Revised
Generation Interconnection
Feasibility Study Report

For

PJM Generation Interconnection Request
Queue Position V3-030

St. Benedict-Patton 46kV

March 2010

Preface

The intent of the Feasibility Study is to determine a plan, with approximate cost and construction time estimates, to connect the subject generation interconnection project to the PJM network at a location specified by the Interconnection Customer. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system. All facilities required for interconnection of a generation interconnection project must be designed to meet the technical specifications (on PJM web site) for the appropriate transmission owner.

In some instances an Interconnection Customer may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection or merchant transmission upgrade, may also contribute to the need for the same network reinforcement. The possibility of sharing the reinforcement costs with other projects may be identified in the Feasibility Study, but the actual allocation, if any, is included in the System Impact Study.

The Study estimates do not include the feasibility, cost, or time required to obtain property rights and permits for construction of the required facilities. The project developer is responsible for the right of way, real estate, and construction permit issues. For properties currently owned by Transmission Owners, the costs associated with them will be addressed when seeking an Interconnection Agreement as outlined below. Developer will also be responsible for providing and installing metering equipment in compliance with applicable PJM and Transmission Owner standards.

General

The Interconnection Customer (IC), has proposed a 32.2 MW (4.0 MW capacity) wind powered generating facility consisting of fourteen (14) Siemens 2.3 MW Mark II WTG on a single collector system. The facility will be located approximately 1.7 mile east of the existing St Benedict 46 kV substation (see Attachment 1) in Cambria County, PA.

The direct connection of this project will be accomplished by the construction of a new 46 kV 3 breaker ring bus and the looping of the Ashville - Spangler (N) 46 kV line to it. Procurement and construction of the 46 kV transmission line connecting the 3 breaker ring bus to the Wind Farm 46 kV export bus is the responsibility of the Interconnection Customer as this facility is not owned by FirstEnergy Corp. The Interconnection Customer will be responsible for acquiring all easements, properties and permits that may be required to construct both the project connection 3 breaker ring bus and the attachment facilities. The Interconnection Customer will also be responsible for the rough grade of the property and an access road to the proposed 3 breaker ring bus site. A summary of the St Benedict - Patton (V3-030) Project direct connection facilities that will be required and their estimated cost are shown on Attachment 3.

Attachment facilities and local upgrades (if required) along with terms and conditions to interconnect V3-030 will be specified in a separate two party Interconnection Agreement (IA) between the Transmission Owner and the Interconnection Customer as this project is considered FERC non-

jurisdictional per the PJM Open Access Transmission Tariff (OATT). From the transmission system perspective, no network impacts were identified as detailed below.

Point of Interconnection

V3-030 will interconnect with the Penelec distribution system on a 46kV line between the Spangler and Summit substations.

Network Impacts

The queue V3-030 project was studied as a 32.2MW injection (4.0MW of which was capacity) into PENELEC's 46kV system. The closest modeling point available in PJM's case was a tap of the equivalized 46kV circuit between the Spangler and Summit substations. The project connected to the system through a line tap between the Spangler and Summit substations. Project V3-030 was evaluated for compliance with reliability criteria for summer peak conditions in 2014.

Potential network impacts were as follows:

Generator Deliverability

(Single or N-1 contingencies for the Capacity portion only of the interconnection)

No problems identified.

Multiple Facility Contingency

(Double Circuit Tower Line, Line with Failed Breaker and, Bus Fault contingencies for the Full energy output.

No problems identified.

Contribution to Previously Identified Overloads

(This project contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

No problems identified.

Short Circuit

The study also showed no significant fault current contribution to the breakers which have already been identified as over-duty. This study was performed on the 100kV and above system.

New System Reinforcements

(Upgrades required to mitigate reliability criteria violations, i.e. "Network Impacts," initially caused by the addition of this project's generation)

None

Contribution to Previously Identified System Reinforcements

(Overloads initially caused by prior Queue positions with additional contribution to overloading by this project.

None.

Potential Congestion due to Local Energy Deliverability

(PJM also studied the delivery of the energy portion of the surrounding generation. Any potential problems identified below are likely to result in operational restrictions to the project under study. The developer can proceed with Network Upgrades to eliminate the operational restriction at their discretion by submitting a Transmission Interconnection Request. Note: Only the most severely overloaded conditions are listed below. There is no guarantee of full deliverability for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed which analyzes all overload conditions associated with the identified overloaded element(s). As a result of the aggregate energy resources in the area, the following violations were identified:

No problems identified.

Power Flow Analysis (46kV network as lumped equivalent at 115kV)

A Power Flow study was conducted to determine the reliability impact of the proposed St Benedict - Patton (V3-030) Project on the FE Transmission System. This included the performance of a contingency analysis to identify any facility overload or voltage condition that violates the FE Planning Criteria. Any such violation that is either directly attributable to this project or for which it will have a shared responsibility is included in this report with a least cost plan identified to mitigate them.

