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PJM RTEP - 2014 Project Proposal Window 2:

Pratts Area Option 3

Redacted Version

Submitted by:

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A. Executive Summary

A.1 Name and address of the proposing entity

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Ameren Transmission Company of Illinois, Inc. ("ATXI") is pleased to provide this proposal to PJM in response to the PJM RETP - 2014 Project Proposal Window 2 to address 2019 Baseline N-1 Voltage, 2019 N-1-1 Voltage and 2018 Light Load Reliability Criteria. This proposal details ATXI's solution to address one or more of the violations identified in PJM's Problem Statement and Requirements Document, dated October 19, 2014.

A.2 A general description of the proposed project

ATXI proposes a Greenfield project to resolve the thermal and voltage issues identified for the Pratts area in the problem statement of PJM RTEP Proposal Window 2. The proposed project involves building approximately 72 miles of 230 kV line between Crozet and Remington CT substations with two new 230/115 kV transformers at Sub B near Pratts and Sub C near Mountain Run. A 230 kV source placed directly at Pratts addresses the voltage collapse issue in the Pratts area. The two additional 230/115 kV transformers will provide counter flow on the thermally constrained elements, as identified by PJM.

ATXI proposes to construct and commission the project in two phases. During the first phase of the project, ATXI will construct a seven position breaker and a half (BAH) substation in the immediate area of the Crozet substation (Sub A). ATXI considers the BAH arrangement for this substation to be the best option given the high number of connections and the improved operational and maintenance flexibility that a BAH arrangement will provide.[1] The seven positions would consist of splitting the 230 kV lines from Dooms to Charlottesville (lines 291 and 233) into and out of Sub A, which would occupy four positions there. ATXI would run two 230 kV supplies to the Crozet sub from Sub A and remove the taps to line 291 and 233 that currently supply the Crozet sub. Supplying Crozet directly from Sub A will increase the reliability to the Crozet Substation by keeping it supplied during common tower outages and single line faults. The remaining position would consist of a new 230 kV line heading to Sub B. Sub A would have a future position available for expansion. Sub B would consist of a three position ring bus that would be expandable to a four position ring bus. The three positions would consist of a new

[1] In lieu of this design, ATXI can design and construct a straight bus or ring bus, if PJM considers them as better options.

230/115 kV substation that would tie into the existing Pratts substation and a terminal for a new 230 kV line to continue onto Sub C. Sub C would also be a three position ring bus that would be expandable into a four position ring bus. A 230/115 kV transformer would be located at Sub C and would supply the Mountain Run Substation.

During Phase 2 of the project, ATXI would construct a 230 kV transmission line that would terminate at Sub C and the unused breaker and a half position at Remington CT. When Phase 2 is placed into service in early 2020, this additional transmission asset will reduce loadings on nearby 115kV transmission lines, eliminate some market congestion, provide additional reliability and thus creates a more optimal solution. For a one line diagram of the proposed project, refer to Appendix A.

A.3 The reliability problem(s) that the project is proposed to resolve

When developing solution ideas to resolve the Pratts area issues, ATXI investigated solutions that provided the needed reliability benefits, are cost-effective and could be constructed within the specified schedule. Based on this criterion, ATXI developed multiple project solutions. Five solutions were thoroughly investigated. Two solutions were dismissed after further analysis because they did not meet all of the constraints identified by PJM. Three solutions were found to meet all of these requirements. One solution is presented in this proposal.

The results presented in Table 1 and Table 2 demonstrate that the proposed project successfully mitigates all constraints that have been identified by PJM. By providing the 230 kV path from Crozet to Remington, the 115 kV path from Gordonsville to Remington and the Charlottesville-Holleymead-Gordonsville 230 kV line will see reduced flow. These lines presently see high loading during different system conditions.

ATXI performed Thermal and Voltage Analysis to test the performance of the proposed project. The following table provides the results of this analysis. The proposed project will resolve all the thermal constraints identified in the PJM problem statement for RTEP Proposal Window 2.

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Table 1. Thermal loading on the transmission elements with and without the proposed project

FG #	Fr Bus	Fr Name	To Bus	To Name	CKT	KVs	Areas	Rating	DC Ld(%)	AC Ld(%)	Contingency 1	Contingency 2	[redacted]
1.1	314755	3GOLDALE	314778	3PAY TAP	1	115/115	345/345	226	107.26	110.4	'LN 2088'	'LN 2054'	
2.1	314815	3OAK GRE	314769	3ORANGE	1	115/115	345/345	231	100.78	105.11	'LN 2088'	'LN 2054'	
1.2	314755	3GOLDALE	314778	3PAY TAP	1	115/115	345/345	226	109.16	111.88	'LN 2054'	'LN 2088'	
2.2	314815	3OAK GRE	314769	3ORANGE	1	115/115	345/345	231	100.69	104.97	'LN 2054'	'LN 2088'	
1.5	314768	3MITCHEL	314345	3MT RUN	1	115/115	345/345	176	101.02	111.18	'LN 6'	'LN 2077'	
1.6	314768	3MITCHEL	314345	3MT RUN	1	115/115	345/345	176	101.02	111.13	'LN 2077'	'LN 6'	
2.6	314768	3MITCHEL	314345	3MT RUN	1	115/115	345/345	176	101.02	111.1	'LN 2077'	'3REMNGCT-6REMNGCT'	
1.7	314768	3MITCHEL	314345	3MT RUN	1	115/115	345/345	176	101.02	111.15	'3REMNGCT - 6REMNGCT'	'LN 2077'	

As shown in the above table the proposed project significantly decreases the flows on the overloaded lines identified by PJM. It should be noted that no generation re-dispatch was needed in between the first and second contingencies to reduce loading on the lines.

The following table shows the performance of the proposed project with regard to voltages for various N-1-1 outages.

Table 2. Voltage level at the transmission buses with and without the proposed project

FG #	Bus #	Name	KV	Area	Cont Volt	Base Volt	Low Limit	Contingency 1	Contingency 2	[redacted]
N2-VM3	314756	3DOUBLDY	115	345	0.7852	1.0037	0.913	LN 2088	LN 2054	
N2-VM4	314757	3GORDNVL	115	345	0.7574	1.0009	0.913	LN 2088	LN 2054	
N2-VM5	314758	6GORDNVL	230	345	0.675	0.9636	0.9217	LN 2088	LN 2054	
N2-VM6	314759	6HOLLYMD	230	345	0.6698	0.9735	0.9217	LN 2088	LN 2054	
N2-VM7	314769	3ORANGE	115	345	0.8093	1.0039	0.913	LN 2088	LN 2054	
N2-VM8	314776	3SOMRSET	115	345	0.769	1.0043	0.913	LN 2088	LN 2054	
N2-VM9	314815	3OAK GRE	115	345	0.9119	1.0157	0.913	LN 2088	LN 2054	
N2-VM10	235533	01PRATTS	115	201	0.6895	0.9368	0.9217	LN 2088	LN 2054	
N2-VM11	314875	3GORDN_1	115	345	0.7577	1.0014	0.913	LN 2088	LN 2054	

FG #	Bus #	Name	KV	Area	Cont Volt	Base Volt	Low Limit	Contingency 1	Contingency 2	[redacted]
N2-VM12	314877	3OAK G_1	115	345	0.9125	1.0164	0.913	LN 2088	LN 2054	[redacted]
N2-VM13	314884	3SOMRS_1	115	345	0.7695	1.005	0.913	LN 2088	LN 2054	[redacted]
N2-VM14	235533	01PRATTS	115	201	0.7541	0.9368	0.9217	LN 2088	LN 2135	[redacted]
N2-VM15	314756	3DOUBLDY	115	345	0.8487	1.0037	0.913	LN 2088	LN 2135	[redacted]
N2-VM16	314757	3GORDNVL	115	345	0.8281	1.0009	0.913	LN 2088	LN 2135	[redacted]
N2-VM17	314769	3ORANGE	115	345	0.8656	1.0039	0.913	LN 2088	LN 2135	[redacted]
N2-VM18	314776	3SOMRSET	115	345	0.8374	1.0043	0.913	LN 2088	LN 2135	[redacted]
N2-VM19	314875	3GORDN_1	115	345	0.8286	1.0014	0.913	LN 2088	LN 2135	[redacted]
N2-VM20	314884	3SOMRS_1	115	345	0.838	1.005	0.913	LN 2088	LN 2135	[redacted]
N2-VM21	235533	01PRATTS	115	201	0.6891	0.9378	0.9217	LN 2054	LN 2088	[redacted]
N2-VM22	314756	3DOUBLDY	115	345	0.785	1.0016	0.913	LN 2054	LN 2088	[redacted]
N2-VM23	314757	3GORDNVL	115	345	0.7571	1.0018	0.913	LN 2054	LN 2088	[redacted]
N2-VM24	314758	6GORDNVL	230	345	0.675	1.0081	0.9217	LN 2054	LN 2088	[redacted]
N2-VM25	314759	6HOLLYMD	230	345	0.6699	1.0033	0.9217	LN 2054	LN 2088	[redacted]
N2-VM26	314769	3ORANGE	115	345	0.8091	1.0003	0.913	LN 2054	LN 2088	[redacted]
N2-VM27	314776	3SOMRSET	115	345	0.7688	1.004	0.913	LN 2054	LN 2088	[redacted]
N2-VM28	314815	3OAK GRE	115	345	0.9117	1.0114	0.913	LN 2054	LN 2088	[redacted]
N2-VM29	314875	3GORDN_1	115	345	0.7575	1.0023	0.913	LN 2054	LN 2088	[redacted]
N2-VM30	314877	3OAK G_1	115	345	0.9124	1.0121	0.913	LN 2054	LN 2088	[redacted]
N2-VM31	314884	3SOMRS_1	115	345	0.7693	1.0046	0.913	LN 2054	LN 2088	[redacted]
N2-VM32	235533	01PRATTS	115	201	0.7547	0.9414	0.9217	LN 2135	LN 2088	[redacted]
N2-VM33	314756	3DOUBLDY	115	345	0.8491	1.0052	0.913	LN 2135	LN 2088	[redacted]
N2-VM34	314757	3GORDNVL	115	345	0.8286	1.0051	0.913	LN 2135	LN 2088	[redacted]
N2-VM35	314769	3ORANGE	115	345	0.866	1.004	0.913	LN 2135	LN 2088	[redacted]

