WHOLESALE GENERATION INTERCONNECTION (WGI) MANUAL

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Rev. 1 Effective Date: August 6, 2010

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Purpose:

Provide FirstEnergy Requirements for Wholesale Generation Interconnection (WGI) projects.

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1	08/06/10	Disclaimer language revised	Colleen Williams

Note: Details of updates after initial issue are located at the end of this document.

Manual Overview Contents

Manual Overview

Purpose

This manual contains the Transmission Owner (TO) requirements for wholesale generation interconnection projects consistent with the interconnection process as defined in the PJM Open Access Transmission Tariff (OATT) and applicable PJM Manuals. The purpose of this document is to provide a detailed list of FirstEnergy (FE) requirements, including required documentation for operational and property transfer, if applicable, when a generation interconnection is requested by an Interconnection Customer (IC). These requirements will facilitate the safe, efficient and reliable integration of the Interconnection Facilities into the transmission system.

Using this Manual

Explaining concepts is as important as presenting technical requirements to the wholesale generation IC. This approach is reflected in the way the material is organized and presented in this manual. This Introduction presents an overview of how to use the various documents referenced throughout the manual.

What You Will Find In This Manual

- **Introduction**: This section explains key terms and concepts. It provides an overview of how the different documents are integrated and clarifies the primary requirement that all deliverables associated with a specific milestone must be met before moving to the next project milestone.
- **Project Requirements:** This section describes specific requirements, guidelines, or procedures that the TO will transmit and the IC must provide as described by milestones during the project.
- **Exhibits and Attachments**: This section contains documents, forms, and tables that are referenced throughout this manual.
- **Glossary of Terms**: This section provides definitions of the terms and acronyms used throughout the manual.

Process Overview

The IC is required to review the entire FirstEnergy Wholesale Generation Interconnection Customer Requirements manual and develop a construction schedule for the project. The construction schedule must contain specific milestones, and the required documents associated with each milestone must be completed and submitted by the IC prior to moving to the next project milestone. Each required document will then be reviewed and accepted by the TO before the project can move to the next project milestone.

Disclaimer

In this document, the Transmission Owner (TO) has attempted to consolidate all requirements for safe, efficient and reliable interconnection of the Generator Unit and Interconnection Facilities to the transmission system. This manual may not be exhaustive of all PJM OATT and applicable PJM Manuals (PJM Documents) and is only intended to serve as an aid to interconnection. Further the PJM OATT and PJM Manuals may change from time to time. The TO retains the right to update this manual as necessary. In the event there are any conflicts and/or inconsistencies between this manual and the PJM OATT and PJM Manuals, the PJM documents shall govern. It is the Interconnection Customer's responsibility to ensure that all interconnection requirements under the PJM OATT and PJM manuals are met.

Key Documents

The following four documents are used throughout the project process:

1. **Wholesale Generation Interconnection Customer Requirements Document** ("Requirements Document") - A detailed narrative document that includes all aspects of the requirements that the IC must provide for a Wholesale Generation Interconnection Project. Refer to **Section 1** for the Customer Requirements and **Section 2** for related Attachments**.**
2. **Wholesale Generation Interconnection Customer Documentation Checklist** ("Documentation Checklist") - Each Requirements Document has an associated Documentation Checklist. The Documentation Checklist summarizes the requirements described in the Requirements Document. Each requirement on the checklist has a specific timing requirement for when it must be provided. Timing requirements are referred to as *milestone events*. Refer to **Section 3** for the Customer Documentation Checklist.
3. **Master Project Schedule** - The Master Project Schedule includes all of the primary tasks and the time frame in which they must be completed. A milestone is an event within the Master Project Schedule that includes the timing for when the event must occur. Each milestone represents one of two types of activities; 1) start of a new event, or 2) completion of a major deliverable. Refer to **Section 4** for the Master Project Schedule.
4. **Master Milestone Checklist** - This checklist integrates the requirements from each Documentation Checklist and aligns respective milestones into one master list. This list is used to record the action for specific required deliverables. All requirements for the milestone must be completed before moving to the next project milestone. Refer to **Section 3** for the Master Milestone Checklist. Note, this is the first checklist in Section 3.

Key Terms

Interconnection Customer (IC) - A Generation Interconnection Customer and/or a Transmission Interconnection Customer.

Transmission Provider (TP) - PJM / Regional Transmission Organization.

PJM – Transmission Provider (TP)

Transmission Owner (TO) - Each entity that owns, leases or otherwise has a possessory interest in facilities used for the transmission of electric energy in interstate commerce under the PJM OATT.

FirstEnergy (FE) – Transmission Owner (TO) (or affiliates, e.g,, Ohio Edison Company, The Cleveland Electric Illuminating Company, The Toledo Edison Company, Pennsylvania Power Company, Pennsylvania Electric Company, Metropolitan Edison Company, and Jersey Central Power & Light Company)

- For additional terms and definitions, see Appendix 1, Definitions, in the PJM Construction Service Agreement (CSA) and/or the Interconnection Service Agreement (ISA). In addition, all capitalized terms herein shall have the meaning set forth in Appendix 1 of the CSA/ISA.

Key Document Concepts

Figure 1 depicts the basic flow of document information between the four key documents that the IC must use (see *Key Documents*). There are two important pieces of information that each of the four key documents share:

1. The requirements in the Documentation Checklist which are specified by the TO and must be supplied by the IC (for example, Below and Above Grade Engineering Packages, Relay & Control Diagrams, Permits, etc.).

2. The time frame for when the required document must be submitted from the IC to the TO.

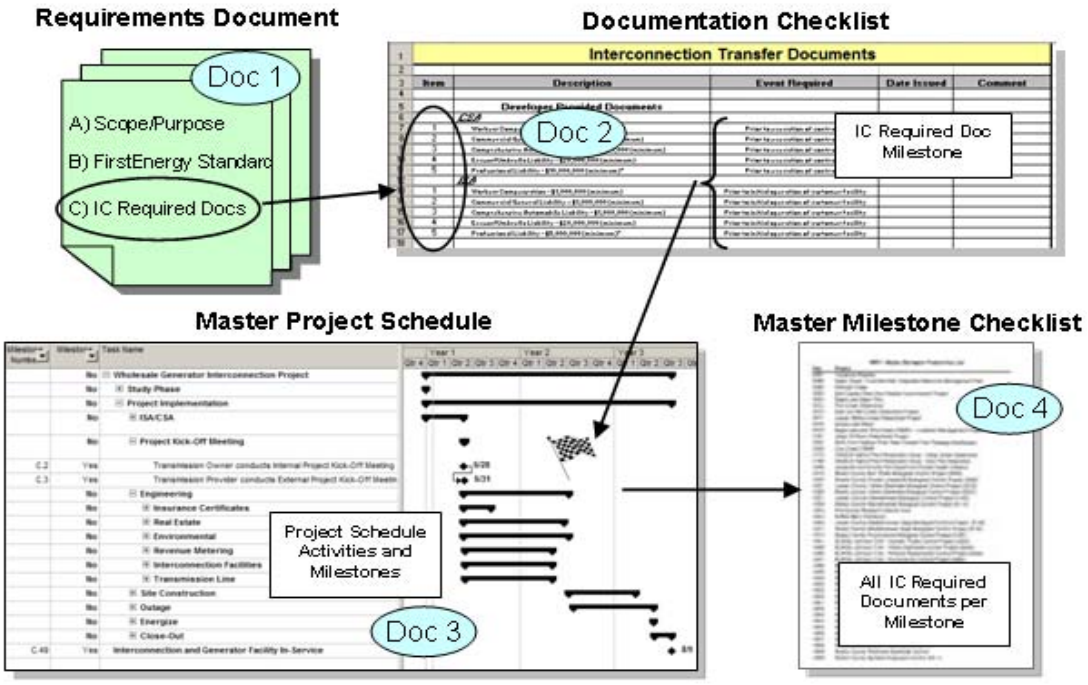


Figure 1
See Key Document Definitions
1 through 4 Above

Project Phases

Major phases documented in the Master Project Schedule are shown in **Figure 2** below. Each phase is detailed with project management activities that are aligned to milestones representing events within the project . During the Feasibility Kick-Off meeting the Option to Build requirements will be discussed.

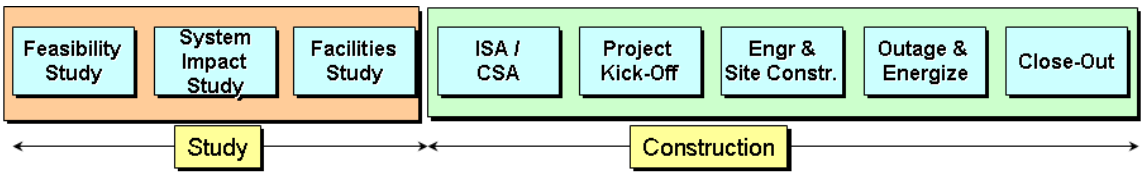


Figure 2

Construction Process Details

Figure 3 Outlines the construction process of managing the documents required for a Wholesale Generation Interconnection Project. The Construction Kick-Off meeting is the primary event that marks the beginning of a project facility implementation. The IC must then review the entire FirstEnergy Wholesale Generation Interconnection Customer Requirements package and incorporate the requirements into the project construction schedule. During the execution of the project schedule, specific events defined as milestones will have required documents associated with them (see Documentation Checklist). These requirements must be completed and documentation must be submitted by the IC at the designated milestone. Each required document will then be reviewed and accepted by the TO before the project can move to the next project milestone.

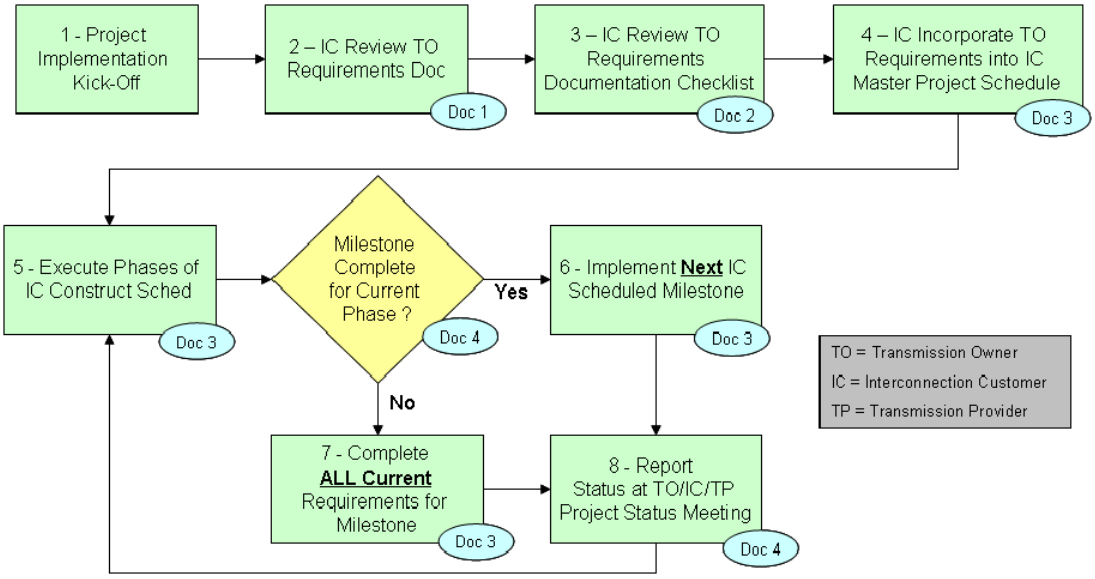


Figure 3
See Key Document Definitions
1 through 4 above

Master Project Schedule

The majority of the Wholesale Generation Interconnection Customer Documentation Requirements are developed around major components of the physical construction of the facility. In **Figure 4** below, each project phase is detailed with additional project management activities. Notice that the Engineering Phase for the Real Estate section has multiple Milestone Events assigned to it (C.8 through C.13). For a complete Master Project Schedule, refer to **Section 4.**

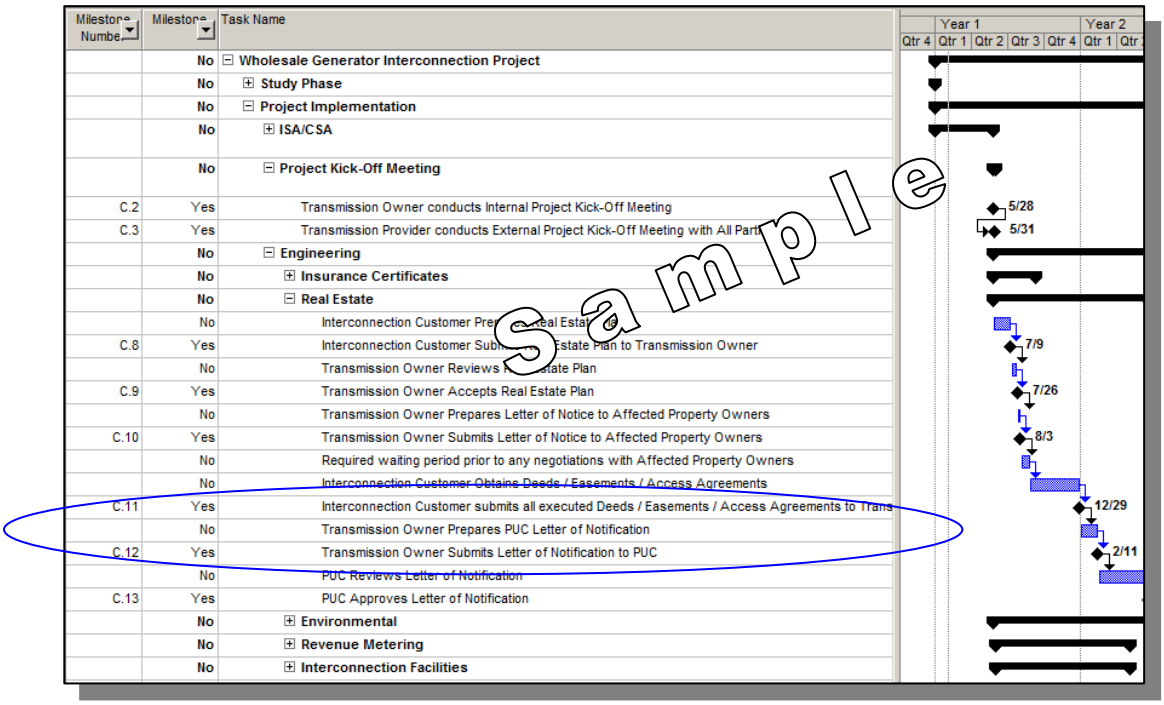


Figure 4

In this example, Milestone *C.11 – "Interconnection Customer submits all executed Deeds / Easements / Access Agreements to Transmission Owner,"* has specific deliverables associated with it, e.g., submit Deeds/Easements/Access Agreements. These deliverables are itemized and flow between three different documents:

1. The Real Estate Requirements Document – the source document for the specified requirements.
2. The Real Estate Documentation Checklist – the document used to list the required documentation.
3. The Master Milestone Checklist - used to integrate requirements from each Documentation Checklist and aligns the requirement with the respective milestones in one master list.

The ten major areas that have a Requirements Document and Documentations Checklist associated with them are:

1. Agreements Support
2. Real Estate
3. Vegetation Management
4. Insurance
5. Regulatory Siting and Environmental Permitting
6. Substation
7. Transmission Line
8. Communications
9. Revenue Metering & Electric Service Billing
10. Tax & Accounting

WGI Customer Requirements Document

Figure 5 below is an excerpt from the Real Estate Requirements Document. Each Requirements Document has three primary sections:

A. - Scope
B. - FE Requirements or related FE Standards
C. - FE Required Documentation

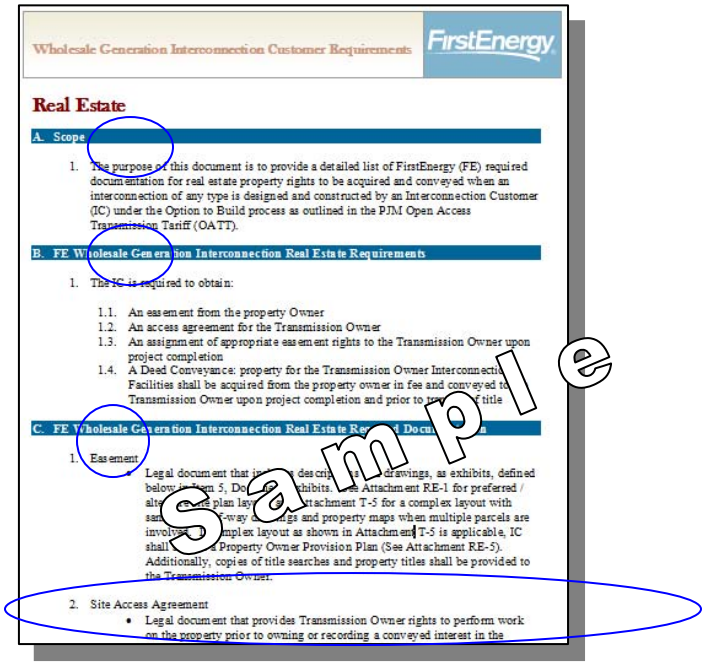
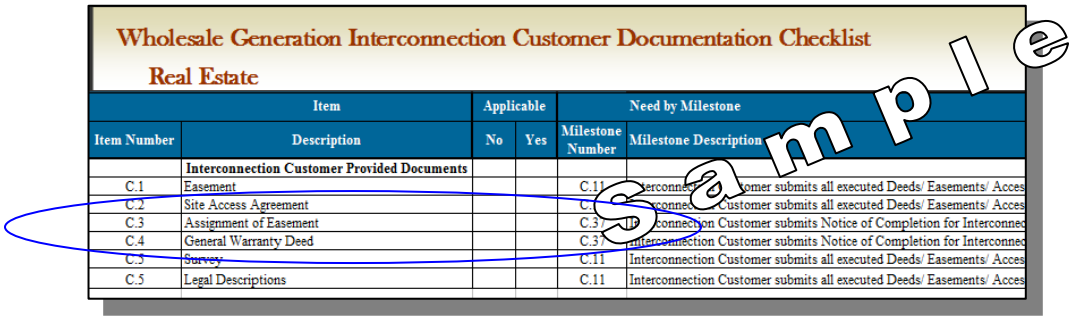


Figure 5

WGI Documentation Checklist

Each of the Requirements Documents has a checklist that summarizes Sections B and C. In **Figure 6** below, the Documentation Checklist is shown for the Real Estate section. Notice the item number on the checklist corresponds to Section C of the Requirements Document (**Figure 5**). For example, C.2 in both documents represents the "Site Access Agreement."

Also note in **Figure 6** that the milestone number and milestone description specifies when the required document must be submitted to the TO. The C.11 milestone "Interconnection Customer submits all executed Deeds / Easements / Access Agreements to Transmission Owner" is reflected in the TO's Master Project Schedule as shown in **Figure 4**.



Wholesale Generation Interconnection Customer Documentation Checklist

Real Estate

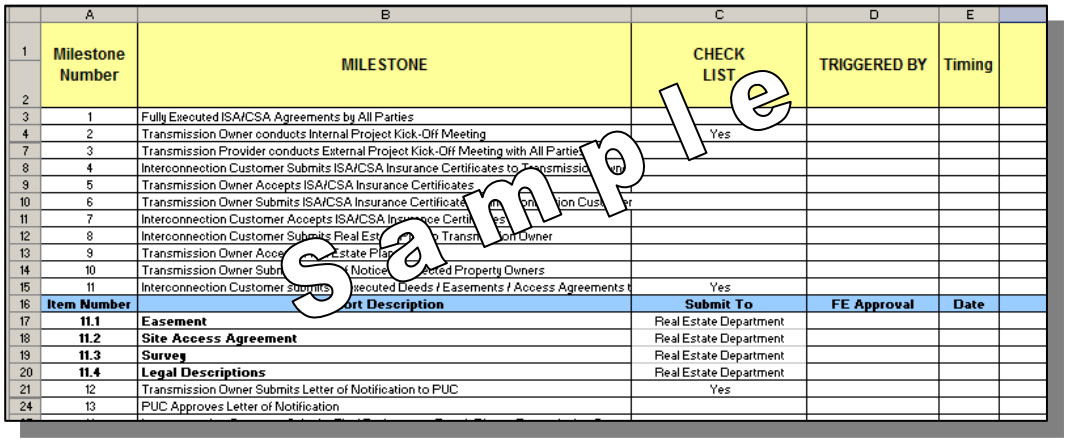
Item		Applicable		Need by Milestone	
Item Number	Description	No	Yes	Milestone Number	Milestone Description
	Interconnection Customer Provided Documents				
C.1	Easement			C.11	Interconnection Customer submits all executed Deeds/ Easements/ Acces
C.2	Site Access Agreement			C.11	Interconnection Customer submits all executed Deeds/ Easements/ Acces
C.3	Assignment of Easement			C.37	Interconnection Customer submits Notice of Completion for Interconnec
C.4	General Warranty Deed			C.37	Interconnection Customer submits Notice of Completion for Interconnec
C.5	Survey			C.11	Interconnection Customer submits all executed Deeds/ Easements/ Acces
C.5	Legal Descriptions			C.11	Interconnection Customer submits all executed Deeds/ Easements/ Acces

Figure 6

Master Milestone Checklist

Figure 7 below is an excerpt of the Master Milestone Checklist. This list integrates the requirements from each of the ten Documentation Checklists and aligns them with the respective milestone in one Master Milestone Checklist. This list is used to record the action for specific required deliverables. All requirements for each milestone must be completed before moving to the next milestone. For a complete Master Milestone Checklist, refer to **Section 3.**

In **Figure 7** below, note the "Site Access Agreement" deliverable has the Item Number 11.2. This refers to Milestone Number 11 and Item Number 2. This corresponds to the Requirements Document (see Figure 5 - Section C and Item Number 2) and to the Documentation Checklist (see Figure 6 – Item Number C.2).



	A	B	C	D	E	
1	Milestone Number	MILESTONE	CHECK LIST	TRIGGERED BY	Timing	
2						
3	1	Fully Executed ISA/CSA Agreements by All Parties				
4	2	Transmission Owner conducts Internal Project Kick-Off Meeting	Yes			
7	3	Transmission Provider conducts External Project Kick-Off Meeting with All Parties				
8	4	Interconnection Customer Submits ISA/CSA Insurance Certificates to Transmission				
9	5	Transmission Owner Accepts ISA/CSA Insurance Certificates				
10	6	Transmission Owner Submits ISA/CSA Insurance Certificates				
11	7	Interconnection Customer Accepts ISA/CSA Insurance Certificates				
12	8	Interconnection Customer Submits Real Estate to Transmission Owner				
13	9	Transmission Owner Accepts Real Estate Plat				
14	10	Transmission Owner Submits Notice to Affected Property Owners				
15	11	Interconnection Customer Submits Executed Deeds / Easements / Access Agreements t	Yes			
16	**Item Number**	**Report Description**	**Submit To**	**FE Approval**	**Date**	
17	**11.1**	**Easement**	Real Estate Department			
18	**11.2**	**Site Access Agreement**	Real Estate Department			
19	**11.3**	**Survey**	Real Estate Department			
20	**11.4**	**Legal Descriptions**	Real Estate Department			
21	12	Transmission Owner Submits Letter of Notification to PUC	Yes			
24	13	PUC Approves Letter of Notification				

Figure 7

Schedule Conclusion

The Master Project Schedule is used to convey to the IC the required deliverables throughout the major project phases. It is not intended to be a detailed implementation schedule for construction activities. It is required that the milestones used in the Master Project Schedule are integrated into the overall engineering and construction project schedule to ensure efficiency and standardization of information reported throughout the project.

By adhering to the process prescribed in the enclosed documentation, all parties will be able to ensure a safe, efficient and reliable integration with the successful transfer of the Interconnection Facilities into the transmission system.

Section 1 Contents

Agreements Support

A. Scope

1. This document contains the Transmission Owner (TO) requirements for wholesale generation interconnection projects consistent with the interconnection process as defined in the PJM Open Access Transmission Tariff (OATT) and applicable PJM manuals. The purpose of this document and attached checklist is to provide a detailed list of FirstEnergy (FE) requirements, including required documentation for operational and property transfer, if applicable, when a generation interconnection is requested by an Interconnection Customer (IC). These requirements will facilitate the safe, efficient and reliable integration of the Interconnection Facilities into the transmission system.
2. The "Wholesale Generation Interconnection Customer Agreements Support Documentation Checklist" will be used to track the status of each document.

B. FE WGI Requirements

1. An IC requesting interconnection of a generating facility (including increases to the capacity of an existing generating unit or decommissioning of a generating unit) within the PJM RTO must do so within PJM's defined interconnection process which can be found at the PJM web site at: http://www.pjm.com/home.aspx. The PJM Operating Agreement, Schedule 6, and the PJM OATT, Part IV, describe the procedures used to process requests for interconnection with the PJM transmission system. Specific requirements for the interconnection request process, financial obligations, and milestone responsibilities can also be found in PJM Manual M14A. PJM Manual M14C describes the various studies and agreements required to complete the transmission interconnection planning process.
2. In addition to the Transmission Provider (TP) requirements, the IC should refer to the FE "Requirements for Transmission Connected Facilities" located at: http://www.firstenergycorp.com/feconnect/Requirements_for_Transmission_Connected_Facilities.html and the "FirstEnergy Wholesale Generation Interconnection Customer Requirements" for specific Real Estate, Vegetation Management, Insurance, Regulatory Siting and Environmental Permitting, Substation, Transmission Line, Communications, Revenue Metering and Electric Service Billing, and Tax and Accounting Requirements.
3. The IC must submit a completed Interconnection Request to the TP, execute the Feasibility Study Agreement (**Attachment N in PJM OATT**), and provide the required deposit and other specific documents as required by the PJM OATT, in order to reserve a place in PJM's interconnection queue.
4. The IC will participate in a kickoff meeting with the TP and the TO within 45 days after receipt of a valid Interconnection Request, if the Interconnection Request is received in the first calendar month of the current New Services Queue; or within 30 days if the Interconnection Request is received within the second calendar month of the current New Services Queue; or in 20 days if the Interconnection Request is received in the third calendar month of the date of the beginning of the New Services Queue.
5. The TO will provide a Project Team Contact List (**Attachment AS-1**) for use by the TP and the IC. The Project Team Contact List will identify each of the TO primary contacts and will be used to assign responsibility for the Master Milestone Checklist.
6. The TP and the TO will coordinate efforts to complete the Feasibility Study Report for submittal to the IC within 90 days from the close of the New Services Queue. Upon submittal of the Feasibility Study Report to the IC, a System Impact Study Agreement will also be issued to the IC for execution.

7. The IC must return the executed System Impact Study Agreement to the TP within 30 days, along with the required deposit and other specific documents as required by the PJM OATT.
8. The TP and the TO will coordinate efforts to complete the System Impact Study Report for submittal to the IC. Due diligence shall be used to complete the System Impact Study within 120 days of the date the study commences. Upon submittal of the System Impact Study Report to the IC, a Facilities Study Agreement will also be issued to the IC for execution.
9. The IC must return the executed Facilities Study Agreement to the TP within 30 days, along with the required deposit and other specific documents as required by the PJM OATT.
10. The IC will participate in a Facilities Study kickoff meeting with the TP and the TO as scheduled by the TP.
11. The TP and the TO will coordinate efforts to complete the Facilities Study Report for submittal to the IC within the time estimated in the Facilities Study Agreement. Upon submittal of the Facilities Study Report to the IC, an Interconnection Service Agreement (ISA) also wi be issued to the IC for review and execution. The IC must return an executed copy of the ISA to the TP within sixty (60) days after receipt of the Facilities Study Report and ISA, along with the required security. The Interconnection Customer must also demonstrate that it has met the milestones specified in Section 212.5 of the PJM OATT. Within 45 days after receipt of the executed ISA, the TP will submit the Construction Service Agreement (CSA) to the IC for review and execution. The IC must return an executed copy of the CSA to the TP within ninety (90) calendar days of receipt of the CSA.
12. Within fifteen (15) days following full execution of the CSA/ISA, the IC shall participate in a project kickoff meeting with the TP and the TO. Note: The IC should refer to PJM Manual 14C for specific information related to the engineering and construction phase of the project.
13. The IC shall participate in (at a minimum) monthly project meetings with the TP and the TO where they will provide and update their design and construction schedules, their major equipment orders and delivery schedules, and key milestones.
14. 95/5 Power Flow Certificate

    14.1. Within 45 days after execution of the CSA/ISA, the IC is to provide the TO with an independent engineering certification (i.e., the professional engineer's seal shall be affixed), as specified in IRS Notice 88-129, attesting that the anticipated power flows through the Interconnection Facilities to the power producer for the first ten years of operation will comprise no more than 5% of the projected total power flows over the Interconnection Facilities. Please see "FirstEnergy Wholesale Generation Interconnection Requirements – Tax and Accounting" for detailed tax requirements.

15. Field Engineer/Inspector

    15.1. The TO may assign a field engineer or field inspector to review the IC's construction of the Interconnection Facilities. The IC will cooperatively assist the field engineer or field inspector. The TO and the IC will cooperatively attempt to resolve all identified construction inadequacies; however, the TO expressly reserves the right to issue an order to halt part or all of the construction activities if, in its opinion, the Interconnection Facilities construction is not proceeding in accordance with the TO's accepted design drawings of the facilities. The IC shall comply with all such orders to halt construction activities.

16. Project Change Request Process

    16.1. Once a package or plan has been reviewed and accepted by the TO, a newly proposed change must be submitted through the Project Change Request Form (**Attachment AS-2**) by the IC. The Project Change Request Form documents the reason for the change and the technical description of the change. Sketches, drawings, and/or similar materials may be attached to the Project Change Request

Form. The IC shall assign a unique sequential number to each Project Change Request Form. Each change shall be submitted to the TO for review and acceptance prior to implementing the project change. The TO will indicate their acceptance with an appropriate indication on a copy of the IC's submitted documentation. In certain cases, when an emergency construction issue arises, the Project Change Request Form may follow the field action within 24 hours of implementation. In these cases the resolution must have been verbally discussed with mutual agreement to proceed from both the TO and the IC.

16.2. It is anticipated that during the commissioning of the facility, field changes will be required as inspection and testing proceeds. It is critical that all deviations from the submitted and accepted design are recorded on the Project Change Request Form (**Attachment AS-2**). The IC will be required to submit all Red Line As-Built Drawings and the associated Project Change Request Form(s) that document each of the red-line deviations. The submittal of the Red Line As-Builts and catalog of Accepted Project Change Request Forms are required to be submitted at the following Project Milestones:

16.2.1. Milestone C.37 - Interconnection Customer submits Notice of Completion for Transmission Line and Interconnection Facilities.

16.2.2. Milestone C.44 - Successful Energization of Interconnection Facilities.

16.2.3. Milestone C.47 - Interconnection Customer Submits Bill of Sale & Notice of Transfer of Title to Transmission Owner

17. Outage Scheduling

17.1. FE will apply for the transmission line outage or outages required for the construction of the transmission line connection, and energization of the TO Interconnection Facilities and the IC Interconnection Facilities.

17.2. The IC will submit the Interconnection Customer Outage Readiness Notification to the TO (**Attachment AS-3**) seven months prior to the requested outage date. This seven month period allows the TO to submit the outage request to the TP for outages greater than five days in duration by the first day of the month, six months prior to the start of the outage in accordance with tariff requirements. The IC should refer to PJM Manual M03 Section 4 for additional outage details.

17.3. In addition, the IC should be aware that outage requests during peak load periods will typically not be approved and that the TP reserves the right to cancel outages at any time due to system reliability conditions.

17.4. If the IC performs a non-direct connection network upgrade under Option to Build, then the IC would need to make an additional outage request to the TO.

18. Notice of Completion

18.1. The IC shall notify the TP and the TO in writing upon completion of the following:

18.1.1. Customer Facility

18.1.2. The IC Interconnection Facilities

18.1.3. Any TO Facilities for which the IC has completed through exercising the Option to Build alternative. (**Attachment AS-4**).

(Reference PJM Manual 14C, Section 2)

19. Notice of Successful Inspection and Testing of Facilities

    19.1. The TO shall issue the Notice of Successful Inspection and Testing of Facilities to the IC within 10 days after satisfactory inspection and/or testing of the Interconnection Facilities built by the IC (**Attachment AS-5**).

    (Reference OATT Att. P, App. 2, Section 3.8.5)

20. The IC must provide verification of successful operation of telemetering systems to the TO prior to energization (**Attachment AS-6**). (Reference OATT Att. P, App. 2, Section 3.9.3)

21. The IC must provide verification of transfer of all utilities (e.g., phone, water) to the TO.

22. Notice of Transfer of Operational Control

    22.1. The IC shall issue the Notice of Transfer of Operational Control to the TO prior to energization (**Attachment AS-6**).

    (Reference OATT Att. P, App. 2, Sections 3.9.1 and 3.9.3)

23. Notice of Acceptance of Facilities

    23.1. The TO shall issue a written notice to the IC, within five days after determining that Interconnection Facilities have been successfully energized, accepting the Interconnection Facilities built by the IC. (**Attachment AS-7**).
    (Reference OATT Att. P, App. 2, Section 3.10)

24. Notice of Transfer of Title

    24.1. The IC shall execute all necessary documentation and shall make all necessary filings to record and perfect the TO's title in such facilities and in the easements and other land rights to be conveyed to the TO. (**Attachment AS-8**). Please see "FirstEnergy Wholesale Generation Interconnection Customer Requirements – Real Estate" for detailed property requirements. (Reference OATT Att. P, App. 2, Section 5.5)

25. Bill of Sale

    25.1. The IC shall provide the Bill of Sale to the TO with the Notice of Transfer of Title. The Bill of Sale shall include the following as Exhibits: Real Property, Personal Property, Drawing List and One-Line Diagram. (**Attachment AS-9**).
    Please see "FirstEnergy Wholesale Generation Interconnection Customer Requirements – Real Estate" for detailed property requirements.
    (Reference OATT Att. P, App. 2, Section 5.5)

26. Notice of Approval of Documentation

    26.1. The TO shall provide written notice of approval of documentation (documented by TO approval of the Bill of Sale) to the IC (such approval not to be unreasonably withheld, delayed, or conditioned). (**Attachment AS-9**).
    (Reference OATT Att. P, App. 2, Section 5.5)

27. Maintenance of Access Road

    27.1 The access road to the TO substation gate must be maintained by the IC to allow the TO access to the substation at all times, including during inclement weather (e.g., snow clearing during snow events, repairs of erosion due to storm water washout). During a snowfall event where snow accumulation is in excess of four inches, the IC is required to make arrangements to have the access road plowed and salted within a twenty-four hour timeframe. The IC shall provide the TO with the name and contact number (24/7 availability) of the person responsible for coordination of road maintenance in the event the TO requires immediate access to the site. In the event of an emergency situation, the IC is responsible to make arrangements for plow services to clear the road

right of way within one hour's notice of request by the TO. If it is determined that the IC cannot meet the TO's requirements, the TO will make arrangements for immediate plow service and the cost associated with that service will be the responsibility of the Interconnection Customer.

28. Applicable Federal Energy Regulatory Commission (FERC) or other regulatory filings

28.1. Within 30 days after the IC's receipt of the TO's written notice of approval of the documentation, the IC, in coordination and consultation with the TO, shall make any necessary filings at the FERC or other governmental agencies for regulatory approval of the transfer of title. (Reference OATT Att. P, App. 2, Section 5.5)

C. FE WGI Required Documentation

1. **TO to provide the IC with the following documents:**

1.1. See "FirstEnergy Wholesale Generation Interconnection Customer Requirements" for Real Estate, Vegetation Management, Insurance, Regulatory Siting and Environmental Permitting, Substation, Transmission Line, Communications, Revenue Meter and Electric Service, and Tax and Accounting for specific documentation required to be provided by the TO to the IC.

1.2. Project Team Contact List (**Attachment AS-1**).

1.3. Project Change Request Form (**Attachment AS-2**).

1.4. Interconnection Customer Outage Readiness Notification (**Attachment AS-3**).

1.5. Notice of Successful Inspection and Testing of Facilities (**Attachment AS-5**).

1.6. Notice of Acceptance of Facilities (**Attachment AS-7**).

1.7. Notice of Approval of Documentation (**Attachment AS-9**).

2. **IC to provide the TO with the following documents:**

2.1. Completed Project Change Request Form (**Attachment AS-2**).

2.2. Completed Interconnection Customer Outage Readiness Notification (**Attachment AS-3**).

2.3. Notice of Completion (**Attachment AS-4**).

2.4. Verification of successful operation of telemetering systems (**Attachment AS-6**)

2.5. Verification of transfer of utilities (e.g., phone, water)

2.6. Notice of Transfer of Operational Control (**Attachment AS-6**).

2.7. Notice of Transfer of Title (**Attachment AS-8**).

2.8. Bill of Sale (**Attachment AS-9**).

2.9. Any applicable Federal Energy Regulatory Commission (FERC) filings

Real Estate

A. Scope

1. This document contains the Transmission Owner (TO) requirements for wholesale generation interconnection projects consistent with the interconnection process as defined in the PJM Open Access Transmission Tariff (OATT) and applicable PJM manuals. The purpose of this document and attached checklist is to provide a detailed list of FirstEnergy (FE) requirements, including required documentation for operational and property transfer, if applicable, when a generation interconnection is requested by an Interconnection Customer (IC). These requirements will facilitate the safe, efficient and reliable integration of the Interconnection Facilities into the transmission system.
2. The "Wholesale Generation Interconnection Customer Real Estate Documentation Checklist" will be used to track the status of each document.