The St Benedict - Patton (V3-030) Project Power Flow Analysis that was performed was completed using a 2014 summer peak load base case power flow provided by the PJM staff. This base case included a detailed representation of the Penelec transmission system. However, 46kV load in the area of the proposed St Benedict and Patton 46 kV substations were modeled as lumped equivalent loads at the Spangler and Summit 115 kV substations. The St Benedict - Patton (V3-030) Project was modeled as a 50/50 split injection between the Spangler 115 kV substation and the Summit 115 kV substation. A simulation of all possible contingencies within the NERC and FE Planning Standards that are impacted by the St Benedict - Patton (V3-030) Project was conducted to test for criteria compliance.

The results from the study Power Flow Analysis showing a comparison of the FE and PJM contingency study results is detailed on Attachment 4. The PJM study was performed with a model which included the recently withdrawn Q72 generation project rated at 60MW (12MW capacity). The FE analysis takes the Q72 into account and is shown for two separate scenarios; scenario 1 is with the Q72 Project generator off line, and scenario 2 is with both the Q72 generator off line and the

Q72 required reinforcements removed. Attachment 1D illustrates the relatively large distance between the Q72 Project and the V3-030 Project, hence the presence or absence of Q72 has negligible impact on V3-030 power flows. As shown, the FE conclusion from this analysis is that there are no new bulk electric system network upgrades required for the St Benedict - Patton (V3-030) Project. Furthermore, there are no findings of previously identified criteria violations from other generation or transmission interconnection projects in which the St Benedict - Patton (V3-030) Project contributes.

In addition, the findings show that there are criteria violations which will have an impact on network congestion and local energy deliverability. The facilities impacted include Keystone - Shelocta 230kV line, and the Homer City – Shelocta 230 kV line. The Interconnection Customer will therefore be subject to generation curtailment in order to mitigate these violations.

Power Flow Analysis (Detailed 46kV network)

In order to identify any overloads on the 46kV system near the St Benedict - Patton (V3-030) Project, FirstEnergy studied its own detailed model for the 2014 Penelec Summer Peak case. The St Benedict - Patton (V3-030) Project was modeled at both 4 MW and 32.2 MW output, and with the generator power factor varied from 0.95 lagging to 0.95 leading.

4 MW Capacity Output
No overload/voltage issues identified

32.2 MW Energy Output
Issues of overvoltage were identified with the V3-030 wind farm modeled at unity power factor in which the voltage at the V3-030 POI exceeded the 1.05 P.U. maximum. However, there were no voltage issues identified with the wind farm modeled at 0.95 leading (absorbing VARs) power factor. Therefore, thermal overload issues were analyzed with the V3-030 wind farm modeled at 0.95 leading power factor.

Outage 1: Patton - V3-030 46 kV line segment

Modeled at unity power factor: Voltage violation at V3-030 interconnection bus (1.056 P.U.)
Modeled at 0.95 leading power factor: No voltage violation

The following overload conditions occur with V3-030 modeled at 0.95 leading power factor:

1. The Spangler - St Benedict 46 kV line segment loaded to 116% of its 23.9 MVA emergency rating. This requires replacement/upgrade of the existing relaying at Spangler on the N 46 kV line exit. The relay upgrade is included as part of the relay protection scope required to accommodate the new V3-030 interconnection substation and is included within the system protection scope for 46 kV direct connection.

2. The V3-030 - St Benedict 46 kV line segment loaded to 105% of its 31.6 MVA emergency rating. This requires either the reconductor of 1.6 miles of sub-transmission line or the curtailment of V3-030 generation.

Outage 2: Spangler - V3-030 46 kV line

Modeled at unity power factor: Voltage violation at V3-030 interconnection bus (1.08 P.U.)
Modeled at 0.95 leading power factor: No voltage violation

The following overload conditions occur with V3-030 modeled at 0.95 leading power factor:

1. The Ashville - Summit 46 kV line loaded to 118% of its 19.1 MVA emergency rating. This requires either the replacement/upgrade of the existing relaying at Summit and Ashville substations or the curtailment of V3-030 generation.

2. The Ashville - NSA Tap 46 kV line segment loaded to 105% of its 23.9 MVA emergency rating. This requires replacement/upgrade of substation conductor and the existing relaying at Spangler on the N 46 kV line exit. The relay upgrade is included as part of the relay protection scope required to accommodate the new V3-030 interconnection substation and is included within the system protection scope for 46 kV direct connection.

3. The V3-030 - Patton 46 kV line segment loaded to 104% of its 31.6 MVA emergency rating. This requires either the reconductor of 1.9 miles of sub-transmission line or curtailment of V3-030 generation.

Short Circuit and Dynamics Analysis

A short circuit analysis will be performed in the System Impact Study stage

System Protection Analysis

An analysis was conducted to assess the impact of the St Benedict - Patton (V3-030) Project on the system protection requirements in the area. The results of this review show that the following relay additions and upgrades will be required:

Ashville Substation - V3-030 46kV line exit

- One line exit relay panel - primary protection over fiber utilizing SEL321 primary relays and SEL311C backup over fiber

- New set of slipover CTs required.