FG #	Bus #	Name	KV	Area	Cont Volt	Base Volt	Low Limit	Contingency 1	Contingency 2	[redacted]
N2-VM36	314776	3SOMRSET	115	345	0.8379	1.0074	0.913	LN 2135	LN 2088	
N2-VM37	314875	3GORDN_1	115	345	0.829	1.0056	0.913	LN 2135	LN 2088	
N2-VM38	314884	3SOMRS_1	115	345	0.8385	1.0081	0.913	LN 2135	LN 2088	

As shown in the above Table 2, the proposed project significantly improves the voltages identified by PJM for N-1-1 outages.

ATXI performed N-1-1 no-harm analysis and determined that the proposed project does not cause any additional thermal or voltage reliability issues on the system. For some N-1-1 contingencies, generation re-dispatch would still be required after the first contingency.

PROMOD analysis was performed on version 2 of the PJM Market Efficiency model that was provided for the Long Term Reliability and Market Efficiency Window that is currently open. The analysis indicated that the project decreased Net Load payments to PJM customers, not accounting for any impact from ARRs. Thus ATXI's project not only does not cause any additional harm to the transmission system but provides benefits.

The b2464 projects that were presented in the March TEAC for this area do not address all of PJM's constraints. It does not address the overload on the Mitchell Tap – Mountain Run 115 kV line. Also, the b2464 projects cause some voltage violations around Sperryville and Pratts. The table below shows the voltage violations caused by the b2464 projects and compares them to the voltage levels without b2464 but with ATXI's proposed project.

Table 3. Voltage level comparison between b2464 and ATXI proposed project

Bus #	Name	KV	Area	Cont Volt	Base Volt	Vdrop%	Low Limit	Contingency	[redacted]
235500	01PAGE	138	201	0.891	0.995	10.45%	0.920	Pratts 230/115 XFMR	
237035	01PAGE CAP	138	201	0.891	0.996	10.54%	0.920	Pratts 230/115 XFMR	
233510	01SPERYV	138	201	0.826	0.987	16.31%	0.920	Pratts 230/115 XFMR	

Bus #	Name	KV	Area	Cont Volt	Base Volt	Vdrop%	Low Limit	Contingency	
235536	01SPRYVIL115	115	201	0.828	1.005	17.61%	0.9217	Pratts 230/115 XFMR	
235533	01PRATTS	115	201	0.696	0.989	29.63%	0.9217	Pratts 230/115 XFMR	

The b2464 projects only supply the Pratts substation with one strong source; a 230/115 kV transformer. If that transformer trips, the remaining 138 or 115 kV line from Sperryville cannot support the load at Pratts during peak load conditions and drags down the voltages at Sperryville and Page. ATXI's proposed project leaves the 115 kV line from Gordonsville. The 115 kV line from Gordonsville to Pratts allows Pratts to be supplied for the loss of the 230/115 kV transformer. ATXI's solution provides extra positions at Sub B and Sub C. These could be extended to Sperryville in the future if voltage issues occur. ATXI investigated the option to construct a 230 kV line extension to Sperryville from Sub B or Sub C and this caused no new problems. ATXI did not submit this option because PJM did not identify any constraints at Sperryville.

ATXI also looked at various options of connecting the proposed project to different substations; especially whether to connect to the Remington substation or the Remington CT substation. After further analysis, ATXI determined that connecting to the Remington CT substation would be preferable from a constructability stand point. The Remington CT has an unused position in its substation. ATXI was initially concerned about getting an outage from a generator to make the connection. However, since Remington CT is a combustion turbine plant, they typically do not operate during the spring and fall seasons. Thus, ATXI does not consider this a major issue. Similarly, ATXI evaluated connecting to the Mountain Run substation or the Culpeper D.P. substation and determined that the Mountain Run substation would be preferable from an ease of construction standpoint. ATXI also considered connecting to the Charlottesville substation but determined it could not be expanded and getting a new line into Charlottesville would prove extremely difficult. Based on this information, ATXI determined that it was preferable to build a new substation next to Crozet, rather than to expand the Charlottesville substation.

During analysis performed by ATXI, a solution that involved building a 230 kV line from Crozet to Pratt's substation was considered. However, when N-1-1 no-harm analysis was performed on this option, it was discovered that the Mitchell to Mountain Run 115 kV line would load above

its thermal rating. So, this particular solution was not considered. ATXI communicated this new constraint to PJM and this was subsequently identified in the most recent version of the problem statement.

For this project proposal, ATXI has proposed to construct three new substations. ATXI's rationale behind this approach is that the construction of these three new substations could be completed, without a need for any extended outages to the existing substations. For example, Sub A could be constructed and the only outage to Crozet Sub would occur, when ATXI removes the taps to the line and provides the supply directly from Sub A. The same also holds true for Sub B and C. These substations could be constructed and the only outage to Pratts and Mountain Run substations would occur when the respective connections are made to Sub B and C. There would be no need for extended outages while the existing substation work is being performed. ATXI recognizes that, if connecting to an existing substation, the incumbent TO may want to include additional breakers or locate the breakers in a different manner. ATXI is willing to work with the incumbent TO to connect to their substation in whatever manner best suits their system.[2]

Line design benefits

ATXI believes that the proposed project will significantly improve the reliability in the Pratts area and resolves all the thermal and voltage issues identified by PJM in the RTEP Project Proposal Window 2 problem statement. ATXI's proposed solution also provides the ability for future expansion to provide support to the Sperryville and Page substations, if required.

A.4 Total proposed project cost

ATXI has endeavored to develop a cost-effective solution that addresses all the identified constraints identified by PJM, while provides additional value to the ultimate customers in the transmission system in the Pratts area. ATXI has estimated the cost to design, construct and commission the proposed transmission project at $198.6 million, escalated in 2019 dollars.

Further details around the development of this estimate are provided under Section C.2.

A.5 Overall schedule duration

ATXI has carefully considered the process for developing, permitting and constructing a project in the proposed region. In the development of our project schedule, we considered the necessary in service dates, versus the need to maintain reasonable and achievable durations

[2] If PJM ultimately decides that expanding the existing substations is the preferred approach, ATXI is amenable to revising our proposed scope of work to connect the proposed greenfield transmission lines directly to existing substations that are upgraded by the incumbent transmission operators.

needed for project development and optimize cost. Our schedule assumes execution of a Designated Entity Agreement with PJM on June 1, 2015. The proposed schedule (through commissioning/energization of all new transmission assets) is estimated at 56 months. However, the schedule has been developed to ensure that all transmission assets necessary to address all the violations identified by PJM are placed into service within 48 months.

A project schedule with key milestones is provided in Section C.3 of this proposal.

A.6 ATXI Eligibility for Designated Entity Status

ATXI has been pre-qualified as a Designated Entity for transmission projects in PJM under section 1.5.8 (a) of the PJM Amended and Restated Operating Agreement. The pre-qualification information is contained in the document originally submitted to PJM dated March 5, 2014, entitled "Designated Entity Pre-Qualification Filing by Ameren". This document is on record with PJM and is posted on PJM's website, with a PJM pre-qualification ID of 14-01. An updated version of this document was submitted to PJM in September 2014. PJM confirmed the pre-qualified status for ATXI in a letter dated April 11, 2014 ("Confirmation Letter").

A.7 Statement of intent to be considered the Designated Entity for the proposed project

ATXI intends to construct, own, operate, maintain and finance the project. ATXI intends to be considered the Designated Entity for the proposed project.

The following provides additional information to details the strength of the financial ties between the Designated Entity and Ameren Corporation

ATXI is a transmission development subsidiary of Ameren Corporation that was formed in March of 2006 to develop, own, construct, acquire, operate, lease and otherwise deal with electric transmission infrastructure and investment. ATXI intends to construct, own, operate, maintain and finance the project with support from Ameren Services Company ("AMS"), a subsidiary of Ameren Corporation pursuant to a General Services Agreement ("GSA"). AMS provides Business and Corporate Services and Transmission Services to ATXI and other operating subsidiaries of Ameren Corporation. Upon request, an executed copy of this agreement can be made available for PJM's review.

The AMS Business and Corporate Services function provides support in the areas of accounting and finance, legal, information systems, environmental, real estate, governmental affairs, communications, strategic sourcing, human resources, and talent acquisition.

The AMS Transmission function provides transmission related support services such as planning, development, engineering, construction, operations and maintenance, and regulatory and policy.

B. Company Evaluation Information

St. Louis-based Ameren Corporation (NYSE: AEE) is among the nation's largest investor-owned electric and gas utilities with more than $20 billion in assets.

