2016	demo	4/12/2016	RPA demo completed with Cheryl Orner on 4/12/16

Item No.	Data Req. No.	Scope Item	Data Request	Date Requested	Information Type	Date Received	Interview/Observation Conducted
25	I	A.1, A.2, A.4	Regional implementation of Substation Inspection & Maintenance Programs (General Inspections, Protective Relays, Transformers, Batteries, Breakers, Thermography, Underground Networks); Processes, practices, and philosophy for system resiliency and storm hardening (JCP&L); including new technologies (substations); Distribution planning process, practices, roles/responsibilities interview (JCP&L) - substations; Load forecasting process, practices, roles/responsibilities interview (JCP&L) - Substations.	2/4/2016	Interview	4/13/2016	Interview completed with Mario Andre and Dennis Pavagahdi on 4/13/16
28	I	A.1	Regional implementation of life-cycle maintenance philosophy and practices, including the average age and condition of all critical system assets and JCP&L's approach to focus on the condition of the asset	2/4/2016	Interview	4/13/2016	Interview completed with Mario Andre and Dennis Pavagahdi on 4/13/16
32	I	A.2	Storm preparedness and response processes	2/4/2016	Interview	4/13/2016	Interview completed with Rae Mallin and Pat Mullin on 4/11/16; Interview completed with Tony Hurley on 4/13
50	I	A.3	ICS process, practices, roles/responsibilities interview (JCP&L)	2/4/2016	interview	4/13/2016	Interview completed with Rae Mallin and Pat Mullin on 4/11/16; Interview completed with Tony Hurley on 4/13
56	I	A.3	Mutual Aid process, practices, roles/responsibilities interview (JCP&L)	2/4/2016	interview	4/13/2016	Interview completed with Tony Hurley on 4/13/16
59	I	A.3	Meteorology process, practices, roles/responsibilities interview (JCP&L)	2/4/2016	interview	4/13/2016	Interview completed with Rae Mallin and Pat Mullin on 4/11/16; Interview completed with Tony Hurley on 4/13

Item No.	Data Req. No.	Scope Item	Data Request	Date Requested	Information Type	Date Received	Interview/Observation Conducted
195	III	A.3	Field visits to 1) substation flood mitigation, 2) DCC (Both), 3) pre-1970's substation visit, including entry to control house for viewing relay panels, and entire control house and substation yard.	4/14/2016	Field visit	5/9/2016	Completed 5/9/16
187	III	A.4	Demo request of walk-through of LFDMS system.	4/14/2016	demo	5/10/2016	Completed 5/10/16
193	III	A.4	Request demo/interview with planning engineer assigned to a JCP&L district. (Conduct at same time as LFDMS demo.)	4/14/2016	demo	5/10/2016	Completed 5/10/16
86	I	B.1	Interview select JCP&L Board Members regarding management practices, areas of concern (e.g. audit committee), and relationship with FE board, including at least one at-large board member.	2/4/2016	Interviews	5/16/2016	Interview completed with Paul Addison and Steve Strah on 5/16/16
196	IV	B.1	Interview with FirstEnergy CFO regarding current JCP&L and FE credit ratings	4/27/2016	Interview	5/16/2016	Interview with Jim Pearson completed 5/16/16
48	I	A.3	Observation of ICS training drill	2/4/2016	observation	5/18/2016	"Sandy Overlay" ICS drill observed 5/18/16

**APPENDIX D. SUPPORTING TABULAR DATA FOR FINANCIAL
COMPARISONS**

Table 13. Tabular Data Supporting Figure 22. Return-on-Equity: Net Utility Operating Income and Rate Base Approach

		Return on Equity FERC Form 1 Net Utility Operating Income and Rate Base Approach									
		2013									
		FE Opco #1	JCPL	FE Opco #2	FE Opco #3	FE Opco #4	FE Opco #5	FE Opco #6	FE Opco #7	FE Opco #8	FE Opco #9
Return on Equity - Net Oper Inc and Rate Base Approach - Beg/End, Excl CWIP		7.23%	7.39%	20.52%	12.53%	25.81%	11.70%	17.22%	14.45%	10.73%	15.44%
Return on Equity - Net Oper Inc and Rate Base Approach - Beg/End, Incl CWIP		7.18%	7.20%	19.88%	11.78%	23.74%	11.40%	16.46%	13.85%	10.59%	14.54%
Avg Return on Equity - Net Oper Inc and Rate Base Approach - Beg/End, Excl CWIP		14.30%	14.30%	14.30%	14.30%	14.30%	14.30%	14.30%	14.30%	14.30%	14.30%
Avg Return on Equity - Net Oper Inc and Rate Base Approach - Beg/End, Incl CWIP		13.66%	13.66%	13.66%	13.66%	13.66%	13.66%	13.66%	13.66%	13.66%	13.66%
		2014									
		FE Opco #1	JCPL	FE Opco #2	FE Opco #3	FE Opco #4	FE Opco #5	FE Opco #6	FE Opco #7	FE Opco #8	FE Opco #9
Return on Equity - Net Oper Inc and Rate Base Approach - Beg/End, Excl CWIP		3.93%	4.13%	6.62%	8.07%	14.15%	3.12%	12.65%	9.40%	8.90%	13.60%
Return on Equity - Net Oper Inc and Rate Base Approach - Beg/End, Incl CWIP		3.90%	3.99%	6.36%	7.69%	12.84%	3.02%	11.90%	9.11%	8.74%	13.06%
Avg Return on Equity - Net Oper Inc and Rate Base Approach - Beg/End, Excl CWIP		8.46%	8.46%	8.46%	8.46%	8.46%	8.46%	8.46%	8.46%	8.46%	8.46%
Avg Return on Equity - Net Oper Inc and Rate Base Approach - Beg/End, Incl CWIP		8.06%	8.06%	8.06%	8.06%	8.06%	8.06%	8.06%	8.06%	8.06%	8.06%
		2015									
		FE Opco #1	JCPL	FE Opco #2	FE Opco #3	FE Opco #4	FE Opco #5	FE Opco #6	FE Opco #7	FE Opco #8	FE Opco #9
Return on Equity - Net Oper Inc and Rate Base Approach - Beg/End, Excl CWIP		6.30%	2.55%	9.78%	7.70%	17.29%	5.58%	14.59%	11.27%	12.11%	14.56%
Return on Equity - Net Oper Inc and Rate Base Approach - Beg/End, Incl CWIP		6.23%	2.45%	9.33%	7.39%	15.79%	5.36%	13.61%	10.84%	11.88%	13.99%
Avg Return on Equity - Net Oper Inc and Rate Base Approach - Beg/End, Excl CWIP		10.17%	10.17%	10.17%	10.17%	10.17%	10.17%	10.17%	10.17%	10.17%	10.17%
Avg Return on Equity - Net Oper Inc and Rate Base Approach - Beg/End, Incl CWIP		9.69%	9.69%	9.69%	9.69%	9.69%	9.69%	9.69%	9.69%	9.69%	9.69%

