Attachment C

Exhibit No. LSPG-NY-200

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

LS POWER GRID NEW YORK CORPORATION I	**)**	**Docket No. ER20-___-000**

DIRECT TESTIMONY AND EXHIBIT
OF
CASEY CARROLL

Exhibit No. LSPG-NY-200

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Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND EMPLOYMENT.

A. My name is Casey Carroll. My business address is 16150 Main Circle Drive, Suite 310, St. Louis, Missouri 63017. I am employed as a Director, Project Development with LS Power Development, LLC ("LSP Development"), the general partner and manager of LS Power Associates, L.P. ("LS Power"), which is an indirect owner of LS Power Grid New York Corporation I ("LSPG-NY" or "Company").

Q. PLEASE SUMMARIZE YOUR EDUCATIONAL BACKGROUND, PROFESSIONAL QUALIFICATIONS, AND BUSINESS EXPERIENCE.

A. I earned a Bachelor of Arts in Physics, *summa cum laude*, from Truman State University and a Bachelor of Science in Civil Engineering, *summa cum laude*, from Washington University/University of Missouri – St. Louis. Since 2007, I have been employed by LSP Development in various roles. Currently, I am responsible for permitting and development of transmission projects. For LSPG-NY specifically, I am responsible for overseeing the full spectrum of development/permitting activities, including siting; securing property rights; landowner and community relations; securing necessary permits; coordination with regulatory agencies and staff; engineering, design, and

selection of installation and construction techniques; arrangement of project contracts; coordination with neighboring utilities; and participation in electrical interconnection processes.

Q. HAVE YOU PREVIOUSLY FILED TESTIMONY BEFORE A REGULATORY BODY?

A: Yes. I filed prepared written testimony before the New York Public Service Commission ("NYPSC"), the Florida Public Service Commission, and FERC.

Q. ON WHOSE BEHALF ARE YOU TESTIFYING IN THIS PROCEEDING?

A. I am testifying on behalf of LSPG-NY.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to describe the Project, permitting and development risks and challenges faced by the Project, as well as advanced technology to be used in the Project.

Q. DESCRIBE THE COMPONENTS OF THE PROJECT

A. The Project, which is anticipated to be constructed predominantly within approximately 93 miles of existing utility-owned transmission line corridor, includes the following components:

- reconductoring, involving the replacement of two circuits of 230 kV transmission line with two circuits of 345 kV transmission line on existing structures, extending for approximately 13 miles from the Edic substation;
- removal of two existing single circuit 230 kV transmission lines on H-frame structures, and replacement with a new 345 kV double circuit transmission line on steel monopoles, extending for approximately 55 miles (with the exception of up to two segments where the double circuit lines may split into single circuits);

- construction of a new 345 kV substation in the Town of Princetown;
- removal of two existing single circuit 230 kV transmission lines on H-frame structures, and replacement with two new single circuit 345 kV transmission lines on steel monopoles between the new Princetown substation and Rotterdam substation, extending for approximately 5 miles, one of which will connect to the new Princetown substation and the other will loop in the Edic portion of the existing Edic to New Scotland 345 kV line;
- construction of a new 345/230/115 kV substation adjacent to the existing Rotterdam substation yard;
- construction of a new double circuit 345 kV transmission line on steel monopoles between the new Princetown substation and the New Scotland substation, extending for approximately 20 miles, rebuild of an existing single circuit 345 kV transmission line on new steel monopoles starting at the new Princetown substation and extending approximately 6 miles southward in that same corridor, and partial removal and/or removal from service of the existing Rotterdam to New Scotland 115 kV line in a portion of that same corridor; and
- upgrades by others to the Marcy, Edic, Rotterdam and New Scotland substations.

A map identifying specific elements of the Project is included in Exhibit LSPG-NY-201. Under the joint proposal with the NYPA, LSPG-NY and NYPA will each own discrete pieces of the Project facilities.

Q. WHAT IS THE EXPECTED CAPITAL COST OF THE PROJECT?

A. The Project is estimated by NYISO to have a total capital cost of $750 million, in 2018 dollars, including 30% contingency.

Q. HOW WILL THE PROJECT BE OPERATED?

A. The Project will be operated as an element of the Bulk Electric System operated by the New York Independent System Operator, Inc. ("NYISO") and NYISO will have operational control of the facilities.