Ameren Corporation serves 2.4 million electric customers and more than 900,000 natural gas customers across 64,000 square miles in Illinois and Missouri. Ameren prides itself on a long, successful tradition of financial strength, cost containment and low rates, as well as more than 100 years of uninterrupted cash dividend payments to shareholders. Ameren has three subsidiaries which are transmission-owning members of the MISO.

- Ameren Missouri is a vertically integrated utility providing electric and gas service in central and eastern Missouri.
- Ameren Illinois delivers electric and gas service to its customers throughout southern and central Illinois.
- Ameren Transmission Company of Illinois (ATXI) is a transmission development subsidiary of Ameren Corporation. ATXI was formed in March of 2006 to develop, own, construct, acquire, operate, lease and otherwise deal with electric transmission infrastructure and investment.

[redacted] Ameren also operates two balancing authority areas, AMMO (which includes Ameren Missouri's customers), and AMIL (which includes Ameren Illinois' customers). During 2013, the peak demand was 8,146 megawatts in AMMO and 8,899 megawatts in AMIL. Ameren's current transmission system assets directly interconnect with 15 other balancing authority areas.

B.1 Description of proposing entity's (or its affiliate, partner or parent company) technical and engineering qualifications relevant to construction, operation and maintenance of the proposed project

Ameren, through its transmission owning subsidiaries and services company, is qualified in all facets of planning, routing and environmental, design, construction, operations, and maintenance of electric transmission facilities. Ameren's experience in operating electric transmission facilities dates back to the early 1900s and includes expertise in the areas of: planning, design, line routing and siting, rights-of-way acquisition, safety, construction, project management, operations and maintenance of transmission, substation, and distribution

facilities, vegetation management, system protection, relay and control, and NERC compliance. Ameren's team of engineers, project managers, skilled craftsmen, and business professionals have a long history of designing, financing, constructing, operating, and maintaining large-scale transmission facilities. Ameren's engineering and technical teams have developed the electric transmission system supporting Central and Eastern Missouri as well as Central and Southern Illinois. Ameren's operations and maintenance teams have extensive experience coordinating operations with numerous other transmission entities located in MISO as well as PJM, including AEP, Commonwealth Edison and Duke. [redacted]

The following list highlights Ameren's technical and engineering qualifications:

- Transmission planning
- Transmission operations
- 24x7 control center
- NERC certified operators
- Transmission, Line and Substation Design
- Construction and maintenance
- Emergency response and restoration
- Project management
- Project risk assessment and controls
- Real estate acquisition
- Spare equipment

B.2 Detailed description of proposing entity's (or its affiliate, partner or parent company) experience

Developing, constructing, operating and maintaining transmission facilities included in the proposal

Ameren, through its transmission owning subsidiaries and services company, has over 100 years of experience in siting, designing, constructing, operating, and maintaining approximately 7,500 miles of high voltage transmission lines and substations rated at 138kV and above, with voltages ranging from 138kV to 345kV. Over this period, Ameren has promptly responded to all kinds of weather emergencies that affected our transmission assets, including ice storms, tornadoes, derechos, floods, etc., and supported other utilities during emergency situations

affecting their service territories. In addition, Ameren has developed and maintained numerous transmission interconnections with 15 separate transmission operators, which include other investor owned utilities (e.g., ComEd, AEP, Duke Energy, First Energy), TVA, municipal utilities (e.g., City of Columbia, MO and Springfield, IL) and cooperatives, with the largest being AECI. We have experience coordinating with utilities located in MISO, SPP, PJM regions. And we have had specific experience coordinating operations with both of the existing incumbent utilities, which includes Dominion, primarily through SERC studies and coordination and ATSI/First Energy, through our Joint Venture GridAmerica.

Ameren has experience developing, constructing, maintaining, and operating transmission lines of all common types including wood pole, lattice steel tower, steel pole, and concrete pole construction. In addition, Ameren operates and maintains 28 extra-long span, river transmission line crossings. Ameren's internal resources are supplemented by a large array of experienced contractors and consultants that regularly perform transmission-related activities for Ameren under contractual agreements. At any time, multiple suppliers in each technical area are maintained under contract.

Multi-Value Projects

ATXI is currently developing three MISO-approved Multi-Value Projects (MVPs) in Illinois and Missouri, consisting of over 500 miles of 345kV transmission lines. These MVPs, named Illinois Rivers, Mark Twain, and Spoon River, will facilitate the delivery of renewable energy, improve reliability and provide economic and efficiency benefits. These projects are directly aligned with Ameren's strategic goals of providing customers with reliable, efficient and environmentally responsible energy.

Illinois Rivers Project

This project involves the construction of a 345-kilovolt line that will extend from a new substation near Palmyra, Missouri, across the Mississippi River to Quincy, Illinois and continue east across Illinois connecting into the following substations: Meredosia, Pawnee, Pana, Faraday, Mt. Zion, and Kansas, then across the Indiana border to Sugar Creek where the line will tie into a substation owned by Duke Energy. The project includes two additional segments from Meredosia to Ipava and Sidney to Rising. At an estimated cost of $1.1 billion, this transmission project presents a wide array of challenges that can be appreciated by considering the following:

- Ten substations will be developed, including: five greenfield substations, four brownfield substations and a greenfield switching station
- Includes 380 miles of 345 kV transmission line
- Includes three river crossings:

- One crossing of the Mississippi River; 1.5 miles long with a 2,600 ft. span
- Two Illinois River crossings; one ¾ mile and one 1-1/4 mile with a 2,900 ft. span

- Touches 66 Levee and drainage districts and 16 Counties
- Involves the construction of approximately 2,100 steel poles and foundations
- Requires the procurement of property rights for approximately 1,350 tracts of land

In May 2011, this project received FERC approval for incentive ratemaking treatment, including Construction Work in Progress (CWIP), use of a hypothetical capital structure during construction, and future recovery of abandonment costs. After nearly 100 public meetings throughout Illinois over six months on the proposed Illinois Rivers route, a filing with the Illinois Commerce Commission was made in November 2012 requesting a Certificate of Public Convenience and Necessity (CPCN). In August 2013, the Illinois Commerce Commission (ICC) issued an order supporting the need for the project and granting a CPCN for the construction of portions of the Illinois Rivers transmission project. In February 2014, the ICC issued a final order approving the remaining substations and routes for the Illinois Rivers project.

This project is currently under construction. The first substation is expected to be placed into service in 2015. The first transmission line sections of Illinois Rivers are expected to be in-service in 2016, and the project is on schedule to be completed by the end of 2019.

Mark Twain Project

This project consists of a new, approximately 55 mile long, 345 kV transmission line between Maywood Substation, near Palmyra, Missouri and the new Zachry Substation to be constructed as part of this project near Kirksville, MO. A new 35-mile long, 345 kV transmission line will also be built north from the Zachary substation to the Iowa border. The estimate for this project is $225 million.

Spoon River Project

This project consists of a new 40 mile, 345 kV transmission line in Northwest Illinois with connections to new substation facilities at each end. A portion of this project will be built by another MISO transmission owner because this project connects with facilities of two MISO transmission owners. The estimated total project cost is $150 million and all portions of the project are expected to be completed by the end of 2018.

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Other Projects

A partial list of other recent projects is summarized in the following table:

Stage	Dates (start-end)	State	Project Name	Description
Completed	2002-2010	MO/IL	Rush-Baldwin 345 kV Line	Rush Island-Baldwin 345 kV Line – New 29 mile 345 kV 3000 A Line, 345 kV line terminal and 2 mile double-circuit river crossing at Rush Island. Upgrade Baldwin 345 kV switchyard.
Completed	2004-2011	IL	Wedron Fox River 138 kV Supplies	LaSalle Area – Construct new Wedron Fox River 138-34.5 kV Substation, N. LaSalle-Wedron Fox River 138 kV Line, and Ottawa-Wedron Fox River 138 kV line (total of 34 miles 138 kV line).
Completed	2006-2011	MO	Big River-Rockwood 138 kV Line	Big River-Rockwood 138 kV Line – New 13 mile 138 kV, 2000 A Line.
Completed	2008-2013	IL	Latham-Oreana 345 kV Line	Latham-Oreana 345 kV Line – Convert Oreana 345 kV Bus to 6-Position Ring Bus with 3000 A Capability; Construct 8.5 miles of 345 kV line from Oreana Substation to 345 kV Line 4571 tap to Latham Substation.
Completed	2002-2010	IL	Prairie State Plant 345 kV Connections	Prairie State 345 kV Plant Connection – New 7.5 miles 345 kV 3000 A double-circuit line for Baldwin-Stallings outlet, New 1.5 miles 345 kV 3000 A double-circuit line for Baldwin-W. Mt. Vernon outlet.
Completed	2008-2010	MO	Gray Summit 2nd. 345/138 kV Transformer	Gray Summit 345/138 kV Substation – 345 kV 6-position Ring Bus, 2nd 560 MVA transformer.
Completed	2006-2010	IL	Conoco-Phillips 138 kV Supply	Conoco-Phillips 138 kV Supply – Tap the Wood River-Roxford 138 kV Line and extend approximately 2.7 miles; extend the Roxford-BOC 138 kV Line approximately 3.3 miles to supply new Conoco Phillips 138-34.5 kV Substations.
Completed	2011-2013	IL	Sidney 2nd. 345/138 kV Transformer	Sidney 345/138 kV Substation – Add a second 345/138 kV, 560 MVA Transformer. Install 2-345 kV PCB's to complete a ring bus. Rearrange existing Sidney 138 kV outlet lines as needed.
Under	2008-current	IL	South Bloomington –	South Bloomington Area 345/138 kV Substation – Install 345/138 kV, 560 MVA Transformer. Extend new 345 kV

Stage	Dates (start-end)	State	Project Name	Description
Construction			Install new 560 MVA 345 /138 Xfmr	line approximately 8 miles from Brokaw Substation to South Bloomington Substation.
Completed	2009-2014	IL	Bondville-S.W. Campus 138 kV Line	Bondville-S.W. Campus 138 kV – Construct 8 miles of new 138 kV line. Construct 138 kV Ring Bus at Bondville and a 138 kV Ring Bus at Champaign S.W. Campus.