B. FE WGI Requirements

1. The IC is required to obtain the following documents in the sequence listed below:
    - 1.1. Acquire the Interconnection Facilities property in fee from the property owner
    - 1.2. Acquire an easement from the property owner
    - 1.3. Provide access agreements to the TO from the property owners and IC
    - 1.4. Provide an assignment of appropriate easement rights to the TO upon project completion
    - 1.5. Provide deed conveyance of fee property for the Interconnection Facilities to the TO upon project completion and prior to transfer of title

C. FE WGI Required Documentation

1. Easement (Perpetual)
    - 1.1. Legal document that includes descriptions and drawings, as exhibits, defined below in Item 5, Document Exhibits. For an easement and preferred / alternate site plan layout example see **Attachment RE-1**. If a complex layout involving multiple parcels is necessary, then detailed right-of-way drawing and property maps are required (**Attachment RE-2)**. Additionally, copies of title searches shall be provided to the TO. If a complex layout as shown in Attachment RE-2 is applicable, the IC shall also submit a Property Owner Provision Plan (**Attachment RE-3)** to the TO.
2. Site Access Agreement
    - 2.1. Legal document that provides the TO rights to perform work on the property prior to owning or recording a conveyed interest in the property (**Attachment RE-4**). The exhibits to be attached to the Site Access Agreement are further defined in Item 5, Document Exhibits.
3. Assignment of Easement
    - 3.1. Legal document assigning ownership interest in the property to the TO (**Attachment RE-5**). The exhibits to be attached to the Assignment of Easement are further defined in Item 5, Document Exhibits.

4. General Warranty Deed

   4.1. Legal document conveying fee ownership interest in the property to the TO (**Attachment RE-6**). The exhibits to be attached to the General Warranty Deed are further defined in Item 5, Document Exhibits.

5. Document Exhibits: IC shall provide a survey and legal description detailing the location of the substation (preferably located adjacent to an existing transmission line easement), ingress-egress to the substation from a dedicated public roadway, and easement for distribution and communication facilities and/or transmission facilities if necessary. This drawing shall be prepared by a licensed and registered surveyor and include at a minimum:

   5.1. Legal description and survey of fee property being conveyed, including all lot split requirements

      5.1.1. When property is conveyed to the TO by fee, the IC is required to submit a completed Phase I Environmental Site Assessment (ESA) to the TO in accordance with all the requirements outlined in ASTM E 1527-05 prior to the start of construction of a substation property that will be transferred to the TO. Furthermore, if the Phase I ESA completed for the property documents the presence of any recognized environmental conditions (RECs), the IC shall bear the cost and responsibility to complete a Phase II ESA in accordance with ASTM Standard E 1903-97 (Guide for Environmental Site Assessments: Phase II Environmental Site Assessment Process), however, final approval and property conveyance shall be at the sole discretion of the TO.

   5.2. Legal description for new transmission easement

   5.3. Legal description for new distribution easement

   5.4. Legal description for any other energy-related facilities that may be required

   5.5. Legal description for ingress-egress easement to a dedicated public roadway

   5.6. Survey drawing that shows:

      5.6.1. New easements along with the location of existing easements
      5.6.2. Other existing facilities on the property
      5.6.3. Names of adjoining property owners
      5.6.4. Basic drawing features: title block, north arrow, legend, graphic scale

Vegetation Management

A. Scope

1. This document contains the Transmission Owner (TO) requirements for wholesale generation interconnection projects consistent with the interconnection process as defined in the PJM Open Access Transmission Tariff (OATT) and applicable PJM manuals. The purpose of this document and attached checklist is to provide a detailed list of FirstEnergy (FE) requirements, including required documentation for operational and property transfer, if applicable, when a generation interconnection is requested by an Interconnection Customer (IC). These requirements will facilitate the safe, efficient and reliable integration of the Interconnection Facilities into the transmission system.
2. The "Wholesale Generation Interconnection Customer Vegetation Management Documentation Checklist" will be used to track the status of each document.

B. FE WGI Requirements

1. The IC shall consult with the TO Vegetation Management representative regarding the scheduling of vegetation clearing activities during the feasibility study, if applicable, and pre-construction (time of engineering design) by defining their work scope of proposed activities or work prescriptions.
2. The proposed Vegetation Management activities for Interconnection Facilities must be performed in accordance with the following:
    - 2.1. Applicable Statutory law and regulations
    - 2.2. Generally accepted industry practices and/or Best Management Practices (BMP) for Integrated Vegetation Management
    - 2.3. Perpetual Easements. Please see "FirstEnergy Wholesale Generation
    - 2.4. Interconnection Customer Requirements – Real Estate Section C. 1.1 Attachment RE-1" for detailed easement language requirements
    - 2.5. NERC Vegetation Management Standard FAC-003-1
    - 2.6. All routine vegetation clearing work is performed in compliance with ANSI Z133.1 and A-300 Standards (along with companion publications for any part regarding Electric Utility Rights-of-Way) and according to the requirements given by OSHA and the National Electrical Safety Code (NESC). Transmission right-of-way projects designed and constructed under the interconnection process that are located in New Jersey requires all debris to be removed within five business days after the vegetation is cut, unless permission is obtained from the property owner to leave vegetation debris. This is in accordance with N.J.A.C 14:5-9.5(g). Take into consideration the time of year being built as vegetation conditions are dynamic and may be restricted due to environmental conditions. (e.g., Indiana bat habitat)
    - 2.7. Contractor personnel shall be properly trained to perform the work proficiently and safely so as to comply with all applicable laws, regulations and local ordinances.
    - 2.8. Plan and Profile Drawings- Please see "FirstEnergy Wholesale Generation Interconnection Customer Requirements – Transmission Line, Section C. 1.1.5" for Plan and Profile Drawing details.

2.9. Right-of-way drawings - Please see “FirstEnergy Wholesale Generation Interconnection Customer Requirements – Transmission Line, Section C. 1.1.8” for Right-of-way Drawing details.

2.10. Property Owner Provision Plan - Please see “FirstEnergy Wholesale Generation Interconnection Customer Requirements – Real Estate, Section C. 1.1 Attachment RE-3” for Property Owner Provision Plan details.

2.10.1. The Property Owner Provision Plan shall detail, if applicable, vegetation activities – manual, mechanical or herbicide.

2.11. A right-of-way clearing zone shall be defined by the voltage and structure type. All trees within the clearing zone shall be cut as close to groundline as possible. The stump will be flush cut no higher than three (3) inches from, and parallel to the ground.

2.12. Trees located outside the clearing zone with limbs extending into the zone will have those limbs removed to the main stem. This will be performed for all limbs on these edge trees regardless of their position along the main stem.

2.13. All trees outside the clearing zone that are dead, dying, diseased, severely leaning or significantly encroaching the right-of-way, have hazardous defects such as obvious decay, uprooting, poor soil conditions, or have lightning, insect, vehicle or animal damage shall be removed.

2.14. Trees, brushwood and slash shall be placed or disposed of as designated by the detailed property and provision list. Accepted TO methods of disposal include windrowing, chipping, lopping, and stacking. Lopping must be below knee height. Brush and logs must not be left in any waterway or within fifteen (15’) feet of the centerline of any distribution line or more than ten feet (10’) from the edge of a transmission line clearing zone or in areas accessible by mechanical equipment. Debris from clearing zone areas that are adjacent to a road shall be kept on the edge of the clearing zone away from the edge of the road.

2.15. Designated trees are to be left in lengths as long as possible, preferably whole tree lengths and shall be placed in neat piles with the tree lengths parallel to and along the edge of the clearing zone corridor and separated from other piles or windrows.

2.16. Slash and brushwood generated from the clearing operation shall be placed in piles or windrows along the edge of the clearing zone corridor and separated from other piles unless otherwise specified. Any disposal of brush, wood, slash, logs or trees shall be in accordance with the laws and regulations of the appropriate governing authority.

2.17. The TO expects all incompatible vegetation on the corridor be controlled with an herbicide treatment, cut surface treatment being the minimum chosen treatment. Herbicide applications are to be made in a manner assuring restriction of applied material to the target. All herbicides shall be applied by the Contractor in accordance with the manufacture’s label instructions. The Contractor shall meet the following requirements when applying herbicides: Hold a current and appropriate pesticide application license from the appropriate State Department of Agriculture or its approved equivalent. Conform to all state, local and federal laws governing the herbicide used. Contractor shall apply all herbicide in a manner assuring restriction of applied material to the right-of-way and shall not contaminate or pollute any water source or body of water.

2.18. The IC is required to arrange a minimum of three inspections with the TO Vegetation Management Representative to review the vegetation clearing activities. The intervals in which these inspections shall take place are pre-construction, during the clearing activities and post-construction.

3. The IC shall provide the TO with prior notification of any modifications of the vegetation clearing activities that will affect the vegetation activities not meeting the written FE standards. The IC shall be required to schedule inspections with a TO Vegetation Management representative to ensure all vegetation activities have been approved and to meet the prescribed standards outlined above. The TO representative will provide the IC with documentation if the work is found not to meet FE standards and or requires any modifications prior to energizing the facilities. The IC will then submit final inspection documents recording the scheduled inspections were completed.

C. FE WGI Required Documentation

1. <u>IC to provide the TO with the following documents:</u>

1.1. Right-of-Way Drawings

1.2. Property and Easement descriptions

1.3. Plan and Profile Drawings

1.4. Property Owner Provision Plans

1.5. Vegetation Clearing Activities Inspections, as stated in Section B.3.

1.5.1. Notification of scheduled Inspection for pre-construction activities

1.5.2. Notification of scheduled Inspection for construction activities (provide date for vegetation clearing during construction)

1.5.3. Notification of scheduled Inspection for post-construction activities

Insurance

A. Scope

1. This document contains the Transmission Owner (TO) requirements for wholesale generation interconnection projects consistent with the interconnection process as defined in the PJM Open Access Transmission Tariff (OATT) and applicable PJM manuals. The purpose of this document and attached checklist is to provide a detailed list of FirstEnergy (FE) requirements, including required documentation for operational and property transfer, if applicable, when a generation interconnection is requested by an Interconnection Customer (IC). These requirements will facilitate the safe, efficient and reliable integration of the Interconnection Facilities into the transmission system.
2. The "Wholesale Generation Interconnection Customer Insurance Documentation Checklist" will be used to track the status of each document.

B. FE WGI Requirements

1. Insurance Standards
    - 1.1. Parenthetically referenced agreement sections in this document are from Section 11 and 14 of the Construction Service Agreement (CSA). Corresponding agreement sections from the Interconnection Service Agreement (ISA) are from Section 13 and 16.
    - 1.2. The IC and the TO are to exchange Certificates of Insurance evidencing the coverages listed below, as required by the CSA and ISA.
    - 1.3. Certificates are required prior to the start of construction of either the Interconnection Facilities or Transmission Line, and shall be provided annually until the termination of the respective agreement.
    - 1.4. If the insurance policy is written on a "Claims First Made Basis," it must remain in effect for two (2) years after the termination of the respective agreement (CSA, Appendix 2, Section 11.3.b and Section 14).
    - 1.5. Required coverage levels are the same for the ISA and CSA with the exception of Professional Liability (see below). These may be evidenced on one certificate (**Attachment IN-1**). If one certificate is submitted for both the CSA and the ISA, the IC must reference both the CSA and the ISA on the certificate, as well as the PJM Project Queue Number.
    - 1.6. Each entity is responsible for verifying that all subcontractors have insurance commensurate with the risks associated with the services they are providing.
    - 1.7. In the event that these conditions cannot be met, contact the TO Corporate Insurance Risk Representative for further guidance.
2. General Policy Requirements
    - 2.1. Each Entity shall include each other's Party as additional insureds to the General Liability, Automobile Liability and Excess/Umbrella Liability policies (CSA, Appendix 2, Section 11.2)
    - 2.2. Policies shall contain a provision specifying it is primary without consideration for other policies separately carried (CSA, Appendix 2, Section 11.3.a)

2.3. Policies shall contain a waiver of all rights of subrogation (CSA, Appendix 2, Section 11.3.c)

2.4. All insurance must be obtained from insurers that have an AM Best rating of "A-" or better. (CSA, Appendix 2, Section 11.1)

3. Requirements for Self-Insurance

3.1. The entities may meet the requirements in Section C by self-insuring themselves provided that they meet the requirements below (CSA, Appendix 2, Section 11.4)

3.1.1. Entity's senior secured debt must be rated investment grade or better by Standard & Poor's.

3.1.2. Self-insurance program must meet the minimum requirements set forth in CSA, Appendix 2, Section 11.

C. FE WGI Required Documentation

1. **TO to provide the IC with the following documents:**

1.1. Workers Compensation meeting state required statutory limits of the work site (CSA, Appendix 2, Section 11.1.A)

1.2. Employers Liability Insurance with minimum limits of one million dollars ($1,000,000) (CSA, Appendix 2, Section 11.1.A)

1.3. Commercial General Liability Insurance with minimum limits of one million dollars ($1,000,000) per occurrence and in the aggregate (CSA, Appendix 2, Section 11.1.B)

1.4. Comprehensive Automobile Liability Insurance with minimum limits of one million dollars ($1,000,000) per occurrence (CSA, Appendix 2, Section 11.1.C)

1.4.1. Must include coverage for owned and non-owned hired vehicles, trailers or semi-trailers designed for travel on public roads

1.5. Excess/Umbrella Liability Insurance with a limit of twenty million dollars ($20,000,000) per occurrence (CSA, Appendix 2, Section 11.1.D)

1.6. Professional Liability with a limit of ten million dollars ($10,000,000) per occurrence and in the aggregate for the CSA (CSA, Appendix 2, Section 11.1.E) and five million dollars ($5,000,000) per occurrence and in the aggregate for the ISA (ISA, Appendix 2, Section 13.1.E).

1.6.1. This requirement may be satisfied by requiring third-party contractors, designers, engineers or other parties who are responsible for design work associated with the facilities necessary for the interconnection to procure in the amounts stated above.

2. **IC to provide the TO with the following documents:**

2.1. Workers Compensation meeting state required statutory limits of the work site (CSA, Appendix 2, Section 11.1.A)

2.2. Employers Liability Insurance with minimum limits of one million dollars ($1,000,000) (CSA, Appendix 2, Section 11.1.A)

2.3. Commercial General Liability Insurance with minimum limits of one million dollars ($1,000,000) per occurrence and in the aggregate (CSA, Appendix 2, Section 11.1.B)

2.4. Comprehensive Automobile Liability Insurance with minimum limits of one million dollars ($1,000,000) per occurrence (CSA, Appendix 2, Section 11.1.C)

2.4.1. Must include coverage for owned and non-owned hired vehicles, trailers or semi-trailers designed for travel on public roads

2.5. Excess/Umbrella Liability Insurance with a limit of twenty million dollars ($20,000,000) per occurrence (CSA, Appendix 2, Section 11.1.D)

2.6. Professional Liability with a limit of ten million dollars ($10,000,000) per occurrence and in the aggregate for the CSA (CSA, Appendix 2, Section 11.1.E) and five million dollars ($5,000,000) per occurrence and in the aggregate for the ISA (ISA, Appendix 2, Section 13.1.E).

2.6.1. This requirement may be satisfied by requiring third-party contractors, designers, engineers or other parties who are responsible for design work associated with the facilities necessary for the interconnection to procure in the amounts stated above.

Regulatory Siting and Environmental Permitting

A. Scope

1. This document contains the Transmission Owner (TO) requirements for wholesale generation interconnection projects consistent with the interconnection process as defined in the PJM Open Access Transmission Tariff (OATT) and applicable PJM manuals. The purpose of this document and attached checklist is to provide a detailed list of FirstEnergy (FE) requirements, including required documentation for operational and property transfer, if applicable, when a generation interconnection is requested by an Interconnection Customer (IC). These requirements will facilitate the safe, efficient and reliable integration of the Interconnection Facilities into the transmission system.
2. The "Wholesale Generation Interconnection Customer Regulatory Siting and Environmental Permitting Documentation Checklist" will be used to track the status of each document.

B. FE WGI Requirements

1. The IC must obtain all regulatory siting approvals and environmental permits that are **applicable to both** the facilities to be installed by the IC and the proposed Interconnection Facilities to be installed by the TO in accordance with all applicable regulations, rules and laws. There are three aspects of the intent of this requirement:
   - 1.1. Where siting approvals, environmental permits and associated studies are required by the approving agency to encompass the entire project or facility, the intent is for the IC to conduct the necessary studies and obtain the necessary approvals. (For example, if the IC's installed facilities require Threatened & Endangered Species Act Consultation, it would be expected that the IC's actions would also include consideration of the Interconnection Facilities located within or in close proximity to the IC's installed facilities as a part of the evaluation.)
   - 1.2. Where applicable siting approvals and environmental permits being obtained by the IC must be obtained prior to starting any project or site construction activities, the IC must obtain those approvals and permits before the TO starts its construction activities. (For example, if the regulatory approval for a generation facility includes the associated substation that is being installed as a part of the Interconnection Facilities, the TO would not start construction of the substation until the IC has obtain the regulatory approval.)
   - 1.3. Where the IC will construct or prepare a portion of the project for the TO's subsequent installation of the Interconnection Facilities, the IC will obtain the necessary siting approvals and environmental permits. (For example, if the IC is providing a graded site for the TO's installation of a substation, the IC would obtain the necessary permit for discharge of storm water from construction activities.)

2. Under the Option to Build process, except for filings with the Pennsylvania Public Utility Commission, the IC must obtain all applicable regulatory siting approvals and environmental permits for the proposed Interconnection Facilities in accordance with all applicable regulations, rules and laws.
   - 2.1. For filings with the Pennsylvania Public Utility Commission, the IC will prepare the filings, incorporating the TO's comments and other requirements, for the TO's submittal to the Pennsylvania Public Utility Commission.

3. For regulatory siting approvals and environmental permits that are applicable to both the facilities to be installed by the IC and the proposed Interconnection Facilities to be installed by the TO, the IC shall provide the TO with the opportunity to review and accept the portions of the regulatory siting and environmental permitting documents describing the Interconnection Facilities.

4. Under the Option to Build process, the IC shall provide the TO with the opportunity to review and accept the regulatory siting and environmental permitting documents and agreements as if the TO had implemented the regulatory siting and environmental permitting process.

5. Prior to accepting any regulatory siting or environmental permitting approvals applicable to both the facilities to be installed by the IC and the proposed Interconnection Facilities to be installed by the TO, or under the Option to Build process, the IC shall provide a draft copy of such approvals (to the extent they exist) or agency-issued approval documents within 48 hours of the issuance of the document for the TO's review and acceptance. In the event that the TO objects to any conditions or other aspects of the approval and requests the IC to oppose such, the IC shall employ their best efforts to resolve such issues, including appeals of such approvals allowed under existing statutes.

C. FE WGI Required Documentation

1. <u>TO to provide the IC with the following documents:</u>

1.1. The TO will provide a Regulatory Siting and Environmental Permitting White Paper for the state (New Jersey, Pennsylvania or Ohio) where the project is located.

1.1.1. The White Paper is designed to help the TO staff plan and manage the development of transmission and distribution lines and substations. The White Paper may assist the IC to become aware of the regulatory and permitting requirements to extend, connect to, or modify transmission and distribution facilities.

1.1.2. IC should note the White Paper is intended only to provide general guidelines about the regulatory and permitting process that may be required to install facilities connected to transmission and distribution systems. The White Paper is not intended to be, nor is it a substitute to the IC's careful and independent consideration, identification and evaluation of all applicable regulatory and permitting processes that may be required for a facility to be installed by the IC or installed by others. The IC is strongly advised to pursue this necessary careful and independent evaluation, and the TO will accept no responsibility for the IC's failure to do so, or for any interpretation of data collected in the IC's evaluation.

1.1.3. The siting approvals and permits listed in the checklist, as well as the Wholesale Generation Interconnection Permit Plan (**Attachment EN-1**), are based on the White Papers.

1.2. The TO will provide a permit plan template (**Attachment EN-1**) with the issuance of the Facilities Study Report. This plan provides a list of potential regulatory siting approvals and environmental permits that may be required for the IC's specific facilities to be constructed under the Option to Build. The IC will use this plan as part of its developed draft and final permit plans that identify all required permits and regulatory siting approvals, and an associated schedule, that are applicable to both

the facilities to be installed by the IC and the Interconnection Facilities to be installed by the TO, or for the specific facilities to be constructed by the IC under the Option to Build for the project.

1.3. After the IC has identified the required regulatory siting approvals and environmental permitting, the IC may request a sample copy of similar siting and permitting applications previously submitted by the TO for a similar project. The TO shall provide one redacted copy, or identify the public record location, of a similar submittal to the extent that such submittal exists, is readily available and is available in the public domain.

1.4. The IC should also note that some "permitting," such as railroad crossing permits, highway crossing permits, FAA permits, and US Army Corps of Engineers permits are considered by the TO to be engineering permits. Please see "FirstEnergy Wholesale Generation Interconnection Customer Requirements – Transmission Line" for detailed engineering permitting requirements. The Wholesale Generation Interconnect Permit Plan (**Attachment EN-1**) includes these engineering permits. In preparing their draft and final permit plans, the IC should indicate the engineering permits required that are applicable to both the facilities to be installed by the IC and the Interconnection Facilities to be installed by the TO, or for the specific IC facilities to be constructed by the IC under the Option to Build for the project.

2. **IC to provide the TO with the following documents:**

2.1. Seven days prior to the external project kick-off meeting, the IC shall submit a draft permit plan for the TO's review and for discussion at the kick-off meeting. The IC will prepare and submit a final permit plan within 30 days after the project kick-off meeting. A permit plan shall include the following:

2.1.1. A list of all regulatory siting approvals and engineering and environmental permits that the IC believes are required that are applicable to both the facilities to be installed by the IC and the Interconnection Facilities to be installed by the TO, or for the specific facilities to be constructed by the IC under the Option to Build for the project. (The required regulatory siting approvals and engineering and environmental permits can be indicated by placing a check in the box before each applicable permit listed in **Attachment EN-1**, the Wholesale Generation Interconnect Permit Plan.)

2.1.2. A schedule indicating the duration and time frame for the necessary studies, preparation of the submittals, the TO's review of the submittals, and the regulatory submittal and review process. (The required schedule can be provided in a bar chart, as a detailed narrative, or prepared with project scheduling software.)

Note: The IC shall revise the list and schedule and resubmit the permit plan, as necessary, until the TO's acceptance is obtained.

2.2. Documents Submitted for Review and Acceptance

2.2.1. For regulatory siting approvals and environmental permits that are applicable to both the facilities to be installed by the IC and the Interconnection Facilities to be installed by the TO:

2.2.1.1. The IC shall provide a draft copy of the portion of all office and field studies that describe the Interconnection Facilities to be installed by the TO, prepared in support of any regulatory siting and environmental permitting for the TO's review and acceptance, and

shall resubmit the documents as necessary until the TO's acceptance is obtained.

2.2.1.2. The IC shall provide a draft copy of the description, location, and any description of the IC's construction and the TO's future ownership of the project ("Generic Text") that will be used in any and all informational requests to local, state or federal agencies prepared in support of any regulatory siting and environmental permitting for the TO's review and acceptance, and shall resubmit the documents as necessary until the TO's acceptance is obtained. In order to minimize the time and effort to review multiple documents, the intent is for the IC to submit one Generic Text that describes the project for the TO's review. After the TO's acceptance is obtained, this Generic Text will be used by the IC in all subsequent submittals. In the event that the Generic Text must be revised, the revised Generic Text will also be submitted for the TO's review and acceptance.

2.2.1.3. The IC shall provide a draft copy of the portion of all regulatory siting and environmental permitting submittals and related correspondence that describe the Interconnection Facilities to be installed by the TO prepared in support of any regulatory siting and environmental permitting for the TO's review and acceptance, and shall resubmit the documents as necessary until the TO's acceptance is obtained.

2.2.1.4. Prior to accepting any regulatory siting or environmental permitting approvals that involve the Interconnection Facilities to be installed by the TO, the IC shall provide a draft copy of such approvals (to the extent they exist) or the final agency document for any regulatory siting and environmental permitting for the TO's review and acceptance. In the event that the TO objects to any conditions or other aspects of the approval and asks the IC to oppose such, the IC shall employ their best efforts to resolve such concerns, including appeals of such approvals allowed under existing statutes.

2.2.1.5. The IC shall promptly provide the TO with copies of all agency permit-required start-of-construction notices that involve the Interconnection Facilities to be installed by the TO.

2.2.1.6. The IC shall provide the TO with a copy of all obtained regulatory siting and environmental permitting approvals that involve the Interconnection Facilities to be installed by the TO within 48 hours of obtaining such approval, and prior to submittal of agency permit-required Notices to Start Construction, or prior to starting construction of the interconnection facilities when an agency permit-required Notice to Start Construction is not required.

2.2.1.7. The IC shall promptly provide the TO with copies of all field inspection reports, regulatory comments on construction or notices of deficiency and similar documents associated with the regulatory siting and environmental permitting of the Interconnection Facilities to be installed by the TO.

2.2.1.8. The IC shall promptly provide the TO with copies of all agency permit-required completion notices and regulatory acceptance of

completion of construction notices that involve the Interconnection Facilities to be installed by the TO.

2.2.2. For the specific IC facilities to be constructed by the IC under the Option to Build for the project:

2.2.2.1. The IC shall provide a draft copy of all office and field studies prepared in support of any regulatory siting and environmental permitting for the TO's review and acceptance, and shall resubmit the documents as necessary until the TO's acceptance is obtained.

2.2.2.2. The IC shall provide a draft copy of the description of the project, the location of the project, and any description of the IC's construction and the TO's future ownership of the project ("Generic Text") that will be used in any and all informational requests to local, state or federal agencies prepared in support of any regulatory siting and environmental permitting for the TO's review and acceptance, and shall resubmit the documents as necessary until the TO's acceptance is obtained. In order to minimize the time and effort to review multiple documents, the intent is for the IC to submit one Generic Text that describes the project for the TO's review. After the TO's acceptance is obtained, this Generic Text will be used by the IC in all subsequent submittals. In the event that the Generic Text must be revised, the revised Generic Text will also be submitted for the TO's review and acceptance.

2.2.2.3. The IC shall provide a draft copy of all regulatory siting and environmental permitting submittals and related correspondence prepared in support of any regulatory siting and environmental permitting for the TO's review and acceptance, and shall resubmit the documents as necessary until the TO's acceptance is obtained.

2.2.2.4. Prior to accepting any regulatory siting or environmental permitting approvals, the IC shall provide a draft copy of such approvals (to the extent they exist) or the final agency document for any regulatory siting and environmental permitting for the TO's review and acceptance. In the event that the TO objects to any conditions or other aspects of the approval and asks the IC to oppose such, the IC shall employ their best efforts to resolve such concerns, including appeals of such approvals allowed under existing statutes.

2.2.2.5. The IC shall promptly provide the TO with copies of all agency permit-required start-of-construction notices.

2.2.2.6. The IC shall provide the TO with a copy of all obtained regulatory siting and environmental permitting approvals within 48 hours of obtaining such approval, and prior to submittal of agency permit-required Notices to Start Construction, or prior to starting construction of the interconnection facilities when an agency permit-required Notice to Start Construction is not required.

2.2.2.7. The IC shall promptly provide the TO with copies of all field inspection reports, regulatory comments on construction or notices of deficiency and similar documents associated with the regulatory siting and environmental permitting of the facility.

2.2.2.8. The IC shall promptly provide the TO with copies of all agency permit-required completion notices and regulatory acceptance of completion notices of construction.

2.3. The more common regulatory siting filings include:

2.3.1. New Jersey

2.3.1.1. Local municipal filings or applications (applicable to all distribution and transmission voltage lines)

2.3.1.2. Appeal filings to the New Jersey Board of Public Utilities

2.3.2. Ohio

2.3.2.1. Ohio Power Siting Board application, Letter of Notification, or Construction Notice for 125 kV and higher designed and constructed transmission lines

2.3.2.2. Ohio Power Siting Board application, Letter of Notification, or Construction Notice for transmission substations

2.3.3. Pennsylvania

2.3.3.1. Pennsylvania Public Utility Commission application or Letter of Notification for 100 kV and higher designed and constructed transmission lines

2.4. The more common environmental permits include:

2.4.1. New Jersey

2.4.1.1. National Pollutant Discharge Elimination System (NPDES) permit for discharge of storm water from construction activities

2.4.1.2. Flood Hazard Area Permit

2.4.1.3. Freshwater Wetlands Permit

2.4.1.4. Highlands Exemption

2.4.1.5. Erosion & Sediment Control Plan Approval

2.4.2. Ohio

2.4.2.1. National Pollutant Discharge Elimination System (NPDES) permit for discharge of storm water from construction activities

2.4.2.2. Storm water Pollution Prevention Plan

2.4.2.3. Threatened & Endangered Species Consultation – US Fish & Wildlife Service, Ohio Dept. of Natural Resources

2.4.2.4. Section 404 Clean Water Act Water Act Permit - US Army Corps of Engineers

2.4.2.5. Nationwide Permit – US Army Corps of Engineers

2.4.2.6. Pre-Construction Notification – US Army Corps of Engineers

2.4.3. Pennsylvania

2.4.3.1. National Pollutant Discharge Elimination System (NPDES) permit for discharge of storm water from construction activities

2.4.3.2. Co-permittee agreement for NPDES Permit for Discharge of Storm water from Construction Activities

2.4.3.3. Erosion and Sediment Control (E&SC) Plan

2.4.3.4. Approval letter for E&SC Plan

2.4.3.5. Notice of Termination (NOT) for NPDES permit for Discharge of Storm water from Construction Activities

2.4.3.6. Final site inspection report/letter from County Conservation District

2.4.3.7. Stream crossing permit

2.4.3.8. Wetland crossing, filling or similar permits

Substation

A. Scope

1. This document contains the Transmission Owner (TO) requirements for wholesale generation interconnection projects consistent with the interconnection process as defined in the PJM Open Access Transmission Tariff (OATT) and applicable PJM manuals. The purpose of this document and attached checklist is to provide a detailed list of FirstEnergy (FE) requirements, including required documentation for operational and property transfer, if applicable, when a generation interconnection is requested by an Interconnection Customer (IC). These requirements will facilitate the safe, efficient and reliable integration of the Interconnection Facilities into the transmission system.
2. The "Wholesale Generation Interconnection Customer Agreements Support Documentation Checklist" will be used to track the status of each document.

B. FE WGI Requirements

1. The proposed Interconnection Facilities must be designed in accordance with the FE "Requirements for Transmission Connected Facilities" located at: http://www.firstenergycorp.com/feconnect/Requirements_for_Transmission_Connected_Facilities.html
2. Vendor Contact Information
   - 2.1 The TO will provide the vendor contact information for major equipment to ensure the IC purchases equipment in accordance with FE standards. Refer to section B.1. for the FE standards and http://www.pjm.com for PJM standards.
3. Substation Design Requirements
   - 3.1 IC is required to select a design contractor from the FE approved contractor list that is located on the PJM website. This approved contractor will design all interconnection facilities in accordance with FE design standards. Refer to section B.1. for the FE standards and http://www.pjm.com for PJM standards. Customer is required to coordinate with the TO's A/E project management to determine the appropriate drawing format to use when documents are transferred to and from the TO by the IC.
4. Transmission Owner's (TO) Interconnection Substation Name & Substation Number
   - 4.1 The TO will determine a suitable name and number for the TO interconnection substation once the location has been determined. As applicable, the IC will provide the proposed name of the IC's substation for the TO's approval. The IC will obtain and provide to the TO the E911 street addresses for both substations.
5. Protection Requirements
   - 5.1 The TO's Planning and Protection Group will provide the protection requirements (**Attachment SU-1**) for the TO interconnection substation. This will detail the equipment necessary for transmission line and substation protection including any communication devices necessary for protection coordination.
   - 5.2 The TO will also provide the inter-tie relaying requirements **(Attachment SU-2)** to be installed in the Customer Interconnection Facilities and/or Customer Facility, as appropriate.
6. Communications Requirements
   - 6.1 Please see "FirstEnergy Wholesale Generation Interconnection Customer Requirements – Communications" for detailed communications requirements.

7. Revenue Metering and Electric Service Billing Requirements

   7.1 Please see "FirstEnergy Wholesale Generation Interconnection Customer Requirements – Revenue Metering and Electric Service Billing" for detailed revenue metering and billing requirements.

8. Transmission Line Connection Requirements

   8.1 Please see "FirstEnergy Wholesale Generation Interconnection Customer Requirements – Transmission Line" for detailed transmission line requirements.

9. Relay Settings

   9.1 The TO will provide the relay settings for the TO Interconnection Facilities.

   9.2 The TO will provide the relay settings for the Inter-tie relay at the Customer Interconnection Facilities and/or Customer Facility, as appropriate.

10. Testing & Commissioning Requirements

    10.1 The TO will provide testing and commissioning requirements.

    10.2 Please note: The TO will not commence with a transmission system outage to connect the new TO Interconnection Facilities until communication circuits are operational and all off-line testing and commissioning is complete. All functional testing of the controls are to be witnessed by the TO Commissioning Engineer.

11. Substation Construction Requirements

    11.1 IC is required to select a construction contractor from the FE approved contractor list that is located on the PJM website. This approved contractor will construct all interconnection facilities in accordance with FE construction standards and testing requirements.

12. Outage Scheduling

    12.1 Please see "FirstEnergy Wholesale Generation Interconnection Customer Requirements – Agreements Support" for detailed outage scheduling requirements.

C. FE WGI Required Documentation

1. The IC shall provide the following documents to the TO for review and acceptance. IC is required to coordinate with the TO's A/E project management to determine the appropriate document format. Following the TO's review, the IC shall incorporate all of the TO's review comments and resubmit the documents as necessary until the TO's acceptance is granted.

   1.1. Bill of Materials (BOM) – The BOM (**Attachment SU-3**) shall include everything that is purchased and installed for the TO Interconnection Facilities (listed per major equipment and material).

   1.2. Property Plan - A property plan (**Attachment SU-4**) shall be developed detailing the location, and fee ownership or perpetual easement property descriptions of the property to be conveyed to the TO. This drawing shall include as a minimum:

      1.2.1. The legal description of the property owned or on which the easement is provided as well as any other easements relating to the transmission/distribution lines, access road or substation related construction. Please see "FirstEnergy Wholesale Generation Interconnection Customer Requirements – Real Estate" for detailed property requirements.

      1.2.2. The driveway shown to the road intersection.

1.2.3. Driveway gate, if any, and driveway entrance apron.

1.2.4. Names of adjoining property owners.

1.2.5. Contour lines and substation final grade elevations.

1.2.6. Substation fence showing gate location.

1.2.7. Fence details, by description or detail view.

1.2.8. A simplified plan view of the substation equipment.

1.2.9. Landscaping, if any (must all be compatible species)

1.2.9.1. Limited space for tree and shrub growth, both above and below ground, restricts choices among species at many planting sites. For locations with overhead electric lines, species should be selected that will not interfere with wires. In narrow spaces between sidewalks and curbs, the most suitable trees and shrubs have smaller crowns and root systems less likely to lift pavements or interfere with structures. There are other kind of space constraints, as well as landscape design considerations (e.g. screens), that call for trees and shrubs in small stature, i.e., trees and or shrubs with mature heights at or below 10 ft.

1.2.10. Substation yard surface details, by description or detail view.

1.2.11. Notes with construction details.

1.2.12. A key (location) map.

1.2.13. Basic drawing features - title block, north arrow, legend, graphic scale.

1.3. Single Line Diagram – The single line diagram has been listed separately due to its extensive use by many functions of the TO. It is usually one of the first drawings to be developed, reviewed, and accepted and should contain the necessary detail for both the TO Interconnection Facilities and the IC Interconnection Facilities, including revenue metering location. (**Attachment SU-5**).

1.4. Balance of Design Drawings – Please see **Attachment SU-6** for further substation drawing details. All design drawings must be reviewed and accepted by the TO and the TP and shall include, but not be limited to, the following:

1.4.1. Drawing number index (See **Attachment SU-7** for example)

1.4.2. List of all drawings used

1.4.3. Structure drawings

1.4.4. Use FE standard drawings (coordinate with the TO if standard drawings cannot be used

1.5. Specifications (Major Equipment) – Any equipment that is purchased that requires a unique specification shall be sent to the TO for review and acceptance.

1.6. Engineering Calculations – The following design calculations shall be submitted for the TO's review and acceptance:

1.6.1. Station service transformer sizing

1.6.2. Station battery and charger sizing

1.6.3. High voltage rigid bus design

1.6.4. Lightning shielding analysis

1.6.5. Foundation design

1.6.6. Grounding safety analysis

1.6.7. Transformer Sound Level Calculations in accordance with NEMA Standards

1.7. Design Field Testing and Data Collection

1.7.1. Geotechnical Reports

1.7.2. Survey Reports

Please Note: Wetland delineations, stream evaluations and similar ecological field studies and reports may be required. Please see "FirstEnergy Wholesale Generation Interconnection Customer Requirements – Regulatory Siting and Environmental Permitting" for detailed environmental requirements.

2. Project Data & Drawings Submitted to the TO:

2.1. A single line diagram of the project that includes all transmission line and Interconnection Facilities to be installed (see Section 1.3 above).