- One fiber communication panel with SEL Remote I/O module to trip the V3-030 generation at V3 generation sub for breaker open at Ashville or MOABs open at Patton and St. Augustine. (2) additional SEL Remote I/O modules required to receive status of line MOAB contacts.

- Add SEL352 BF/SC (Breaker Failure / Sync Check) relays and associated Bus and Line VTs as needed.

V3-030 Interconnection Ring Bus Substation - Three Line Relay panels and One fiber panel for Ashville 46kV line and One Fiber Panel for Spangler 46kV line exit

- Ashville exit- - primary protection over fiber utilizing SEL321, backup using SEL311C over fiber, SEL Remote I/O module to trip V3-030 generation for breaker at Ashville or line MOABs open to Ashville sub,

- Spangler exit - - primary protection over fiber utilizing SEL321, backup using SEL311C over fiber, SEL Remote I/O module to trip V3-030 generation for breaker at Spangler or line MOABs open to Spangler sub

- V3-030 Generation exit - - dual bus protection utilizing SEL-587Z and SEL387 ; DTT (Direct Transfer Trip) via wiring to trip V3-030 generation

- SEL352 BF/SC relaying required (one per breaker).

V3-030 Generation Substation - V3-030 Interconnection line exit

- dual bus protection wiring for SEL-587Z and SEL387 ; DTT via wiring to trip V3-030 generation.

- Additional relaying to protect this substation supplied by the customer.

Spangler Substation - V3-030 46kV line exit

- One line exit relay panel - primary protection over fiber utilizing SEL321 primary relays and SEL311C backup over fiber

- New set of slipover CTs required.

- One fiber communication panel with SEL Remote I/O module to trip the V3-030 generation at generation sub for breaker open at Ashville or MOABs open at St. Benedict.

- One additional SEL Remote I/O modules required to receive status of line MOAB contacts.

- Add SEL352 BF/SC relays and associated Bus and Line VTs as needed.

St. Augustine, Patton, and St. Benedict Line MOABS-

- One SEL Remote I/O modules required to send status of line MOAB contacts

Ground grids for V3 Interconnection sub and Generation Sub shall be tied together to eliminate ground potential rise problems between substations.

Metering

The Interconnection Customer will be required to comply with all FE Revenue Metering Requirements for Generation Interconnection Customers. These FE requirements are detailed on Attachment 7 of this report.

Compliance Issues

The Interconnection Customer will be responsible for meeting all FE criteria as defined in the FE Requirements for Transmission Connected Facilities document. This includes the provision of a reactive power capability sufficient to maintain a composite power delivery for the facility at the interconnection point at a power factor between .95 leading (absorbing MVARs) and .95 lagging (producing MVARs).

The FE performed analysis does show the need for additional reactive capability beyond unity. With this wind farm modeled at a unity power factor, two outages were identified that caused over voltage conditions on the 46 kV system. Once the wind generation had the ability to absorb Vars from the system under these outages, the over voltage conditions were mitigated.

The Interconnection Customer must also meet all PJM, ReliabilityFirst and NERC reliability criteria and operating procedures required for standards compliance. For example, the Developer will need to properly locate and report the over and under-voltage and over and under-frequency system protection elements for its units as well as the submission of the generator model and protection data required to satisfy the PJM and ReliabilityFirst audits. Failure to comply with these requirements may result in a disconnection of service if the violation is found to compromise the reliability of the FE system.

FE Facility Upgrades and Costs

The results from the FE power flow analysis (Attachment 4) show that there are no FE criteria violations that are directly attributable to the capacity of the St Benedict - Patton (V3-030) Project. Furthermore, there are no violations affecting thermal overload on network branches in which the capacity of the St Benedict - Patton (V3-030) Project is a contributor. However, there are four violations (two violations at 230 kV and two violations at 46 kV) affecting network congestion and local energy delivery that the St Benedict - Patton (V3-030) Project will impact. Note that the FE and PJM study results differ somewhat due to the differences in the study process and power flow programs utilized. However, the overall conclusions reached by the FE and PJM staff are the same. In accordance with the RTEP procedures defined in the PJM Open Access Transmission Tariff and PJM Manuals, the Interconnection Customer is not responsible for network upgrades, and hence Attachment 5 has been omitted. The direct connection costs however are detailed in Attachment 3.

Note that all cost estimates contained in this document were produced without a detailed engineering review and are therefore subject to error. More accurate estimates will be determined as a part of the System Impact Study. The Interconnection Customer will be responsible for the actual cost of the direct connection that is implemented. In addition, the Interconnection Customer is responsible to provide the transmission line between V3-030 interconnecting substation and the V3-030 generating substation, as the Interconnection Customer will own this transmission line. FE herein reserves the

right to return to any issues in this document and, upon appropriate justification, request additional monies to complete any reinforcements to the transmission system.

Interconnection Customer Requirements

In addition to the FE facilities, the Interconnection Customer will also be responsible for meeting all criteria as specified in the applicable sections of the "FE Requirements for Transmission Connected Facilities" document including:

1. The purchase and installation of the minimum required FE generation interconnection relaying and control facilities. This includes over/under voltage protection, over/under frequency protection, and zero sequence voltage protection relays.