Adhering to standardized construction, maintenance, and operating practices, including the capability for emergency response and restoration of damaged equipment

Ameren is fully committed to compliance with standardized construction, maintenance, and operating practices. Standards set by the North American Electric Reliability Corporation (NERC), SERC Reliability Corporation (SERC), the Occupational Safety & Health Administration (OSHA), National Electrical Safety Code (NESC), the Institute for Electrical and Electronics Engineers (IEEE), and the American National Standards Institute (ANSI), as well as other regulatory and standards setting organizations are the basic components in a culture of compliance at Ameren. As testament to this, Ameren has never had a NERC Standard violation for the Order 693 standards and has successfully completed three on-site SERC audits.

Ameren currently adheres to standardized operating processes consistent with NERC Standards relating to coordinated operation. Ameren internal processes govern normal, emergency, and abnormal conditions. As to external processes, Ameren adheres to operating practices of PJM as a neighboring Balancing Authority (BA) and Transmission Operator (TO), and with MISO, its Reliability Coordinator (RC). Additionally, Ameren adheres to good utility practice in the absence of formal operating practice processes.

Ameren has developed Standard Specifications, Design Criteria, and Guidelines that assure a consistent approach will be followed in the design and construction of transmission lines and substations. These construction specifications are issued with each job to the Ameren crew or the Contractor crew. Each job is monitored throughout the construction phase by a construction supervisor. Prior to energizing, each project is inspected by engineering, maintenance, and forestry to assure that the project was constructed as per all Ameren Standards, Design Criteria, and Guidelines. Any deficiencies found either during construction or upon final inspection are added to a punch-list, subsequently corrected, and then verified as properly corrected prior to the transmission line or substation equipment being released to Ameren Transmission

Operations for start-up. A written Commissioning (start-up) procedure is then followed to assure the equipment is energized in the proper sequence. During the commissioning, testing/measurements are performed as required and the equipment verified to be functioning properly prior to an official release to the operations group for service.

Examples of Design and Construction standards are as follows:

- 30 Transmission Line Design Specifications
- 23 Transmission Line Guidelines
- 14 Transmission Line Design Criteria
- 18 Transmission Line Construction Inspection Checklist
- 97 Substation Design Guides, Material/Equipment/Construction Specifications and numerous standard drawings

Ameren has developed procedures to support compliance with NERC reliability and planning standards. For example, Ameren's Transmission Interconnections group is responsible for compliance with the NERC Facility Rating Methodology standard (FAC-008-3), the NERC standard to determine and communicate System Operating Limits (FAC-014-2), and the NERC planning standards (TPL Standards 001 through 004). Documents have been created detailing the procedures followed to meet compliance for each of these standards.

Ameren's planning group looks at the 'uniqueness' of a transmission area; to identify any additional criteria, as needed, to ensure reliability that will exceed NERC reliability standards from both a steady-state and a dynamics perspective. For example, the following criteria have been used now, or in the past, to address current state transmission issues, e.g., load shifts, generation retirements:

- Upgrades required for the coincident outage of a generator and a transmission line or transformer
- Limits to dropping load for coincident (Category C) transmission outages
- Minimize the use of special protection systems to meet reliability standards
- Maintain margins between contingency flow and emergency ratings for incremental transfer capability (simultaneous and non-simultaneous)
- No allowance for high-speed reclosing of 345 kV circuits to maintain stability
- Stability to be maintained for double line to ground faults (2LG) with delayed clearing

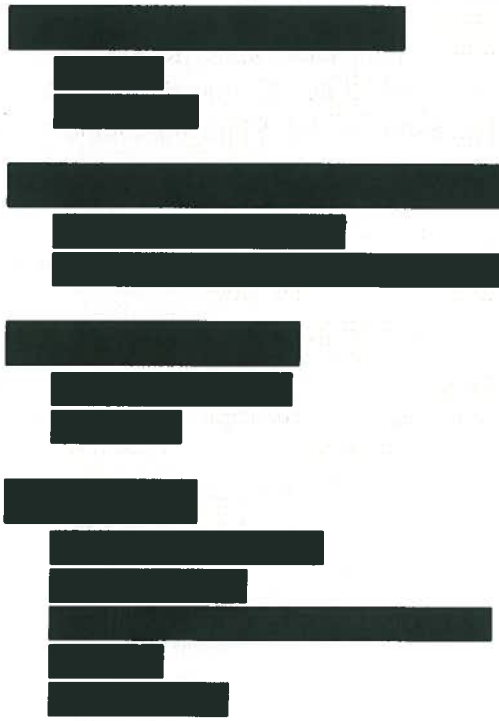
Working in the geographical region in which the project has been proposed

To supplement Ameren's capabilities and capacity to manage the development (routing), design, procurement, construction, operation and maintenance of our transmission assets, Ameren sub-contracts work to pre-qualified suppliers and contractors. Ameren has strategic

sourcing agreements in place with a large array of service providers and we proactively work with them to ensure that our transmission assets are designed, constructed, operated and maintained in strict accordance with our technical specifications and corporate requirements for reliability, safety and performance, as well as meeting all federal, state and local standards and requirements. In Ameren's service territory, many of these service providers work collaboratively with us to ensure that we are able to provide rapid response for critical maintenance issues, weather-related emergencies, key resources to support design and construction of greenfield and retrofit projects.

Many of these vendors have significant experience working across the United States, including the region where this project is proposed. Ameren works with these suppliers to better understand the local issues associated with routing, environmental/permitting, design, construction, and operations and maintenance. If selected to develop the proposed project, ATXI will leverage Ameren's long and successful working relationships with these suppliers to successfully construct, operate and maintain the transmission asset.

The following list summarizes some of the key suppliers that have strategic relationships with Ameren, and many have local experience that we could leverage to successfully execute the proposed project:



[redacted]

Ameren will contract with vendors on this list and/or other vendors having demonstrated successful experience in the region of the proposed project.

Acquiring rights-of-way with specific emphasis on the geographical region in which the project has been proposed

Ameren has a substantial full-time internal staff dedicated to researching, acquiring, and managing company real property assets, which include fee owned properties, transmission and distribution rights-of-way and other miscellaneous property rights. This group has personnel located throughout the Ameren service areas served by Ameren companies with numerous property right acquisition efforts underway at all times. As mentioned previously, Ameren has a list of nationally approved service providers that assist us in surveying and right-of-way acquisition. In the last several years, Ameren has acquired hundreds of miles of transmission right-of-way in both Illinois and Missouri and has a very substantial acquisition program underway in 2014. The Real Estate Department works very closely with Ameren's Planning, Stakeholder Relations, Engineering, Environmental Services, Legal, Governmental Affairs and Communications departments to either verify existing rights-of-way or acquire new rights-of-way and real property interests necessary to advance pending projects, as well as sustain, modify, and improve existing facilities.

In addition, pursuant to state law, Ameren has utilized its ability to exercise eminent domain in Illinois and Missouri to acquire properties for transmission related projects. However, Ameren has a strong preference for acquiring necessary property rights through fair and meaningful negotiations with affected property owners. Moreover, the Ameren Real Estate Department has considerable experience working with the state regulatory commissions and local courts to ensure all necessary property rights are acquired in a fair, equitable and timely manner to keep projects on schedule.

[redacted]

[redacted]

B.3 Proposed financing plan for the project including discussion of any cost advantages available to the proposing entity as a result of their financing plan and structure

[redacted]

The construction of this Project is supportive of Ameren's business goal to invest in regulated development initiatives. Ameren has an overall $8.3 billion funding program supporting new regulated infrastructure investment from 2014 to 2018. At year-end 2013, Ameren had combined assets totaling approximately $21.6 billion with $16.7 billion of plant and equipment, including approximately $750 million of FERC regulated (unbundled) transmission assets. Ameren is forecasting FERC regulated transmission assets to rise to $2.6 billion by 2018 with the majority of this investment at ATXI. Additional information regarding Ameren's business plans can be found at its website: http://www.ameren.com/

Ameren Corporation has access to extensive short and long term sources of financing with stable issuer rating of Baa2/BBB+/BBB+ and commercial paper ratings of P-2, A-2, F2 from Moody's, S&P, and Fitch. Credit ratings have been upgraded by all agencies within the last 12 months. Short term sources of credit include Ameren's $2.1 billion credit facilities. Ameren accesses $1.6 billion of commercial paper as part of its $2.1 billion of short term credit to minimize short term interest costs. Ameren and its operating subsidiaries have significant and competitive access to long term debt, and have raised a total of $1.5 billion in debt since 2011. All of these recent debt issuances have lowered the imbedded debt costs, and therefore lowered costs to its customers. We anticipate that ATXI will benefit from the excellent credit profile of its parent company, and that this will translate into low borrowing costs for this Project.