Q. WHEN IS THE EXPECTED IN-SERVICE DATE OF THE PROJECT?

A. The AC Transmission Public Policy Transmission Plan identified the Project in-service date as December 2023, which is the timeframe that will be used in the Development Agreement between LSP-NY and NYISO. However to meet this in-service date for the entire Project some components of the Project will likely be placed in-service in phases ahead of this timeframe. It's expected that some components of the Project will need to be placed in-service before certain existing facilities can be removed to allow construction of the remaining elements of the Project to proceed. These early, relatively small components of the Project could begin being placed in-service as early as 2021.

Q. DESCRIBE THE REGULATORY RISKS AND CHALLENGES FACING THE PROJECT.

A. As described by Mr. Willick, the Project is part of a broad public policy agenda such that the Project has evolved over the course of several solicitation processes and has been the subject of years of regulatory proceedings at the NYPSC. This has included participation from many different state agencies and local government representatives. The Project will continue to be subject to multiple layers of regulatory review involving federal, state and local agencies. Construction of the Project requires numerous permits and approvals

at each of the federal, state, and local government levels. For example, the Project will need to obtain approval from the U.S. Army Corps of Engineers for Section 10 and Section 404 permits for water body crossings and wetland disturbances ; New York State Department of Environmental Conservation State Pollution Discharge Elimination System General Permit for Stormwater Discharge During Construction Activities; Utility Work Permit from the New York State Department of Transportation; Work Permit from the New York State Thruway Authority; Certificate of Environmental Capability and Public Need ("CECPN") under Article VII of the Public Service Law from the NYPSC; and a Certificate of Public Convenience and Necessity ("CPCN") under Section 68 of the Public Service Law from the NYPSC. The Project is expected to be located in portions of five Counties, 19 Towns, and one Village.

There has been significant public involvement throughout the NYPSC process. The process was already put on hold once to allow time to resubmit proposals to be more responsive to public comments.[1] There have been thousands of public comments in the years-long NYPSC process leading to development of the Transmission Needs Driven by Public Policy Requirements and the solicitation of AC Transmission Public Policy Needs. There has been significant public comment related to the AC Transmission Public Policy Needs, with over 3,000 public comments received to date, largely in opposition to aspects of the AC Transmission process including the need for new or upgraded transmission lines. Significant additional public participation opportunities are included in the permitting process for the Project, particularly via the CECPN and the CPCN.

[1] *See Willick Testimony, Footnote 11.*

The CECPN permitting process will provide an opportunity for many constituencies to raise issues and concerns with impacts of the transmission line construction and operation. This includes the anticipated participation from the New York Department of Agriculture and Markets ("Ag and Markets"). Ag and Markets protects the interests of agricultural resources, and may require the use of construction matting through agricultural areas. The New York Department of Environmental Conservation is also anticipated to participate, which is expected to result in certificate conditions that minimize impacts on sensitive species, potentially requiring seasonal limitations on certain construction activities. The CECPN and CPCN require a showing to be made for Project need and since the Project is driven by public policy rather than more typical reliability needs, there could be challenges to the Project. In addition, local regulations and local plans are considered in the Article VII process, which may not address major utility facilities like the Project.

Q. DESCRIBE THE CONSTRUCTION RISKS AND CHALLENGES FACING THE PROJECT.

Beyond the development risks associated with securing the required permits, regulatory authorizations and real estate rights, LSPG-NY faces significant risks and challenges to constructing the Project. Many of these risks and challenges go beyond what is typical for a high-voltage transmission project.

The Project involves demolition of existing transmission lines owned by another entity and replacement with new transmission lines with a higher voltage in the same right-of-way. Portions of the right-of-way are constrained by colocations of natural gas pipelines, buried fiber optic cables, and parallel transmission lines. These can make

construction more difficult and presents the risk of potential mitigation of impacts to these parallel facilities, which can increase the cost of the Project or result in delays.

The rights-of-way for majority of the Project are owned by an incumbent public utility. LSPG-NY will need to coordinate with the incumbent public utility to get access to the rights-of-way. While LSPG-NY anticipates that the incumbent public utility will cooperate in coordination of these important public policy projects, the added layer of bureaucracy could delay the process, result in unreasonable or burdensome access restrictions, or otherwise obstruct the construction efforts. Although the NYPSC specifically required that incumbent utilities make rights-of-way available to the selected developer, determining the compensation for, and terms governing use of, the rights-of-way could be an issue.