2. The purchase and installation of a 46 kV interconnection metering instrument transformer. FE will provide the ratio and accuracy specifications based on the customer load and generation levels.

3. The purchase and installation of a revenue class meter for each unit to measure the power delivered in compliance with the FE standards.

4. The purchase and installation of supervisory control and data acquisition (SCADA) equipment to provide information in a compatible format to the FE Transmission System Control Center.

5. The establishment of dedicated communication circuits for SCADA report to the FE Transmission System Control Center.

6. A compliance with the FE and PJM generator power factor and voltage control requirements.

7. The execution of a back-up service agreement to serve the customer load supplied from the either the St Benedict substation or Patton substation when the units are out-of-service. This assumes the intent of the Interconnection Customer is to net the generation with the load.

8. The rough grade of the property for the V3-030 Interconnection 46 kV Substation and an access road for the delivery of equipment to this site.

The above requirements are in addition to any metering required by PJM.

Summary

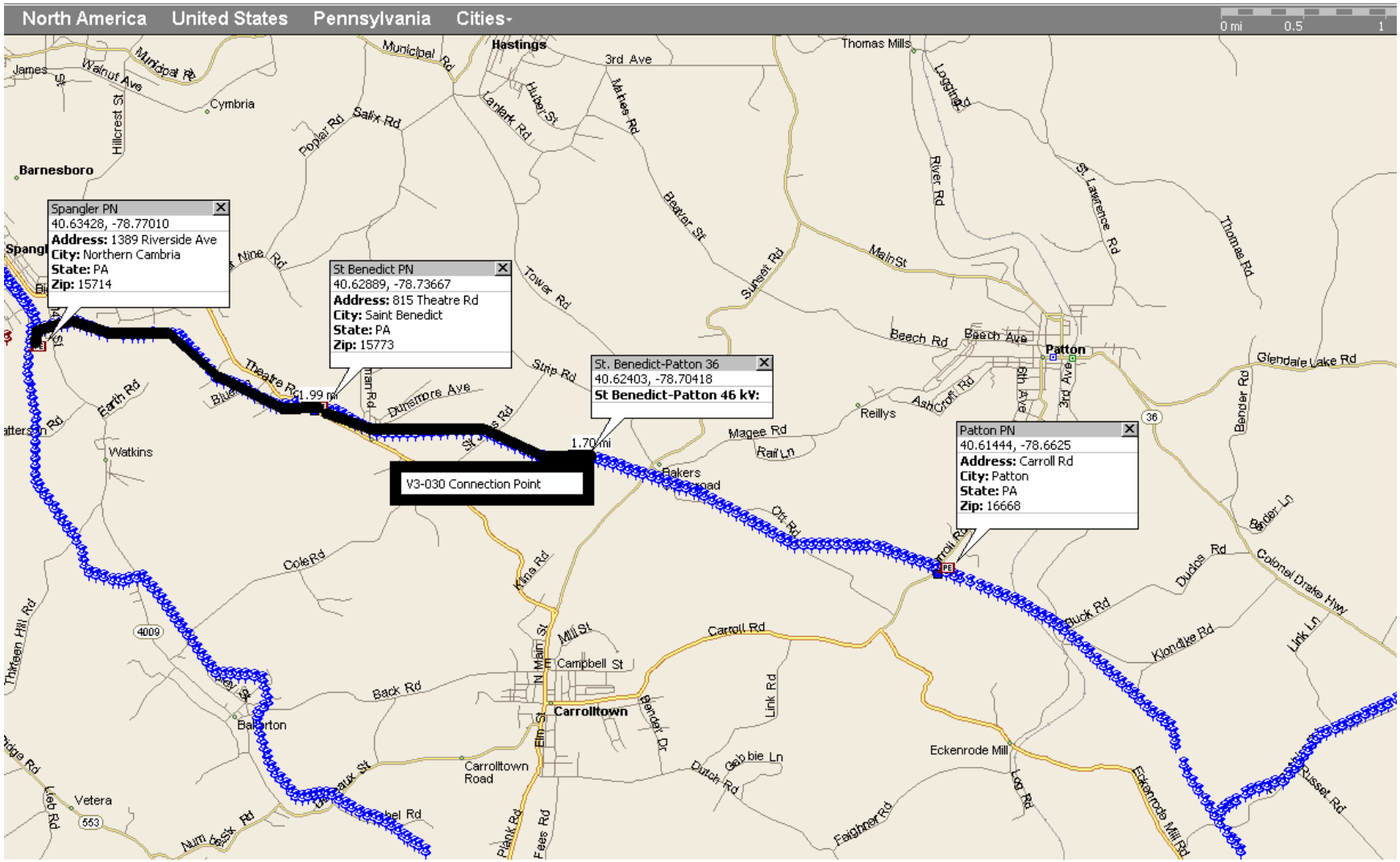
The St Benedict - Patton (V3-030) Project direct connection will require the facility upgrades defined in Attachment 3. As shown, the total estimated cost of the new three breaker ring bus substation and attachment lines is $4,756,300. The St Benedict - Patton (V3-030) Project does not have any network upgrades.