[redacted]

B.4 Description of proposing entity's (or its affiliate, partner or parent company) managerial ability to contain costs and adhere to construction schedules for the proposed project, including a description of verifiable past achievement of these goals

[redacted]

The following lists some of the key tools, processes and strategies that Ameren project teams utilize to manage and contain costs and project schedules:

Development of Cost Estimates

Project cost estimates are developed based upon recently completed projects to incorporate lessons-learned and best practices. We also work with our vendors early in the project to validate cost estimates based on preliminary design information. For example, in support of this proposal, we have consulted with a third-party contractor, that has recently executed projects in the proposed region, to get an independent cost estimate and project schedule, based upon recently executed projects in the proposed region. Cost estimates are continuously updated throughout the development process to obtain an Association for the Advancement of Cost Engineering International (AACEI) Class 2 (or better) quality estimate, prior to requesting full-funding of our projects. Having a high-quality estimate helps ensure project teams have taken into account all known costs expected to be present on any given project.

[redacted]

[redacted]

Development of Project Risk Registers

These are compiled based upon a bottom-up risk assessment, past project experience, and are specific to each project. These risks are evaluated to establish a probability of occurrence and potential impact should the risk actually occur. A Monte-Carlo analysis is performed to establish an expected and a high-end contingency reserve. A tolerance level is also established for each of the risks in order to establish when a risk would pose a severe threat to the project; along with appropriate plans for response should this tolerance be exceeded. Risks are related to schedule activities to determine when they are likely to occur and respond in a planned – rather than reactive – manner.

Management of Contingency Accounts

Contingency established as part of the risk register is managed throughout the project lifecycle using a change management process. By directly linking the contingency management to the risk register, the project team can begin to establish trending and forecasting of potential future risks and costs based upon knowledge and experience gained throughout the execution of the project. Risk registers are actively managed and updated on a regular basis (monthly at a minimum) by the project manager and risk specialists assigned to the project. The project team also performs a regular review of the contingency assigned to the project and adjusts as appropriate to ensure that appropriate reserves are maintained.

Development of Detailed Project Schedules

These are developed at the beginning of each project and are continuously refined as more information becomes available and new activities are created. Resource loaded schedules are

required for all major capital projects at Ameren. Prior to construction, a detailed float analysis report is used to track and manage key milestone activities to ensure that critical deliverables are provided as they are required. As the project moves into construction, Ameren works with our partners to develop measureable construction activities that are linked together and loaded with labor-hours in order to establish a baseline to use as a basis of comparison. During construction, we obtain and measure actual construction performance (in hours and dollars) against this baseline in order to calculate both cost and schedule performance. After the construction is underway, the project team uses the comparative analysis to predict the final estimated cost at completion of the project and as a means to begin discussions with contractors to establish recovery plans as appropriate in order to get the project cost and schedule back in-line with the baseline plan.

Forecasting Project Cash Flows

Ameren forecasts project cash flows on a monthly basis; to track expected capital funding requirements. We manage and track forecast versus actual costs to measure variances and develop action plans. In support of this activity, Ameren project teams implement 'deep-dive' review meetings with our large contract partners to review their estimated costs to complete the remaining work on a given project. This meeting incorporates actual costs-to-date and remaining schedule activities in order to establish an updated cost-to-complete each activity. This information is then used to estimate the expected remaining cash flow for the project.

Over a three-year period across Ameren's entire portfolio of large capital projects (greater than $10 million) we have been able to manage our final costs to within less than 1% of original estimates (including contingency) that were established at initial project review. This is a testament to Ameren's success in project management, risk assessment and control.

B.5 Details of any construction cost caps or commitment the proposing entity wishes PJM to consider in its analysis, including the conditions and exceptions to such construction cost caps or commitments

As discussed earlier, ATXI has significant experience in budgeting and managing the development and construction of transmission projects and we are confident in our ability to deliver this project in accordance with the proposed cost estimate and schedule. Given the very short duration of the proposal window, ATXI has not had the opportunity to complete the activities that would be required to support the provision of any construction cost caps or commitments. However, with additional time to further pre-engineer and develop the project, ATXI would be willing to consider different commercial models and cost commitments that could be of interest to PJM.

B.6 Description of any other unique qualifications the entity may have to construct, operate, and maintain the proposed project, including any cost commitment the entity may wish to submit

As summarized earlier, ATXI has demonstrated experience in constructing, operating and maintaining large transmission projects with a very high degree of complexity and we are confident in our ability to successfully construct, operate and maintain this project. Through Ameren, ATXI has the capital structure to support on-balance sheet financing of major capital projects. ATXI also has long-term strategic relationships in place with a broad range of material suppliers, service providers and contractors that we would leverage to successfully execute the proposed project.

B.7 List of assumptions used in developing the project proposal package such as work to be executed by incumbent Transmission Owner(s)

The proposal provides details regarding the proposed scope to refurbish existing substations necessary to tie in the propose project. ATXI has included an internal estimate to refurbish these substations in our proposal. However, ATXI assumes that, if awarded the project, that the incumbent Transmission Owners would take the responsibility for this scope.

In developing our cost estimate and project schedule, we have researched past projects executed in similar regions, terrains, labor conditions, weather conditions and conferred with external consultants to support the development of our project cost estimate. To develop our project schedule, ATXI has combined our extensive internal experience developing transmission projects with any experience working in the region and incorporated input from external consultants regarding the state law and regulatory environment to support our estimated durations to perform the routing and public outreach process, apply for a Certificate of Public Convenience and Necessity, perform environmental studies, and apply for project permits. Finally, we have conferred with an external consultant with recent experience constructing projects in the region to provide an external check of our cost estimate and project schedule.

[redacted]

C. Proposed Project Constructability Information

C.1.a. Greenfield Transmission Line Element Detail

C.1.a.1. Terminal points

New 230kV transmission lines would connect:

- Substation A (new 230 kV sub adjacent and connected to the existing Crozet Sub) and Substation B (new 230kV/115kV sub in Pratts, VA)
- Substation B and Substation C (new 230kV/115kV sub in Culpeper, VA)
- Substation C and Remington CT

New 115kV transmission lines would connect:

- Substation B and Pratts Substation
- Substation C and Mountain Run Substation

C.1.a.2 A general description of alternative routes or routing study area

The anticipated routing study area would be 20 miles by 65 miles and range from the existing Crozet substation to the Remington CT (Refer to the geographic map included under Appendix B). The roughly 850,000 acre area would span Louisa, Albemarle, Greene, Madison, Culpeper, Orange, and Fauquier counties in Virginia. The area is primarily rural, though it does include some densely populated and developed areas.

C.1.a.3. Geographic description of any terrain traversed by the proposed new line or the study area

The project area is located east of the Shenandoah National Park in Albemarle, Fluvanna, Greene, Louisa, Orange, Madison, Culpeper, and Fauquier Counties. The study area is outside of the Blue Ridge Mountain range, but does contain some foothill areas. The land use of the area includes primarily agricultural and forested areas with a few smaller urban centers. ATXI's study focused on the objective to avoid populated and developed areas, as well as other sensitive areas to the maximum extent possible. We concluded that it was feasible to develop a route that could meet these objectives.

C.1.a.4. Route description by segment that includes lengths and widths

It is expected that new right-of-way will be acquired for all new transmission lines. The right-of-way width is estimated to be 125ft wide for 230kV lines and 100ft wide for 115kV lines. Lengths of each section are estimated to be:

- Substation A to Substation B, 230kV – 36mi
- Substation B to Substation C, 230kV – 21.4mi
- Substation C to Remington CT, 230kV – 14.6mi
- Substation B to Pratts Substation, 115kV – 0.5mi
- Substation C to Mountain Run Substation, 115kV – 0.5mi

[redacted]

C.1.a.5 Electrical characteristics

- Nominal voltage rating: 115 kV and 230 kV
- AC or DC: AC
- Line MVA normal and emergency rating:

Line	Nominal Voltage	AC/DC	Summer Normal	Summer Emergency	Winter Normal	Winter Emergency
Sub A-Sub B	230 kV	60 Hz AC	705 MVA	807 MVA	780 MVA	865 MVA
Sub B-Sub C	230 kV	60 Hz AC	705 MVA	807 MVA	780 MVA	865 MVA
Sub C-Remington CT	230 kV	60 Hz AC	705 MVA	807 MVA	780 MVA	865 MVA
Sub B-Pratts Sub	115 kV	60 Hz AC	282 MVA	321 MVA	312 MVA	346 MVA
Sub C-Mountain Run Sub	115 kV	60 Hz AC	282 MVA	321 MVA	312 MVA	346 MVA

- Grounding design for underground or submarine circuits: NA

C.1.a.6 Physical characteristics

[redacted]

[redacted]

230kV transmission lines

- Single circuit, wood h-frame construction, 22ft phase spacing
- 1192kcmil 54/19 (Grackle) ACSS conductor
- One 3/8" 7 strand EHS shield wire
- One fiber optic shield wire

115kV transmission lines

- Single circuit, wood h-frame construction, 15.5ft phase spacing
- 795kcmil 26/7 (Drake) ACSS conductor
- One 3/8" 7 strand EHS shield wire
- One fiber optic shield wire

C.1.a.7 Geographic map with proposed transmission line study area superimposed

Refer to Appendix B of this proposal for a geographic map that identifies the area that was investigated for ATXI's routing study.