Table 14. Tabular Data Supporting Figure 23. FERC Form 1 Return-on-Equity (based on Net Income)

		Return on Equity FERC Form 1 Net Income / Total Proprietary Capital									
		2013									
		FE Opco #1	JCPL	FE Opco #2	FE Opco #3	FE Opco #4	FE Opco #5	FE Opco #6	FE Opco #7	FE Opco #8	FE Opco #9
Return on Equity - FF1 Net Income / Avg Equity		7.27%	7.69%	-2.86%	-7.93%	23.51%	6.66%	15.99%	17.49%	9.55%	16.80%
Avg Return on Equity - FF1 Net Income / Avg Equity		9.42%	9.42%	9.42%	9.42%	9.42%	9.42%	9.42%	9.42%	9.42%	9.42%
		2014									
		FE Opco #1	JCPL	FE Opco #2	FE Opco #3	FE Opco #4	FE Opco #5	FE Opco #6	FE Opco #7	FE Opco #8	FE Opco #9
Return on Equity - FF1 Net Income / Avg Equity		3.31%	3.67%	5.56%	9.03%	11.23%	2.99%	12.85%	10.35%	5.39%	15.32%
Avg Return on Equity - FF1 Net Income / Avg Equity		7.97%	7.97%	7.97%	7.97%	7.97%	7.97%	7.97%	7.97%	7.97%	7.97%
		2015									
		FE Opco #1	JCPL	FE Opco #2	FE Opco #3	FE Opco #4	FE Opco #5	FE Opco #6	FE Opco #7	FE Opco #8	FE Opco #9
Return on Equity - FF1 Net Income / Avg Equity		6.03%	2.01%	8.73%	9.36%	12.81%	6.49%	14.99%	13.15%	5.70%	16.12%
Avg Return on Equity - FF1 Net Income / Avg Equity		9.54%	9.54%	9.54%	9.54%	9.54%	9.54%	9.54%	9.54%	9.54%	9.54%

APPENDIX E. EMPLOYEE SURVEY ADDITIONAL DETAILS

E.1 Survey Summary

A voluntary survey was issued to employees of JCP&L. The survey contained 17 questions that asked for an answer between one and five (1-5), with 1 being strongly disagree, 5 being strongly agree. The survey was issued to two separate groups of JCP&L employees: Management level (non-union) and Bargaining Unit (union). At the Management level, there were 225 surveys completed out of a possible 372. At the Bargaining Unit level, 754 were completed out of a possible 1112.

Navigant further broke down the results of the survey by separating each of the previously mentioned groups into three categories each, determined by how long employees had been working at JCP&L. The new categories included employees that have been with JCP&L for less than five (5) years, employees that have been with JCP&L between five (5) and ten (10) years, and employees that have been with JCP&L for over ten (10) years. The resulting splits are shown below in Table 15.

Table 15. Responses to Employee Survey

	< 5 Years	5-10 years	10 + years	Total
Management – Number of Responses	26	41	156	223
Bargaining Unit – Number of Responses	118	131	418	667

For analysis purposes, Navigant's team divided the 17 survey questions into three categories: "Employee Experience", "Customer Service", and "Perception of Product."

E.2 Summary of Results

Analysis of the employee survey results indicated one clear takeaway. Employees in both the Management Level and Bargaining Unit, that have been with JCP&L for less than 5 years, tended to answer questions more favorably than their peers that have been with JCP&L for longer than 5 years. Additionally, both Management Level and Bargaining Unit employees tended to respond more favorably to questions concerning service to customers and products than they did for questions concerning employee experience. Correlation analysis did not indicate any unexpected correlations between responses for any given questions. In addition, there were no negatively correlated questions. Hypothesis testing showed that there was no statistically significant difference between the average responses from the Management Level and Bargaining Unit. These results are provided more in depth in the following report.

Analysis of the Bargaining Unit

The overall mean responses for the all 17 questions in the Bargaining Unit group was 3.4. The analysis demonstrates that 53% of respondents that have been with JCP&L for 5 years or less provided a '5' response, while less than 10% of the same group provided '2' or lower. This is in contrast to employees

that have been with JCP&L for more than 5 years. While a majority of these employees provided a '3' response or higher, about 25% of them provided an answer below '3'. Response breakdown for the Bargaining Unit is shown in Table 16.

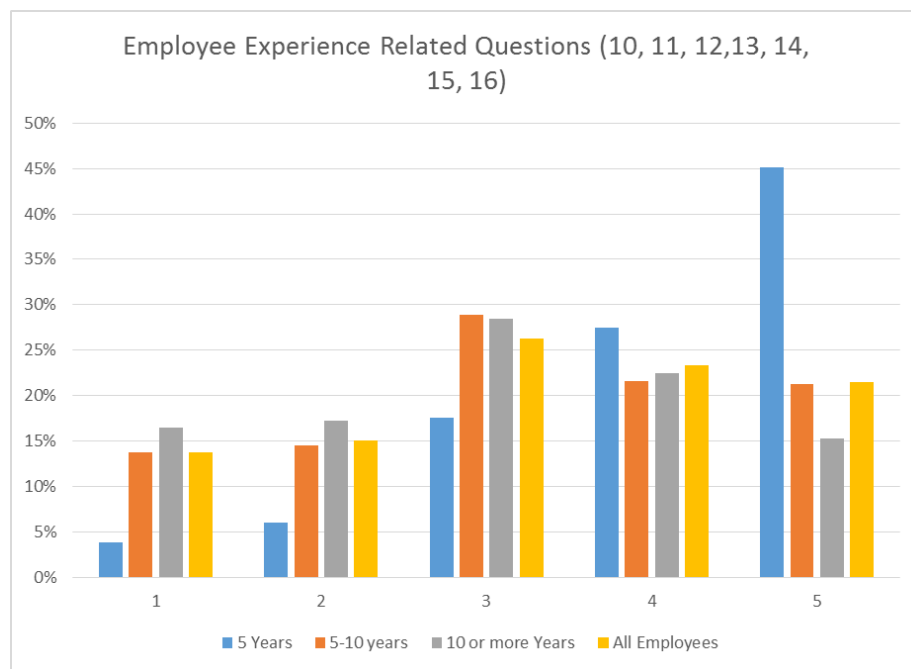
Table 16. Bargaining Unit Survey Response by Tenure

	Less than 5 Years	5-10 years	10 or more years
1	4%	12%	14%
2	4%	14%	16%
3	14%	27%	27%
4	24%	21%	23%
5	53%	26%	21%
Total	100%	100%	100%

Navigant conducted a correlation analysis of responses from each question provided by the Management Level group. While this analysis was used to group certain questions together, the resulting correlations were either expected due to similarity in questions, or were too weakly correlated to make any further conclusions.