2.2. The Generator Electrical System Single Line Diagram (Interconnection Customer Facility)

2.3. Actual Generator Electrical System Design Information (So a computer model can be made of the system) to include as a minimum:

2.3.1. Transformer Design Information

2.3.1.1. Nameplate

2.3.1.2. Impedance Data

2.3.1.3. Test Report

2.3.2. Generator Design Information

2.3.2.1. Impedance Data

2.3.2.2. Transmission Line Electrical Design Information

2.3.2.3. Line Impedances - Positive & Zero Sequence

2.3.2.4. Line Length

2.3.2.5. Conductor Data

2.3.3. Generation Electrical System Data

2.3.3.1. Short Circuit Equivalent Impedances

2.4. Common Relay System Design Data

2.4.1. Example - Current Transformer Lead Lengths for Bus Differential Relaying Circuits

2.4.2. Current Transformer Excitation Curves

2.5. Generator Electrical System Drawings

2.5.1. AC & DC Schematics for the Main Breaker, and Transformer Protection

2.5.2. AC Schematics for Revenue Metering

2.5.3. Relay Settings

2.5.3.1. Relay Settings for Developer provided relays that need to coordinate with the TO's Interconnection Substation Relays.

3. Drawings Issued for Construction

3.1. The IC will provide hard copies of the construction drawings per a distribution list provided by the TO. The details of the "Issued for Construction Drawings" shall be recorded on the "FirstEnergy Wholesale Generation Interconnection Customer Substation Required Documentation Checklist - Construction Drawing Details." There are three Milestones that coincide with the issuance of the Below Grade, Above Grade and Relay & Control Engineering packages:

3.1.1. Milestone C.24 - IC Submits Below Grade Interconnection Facilities Engineering Package to TO

3.1.2. Milestone C.26 - IC Submits Above Grade Interconnection Facilities Engineering Package to TO

3.1.3. Milestone C.28 - IC Submits Relay & Control Interconnection Facilities Engineering Package to TO

Note: Please see **Attachment SU-6** for the construction drawing package submittals. The distribution shall be made according to the FirstEnergy Print Distribution List that is available to the TO's approved Engineering Contractor.

4. Field Engineer/Inspector

4.1. Please see "FirstEnergy Wholesale Generation Interconnection Customer Requirements – Agreements Support" for detailed Field Engineer/Inspector requirements.

5. Project Change Request Process

5.1. Please see "FirstEnergy Wholesale Generation Interconnection Customer Requirements – Agreements Support" for detailed Project Change Request Process requirements.

6. As-Built Drawings – Red Line and Final Record

6.1. Red Line

6.1.1. At the end of construction for Milestone C.37 - "Interconnection Customer submits Notice of Completion for Interconnection Facilities to Transmission Owner and Transmission Provider" and prior to the scheduled Transmission line outage, the following red line as-built drawing set shall be provided:

6.1.1.1. One (1) current Red Line set remains in the TO interconnection substation for the TO's field use.

6.1.1.2. One (1) current Red Line drawing will be submitted to the TO's Substation Engineer for the TO's review and acceptance. The IC shall incorporate all of the TO's comments into the drawings and resubmit the drawings as necessary until accepted.

6.1.1.3. **Please Note:** IC is required to coordinate with the TO's A/E project management to determine the appropriate drawing format.

6.1.2. At Milestone C.44 – "Successful Energization of Interconnection Facilities (Stage 1)", the following sets of red line as-built drawings shall be provided:

6.1.2.1. One (1) current Red Line set remains in the TO interconnection substation for the TO's field use

6.1.2.2. One (1) current set is sent to the TO's Substation Engineer for interim use.

6.1.2.3. The details of the red line as-built drawings shall be recorded on the "FirstEnergy Wholesale Generation Interconnection Customer Substation Required Documentation Checklist - Red-Line Drawing Details."

6.1.2.4. **Please Note:** Each unique change to the construction drawings conveyed in the red line as-built drawings must be directly linked to a TO reviewed and accepted field change. Please see "FirstEnergy Wholesale Generation Interconnection Customer Requirements – Agreements Support" for detailed field change requirements.

6.2. Final Record

6.2.1. The record as-built drawings shall be issued to the TO in electronic (AutoCAD) format within 45 days after initial operation. IC is required to coordinate with the TO's A/E project management to determine the appropriate drawing format. The record as-built drawings must be submitted for Milestone C.47 – "Interconnection Customer Submits Bill of Sale & Notice of Transfer of Title to Transmission Owner and Transmission Provider". It is expected that the Final Record Drawings will be complete and all red-line changes have been incorporated. The details of the Final Record as-built drawings shall be recorded on the "FirstEnergy Wholesale Generation Interconnection Customer Substation Required Documentation Checklist - Record Drawing Details."

7. Manufacturer Drawings

7.1. The manufacturer drawings shall be issued to the TO in electronic (AutoCAD) format within 45 days after energization. IC is required to coordinate with the TO's A/E project management to determine the appropriate drawing format. The IC shall provide the following documentation per the print distribution list (see the Note following Section 3.1.3):

7.1.1. Manufacturer drawings include hard copies and AutoCAD files (As described previously, these drawings must be included as part of the structure drawings submitted for the TO's review and acceptance)

7.1.2. Factory test reports include hard copies and pdf files (As described previously, the factory test reports must also be submitted for the TO's review and acceptance)

7.1.3. Transformer Manufacturer Test Reports to include Loss Tests, Thermal Tests, Dielectric Tests, Oil Certification, Ratio Test, Power Factor Test, Insulation Resistance Tests, and Sound Tests

7.1.4. Instruction books include hard copies and pdf files

7.1.5. Warranty assignments to be provided to the TO

7.1.5.1. Any material or equipment to be turned over to the TO shall also have the warranty transferred to the TO as the ultimate owner

7.1.5.2. **Please note:** It is required that the purchaser of the equipment ensure that the TO is identified, along with the substation name, on the purchase order as the ultimate owner no later than Milestone C.47 – "Interconnection Customer Submits Bill of Sale & Notice of Transfer of Title to Transmission Owner and Transmission Provider".

8. Construction Field Test Reports

8.1. The construction field test reports shall be issued to the TO within 45 days after energization. IC is required to coordinate with the TO's A/E project management to determine the appropriate document format. Provide copies of all field test reports in hard copy and electronic format (pdf), as well as copies in the original test (equipment) format; e.g., power factor/timing/etc., per the print distribution list.

Transmission Line

A. Scope

1. This document contains the Transmission Owner (TO) requirements for wholesale generation interconnection projects consistent with the interconnection process as defined in the PJM Open Access Transmission Tariff (OATT) and applicable PJM manuals. The purpose of this document and attached checklist is to provide a detailed list of FirstEnergy (FE) requirements, including required documentation for operational and property transfer, if applicable, when a generation interconnection is requested by an Interconnection Customer (IC). These requirements will facilitate the safe, efficient and reliable integration of the Interconnection Facilities into the transmission system.
2. The "Wholesale Generation Interconnection Customer Transmission Documentation Checklist" will be used to track the status of each document.

B. FE WGI Requirements

1. The proposed Interconnection Facilities must be designed in accordance with the FE "Requirements for Transmission Connected Facilities" located at http://www.firstenergycorp.com/feconnect/Requirements_for_Transmission_Connected_Facilities.html
2. Transmission Line Design Requirements
   - 2.1. IC is required to select a design contractor from the FE approved contractor list that is located on the PJM website. This approved contractor will design all interconnection facilities in accordance with the TO's design standards. Refer to section B.1. for the FE standards and http://www.pjm.com for PJM standards.
3. Vendor Contact Information
   - 3.1. The TO will provide the vendor contact information for major equipment to ensure the IC purchases equipment in accordance with FE standards. Refer to section B.1. for the FE standards and http://www.pjm.com for PJM standards.
4. TO's Interconnection Transmission Line Identification
   - 4.1. The TO will determine a suitable transmission line name and transmission line number for the TO interconnection transmission line once the location has been determined.
   - 4.2. As applicable, the TO will determine a suitable number for the transmission poles being installed by the IC.
   - 4.3. As applicable, the TO will determine a suitable number for the transmission switches and similar equipment being installed by the IC.
5. Communications Requirements
   - 5.1. Please see "FirstEnergy Wholesale Generation Interconnection Customer Requirements – Communications" for detailed communications requirements and **Attachment TR-1**.
6. Transmission Line Connection Requirements
   - 6.1. The TO will provide design details for the connection requirements to the existing TO transmission line. This includes, but is not limited to, dead end termination height, standard structure details and requirements, conductor type and size, static wire type and size, standard insulator and hardware, range of typical tension of the phase and

shield wires, grounding requirements, features of transmission switch and similar equipment and requirements.

7. Transmission Line Construction Requirements

   7.1. IC is required to select a construction contractor from the FE approved contractor list that is located on the PJM website. This approved contractor will construct all interconnection facilities in accordance with FE construction standards.

8. Transmission Line Standard Material Requirements

   8.1. The TO will provide standard material requirements for design and the construction of the transmission line. This includes, but is not limited to, wire size and manufacturer; hardware size, type and manufacturer; insulator size, type and manufacturer; pole type, size and manufacturer; guying size, type and manufacturer; transmission switch and similar equipment type, size and manufacturer.

9. Transmission Line Right-of-Way Requirements

   9.1. The TO will provide the minimal right-of-way width, danger tree requirements and associated requirements for the transmission line being installed by the IC based on the voltage, span length, structure type and other pertinent considerations.

   9.2. **Please note:** The TO requires fee ownership interest or a perpetual easement for all right-of-ways. Please see "FirstEnergy Wholesale Generation Interconnection Customer Requirements – Real Estate" for detailed property requirements.

10. Testing & Commissioning Requirements

    10.1. The TO will provide testing and commissioning requirements.

    10.2. The TO will perform an Audit of the Facilities during Pre-energization

    10.3. **Please note:** The TO will not commence with a transmission system outage to connect the new TO's interconnection transmission line until communication circuits are operational and all off-line testing and commissioning is complete.

    All functional testing of the controls are to be witnessed by the TO commissioning engineer.

11. Outage Scheduling

    11.1. Please see "FirstEnergy Wholesale Generation Interconnection Customer Requirements – Agreements Support" for detailed outage scheduling requirements.

C. FE WGI Required Documentation

1. IC to provide the TO with the following documents:

1.1. The IC shall provide the following documents to the TO for the TO's review and acceptance. IC is required to coordinate with the TO's Transmission Design project management to determine the appropriate document format.

Please Note: The IC is responsible for the design of the transmission facilities in compliance with all applicable regulatory and code requirements. The IC shall submit all drawings to the TO for the TO's review and acceptance prior to starting construction. The IC shall incorporate all TO comments into their engineering design and drawing efforts and resubmit the drawings as necessary until accepted by the TO.

1.1.1. Design Field Testing and Data Collection

1.1.1.1. Geotechnical Reports

1.1.1.2. Survey Reports

1.1.1.3. **Please Note:** Wetland delineations, stream evaluations and similar ecological field studies and reports may be required. Please see "FirstEnergy Wholesale Generation Interconnection Customer Requirements – Regulatory Siting and Environmental Permitting" for detailed environmental requirements.

1.1.2. Bill of Materials (BOM) (**Attachment TR-2**)

1.1.2.1. The BOM shall include everything that is purchased and installed for the TO's transmission line (listed per each structure).

1.1.3. Field Report (FR) (**Attachment TR-2**)

1.1.3.1. The FR provides installation information about the transmission line and shall include everything that is purchased and installed for the TO's transmission line (listed per each structure).

1.1.3.2. **Please note:** In addition to being a reference for the TO's transmission line construction drawings, the FR is also used as a basis by the TO accounting staff to accurately determine the value of the TO's transmission line.

1.1.4. Single Line Diagram (**Attachment TR-3**)

1.1.4.1. This drawing shall contain the necessary existing Transmission Facilities and any new proposed Transmission Facilities required as part of interconnecting the Interconnection Facilities. This has been listed separately due to its extensive use by many functions of the TO. It is usually one of the first drawings to be developed, reviewed and accepted.

1.1.5. Plan and Profile Drawing(s) (**Attachment TR-4**)

1.1.5.1. Plan view shall include as a minimum an aerial image with streets, railroads, properties, counties, townships, municipalities identified, route right of way alignment and pole locations.

1.1.5.2. Profile view shall include as a minimum the structure number, structure type, pole size and class, structure drawing number, station, line angle, guying information, conductor and ground wire data (sag chart number, ruling span, maximum tension), and centerline ground elevations and offsets for steeply sloped locations.

1.1.5.3. Modifications to the existing Transmission line shall be made on the existing plan – Profile drawings.

1.1.5.4. New Plan – Profile drawings shall be provided in AutoCAD/PLS CAD drawing format as agreed to by Transmission Engineering.

1.1.6. Structure Drawings - These types of drawings shall be provided when using steel poles, lattice towers, laminated wood poles or similar structures, which are not depicted within FE's Construction Standards. At a minimum the submittal is to include:

1.1.6.1. Plan view and elevation view of the structure, showing dimensions, material specifications, connection and manufacturing details, and total weight.

1.1.6.2. Foundation details and materials.

1.1.6.3. Shipping, handling and installation details as necessary.

1.1.6.4. Loading trees and similar engineering design information.

1.1.6.5. Fabrication drawings

1.1.6.6. Hardware drawings

1.1.6.7. Manufacturer drawings – these types of drawings shall be incorporated into and included as structure drawings.

1.1.6.8. **Please note:** The preference is to use FE's Construction Standard Drawings. The requirements provided above are to be used whenever other installation details must be employed.

1.1.7. Wire Arrangement (**Attachment TR-5**) - A wire arrangement or "phasing" drawing shall be prepared. This drawing shall include as a minimum:

1.1.7.1. Phasing at each structure

1.1.7.2. Conductor and ground wire sizes

1.1.7.3. Switch information

1.1.7.3.1. Manufacturer catalog number

1.1.7.3.2. Voltage

1.1.7.3.3. Amp rating

1.1.7.3.4. Interrupting device (High Speed Velocity Whips, Vacuum Interrupter, etc.)

1.1.7.3.5. Motor operators

1.1.7.4. Footage and mileage to wire size changes, switches, tap points, and substations

1.1.8. Right-of-way drawings and property and easement descriptions - shall include, but are not limited to:

1.1.8.1. Route and property maps (**Attachment TR-6**)

1.1.8.2. Property drawings

1.1.8.3. Fee ownership or perpetual easement property descriptions prepared and sealed by a licensed surveyor

1.1.8.4. Fee ownership or perpetual easement property plats prepared and sealed by a licensed surveyor

1.1.8.5. Title searches

1.1.8.6. Property Titles

1.1.8.7. **Please note:** Please see "FirstEnergy Wholesale Generation Interconnection Customer Requirements – Real Estate" for detailed property requirements.

1.1.9. Balance of Design Drawings – shall include, but are not limited to:

1.1.9.1. Drawing number index (**Attachment TR-7**)

1.1.9.2. Structure drawings

1.1.9.3. Stringing (Sag) charts

1.1.9.4. **Note:** Use FE standard drawings (coordinate with the TO if standard drawings can not be used)

1.1.10. Engineering Permits – shall include, but are not limited to:

1.1.10.1. Highway crossing drawings

1.1.10.2. To be submitted Highway crossing permit applications and all other related submittals

1.1.10.3. Approved Highway crossing permit

1.1.10.4. Railroad crossing drawings

1.1.10.5. To be submitted Railroad crossing permit applications and all other related submittals

1.1.10.6. Approved Railroad crossing permits

1.1.10.7. River crossing drawings (Likely under US Army Corps of Engineers jurisdiction)

1.1.10.8. To be submitted River crossing permit applications and all other related submittals

1.1.10.9. Approved River crossing permits

1.1.10.10. FAA required drawings

1.1.10.11. To be submitted FAA required permit applications and all other related submittals

1.1.10.12. Approved FAA permits

1.1.10.13. **Please note:** The approved permits for all permits required for construction of the project are to be submitted to the TO prior to starting construction. Please see "FirstEnergy Wholesale Generation Interconnection Customer Requirements – Regulatory Siting and Environmental Permitting" for detailed permitting requirements.

1.1.11. Specifications – Major Equipment – shall include, but is not limited to:

1.1.11.1. Any significant equipment, and specifically equipment or material purchased that requires a unique specification or engineering drawings, shall be sent to FE for review and acceptance.

1.1.12. Engineering Calculations – shall include, but are not limited to:

1.1.12.1. Structure loading (tower steel or laminated pole load trees)

1.1.12.2. Foundations

1.1.12.3. Guying and anchors

1.1.12.4. Insulator swing

1.1.12.5. Galloping and Aeolian vibration

1.1.12.6. Uplift

1.1.12.7. Inductive considerations/coordination for railroad track signal lines and underground pipelines

1.1.13. Manufacturer Drawings – shall include, but are not limited to:

1.1.13.1. Manufacturer drawings

1.1.13.2. Factory test reports

1.2. Drawings Issued for Construction – shall include, but are not limited to:

1.2.1. Bill of Materials

1.2.2. Field Report

1.2.3. Plan and Profile

1.2.4. Structure Drawings

1.2.5. Wire Arrangement

1.2.6. Drawing Number Index

1.2.7. Stringing Charts

1.2.8. Highway, Railroad, River crossing drawings

1.2.9. Approved Permits

1.2.10. Manufacturer installation drawings

1.2.11. **Please Note:** The IC will provide multiple sets of hard (paper) copies of the construction drawings per a distribution list provided by the TO. The details of the "Drawings Issued for Construction" shall be recorded on the "Wholesale Generation Interconnection Customer Transmission Line Documentation Checklist".

1.3. GPS Locations of Transmission Line Structures

1.3.1. The IC shall provide GPS locations, accurate to one meter or less, of all installed transmission line structures. At a minimum, the pole numbers, approximate location and GPS locations are to be provided to the TO in a spreadsheet format, and the GPS locations are to be added to the drawings in the red line as-built drawing process.

1.4. Field Engineer/Inspector

1.4.1. Please see "FirstEnergy Wholesale Generation Interconnection Customer Requirements – Agreements Support" for detailed Field Engineer/Inspector requirements.

1.5. Project Change Request Process

1.5.1. Please see "FirstEnergy Wholesale Generation Interconnection Customer Requirements – Agreements Support" for detailed Project Change Request Process requirements

1.6. Red Line As-Built Drawings

1.6.1. At the end of construction and prior to the transmission outage, the IC shall provide to the TO the following sets of red line as-built drawings:

1.6.1.1. The Red Line drawings will be submitted to the TO's Transmission Engineer for the TO's review and acceptance. IC is required to coordinate with the TO's Transmission Design project management to determine the appropriate drawing format. The IC shall incorporate all of the TO's comments into the drawings and resubmit the drawings as necessary until accepted.

1.6.1.2. **Please Note:** Each unique change to the construction drawings conveyed in the red line as-built drawings must be directly linked to a TO reviewed and accepted field change. Please see "FirstEnergy Wholesale Generation Interconnection Customer Requirements – Agreements Support" for detailed field change requirements.

1.6.2. After Energization of the Interconnection Facilities, the following sets of red line as-built drawings shall be provided:

1.6.2.1. One (1) set, sent to the TO's Transmission Engineer for interim use.

1.7. Final Record As-Built Drawings:

1.7.1. The IC shall provide to the TO record as-built drawings in electronic (AutoCAD) format within 45 days after initial operation. (There may be adjustments to the red line drawings after the transmission line is

energized. IC is required to coordinate with the TO's Transmission Design project management to determine the appropriate drawing format.

1.8. Manufacturer Drawings - The IC shall provide the following documentation per the TO's print distribution list within 45 days after energization:

1.8.1. Manufacturer drawings include hard copies and AutoCAD files. (As described previously, these drawings must be included as part of the structure drawings submitted for the TO's review and acceptance). IC is required to coordinate with the TO's Transmission Design project management to determine the appropriate drawing format.

1.8.2. Factory test reports include hard copies and pdf files. (As described previously, the factory test reports must also be submitted for the TO's review and acceptance.)

1.8.3. Instruction books include hard copies and pdf files

1.8.4. Warranty assignments to be provided to the TO

1.8.4.1. Any material or equipment to be turned over to the TO shall also have the warranty transferred to the TO as the ultimate owner.

1.8.4.2. **Please note:** It is required that the purchaser of the equipment document that the TO is acknowledged along with the transmission line name, switch number or similar identifier, on the purchase order as the ultimate owner no later than Milestone C.47 – "Interconnection Customer Submits Bill of Sale and Notice of Transfer of Title to Transmission Owner and Transmission Provider."

1.9. Construction Field Test Reports - The construction field test reports shall be issued to the TO within 45 days after energization. IC is required to coordinate with the TO's Transmission Design project management to determine the appropriate document format.

1.9.1. Provide line grounding readings at each structure. (See **Attachment TR-8 and TR-9** for standard grounding methods and transmission line grounding data).

1.9.2. Provide concrete test cylinder reports that contain a minimum of four test cylinders for each truck load of delivered concrete.

Communications

A. Scope

1. This document contains the Transmission Owner (TO) requirements for wholesale generation interconnection projects consistent with the interconnection process as defined in the PJM Open Access Transmission Tariff (OATT) and applicable PJM manuals. The purpose of this document and attached checklist is to provide a detailed list of FirstEnergy (FE) requirements, including required documentation for operational and property transfer, if applicable, when a generation interconnection is requested by an Interconnection Customer (IC). These requirements will facilitate the safe, efficient and reliable integration of the Interconnection Facilities into the transmission system.
2. The "Wholesale Generation Interconnection Customer Communication Documentation Checklist" will be used to track the status of each document.

B. FE WGI Requirements

1. TO Communications Design and Construction Involvement

   1.1. It is imperative that the TO Network Engineering personnel are included early in the project discussion process, as specific communications requirements can vary depending upon the nature of the facility to be constructed.

   1.2. TO Network Engineering will determine the quantity and type of communications circuits required, as well as the method of transport (metallic cable, fiber optics, etc). Communications facilities will be designed and built to these parameters.

2. The installation of communications circuits into electrical substations or facilities, where hazardous step potential voltages can occur due to ground potential rise (GPR) during fault conditions, requires specialized design practices. Communications infrastructure can be designed as either fiber optic cable or metallic cable, depending upon the specifics of the facility being constructed. Wherever feasible, the use of fiber optics is preferred. These designs are described as follows:

   2.1. The use of fiber optics to provide electrical isolation has become a common and accepted alternative method. In this design, fiber optic cable is extended out from the substation, and the demarcation point with the local exchange carrier is established beyond the substation perimeter. Note that IC provision of GPR data is still required, as described in Section 2 above, in order to determine the safe distance for establishment of the demarcation point. The demarcation point is established in a pole or pad mounted outdoor enclosure specifically designed for this purpose. Specialized fiber optic electronics such as that manufactured by RLH Industries or Positron are used. In this application, the installation of fiber optic cable and electronics is typically the responsibility of the IC. Either single-mode or multi-mode fiber optic cable may be installed, depending upon the specifics of the application. Either SC or ST type fiber optic connectors may be used, depending upon the characteristics of the electronics installed. A primary advantage of this design is that it provides guaranteed electric isolation, as communications circuits are transported as light over glass. In addition, the establishment of the demarcation point beyond the substation perimeter allows for a "standard" installation from the local exchange carrier's perspective. Circuits can be installed to the demarcation point earlier in the construction process so that they are available when needed by extension over the fiber optic cable, with the actual cable installation controlled by the IC.

   2.2. Electrical isolation has traditionally been provided through the installation of high-dielectric metallic cable terminated on electronics such as that manufactured by Positron. In this application the cable is installed by the local exchange carrier, with

the design and overall length determined by the carrier based upon GPR data provided by the IC. Specific data requirements can vary by local exchange carrier. It is the IC's responsibility to provide this information. Electronics can be provided either by the carrier or by the IC. It is essential that design and installation practices are followed to exacting standards in order to provide the isolation protection as required. Also note that since this is considered a "non-standard" installation by the local exchange carrier, excessively long lead times are common from placement of the circuit order to delivery of a working circuit. The IC has little control over this process, which can exceed six months in many cases.

2.3. RLH products have an unconditional lifetime warranty. Positron products come with a standard 5-year warranty. In either case, the TO will provide a detailed materials list once specifics of the installation are known.

3. TO Circuit Requirements (includes SCADA, Revenue Metering, Voice and Protective Relaying)

3.1. General Information - In most applications, the TO requires the IC to order a 4-Wire Analog Data Circuit for SCADA communications and a standard business line for voice communications. These circuits will terminate in the TO's control house. The IC will also require SCADA, voice and revenue metering circuits in their control house. The type of SCADA circuit required is dependant upon the type of Remote Terminal Unit (RTU) device installed by the IC. The revenue metering and voice circuits are typically standard business lines. In all cases, the IC will need to obtain a street address for the substation in order to fulfill Enhanced 911 (E911) requirements prior to placement of the circuit orders. The IC will also be required to provide GPR data by completing a High Voltage Protection data form provided the serving telephone company.

3.2. Detail on the TO circuit requirements is provided below in order to assist the CI in placing the circuit orders:

3.2.1. SCADA Circuit – The TO currently requires a 4-Wire Analog Data Circuit (commonly referred to as an "FDDA" type circuit) for interface between the RTU and the regional control center. The IC should specify transmission levels of 0dB Transmit, 16dB Receive, with a line-powered Data Terminal Equipment (DTE) provided by the local exchange carrier. In fiber optic applications, the DTE must be able to provide access to tap points for sealing current to drive the optics at the demarcation point (specify Westell models 4368-02, 5496LGI2, 5497FA I3, or Verizon no. 934461).

3.2.2. Voice Circuit – A standard business line is ordered to support voice communications. The order should specify that the line is to be blocked from placing calls to area codes 900 and 976, and from 3rd party calling, collect and international calls.

3.2.3. Revenue Metering – A dedicated voice-grade analog telephone line is required to support remote access for the IC-owned revenue meter through a dial-up modem connection. This order should also specify that the line is to be blocked from placing calls to area codes 900 and 976, and from 3rd party calling, collect and international calls. The circuit and revenue meter are located in the IC's step-up substation control house.

3.2.4. When required, protective relaying is supported by the installation of fiber optic cable between the IC's substation and the transmission line tap point or the TO substation. Either single-mode or multi-mode fiber optic cable may be installed, depending upon the specifics of the application. Either SC or ST type fiber optic connectors may be used, depending upon the characteristics of the electronics installed.

3.2.5. Note that when placing circuit orders with the serving telephone company, a defined street address is required for E911 purposes. It is the IC's responsibility to obtain this address.

4. RTU Requirements

4.1. The TO will provide a specification for the purchase of the RTU. If the substation will be owned by the TO, the standard TO RTU to use shall be the "GE D20" RTU. The typical RTU used at TO transmission stations is a factory assembled RTU, which includes an RTU (BASE) D20 VME chassis with one Analog, one Status, and one Control peripheral boards as well as 125VDC power supply, bell 202 modem in a NEMA 12 cabinet. This is subject to change; as the substation is engineered there may be a need to add/change the RTU equipment.

4.2. The RTU shall provide the TO with at least the information and control capabilities listed in this document. Facilities with unusual or non-conforming load characteristics may be required to provide additional information and control beyond those listed.

4.3. Control – The RTU shall provide the TO with control of all circuit interrupting devices that are directly in the TO transmission path.

4.4. Position indication – The RTU shall provide the TO position indication of all transmission voltage circuit interrupting devices and motor operated disconnect devices.

4.5. Alarms – The RTU shall provide the TO equipment alarm information for each circuit interrupting device and associated protective relaying in the transmission path. Indication of protective relay operation alarms for relaying other than the transmission line relaying that operates a circuit interrupting device in the transmission path will also be provided. (These may include breaker failure or bus differential relaying.)

4.6. Operational Metering – The RTU shall provide the TO instantaneous bi-directional real and reactive power metering (MW and MVAR) and voltage for all TO transmission lines connected to the facility, as well as ampere metering of each circuit breaker in the transmission path. These quantities may be measured using relay accuracy class instrument transformers and meters/transducers. For RTUs serially connected to Satec meters, an optically isolated RS-232 to RS-485 converter will be used. Equipment typically used is the B&B model :485LDRC9.

4.7. The TO will provide communication protocol for the RTU that may be located in the IC's substation or Customer Facility, as appropriate. The protocol for the RTU will be "DNP 3.0" if communicating to the TO's EMS (Energy Management System).

4.8. The TO will provide a typical points list for development of the TO's Interconnection substation RTU and Human Machine Interface (HMI)/Annunciator. The points list may be modified; however, a final points list must be issued to a TO SCADA engineer and a TO substation design engineer for final review. The points list will be entered into the EMS database for upload into the system. EMS uploads occur once every two weeks. Ample time should be given to enter RTU information into an EMS database upload before a scheduled outage of the substation. RTU information should be in the EMS database one month prior to substation outage. This will allow for testing between the RTU and the EMS system and will allow for any changes that need to be made to the RTU or EMS database before the scheduled outage.

4.9. Testing – The RTU's communication and most data points on the points list will be tested to the TO's EMS system before the scheduled outage. It is understood that not all points will be able to be tested down to the field/equipment level until the outage has occurred.

4.10. The TO will provide the list of points required to be transmitted to the TO Transmission System Operator (TSO) from the IC's substation or Customer Facility, as appropriate.

C. FE WGI Required Documentation

1. TO to provide the IC with the following documents:

1.1. Telecommunications Protection Design Standard **(Attachment CO-1)**

1.2. Telecommunications Protection Design – Metallic Cable "The Positron Design" **(Attachment CO-2)**

1.3. Telecommunications Protection Design – Fiber Optic Cable "The RLH Design" **(Attachment CO-3)**

1.4. High Voltage Protection Form "Verizon Example"

(Attachment CO-4)

1.5. SCADA Points List – Example Form **(Attachment CO-5)**

1.6. Optical Power Measurement Form **(Attachment CO-6)**

1.7. TO Required Communication Materials and Equipment List (See Section B.2.2.3 for timing of issuance)

1.8. Network Standards Design - The TO uses either wireless or fiber optic technology for SCADA communications to line switches, depending upon the specific application. When wireless communications is deployed, this will be implemented internally by TO personnel on existing wireless platforms. If the use of fiber optics is selected, construction of fiber optic cable between the control house and the switch location will be required. **(Attachment CO-7)**

2. IC to provide the TO with the following documents:

2.1. E911 Address Confirmation - Provided in Outage Readiness Notification

2.2. Substation conduit detail design drawing

2.3. Substation control house rack layout drawing

2.4. Copies of Telco service orders, including projected due dates

2.5. Completed High Voltage Protection Form, including Telco provided calculations

2.6. SCADA/RTU Points List – completed form

2.7. Fiber optic cable power measurement test results

2.8. RTU Schematic

2.9. RTU/HMI Configuration Files

2.10. OTDR Traces test results

2.11. Communication Equipment Manufacturers Manuals and Warranty Information

2.12. Communication Equipment Spares List

2.13. Notification that RTU Communication Circuits are ready for TO Testing

2.14. Notification that RTU is ready for TO Testing

2.15. Wave Trap on site ready for TO Testing

2.16. Power Line Carrier on ready for TO Testing

Revenue Metering and Electric Service Billing

A. Scope

1. This document contains the Transmission Owner (TO) requirements for wholesale generation interconnection projects consistent with the interconnection process as defined in the PJM Open Access Transmission Tariff (OATT) and applicable PJM manuals. The purpose of this document and attached checklist is to provide a detailed list of FirstEnergy (FE) requirements, including required documentation for operational and property transfer, if applicable, when a generation interconnection is requested by an Interconnection Customer (IC). These requirements will facilitate the safe, efficient and reliable integration of the Interconnection Facilities into the transmission system.
2. The "Wholesale Generation Interconnection Customer Revenue Metering and Electric Service Billing Documentation Checklist" will be used to track the status of each document.

B. FE WGI Requirements

1. Revenue Metering
   - 1.1. The IC 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 TO and TP connection documents. The FE "Requirements for Transmission Connected Facilities" is located at: http://www.firstenergycorp.com/feconnect
   - 1.2. The Metering equipment shall be located at the IC Facility on the high-voltage side of the generator step-up transformer(s) and/or station service power transformer(s). Power flows to and from the facility shall be compensated for line losses to the Point of Interconnection. Line loss compensation is not required if the IC's step-up substation property adjoins the Interconnected TO's substation property, which generally places the IC's Metering equipment at the Point of Interconnection.
   - 1.3. 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 the TO, typically fifteen minutes or thirty minutes. The IC must provide the TO with remote access to the billing data in the Metering equipment via a dedicated voice-grade analog telephone circuit. The IC shall provide the TO with contact information for the person(s) responsible for meter programming and Metering equipment maintenance.
   - 1.4. The IC shall provide the TO with prior notification of any modifications at the facility that will affect the revenue meter measurements, including substation reconfigurations and meter program changes.
   - 1.5. The revenue metering system at each location shall be tested for accuracy by the IC once every two years. The IC shall give reasonable notice to the TO of the time when the testing is scheduled so that the TO may have representatives present. The TO and the TP shall have the right to audit the revenue Metering equipment and/or related documents. The IC shall be given a reasonable period of time to comply with any requests associated with an audit.
2. Electric Service Billing
   - 2.1. The Station Power billing shall be for one (1) year and shall renew automatically from year to year until terminated by written notice from either party to the other at least thirty (30) days prior to the expiration of any of the Application For Service time periods.
   - 2.2. In the event that PJM does not reallocate the IC's capacity obligation back to the IC, the TO will bill the IC for all costs resulting from any future capacity obligations at PJM.

2.3. Official written refusal of service is required from the local Electric Distribution Companies (EDC) (or Rural Electric Co-Op (REC)) if the local EDC refuses to serve energy as specified above.

2.4. FERC and PUCO/PUC/BPU regulations both govern the billing of the IC's power flow. FERC regulations govern billing for the IC's generation output for both transmission and distribution interconnections. The PUCO/PUC/BPU regulations govern billing for retail and backup retail service for both transmission and distribution service customers. FE retail tariffs are available at www.firstenergycorp.com.

2.5. ICs require energy for uses in various forms.

2.5.1 Station service is typically a few hundred kVA to feed substation control power only, with no power leaving the sub.

2.5.2 Station power is actually flowing into the Interconnection facility for either backup service to allow for power backfeed into the Interconnection when power generation is very low or at zero either due to a trip or other normal event, or as maintenance power for use during a planned maintenance outage, usually for an extended period of time.

2.6. The various sources of power above might come from different sources, with different EDC, with different energy suppliers, and with different contracts.

2.7. If the Interconnection is in another EDC territory, but connects to FE transmission, then the local EDC has first right to substation control power, and backup and maintenance power if electrically feasible. Interconnections with a single electrical source for power other than the substation will realistically take power from the Point of Interconnection, requiring flow from the FE transmission system.

2.8. The TO shall furnish Station Power (as the term is defined by the PJM Interconnection, L.L.C. Open Access Transmission Tariff ["OATT"]) to the IC's generation facility. Station Power service will be rendered by the TO consistent with PJM's monthly netting methodology set forth in the PJM OATT, as said OATT may be modified from time to time.

2.9. The TP shall determine the IC's gross energy output less the Station Power requirements of the IC ("Net Output").

2.9.1 Net Positive – The TO will bill the Minimum Charge of the Applicable Rate Schedule at the then prevailing prices on a monthly basis, applicable to recover the TO's costs associated with the ownership and maintenance of any metering and related equipment and administrative efforts for the provision of Station Power.

2.9.2 Net Negative – The TO will bill the IC for the energy and import flow at the charges set forth in the applicable Rate Schedule at the then-prevailing prices on a monthly basis with the exception of the Generation and Transmission Charges. The Generation Charge will be billed at the Real Time Locational Marginal Price for the FE Zone for the net energy, and the Transmission Charge will be billed for the net energy at the charges set forth in the appropriate Rate Schedule at the then prevailing prices on a monthly basis, unless the energy is purchased from a Third Party Supplier in which case the Generation and Transmission Charges will be provided by the Third Party Supplier.

2.10. The TO will provide the following applications:

2.10.1 Application for Electrical Service – General

2.10.2 Application for Station Power Service

2.10.3 Application and Agreement for Backup and Maintenance Service

C. FE WGI Required Documentation

1. Revenue Metering—the IC shall consult with the TO regarding the revenue quality metering system design and provide the following information:
   - 1.1. Single-line diagram showing revenue metering in the IC's step-up substation.
   - 1.2. Estimated power flows to and from the IC's step-up substation at all revenue metering points.
   - 1.3. Proposed revenue metering current transformer (CT) and voltage transformer (VT) specifications including manufacturer, type, ratios, accuracy ratings and burden ratings.
   - 1.4. Proposed revenue meter specifications including manufacturer, type and model number.
   - 1.5. Conductor type, length, resistance per phase and reactance per phase for the transmission line between the IC's step-up substation and the Point of Interconnection (if applicable).
   - 1.6. Three-line schematic and wiring diagrams showing all CT and VT connections to revenue meters.
   - 1.7. Manufacturer's certified accuracy test reports for the revenue meter, CTs and VTs.
   - 1.8. Revenue meter program information including but not limited to loss compensation values (if applicable), billing data recorder channel assignments, recorder pulse weights (Ke) and read-only password for access to interval data by the TO billing data collection system (MV-90).
   - 1.9. Revenue meter telephone number.
   - 1.10. Notice that the revenue meter is receiving current and voltage inputs from the CTs and VTs and is ready for real-time communications through the dedicated voice grade analog telephone circuit.
2. Electric Service Billing
   - 2.1. The IC shall complete an Application for Electric Service document (**Attachment RM-1**) when the IC is distribution-connected to establish billing parameters such as the name, address, contact person and billing terms.
     - 2.1.1. Verification of the billing entity, address and contract information needs to take place prior to the IC submitting the Bill of Sale and Notice of Transfer of Title to the TO.
   - 2.2. The IC shall complete an Application for Station Power Service document (**Attachment RM-2**) when the IC is transmission-connected so the TO can furnish Station Power to the IC's generation facility to establish billing parameters such as the name, address, contact person and billing terms.
     - 2.2.1. Verification of the billing entity, address and contract information needs to take place prior to the IC submitting the Bill of Sale and Notice of Transfer of Title to the TO.
   - 2.3. The IC shall optionally request Backup and Maintenance power via a separate application (**Attachment RM-3**) to avoid additional minimum bills when energy consumption exceeds energy production. Written notice as outlined in RM-3 shall be required when Backup or Maintenance power is taken or planned.