Based on the scope of the FE direct connection, it is expected to take a minimum of two (2) years from the signing of a Connection Service Agreement to complete the installation required for the St Benedict - Patton (V3-030) Project. This includes a preliminary payment that compensates FE for

the first three months of the engineering design work that is related to the construction of a new V3-030 Interconnecting substation and the loop of the Penelec 46 kV lines to this site. It also assumes that the Interconnection Customer will provide the property for the attachment substation and all right-of-way, permits, easements, etc. that will be needed. A further assumption is that there will be no environmental issues with any of the new properties associated with this project, that there will be no delays in acquiring the necessary permits for implementing the defined direct connection and network upgrades, and that PJM will allow all transmission system outages when requested.

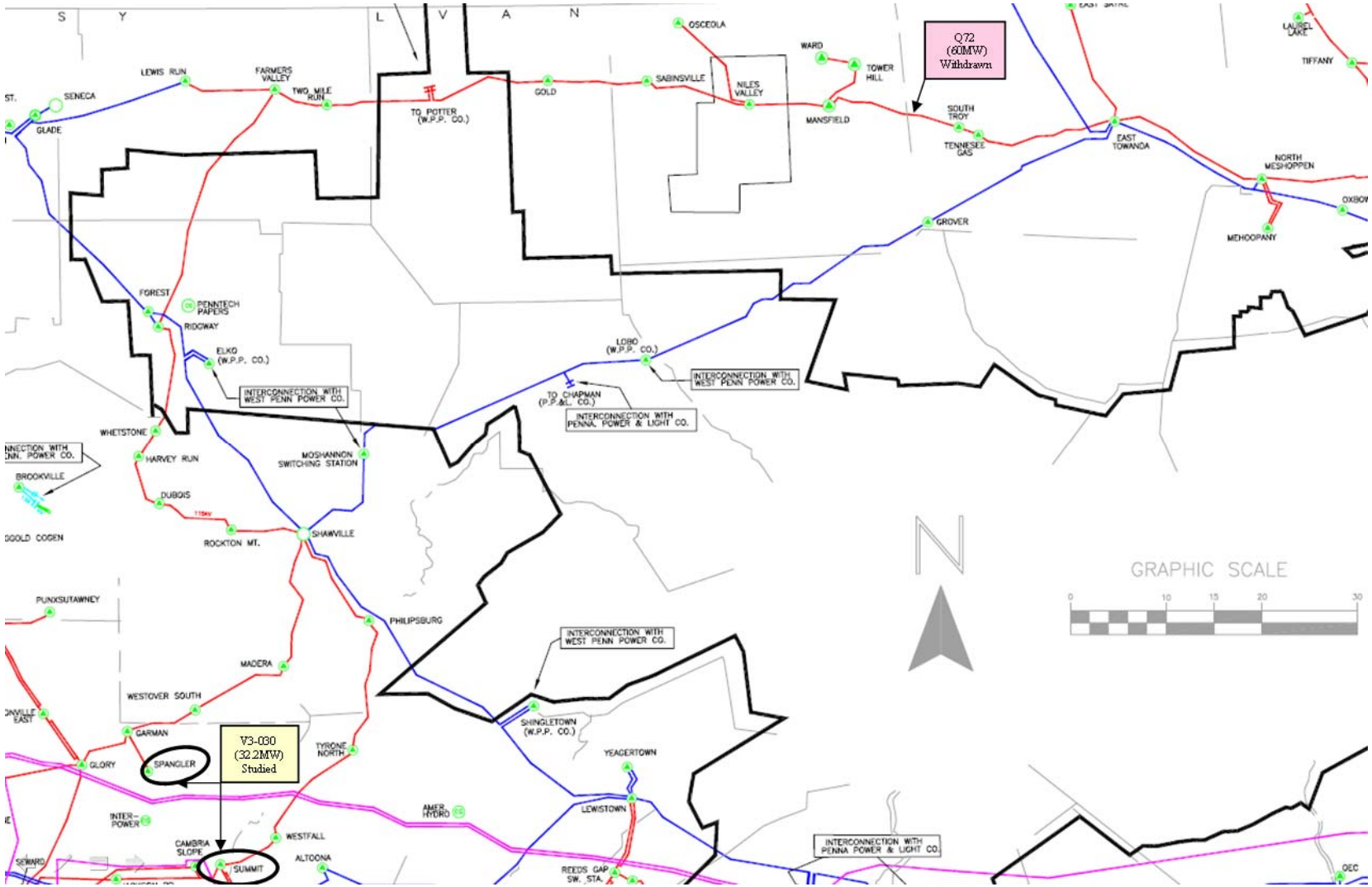
Attachment 1A
St Benedict – Patton (V3-030) RTEP Project
Project Location

Attachment 1B
St Benedict – Patton (V3-030) RTEP Project
46 kV Interconnection Substation Location (Street View)