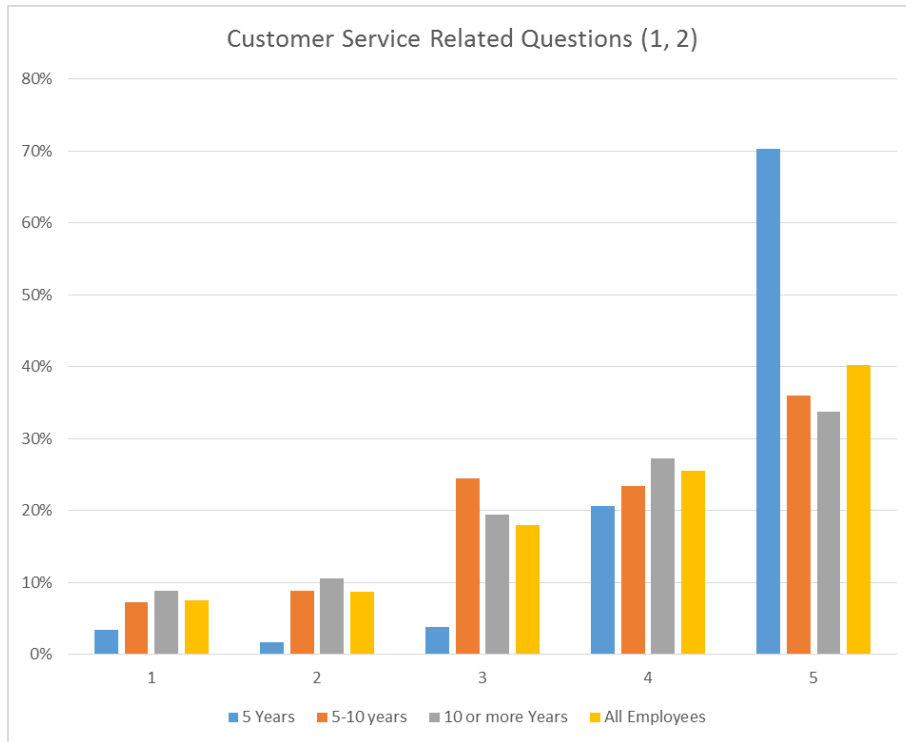
An analysis of the “Employee Experience” question category further suggests that employees who have spent less time with JCP&L tend to be more satisfied than those who have been with JCP&L for a longer period of time. Whereas a large majority of employees who have been with JCP&L for less than 5 years provided a ‘4’ or higher for these questions, a majority of employees that have been with JCP&L for more than 5 years provided a ‘3’. This indicates that employees that have been with JCP&L for a longer period of time are not fully satisfied with their opportunity for skill development, communication through FirstEnergy, nor JCP&L’s commitment to employee satisfaction. The distribution for “Employee Experience” questions is shown in Figure 32.

Figure 32. “Employee Experience” Bargaining Unit Responses



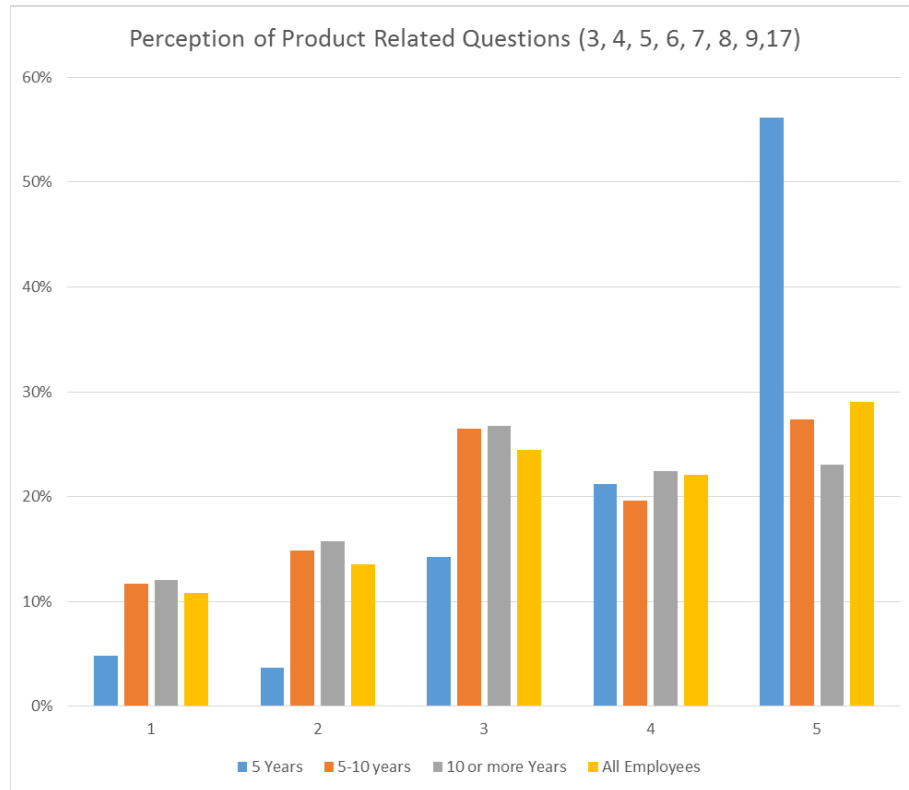
An analysis of the “Customer Service” question category demonstrated that a majority of JCP&L employees in all three categories of employment duration provided above ‘3’, indicating JCP&L employees are satisfied with how the company provides service to its customers. The distribution for “Customer Service” questions is shown in Figure 33.

Figure 33. “Customer Service” Bargaining Unit Responses



An analysis of the “Perception of Product” question category showed that a large majority of JCP&L employees provided a ‘3’ or higher to these questions. Employees that have been with JCP&L for less than 5 years were much more likely to answer with a ‘4’ or ‘5’ than employees that had been employed for more than 5 years. The distribution for “Perception of Product” questions is shown in Figure 34.