2.4. Written notice to suppliersupport@firstenergycorp.com is required when the IC obtains generation and transmission from a third party. The supplier must adhere to the TO and PUC notification rules.

Tax and Accounting

A. Scope

1. This document contains the Transmission Owner (TO) requirements for wholesale generation interconnection projects consistent with the interconnection process as defined in the PJM Open Access Transmission Tariff (OATT) and applicable PJM manuals. The purpose of this document and attached checklist is to provide a detailed list of FirstEnergy (FE) requirements, including required documentation for operational and property transfer, if applicable, when a generation interconnection is requested by an Interconnection Customer (IC). These requirements will facilitate the safe, efficient and reliable integration of the Interconnection Facilities into the transmission system.
2. The "Wholesale Generation Interconnection Customer Tax and Accounting Documentation Checklist" will be used to track the status of each document.

B. FE WGI Requirements

1. Tax Requirements
    - 1.1. A representation from an independent engineer that the facility will not exceed the 95/5 power flows test on a prospective basis, for the first ten taxable years of the Utility beginning with the year of asset ownership transfer. (Notice 88-129). Please see "FirstEnergy Wholesale Generation Interconnection Requirements – Agreements Support" for details and an example of the 95/5 Power Flow Certificate.
    - 1.2. A representation on the part of the IC that the asset ownership transfer is being made to facilitate the transmission of power over a transmission grid for sale to a third party. To this end, title to power must pass to the third party (PJM) prior to the buss bar.
    - 1.3. A representation that the asset ownership transfer is made in connection with a long-term interconnection agreement with a term of at least 10 years. (Notice 2001-82)
    - 1.4. A representation on the part of the TO that the intertie is not included in the Utility's rate base. That is, the asset received from the customer will be added to the Continuous Property Record (CPR) at $0 net value. Note that the value of the substation will be maintained in the CPR for property tax purposes.
    - 1.5. A representation, on the part of the TO, that the asset ownership transfer otherwise will be treated as a capital contribution under IRC §118(a).
    - 1.6. An indemnity, from the IC to the TO, that holds the TO harmless from the tax consequences of the asset ownership transfer if the IRS should change its position on intertie asset ownership transfers or if a disqualifying event occurs such as violating the 95/5 power flows test on an actual basis. If the asset ownership transfer becomes taxable, Notice 90-60 provides that the fair value of the asset ownership transfer will be determined by depreciated replacement cost at the time of the disqualifying event.
2. Accounting Requirements
    - 2.1. Cost data must be submitted to the TO in the level of detail described below:
        - 2.1.1. IC to provide installed cost and quantity of all major assets, including poles, towers, insulators, switches, breakers, transformers, motor operators, conductor and ground wire, etc. Hardware assemblies and clamps are to

be included as a miscellaneous bucket. Copies of all purchase orders, receipts, etc.

2.1.2. Personal property cost data must be separate from real property cost data

2.1.3. Cost data must be divided by function and by year (substation, transmission or distribution)

2.1.4. Once divided, the cost data must be detailed out by retirement unit. (See **Attachment TA-1** for the Cost Data Template for Substation and **Attachment TA-2** for the Cost Data Template for the Transmission Line).

C. FE WGI Documentation Requirements

1. Tax
   1.1. 95/5 Power Flow Certificate (**Attachment TA-3**)
2. Accounting
   2.1. Cost Data
      2.1.1. IC to provide the following cost data to the TO for review and acceptance:
         2.1.1.1. Completed Cost Data Template with Estimated Cost Data
         2.1.1.2. Updated Cost Data Template with Actual Cost Data
         2.1.1.3. Final Cost Data Template with “as-built” Actual Cost

Section 2 Contents

FirstEnergy

AS-1: Project Team Contact List

Project Name:

	Phase / Requirements Document Section	Business Unit	SME	Contact Number
1.0	Agreements Support	Agreements Support		
2.0	Real Estate	Real Estate Services		
3.0	Insurance Risk Management	Insurance Risk Management		
3.1	Credit Risk Management	Credit Risk Management		
4.0	Vegetation Management	Vegetation Management		
5.0	Regulatory Siting & Environmental Permitting	ED Siting, Surveying, ROW Engineering		
5.1	Regulatory Siting & Environmental Permitting	Environmental Energy Delivery Services		
6.0	Substation	Substation Engineering (Pre-ISA/CSA) Substation Engineering (Post-ISA/CSA)		
6.1	Substation	Substation Services		
6.2	Substation	Substation Maintenance		
7.0	Transmission	Transmission Engineering		
7.1	Transmission	Transmission Maintenance		
8.0	Communication	IT-Network Engineering/Planning		
8.1	Communication	IT EMS		

8.2	Communication	IT-Infrastructure-Network Field Operations		
9.0	Revenue Metering & Electric Service Billing	Metering		
9.1	Revenue Metering & Electric Service Billing	Customer Support		
10.0	Tax and Accounting	Tax		
10.1	Tax and Accounting	Accounting Policy & Control		
11.0	Property Accounting	Property Accounting		
12.0	Business Services	Business Services		
13.0	ED Planning & Protection	ED Planning		
13.1	ED Planning & Protection	ED Protection		
14.0	Project Management	Project Lead		
15.0	Operation Services	Transmission Operation Services		
16.0	Legal	Legal		
17.0	Transmission System Operations	ATSI-Transmission System Dispatching		
18.0	Customer Services – Power Billing	Power Billing		
19.0	Metering Systems & Reporting	MV90		
20.0	RTO Operations Settlement	RTO Operations Settlement		

	DISTRIBUTION			
21.0	Distribution System Operations	Regional Distribution System Operations		
22.0	Planning & Protection	Regional Planning		
22.1	Planning & Protection	Regional Protection		
23.0	Engineering Services	Engineering Services Design		

FirstEnergy

CHANGE REQUEST FORM _____

This form will be used to document a change to an accepted project. This form should hold a summary of the impact of the proposed change. Change Request Forms are completed for all changes that require Acceptance by the Transmission Owner (TO) Project Management.

Project: _____

TO Project WBS # _____

Submitted by : ☐ **TO** ☐ **Interconnection Customer (IC):** _____

Submitted by Name: _____ **Phone**:_**Date**: _____

Description of Recommended Change: _____

_____

_____

_____

Reason / Benefit / Justification for Change: _____

_____

_____

_____

Impact on Scope / Schedule / Budget: _____

_____

_____

_____

Description of Accepted Resolution: _____

_____

_____

_____

TO Project Manager Acceptance of Resolution: _____ **Phone:** _____ **Date:** __

IC Acceptance of Resolution: _____ **Phone:** _____ **Date:** __

Impacted Stakeholders: _____

_____

_____

Outage Readiness Notification

Wholesale Generator Interconnection

1. The Interconnection Customer (IC) will submit the Outage Readiness Notification to the Transmission Owner (TO) designee(s) as listed in Attachment AS-11 of the Transmission Owner Facility Requirements document, no later than seven (7) months prior to the requested Outage Date.
2. The TO will review and upon acceptance will submit the Outage Request to the Transmission Provider (TP) for review, acceptance and scheduling of the outage(s) necessary to construct and energize a new and/or rebuilt Transmission Line(s) and/or Interconnection Facility.
3. The IC may refer to PJM Manual M03 Section 4 for additional details. The IC should be aware that an Outage Request planned for during peak load periods will typically not be approved and that PJM reserves the right to cancel outages at any time due to system reliability conditions.

Name of Customer/Company: _____
PJM Queue Project #: _____
Name of Company Official in Charge: _____
Title of Official : _____
Service Location Address (911 Address): _____
_____
_____
_____
Customer Mailing Address: _____
_____
_____
Customer Billing Address: _____
_____
_____
Requested Start of Outage _____
Requested Duration of Outage _____
Name of Customer Outage Coordinator: _____
Phone of Customer Outage Coordinator: _____
Mailing Address of Customer Outage Coordinator: _____
_____
_____

Interconnection Customer Name

Date

Transmission Owner Name and Address

PJM Interconnection, L.L.C.
Attn:
955 Jefferson Avenue
Valley Forge Corporate Center
Norristown, PA 19403-2497

Re: Notice of Completion of Interconnection Facilities - *(PJM Queue Position)*

This notice is in reference to the Interconnection Construction Service Agreement by and among PJM Interconnection, L.L.C., *Name of Interconnection Customer*, and *Name of Transmission Owner*, (said ICSA relating to *PJM Interconnection Queue Position*) pertaining to the *Name of Interconnection Switchyard Substation*.

Interconnection Customer Name hereby provides notification that it has satisfied all requirements for the achievement of energization of the Interconnection Facilities, including but not limited to, the Transmission Owner's substation, the Interconnection Customer's substation, and all electrical interconnections between and among the facilities, to enable interconnection to the Transmission Owner's transmission line. Upon Transmission Owner's successful testing and inspection of the above mentioned Interconnection Facilities, it is the understanding of the Interconnection Customer that the facilities will be scheduled for energization.

Sincerely,

_____
Interconnection Customer Name

_____
Name

_____
Title

Date

Interconnection Customer Name and Address

PJM Interconnection, L.L.C.
Attn:
955 Jefferson Avenue
Valley Forge Corporate Center
Norristown, PA 19403-2497

Re: Notice of Successful Inspection and Testing of Facilities – Acceptable for Energization - (*PJM Queue Position*)

This notice is in reference to the Interconnection Construction Service Agreement by and among PJM Interconnection, L.L.C., *Name of Interconnection Customer*, and *Name of Transmission Owner*, (said ICSA relating to *PJM Interconnection Queue Position*) pertaining to the *Name of Interconnection Switchyard Substation*, as approved by the Federal Energy Regulatory Commission in *Docket Number* and *PJM Original Service Agreement Number* .

By issuance of this document, *Name of Transmission Owner*, hereby acknowledges the pre-energization acceptance of the *Name of Interconnection Switchyard Substation* (*PJM Queue Position*) built by the Interconnection Customer (*Name of Interconnection Customer*).

PJM Queue Position for the *name of windfarm* Project has the requirement to provide written documentation of the completed inspection and testing for the *Name of Interconnection Switchyard Substation*, pursuant to Section 3.8.5 of Attachment P, Appendix 2, Standard Construction Terms and Conditions as contained in PJM's Open Access Transmission Tariff and pursuant to Section 3.8.5 of the *Interconnection Construction Service Agreement No.* .

Name of Transmission Owner

By:		By:	
Name:		Name:	
Title:	Mgr., Substation Services	Title:	Mgr., Trans. Sys. Dispatching

By:		By:	
Name:		Name:	
Title:	Supv., Substation Maint	Title:	Mgr., ED Reg. Project Mgmt.

Interconnection Customer Name

Date

Pennsylvania Electric Company, a FirstEnergy Company
Attn: Mike Thorn
76 S. Main Street
Akron, OH 44308

PJM Interconnection, L.L.C.
Attn:
955 Jefferson Avenue
Valley Forge Corporate Center
Norristown, PA 19403-2497

Re: Notice of Transfer of Operational Control - *(PJM Queue Position No. ____)*

This notice is in reference to the Interconnection Construction Service Agreement Number ____ by and among PJM Interconnection, L.L.C., *Name of Interconnection Customer*, and *Name of Transmission Owner*, (said ICSA relating to *PJM Interconnection Queue Position*) pertaining to the *Name of Interconnection Switchyard Substation.*

PJM Queue Position for the *Name of Interconnection Customer* facility does, as required pursuant to Section 3.9.1 and 3.9.3 of Attachment P, Appendix 2, Standard Construction Terms and Conditions contained in PJM's Open Access Transmission Tariff, hereby transfer to *Name of Transmission Owner*, operational control of the *Name of Interconnection Switchyard Substation* as of the date written below. *Name of Interconnection Customer* has delivered, prior to this written instrument of transfer, the marked-up as-built drawings of the *Name of Interconnection Switchyard Substation.* *Name of Interconnection Customer* will ensure telemetering systems are operational and provide PJM and *Name of Transmission Owner* with telemetered data as specified in OATT Attachment O, Appendix 2, Section 8.5.2 before Stage Two energization (initial synchronization of any generators).

Sincerely,

_____
Interconnection Customer Name

_____
Name

_____
Title

_____
Date of Transfer of Operational Control

Date

Interconnection Customer Name and Address

PJM Interconnection, L.L.C.
Attn:
955 Jefferson Avenue
Valley Forge Corporate Center
Norristown, PA 19403-2497

Re: Notice of Acceptance of Facilities – *(PJM Queue Position)*

This notice is in reference to the Interconnection Construction Service Agreement by and among PJM Interconnection, L.L.C., *Name of Interconnection Customer*, and *Name of Transmission Owner*, (said ICSA relating to *PJM Interconnection Queue Position*) pertaining to the *Name of Interconnection Switchyard Substation*, as approved by the Federal Energy Regulatory Commission in *Docket Number* and *PJM Original Service Agreement Number* .

By issuance of this document, *Name of Transmission Owner*, hereby acknowledges the acceptance of the facilities of the *Name of Interconnection Switchyard Substation* and Transmission Tap built by the Interconnection Customer, *Name of Interconnection Customer*.

PJM requires written documentation of the acceptance of facilities constructed by the Interconnection Customer, pursuant to Section 3.10 of Attachment P, Appendix 2, Standard Construction Terms and Conditions as contained in PJM's Open Access Transmission Tariff.

These facilities were energized on *date of energization*, and punch list items from the site inspection of *date of site walkdown* have been resolved.

Name of Transmission Owner

By:		By:	
Name:		Name:	
Title:	Mgr., Substation Services	Title:	Mgr., Trans. Sys. Dispatching
By:		By:	
Name:		Name:	
Title:	Supv., Substation Maint.	Title:	Mgr., Engineering Services

Interconnection Customer Name

Date

Transmission Owner Name and Address

PJM Interconnection, L.L.C.
Attn:
955 Jefferson Avenue
Valley Forge Corporate Center
Norristown, PA 19403-2497

Re: Notice of Transfer of Title – *(PJM Queue Position)*

This notice is in reference to the Interconnection Construction Service Agreement by and among PJM Interconnection, L.L.C., *Name of Interconnection Customer*, and *Name of Transmission Owner*, (said ICSA relating to *PJM Interconnection Queue Position*) pertaining to the *Name of Interconnection Switchyard Substation*, as approved by the Federal Energy Regulatory Commission in *Docket Number* and *PJM Original Service Agreement Number* .

PJM Queue Position for the *Name of Interconnection Customer* facility does, required pursuant to Attachment P, Appendix 2, Section 5.5 of PJM's Open Access Transmission Tariff, hereby transfer to *Name of Transmission Owner*, the *Name of Interconnection Switchyard Substation* as of the date written above. The *Name of Interconnection Customer* transfer of the *Name of Interconnection Switchyard Substation* requires a Bill of Sale to transfer and convey to *Name of Transmission Owner*, certain items of personal property as described in Exhibit B to the Bill of Sale and attached hereto.

Sincerely,

_____
Interconnection Customer Name

_____
Name

_____
Title

BILL OF SALE

This Bill of Sale, is made as of ***date*** ("Effective Date") by ***Name of Interconnection Customer*** ("Interconnection Customer") to ***Name of Transmission Owner*** ("Transmission Owner").

Witnesseth:

Whereas, ***Name of Property Owner*** and Transmission Owner are parties to that certain Easement dated as of ***date*** and recorded in the ***name of County*** County Recorder's Office in record book _____, page ____ (the "Easement") related to certain real property commonly referred to as the ***Name of Interconnection Switchyard Substation***, and as more particularly described on Exhibit A, attached hereto (the "Real Property");

Whereas, pursuant to the terms of this Bill of Sale, Interconnection Customer desires to transfer and convey to Transmission Owner all of Interconnection Customer's interest in the equipment, facilities, and other personal properties located on the Real Property, including without limitation the personal property more particularly described in the "***Name of Interconnection Switchyard Substation*** Facilities Description" attached hereto as Exhibit B and incorporated herein by this reference (the "Personal Property").

Now, therefore, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, effective as of the Effective Date, Interconnection Customer does hereby Grant, Sell, Transfer, Set Over, and Deliver to Transmission Owner, all the Personal Property free and clear of any and all liens, security interests and encumbrances.

Interconnection Customer hereby represents and warrants to Transmission Owner, that Interconnection Customer is the sole lawful owner of the Personal Property; that Interconnection Customer has good and marketable title to the Personal Property free and clear of all liens, claims, rights, charges, or encumbrances of any nature whatsoever; and that Interconnection Customer has the right to transfer the Personal Property to Transmission Owner as aforesaid. Notwithstanding anything herein to the contrary, Interconnection Customer hereby covenants and agrees for the benefit of Transmission Owner that Interconnection Customer will, for Interconnection Customer and Interconnection Customer's successors and assigns, warrant and forever defend, at Interconnection Customer's sole cost and expense, the right, title, and interest of Transmission Owner and Transmission Owner's successors and assigns in and to the Personal Property against the lawful claims and demands of all persons. The provisions of this paragraph shall apply notwithstanding any other provisions of this Bill of Sale or the Easement, and shall survive termination, cancellation, or completion of this Bill of Sale and the Easement.

This Bill of Sale shall be governed by, interpreted under and construed and enforceable in accordance with the laws of the State/Commonwealth of Pennsylvania.

This Bill of Sale may be executed in counterparts, each of which shall be an original and all of which counterparts taken together shall constitute one and the same agreement.

In witness whereof, Interconnection Customer has caused this Bill of Sale to be duly executed and delivered as of the date and year first above written.

Interconnection Customer Name

_____
Name:

_____
Title:

"Accepted on the above terms and conditions as of the _____ day of _____ 20____.

TRANSMISSION OWNER:

Transmission Owner Name

By: _____
Name

_____
Title

ACKNOWLEDGMENT

STATE OF _____)
)
COUNTY OF _____)

On _____ 20___, before me, _____, Notary Public, personally appeared _____, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument, the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of _____ that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

_____

[SEAL]

Exhibit A

Real Property

[See attached]

Exhibit B
Personal Property

Name of Interconnection Switchyard Substation Facilities Description

General Description

The ***Name of Interconnection Customer*** electrical interconnection facilities consist of the _____kV ***Name of Interconnection Switchyard Substation*** facilities and the _____kV/_____kV ***Name of Interconnection Customer Substation*** facilities. The _____kV ***Name of Interconnection Switchyard Substation*** facilities by this agreement will be owned and operated by ***Name of Transmission Owner*** ("Transmission Owner"). This schedule describes the electrical equipment that has been constructed and will be turned over to Transmission Owner in accordance with Interconnection Construction Service Agreement No. _____. Transmission Owner has earlier been provided a permanent easement to the land under the ***Name of Interconnection Switchyard Substation*** and an access easement to the substation from _____ Road.

Interfaces

The point of interface to the existing FirstEnergy _____kV transmission system is at the new ***Name of Interconnection Switchyard Substation***. ***Name of Interconnection Switchyard Substation*** is a three breaker ring switching station that intercepts the existing _____ to _____ _____kV line. The station provides a new terminal position for the line to _____, a second position for the line to _____ and the third position serves the new ***Name of Interconnection Customer Substation***. All structures and equipment from the existing _____kV transmission line to the _____kV bus in the adjacent ***Name of Interconnection Customer Substation*** compose the ***Name of Interconnection Switchyard Substation***.

Structures and Equipment

The _____kV ***Name of Interconnection Switchyard Substation*** includes the following major components:

- Steel Deadend Structures (qty 2) (_____ and _____ lines)
- 70kV MCOV Lightning Arresters (qty 6) (3 each on each incoming line position)
- Capacitive Voltage Transformers (qty 9) (3 each on each circuit position)
- 145kV, 3000 Amp Circuit Breakers including Bushing Current Transformers (qty 3) (1 for each circuit position)
- 121kV, 2000 Amp Disconnect Switches (qty 6) (2 each for each circuit breaker)
- 66,359-120/240V, 50kVA Station Service Transformer (qty 1)
- Aluminum Buswork, Tubing, Wire & Connectors
- Steel Support Structures including Insulators
- Control Building including, Communication, Protection and Control Equipment and Interconnecting Wiring
- Underground Copper Grounding Grid, Wiring Conduits & Cable Trench
- Concrete Foundations and Crushed Rock Surfacing
- Chain Link Security Fencing

See attached Drawing List for ***Name of Interconnection Switchyard Substation***, Dwg. No. _____; and see attached one-line Diagram, Dwg. No. _____.

Drawing List

[See attached]

Diagram

[See attached]

EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that we, _____, claiming title by virtue of an instrument recorded in. Volume _____, Page ___, of the _____ County Deed Records, hereinafter called the "Grantors", for and in consideration of the sum of One Dollar ($1.00) and other good and valuable considerations, and DEVELOPER'S NAME, a STATE Corporation, having its principal office at ADDRESS, CITY, STATE, ZIP CODE, hereinafter called "Grantee", hereby grant and convey with covenants to Grantee, its successors and assigns an easement to construct and operate electrical facilities on Grantors premises located in _____, _____ County, PA, premises further described and shown on Exhibit A attached hereto and made a part hereof.

The easement rights include lines for the transmission and distribution of electric energy consisting of overhead and underground conductors and lightning protective wires, supporting structures, guys, push braces, ducts, conduits, communication wires and structures, cables, anchors, wires and other usual fixtures and appurtenances and equipment deemed by Grantee to be necessary for the transmission and distribution of electric energy, together with the right to patrol, inspect, redesign, rebuild or alter said lines or facilities, and to install such additional lines, apparatus and equipment as Grantee may at any time deem necessary and the right to remove any line or equipment, or any part thereof. In addition, Grantor grants and conveys the right to remove or clear and keep clear any or all trees and underbrush by any methods as Grantee may deem proper or necessary, including the use of herbicides, and other structures and obstructions within said easement areas, and such trees beyond the same as in the sole judgment of Grantee that may interfere with or endanger said lines or appurtenances when erected, and the right to enter without notice upon Grantor's said lands for all of the purposes aforesaid.

Grantors also grant a nonexclusive easement for ingress and egress to the substation easement by means of a driveway as described in Exhibit B attached hereto and made a part hereof.

The rights granted hereby may be assigned in whole or in part and the words "Grantors" and "Grantee" shall include their heirs, executors, administrators, successors and assigns, as the case may be.

IN WITNESS WHEREOF, We have hereunto set our hands this ___day of _____ 20_.

_____
Printed Name_____

_____
Printed Name_____

COMMONWEALTH OF PENNSYLVANIA)
) SS:
COUNTY OF)

On this _____ day of _____, 20_, before me, a Notary Public, the undersigned officer, personally appeared _____, known to me (or satisfactorily proven) to be the person whose name subscribed to the within instrument, and acknowledged that he executed the same for the purposes therein contained.

In witness whereof, I hereunto set my hand and official seal.

_____
Notary Public

This instrument prepared by
DEVELOPER'S NAME

Reviewed as to content:

By: _____
FirstEnergy Real Estate Department

Date: _____

WAIVER AND JOINDER

(Page 3 depending on Grantors marital status)

I, _____, spouse of _____, in consideration of the above sum and other good and valuable consideration received, do hereby waive and release to Grantee all rights of dower, curtesy, homestead, community property, and all other right, title and interest, if any, consistent with and joining in the above Easement in and to the property described therein.

WITNESS my hand this ___day of _____ 20_.

_____

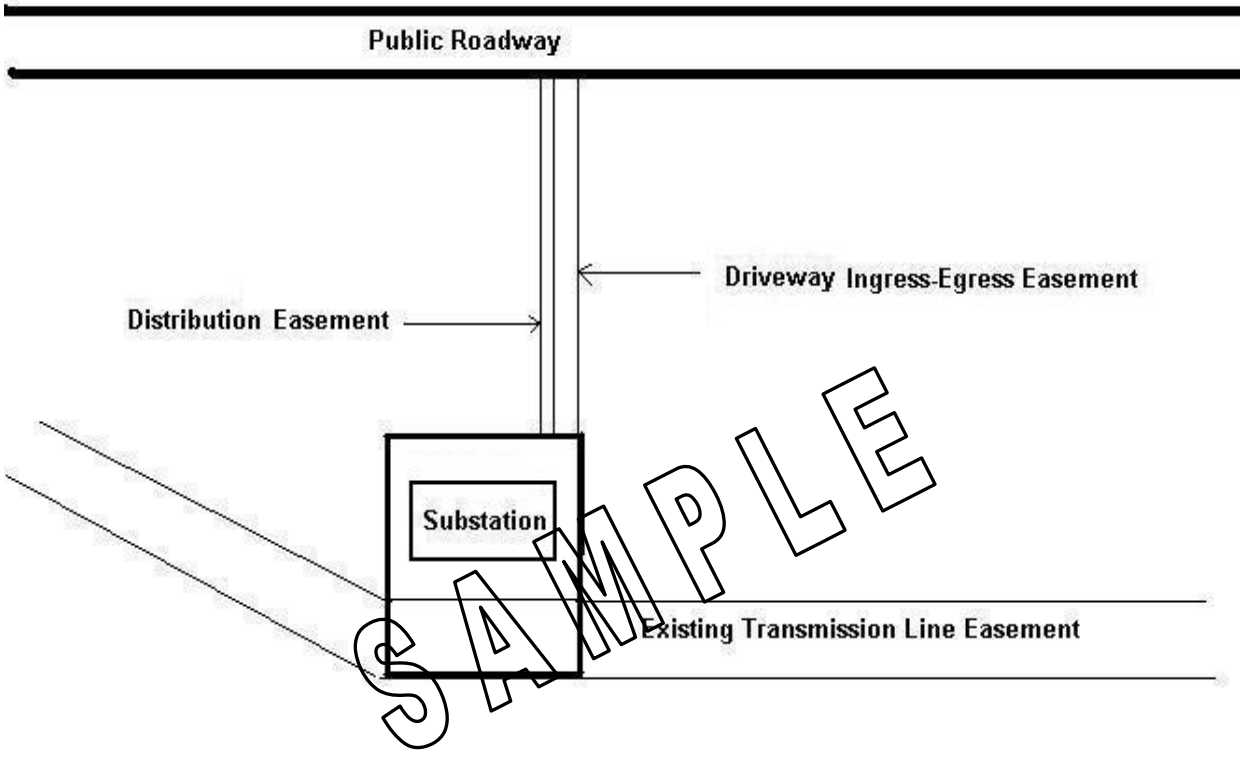
Printed Name_____

COMMONWEALTH OF PENNSYLVANIA)

) SS:

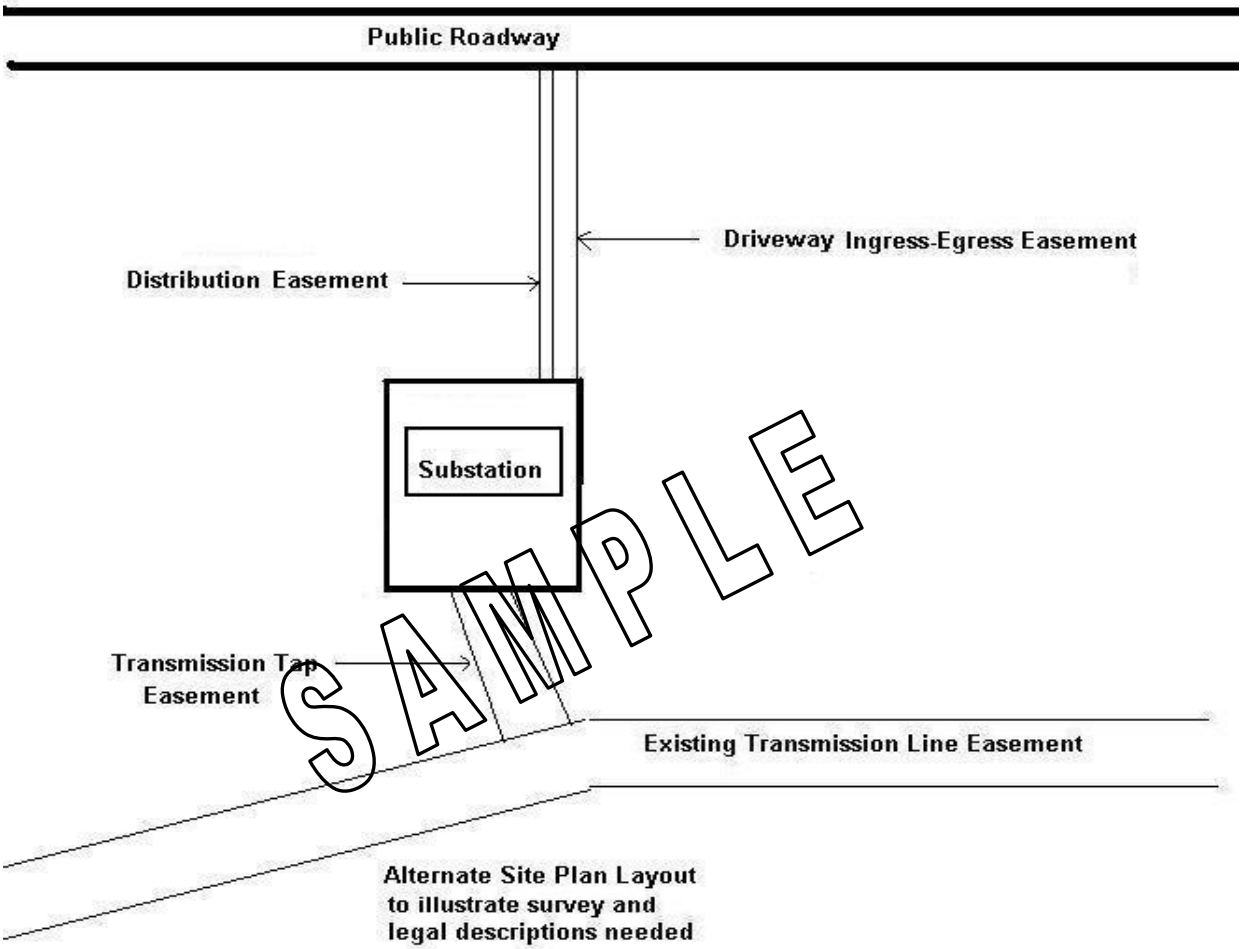
COUNTY OF)

On this _____ day of _____, 20_, before me, a Notary Public, the undersigned officer, personally appeared _____, known to me (or satisfactorily proven) to be the person whose name subscribed to the within instrument, and acknowledged that he executed the same for the purposes therein contained.



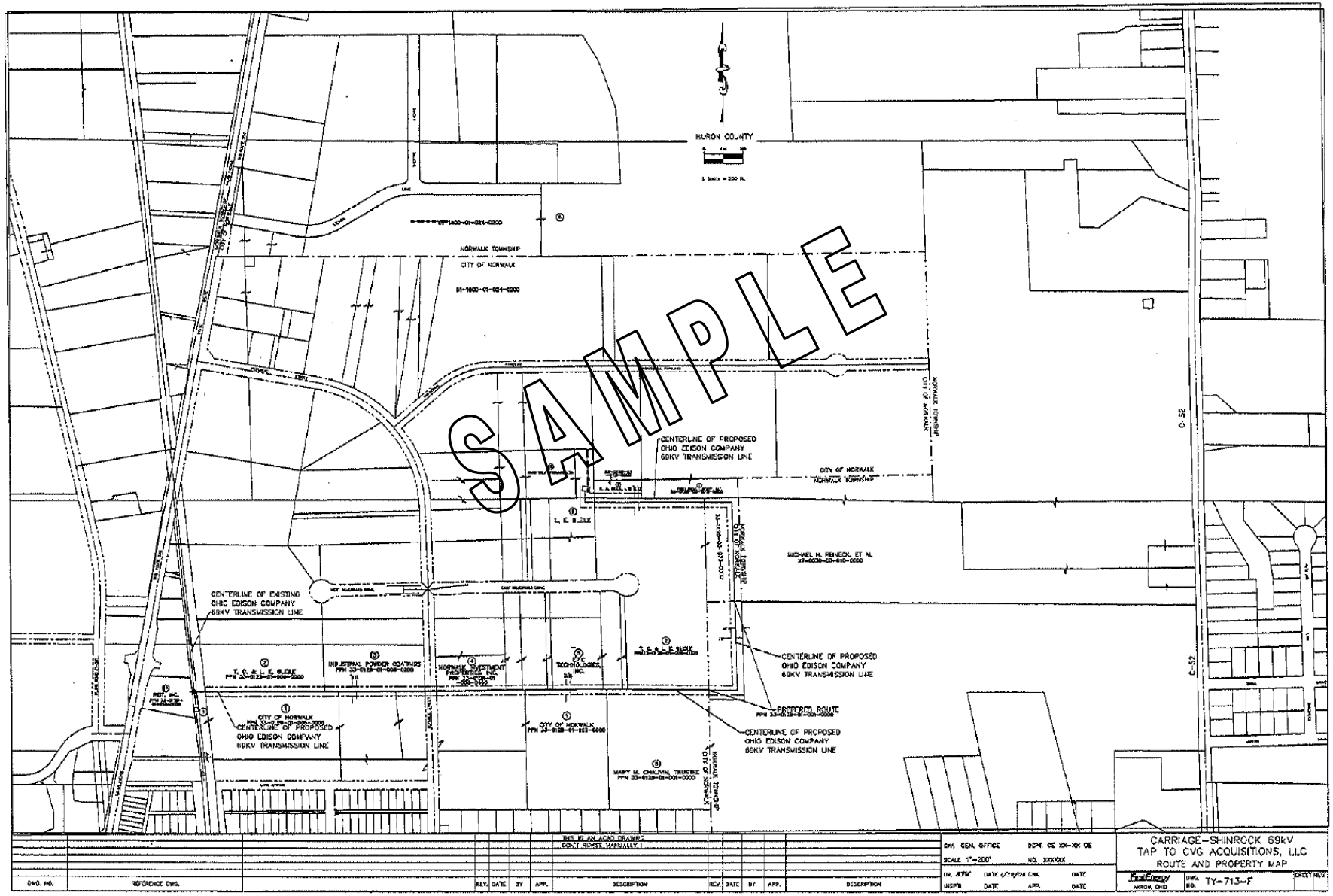
Preferred Site Plan Layout

to illustrate survey and
legal descriptions needed


Public Roadway
Driveway Ingress-Egress Easement
Distribution Easement
Substation
SAMPLE
Transmission Tap
Easement
Existing Transmission Line Easement
Alternate Site Plan Layout
to illustrate survey and
legal descriptions needed

RE-2: Complex Layout with Sample Right of Way Drawings and Property Maps when Multiple Parcels are Involved

:



Real Estate Department
Easements subsystem
DETAILED PROPERTY AND PROVISION LIST

Parcel No.	Structure Nos.	Name of Owner / Tenant / Custodian	Owner / Tenant / Custodian specific information
01		Smith, Joe 123 Blue Road Red, OH 44444 (330) 555-555	EASEMENT SECURED Forestry and construction personnel contact property owner before entering property. Remove 5 trees - 4 pines, 1 maple. Mulch pines and brush. Property owner will locate place to dump. Cut maple into handling lengths and stack.
02		Smith, Bob 125 Blue Road Red, OH 44444 (330) 555-5554	EASEMENT NOT NEEDED
03		Smith, John 127 Blue Road Red, OH 44444 (330) 555-5553	EASEMENT SECURED Forestry and construction personnel contact property owner before entering property. Trim off all road side branches of walnut tree.
04		Smith, Mary 129 Blue Road Red, Ohio 44444 (330) 555-5552	EASEMENT SECURED
05		Smith, Jane 131 Blue Road Red, Ohio 44444 (330) 555- 5551	EASEMENT SECURED Remove trees along road front and grind the stumps Talk to property owner and explain work to be done

ACCESS AGREEMENT

This Agreement ("Agreement") is entered into as of the _____ day of _____ 200__, between PENNSYLVANIA ELECTRIC COMPANY, 76 South Main Street, Akron, Ohio 44308 ("PENELEC"), and _____, ADDRESS, CITY, STATE, ZIP CODE ("Owner").

1. Statement of Purpose. PENELEC is accessing Owner's parcel of land comprising approximately _____ acres located in the township of _____, _____ County, Commonwealth of Pennsylvania, as described on Exhibit "A" and further shown on Exhibit "B", attached hereto and made a part hereof (the "Property"), with such personnel and equipment as PENELEC may deem necessary or convenient for substation development and construction purposes.