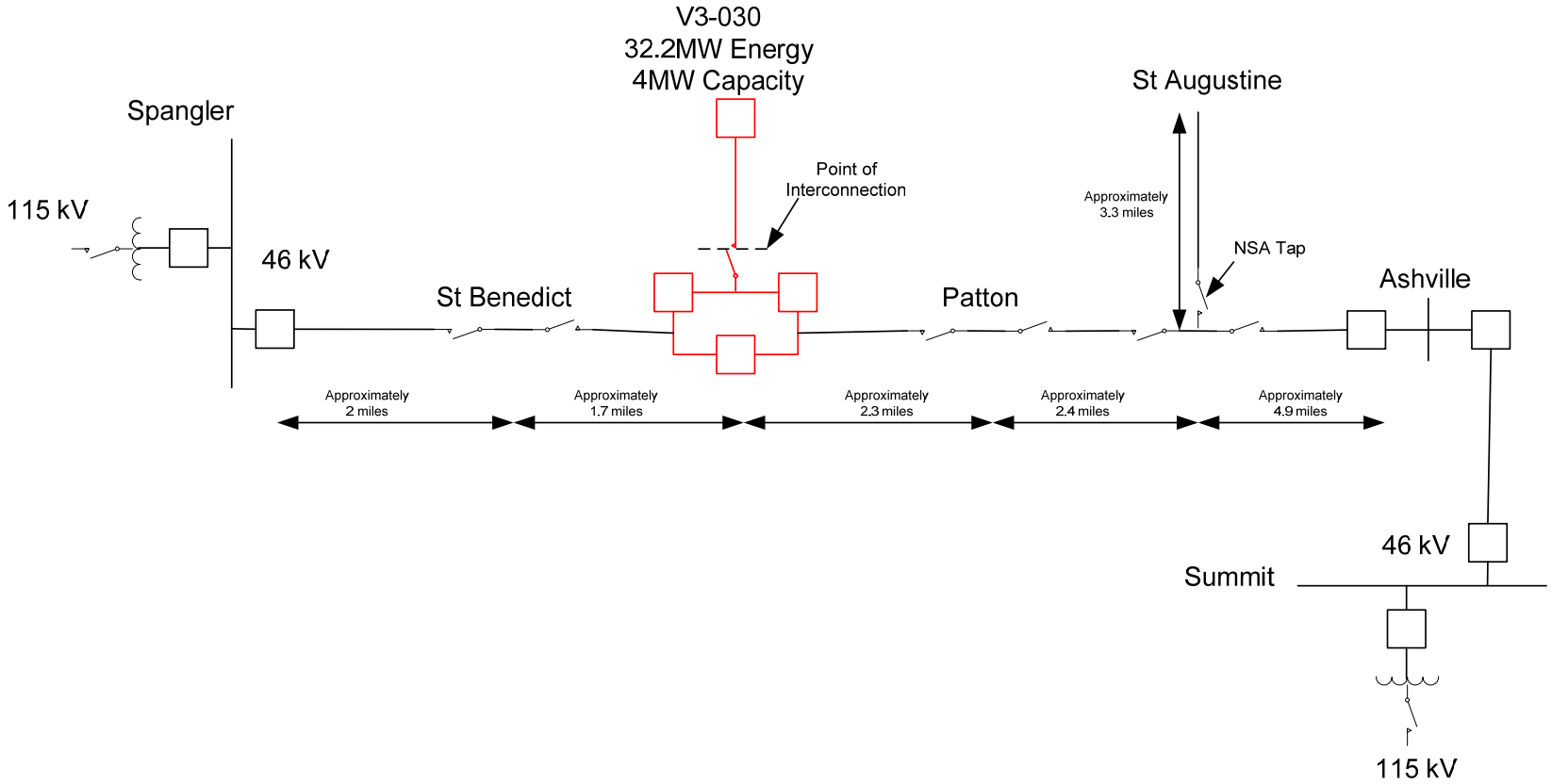


Attachment 1C
St Benedict – Patton (V3-030) RTEP Project
46 kV Interconnection Substation Location (Terrain View)

Attachment 1D
St Benedict – Patton (V3-030) RTEP Project
V3-030 Project Location in relation to Q72 Project Location (withdrawn)



Attachment 2
St Benedict – Patton (V3-030) RTEP Project
Conceptual 46 kV Interconnection Substation Configuration



Attachment 3
St Benedict - Patton 46 kV (V3-030) Feasibility Study
Direct Connection Requirements