Figure 34. “Perception of Product” Bargaining Unit Responses



Analysis of Management Level Employees

The overall mean responses for the all 17 questions in the Management Level group was 4.0. Analysis showed that on average, 75% of employees in this group provided responses of '4' or higher, while less than 10% provided responses below '3'. Similar to the Bargaining Unit group, employees that have been with JCP&L for less time tended to answer more favorably than those who have been with the company longer. The full results of average responses for the Management Level group is shown in Table 17.

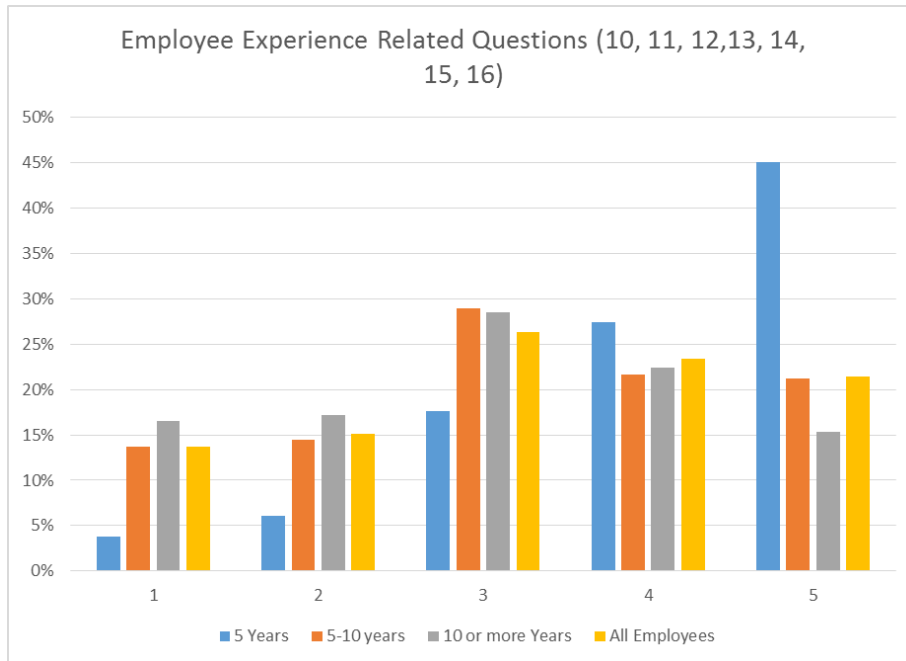
Table 17. Management Survey Responses by Tenure

	Less than 5 Years	5-10 years	10 or more years
1	3%	4%	2%
2	1%	4%	7%
3	6%	10%	16%
4	33%	37%	37%
5	56%	45%	37%
Total	100%	100%	100%

Similar to the analysis conducted for the Management Level group, Navigant conducted a correlation analysis of responses from each question provided by the Bargaining Unit group. The results were much the same, if not even less substantial.

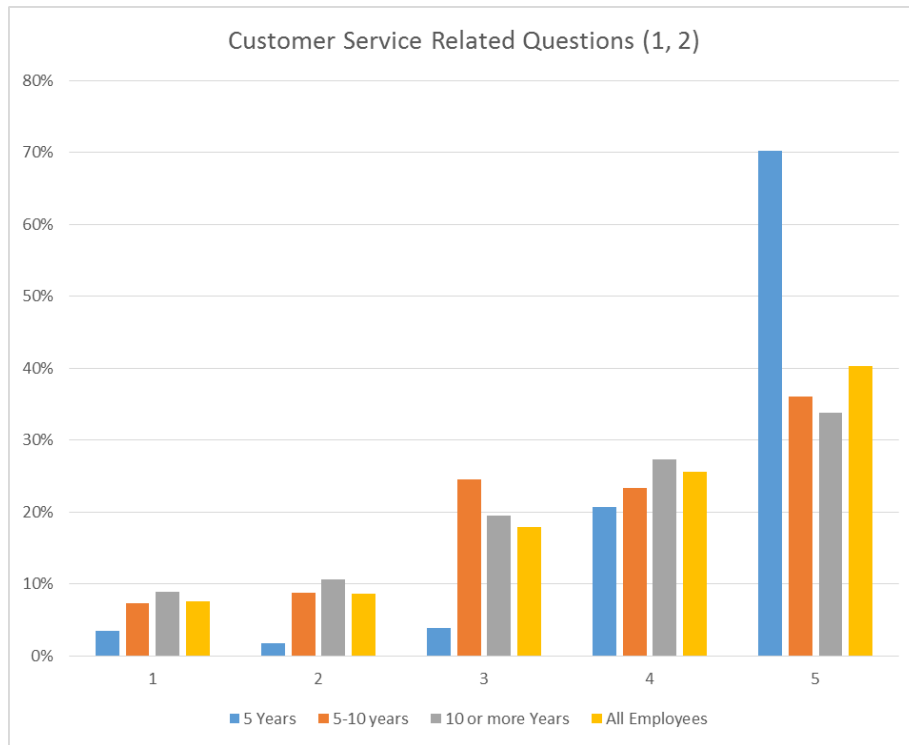
An analysis of the “Employee Experience” question category indicated that a majority of all JCP&L employees provided a ‘3’ or higher, with employees that have worked with JCP&L for less time tended to answer more favorably than those that have worked for longer. The distribution for “Employee Experience” questions is shown in Figure 35.

Figure 35. “Employee Experience” Management Responses



An analysis of the "Customer Service" question category showed that a large majority of all JCP&L employees provided a '4' or higher, indicating the management level employees are satisfied with JCP&L's service to customers. The distribution for "Customer Service" questions is shown in Figure 36.

Figure 36. "Customer Service" Management Responses



An analysis of the “Perception of Product” question category indicated very similar results to the “Employee Experience” category: a majority of all employees provided a ‘3’ or higher, with the shorter tenured employees providing much more favorable responses than those that have been employed for more than 5 years. The distribution for “Perception of Product” questions is shown in Figure 37.