Beyond the fact that the rights-of-way are owned by an incumbent utility, the rights-of-way are occupied by existing facilities owned by an incumbent public utility. LSPG-NY will need to coordinate with the existing asset owner regarding the disposition of these facilities, and the compensation for, and terms governing the removal of existing facilities could be an issue. The removal of existing facilities will need to be performed in such a manner as to not interrupt the electrical service in the local area or cause transmission system issues. This will require significant coordination and planning to sequence the demolition and construction in a manner that continues to provide adequate service. Before removing certain existing facilities, LSPG-NY anticipates that some components of the Project, and other facilities that will be constructed by the interconnecting transmission owner, will need to be fully constructed and placed in-service. This complex construction sequencing will require that construction cannot

proceed in a linear fashion as with a typical greenfield transmission facility. The difficulty in sequencing the work, potential for interruptions, and the inability to obtain outages in a manner to support the required construction sequencing present heightened risk of delay for the project relative to a typical transmission facility.

The Project is also unique in how it will be integrated into the system. It is not a typical transmission line project from Point A to Point B, connecting to a transmission owner on each end, but will have multiple interconnections. The Project will interconnect with National Grid as follows: two connections at Edic; two connections in the Princetown area (one tapping the existing Edic to New Scotland line for the segment to Rotterdam and one for the existing line south to New Scotland); three connections at Rotterdam (two at 115 kV and one at 230 kV); and two connections at New Scotland. Additional complexities include: one of the Princetown area connections involves rebuilding a six mile segment of National Grid's Edic to New Scotland line; the removal of portions of National Grid's existing Rotterdam to New Scotland 115 kV line; and other changes to existing facilities.

The specific construction risks and challenges facing the Project are in addition to the many risks and challenges that any construction project faces, including: the cost and availability of materials, specialized skilled labor, and specialized equipment; adverse weather; and vandalism and theft. In addition, there are several recent industry developments for transmission projects in New York and the United States that highlight these risks. The Project is the largest transmission project in New York State since at

least the advent of competitive markets in 2000,[2] and the magnitude of the project alone could stress the availability of skilled labor and necessary equipment in the area. Further exacerbating the issue, the Project is scheduled to be under construction at the same time as several other large transmission construction projects including NextEra's Empire State Line, NYPA's Smart Path, and New York Transco's New York Energy Solution. In addition, it is common for transmission facility equipment and materials to be sourced from suppliers outside of the United States. U.S. import tariffs on steel and aluminum have impacted some supplies of raw materials, and the prospect of additional tariffs on other materials could impact cost and the ability to find willing suppliers of material and equipment.

LSPG-NY and NYPA will enter into a Development Agreement with NYISO, which allows NYISO to terminate the Development Agreement if there are significant Project delays and requires that NYISO approve any material modifications. Further, the Project will need to complete interconnection studies and subsequent agreements with incumbent transmission owners which could also delay the Project.

Q. WILL THE PROJECT BE EMPLOYING ANY ADVANCED TECHNOLOGY?

A. LSPG-NY anticipates employing several elements considered to be advanced technology under Section 1223 (a). In addition, LSPG-NY will be required to use advanced engineering approaches and construction techniques to facilitate addressing a number of

[2] 2018 Power Trends, Figure 10, p. 18 "New Transmission in New York State: 2000-2018" identifies new transmission projects to consist of two in-state projects, Transmission Owner Transmission Solutions ($241 million) and ConEd M29 ($468 million), along with four inter-regional merchant projects (Hudson Transmission Project, Linden VFT, Cross Sound Cable and Neptune DC Cable. This report did not include the Western New York Project (estimated to cost $181 million). https://home.nyiso.com/wp-content/uploads/2018/05/2018-Power-Trends_050318.pdf?utm_source=Press&utm_medium=Website&utm_campaign=PT18_Report&utm_term=2018-Power-Trends

Project challenges and public policy goals. The implementation of advanced technology, engineering approaches, and construction techniques increases the overall risk associated with the Project. Each of the technologies and techniques described below "increase the capacity, efficiency, or reliability" of the Project and overall transmission system.

Specific advanced technologies which will be applied in the development, construction, and operation of the Project include using existing rights-of-way, advanced substation technology, and other advanced technology.