Upgrade ID	Description	Total Cost
Region	46 KV line loop connection to a new 46 KV substation supplying a proposed wind farm between the existing St. Benedict and Patton Substations Interconnect Sub will be constructed immediately next to existing 46 KV line right-of-way. Assume no more than 100' from existing 46 KV line to new substation deadend structure.	$28,000
	Engineering Oversight and Commissioning Support of the Interconnection Customer Generation substation including support of protective relay installation	$63,900
PN-S-397-1	V3-030 Interconnect Sub: Install new 46 kV 3 breaker ring bus. (ISD 10/1/2012)	$2,543,100
	Install approx 16.51 Miles of Fiberoptic Cable from Ashville Sub to St Augustine Sub, Patton Sub, St Benedict Sub and Spangler Sub. Assumed to be a TX installations OPGW	$1,417,800
PN-S-397-5	St. Augustine: Add SEL 2505 I/O module to monitor status of line MOABs at remote 46kV substation. (ISD 10/1/2012)	$46,300
PN-S-397-4	Patton: Add SEL 2505 I/O module to monitor status of line MOABs at remote 46kV substation. (ISD 10/1/2012)	$46,300
PN-S-397-6	St. Benedict: Add SEL 2505 I/O module to monitor status of line MOABs at remote 46kV substation. (ISD 10/1/2012)	$46,300
PN-S-397-3	Spangler Sub: Line relay upgrade to support new 46kV V3-030 interconnect substation. (ISD 10/1/2012)	$272,700
PN-S-397-2	Ashville Sub: Line relay upgrade to support new 46kV V3-030 interconnect substation. (ISD 10/1/2012)	$291,900
TOTAL		$4,756,300

Attachment 4

St Benedict - Patton 46 kV (V3-030) Feasibility Study

FE Contingency Analysis Results

Identified New Project Upgrades

					Q72 Gen only removed		Q72 in Place		Q72 Gen and Reinforcement removed	
					FirstEnergy Results		PJM Results		FirstEnergy Results	
PJM #	FE Contingency	Outage Description	Overloaded Element	N/A-Hr Rating	MVA Flow	% Rating	MVA Flow	% Rating	MVA Flow	% Rating

Contributions To Previously Identified Overloads

					FirstEnergy Results		PJM Results		FirstEnergy Results	
PJM #	FE Contingency	Outage Description	Overloaded Element	N/A-Hr Rating	MVA Flow	% Rating	MVA Flow	% Rating	MVA Flow	% Rating

Potential Congestion due to Local Energy Deliverability (46 KV Lumped Equivalent Model)

					FirstEnergy Results		PJM Results		FirstEnergy Results	
PJM #	FE Contingency	Outage Description	Overloaded Element	N/A-Hr Rating	MVA Flow	% Rating	MVA Flow	% Rating	MVA Flow	% Rating
1	b_PN345-SX-#6	HANDSOME LAKE - WAYNE (WHL) 345 KV - (PJM-PN33A)	KEYSTONE - SHELOCTA 230kV line	721 / 841	1784	212.1	1144	135.99	1788	212.6
--	b_PN345-SX-#6	HANDSOME LAKE - WAYNE (WHL) 345 KV - (PJM-PN33A)	HOMER CITY - SHELOCTA 230 kV line	721 / 841	1622	192.9	--	--	1739	206.8
2	b_PN230-XF-#133A	LEWISTOWN 230/115KV BANK #3 FAULT	HOMER CITY - SHELOCTA 230 kV line	721 / 841	1702	202.4	1116	132.73	1710	203.3
--	b_PN230-XF-#133A	LEWISTOWN 230/115KV BANK #3 FAULT	KEYSTONE - SHELOCTA 230kV line	721 / 841	1801	214.2	--	--	1813	215.6
	Base Case		KEYSTONE - SHELOCTA 230kV line	721 / 841	1469	203.8	--	--	1474	204.5
--	Base Case		HOMER CITY - SHELOCTA 230 kV line	721 / 841	1436	199.1	--	--	1422	197.3

Potential Congestion due to Local Energy Deliverability (46 KV Detailed Model)

					FirstEnergy Results		PJM Results		FirstEnergy Results	
FE #	FE Contingency	Outage Description	Overloaded Element	N/A-Hr Rating	MVA Flow	% Rating	MVA Flow	% Rating	MVA Flow	% Rating
1	FE 1	Patton - V3-030 46 kV line	Spangler - St Benedict 46 kV line	23 / 23.9	--	--	--	--	27.7	116
--	FE 1	Patton - V3-030 46 kV line	V3-030 - St Benedict 46 kV line	31 / 31.6	--	--	--	--	33.2	105
2	FE 2	Spangler - V3-030 46 kV line	Ashville - Summit 46 kV line	19 / 19.1	--	--	--	--	22.5	118
--	FE 2	Spangler - V3-030 46 kV line	Ashville - NSA Tap 46 kV line	19 / 23.9	--	--	--	--	25.1	105
--	FE 2	Spangler - V3-030 46 kV line	V3-030 - Patton 46 kV line	31 / 31.6	--	--	--	--	32.9	104

Attachment 5
St Benedict – Patton (V3-030) RTEP Project
FE Network Facility Reinforcement Conceptual Cost Estimates

None Required

Attachment 6
St Benedict – Patton (V3-030) RTEP Project
FE Network Facility Reinforcement Conceptual One Line Diagrams

None Required

Attachment 7

FirstEnergy Revenue Metering Requirements for Generation Interconnection Customer

Interconnection Customer shall install, own, operate, test and maintain the necessary revenue quality Metering Equipment. This includes current transformers, voltage transformers, mounting structures, wiring, meters, communication circuits, and associated devices. The Metering Equipment must meet the specifications listed in the FirstEnergy and regional transmission organization (RTO) connection documents. The FirstEnergy "Requirements for Transmission Connected Facilities" are located at: http://www.firstenergycorp.com/feconnect

The Metering Equipment shall be located at the generation facility on the high voltage side of the generator step-up transformers or facility main step-up transformer and/or station service power transformers. Power flows to and from the facility shall be compensated to the Point of Interconnection.