2. Right of Access. Owner, for good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, grants to PENELEC a temporary license for a period of twelve (12) months, commencing on the date of this Agreement, to enter upon the Property for the sole purpose set forth above, and for no other purpose, and subject to the terms and conditions as set forth herein.

3. Obligations.

a. As of the date hereof, PENELEC shall have the right to enter upon the Property for the purpose set forth above.

b. PENELEC may bring equipment and appurtenances onto the Property as may be required for the purposes set forth above, provided that all such equipment and appurtenances shall be maintained and operated in compliance with all applicable laws and regulations.

c. PENELEC agrees to pay for all labor and materials used upon the Property and shall save Owner harmless from any lien, or claim of lien, in respect thereto.

d. PENELEC shall, at all times relevant hereto, comply with all applicable laws, rules and regulations. PENELEC, at its own expense, shall obtain all necessary permits, licenses and approvals in connection with its assessment of the Property.

e. PENELEC shall take all reasonable steps to preserve and to avoid damage to the Property. PENELEC shall repair or replace Owner's buildings, driveway, structures, or other real or personal property damaged by PENELEC.

4. Release of Liability. PENELEC shall enter the Property at its own risk, and hereby releases Owner from any and all claims for damages and liability arising out of PENELEC's

use of or entry onto the Property under this Agreement, except for willful or negligent acts of Owner.

5. Indemnity. PENELEC hereby releases and agrees to indemnify and hold harmless Owner from and against any and all claims, damages, actions or causes of action asserted by any person or persons for bodily injury, including death at any time resulting therefrom, damage to or loss or destruction of personal property, or damage to or loss or destruction of real property, resulting from or arising out of PENELEC 's entry, presence, work, maintenance, equipment, and personnel on the Property during the term of this Agreement, except that PENELEC shall have no liability for losses solely resulting from or arising out of the negligent, willful or wanton acts or omissions of Owner, nor shall PENELEC 's actions relative to this Agreement, except as expressly provided for herein, create any obligations for PENELEC.

6. This Agreement shall be governed by, construed, and interpreted in accordance with the laws of the state of Ohio.

IN WITNESS WHEREOF, this Agreement is executed as of the date first above written.

WITNESSED BY:

OWNER

_____

_____
(Printed Name)

By:_____
Printed Name

_____

_____
(Printed Name)

By:_____
Printed Name

PENNSYLVANIA ELECTRIC COMPANY

_____

By:_____
Michelle A. Mazurek

_____
(Printed Name)

Its: Director, Real Estate & Facilities for FirstEnergy Service Company on behalf of Pennsylvania Electric Company

_____

_____
(Printed Name)

Assignment of Easement

DEVELOPER NAME, a STATE corporation, ADDRESS, CITY, STATE, ZIP CODE, the ASSIGNOR, for valuable consideration paid, assigns to **PENNSYLVANIA ELECTRIC COMPANY,** a Pennsylvania corporation, whose tax mailing address shall be 76 South Main Street, Akron, Ohio 44308, the ASSIGNEE, an easement and right of way for rights and privileges for the transmission and distribution of electric current, including communications facilities as recorded in Deed Record Book ___, Page ___-___, in _____ County Records.

Said Assignor has executed this assignment by its duly authorized officers as of the _____ day of _____ 200_.

DEVELOPER NAME

By: _____
Printed name and title

COMMONWEALTH OF PENNSYLVANIA)
) SS:
COUNTY OF _____)

The foregoing instrument was acknowledged before me this _____ day of _____ 200_ by _____ of DEVELOPER NAME, a STATE corporation, on behalf of the corporation.

_____
Notary Public

This instrument prepared by
Pennsylvania Electric Company

Reviewed as to content:

By: _____
FirstEnergy Real Estate Department
Date: _____

GENERAL WARRANTY DEED

DEVELOPER NAME_____, with address at ADDRESS, CITY, STATE, ZIP CODE, the GRANTOR, for valuable consideration paid, grants with general warranty covenants to PENNSYLVANIA ELECTRIC COMPANY, an Pennsylvania corporation, whose tax mailing address shall be 76 South Main Street, Akron, Ohio 44308, the GRANTEE, the following real property:

Property is described by survey as set forth on Exhibit "A", attached hereto and made a part hereof.

Except restrictions, conditions and easements of record, and zoning ordinances and taxes, which shall be prorated between the parties as of the date of transfer.

Permanent Parcel Number: _____

Prior Deed Reference: Volume _____, Page ____-____

Said Grantor has executed this general warranty as of the _____of _____200_.

DEVELOPER NAME

By:_____
Printed name and title

ACORD

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY) 06/02/2009

PRODUCER
Aon Risk Services Northeast, Inc.
Providence RI Office
50 Kennedy Plaza
10th Floor
Providence RI 02903-2393 USA

PHONE: (866) 283-7122 FAX: (847) 953-5390

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

INSURED
[redacted]

INSURERS AFFORDING COVERAGE		NAIC #
INSURER A:	Lexington Insurance Company	19437
INSURER B:	XL Insurance America Inc	24554
INSURER C:	Greenwich Insurance Company	22322
INSURER D:		
INSURER E:		

Holder Identifier :

SIR applies per terms and conditions of the policy

COVERAGES

THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

LIMITS SHOWN ARE AS REQUESTED

INSR LTR	ADD'L INSRD	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE(MM/DD/YYYY)	POLICY EXPIRATION DATE(MM/DD/YYYY)	LIMITS	
B		GENERAL LIABILITY X COMMERCIAL GENERAL LIABILITY CLAIMS MADE [X] OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: POLICY [X] PRO-JECT LOC	US00010949LI09A	06/01/2009	06/01/2010	EACH OCCURRENCE	$1,000,000
						DAMAGE TO RENTED PREMISES (Ea occurrence)	$1,000,000
						MED EXP (Any one person)	$10,000
						PERSONAL & ADV INJURY	$1,000,000
						GENERAL AGGREGATE	$2,000,000
						PRODUCTS - COMP/OP AGG	$2,000,000
C		AUTOMOBILE LIABILITY X ANY AUTO ALL OWNED AUTOS SCHEDULED AUTOS HIRED AUTOS NON OWNED AUTOS	RAG943734601	05/31/2009	06/01/2010	COMBINED SINGLE LIMIT (Ea accident)	$1,000,000
						BODILY INJURY (Per person)	
						BODILY INJURY (Per accident)	
						PROPERTY DAMAGE (Per accident)	
		GARAGE LIABILITY ANY AUTO				AUTO ONLY - EA ACCIDENT	
						OTHER THAN AUTO ONLY: EA ACC	
						AGG	
B		EXCESS / UMBRELLA LIABILITY X OCCUR CLAIMS MADE DEDUCTIBLE RETENTION	US00010950LI09A	06/01/2009	06/01/2010	EACH OCCURRENCE	$20,000,000
						AGGREGATE	$20,000,000
B		WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR / PARTNER / EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) Y/N N If yes, describe under SPECIAL PROVISIONS below	RWG943524901	05/31/2009	06/01/2010	X WC STATU-TORY LIMITS OTH-ER	
						E.L. EACH ACCIDENT	$1,000,000
						E.L. DISEASE-EA EMPLOYEE	$1,000,000
						E.L. DISEASE-POLICY LIMIT	$1,000,000
A		OTHER Prof Liability	023462400 Professional Liability	02/08/2009	02/08/2010	Aggregate SIR	$10,000,000 $500,000

Certificate No : 570034747241

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/EXCLUSIONS ADDED BY ENDORSEMENT/SPECIAL PROVISIONS

[redacted] - The Transmission Owner and its respective officers, agents and employees are additional insureds on all policies except Workers' Compensation as per the Interconnection Service and Construction Agreement Among PJM Interconnection LLC and [redacted]

SAMPLE

CERTIFICATE HOLDER

Pennsylvania Electric Company
a First Energy Company
76 South Main Street
Akron OH 44308 USA

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL ENDEAVOR TO MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO DO SO SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER, ITS AGENTS OR REPRESENTATIVES.

AUTHORIZED REPRESENTATIVE Aon Risk Services Northeast Inc

ACORD 25 (2009/01)

ADDITIONAL INFORMATION

LOS-000771360-03 DATE (MM/DD/YY) 03/02/00

PRODUCER

[redacted]

INSURED

COMPANIES AFFORDING COVERAGE

COMPANY E

COMPANY F

COMPANY G

COMPANY H

TEXT

CONTINUED FROM DESCRIPTION SECTION:

Coverage is primary and any other insurance maintained shall be deemed excess and non-contributory.

Waiver of subrogation is provided in favor of additional insureds as respects those risks, losses and liabilities expressly assumed under written contract by the named insured.

SAMPLE

CERTIFICATE HOLDER

Pennsylvania Electric Company
a First Energy Company
76 South Main Street
Akron OH 44308 USA

AUTHORIZED REPRESENTATIVE
of Marsh Risk & Insurance Services
BY: Larry Mosier

Page 2

ATTACHMENT EN-1: Wholesale Generation Interconnection Permit Plan

This permit plan is designed to identify any and all permits that will be required for the ***Insert Project Name***
Please mark all PERMITS that are applicable by placing a check in the box before each applicable permit.

NEW JERSEY LIST OF PERMITS

SPECIFIC REGULATORY SITING FILINGS (as applicable to specific projects)	
☐	**Local municipal filings or applications (applicable to all distribution and transmission substations and lines)**
☐	Service documents associated with municipal filings and applications
☐	Applications to be submitted to local municipality
☐	Service documents associated with Applications
☐	Public Notices associated with Applications
☐	Discovery, interrogatory and other documents associated with Applications
☐	**Appeal filings to the New Jersey Board of Public Utilities**
☐	Service documents associated with appeal filings
☐	Appeal filings to be submitted to NJ BPU
☐	Service documents associated with appeal filings
☐	Public Notices associated with appeal filings
☐	Discovery, interrogatory and other documents associated with appeal filings
☐	**Other (describe)**
SPECIFIC ENVIRONMENTAL PERMITS - BEFORE CONSTRUCTION (as applicable to specific projects)	
☐	**National Environmental Policy Act (NEPA) - Environmental Assessment (EA) or Impact Statement (EIS)**
☐	**Threatened & Endangered Species Act Consultation**
☐	**Migratory Bird Treaty Act & Bald and Golden Eagle Protection Act Compliance**
☐	**Section 106 NHPA Compliance**
☐	**Section 404 Clean Water Act Permit Nationwide Permit**
☐	**Section 404 Clean Water Act Permit Individual Permit**
☐	**State Programmatic General Permit - 17 (Tidal Lagoons)**
☐	**Freshwater Wetlands Protection Act Program (FWPAP) Compliance**

NEW JERSEY LIST OF PERMITS		
☐	**Section 401 Water Quality Certification(WQC)**	
☐	**Section 402 - NPDES Permit for Discharge of Stormwater from Construction Activities**	
☐	Co-permittee for NPDES Permit for Discharge of Stormwater from Construction Activities	
☐	Approved Erosion & Sediment Control Plan	
☐	Approved Postconstruction Stormwater Management Plan	
☐	**Surface Water Permit for Construction Dewatering**	
☐	**Flood Hazard Area Control Act Permit**	
☐	**Other (describe)**	
SPECIFIC ENVIRONMENTAL PERMITS - AFTER CONSTRUCTION (as applicable to specific projects)		
☐	**NOT of NPDES Permit for Discharge of Stormwater from Construction Activities**	
☐	**Other (describe)**	
SPECIAL ENVIRONMENTAL PERMITS AND AUTHORIZATIONS (as applicable to specific projects)		
☐	**National Forest and Park Special Use Permits**	
☐	**Appalachian Trail Access Authorization**	
☐	**NJ Forest and Park Right of Way Permit**	
☐	**Tidelands Conveyance License/Grant**	
☐	**Green Acres Approval**	
☐	**NJ Pinelands Certificate of Filing**	
☐	**Highlands Construction Compliance**	
☐	**Hackensack Meadowlands Permit**	
☐	**Other (describe)**	
SPECIFIC ENGINEERING PERMITS (as applicable to specific projects)		
☐	**Corps of Engineers Section 10 Permit**	
☐	**Federal Aviation Administration Notification**	
☐	**NJDOT Aviation Obstruction Permit**	
☐	**Federal Right-of -Way Permit**	
☐	**DOT Over-sized Load Permit**	
☐	**DOT Right-of-Way Permit**	
☐	**NJ Turnpike Right 0f Way Permit**	
☐	**Railroad Crossing Permit**	
☐	**Other (describe)**	

ATTACHMENT EN-1: Wholesale Generation Interconnection Permit Plan

This permit plan is designed to identify any and all permits that will be required for the ***Insert Project Name***
Please mark all PERMITS that are applicable by placing a check in the box before each applicable permit.A104

OHIO LIST OF PERMITS

SPECIFIC REGULATORY SITING FILINGS (as applicable to specific projects)	
☐	Construction Notices to be submitted to the Ohio Power Siting Board for transmission substations and/or transmission lines
☐	Service documents associated with Construction Notices
☐	Letters of Notification to be submitted to the Ohio Power Siting Board for transmission substations and/or transmission lines
☐	Service documents associated with Letters of Notification
☐	Application to be submitted to the Ohio Power Siting Board for transmission substations and/or transmission lines
☐	Service documents associated with Applications
☐	Public Notices associated with Applications
☐	Discovery, interrogatory and other documents associated with Applications
☐	Submittals related to implementation of OPSB and other agency imposed conditions in approvals of Construction Notices, Letters of Notification and Application, and other permit filings
☐	**Other (describe)**
SPECIFIC ENVIRONMENTAL PERMITS - BEFORE CONSTRUCTION (as applicable to specific projects)	
☐	**NPDES Permit for Discharge of Stormwater from Construction Activities - Ohio EPA**
☐	Co-permittee for NPDES Permit for Discharge of Stormwater from Construction Activities
☐	Stormwater Pollution Prevention Plan
☐	**Section 404 Clean Water Act Nationwide Permits - USACE**
☐	**Utility Line Activities Permit (Nationwide Permit 12)**
☐	Nationwide Permit Pre-Construction Notification
☐	**Bank Stabilization Permit (Nationwide Permit 13)**
☐	Nationwide Permit Pre-Construction Notification
☐	**Linear Transportation Projects Permit (Nationwide Permit 14)**
☐	Nationwide Permit Pre-Construction Notification
☐	**Section 401 Water Quality Certification(WQC) - Ohio EPA**
☐	**Section 404 Clean Water Act Permit Individual Permit - USACE**
☐	**Isolated Wetland Permit - Ohio EPA**

EN-1: Wholesale Generation Interconnection Permit Plan

OHIO LIST OF PERMITS		
☐	National Environmental Policy Act (NEPA) Environmental Assessment (EA) or Impact Statement (EIS) - Lead Federal Agency (e.g. USACE, NPS, etc)	
☐	Threatened & Endangered Species Consultation - USF&W, ODNR	
☐	Migratory Bird Treaty Act Compliance - USF&W, ODNR	
☐	Section 106 National Historic Preservation Act (NHPA) Compliance - Ohio Historic Preservation Office, Advisory Council on Historic Preservation	
☐	Temporary Water Withdrawal Facility Registration - ODNR	
☐	Burn Permit - Ohio EPA	
☐	Blasting Permit - Ohio EPA	
☐	Other (describe)	
SPECIFIC ENVIRONMENTAL PERMITS - AFTER CONSTRUCTION (as applicable to specific projects)		
☐	NOT for NPDES Permit for Discharge of Stormwater from Construction Activities - Ohio EPA	
☐	Section 404 Construction Completion Reporting / Monitoring - USACE	
☐	Section 10 Construction Completion Reporting	
☐	Section 401 Construction Completion Reporting / Monitoring - Ohio EPA	
☐	Other (describe)	
SPECIFIC ENGINEERING PERMITS (as applicable to specific projects)		
☐	ODOT Access Permit	
☐	Railroad Crossing Permit	
☐	OH Turnpike Utility Right-of-Way Permit	
☐	Federal Right-of -Way Permit - Dept. of Interior Bureau of Land Mgt	
☐	ODOT Special Hauling Permit	
☐	OH Turnpike Special Hauling Permit	
☐	Section 10 River and Harbors Act Permit - USACE	
☐	Federal Aviation Administration Notification	
☐	ODOT Air Traffic Obstruction Permit	
SPECIAL ENGINEERING AUTHORIZATIONS (as applicable to specific projects)		
☐	National Forest and Park Special Use Authorizations - NFS, NPS	
☐	OH State Forest Special Use Authorization - ODNR	
☐	OH State Park Access Permits - ODNR	
☐	OH State Nature Preserves Access Permit - ODNR	

OHIO LIST OF PERMITS		
☐	Canal Lands Lease - ODNR	
☐	Coastal Construction Permit - ODNR	
☐	Other (describe)	

ATTACHMENT EN-1: Wholesale Generation Interconnection Permit Plan	
This permit plan is designed to identify any and all permits that will be required for the ***Insert Project Name*** Please mark all PERMITS that are applicable by placing a check in the box before each applicable permit.	
PENNSYLVANIA LIST OF PERMITS	
SPECIFIC REGULATORY SITING FILINGS (as applicable to specific projects)	
☐	Letters of Notification to be submitted to the Pennsylvania Public Utility Commission
☐	Service documents associated with Letters of Notification
☐	Application to be submitted to the Pennsylvania Public Utility Commission
☐	Service documents associated with Applications
☐	Public Notices associated with Applications
☐	Discovery, interrogatory and other documents associated with Applications
☐	**Other (describe)**
SPECIFIC ENVIRONMENTAL PERMITS - BEFORE CONSTRUCTION (as applicable to specific projects)	
☐	**Section 402 Individual NPDES Permit for Discharge of Stormwater from Construction Activities**
☐	**Section 402 General NPDES Permit for Discharge of Stormwater from Construction Activities**
☐	Co-permittee for NPDES Permit for Discharge of Stormwater from Construction Activities
☐	Approved Erosion & Sediment Control Plan
☐	Approved Postconstruction Stormwater Management Plan
☐	**River, Stream or Wetland Crossing General Permits & Small Project Permits**
☐	**PADEP GP-5 (General Permit 5:Utility Line Stream Crossing Permit)**
☐	Start of Construction Notice- Conservation District
☐	Start of Construction Notice- PFBC
☐	**PADEP GP-7 (General Permit 7: Minor Road Crossing Permit)**
☐	Start of Construction Notice- Conservation District
☐	Start of Construction Notice- PFBC
☐	**PADEP GP-8 (General Permit 8: Temporary Road Crossing Permit)**
☐	Start of Construction Notice- Conservation District
☐	Start of Construction Notice- PFBC

PENNSYLVANIA LIST OF PERMITS		
☐	**PADEP Small Projects Permit**	
☐	Acknowledgement of Receipt of Permit to PADEP	
☐	Acknowledgment of Apprisal of Permit Conditions to PADEP	
☐	Start of Construction Notice - PADEP	
☐	Start of Construction Notice - Conservation District	
☐	Start of Construction Notice - PFBC	
☐	**Maintenance, Testing, Repair, Rehabilitation or Replacement of Water Obstructions and Encroachments Permit (GP-11)**	
☐	Start of Construction Notice- PFBC	
☐	**PA Submerged Lands License Agreement**	
☐	FE Executed Returned	
☐	PA Executed Received	
☐	**Pennsylvania State Programmatic General Permit - (SPGP-3)**	
☐	**Floodplain Mangement Permit**	
☐	Acknowledgement of Receipt of Permit to PADEP	
☐	Acknowledgment of Apprisal of Permit Conditions to PADEP	
☐	Start of Construction Notice - PADEP	
☐	Start of Construction Notice - Conservation District	
☐	Start of Construction Notice - PFBC	
☐	**Section 10 River and Harbors Act Compliance**	
☐	Pre-Construction Notice (PCN)	
☐	Work Commencement Form	
☐	**Army Corps of Engineers Nationwide Permit 12: Utility Line Activities**	
☐	Pre-Construction Notice (PCN)	
☐	Work Commencement Form	
☐	**Army Corps of Engineers Nationwide Permit 13: Bank Stabilization**	
☐	Pre-Construction Notice (PCN)	
☐	Work Commencement Form	
☐	**Army Corps of Engineers Nationwide Permit 14: Road Crossing**	
☐	Pre-Construction Notice (PCN)	
☐	Work Commencement Form	
☐	**Section 404 Clean Water Act Individual Permit**	

PENNSYLVANIA LIST OF PERMITS		
☐	Acknowledgement of Receipt of Permit to PADEP	
☐	Acknowledgment of Apprisal of Permit Conditions to PADEP	
☐	Start of Construction Notice - PADEP	
☐	Start of Construction Notice - Conservation District	
☐	Start of Construction Notice - PFBC	
☐	**Section 401 Water Quality Certification**	
☐	**National Environmental Policy Act (NEPA) - Environmental Assessment (EA) or Impact Statement (EIS)**	
☐	**Threatened & Endangered Species Act Consultation**	
☐	**Migratory Bird Treaty Act & Bald and Golden Eagle Protection Act Compliance**	
☐	**Section 106 National Historic Preservation Act Compliance**	
☐	**Bank Rehabilitation, Bank Protection and Gravel Bar Removal Permit (PA-GP-3)**	
☐	**Other (describe)**	
SPECIFIC ENVIRONMENTAL PERMITS - AFTER CONSTRUCTION (as applicable to specific projects)		
☐	**NOT of NPDES Permit for Discharge of Stormwater from Construction Activities**	
☐	**Final E&S inspection report from County Conservation District**	
☐	**River, Stream or Wetland Crossing General Permits & Small Project Permits**	
☐	**PADEP GP-5 (General Permit 5:Utility Line Stream Crossing Permit)**	
☐	**PADEP GP-7 (General Permit 7: Minor Road Crossing Permit)**	
☐	**PADEP GP-8 (General Permit 8: Temporary Road Crossing Permit)**	
☐	**PADEP Small Projects Permit**	
☐	Project Completion Notice - PADEP	
☐	Project Completion Notice - Conservation District	
☐	Project Completion Notice - PFBC	
☐	**PADEP Individual Permit**	
☐	Project Completion Notice - PADEP	
☐	Project Completion Notice - Conservation District	
☐	Project Completion Notice - PFBC	
☐	**Corps of Engineers PASPGP-3**	
☐	Project Completion Notice	
☐	**Corps of Engineers Nationwide Permit**	
☐	Work Completion Form	

PENNSYLVANIA LIST OF PERMITS		
☐	**Corps of Engineers Section 10 Permit**	
☐	Project Completion Notice	
☐	**PADEP Floodplain Permit**	
☐	Project Completion Notice - PADEP	
☐	Project Completion Notice -Conservation District	
☐	Project Completion Notice - PFBC	
☐	**Other (describe)**	
SPECIFIC ENGINEERING PERMITS (as applicable to specific projects)		
☐	**DOT Right-of-Way Permit**	
☐	**Railroad Crossing Permit**	
☐	**Turnpike Right-of-Way Permit**	
☐	**Federal Right-of -Way Grant**	
☐	**Federal Aviation Administration Notification**	
☐	**DOT Special Hauling Permit**	
☐	**Turnpike Over-Dimensional Vehicle Permit**	
☐	**Blasting Permit**	
☐	**Other (describe)**	
SPECIAL ENGINEERING AUTHORIZATIONS (as applicable to specific projects)		
☐	**PA State Forest Access Authorization**	
☐	**PA State Park Construction Authorization**	
☐	**National Forest Special Use Permits**	
☐	**National Park Special Use Permits**	
☐	**Coastal Construction Permits**	
☐	**Appalachian Trail Access Authorization**	
☐	**Other (describe)**	

FirstEnergy Corporation
Transmission Planning and Protection Department
Protection Specifications

SHEET 3 **OF** 13

STATION N36 Interconnection Sub **WBS** _____ **Network** _____

SUBJECT Construct a New N36 115kV Interconnection Substation

- Trip Breaker-B and block close
- Trip Breaker-C and block close
- Stop carrier on the Potter line
- Stop carrier on the Niles Valley line
- Initiate SCADA alarm (one common BFT point per substation)

1- **Schweitzer "SEL-0351A00HX35XXXX**," Breaker Auto-reclosing relay suitable for use at 125V DC. New, to be used for **Breaker-A automatic reclosing.**
- Access to back of Schweitzer relays is required for PC connection.
- Appropriate test/disconnect switches are required to provide connections for relay testing and isolation.
- Install one automatic reclose cut-off switch which shall provide an input into the SEL-351A.
- PT ratio = 1000:1 at 115 kV

Output Contact Assignments
OUT101 – Close Breaker-A (automatic reclose)
OUT102 – spare
OUT103 – spare
OUT104 – spare
OUT105 – spare
OUT106 – LOP Alarm
OUT107 – spare

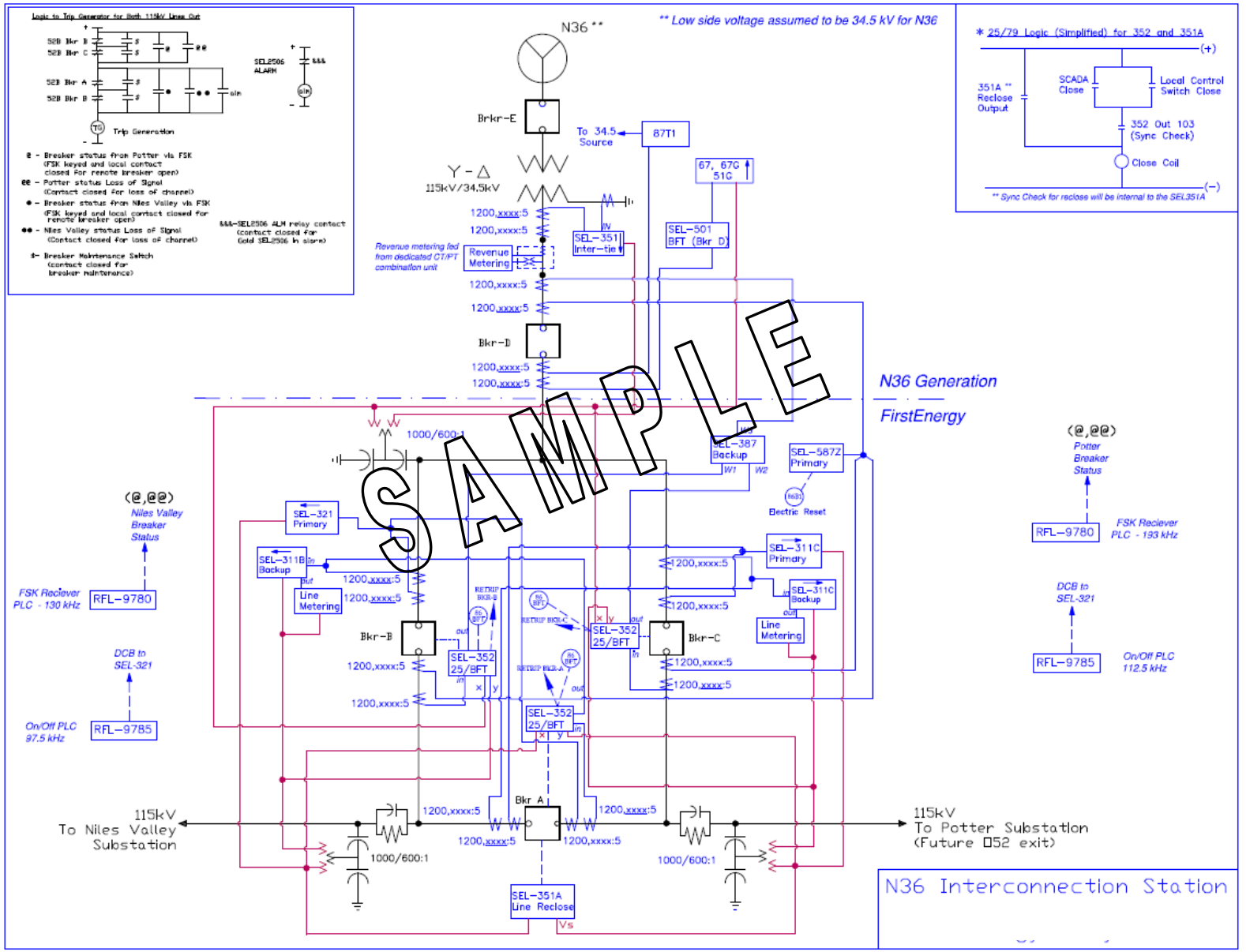
Input Contact Assignments
IN101 – SEL 321 (OUT5) Niles Valley Auto-Reclose Initiate
IN102 – SEL 311C (OUT 105) Potter Auto-Reclose Initiate
IN103 – spare
IN104 – Breaker-A auto-reclose cut-off switch *
IN105 – spare
IN106 – spare

* When enabling automatic reclosing by placing the cut-off switch in the ON position, the reclose cutoff switch should be closed applying 125V DC to the input.

Breaker-B

1- **Schweitzer "SEL-035210325HXX4XX**," Breaker Failure relay suitable for use at 125VDC. New, to be used for **Breaker-B Failure-to-Trip protection** plus **Breaker-B Sync Check.**
- Access to back of Schweitzer relays is required for PC connection.
- Appropriate test/disconnect switches are required to provide connections for relay testing and isolation.

Set CT ratio to 800:5 A tap PT ratio = 1000:1 at 115kV


SAMPLE
N36 **
** Low side voltage assumed to be 34.5 kV for N36
Brkr-E
To 34.5 Source
87T1
Y - Δ
115kV/34.5kV
67, 67G 51G
SEL-351 Inter-tie
SEL-501 BFT (Bkr D)
Revenue Metering
Revenue metering fed from dedicated CT/PT combination unit
Bkr-D
N36 Generation
FirstEnergy
1000/600:1
SEL-387 Backup
SEL-587Z Primary
Electric Reset
(@,@@)
Niles Valley Breaker Status
SEL-321 Primary
SEL-311B Backup
Line Metering
FSK Reciever PLC - 130 kHz
RFL-9780
DCB to SEL-321
On/Off PLC 97.5 kHz
RFL-9785
SEL-311C Primary
SEL-311C Backup
Line Metering
Bkr-B
Bkr-C
SEL-352 25/BFT
Bkr A
SEL-351A Line Reclose
115kV To Niles Valley Substation
115kV To Potter Substation (Future 052 exit)
(@,@@)
Potter Breaker Status
RFL-9780
FSK Reciever PLC - 193 kHz
DCB to SEL-321
RFL-9785
On/Off PLC 112.5 kHz
* 25/79 Logic (Simplified) for 352 and 351A
SCADA Close
Local Control Switch Close
351A ** Reclose Output
352 Out 103 (Sync Check)
Close Coil
** Sync Check for reclose will be internal to the SEL351A
N36 Interconnection Station

SU-3: Bill of Materials – Substation (Example Form)

Item No.	Qty.	Description	Purchase Info.
A		Battery Equipment	
B		Conductors & Fittings	
C		Conduit & Fittings	
D		Conversion Equipment	
E		Insulators & Fittings	
F		Communication Equipment	
G		Lighting Equipment	
H		Pumps, Fans, Compressors, Motors, Etc.	
I		Station Furniture & Equipment	
J		Pipe & Fittings	
K		Protective Equipment	
L		Regulating Equipment	
M		Structural Equipment	
N		Line Material	
O		Bolts, Nuts, Washers, Screws	
P		Switching Equipment – (Typical Entry Below. Each new Item Letter should start on a new sheet. One page per file.)	
P-1	3	SIEMENS SPS2-145-40 POWER CIRCUIT BREAKER, SF6, 145 KV, 3000 AMPERE, 40 KAIC, IN ACCORDANCE WITH FIRSTENERGY SPECIFICATION FE-BKR-1, GENERAL SPECIFICATION FOR POWER CIRCUIT BREAKERS 23KV THROUGH 550KV, DATED AUGUST 2002, AND AS FOLLOWS: CONTROL AND SPRING CHARGING MOTOR VOLTAGE: 125 VDC CABINET HEATER VOLTAGE: 120/240 VAC ALARM ANNUNCIATOR SHALL BE A SEEKARK ANNUNCIATOR, MODEL NO. G1003-S60 CURRENT TRANSFORMER TERMINAL BLOCKS SHALL BE GE TYPE EB-27 SCREW-TYPE TERMINAL BLOCKS WITH SHORTING STRIP. POWER CIRCUIT BREAKER SHALL INCLUDE (12) M.R. CT's, WITH A RELAYING ACCURACY CLASS TO BE C800. CT RATIOS, QUANTITIES, LOCATION OF CT'S AND THERMAL RATING FACTORS (TRF) SHALL BE: 1200/5 , WITH A RATING FACTOR OF 2.5. POWER CIRCUIT BREAKER SHALL COME COMPLETELY WIRED, ASSEMBLED, TIMED AND READY FOR INSTALLATION. EACH BREAKER IS TO BE SUPPLIED WITH SF6 GAS AND TANK HEATERS. VENDOR SHALL SUPPLY ONE STANDARD MAINTENANCE TOOL KIT AND SF6 FILL KIT PER BREAKER. THIS TOOL KIT INCLUDES A MAINTENANCE CLOSING DEVICE.	
R		Transformer	
S		Switchboard Equipment	
T		Nameplates & Signs	

SAMPLE

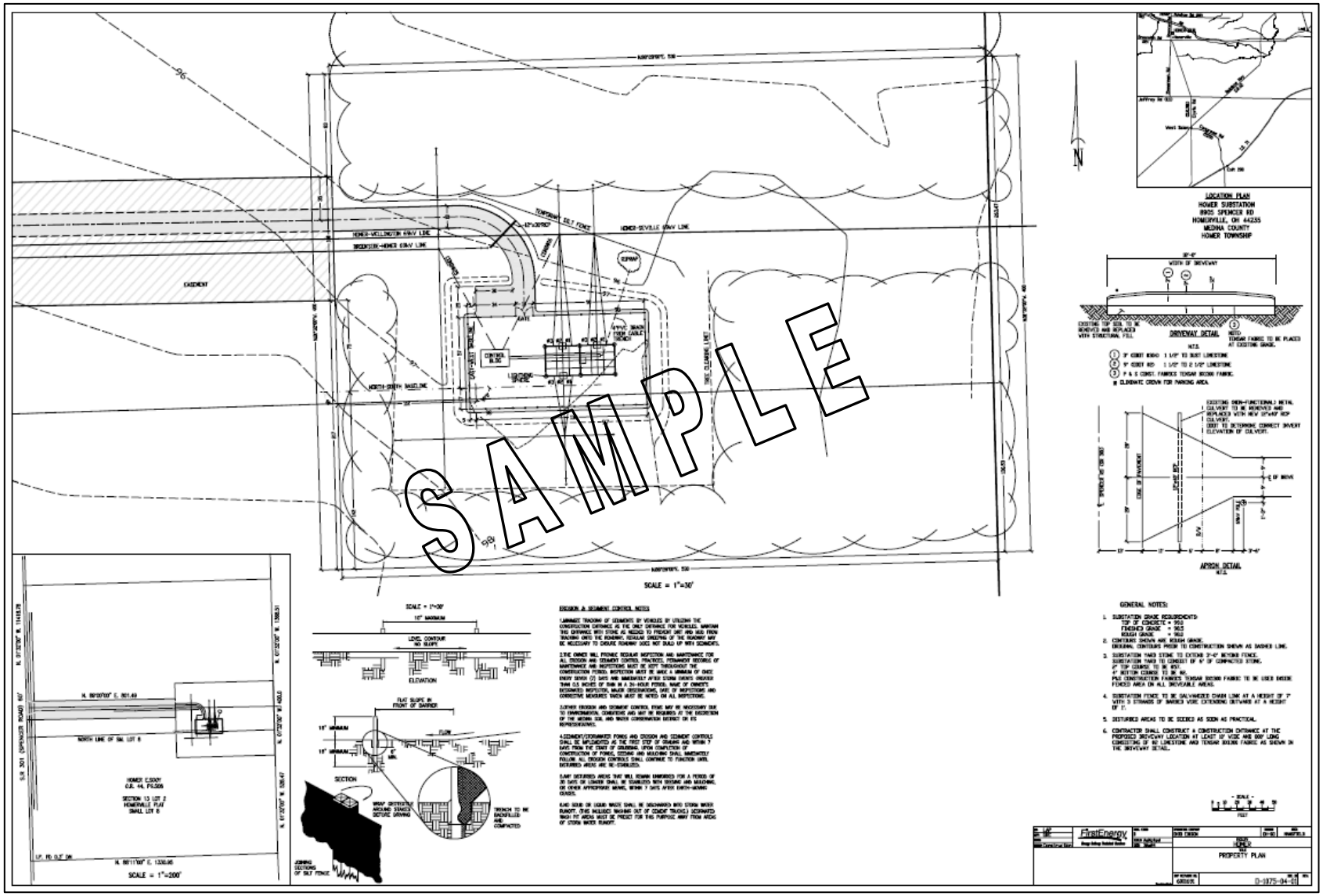
[ ] Const. As Issued [ ] Const. As Marked Inspected By _____ Date _____ Issued For: Construction

Rev	Date	By	Network	Rev	Date	By	Network
-							

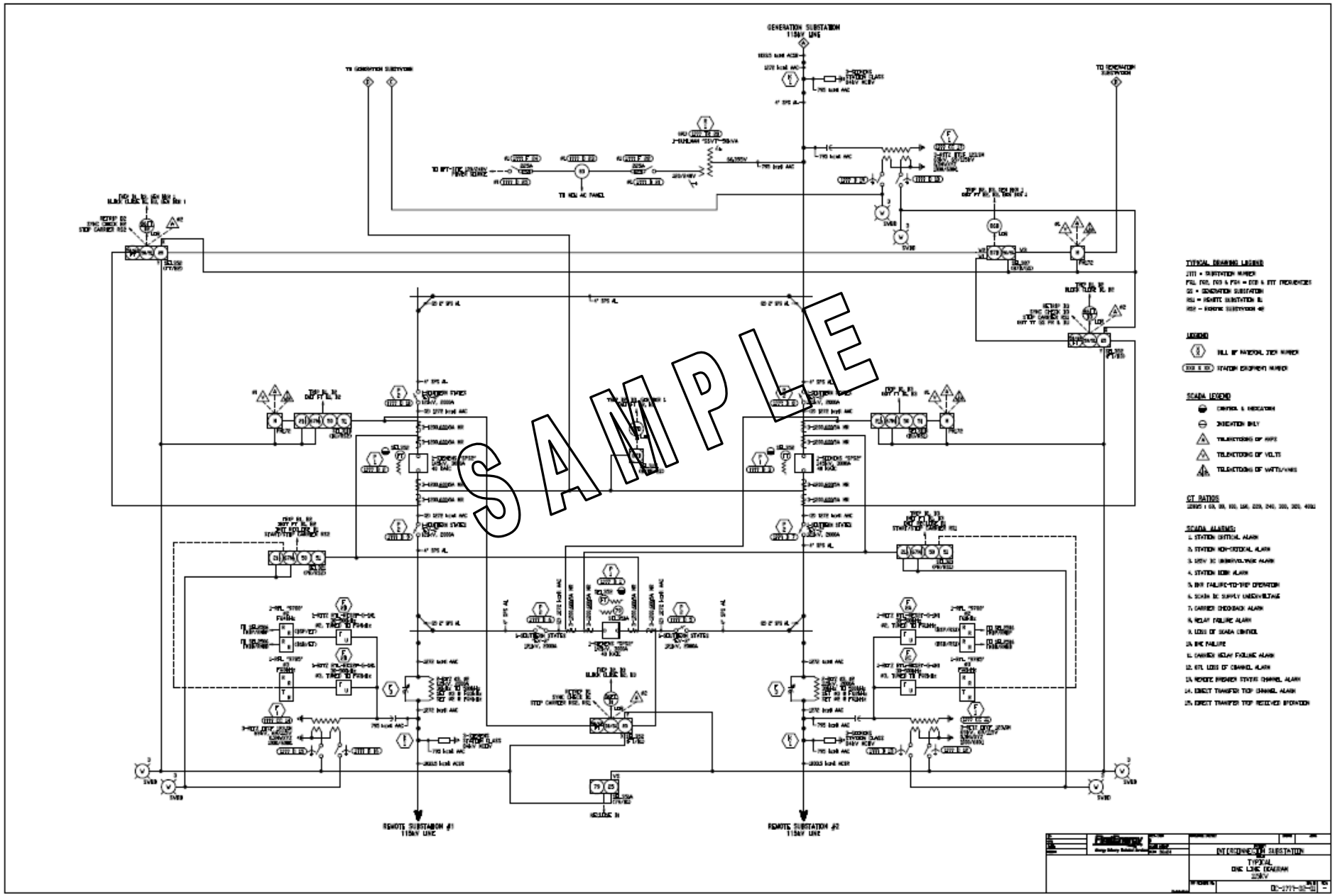
FirstEnergy

Substation	TYPICAL		
Item No		Network	
Dwg No		Rev.	