Figure 37. “Perception of Product Management Responses

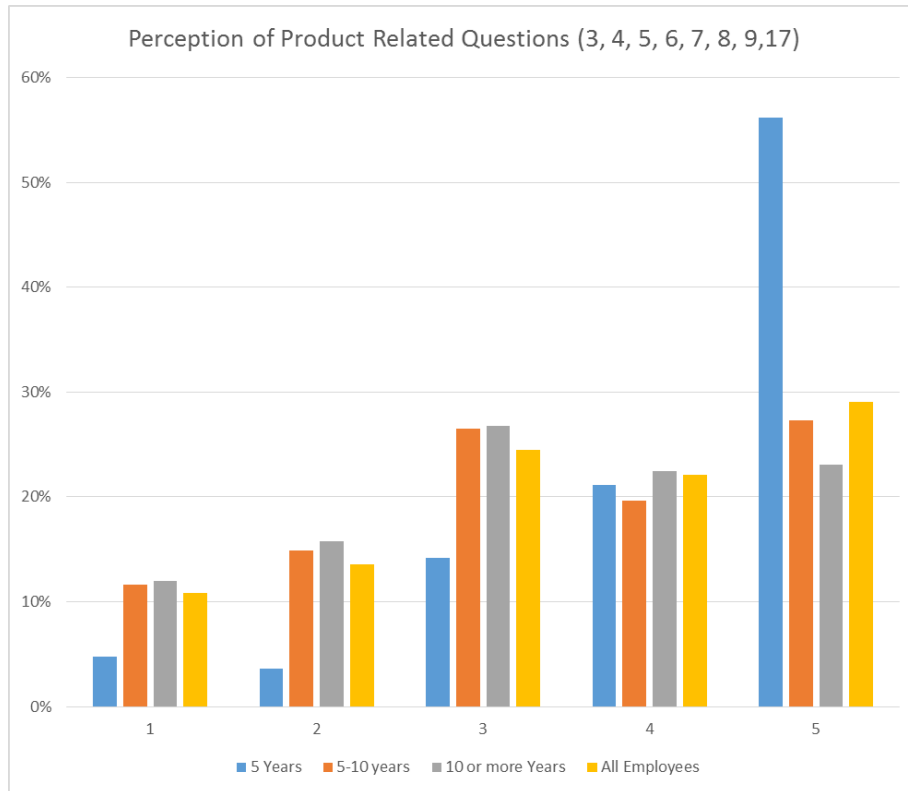
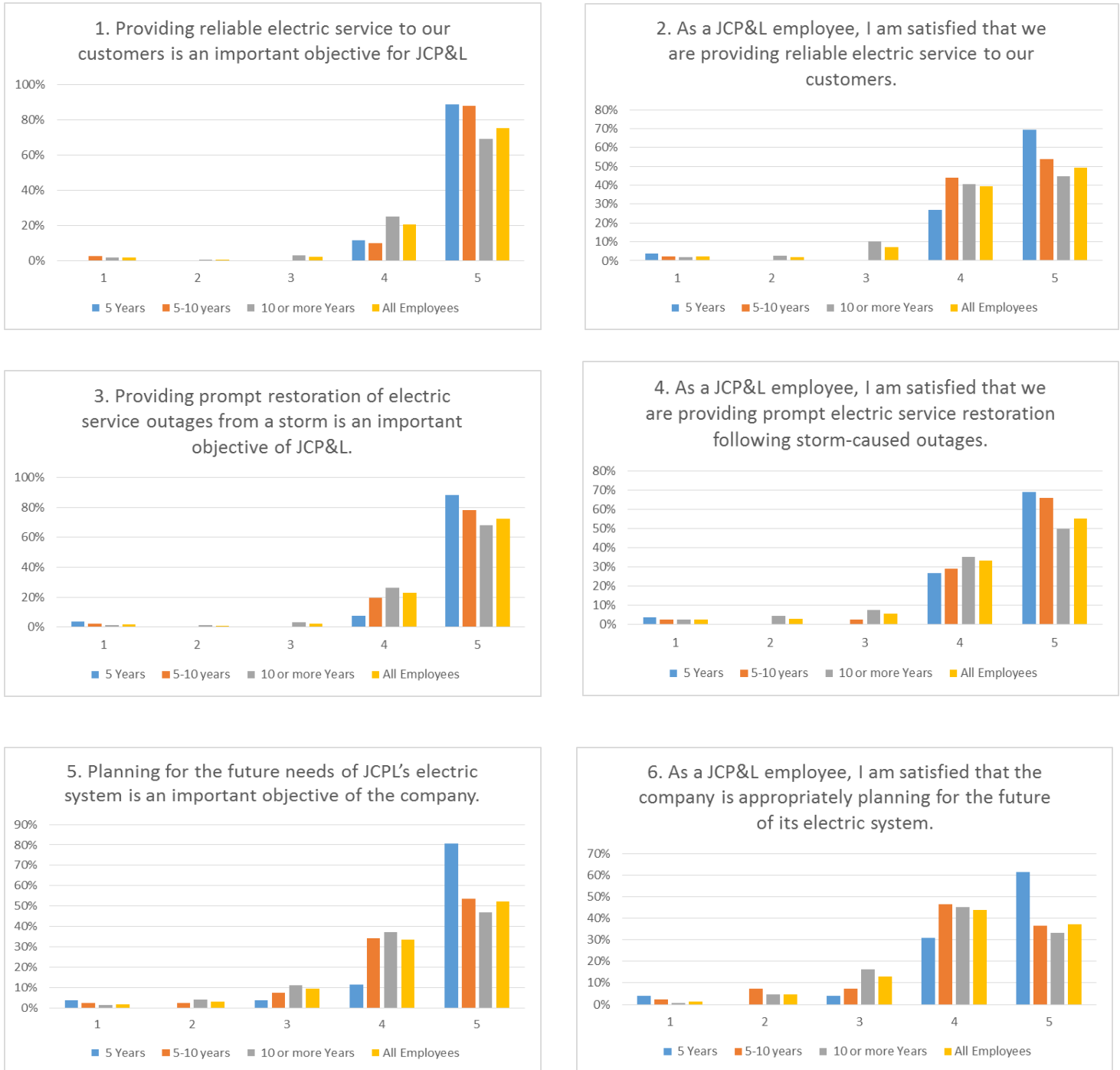
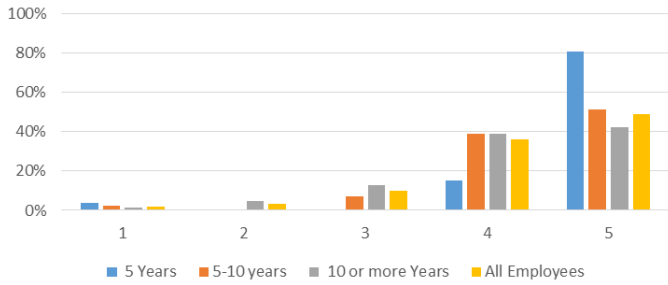