C.1.b Greenfield Substation/Switchyard Facility Element Detail

C.1.b.1 General description of the proposed location(s)

Sub A is a new 230kV breaker-and-a-half substation is proposed to be installed north of Crozet, VA. The area around Crozet is a mixture of residential and farmland which provides many options for locating the new substation. To minimize the impact on the surrounding area we have chosen to propose the new substation be located adjacent to the existing Crozet Substation as illustrated in Appendix C. Approximately 15 to 20 acres of property will be needed for the new substation and transmission line equipment depending on the final substation layout and transmission line route. Seven transmission lines will be routed to this

new substation: four positions will be occupied by the two existing 230kV transmission lines that are currently supplying Crozet Substation, one position for the new 230kV transmission line to the new Pratts Area Substation (Sub B), and two positions will replace the existing 230kV supplies to Crozet Substation.

Sub C is a new 230/115kV substation to be constructed in Pratts, VA. The area around Pratts is mostly farmland and pastures which provides many options for locating the new substation. To minimize the impact on the surrounding area we have chosen to propose Sub B be located adjacent to the existing Pratts Substation as illustrated in Appendix D. Approximately five acres of property will be needed for Sub B and transmission line equipment depending on the final substation layout and transmission line route. Three transmission lines will be routed to this new substation, one new 230kV line from Sub A, one new 230kV line from a second new 230/115kV substation located in the Culpeper area (Sub C), and one new 115kV line to connect to the Pratts Substation.

Sub C is a new 230/115kV substation to be constructed in Culpeper, VA. The area to the east of Culpeper appears to be mostly farmland and pastures and will provide adequate space for a new substation. To minimize the impact on the surrounding area we have chosen to propose Sub C be located adjacent to the existing Mountain Substation as illustrated in Appendix E. Approximately five acres of property will be needed for Sub C and transmission line equipment depending on the final substation layout and transmission line route. Three transmission lines will be routed to this new substation, one new 230kV line from Sub B, one new 230kV line from Remington C.T., and one new 115kV line to connect to the Mountain Run Substation.

Land ownership in the vicinity of proposed locations(s)

ATXI has identified areas that appear feasible for location of the proposed substations. Based upon an initial survey of county assessor data, a majority of the property appears to be privately owned. ATXI would negotiate in good faith with the property owner(s) at the beginning of the project with the goal of reaching a mutually acceptable agreement for the property rights needed.

C.1.b.2 One-line diagram and general arrangement drawing

Refer to Appendix A for a One-Line Diagram that describes the proposed project.

C.1.b.3 Electrical design including specifications and ratings for transformers or reactive devices

Sub A will be constructed as a 230kV four leg breaker-and-a-half configuration with one of the positions reserved as a spare for future expansion. The new positions will be occupied by the transmission lines as stated above in Section C.1.b. The transformer will have a rating of 250

MVA. The substation equipment will consist of: eleven 230kV 3000A gas circuit breakers, twenty nine 230kV 3000A manually operated disconnect switches, 3000A bus, 230kV surge arresters, 230kV CCVTs and VTs, required metering equipment, normal and emergency station service sources, lightning protection, control building with protective relaying, grounding and conduit system, and physical/cyber security.

Sub B will be constructed as a four position 230kV ring bus with one of the four reserved as a spare position for future expansion. The three new positions will consist of: a position for the Sub A – Sub B 230kV Transmission Line, a position for the Sub B – Sub C 230kV Transmission Line, and a position for a 230/115kV Transformer to serve as a secondary source for the Pratts Substation. The ring bus will consist of: three 230kV 3000A gas circuit breakers, nine 230kV 3000A manually operated disconnect switches, one 115kV 2000A gas circuit breaker, one 115kV 2000A manually operated disconnect switch, 3000A and 2000A bus, 230kV and 115kV surge arresters, 230kV and 115kV CCVTs and VTs, required metering equipment, normal and emergency station service sources, lightning protection, control building with protective relaying, grounding and conduit system, and physical/cyber security.

Sub C will be constructed as a four position 230kV ring bus with one of the four reserved as a spare position for future expansion. The three new positions will consist of: a position for the Sub B – Sub C 230kV Transmission Line, a position for the Remington C.T. Sub C 230kV Transmission Line, and a position for a 230/115kV Transformer to serve as a source to the Mountain Substation. The ring bus will consist of: three 230kV 3000A gas circuit breakers, nine 230kV 3000A manually operated disconnect switches, one 115kV 2000A gas circuit breaker, one 115kV 2000A manually operated disconnect switch, 3000A and 2000A bus, 230kV and 115kV surge arresters, 230kV and 115kV CCVTs and VTs, required metering equipment, normal and emergency station service sources, lightning protection, control building with protective relaying, grounding and conduit system, and physical/cyber security.

C.1.b.4 Relay communications plan

All new transmission lines will be protected with redundant high speed relaying schemes. Both fiber optic cable and power line carrier may be utilized to provide instantaneous clearing for all line faults. Direct transfer trip will be performed over these communication channels where required. Transformer, bus and breaker failure relaying will be supplied for all new facilities. Metering and control will be installed as well as a remote terminal unit (RTU) for remote control and monitoring. ATXI will coordinate relay plans and settings with other transmission entities. Currently, or in the past, Ameren has successfully performed this coordination with other PJM entities such as AEP, Commonwealth-Edison, Duke Energy and others.

C.1.b.5 Geographic map with proposed substation location superimposed

See Appendices C, D and E.

C.1.c Transmission Facilities to be Constructed by Others

C.1.C.1 Proposed Transmission Line Relocation

Under this proposal, there will be no transmission line relocation to be performed by others.

C.1.C.2 Proposed Substation Expansion or Modification

The following summarizes proposed modifications to the Pratts, Mountain and Remington substations:

One-line diagram and general arrangement drawing

Refer to Appendix A for a One-Line Diagram.

Protection and controls plan

At existing substations where this proposal suggests there should be equipment additions it is assumed that the incumbent substation owner will be required to make modifications to the existing relay protection, SCADA, and metering configuration.

Geographic map with proposed substation location superimposed

Refer to Appendices D, E and F for geographic maps that illustrate the proposed modifications to the existing substations.

General description of the proposed expansion

Crozet Substation will not require any expansion. The existing transmission line taps will be removed to allow for connection to the new breaker-and-a-half substation.

Sub B will be connected to the Pratts Substation via a new 115kV Transmission Line as illustrated in Appendix D. It will be the responsibility of the incumbent substation owner to provide a point of attachment for this new 115kV line. This proposal suggests that the connection point be at the existing open north terminal position where there appears to be adequate space available for the new equipment. The incumbent substation owner also will have the responsibility to install a 115kV bus-tie breaker to prevent a substation outage during a prolonged transmission line outage.

Sub C will be connected to the Mountain Substation via a new 115kV Transmission Line as can be seen in Appendix E. It will be the responsibility of the incumbent to provide a point of

attachment for this new 115kV line. This proposal suggests that the connection point be at one of the existing open positions where there is adequate space available for the new equipment.

In the Remington, VA area a connection to the 230kV transmission system will be made at the Remington C.T. Substation as illustrated in Appendix F. It will be the responsibility of the incumbent substation owner to provide a point of attachment for the new Sub C-Remington C.T. 230kV Transmission Line. This proposal suggests connecting to the existing open breaker-and-a-half position on the south side of the leg closest to the generators.

Land ownership in the vicinity of proposed expansion

ATXI has identified areas that appear feasible for location of the proposed substations. Based upon an initial survey of county assessor data, a majority of the property appears to be privately owned. ATXI would negotiate in good faith with the property owner(s) at the beginning of the project with the goal of reaching a mutually acceptable agreement for the property rights needed.

Electrical design including specifications and ratings for transformers or reactive devices

At the Crozet Substation there will be minimal work to be completed by the incumbent substation owner. The new 230kV transmission lines from the new breaker-and-a-half substation will land directly on the existing arbors. Some protective relay upgrades may be necessary.

At the Pratts Substation a new 115kV terminal will be installed for connection to Sub B. The additional equipment to be installed consists of: new bus work connecting to the empty north terminal position; a transmission line arbor; 115kV 2000A manually operated disconnect switch; 115kV surge arresters; and one 115kV 2000A gas circuit breaker with 2000A manually operated isolating disconnect switches.

The Mountain Substation has three open 115kV terminal positions, one on the north bus and two on the south bus. This proposal suggests connecting the new 115kV transmission line from Sub C to one of the south bus terminal positions. The additional equipment to be installed consists of: new bus work connecting to the empty south terminal position; a transmission line arbor; 115kV 2000A manually operated disconnect switch; 115kV surge arresters; and required metering equipment.

The Remington C.T. Substation has an open breaker-and-a-half position that can be used to connect to the new Sub C-Remington C.T. 230kV Transmission Line. The additional equipment to be installed consists of: one, 230kV 3000A gas circuit breaker; two, 230kV 3000A manually

operated disconnect switches; 230kV surge arresters; 230kV CCVTs; required metering equipment; lightning protection; and grounding and conduit system expansion.

C.1.d Environmental, Permitting and Land Acquisition

Route Selection and Approach

Ameren will use internal resources to accomplish the route selection tasks. The internal Ameren route selection team will include personnel from a variety of perspectives including planning, design, construction, real estate, environmental, and public communications. We will also hire an outside consulting firm experienced in utility routing in the region that will be part of the route selection team. Having the variety of backgrounds and local knowledge working together will provide a route that can be supported through the regulatory process. Ameren has successfully used this collaborative process to obtain CPCN for over 400 miles of line in Missouri and Illinois in the last five years.