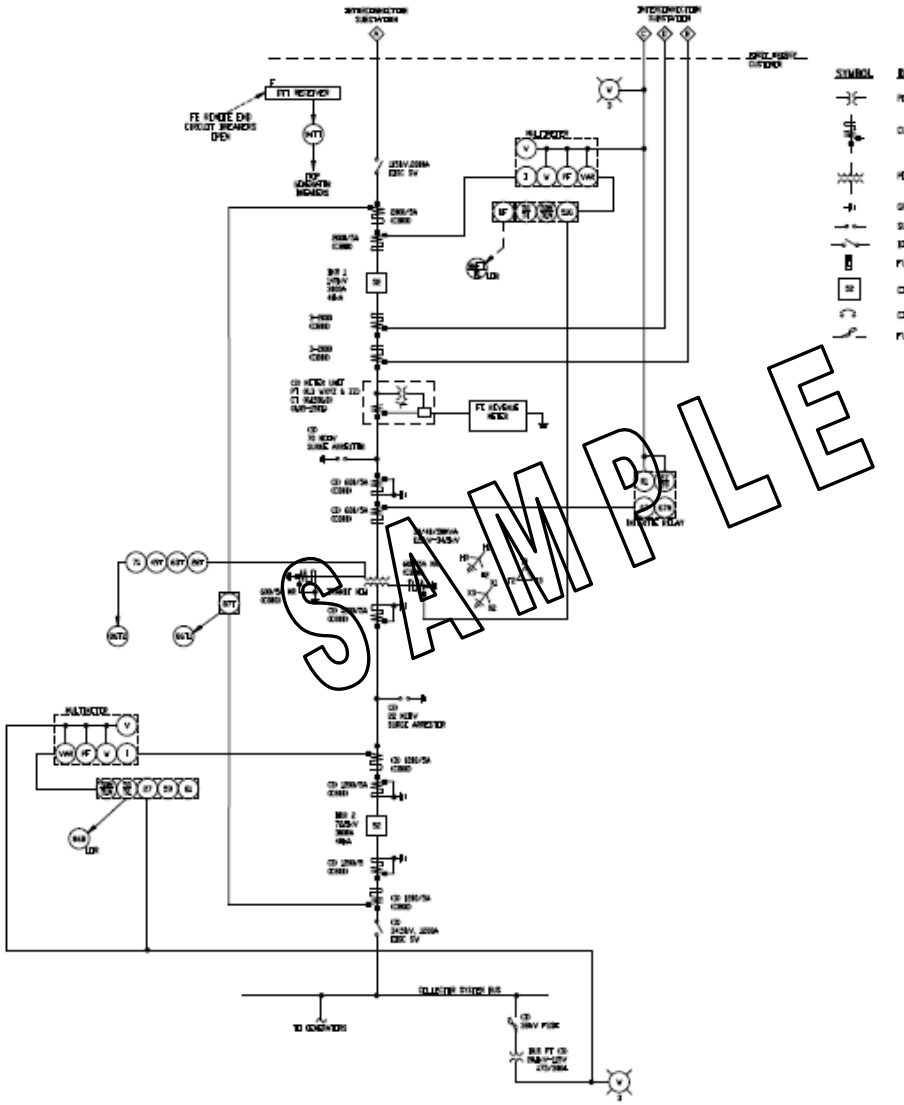
SU-4: Property Plan Drawing



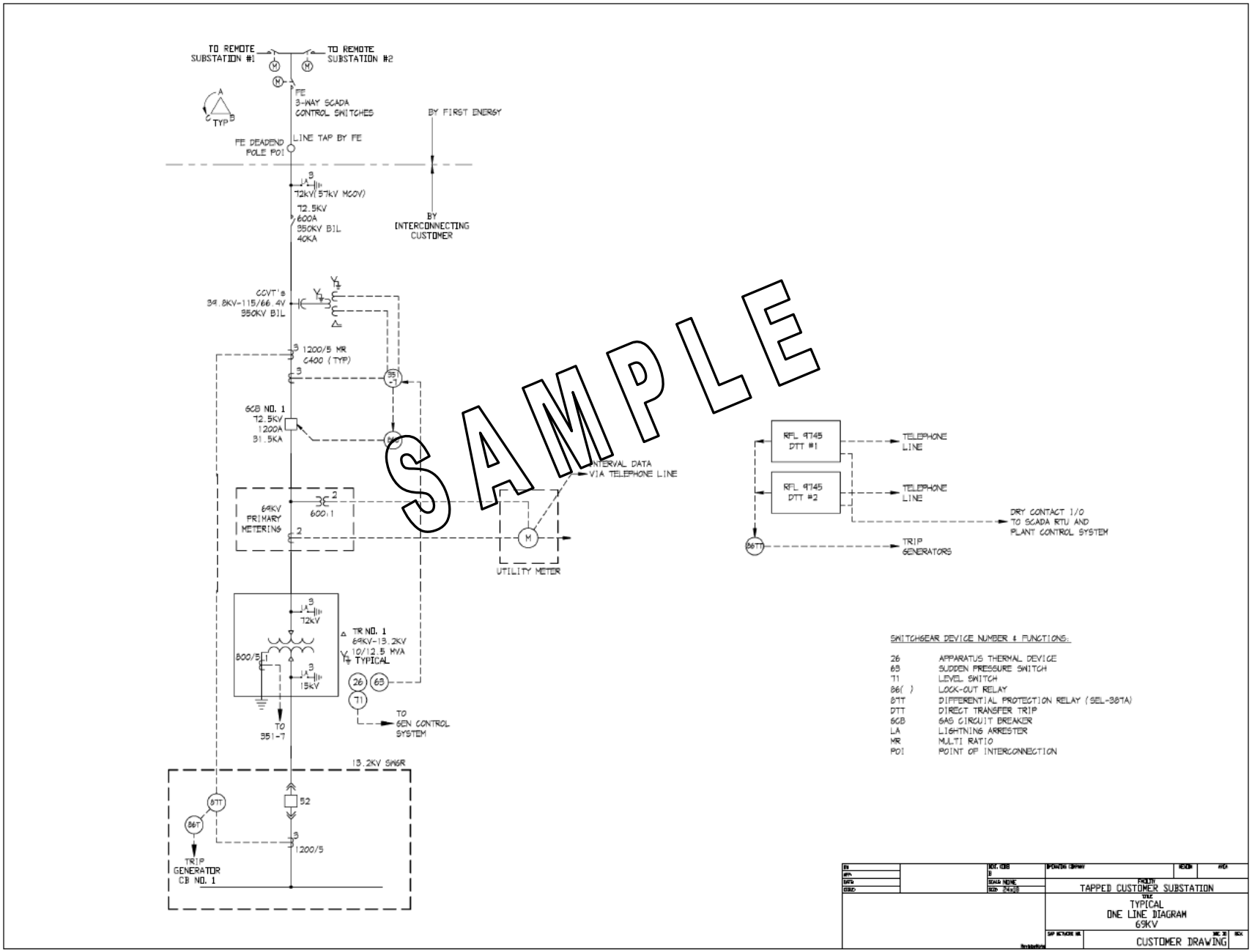
Typical 115kV Interconnection Substation Single Line Diagram



Typical 115kV Customer Substation Single Line Diagram



Typical 69kV Customer Tapped Substation Single Line Diagram



Recommended Construction Drawing Submittal Package Contents

The following Reference Drawings which should have been reviewed prior to detailed engineering should also accompany the construction packages as noted below.

Reference Drawings (Should have been Reviewed Prior to Detailed Engineering Start)

Drawing Group	Description	Drawing Submittal
02	One Line Diagram	With Relay & Control
04	Property (Site) Plan	With Below Grade
13 or 14	Electrical Plan View	With Above Grade

Below Grade

Drawing Group	Description	Drawing Submittal
04	Property (Site) Plan	1 or more Drawing(s)
06	Bill of Material - Below Grade	Multiple Sheets
15	Foundation Layouts & Details Group	Multiple Drawings
	Foundation Plan	
	Foundation Details	
16	Conduit/Grounding Layout & Details Group	Multiple Drawings
	Conduit Plan	
	Conduit Details	
	Grounding Plan	
	Grounding Details	
40	Miscellaneous Drawings Group	As Required

Above Grade

Drawing Group	Description	Drawing Submittal
06	Bill of Material - Above Grade	Multiple Sheets
13	Low Voltage Electrical Plan Group	Multiple Drawings
	Electrical Plan View	
	Electrical Elevation (or Section) Views	
14	High Voltage Electrical Plan Group	Multiple Drawings
	Electrical Plan View	
	Electrical Elevation (or Section) Views	

18	Steel Erection Diagrams Group Plan View Steel Details	Multiple Drawings
23	[redacted] Nameplates	Multiple Sheets
25	Conduit List	Multiple Sheets
26	Circuit List	Multiple Sheets
30	Control Building Plans and Details	Multiple Drawings
40	Miscellaneous Drawings Group	As Required

Relay & Control (Indoor)

Drawing Group	Description	Drawing Submittal
00	Check off List	1 Drawing
01	Drawing List	1 Drawing
02	One Line Diagram	1 Drawing
03	AC One Line	1 Drawing
05	DC One Line	1 Drawing
06	Bill of Material - Relay & Control	Multiple Sheets
07	Low Voltage Schematics Group Line Protection Schematics Breaker Protection Schematics Communications Schematics SCADA/HMI Schematics Miscellaneous Schematics	None or Multiple Drawings
08	High Voltage Schematics Group Line Protection Schematics Breaker Protection Schematics Communications Schematics SCADA/HMI Schematics Miscellaneous Schematics	None or Multiple Drawings
09	Low Voltage Equip. Detail Wiring Diagrams Group Breaker Detail Wiring Diagrams CVT Detail Wiring Diagrams	None or Multiple Drawings
10	High Voltage Equip. Detail Wiring Diagrams Group Breaker Detail Wiring Diagrams CVT Detail Wiring Diagrams	None or Multiple Drawings
11	Switchboard Front Views	1 Drawing
12	Switchboard Wiring Diagrams Group Switchboard Detail Wiring Diagrams SCADA/HMI Detail Wiring Diagrams	Multiple Drawings
24	Switchboard Nameplates	Multiple Sheets
40	Miscellaneous Drawings Telephone Protection Panel	As Required

TYPICAL

DRAWING LIST

Issued	Code	Doc ID	Rev	Description/Title
x	a	O-1075-01		Drawing List
x	b	O-1075-02-01	B	One Line Wiring Diagram 69kV
	e	O-1075-03-01	A	AC One Line Diagram
	c	O-1075-04-01		Property Plan
		O-1075-04-02		Original Survey
x	e	O-1075-05-01	A	DC One Line Wiring Diagram
	d	O-1075-06		Bill Of Material
	e	O-1075-07-01	A	Schematic Wiring Diagram 69kV Bus Protection
x	e	O-1075-07-02	B	Schematic Wiring Diagram 69kV PTs
	e	O-1075-07-03	A	Schematic Wiring Diagram 69kV Line Breaker 1075-B-1
	e	O-1075-07-04	A	Schematic Wiring Diagram 69kV Line Breaker 1075-B-2
x	e	O-1075-07-05	B	Schematic Wiring Diagram 69kV Line Breaker 1075-B-3
x	e	O-1075-07-06	B	Schematic Wiring Diagram Annunciator
	e,k	O-1075-07-07	A	Schematic Wiring Diagram Scada RTU Power Supply & Comm Ports
	e,k	O-1075-07-08		Schematic Wiring Diagram Scada Analog/Control/Status
	e	O-1075-07-09	A	Schematic & Detail Wiring Diagram Lighting Control Cabinet
	f	O-1075-10-01	A	Detail Wiring Diagram 69kV Bkr 1075 B 1
	f	O-1075-10-02	A	Detail Wiring Diagram 69 kV Bkr 1075 B 2
x	f	O-1075-10-03	B	Detail Wiring Diagram 69 kV Bkr 1075 B 3
	f	O-1075-10-04		Detail Wiring Diagram 69kV PTs
	f	O-1075-12-01	B	Switchboard Wiring Diagram & Front View Frame 1 Alarm
	f	O-1075-12-02	A	Switchboard Wiring Diagram & Front View Frame 2 69kV Bus Protection
	f	O-1075-12-03		Switchboard Wiring Diagram & Front View Frame 3 69kV Breaker 1075-B-2
	f	O-1075-12-04	A	Switchboard Wiring Diagram Frame 4 69kV Breaker (1075-B-1)
x	f	O-1075-12-05	A	Switchboard Wiring Diagram Frame 5 69kV Breaker (1075-B-3)
	f	O-1075-12-06		Detail Wiring Diagram Scada RTU
x	f	O-1075-12-07		Switchboard Wiring Diagram & Front View Frame 6 UF Relaying
		O-1075-13-01		Electrical Layout 69kV Plan View
		O-1075-13-02		Electrical Layout 69kV Plan View
		O-1075-13-03		Electrical Layout 69kV Elevations C3-C3 & D3-D3
		O-1075-13-04		Electrical Layout 69kV Sections E4-E4, F4-F4 & G4-G4
		O-1075-15-01		Foundation & Conduit Layout
		O-1075-15-02		Foundation & Conduit Details
		O-1075-16-01	A	Grounding Layout
		O-1075-16-02		Grounding Details
		O-1075-16-03		Cable Tray Grounding
		O-1075-16-04	A	Lighting Details
		O-1075-18-01		69kV Breaker Structure 28' X 24' X 33'-6 Erection Diagram
		O-1075-18-02		69kV Breaker Structure 28' X 24' X 33'-6" Column Assembly & Steel Details
		O-1075-18-03		69kV Breaker Structure 28' X 24' X 33'-6 Truss Assembly & Steel Details
		O-1075-18-04	B	69kV Breaker Structure 28' X 24' X 33'-6
		O-1075-18-05	A	69kV Station Power Stand Erection & Steel Details
	h	O-1075-23		Substation Nameplates
x	h	O-1075-24		Switchboard Nameplates
		O-1075-25		Conduit List
x		O-1075-26		Circuit List
x		O-1075-30-01	A	Packaged Control Room Plan View
		O-1075-40-01		Detail Wiring Diagram Telephone Demarcation Panel
	spcc	O-1075-60		SPCC Plan

Network Standards Design—IT Network Engineering

Transport to Remote Controlled Line Switches

PURPOSE

To provide guidelines for designing and installing the communications path and SCADA control for remote controlled line switches. These switches may be one of the following types:

- Sectionalizers
- Reclosers
- Motor operated air break
- Motor operated vacuum switches

Scope

This document describes communications paths and SCADA controls for all types of switches used for the control of distribution and transmission systems.
These controls may be used to operate and monitor switches controlling voltages ranging from the lowest primary distribution through the highest transmission voltages in FirstEnergy systems.

Use Scenario

This design standard shall be used for guidance when remote control of a line switch is required. This does not apply if the switch is controlled directly by a substation RTU.
Factoring in topography, terrain, and existing infrastructurethe method of providing communications to remote controlled line switches is subjective, depending on the terrain and the type of application. For wireless applications, factors in the decision include the embedded wireless infrastructure as well as the geographic topology of the region where the installation takes place.
In Penelec, there are widespread deployments of MOSCAD and now ACE on the existing VHF and UHF radio systems – this is most suitable to the mountainous topology encountered in the vast majority of the Penelec region.
OE, TE, CEI, PP, MetEd and JCP&L have limited MOSCAD deployments but are using MAS or CDMA digital cellular technology. When not using MOSCAD/ACE as the transport/control mechanism, then the GE IBox RTU will be used as the control interface.
The site assessment should establish whether there is EDVO in the area. When we have a marginal signal we look for a carrier who has a good signal. EVDO is optimal.

No signal – if you have worse than a -85 (85dB) using the 9dB antenna, then you have to look at another means or another vendor. A 10 dB fade margin is required.
Where feasible, the use of fiber optics is an excellent solution for remote controlled line switches. This application is seen most often where the switch is located in close proximity to an existing substation with available RTU interface support, but there have been installations where the distance of run exceeds 1000 feet.
Feasibility depends on the availability of the supporting architecture (existing conduit, cost of new conduit, ability to underbuild aerial ADSS, etc.) rather than just distance alone.

In similar close-in applications where deployment of fiber optics would be cost prohibitive, the use of 900Mhz MDS radios in a point-to-point arrangement can work well.
Installing multi-mode versus single-mode fiber is as much project-specific as time sensitive. In cases where the substation is reasonably close to existing or planned FirstEnergy fiber optic network infrastructure, the use of single-mode fiber provides the future potential to integrate the substation into the corporate network.

However, in a remote point-to-point application, the use of multi-mode fiber provides a lower cost alternative. The design engineer has options depending upon the specific application and the region/geography where the design is being implemented.

Standard

Remote-controlled line switch installations located outside of, but within approximately 150 feet of a Substation's fence: The standard is to place a RS 232 Copper to Fiber Link Repeater and a fiber patch panel in the Switch's RTU/Control cabinet. If this is not feasible, then sometimes they splice pigtails directly onto the fibers.
A fiber patch panel & Fiber Link Repeater are installed in the substation to provide conversion back to RS-232 Copper connection.

Transmission Engineering may drive where Network Engineering starts on a project or design. Transmission Engineering has set a new standard to circulate an RFC with a 2-week window for response when they are beginning the engineering on a project. Network Engineering's focus is to recommend/decide on one of two controls: ACE or IBox. For IBox, choose MAS radio, CDMA, or fiber. Respond to Transmission Engineering's RFC with advice and recommendations. Network Engineering may be given different combinations of equipment, and the goal is to get them to work together. Sometimes it may not be possible to give input into purchasing the equipment, the equipment may already be purchased when the project comes to you. For example, Transmission Engineering may have already purchased the switch; an iBox or ACE may already be specified.

There are legacy applications where the switch does not have an independent RTU, the copper connections for Control and Status are made directly to the Station RTU Input/Output boards (legacy equipment). This is not a preferred solution, and another solution is encouraged.

If the switch has an independent RTU this fiber link repeater is then used to connect the switch's RTU directly to the substation's router (preferred method), or if the substation is not so equipped, bridged with the station's Master RTU communications path/circuit.

> **NOTE:** While it is possible to daisy-chain the RTUs, it is not the preferred method due to the risk of single point of failure.

If we use the MAS store and forward methodology, that's not the preferred method because there's the risk of single point of failure to any downstream device. If the switch RTU is connected into the station RTU directly, then we have created a single point of failure possible for any downstream devices from the substation RTU.

This fiber link installation should be installed as follows:
(1) The RS232 port of a Copper to Fiber Link Repeater such as a Dymec 5843 or 5844 shall be connected to a serial port of the Router and the switch's RTU.
(2) The two fiber link repeaters shall be connected to each other by installing a minimum of 12 count, multimode 62.5/125 fiber optic cable suitable for outdoor installations that is terminated in a fiber patch panel located near each fiber link repeater. Cable route considerations such as underground in conduit vs. overhead on poles must also be reviewed during fiber optic cable selection process.
(3) The specific style of fiber optic patch panel will need to be reviewed on a per site basis. ST type connectors shall be placed on the ends of each fiber in the cable. Multimode, ST type jumpers shall be used to connect the link repeaters to their associated patch panels.
NOTE: If the multimode fiber optic cable described above is not available in a time frame that supports the construction schedule, standard single mode fiber optic cable suitable for 1310 nm operation may also be used but single mode link repeaters will be required.
For a typical diagram showing this installation at the switch cabinet, Click Here *for a block diagram that shows a typical fiber link repeater installation.*

Remote-controlled line switch installations located approximately more than 150 feet from a Substation: The standard is to place (as determined appropriate by Network Engineering)
(1) A Multiple Address System (MAS) radio [preferred] or
(2) Motorola ACE integrated Radio and RTU [preferred]. This is only for MOSCAD replacements or for additions requiring the use of MDLC.
(3) A device/modem with RS 232 output in the Switch's RTU/Control cabinet using third party or public carrier-provided wireless services.

Remote controlled line switches (located more than 150 feet outside of Substation Fence) are provided with a controller as part of the switch package. The controller is housed in a weatherproof cabinet. If this switch location requires remote control capability from the Dispatcher, the controller package shall also include an RTU.

An RTU (such as the GE iBox) should be able to handle at least four control points and 8 status points. This RTU should have a minimum of three serial ports that are RS232 & RS485 capable. The 120VAC that is required to power the Battery & Charger System for the RTU and other control functions is provided by others (distribution dept of the area operating company).

Communication connection to this distant switch is accomplished by one of the following methods:

1. For MAS Radio installations: Radio signals originating from a Master MAS radio that is located at the closest and/or associated Substation whose RS 232 port receives communications from the Substation's router.
2. For Motorola ACE installations, an available private land mobile radio frequency shall be utilized.
3. For device/modem installations: The device/modem communicates using third party or public carrier-provided wireless services via VPN to the WCC EMS (Wadsworth) and the RCC EMS (Reading).

EXCEPTIONS

Any exceptions to the guidelines or metrics in this standard should be requested and documented using the standard exceptions process. Refer to Exceptions to the Network Standards Program – IT-NET-STD-PROC-ALL-002.

Roles and Responsibilities

Network Engineering

Network Engineering works cooperatively with both Substation Engineering and Transmission Engineering to provide the best overall functionality possible for a remote controlled line switch in place at FirstEnergy.

For remote-controlled line switch installations, the determination of which type of communication path the RTUs will use is the responsibility of the Network Engineering Department Transport Group. The preferred communications path for all new Remote-controlled line switch installations is currently wireless. The preferred wireless communications medium is the use of the company-owned MAS master-slave radio or Motorola ACE integrated systems.

Radio systems may be operated on VHF in the 30 – 50 Mhz, 150 – 175 Mhz range, UHF in the 450 – 470 Mhz range, Unlicensed Spread Spectrum in the 902 – 928 Mhz ISM band, or licensed as split-frequency on the 928 – 952 Mhz bands. For areas where the company has inadequate facilities to provide proper backhaul, other wireless technology may be utilized on various government or public carriers' networks. Primary and secondary licensing regulations must be considered when deploying communications on private VHF and UHF frequencies.

REFERENCES

- Exceptions to the Network Standards Program – IT-NET-STD-PROC-ALL-002
- Substation Design Standards (requires SAP ID login)
- Transmission Design Standards (requires SAP ID login)

NOTE: There is no need for a Network Engineering Testing Standard with this topic, as testing is performed by Transmission Engineering. Network's contribution is in the configuration for communications; Transmission Engineering assumes oversight for equipment performance once configured.

Version History and Approval

Table 1. Version History and Approval

VERSION HISTORY			
VERSION	**DATE**	**DESCRIPTION**	**CHANGES BY**
1.0	3/24/2009	Created draft of standard with James K. Andrews, DSME, included edits from cross-functional VSME team	
APPROVAL			
APPROVED BY			**DATE**

SHEET 1 OF 1 — FIRSTENERGY CORP. — TOLEDO EDISON — REGION

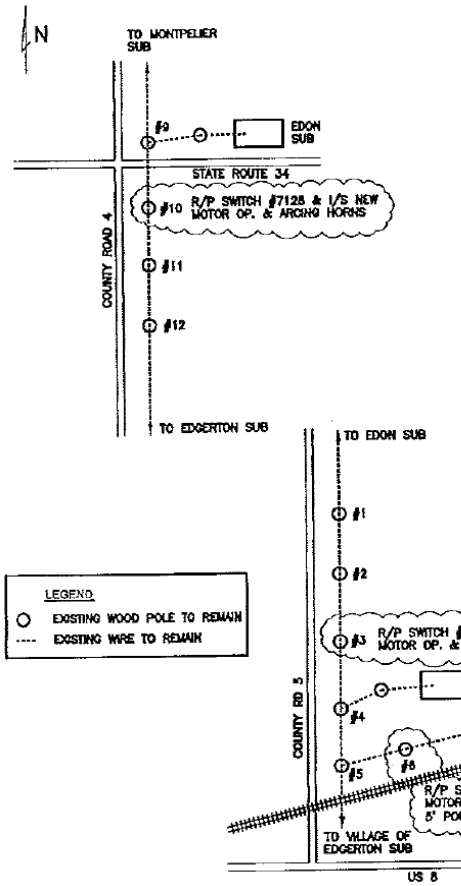
LINE WORK DRAWING – FIELD REPORT

DR.	ENG.	APP.
CJT	CJT	DRK Jr.
DATE 8/08	DATE 8/08	DATE 8/08

TITLE EDGERTON 69kV

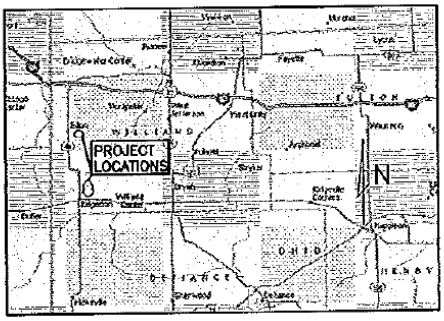
REPLACE SWITCHES 7128, 7157, & 7158 AND INSTALL MOTOR OP W/ SCADA

CREWS W.R. NO.	ESTIMATE NO.
11703418	CE-08-40-TE
SAP RESERVATION NO.	SAP ORDER NO.
	12389831
PROJECT DEFINITION	SAP NOTIFICATION NO.
TW-000704	



CONSTRUCTION NOTES

1. REPLACE SWITCHES #7128, #7157, & #7158 WITH NEW BRIDGES TYPE ONE-WAY, 69kV, 1200A WITH MOTOR OPERATOR AND SCADA. CONSTRUCT SWITCHES PER DRAWING TY-802-F MAINTAINING A 7' MINIMUM CLEARANCE BETWEEN THE BOTTOM PHASE AND DISTRIBUTION UNDERBUILD. SEE DRAWING TY-803-F FOR MOTOR OPERATOR DETAILS.
2. INSTALL VACUUM INTERRUPTERS ON SWITCH #7157 AND ARCING HORNS ON SWITCHES #7128 AND #7158.
3. GROUND SWITCHES PER FE STD. 18-335 WITH GROUND MATS.
4. AT STRUCTURE #8 (SWITCH #7158), INSTALL A 5' FIBERGLASS POLE TOP EXTENSION AND DEADEND STATIC WIRE 1' DOWN (FE STD. 18-010)
5. TRANSFER EXISTING GROUND WIRE AND CONDUCTORS, MAINTAINING THE EXISTING SAG AND TENSION.
6. NOTE: REGIONAL ENGINEERING IS RESPONSIBLE FOR SUPPLYING 120V AC TO THE MOTOR OPERATOR. THE DISTRIBUTION SHALL GO THROUGH A FUSED DISCONNECT SWITCH. (SEE TY-5111-A) ALL CONDUITS AND FITTINGS SHALL BE FIELD SUPPLIED. (REUSE EXISTING AS MUCH AS POSSIBLE)
7. NOTE: CONTACT GARY LAMPE (NETWORK ENGINEERING) AT (330) 384-5497 WHEN THE MOTOR OPERATOR HAS BEEN MOUNTED. HE WILL ARRANGE FOR A TECHNICIAN TO INSTALL THE WIRELESS COMMUNICATION DEVICE AT THE STRUCTURE. PLEASE CONTACT GARY LAMPE AT LEAST (5) DAYS PRIOR TO THE NEED FOR THE DEVICE.

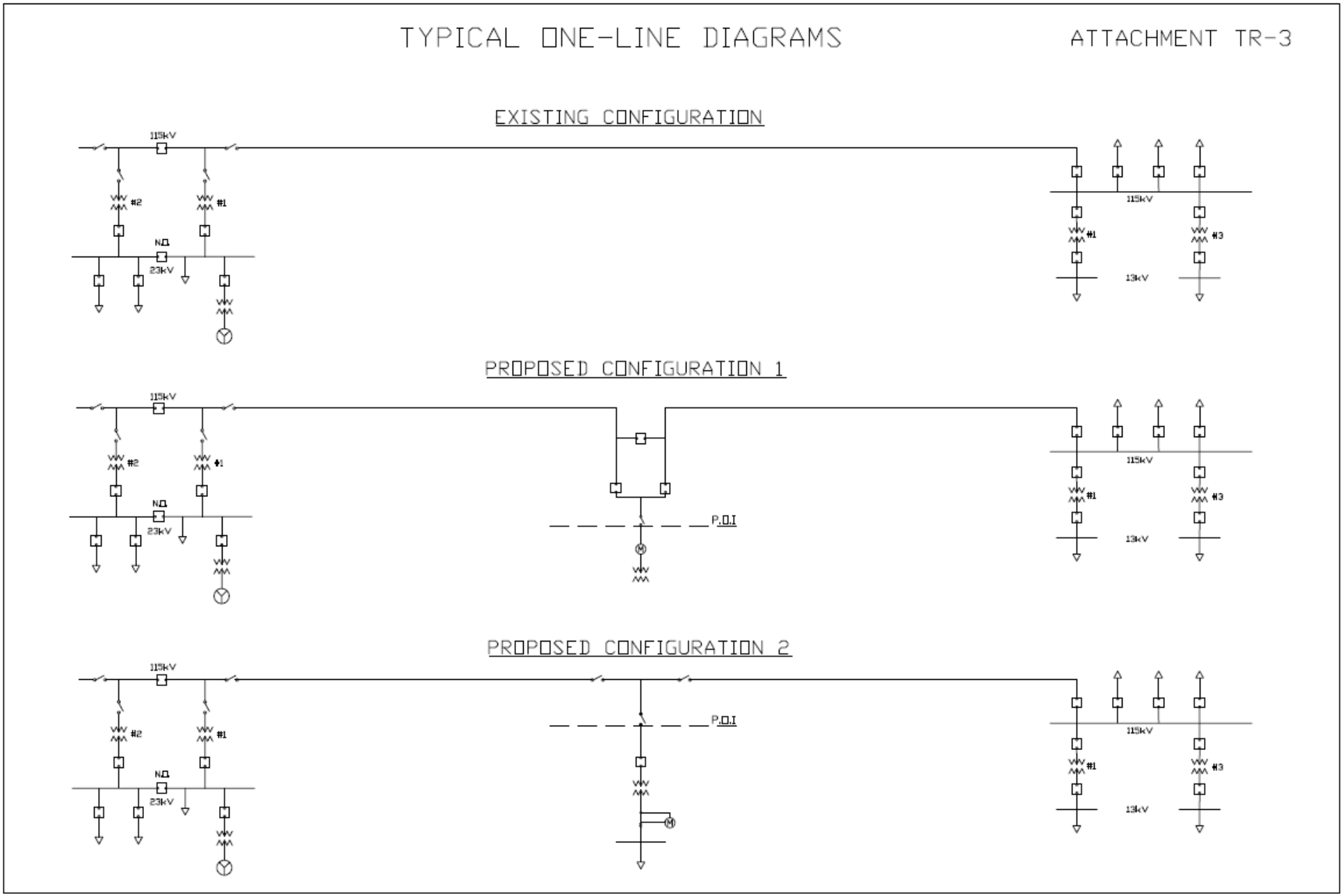


LOCATION MAP

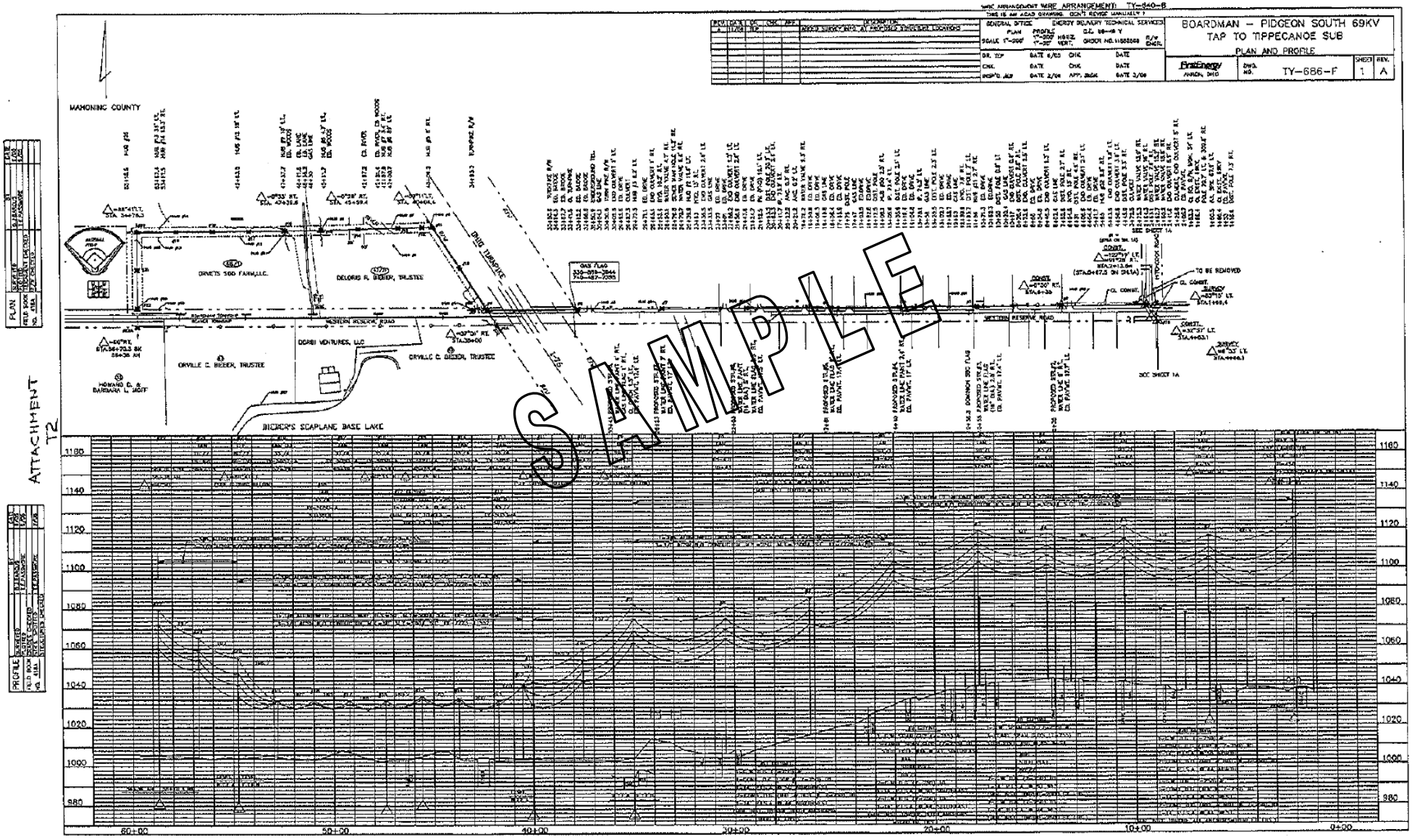
POLE NO. IN FIELD		#7128		#7157		#7158							PLANT ADDITION TOTAL				RETIREMENT TOTAL			
POLE NO. ON DRAWING		#10		#3		#5							UNIT QUANTITY		ESTIMATED COST		UNIT QUANTITY		ESTIMATED COST	
REMOVED POLE - YEAR SET																				
UNITS		P	R	P	R	P	R	P	R	P	R		EST.	ACTUAL	LABOR	MAT'L	EST.	ACTUAL	LABOR	MAT'L
	1											1								
INSULATOR: 69kV SUSP (3-UNIT EQUIVALENT)	2	6		6		6						2	18							
	3											3								
CLAMP: STRAIN (5/16" ALUMOWELD)	4	2		2		2						4	6							
CLAMP: STRAIN (636 KCMIL 37 STRAND AA)	5	6	6	6	6	6	6					5	18				18			
CLAMP: SUSP (5/16" ALUMOWELD)	6		1		1		1					6					3			
ASSEMBLY: 69kV GW DE	7	2		2		2						7	6							
ASSEMBLY: 69kV COND DE	8	6		6		6						8	18							
BRACKET: GROUND WIRE	9		1		1		1					9					3			
ARMOR ROD: 5/16" ALUMOWELD	10		1		1		1					10					3			
SWITCH: 69kV, 1-WAY, 1200A BRIDGES, MOTOR OP (W/ SCADA)	11	1		1		1						11	3							
SWITCH: 69kV, KPF (W-206), MOTOR OP (W/SCADA)	12		1		1		1					12					3			
ARCING HORNS: BRIDGES TYPE FOR 69kV SWITCH	13	3				3						13	6							
VACUUM INT: BRIDGES TYPE FOR 69kV SWITCH	14			3								14	3							
GROUND SWITCH HANDLE (FE STD 18-335)	15	1		1		1						15	3							
GROUND SWITCH HANDLE (FE STD 18-334)	16		1		1		1					16					3			
BONDING: SWITCH	17	1		1		1						17	3							
FUSED DISCONNECT SWITCH FOR 120V AC	18	REUSE		REUSE		REUSE						18	REUSE							
DISTRIBUTION 120V AC SUPPLIED TO SW. CABINET	19	REG		REG		REG						19	REG							
	20											20								
POLE TO EXTENSION: 5' FIBERGLASS	21					1						21	1							
CONNECTOR: COMPRESSION (5/16" ALUMOWELD)	22	1		1		1						22	3							
CONNECTOR: 4-HOLE TERMINAL (636 KCMIL 37 STRAND AA)	23	6		6		6						23	18							
	24											24								
	25											25								
WIRE: 5/16" ALUMOWELD	26	TRANSFER		TRANSFER		TRANSFER						26	TRANSFER							
WIRE: 636 KCMIL 37 STRAND AA (3 PHASE)	27	TRANSFER		TRANSFER		TRANSFER						27	TRANSFER							