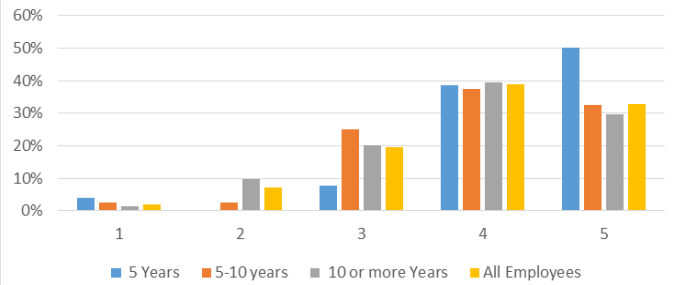
Figure 38. Graphical Distributions of Each Question for Management Level Survey Responses



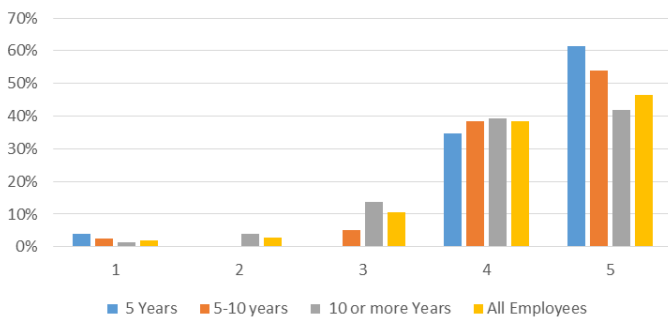
7. Spending appropriately to support and/or maintain its electric system is an important objective for JCP&L



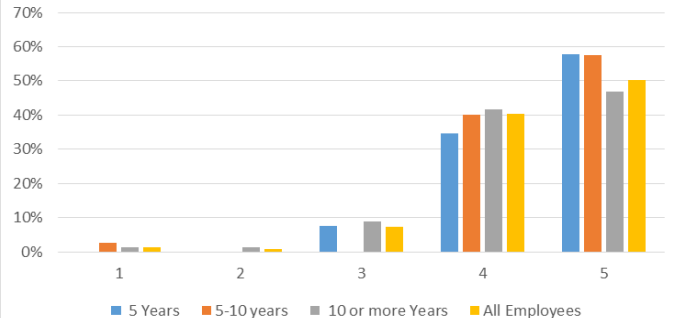
8. As a JCP&L employee, I am satisfied with how appropriately JCP&L spends to operate and maintain its electric system.



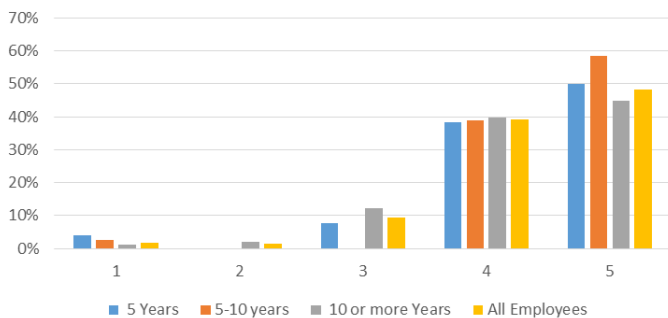
9. Alignment of JCP&L goals to FirstEnergy goals is an important objective.



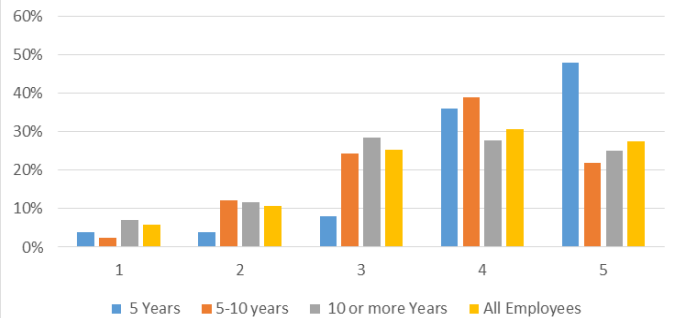
10. I am satisfied with how my work supports the goals of JCP&L and FirstEnergy.