Ameren will follow the Virginia State Corporation Commission rules and guidance regarding route selection and public involvement, as well as our own internal processes and best practices

The route selection process generally involves developing, comparing and contrasting potential routing options. The list of environmental routing criteria includes existing linear features or facilities (Opportunities) and various features of the human and natural environment (Sensitivities). The routing criteria also include cost, engineering, and regulatory considerations. The tools and technologies we will use to accomplish route selection will include GIS mapping of the Sensitivities and Opportunities and the EEI routing tool or a similar tool used by Ameren on prior route selection events. Through Ameren's route selection and public involvement processes, Ameren has been successful in developing routes that leverage Opportunities, minimize impacts to the Sensitivities, while maintaining reasonable costs, constructability, and regulatory feasibility. As mentioned earlier, Ameren has service agreements in place with several national firms that have significant experience conducting environmental studies and supporting the permitting process for projects in the region under consideration.

The Project Area will be delineated by identifying the project endpoints and allowing for enough geographic diversity between and around these areas so that numerous route options can be identified and studied. During the route selection process Ameren will review publically available federal, state, and local sources of information for wetland and soils information, cultural resources information, and threatened and endangered species information, as well as information on protected lands, siting guidelines and various conservation easements within the project area. Environmental data associated with the environmental routing criteria will also be obtained from potentially affected agencies, public comments and other non-public sources. Ameren staff and our selected routing consultant will also review the project area from public

roads as much as possible during the early stages of the routing process and will continue to review route options from the field as the routing process continues. Data collection and refinement is an ongoing process. We encourage input from landowners and other parties throughout the public involvement process should any of our data appear in error, or should it appear that we are missing information.

Our initial routing methodology generally includes the following process:

- Identifying the Project Area
- Collecting and mapping initial Sensitivity and Opportunity data
- Identify potential route segments throughout the project area. The goal for this project is to identify route options throughout the area that take advantage of the Opportunities while also being located in areas with lower concentrations of Sensitivities. Together, these segments will form an extensive network of potential route options.
- Specifically, in Virginia, the routing criteria will include:
    - Using existing rights-of-way for electric or other utilities
    - Using local government designated utility corridors
    - Minimizing visibility of the line including not allowing for clear sightlines in forested sections
    - In situations where timber must be cut to accommodate a transmission line, and the line is visible to the public, it should be deflected occasionally and should follow irregular patterns or be suitably screened to prevent the rights-of-way from appearing as tunnels cut through the timber.
    - When transmission lines must be located on slopes within public view, guidelines state a preference for locating the line approximately two-thirds the distance up the slope where feasible so as to provide a background of topography.
    - Transmission lines should not be located on the crests of hills, or directly parallel to long stretches of highway.
- The route options will then be analyzed and comparatively evaluated to determine those that best minimize overall potential impact and best adhere to the routing criteria.
- Our routing objective is to identify feasible potential route alternatives that minimize the potential for impact overall, can be permitted, can be constructed, best incorporate what we've heard from the public and the elected officials and agencies, and are cost effective.

Right-of-way and land acquisition plan and approach for both public and private lands

The acquisition of right-of-way is accomplished by eight broad categories of activities determined by the overall acquisition plan for the project: file preparation including document

origination; title reports; survey; property valuation (appraisal); right of entry and easement negotiations; condemnation support; construction support; and project completion including damage settlements and records management.

As discussed earlier, Ameren's Real Estate group is supported by a pre-approved group of national service providers and is involved from the routing phase to project completion communicating with property owners during each phase. In most cases property owners are aware of the project through their involvement with the public participation process to select a route. Using the acquisition strategy that was previously developed, Real Estate will setup individual appointments with property owners to discuss the purpose of the project, explain what facilities will be located on their property (structures, fences, gates), access to the facilities, terms of the easement and amount of compensation. Ameren strives to have the same agent work with a property owner throughout the project to develop trust and consistency into the process.

If negotiations reach an impasse and an agreement cannot be reached then it will be necessary to acquire the easement through eminent domain. Condemnation is a last resort. Prior to filing for condemnation Real Estate will seek alternative methods to reach a mutually beneficial agreement with the property owner. Should it become necessary, third party mediators can be involved in negotiation process in an attempt to reach a negotiated agreement for the easement.

Fee

Real Estate will manage the Real Estate Purchase process for fee purchases, with responsibilities including, but not limited to: 1) obtaining initial purchase approval, 2) determining fair market value, 3) negotiating and closing the Purchase transaction, 4) preparing the Purchase Contract, and 5) preparing the necessary closing, tax and real estate documentation.

Leasing

Leasing property is generally used for short term needs such as office space, storage yards and reporting sites. ATXI intends to lease some property for the proposed project and these costs have been included in our cost estimate.

Staffing

Upon development of the initial project scope within the project area, Real Estate will provide an estimate of the number and type of personnel required for their role in the project and an estimated timeline and funding amounts required for real estate activities and personnel. ATXI will utilize both internal personnel, supported by our preferred service providers that have local experience in real estate valuation, surveying and right-of way acquisition.

Ameren currently has a robust roster of valued business partners with existing Service Contracts to perform work for the company. This roster includes several regional and national firms that have performed Real Estate services in the geographic area specific to this project. Ameren's existing relationship with these business partners will allow for seamless internal management and oversight of the work being performed while allowing the partner to utilize their local assets to be successful on the project.

Permitting Plan and Approach

During the route selection process, publically available information on Sensitivities that may require further permitting consideration before construction will be identified and mapped. Ameren will also contact affected agencies to obtain further information and continue to coordinate with them throughout the route selection process. A preliminary desk top review of the project area indicates that the proposed route would not likely impact federal or state lands. A review of the Virginia Department of Conservation and Recreation Natural Heritage Data Explorer has identified several potential sensitivity areas such as cultural assets, endangered species, wetlands, scenic rivers, and Virginia Outdoor Foundation conservation easement properties within the project area. Ameren has incorporated as part of our routing process the need to minimize impacts to these types of sensitive areas. Based on the preliminary review, permits may be required from the following agencies as described below.

Federal

- US Army Corps of Engineers, Norfolk District
- US Fish and Wildlife Service, Virginia Field Office
- Federal Aviation Agency
- Federal Communications Commission

State

- Virginia Department of Environmental Quality
- Virginia Department of Conservation and Recreation
- Virginia Department of Agriculture
- Virginia Department of Historic Resources
- Virginia Department of Forestry
- Virginia Outdoors Foundation

Other

- Virginia DOT, Local Highway and Roadway Permits
- Railroad crossing permits
- County, Municipal, or Township permits
- Coordination with other Utilities and Levee/Drainage Districts

During the pre-application or application process to the Virginia State Corporation Commission, the Commission will seek input from the Virginia Department of Environmental Quality and other impacted agencies to get a list of all studies, permits, or reviews that may be required for this project. This information will be used to develop a schedule for these permits and reviews that will be updated as the project moves forward. The following is a discussion of some of the types of permits and reviews anticipated for this project.

Federal Permits

Environmental Impact Statement

At this time, we do not believe a formal Federal Environmental Impact Statement will be required as we will not be crossing Federal or State lands or using Federal funding for this project.

Clean Water Act Section 404

The Norfolk District of the U.S. Army Corps of Engineers (USACE) has the jurisdiction to issue permits under Section 404 of the Clean Water Act. ATXI will initiate wetland delineation field studies with a consulting firm with a local presence to support applications for Section 404 permits as necessary based on the specific route chosen. Ameren will minimize impacts to wetlands as much as practicable during design through adjustments in structure spacing and alignment. It is assumed for the purposes of this proposal that Nationwide permits rather than an Individual permit will be obtained for this project. Should an Individual permit be necessary, the permitting process will extend at least 12 months beyond the proposed schedule provided. Mitigation for replacement of the impacted wetlands, if required, will be completed in close coordination with the USACE. ATXI will strive to purchase credits from nearby wetland banks as much as possible. The Virginia Department of Environmental Quality, Office of Wetland and Stream Protection will be contacted for a Water Protection Permit if an Individual 404 Permit is required.

Endangered Species

A review of the Virginia Natural Heritage database for this region indicated that there are approximately a dozen federal or state threatened or endangered species that may be located in the project area. During the routing process ATXI will contact the U.S. Fish and Wildlife Service and the Virginia Department of Conservation and Recreation, Virginia Department of Game and Inland Fisheries, and the Virginia Department of Agriculture to determine which of these species are of concern for this type of construction. After the Virginia State Corporation Commission has given approval for this line to be constructed, Ameren will enter into formal consultation with these Federal and State agencies and initiate appropriate field studies with a consulting firm with a local presence. These field studies will support the consultation or

application process with these agencies. ATXI will minimize impacts to endangered species or habitats as much as practicable during design through adjustments in structure spacing and alignment. Mitigation to minimize or offset impacts will be coordinated with these agencies as needed.

Avian Protection

ATXI has a corporate-wide Avian Protection Plan in place. The design and placement of structures will be reviewed by outside experts to ensure impacts on birds are minimized per Edison Electric Institute – Avian Power Line Interaction Committee (EEI-APLIC) guidelines. The review will include evaluating the clearances between conductors and grounded hardware, and the risk of collision and possible need for aerial/visual markers.

State Permits

Cultural and Historic Resources

A review of the Virginia Natural Heritage database showed locations of several high probability areas for cultural resources sites within the project area. This indicates that Phase I and likely several Phase II studies will be required as part of the consultation for this project.