Q. DESCRIBE THE USE OF EXISTING RIGHTS-OF-WAY AS ADVANCED TECHNOLOGY.

A. To address a public policy goal of limiting the acquisition of new rights-of-way as much as possible, the Projects will use existing, occupied rights-of-way. LSPG-NY will need to use innovative demolition and construction techniques to provide uninterrupted service in the local area without negative system impacts. While such techniques are sometimes employed on smaller scale projects, the Project includes a significant amount of conversion of existing lines to new lines of a higher voltage. Between Edic and the Princetown area, approximately 122 miles of existing 230 kV transmission facilities (2 single circuit lines for 61 miles each) will be replaced with 345 kV transmission facilities; between the Princetown area and Rotterdam, approximately 10 miles of existing 230 kV transmission facilities (2 single circuit lines for 5 miles each) will be replaced with 345 kV facilities. From an engineering perspective, facilities cannot simply be replaced with facilities of a higher voltage - either higher voltage termination facilities in the area need to be identified, or transformation equipment needs to be added to the system.

Q. DESCRIBE THE USE OF ADVANCED SUBSTATION EQUIPMENT IN THE PROJECT.

A. LSPG-NY and NYPA have incorporated several elements in the Project intended to improve the performance or minimize the impact of substation equipment. The Project's two new substations are proposed to utilize Gas-Insulated-Switchgear (GIS) in order to minimize the substation footprint. GIS equipment is proposed to minimize the footprint of the proposed Princetown station, to allow it to be sited on a small parcel directly adjacent to the right-of-way. GIS equipment is proposed for the Rotterdam Substation to address several siting constraints on the existing property. The use of advanced GIS equipment increases the project risk since GIS equipment has a longer lead-time than traditional equipment and will require financial commitments to equipment suppliers before all permits and approvals are received in order to meet the Project schedule, placing additional financial risk on LSPG-NY in Project implementation.

Q. DESCRIBE OTHER ADVANCED TECHNOLOGY THAT WILL BE USED IN THE PROJECT.

A. LSPG-NY and NYPA included several other advanced technology features, some of which are becoming commonly deployed in the construction of new transmission facilities but which continue to be recognized as state-of-the-art technology.

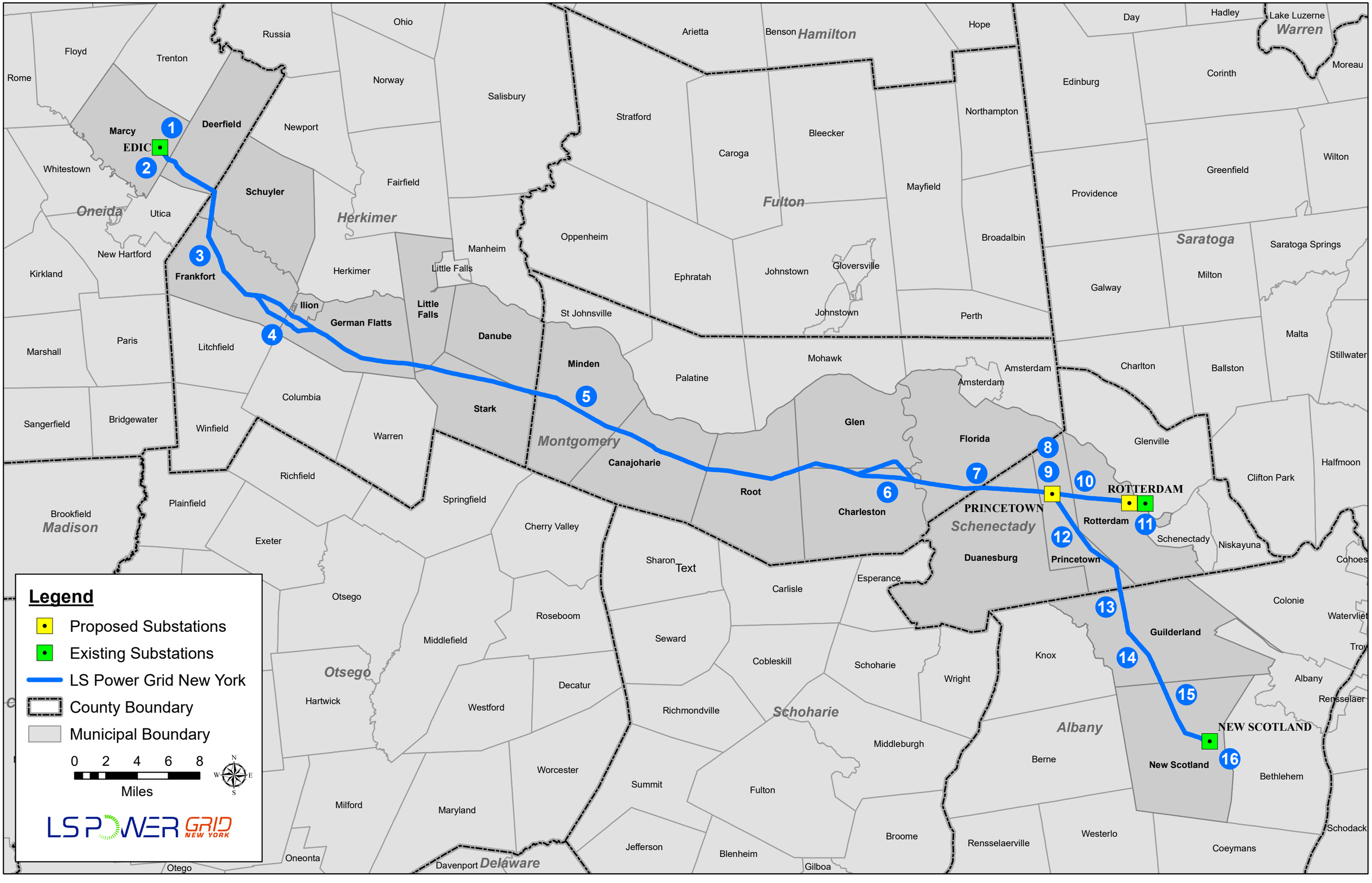
Optical Ground Wires (OPGW) are proposed to be installed, and are not in widespread use in the Project area. Optical fibers in the shield wire provide the traditional function of a shield wire to protect the phase conductors in the event of a direct lightning strike, while also allowing a communications link that can enable the use of differential line protection to reliably detect short circuits. Optical fibers also provide a high-capacity, high-speed communication channel to ensure: reliable monitoring and