11. Employee satisfaction is an important objective for JCP&L.



12. My work volume and expectations are reasonable.



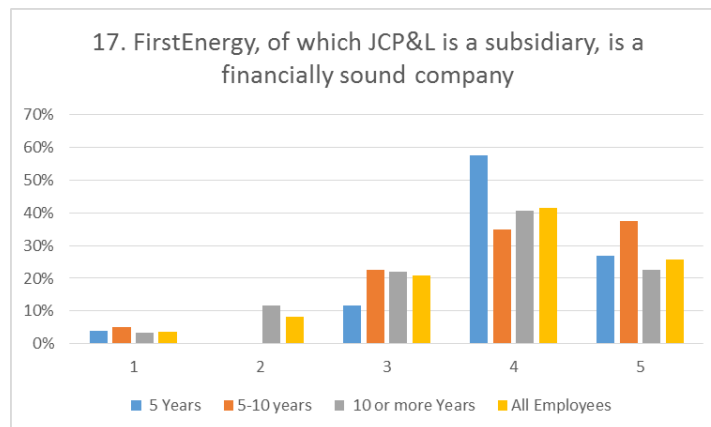
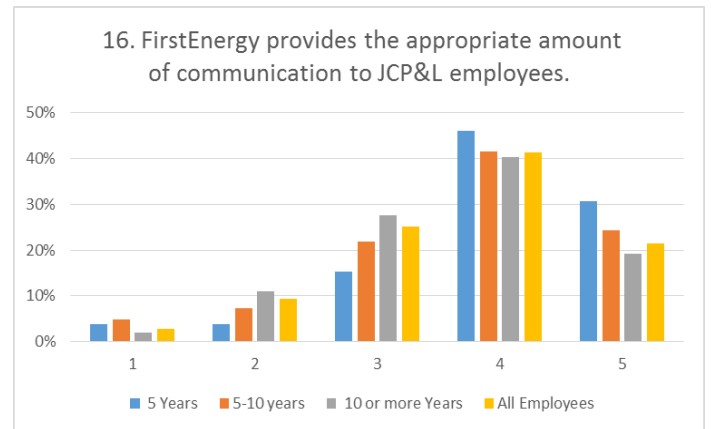
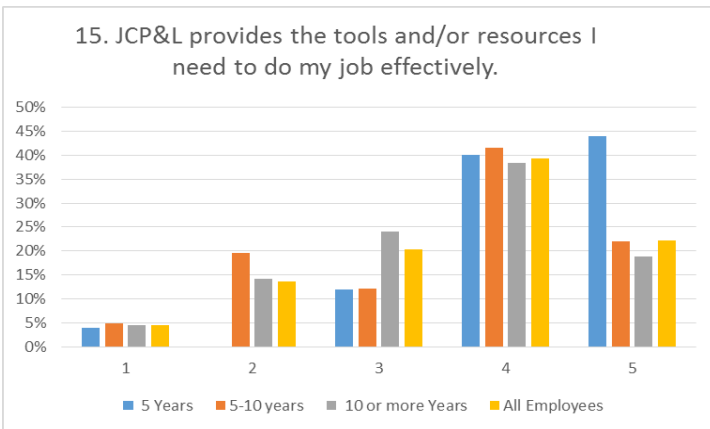
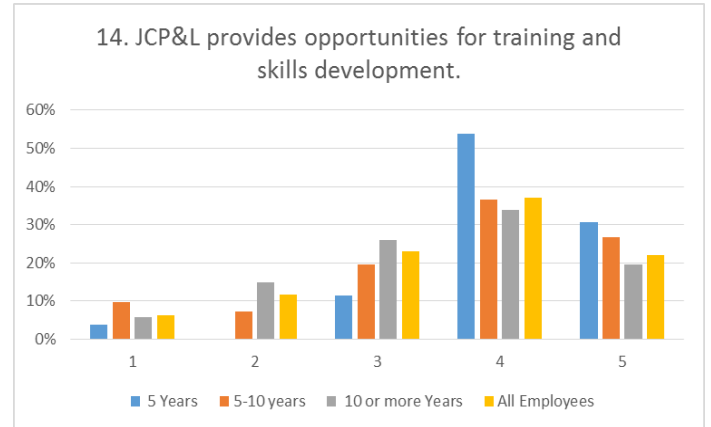
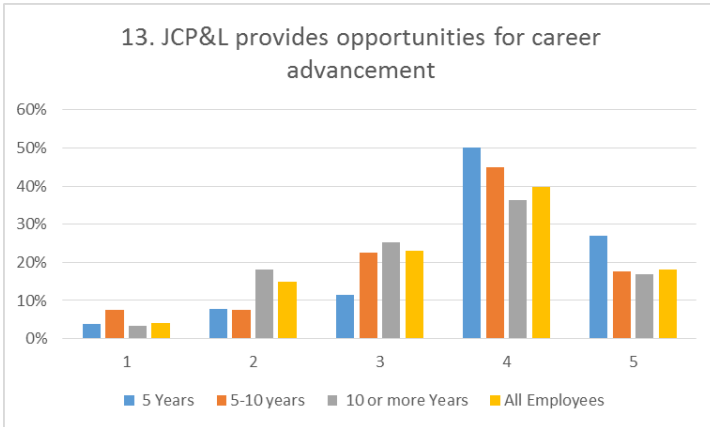
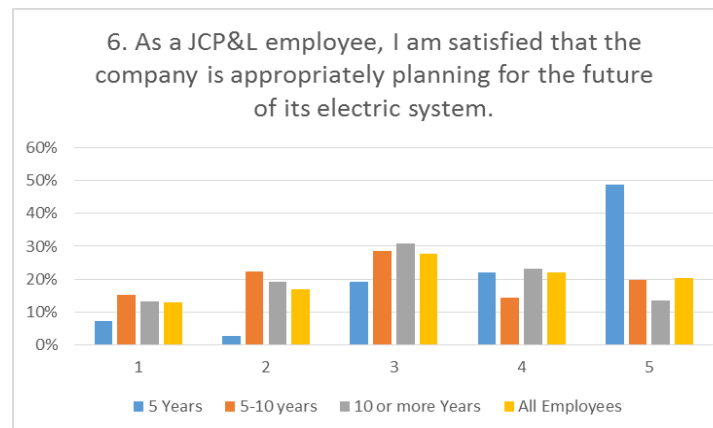
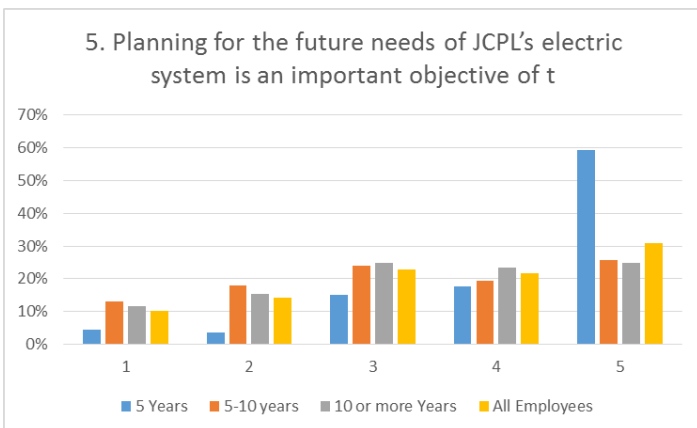
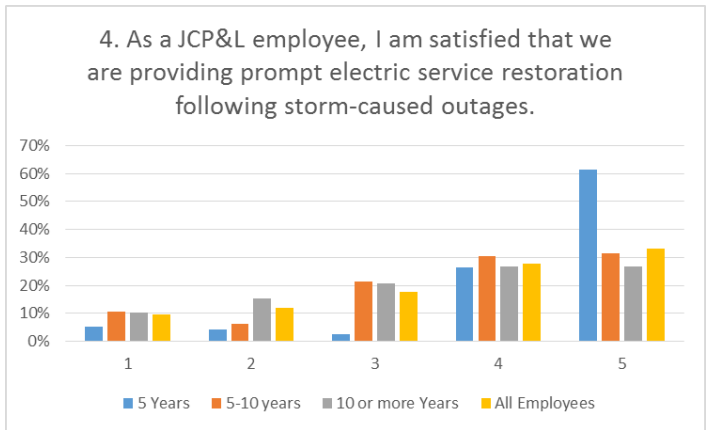
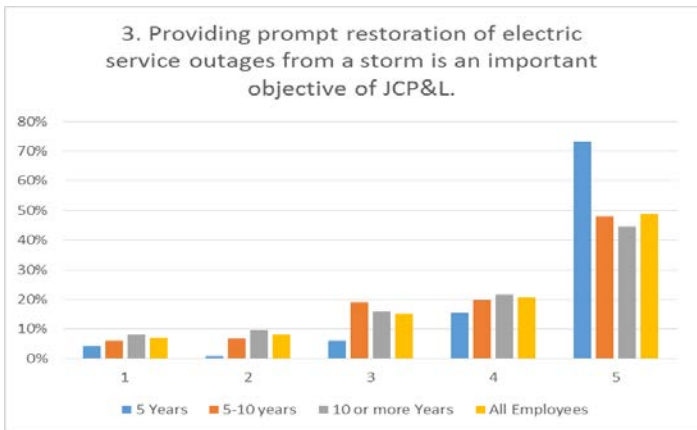
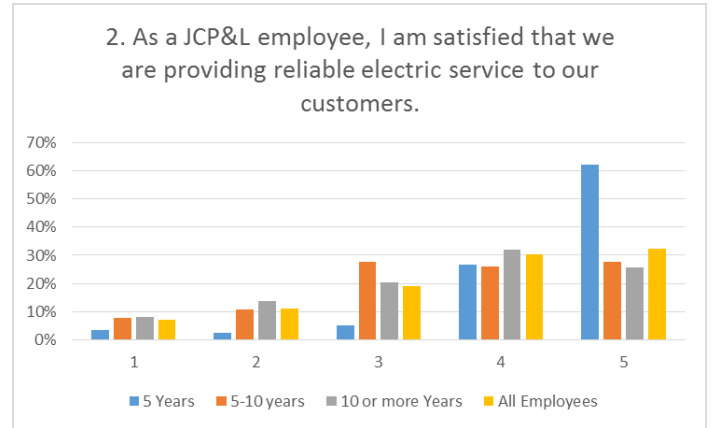
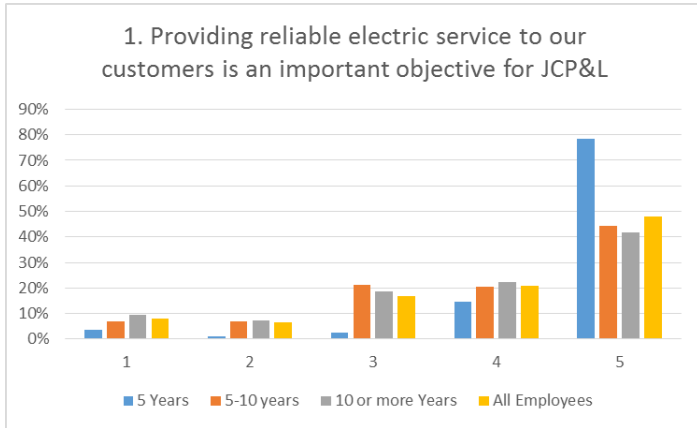
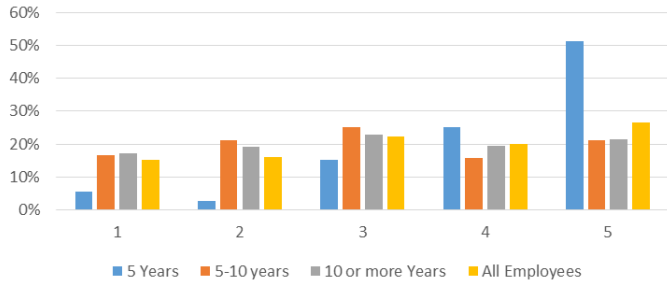