DATE START	DATE FINISH	BY	COMPLETION DATA VERIFIED BY	DATE	ENTERED ON RECORD MAPS BY	DATE	TOTAL			TOTAL		

TR-3: Single Line Diagram

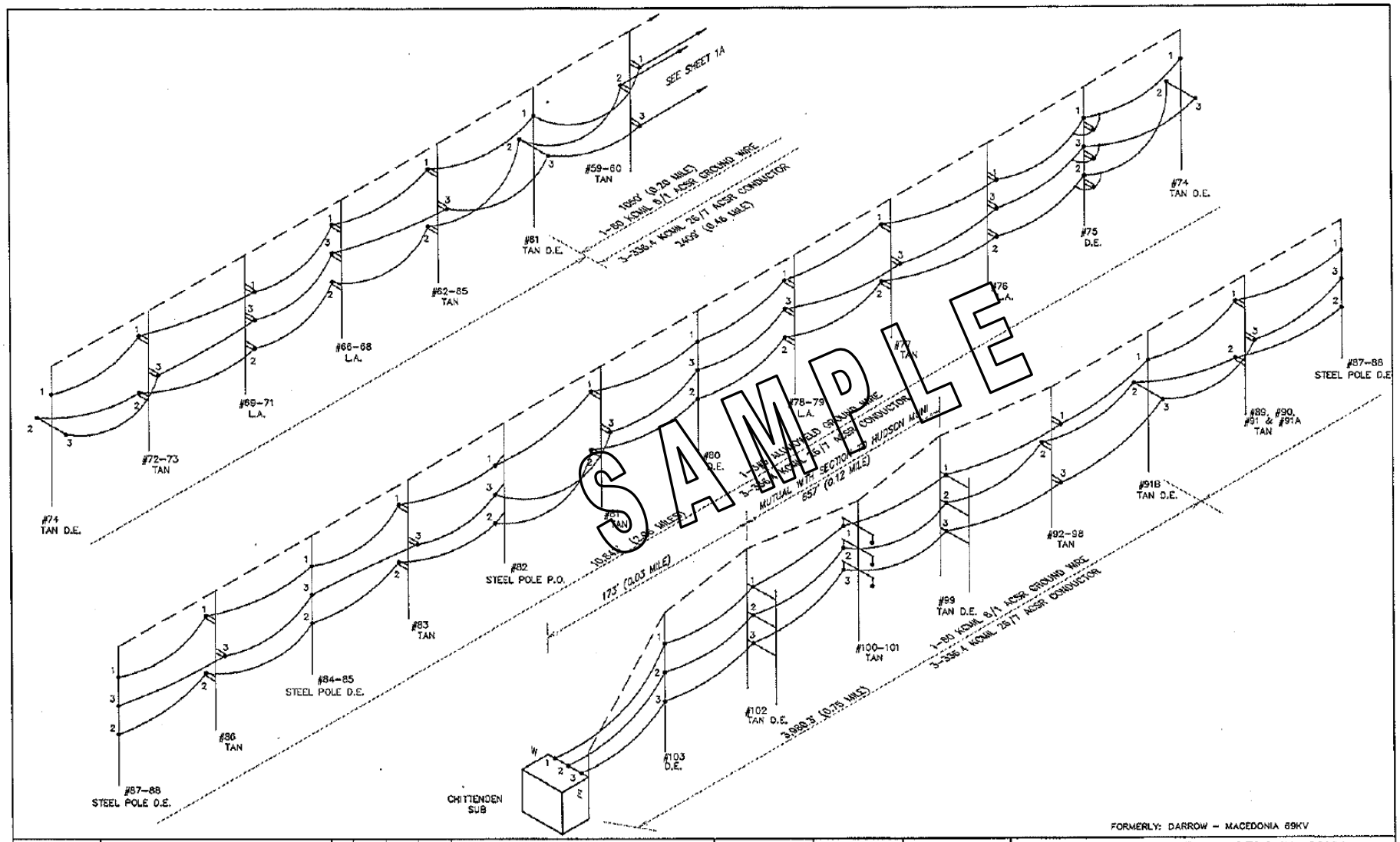


TR-4: Plan and Profile Drawing



ATTACHMENT T2

TR-5: Wire Arrangement



DWG. NO.	REFERENCE	REV.	DATE	BY	APP.	DESCRIPTION
TY-265-F	PLAN AND PROFILE RAF/BET 7/07	A	7/07	TEP	DRK Jr. 7/07	REDRAWN, RELOCATED STR.#61 THRU #91B FOR S.R.8 HIGHWAY PROJECT PER CE 04-24 C

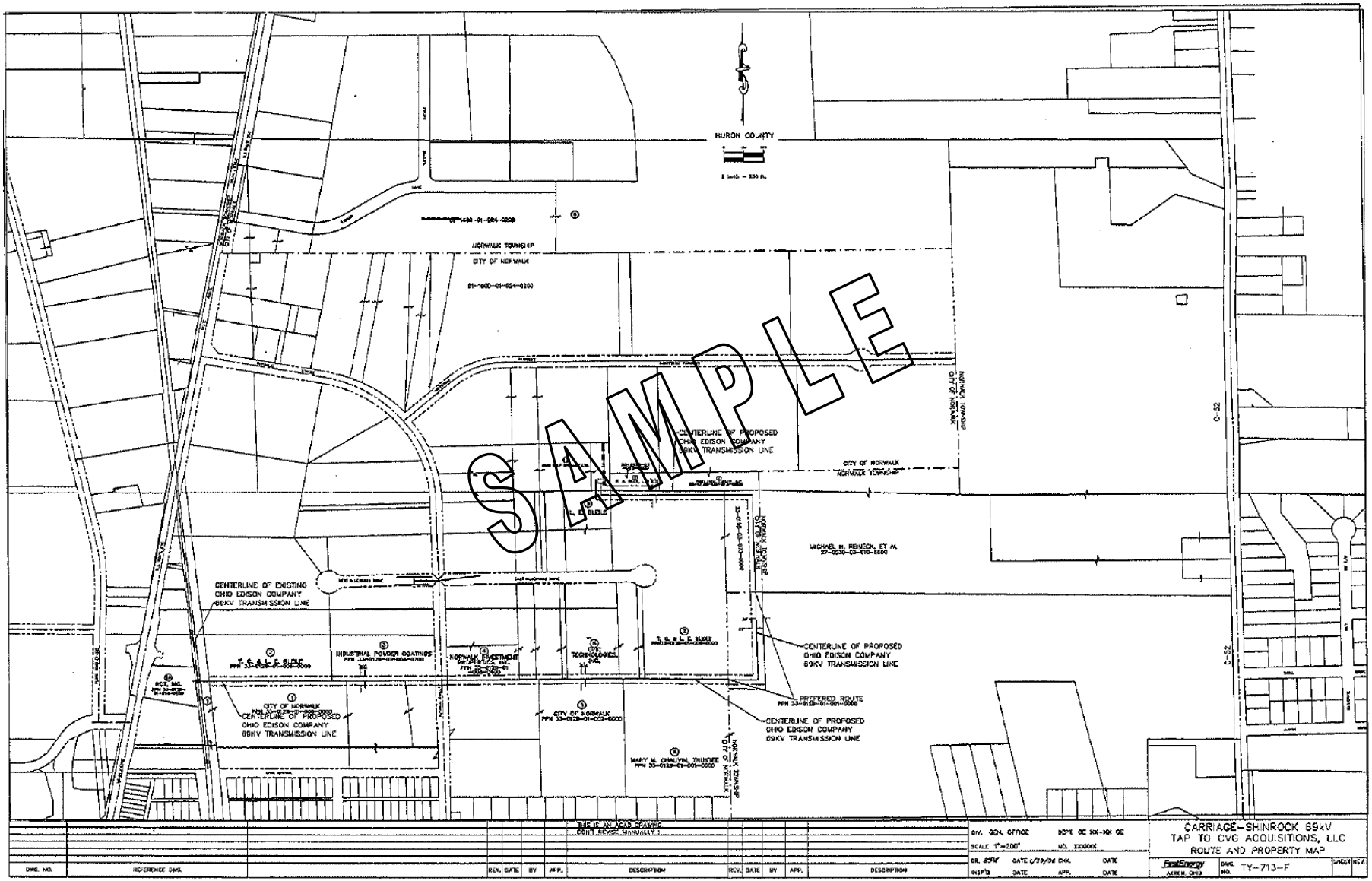
ISSUE DATE: ☐CONSTRUCTION ☐AS BUILT ☐RECORD

DR. TEP 7/07 C.E. REDRAWN
DRK. ORDER NO.
INS. WBS #/W
APP. SCALE N.T.S.

HUDSON - SOUTH MACEDONIA 69KV
WIRE ARRANGEMENT

FirstEnergy Transmission Design | OPERATING CO. OHIO EDISON | DWG NO. TY-302-B | SHEET 2 | REV. A

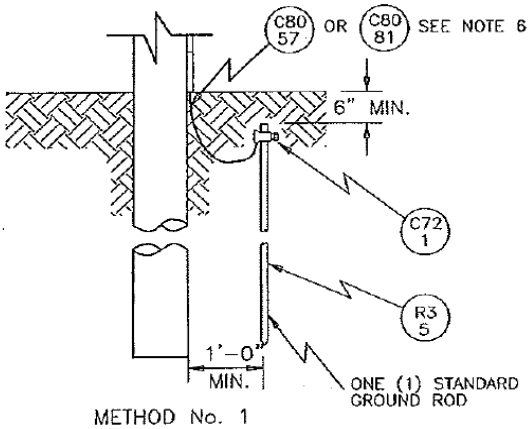
TR-6: Route and Property Maps



Drawing No.	Title
TY-276-F, Sh. 4A, Rev. A	Plan & Profile
TY-402-B, Sh. 2, Rev. C	Wire Arrangement
TY-402-B, Sh. 3, Rev. L	Wire Arrangement
CE-02-43-S, Sh. 1 to 2	Field Report
TY-5048-A	69 kV Converted Double Circuit Tangent Dead End Str. #59
5-050	Standard Grounding Methods
7-105	Anchor Types and Sizes
7-250	Down Guys, 13,500 Lbs. Max. Guy Strength, 5,000 Lbs. Vertical
7-255	Span Guys, 13,500 Lbs. Max. Guy Strength
7-260	Down Guys, 13,500 Lbs. Max. Guy Strength, 10,000 Lbs. Vertical
18-130	69 kV Single Circuit Corner, Angles 60° to 120°
18-221	69 kV Double Circuit Light Angle, Horiz. Post Insul., Angles 0° to 20°
18-225	69 kV Double Circuit Pull Off, Angles 12° to 59°
18-425	69 kV Single Circuit Light Angle, Horiz. Post Insul., Angles 0° to 20°
18-430	69 kV Single Circuit Tangent Dead End
18-520	69 kV Double Circuit Tangent, Horizontal Post Insulators
TX-3780-A	Specification for Tamping Wood, Steel and Laminated Trans. Line Poles
----------	Transmission Line Grounding Data
	Right-of-Way Drawings
TY-1896-E, Rev. B	Route and Property Map
TY-1310-B, Rev. A	Property Drawing, Parcel #1, SCC Merger Corporation
TY-1311-B, Rev. A	Property Drawing, Parcel #2, The City of Mansfield
TY-1312-B, Rev. A	Property Drawing, Parcel #4, Fernwood Farm, L.L.C.
TY-1343-B	Norfolk Southern Railroad Crossing
	Sag Data
	3#6 Alumoweld, RS = 280', MT = 2,000#
	605 Kcmil 24/7 ACSR, RS = 275', MT = 3,000#
	Requisitions
CREWS Work Request No. 8486086	Cook – Longview 69 kV (SAP Order No. 11729044)
SAP Reservation No. 1816926	Storeroom Material

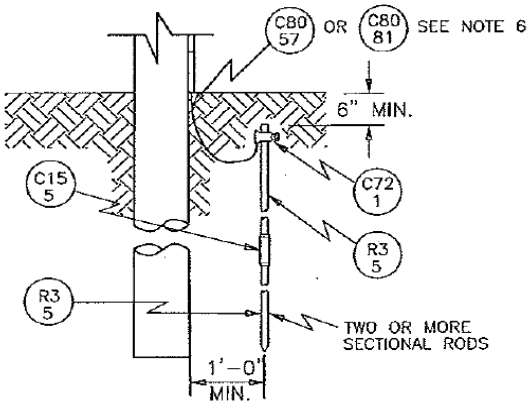
CE 02-43-S

DIV.	G.O.	DEPT.	EDTSD	FirstEnergy	Cook - Longview 69 kV Reconductor & Relocate for Illinois Ave. Bridge over N.S.R.R. Drawing No. Index
SC.	~	SAP No.	11729044		
DR.	*DLP*	CHK.	*TDS 3/07*	DWG. NO. TY-2020-A	SHEET 13 / REV.
DA.	3/07	APP.	*DRK 3/07*		



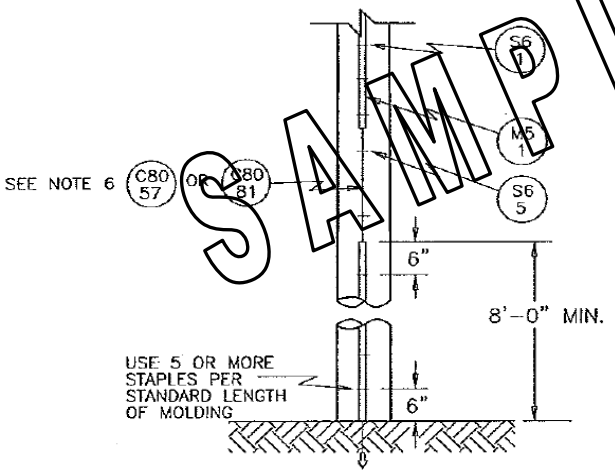
METHOD No. 1

USE THIS METHOD WHERE SUFFICIENTLY LOW GROUND RESISTANCE CAN BE OBTAINED. (10 OHMS OR LESS FOR TRANSMISSION)



METHOD No. 2

USE THIS METHOD WHERE METHOD No. 1 DOES NOT GIVE SUFFICIENT LOW RESISTANCE.



INSTALLATION OF GROUND CONDUCTOR ON POLE

NOT FOR SWITCH POLES. SEE SECTIONS 17 AND 18 FOR SWITCH POLE GROUNDING.

NOTE:

1. MEASURE GROUND RESISTANCE TO VERIFY 10 OHMS MAX. FOR TRANSMISSION.
2. INSTALL ONLY ONE GROUNDING CONDUCTOR FOR BOTH DISTRIBUTION AND TRANSMISSION EQUIPMENT.
3. THE NEUTRAL SHALL BE GROUNDED AT A MIN. OF FOUR (4) POINTS PER CIRCUIT MILE. THE INTENT IS TO DISTRIBUTE GROUNDS AT 1/4 MILE INTERVALS. SEE FE DISTRIBUTION ENGINEERING PRACTICE 10-210.
4. INSTALL DOWN GROUND MOLDING AT GROUND AND SECONDARY ELEVATIONS.
5. FOR FOREIGN CO. BONDING TO FirstEnergy GROUND, SEE PAGE 3-210.
6. INSTALL C 80/81 #4 CW BETWEEN GROUND ROD AND SECONDARY HEIGHT ON POLES SUBJECT TO VANDALISM OR THEFT.
7. COUNTERPOISE GROUNDING MAY BE USED IN AREAS OF HIGH SOIL RESISTIVITY OR SHALLOW BEDROCK, OR WHERE LOWER RESISTANCE IS DESIRED; REQUIRES BARE #6 CU OR LARGER BURIED IN EARTH 18" OR GREATER AND A LENGTH OF 100' OR GREATER, LAID APPROXIMATELY STRAIGHT. REFER TO NESC RULE 94B3A FOR DETAILS.

STANDARD GROUNDING METHODS MULTI-GROUNDED WYE SYSTEMS	FirstEnergy Construction Std. 5-050	REV. 3 DATE 10/08

FirstEnergy Corporation

TRANSMISSION LINE GROUNDING DATA

REGION ______________________

______ VOLT LINE FROM ______________ TO ______________

Constructed On SAP Order No. ______________

POLE NO.	ANCHOR AT POLE NO.	RESIST-ANCE 2 RODS DRIVEN (IN OHMS)	TOTAL RODS DRIVEN	RESIST-ANCE ALL RODS AS LEFT (IN OHMS)	POLE NO.	ANCHOR AT POLE NO.	RESIST-ANCE 2 RODS DRIVEN (IN OHMS)	TOTAL RODS DRIVEN	RESIST-ANCE ALL RODS AS LEFT (IN OHMS)

TEST DATE ______________ TESTED BY ______________

REGION CE FILE	DEPT. ORDER NO.	FirstEnergy AKRON, OHIO			
DR. DATE	CHK. APP.		DRAWING NO.	SHEET 1	REV.

TELECOMMUNICATIONS PROTECTION DESIGN

PURPOSE

This document lists the designs by Network Engineering and Field Operations used to minimize the risk of Ground Potential Rise (GPR) in the FirstEnergy network. These designs minimize the risk of a high voltage being induced into a copper telephone cable.

Scope

The basic concept is to provide electrical isolation between the electrical substation environment and the copper-wire telephony environment where there is perceived risk on the network.

In the past, transformers were used to minimize this risk. A transformer provides separation: one voltage comes in, and a lower voltage runs out. In power lines, a step-up transformer boosts signals to transmission lines and a step-down transformer reduces signal for a local distribution of cycles/second (Hz) to homes.

The aim of all telecommunications protection solutions is to minimize any stray electrical charge that might be generated from a fault in the electrical equipment, and induced into a copper phone wire from the RTU. A high voltage could be harmful. The goal of telecommunication protection is to reduce/minimize the possibility that any stray electrical charge would be beyond what is called “the 300 volt point” – which means ‘to the point of minimized and acceptable risk’ – or below. Calculations to find the 300 volt point set the perimeter of the ‘zone of influence’ (ZOI) or GPR Zone – this is the measured distance away until arriving at the point of acceptable risk.

Use Scenario

Several alternatives are in use at FirstEnergy to provide isolation of high voltage through installing preventative designs and devices. Often these designs and devices will use glass fiber optic wire, due to the fact that glass fibers do not conduct current and thus they provide the required isolation from high voltage.

- All solutions should abide with the standard of IEEE 487, “Recommended Practice for the Protection of Wire-Line Communications Facilities Serving Electric Supply Locations”, and the companion IEEE 1590, “Recommended Practice for the Electrical Protection of Optical Fiber Communication Facilities Serving, or Connected to, Electrical Supply Locations”, and IEEE 367, “IEEE Recommended Practice for Determining the Electric Power Station Ground Potential Rise and Induced Voltage From a Power Fault.”

These documents from the IEEE are used as the reference for FirstEnergy network designs that focus on creating safe environments.

NOTE

It should be mentioned that various telephone circuit providers interpret IEEE guidelines in different ways that can change from company to company. In some cases, smaller providers may have no requirements that expressly address GPR.

It is the policy of Network Engineering and Field Operations to comply with the requirements of each telecommunications provider with whom we deal. Thus, this issue can become very particular in dealing with each specific FirstEnergy substation and the specific telecommunications requirements. See IT Network Telecommunication Protection Policy IT-NET-POL-DSGN-004 for more detailed policy.

Telephony partners

FE leases communications services running to the substations. We lease lines from local exchange carriers based on who is an available, reliable vendor in the substation's geographic area.

Leased communications lines are commonly metallic (copper) wire running on telephone poles. The requirements and specifications each telecommunications company requires in order to run a line into a FirstEnergy substation may differ.

In our geographical locations, FirstEnergy deals with the following telecom providers:

Leased Line (Telcom) Providers	
Verizon	Level 3
Frontier	North Pittsburgh Tel
AT&T	North Penn Telephone Co
Embarq	Sprint-Nextel
CenturyTel	Time Warner Cable
Windstream	Cox Communications
First Communications	Comcast
Network Innovations	Adelphia

- And others
-

The above vendors provide telephone lines and hold to various policies to cope with any risk of Ground Potential Rise (GPR).

Even the IEEE still debates how to model calculations to realistically deal with GPR. There are debates about how random energy is diffused into existing metallic structures, such as in a populated urban area, where a metallic substructure consisting of existing water and sewer pipes and roadway substructure all exist.

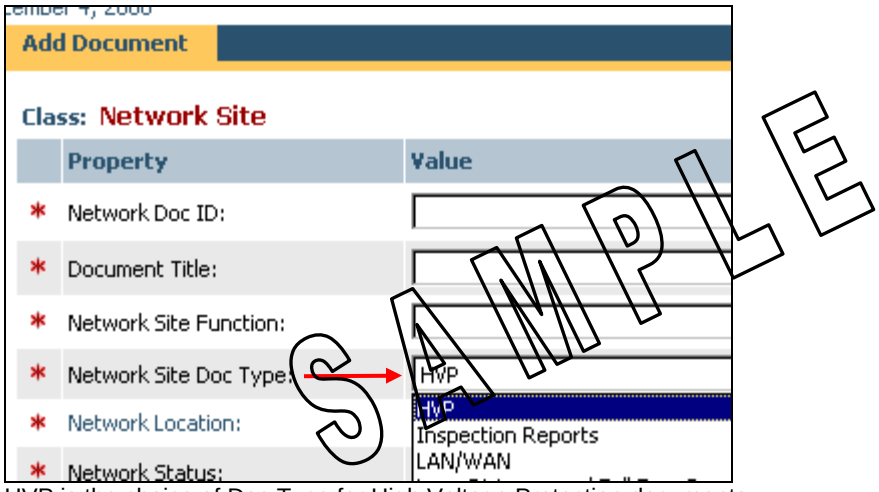
The writers of IEEE policy debate the concepts of GPR versus GPD, or Ground Potential Difference, saying that induction is minimized in any specific urban infrastructure due to stray voltage scattering across the existing spectrum of metals, called "multi-grounded neutrals" or MGNs. The bigger challenge, experts point out, would be in a rural area, where there is no urban infrastructure and thus less metal where stray voltages can diffuse, thus increasing the risk of voltage in whatever metal object might be present.

Despite the debate, the business standard at FirstEnergy is to comply with IEEE policies and current standards.

Each telecommunications provider will tell FirstEnergy how they require the configuration of a telephone line for their service delivery to the substation. They will install according to their own requirements, the contract specifying how FirstEnergy complies for that installation.

HVP Documentation Practice

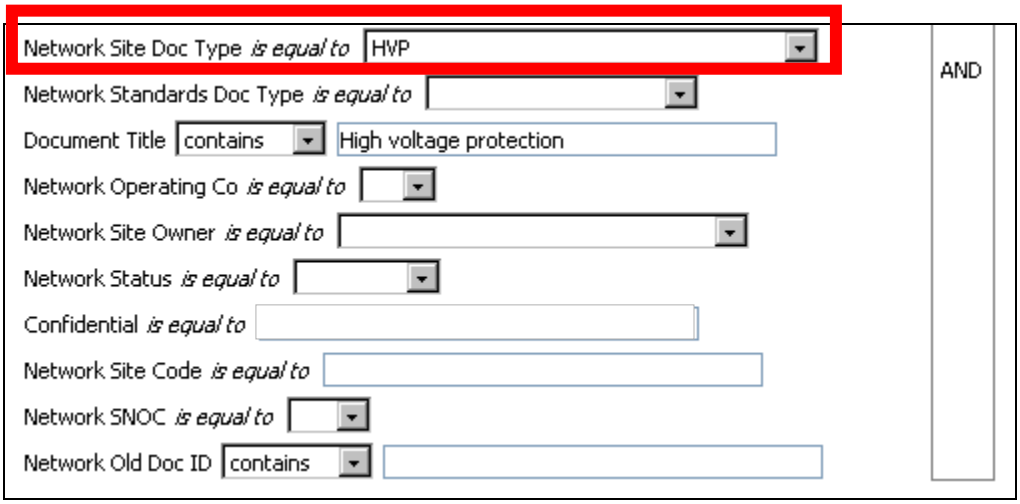
If documentation such as forms for HVP are required, then please have ED sign and scan the completed HVP forms per site when requesting High Voltage Protection calculations. **The HVP doc type should be assigned to HVP documents**. Then file in the Network Site class.
Documents are assigned a DWG number via the Lotus Notes database NumGen.
For more guidance, see the Team Lead in Network Engineering for assistance.



HVP is the choice of Doc Type for High Voltage Protection documents.

Scanning and Uploading of HVP forms into the Site class

- **HVP telco forms** are assigned a NumGen DWG number, scanned and uploaded into the Site class.
- **HVP Drawings** are assigned a NumGen DWG number, scanned and uploaded into the Site class.



Standard

FirstEnergy wants to mimimize the risk of ground potential rise, and encourages strategies, equipment, and techniques that minimize the risk of ground potential rise. Networking and Field Operations actively work to decrease the possibility of ground potential rise by employing strategies such as fiber optics and hi-dielectric cable. Common designs include:

RLH Design

See Telecommunications Protection Design – The RLH Design, in FileNet

Positron Design

See Telecommunications Protection Design – the Positron Design, in FileNet

See the References section for links to the documentation for the RLH and Positron strategic designs.

Exceptions

Exceptions to this standard should be requested and documented using the standard exceptions process. Refer to Exceptions to the Network Standards Program – IT-NET-STD-PROC-ALL-002.

Roles and Responsibilities

Network Engineers and Field Operations staff working with Substation Engineering and the respective telephone providers are responsible for delivering the telecommunication protection required by the telecommunications services provider at the site of service. Compliance with this standard shall be the responsibility of the Network Engineering Team Leaders and their Engineers. As needed, Network Engineering and Field Operations will comply with scanning and filing into FileNet as:

Title = DWG _ _ _ _ _

Class: Network Site

Network Site Doc Type = HVP

REFERENCES

1. RLH Design
2. Positron Design
3. FYI: "FOG wire" – a term for Optical Ground Wire, also sometimes called 'skywire' or 'OPGW'. Optical ground wire runs along the top of transmission towers. Originally it was an aluminum ground wire to ground the transmission tower from lighting strikes, but now it combines grounding with a communications method – FOG wire is composed of an aluminum ground wire + a fiber optic cable. FOG wire is a communications medium, not a Telecommunications Protection medium, even though it is fiber optic. FOG wire is strung between substations. Most of the FirstEnergy Sonet Network is attached to optical ground wire. Most of the FOG wire at FirstEnergy is single mode as opposed to multimode.

   FirstCom Communications, an unregulated telecommunications company, handles FirstEnergy's network needs for FOG wire, handling coordination, installation, and maintenance. FirstCom and FirstEnergy may partner on installing FOG wire depending on whether FirstCom can shop this bandwidth to their customers, and so this means that due to FirstCom deals, some FOG wire found atop FirstEnergy transmission towers may be leased out in strands to other FirstCom customers. Dependent on the deal, FirstEnergy may own some strands, all strands, or no strands of a fiber optic stretch. Stretches already owned by FirstEnergy could be considered "free" communications wire. FOG wire is the FE Network backbone, with optical carrier speeds up to OC48, or 600 Mbit/sec. FOGwire corresponds to Layer 1 of the OSI model.
4. This documentation is used as a resource for network designs in Network Engineering and Field Operations:

- IEEE 487–2000 – Recommended Practice for the Protection of Wire-Line Communications Facilities Serving Electric Supply Locations.
- IEEE 1590-2003 – Recommended Practice for the Electrical Protection of Optical Fiber Communication Facilities Serving, or Connected to, Electrical Supply Locations.
- IEEE Std 367-1996(R2002) - Recommended Practice for Determining the Electric Power Station Ground Potential Rise and Induced Voltage From a Power Fault

Related Drawings

- HVP - AT&T POSITRON 3-CARD STANDARD - WIRING DIAGRAM
- HVP - VERIZON POSITRON 3-CARD STANDARD - WIRING DIAGRAM
- HVP - AT&T POSITRON 3-CARD STANDARD - BACKBOARD LAYOUT
- HVP - VERIZON POSITRON 3-CARD STANDARD - BACKBOARD LAYOUT
- SUPERVISOR'S LINE FOR KEY SETS AND POSITRON

To access this documentation online through the FirstEnergy Intranet Portal, see the instructions: Locating IEEE documentation in the FE Online Resources library - an instruction sheet, or go here: FE Online Library Link for IEEE Resources lookup for a link to the IHS Subscription Library and follow the logon instructions for the IHS Standards Expert service (subscription).

- FE Online Library Link for IEEE Resources lookup
- Locating IEEE documentation in the FE Online Resources library - an instruction sheet (DWG15738)
- Telecommunication Protection Policy – IT-NET-STD-POL-DSGN-004
- Exceptions to the Network Standards Program – IT-NET-STD-PROC-ALL-002

Version History and Approval

Table 2. Version History and Approval

VERSION HISTORY			
VERSION	**DATE**	**DESCRIPTION**	**CHANGES BY**
1.0	11/20/2008		
APPROVAL			
APPROVED BY			**DATE**

Telecommunications Protection Design – the Positron Design

PURPOSE

This document describes the Positron design by Network Engineering and Field Operations to minimize the risk of Ground Potential Rise (GPR) in the FirstEnergy network which minimizes the risk of a high voltage being induced into a copper telephone cable.
CO-2: The Positron Design.

Scope

The Positron cabinet/card alternative can be considered for any substation size. Positron cabinets can have 3, 5, or 8 slots. The majority of FirstEnergy substations using Positron have the 5-card shelf. A small substation might need a smaller shelf for a smaller footprint, and a large substation might need more slots for more phone lines up to 8 slots.
Hi-dielectric copper cable has a special thick shielding that protects it from GPR-induced electrical surges. This becomes the phone line carrying the leased services signal from the Positron cabinet in the Control House at the substation to the 300-volt-point perimeter.
At this perimeter or beyond, the telephone company splices to regular dielectric phone line. The 300-volt-point perimeter is calculated by the telephone company vendor supplying the leased telephone line to the substation. See Telephone Protection Policy for more information on the Network Engineering policy with vendors.

Use Scenario

The Positron design uses isolation cards along with a telco-supplied hi-dielectric cable, which is shielded to protect it from surge voltages. This combination of isolation cards and hi-dielectric cable prevents GPR surge voltage from entering the telco metallic pairs within the GPR Zone of Influence (ZOI).

Standard: Positron Card Protection

These cards provide interface between substation communications equipment and the Telco-provided hi-dielectric cable. Other types of Positron cards could have small fiber optic strands to switch signals to modulated light, and then switch them back to electrical signals. Various models of cards are available depending on services required (i.e., POTS, 4-wire analog, DSL, T1, HDSL, etc.)

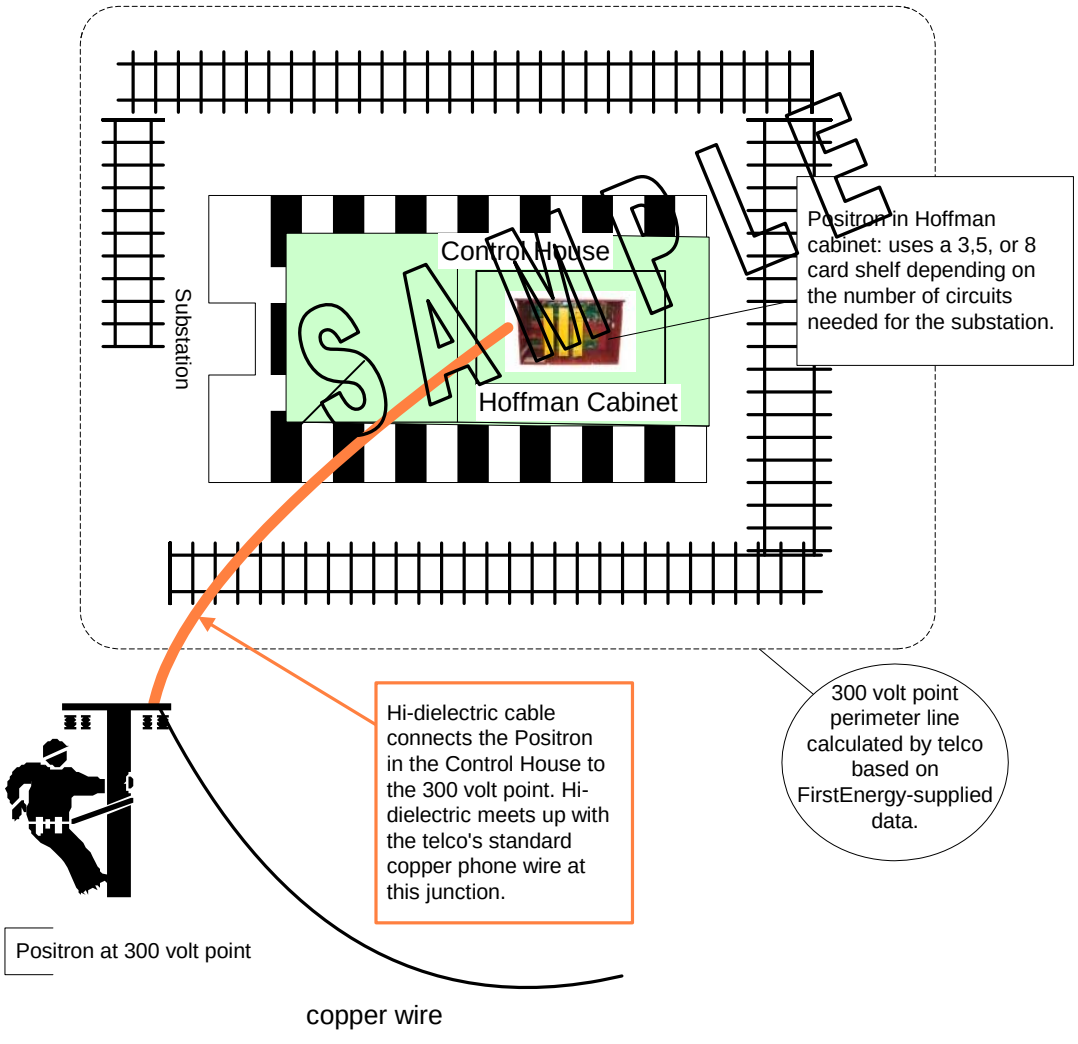
Connectivity

From the regular copper phone wire at the street, the telephone company splices in hi-dielectric copper cable at the 300-volt-point of the substation. The hi-dielectric cable runs to the Control House.
Hi-dielectric cable is not fiber optic, but it is copper wire in a gel-filled shielded cable. Hi-dielectric cable is connected to the Positron in the substation to provide high voltage protection.