FirstEnergy will provide revenue quality Metering Equipment for a station service power supply at a generation facility if the supply is from the local FirstEnergy distribution system.

The revenue quality Metering Equipment shall be capable of collecting and storing bidirectional billing data. The billing data shall be stored in intervals specified by FirstEnergy, typically fifteen minutes or thirty minutes. The Interconnection Customer must provide FirstEnergy with remote access to the billing data in the Metering Equipment via a dedicated voice-grade analog telephone circuit. The Interconnection Customer shall provide FirstEnergy with contact information for the person or persons responsible for meter programming and Metering Equipment maintenance.

The Interconnection Customer shall consult with FirstEnergy regarding the revenue quality metering system design and provide the following information:

- Facility one line and revenue metering installation drawings (schematics, wiring diagrams, etc.)
- Estimated power flows to and from the facility at all revenue metering points
- Current transformer and voltage transformer specifications, including manufacturer, type, nameplate drawings, and certified accuracy test reports
- Revenue meter specifications including manufacturer, type, model number, and accuracy
- Revenue meter program information including but not limited to billing data recorder channel assignments, recorder pulse weights (Ke), and read-only password for access to interval data by the FirstEnergy billing data collection system (MV-90)
- Revenue meter telephone number
- Revenue meter loss compensation data (if applicable)

The Interconnection Customer shall provide FirstEnergy with prior notification of any modifications at the facility that will affect the revenue meter measurements, including substation reconfigurations and meter program changes.

The revenue metering system at each location shall be tested for accuracy by the Interconnection Customer once every two years. The Interconnection Customer shall give reasonable notice to FirstEnergy of the time when the testing is scheduled so that FirstEnergy may have representatives present. FirstEnergy and the RTO shall have the right to audit the revenue metering equipment and/or related documents. The Interconnection Customer shall be given a reasonable period of time to comply with any requests associated with an audit.

Generation Interconnection Combined Feasibility/System Impact Study Report

For

PJM Generation Interconnection Request Queue Position V3-030

St. Benedict-Patton 46kV

January 2010

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Potential network impacts were as follows:

Generator Deliverability

*(Single or N-1 contingencies for the **Capacity** portion only of the interconnection)*

No problems identified.

Multiple Facility Contingency

*(Double Circuit Tower Line, Line with Failed Breaker and, Bus Fault contingencies for the **Full** energy output.*

No problems identified.

Contribution to Previously Identified Overloads

(This project contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

1. The SHELOCTA - KEYSTONE 230kV line (from bus 200795 to bus 200810 ckt 1) loads from 113.77% to 115.33% (DC power flow) of its emergency rating (841MVA) for the tower contingency (PL100639) as a result of V3-030. This project contributes approximately 13.1MW to cause this thermal violation.

2. The HOMER CITY - SHELOCTA 230kV line (from bus 200767 to bus 200795 ckt 1) loads from 111.3% to 112.38% (DC power flow) of its emergency rating (841MVA) for the tower contingency (PL100639) as a result of V3-030. This project contributes approximately 9.1MW to cause this thermal violation.

Short Circuit

The study also showed no significant fault current contribution to the breakers which have already been identified as over-duty. This study was performed on the 100kV and above system.

New System Reinforcements

(Upgrades required to mitigate reliability criteria violations, i.e. "Network Impacts," initially caused by the addition of this project's generation)

None.

Contribution to Previously Identified System Reinforcements

(Overloads initially caused by prior Queue positions with additional contribution to overloading by this project.

1. The SHELOCTA-KEYSTONE 230kV line overload would require the replacement of a disconnect switch at Shelocta Substation (estimated to cost $100,000) and a disconnect switch (estimated to cost $100,000) and two CT circuits (estimated to cost $280,000) at Keystone Substation. Further upgrades would require the upgrade/reconductor of 2.26 miles of transmission line (estimated to cost $1,356,000). The total cost of this upgrade is estimated to be **$1,836,000**.

2. The HOMER CITY-SHELOCTA 230kV line overload would require the replacement/upgrade of line trap and CT circuit at Homer City 230 kV substation (estimated cost approximately $265,000) and the reconductor of approximately 10.73 miles of 230 kV transmission line (estimated cost approximately $5,365,000). The total cost of this upgrade is approximately **$5,630,000**.

Potential Congestion due to Local Energy Deliverability

(PJM also studied the delivery of the energy portion of the surrounding generation. Any potential problems identified below are likely to result in operational restrictions to the project under study. The developer can proceed with Network Upgrades to eliminate the operational restriction at their discretion by submitting a Transmission Interconnection Request. Note: Only the most severely overloaded conditions are listed below. There is no guarantee of full deliverability for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed which analyzes all overload conditions associated with the identified overloaded element(s). As a result of the aggregate energy resources in the area, the following violations were identified:

No problems identified.