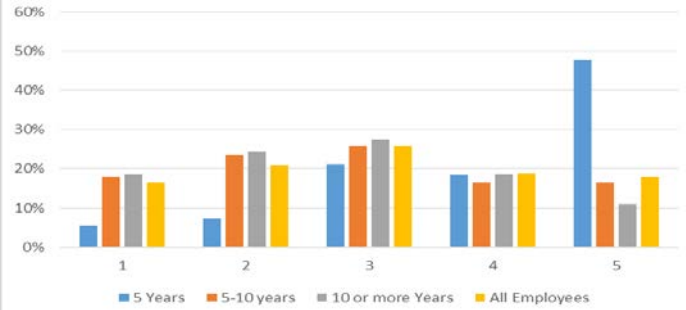
Figure 39. Graphical Distributions of Each Question for Bargaining Unit Survey Responses



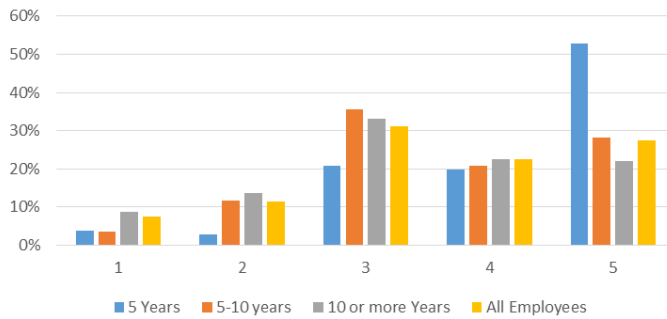
7. Spending appropriately to support and/or maintain its electric system is an important objective for JCP&L



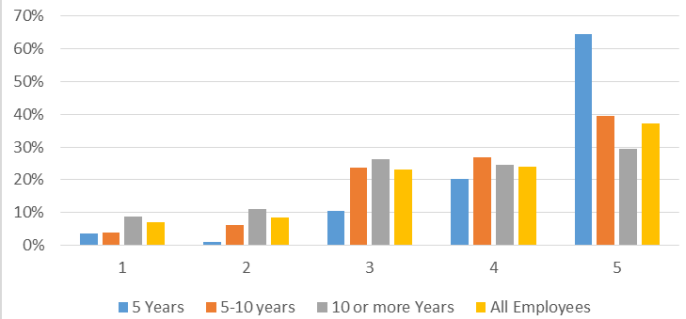
8. As a JCP&L employee, I am satisfied with how appropriately JCP&L spends to operate and maintain its electric system.



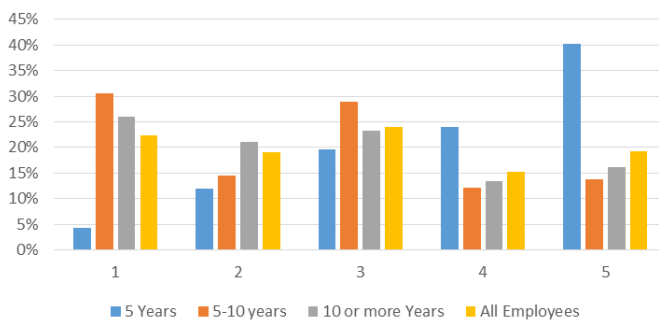
9. Alignment of JCP&L goals to FirstEnergy goals is an important objective.



10. I am satisfied with how my work supports the goals of JCP&L and FirstEnergy.



11. Employee satisfaction is an important objective for JCP&L.



12. My work volume and expectations are reasonable.