During the routing process ATXI will examine each proposed project component to identify historic and architectural resources, as well as archaeological sites that could be affected. In accordance with Virginia Department of Historic Resources (VDHR) Guidelines for Assessing Impacts of Proposed Electric Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia, the cultural resource review will consider the following:

- National Historic Landmark (NHL) properties located within a 1.5-mile radius of the centerline;
- National Register of Historic Places (NRHP)-listed properties,
- NHLs, battlefields, and historic landscapes within a 1.0-mile radius of the centerline;
- NRHP-eligible and listed properties, NHLs, battlefields, and historic landscapes within a 0.5-mile radius of the centerline; and these same resources as well as archaeological sites located within the right-of-way for each Project component.

An archeological firm with a local presence will be used to examine site files maintained by the VDHR to identify previously recorded archaeological, historical, and architectural sites within the 1.5-mile tiered study area, including sites listed in or eligible for listing in the NRHP.

After the Virginia State Corporation Commission has given approval for this line to be constructed, ATXI will enter into formal consultation with VDHR on the potential presence of

prehistoric or historic resources within the final project components. If needed, a Phase I and possible Phase II survey including visual Impact analysis will be conducted by professional archaeologists to determine location and extent of any cultural resource sites affected by this project.

[redacted]

Construction Storm Water, Sediment, and Erosion Control

The Virginia Department of Environmental Quality issues the General NPDES Permit for Construction Activities. However, if the proposed project passes through a County or Municipality that is a designated Municipal Small Separate Stormwater System (MS4), the local government will issue the permit. ATXI will obtain the General NPDES Permit for Construction Activities from the appropriate agency(ies) for this project. As part of the application process, a Storm Water Pollution Prevention Plan (SWPPP) will be developed. The SWPPP will include an Erosion and Sediment Control Plan, a Storm Water Management Plan, and a Pollution Prevention Plan. As the project area contains a variety of conditions including steep slopes, stream banks, wetlands, and forested areas, the SWPPP will include a menu of best management practices that could be used in each of these types of areas consistent with the Virginia Stormwater Management Handbook, Virginia Erosion and Sediment Control Handbook, and the Virginia BMP Design Standards & Specifications.

ATXI is partnering with the National Wild Turkey Foundation and is currently pursuing additional partnerships with government and private entities that support native wildlife habitat enhancements. Native plants will be used for restoration of the right-of-way after construction, where appropriate, to help create a compatible and sustainable environment in the rights-of-way.

Other Permits

Other non-environmental permits and reviews will be conducted as required by the elements of the proposed actions and the jurisdictions crossed. These permits could include FAA reviews of structures near airports or FCC reviews of communications towers. Virginia DOT, Railroad companies, and local highway departments will review or permit crossings and access points. There will also be close coordination between ATXI and other utility companies, levee districts, and or drainage districts crossed by the proposed actions.

Discussion of Potential Public Opposition

While we are not attempting to route this option through the Shenandoah National Park, it is recognized that this is a scenic area and anticipated that people who live and work in this area will be concerned about an overhead utility being located in this region. In addition, preliminary review of the area indicates that there are a large portion of properties with Virginia Outdoor Foundation conservation easements. Minimizing impacts to these properties will be part of the routing criteria used, but there may still be impacts to these properties. Ameren will need to work closely with the Virginia Outdoor Foundation through the route selection and easement acquisition process.

C.2 Project Component Cost Estimates

ATXI developed the project cost estimate using actual information from a variety of recently executed projects in Ameren's existing service territory that were of similar size, design, geography, etc. Where feasible, ATXI used actual procured costs for major equipment (e.g., transformers). In other cases, ATXI developed representative unit costs ($/mile) for transmission lines that could be applied to this project. Costs for services (engineering, project management, procurement, construction management, etc.) were developed using a bottoms up approach. For some regional specific costs (e.g., real estate), actual costs were obtained from local firms. Where known differences existed between the projects, adjustments were made accordingly. A check estimate was obtained from a third-party consultant that has recently constructed projects in the region and differences were reviewed in depth and considered in development of the final cost estimate. A 25% contingency has been added to account for 'known unknowns'. Given the short period of time available, ATXI feels that we have appropriately estimated the costs associated with this project.

The project cost estimate is provided in the following table and is broken into the following sub-categories: a) New sub-stations; b) Refurbishments to existing sub-stations; and c) New transmission lines. All costs were estimated assuming a 3% escalation rate and assuming in-service dates, as defined per the project schedule.

[redacted]

GRAND TOTAL	$ 198,586,828

C.3 Schedule

A milestone project schedule is attached as Appendix G.

[redacted]

[redacted]

Other key comments regarding the proposed schedule include the following:

[redacted]

[redacted]

C.4 On-going Transmission Facility Items

C.4.a Operational Plan

The package shall contain the proposing entity's plan for operating the new transmission facilities for the proposed project. At a minimum, the plan should discuss the proposing entity's plan for securing a control center facility and provide required telemetry to PJM.

Ameren operates a fully functional Transmission Operations/Balancing Authority Operations Center. From this location, we dispatch transmission facilities across three states, as well as two Balancing Authority Areas (BAAs). ATXI proposes to use this operating center to dispatch the transmission assets for the proposed project. Ameren maintains short-term and long-term fully functional backup facilities to provide redundancy to the primary operating center.

For the proposed project, ATXI proposes to hire at least one full-time operator that would reside in the area around the transmission asset. This operator would report directly to the Operations Center and would be responsible for all routine operating tasks and would perform routine maintenance, as well as provide first response. As required by manpower needs, this operator would be supported by contract personnel from one of Ameren's strategic suppliers, as discussed earlier in this proposal.

ATXI will operate the proposed transmission assets consistent with PJM's TO/TOP matrix. Ameren has never had a NERC Standard violation for the Order 693 standards and has successfully completed three on-site SERC audits. ATXI will negotiate interconnection agreements with the two incumbent transmission operators; Dominion Electric Power and ATSI, (an affiliate of First Energy). Ameren currently has transmission interconnection agreements in place with over 20 entities, including several PJM members.

Real-time system information will be delivered to PJM and the Ameren Operations Center via direct communications from the Remote Terminal Unit (RTU) ports. Communication will be on direct communication facilities or Inter Control Center Communications Protocol (ICCP). Digital Fault Recorders (DFR) data will be installed on the lines consistent with Ameren practice. This data and that from electronic relays will be available to the Operations Center for analysis.

Lightning data from the area of these facilities will be made available to the Operations Center for analysis. System Control and Data Acquisition (SCADA) displays will be built and maintained by the Transmission Technical staff at the Operations Center. Data from other

regional transmission operators will be provided via ICCP for area systems not controlled by Ameren; to develop SCADA displays for a sufficient footprint to facilitate operational considerations.

Ameren will develop and maintain Normal, Abnormal and Emergency procedures for the new facilities as appropriate. Ameren personnel will be directly responsible for operational response (e.g., first response and switching). Ameren has an ongoing multi-disciplinary event review team that addresses operational events to support operational excellence. Ameren is a participant in mutual aid agreements and regularly dispatches crews to support other Transmission Owners, and will call on said aid as needed.

C.4.b Maintenance Plan

The package shall contain the proposing entity's plan for maintaining the new transmission facilities for the proposed project including equipment spares.

For the proposed project, ATXI will be responsible for line maintenance, substation maintenance and relay maintenance, vegetation maintenance and overall management of the greenfield transmission assets. Ameren personnel from the Operations Center will initiate and develop working relationships with area transmission operators, transmission customers, power plants and the reliability coordinator, similar to agreements Ameren has previously developed with Duke Energy, AEP, Commonwealth-Edison and First Energy.

As mentioned in Section C.4.a, ATXI will hire a local operator that will also perform routine maintenance and supervise, as required, planned maintenance services provided through one of Ameren's strategic suppliers. Planned maintenance and compliance activities for substation, line and relay equipment will be scheduled and arranged consistent with Ameren criteria or local criteria to ensure excellent coordination and an acceptable level of reliability during said activities.

Planned outages for maintenance will be arranged and submitted to the PJM reliability coordinator by Operations Center personnel. Outages affecting neighboring transmission owners will be also be coordinated directly. Outages will be coordinated to achieve simultaneous terminal and line work when possible, and will respect area constraints and the minimization of power plant output restrictions.

Ameren will be installing RFID markers along the right-of-way per our conventional practice, to protect landowners and assure effective **total** right-of-way maintenance.

C.5 Assumptions

A list of assumptions, uncertainties and / or qualifiers that may impact the estimated costs and schedules must be identified.

In general, permitting of above ground transmission lines is a multifaceted undertaking with multiple parties involved. For this reason and the fact that the route selection process has not been completed at this time, the exact studies and permits required and the risks associated with the permitting process is difficult to identify precisely at this time. However, there are several items that should be noted at this time that could challenge the cost and schedule presented in this proposal.

Ameren TRANSMISSION

[redacted]

Appendix A –REDACTED [redacted]

Ameren TRANSMISSION

Appendix B – REDACTED [redacted] [redacted]

Ameren TRANSMISSION

Appendix C – REDACTED [redacted]

[redacted]

Ameren TRANSMISSION

Appendix D – REDACTED [redacted]

[redacted]

Ameren TRANSMISSION

Appendix E – REDACTED [redacted]

Ameren TRANSMISSION

Appendix F – REDACTED [redacted] [redacted]

Appendix G – REDACTED [redacted]