operation of the line within the transmission system; fast, secure, and highly reliable transmission system relay protection and control; necessary support of control centers; and the potential for excess capacity that may be used outside of the transmission system operation for national security or other public use. The optical fibers will be in full compliance with NERC Critical Infrastructure Protection regulations.

Digital Fault Recorders will be incorporated into the Project. Modern digital fault recorders simultaneously detect and record transient faults, transmission system disturbances, specific operational data (often referred to as sequence of events data), and in general provide information necessary to efficiently analyze electric system performance. The present generation of digital fault recorders provides many new features, including a combination of traditional fault recording with disturbance recording, sequence of event recording, and power quality analysis. Together, microprocessor-based relays and digital fault recorders help maintain the reliability of the grid and the quality of power delivery with a minimum intervention by the transmission operator. These are "smart grid advancements" because they perform tasks quickly and largely on their own, perform self-diagnostic activities, report when corrective actions are necessary, and can automatically change the operating settings of the protection system based on the actual fault and its magnitude within the system (reducing the risk of the fault damaging other devices or equipment).

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes.



1. Marcy substation upgrades (by NYPA)
2. Edic substation upgrades (by others)
3. 345kV reconductoring on existing structures (12 miles)
4. Two new single circuit 345kV monopoles. Remove two 230kV H-frames (5 miles)
5. New double circuit 345kV monopoles. Remove two 230kV H-frames (37 miles)
6. Two new single circuit 345kV monopoles. Remove two 230kV H-frames (4 miles)
7. New double circuit 345kV monopoles. Remove two 230kV H-frames (9 miles)
8. Existing 345kV Edic-New Scotland line to connect outside Princetown to one of the new 345kV lines from Rotterdam
9. New Princetown 345kV switchyard 6 position breaker and a half GIS
10. Two new single circuit 345kV monopoles. Remove two 230kV H-frames (5 miles)
11. New Rotterdam 345kV GIS 5 position breaker and a half, 345/230kV transformer, and two 345/115kV transformers. Retire existing Rotterdam 230kV substation
12. New double circuit 345kV monopoles. Rebuild existing 345kV circuit on monopoles (6 miles)
13. New double circuit 345kV monopoles (4 miles)
14. New double circuit 345kV monopoles. Remove single circuit 115kV (2 miles)
15. New double circuit 345kV monopoles (6 miles)
16. New Scotland substation upgrades (by others)

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AFFIDAVIT

CASEY CARROLL, being duly sworn, deposes and states: that the foregoing Direct Testimony and Exhibits of CASEY CARROLL was prepared by me or under my direct supervision, and that the statements contained therein and the Exhibits attached thereto are true and correct to the best of my knowledge and belief.

Casey Carroll

Subscribed and sworn before me this 18th day of December, 2019.

Mary Acker
Notary Public
My commission expires: 6/20/2020

MARY K. ACKER
Notary Public, Notary Seal
State of Missouri
St. Louis County
Commission # 12358063
My Commission Expires June 20, 2020