The Positron cabinet should be mounted on 4x8 fire-retardant plywood. The telephone cable should be 6 inches away from all other components. The hi-dielectric telco cable should be routed to the Positron cabinet with PVC conduit. Four-inch PVC to control houses is required.

Three-quarter (¾)-inch EMT conduits for 130 vdc wiring and RTU cable shall be placed. Wiring should not go through floor trenches. (See drawing XXXXXXX)
Other components of the system are an insulated mat and a grounding bar.

Positron Design for Telecommunications Protection



EXCEPTIONS

Exceptions to this standard should be requested and documented using the standard exceptions process. Refer to Exceptions to the Network Standards Program – IT-NET-STD-PROC-ALL-002.

Roles and Responsibilities

Network Engineering
Field Operations
Telco/Vendor
Positron/Vendor

REFERENCES

- Exceptions to the Network Standards Program – IT-NET-STD-PROC-ALL-002
- Telecommunications Protection Policy IT NET POL DSGN 004
- Telecommunication Protection Design IT-NET-STD-DSGN-SS-TRANS-001
- Telecommunications Protection Design – the RLH Design IT-NET-STD-DSGN-TRANS-RLH-002
- Global Alarming Standard IT-NET-STD-DSGN-SS-ALL-003

Version History and Approval

Table 3 Version History and Approval

VERSION HISTORY			
VERSION	**DATE**	**DESCRIPTION**	**CHANGES BY**
1.0		DSMEs George Moll and Rod Kaufman	Martha Shaw
APPROVAL			
APPROVED BY			**DATE**

Telecommunications Protection Design – the RLH Design

PURPOSE

This document describes the RLH design by Network Engineering and Field Operations to minimize the risk of Ground Potential Rise (GPR) in the FirstEnergy network, which provides high voltage isolation and protects against a surge of voltage being impressed into a copper telephone cable.

Scope

This design can be applied across FirstEnergy territory to minimize the risk of surges due to ground fault, relying on each telco vendor to apply their business rules to supplying service to FirstEnergy facilities and substations.

Use Scenario

The RLH design uses fiber optic cable, so surges in voltage which might be generated at the substation during a fault won't travel down the fiber optic line due to the lack of conductivity in the [glass] fiber.

One end of the fiber optic cable is an RLH chassis (and cards) in the Control House. At the other end of the fiber optic cable, a second RLH chassis (either free-standing or on a pole) is located in an outdoor enclosure that cross-connects to the phone company's copper phone wire connected at/past the 300-volt-point.

The "300-volt point" is a calculation of where the perimeter falls in a circumference around the substation where the risk of a surge impressing into a conducting metal (such as the copper of a phone line) will fall below the '300 volt point'.

Based on the individual telco, (who we approach to provide us with telephone service) the telco calculates the minimum 300-volt-point for an FE substation based on data supplied by FirstEnergy, which we obtain from Substation Engineering and System Protection. The demarc point will be chosen in consultation with FE by the individual telco at or beyond the 300-volt point.

Why would a cross-connect occur beyond the 300-volt point? Because if the 300-volt-point is located between wood poles, then the installation would be more efficient for a cross-connect to occur at the nearest pole located beyond the 300-volt point.

The telco's business policy determines where (if anywhere) they determine a 300-volt-point perimeter for the substation.

It is necessary to calculate each substation environment on an individual basis, since the 300 volt point perimeter can be located at varying distances away on the ground from the substation, depending on soil conditions of the earth, and a variety of factors. In real life, these factors define the perimeter, which is probably not a circle. But mathematical calculations for GPR may define more ideal forms.

Example: Enclosure on pole at calculated 300 volt point. This could be a locked cabinet with telco and FirstEnergy sharing space but having different access doors, or sharing the same door/access with multiple keys and using different sides of the same enclosure.

Standard

When a telephone company provides phone lines, they will run the phone line to the demarcation point. In the RLH design, an outside enclosure marks the demarc point where the telephone company's responsibility ends.

> From Wikipedia, the free encyclopedia
>
> In telephony, the **demarcation point** is the point at which the telephone company network ends and connects with the wiring at the customer premises. A demarcation point is also referred to as the **demarc**, **DMARC**, **MPOE**, or **minimum point of entry**.

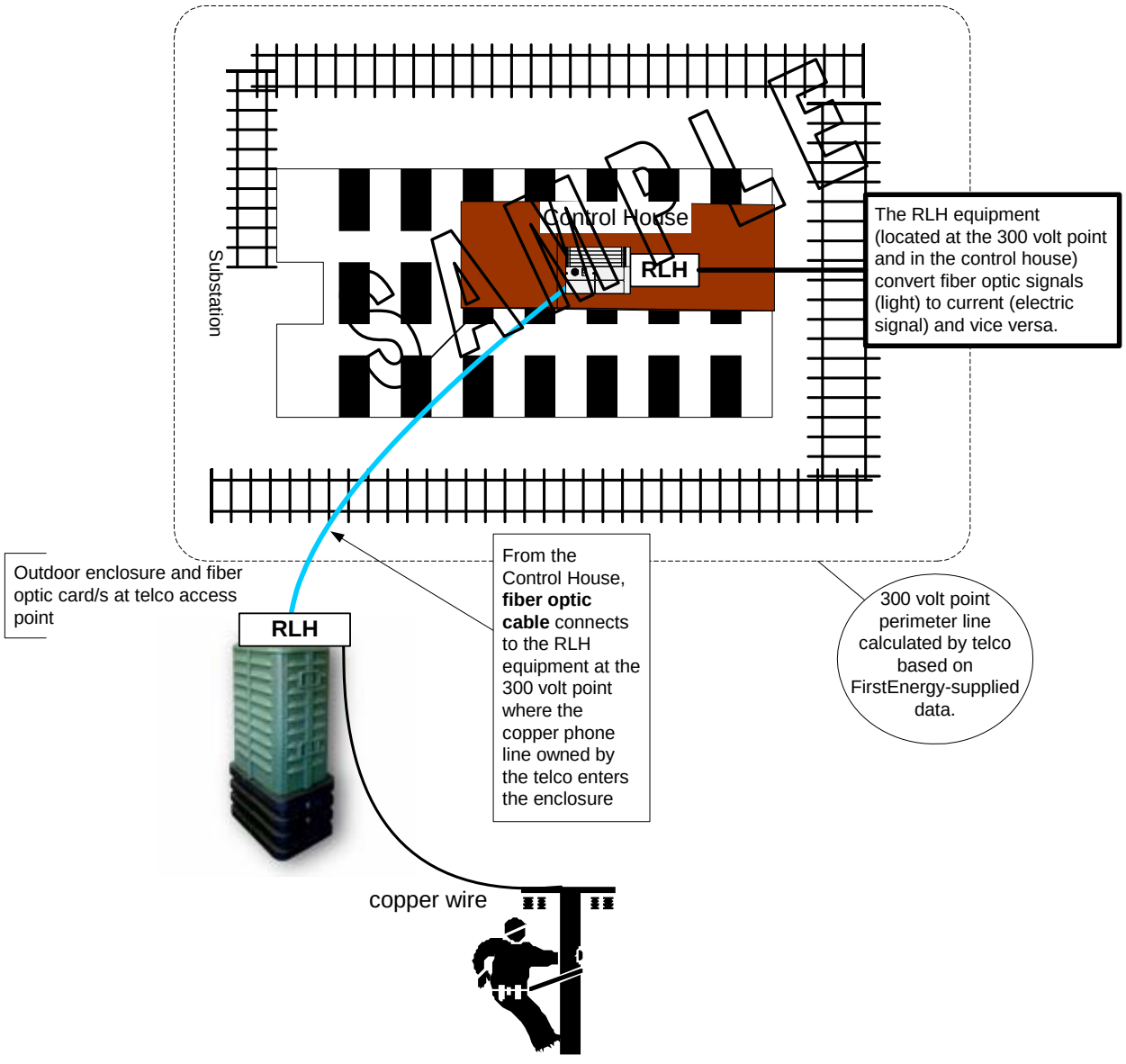
In the RLH solution, Network Engineering and Field Operations work with the telephone company to set an outdoor enclosure onto either a wood pole or a pedestal at the 300-volt-point. The telco's copper line goes into this cabinet, which forestalls the telco from needing to access the FirstEnergy substation beyond this demarc point.

Outdoor freestanding enclosure is set at the calculated 300 volt point or beyond – inside is communications hardware meeting telephone protection standards. The telephone line is connected to RLH fiber equipment at this point.

In the weatherproof enclosure, the telephone cable terminates on to RLH fiber equipment. From the enclosure, a fiber optic cable carries the signal back across FirstEnergy property into the substation, where the fiber optic cable again terminates on to another set of RLH fiber equipment in the Control House. At this point the fiber optic signal (light) is converted back to an electric signal.

All equipment within the outdoor enclosure should be powered by telco-supplied CO line current when possible, thereby eliminating the requirement for local power.

In the RLH solution, fiber optic cable is used. The RLH equipment converts between electrical and optical signals.



EXCEPTIONS

- Exceptions to this standard should be requested and documented using the standard exceptions process. Refer to Exceptions to the Network Standards Program – IT-NET-STD-PROC-ALL-002.

Roles and Responsibilities

Network Engineering
Field Operations
Telco/Vendor

REFERENCES

- Exceptions to the Network Standards Program – IT-NET-STD-PROC-ALL-002
- Telecommunications Protection Policy IT NET POL DSGN 004
- Telecommunication Protection Design IT-NET-STD-DSGN-SS-TRANS-001
- Telecommunications Protection Design – the Positron Design IT-NET-STD-DSGN-TRANS-Positron-001

Version History and Approval

Table 4. Version History and Approval

VERSION HISTORY			
VERSION	**DATE**	**DESCRIPTION**	**CHANGES BY**
1.0	10/14/2008		
APPROVAL			
APPROVED BY			**DATE**

Power Station Request for Telecommunications Service

Verizon Contact:
Joseph J. MacDonald, Inductive Coordination & Electrical Protection (ICEP) Engineer
147 Morristown Rd
Bernardsville, NJ 07924
Phone: (973) 649-5180
Fax: (908) 766-9847
Email: joseph.j.macdonald@verizon.com

Customer Contact:

Electric Substation Data:

Substation Name/Address:	
Is Substation new or existing? If existing, please provide at least 1 existing circuit # (CKID).	
Square Foot Area: (Total Size of Ground Grid / Ground Mat)	
Total Expected (line-to-ground) Fault Current (Specify Amps RMS or Peak)	
Grid Impedance (in ohms) to Remote Earth: (Specify Measured or Calculated)	
X/R Ratio:	
% Earth Return Current in Amps:	
Soil Resistivity:	
Telecommunications Peak Factor: (Determined by Telco)	
Peak Ground Potential Rise: (Determined by Telco)	
Remote Earth Point (300 V) distance from Substation Grid: (Determined by Telco)	

Verification of Data:
Electric Company Representative
Signature:_____ Date:_____

SCADA RTU POINT LISTING

TYPICAL INTERCONNECTION SUBSTATION POINTS LIST

EMS Information

RTU Name: Sub Name
FEP:
Channel:
Address:

RTU Information

RTU Type: GE D20ME II VME
Firmware / Boot ROM:
Processor:
Powered At: 125 VDC
Peripherals: 1 D20CI, 1 D20KR, 2 D20S, 1 D20A, 3 Meters, 1 SEL2020

Station Phone:
Station Address:

Latitude:
Longitude:

RTU Physical Communication Ports

Comm Port	Protocol	LRU No.	RTU Chnl	Local Address	Remote Address	Destination	Communication Circuit
0 (J3)	ASCI					Maintenance (Local), 9600 Baud	RS232
1 (P2)	DNP DPA	1	0	20026?	10	Johnstown?? (Penelec?? EMS 1200 Baud	4-wire Dedicated
2 (P3)	DNP DCA	1	1	20	11	Line Exit Satec Meter	RS485
	DNP DCA	1	1	20	12	Line Exit Satec Meter	RS485
	DNP DCA	1	1	20	13	Line Exit Satec Meter	RS485
	DNP DCA	1	1	20	14	SEL2020	RS232
3 (P4)	DNP DCA	1	2	20	9	SEL 3351 HMI	RS232
4 (P5)	DNP DPA	1	3	20	1	Not Used	
5 (P6)						Not Used	
6 (P7)						Not Used	
7 (P8)						Not Used	

REVISIONS

Rev.	Date	Description	Rev. By
A			

OPTICAL POWER MEASUREMENT FORM

A	
Link #:	
Location :	
Wavelengh:	
Path Length	
Date	
Tester	
Test Equip:	

Power Meter End To End Results

B	
Link # :	
Location :	
Wavelengh:	
Path Length	
Date	
Tester	
Test Equip:	

Fiber #	Buffer Tube	Fiber Color	Loss In dB A-B	Loss In dB B-A	Loss In dB Avg	Fiber #	Buffer Tube	Fiber Color	Loss In dB A-B	Loss In dB B-A	Loss In dB Avg
1						37					
2						38					
3						39					
4						40					
5						41					
6						42					
7						43					
8						44					
9						45					
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Network Standards Design—IT Network Engineering

IT-NET-STD-DSGN-EMS-TRANS-002

Transport to Remote Controlled Line Switches

PURPOSE

To provide guidelines for designing and installing the communications path and SCADA control for remote controlled line switches. These switches may be one of the following types:

- Sectionalizers
- Reclosers
- Motor operated air break
- Motor operated vacuum switches

Scope

This document describes communications paths and SCADA controls for all types of switches used for the control of distribution and transmission systems.
These controls may be used to operate & monitor switches controlling voltages ranging from the lowest primary distribution through the highest transmission voltages in FirstEnergy systems.

Use Scenario

This design standard shall be used for guidance when remote control of a line switch is required. This does not apply if the switch is controlled directly by a substation RTU.

Factoring in topography, terrain, and existing infrastructure

The method of providing communications to remote controlled line switches is subjective, depending on the terrain and the type of application. For wireless applications, factors in the decision include the embedded wireless infrastructure as well as the geographic topology of the region where the installation takes place.

In Penelec, there are widespread deployments of MOSCAD and now ACE on the existing VHF and UHF radio systems – this is most suitable to the mountainous topology encountered in the vast majority of the Penelec region.

OE, TE, CEI, PP, MetEd and JCP&L have limited MOSCAD deployments but are using MAS or CDMA digital cellular technology. When not using MOSCAD/ACE as the transport/control mechanism, then the GE IBox RTU will be used as the control interface.
The site assessment should establish whether there is EDVO in the area. When we have a marginal signal we look for a carrier who has a good signal. EVDO is optimal.

No signal – if you have less than a -85 (85dB) using the 9dB antenna, then you have to look at another means or another vendor. A 10 dB fade margin is required.

Where feasible, the use of fiber optics is an excellent solution for remote controlled line switches. This application is seen most often where the switch is located in close proximity to an existing substation with available RTU interface support, but there have been installations where the distance of run exceeds 1000 feet.

Feasibility depends on the availability of the supporting architecture (existing conduit, cost of new conduit, ability to underbuild aerial ADSS, etc.) rather than just distance alone.

In similar close-in applications where deployment of fiber optics would be cost prohibitive, the use of 900Mhz MDS radios in a point-to-point arrangement can work well.

Installing multi-mode versus single-mode fiber is as much project-specific as time sensitive. In cases where the substation is reasonably close to existing or planned FirstEnergy fiber optic network infrastructure, the use of single-mode fiber provides the future potential to integrate the substation into the corporate network.

However, in a remote point-to-point application, the use of multi-mode fiber provides a lower cost alternative. The design engineer has options depending upon the specific application and the region/geography where the design is being implemented.

Standard

Remote-controlled line switch installations located outside of, but within approximately 150 feet of a Substation's fence: The standard is to place a RS 232 Copper to Fiber Link Repeater and a fiber patch panel in the Switch's RTU/Control cabinet. If this is not feasible, then sometimes they splice pigtails directly onto the fibers.

A fiber patch panel and Fiber Link Repeater are installed in the substation to provide conversion back to RS-232 Copper connection.

Transmission Engineering may drive where Network Engineering starts on a project or design. Transmission Engineering has set a new standard to circulate an RFC with a 2-week window for response when they are beginning the engineering on a project. Network Engineering's focus is to recommend/decide on one of two controls: ACE or IBox. For IBox, choose MAS radio, CDMA, or fiber. Respond to Transmission Engineering's RFC with advice and recommendations. Network Engineering may be given different combinations of equipment, and the goal is to get them to work together. Sometimes it may not be possible to give input into purchasing the equipment the equipment may already be purchased when the project comes to you. For example, Transmission Engineering may have already purchased the switch; an iBox or ACE may already be specified.

There are legacy applications where the switch does not have an independent RTU, the copper connections for Control and Status are made directly to the Station RTU Input/Output boards (legacy equipment). This is not a preferred solution, and another solution is encouraged.

If the switch has an independent RTU this fiber link repeater is then used to connect the switch's RTU directly to the substation's router (preferred method), or if the substation is not so equipped, bridged with the station's Master RTU communications path/circuit.

> **NOTE:** While it is possible to daisy-chain the RTUs, it is not the preferred method due to the risk of single point of failure.

If we use the MAS store and forward methodology, that's not the preferred method because there's the risk of single point of failure to any downstream device. If the switch RTU is connected into the station RTU directly, then we have created a single point of failure possible for any downstream devices from the substation RTU.

This fiber link installation should be installed as follows:

(1) The RS232 port of a Copper to Fiber Link Repeater such as a Dymec 5843 or 5844 shall be connected to a serial port of the Router and the switch's RTU.

(2) The two fiber link repeaters shall be connected to each other by installing a minimum of 12 count, multimode 62.5/125 fiber optic cable suitable for outdoor installations that is terminated in a fiber patch panel located near each fiber link repeater. Cable route considerations such as underground in conduit vs. overhead on poles must also be reviewed during fiber optic cable selection process.

(3) The specific style of fiber optic patch panel will need to be reviewed on a per site basis. ST type connectors shall be placed on the ends of each fiber in the cable. Multimode, ST type jumpers shall be used to connect the link repeaters to their associated patch panels.

NOTE: If the multimode fiber optic cable described above is not available in a time frame that supports the construction schedule, standard single mode fiber optic cable suitable for 1310 nm operation may also be used but single mode link repeaters will be required.

For a typical diagram showing this installation at the switch cabinet, Click Here *for a block diagram that shows a typical fiber link repeater installation.*

Remote-controlled line switch installations located approximately more than 150 feet from a Substation: The standard is to place (as determined appropriate by Network Engineering)

(1) A Multiple Address System (MAS) radio [preferred] or

(2) Motorola ACE integrated Radio and RTU [preferred]. This is only for MOSCAD replacements or for additions requiring the use of MDLC.

(3) A device/modem with RS 232 output in the Switch's RTU/Control cabinet using third party or public carrier-provided wireless services.

Remote controlled line switches (located more than 150 feet outside of Substation Fence) are provided with a controller as part of the switch package. The controller is housed in a weatherproof cabinet. If this switch location requires remote control capability from the Dispatcher, the controller package shall also include an RTU.

An RTU (such as the GE iBox) should be able to handle at least four control points and 8 status points.

This RTU should have a minimum of three serial ports that are RS232 & RS485 capable. The 120VAC that is required to power the Battery & Charger System for the RTU and other control functions is provided by others (distribution dept of the area operating company).

Communication connection to this distant switch is accomplished by one of the following methods:

1. For MAS Radio installations: Radio signals originating from a Master MAS radio that is located at the closest and/or associated Substation whose RS 232 port receives communications from the

Substation's router.

2. For Motorola ACE installations, an available private land mobile radio frequency shall be utilized.
3. For device/modem installations: The device/modem communicates using third party or public carrier-provided wireless services via VPN to the WCC EMS (Wadsworth) and the RCC EMS (Reading).

EXCEPTIONS

Any exceptions to the guidelines or metrics in this standard should be requested and documented using the standard exceptions process. Refer to Exceptions to the Network Standards Program – IT-NET-STD-PROC-ALL-002.

ROLES AND RESPONSIBILITIES

Network Engineering

Network Engineering works cooperatively with both Substation Engineering and Transmission Engineering to provide the best overall functionality possible for a remote controlled line switch in place at FirstEnergy.

For remote-controlled line switch installations, the determination of which type of communication path the RTUs will use is the responsibility of the Network Engineering Department Transport Group. The preferred communications path for all new Remote-controlled line switch installations is currently wireless. The preferred wireless communications medium is the use of the company-owned MAS master-slave radio or Motorola ACE integrated systems.

Radio systems may be operated on VHF in the 30 – 50 Mhz, 150 – 175 Mhz range, UHF in the 450 – 470 Mhz range, Unlicensed Spread Spectrum in the 902 – 928 Mhz ISM band, or licensed as split-frequency on the 928 – 952 Mhz bands. For areas where the company has inadequate facilities to provide proper backhaul, other wireless technology may be utilized on various government or public carriers' networks. Primary and secondary licensing regulations must be considered when deploying communications on private VHF and UHF frequencies.

REFERENCES

- Exceptions to the Network Standards Program – IT-NET-STD-PROC-ALL-002
- Substation Design Standards (requires SAP ID login)
- Transmission Design Standards (requires SAP ID login)

NOTE: There is no need for a Network Engineering Testing Standard with this topic, as testing is performed by Transmission Engineering. Network's contribution is in the configuration for communications; Transmission Engineering assumes oversight for equipment performance once configured.

Version History and Approval

Table 5. Version History and Approval

VERSION HISTORY			
VERSION	**DATE**	**DESCRIPTION**	**CHANGES BY**
1.0	3/24/2009	Created draft of standard with James K. Andrews, DSME, included edits from cross-functional VSME team	
APPROVAL			
APPROVED BY			**DATE**

PENNSYLVANIA ELECTRIC COMPANY
APPLICATION FOR ELECTRIC SERVICE - GENERAL

Name of Customer: _____ Rate: _____
Service Location: _____ Business: _____
Mailing Address: _____
Premise Number: _____ Account Number: _____
Official in Charge: _____ Title _____
Billing Voltage _____ Meter Voltage _____ Transformer Ownership _____
Estimated Demand _____ KW or Contract Demand _____ KW
Record Other Billing Information on Reverse Side.
Connected Load _____ H. P. or _____ KW as described hereunder:

On-peak hours shall be from 8:00 a.m. to 8:00 p.m. prevailing time, Monday-Friday. All other hours shall be off-peak including New Years Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day. The Penelec Tariff Rule 9 gives Penelec the right to require customers to maintain an average power factor of no less than 85% lagging. The tariff recommends that customers install protective devices and alternate power supplies that may prevent or limit damages from interruptions, reversals, spikes, surges, single phasing, or variations in power supply.

The Customer is to provide an analog telephone line to Penelec's metering.

Pennsylvania Electric Company, ("Company") is hereby requested to furnish the undersigned with electric service at the above address; such service to be supplied by the Company under its Tariff of Rates, Rules and Regulations for electric light and power service on file with the Public Utility Commission and available for inspection at the Company's offices, and to be paid for by the undersigned in accordance with applicable service classifications.

The term of the contract shall continue for a minimum of 1 year, from the _____ day of _____, 20__ (or as soon thereafter as service is made available), and thereafter from year to year until terminated by written notice from either party to the other thirty days prior to the expiration of any of the said periods or as otherwise provided for in the applicable rate.

This application shall not be binding upon Company until accepted by Company, and shall not be modified or affected by promise, agreement, or representation by any agent or employee of Company made before or after signing, unless incorporated in writing herein before acceptance by Company.

This application, when accepted, shall constitute a contract between the parties hereto, which shall bind and inure to the benefit of the heirs, executors, administrators, successors, as the case may be, of the respective parties hereto. This contract shall not be assigned.

PENNSYLVANIA ELECTRIC COMPANY

ACCEPTED:

Signed by: _____ Date: _____
Title: _____

_____
CUSTOMER NAME

Signed by: _____ Date: _____
Title: _____
Witnessed by: _____
Date: _____

Note: This contract cancels the following existing contract:
Name of Customer _____ Rate _____ H. P. _____
Service Location _____
Date of Contract _____ Cancellation Effective _____

PENNSYLVANIA ELECTRIC COMPANY - APPLICATION FOR STATION POWER SERVICE

Name of Customer: _____ Rate: GP - Station Power Service .
Service Location: _____ Business: _____.
Mailing Address: _____.
Premise Number: _____ Account Number: _____
Official in Charge: _____ Title: _____
Billing Voltage: _____ Meter Voltage: _____ Transformer Ownership: Customer .
Estimated Demand: _____

Pennsylvania Electric Company ("Company") is requested by Customer to furnish Station Power (as the term is defined by the PJM Interconnection, L.L.C. Open Access Transmission Tariff ("OATT")) to the Customer's generation facility located at the address listed above ("Facility"). If the Company accepts this application, Company agrees to provide, and Customer agrees to receive, Station Power pursuant to the terms and conditions below.

Station Power Service will be rendered by the Company consistent with PJM's monthly netting methodology set forth in the PJM OATT, as said OATT may be amended from time to time.[1]

During the calendar months when PJM has determined that the Facility's gross energy output less the Station Power requirements of the Facility ("Net Output") is negative, Penelec will bill Customer for the energy and import flow at the charges set forth in Rate Schedule GP at the then prevailing prices, with the exception of the Generation and Transmission Charges. The Generation Charge will be billed at the Real Time Locational Marginal Price for the Penelec Zone for the net energy, and the Transmission Charge will be billed for the net energy at the charges set forth in Rate Schedule GP at the then prevailing prices, unless the energy is purchased from a Third Party Supplier in which case the Generation and Transmission Charges will be provided by the Third Party Supplier.

During the calendar months when the PJM has determined that the Net Output from the Facility is positive, Penelec will bill the Minimum Charge of Rate Schedule GP at the then prevailing prices on a monthly basis. The current Minimum Charge for Rate Schedule GP is $292.49 and is applicable to recover the Company's costs associated with the ownership and maintenance of the meter and related equipment and administrative efforts for the provision of Station Power.

The initial term for Station Power Service shall be for one (1) year, from the _____ day of _____, 20__. The term shall renew automatically thereafter year to year until terminated by written notice from either party to the other at least thirty (30) days prior to the expiration of any of the said periods.

This application shall not be binding upon Company until accepted by Company, and shall neither be modified, amended, or supplemented without the written agreement of Company at the time of such modification, amendment, or supplement, nor affected by promise, agreement, or representation by any agent or employee of Company made before or after signing, unless incorporated in writing herein before acceptance by Company.

This application, when accepted, shall constitute a contract between the parties hereto, which shall bind and inure to the benefit of the heirs, executors, administrators, successors or assigns, as the case may be, of the respective parties hereto, but neither Customer nor Customer's permitted assigns shall assign any rights hereunder without the prior written consent of the Company.

PENNSYLVANIA ELECTRIC COMPANY

ACCEPTED BY: _____

Signed by: _____ Date: _____
Title: _____

_____
CUSTOMER NAME
Signed by: _____ Date: _____
Title: _____
Witnessed by: _____
Date: _____

Note: This contract cancels the following existing contract:
Name of Customer: _____ Rate: _____ H. P.: _____

RM-2: Application for Station Power Service

Service Location: _____

Date of Contract: _____ Cancellation Effective: _____

[1] The charges identified above are predicated upon Penelec not being obligated to any future monthly capacity obligations from PJM resulting from the Facility's load under Penelec's Station Power Service. In the event that PJM does not reallocate the Facility's capacity obligation back to the Facility, Penelec will bill the Facility for all costs resulting from any future capacity obligations at PJM.

APPLICATION AND AGREEMENT WITH PENNSYLVANIA ELECTRIC COMPANY

FOR BACKUP AND MAINTENANCE ELECTRIC SERVICE

The Customer hereby requests and agrees to take Backup Service and/or Maintenance Service in accordance with the terms and provisions of Rate QF or Rule 19 of the Pennsylvania Electric Company Electric Service Tariff, attached and made part hereof, as it may be amended, modified, supplemented or superseded from time to time.

CUSTOMER NAME: _____

SERVICE ADDRESS: _____

MAILING ADDRESS: _____

ACCOUNT NUMBER: _____

PREMISE ID NUMBER: _____

REQUESTED SERVICE: BACKUP only, MAINTENANCE only, or BOTH _____

APPLICABLE RATE TARIFF (COPY ATTACHED): RATE QF or RULE 21 _____

APPLICABLE RATE SCHEDULE: GS, GST, GP, or LP . _____

EFFECTIVE DATE OF BACKUP SERVICE and/or MAINTENANCE SERVICE:. _____

TERM OF CONTRACT (Number of months, RULE 21 Customers only) _____

BACKUP SERVICE DEMAND, NON-INTERRUPTIBLE (kiloWatts). _____

BACKUP SERVICE DEMAND, INTERRUPTIBLE (kiloWatts). _____

BACKUP SERVICE DEMAND, TOTAL (kiloWatts) _____

MAINTENANCE SERVICE CONTRACT DEMAND, TOTAL (kiloWatts). _____

It is understood that this Application, when accepted by Pennsylvania Electric Company (Penelec), together with Penelec's Electric Service Tariff as may be in effect, shall constitute the entire Agreement between Penelec and the Customer with respect to Backup Service and/or Maintenance Service. If the Customer is a partnership or corporation, the signatory hereby states that he or she is authorized to act in the Customer's behalf in entering into this agreement.

Notification of Use – Backup or Maintenance Service - Rule 19 During any billing period in which a Customer's generating equipment or other source of power experiences a forced or unscheduled outage which requires the Company to provide Backup Service, the Customer shall notify the Company of the failure. The Company shall not be required to rebill the Customer if the Company is not notified of the equipment failure prior to the Company's scheduled billing date of the Customer's account. In addition, the Customer shall provide the Company thirty (30) days written advance notice of a scheduled maintenance outage. The notifications need to be sent to one of the available communications options below.

RM-3: Application for Backup and Maintenance Electric Service

U.S. Mail: FirstEnergy Corporation
Attn: Power Billing
76 S. Main St. A-NRHQ-213
powerbilling@firstenergycorp.com
Akron, OH 44308

Fax : 330-315-9628

Email:

CUSTOMER APPLICATION FOR APPROVAL:

Submitted by (Please sign): _____

Name (Please Print): _____ Date: _____

ACCEPTANCE BY PENELEC:

Accepted by (Please sign): _____

Title: _____ Date: _____

– Substation (Example Form)			
Item No.	Qty.	Description	Purchase Info.
A		Battery Equipment	
B		Conductors & Fittings	
C		Conduit & Fittings	
D		Conversion Equipment	
E		Insulators & Fittings	
F		Communication Equipment	
G		Lighting Equipment	
H		Pumps, Fans, Compressors, Motors, Etc.	
I		Station Furniture & Equipment	
J		Pipe & Fittings	
K		Protective Equipment	
L		Regulating Equipment	
M		Structural Equipment	
N		Line Material	
O		Bolts, Nuts, Washers, Screws	
P		Switching Equipment – (Typical Entry Below. Each new Item Letter should start on a new sheet. One page per file.)	
P-1	3	SIEMENS SPS2-145-40 POWER CIRCUIT BREAKER, SF6, 145 KV, 3000 AMPERE, 40 KAIC, IN ACCORDANCE WITH FIRSTENERGY SPECIFICATION FE-BKP-1, GENERAL SPECIFICATION FOR POWER CIRCUIT BREAKERS 23KV THROUGH 550KV, DATED AUGUST 2002, AND AS FOLLOWS: CONTROL AND SPRING CHARGING MOTOR VOLTAGE: 125 VDC CABINET HEATER VOLTAGE: 120/240 VAC ALARM ANNUNCIATOR SHALL BE A SEEKIRK ANNUNCIATOR, MODEL NO. G1003-S60 CURRENT TRANSFORMER TERMINAL BLOCKS SHALL BE GE TYPE EB-27 SCREW-TYPE TERMINAL BLOCKS WITH SHORTING STRIP. POWER CIRCUIT BREAKER SHALL INCLUDE (12) M.R. CT's, WITH A RELAYING ACCURACY CLASS TO BE C800. CT RATIOS, QUANTITIES, LOCATION OF CT'S AND THERMAL RATING FACTORS (TRF) SHALL BE: 1200/5 , WITH A RATING FACTOR OF 2.5. POWER CIRCUIT BREAKER SHALL COME COMPLETELY WIRED, ASSEMBLED, TIMED AND READY FOR INSTALLATION. EACH BREAKER IS TO BE SUPPLIED WITH SF6 GAS AND TANK HEATERS. VENDOR SHALL SUPPLY ONE STANDARD MAINTENANCE TOOL KIT AND SF6 FILL KIT PER BREAKER. THIS TOOL KIT INCLUDES A MAINTENANCE CLOSING DEVICE.	
R		Transformer	
S		Switchboard Equipment	
T		Nameplates & Signs	

SAMPLE

[ ] Const. As Issued [ ] Const. As Marked Inspected By _____ Date _____ Issued For: Construction

Rev	Date	By	Network	Rev	Date	By	Network
-							

FirstEnergy

Substation	TYPICAL		
Item No		Network	
Dwg No		Rev.	

SHEET 1 OF 1 — FIRSTENERGY CORP. — TOLEDO EDISON — REGION

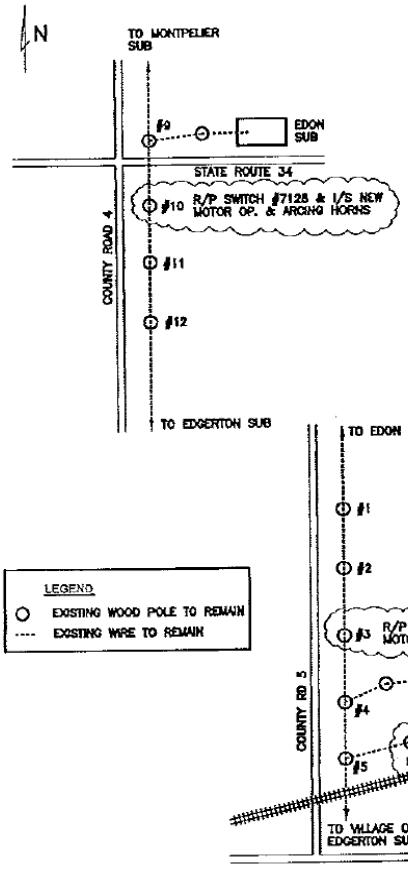
LINE WORK DRAWING – FIELD REPORT

DR.	ENG.	APP.
CJT	CJT	DRK Jr.
DATE 8/08	DATE 8/08	DATE 8/08

TITLE EDGERTON 69kV

REPLACE SWITCHES 7128, 7157, & 7158 AND INSTALL MOTOR OP W/ SCADA

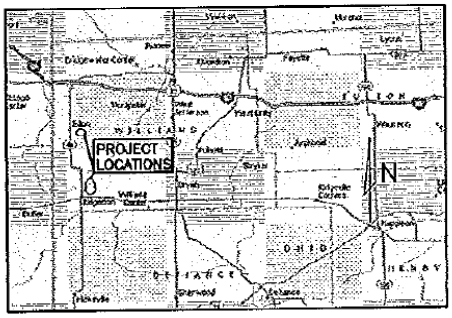
CREWS W.R. NO.	ESTIMATE NO.
11703418	CE-08-40-TE
SAP RESERVATION NO.	SAP ORDER NO.
	12399831
PROJECT DEFINITION	SAP NOTIFICATION NO.
TW-000704	



CONSTRUCTION NOTES

1. REPLACE SWITCHES #7128, #7157, & #7158 WITH NEW BRIDGES TYPE ONE-WAY, 69kV, 1200A WITH MOTOR OPERATOR AND SCADA. CONSTRUCT SWITCHES PER DRAWING TY-802-F MAINTAINING A 7' MINIMUM CLEARANCE BETWEEN THE BOTTOM PHASE AND DISTRIBUTION UNDERBUILD. SEE DRAWING TY-803-F FOR MOTOR OPERATOR DETAILS.
2. INSTALL VACUUM INTERRUPTERS ON SWITCH #7157 AND ARCING HORNS ON SWITCHES #7128 AND #7158.
3. GROUND SWITCHES PER FE STD. 18-335 WITH GROUND MATS.
4. AT STRUCTURE #6 (SWITCH #7158), INSTALL A 5' FIBERGLASS POLE TOP EXTENSION AND DEADEND STATIC WIRE 1' DOWN (FE STD. 18-010)
5. TRANSFER EXISTING GROUND WIRE AND CONDUCTORS, MAINTAINING THE EXISTING SAG AND TENSION.
6. NOTE: REGIONAL ENGINEERING IS RESPONSIBLE FOR SUPPLYING 120V AC TO THE MOTOR OPERATOR. THE DISTRIBUTION SHALL GO THROUGH A FUSED DISCONNECT SWITCH. (SEE TY-5111-A) ALL CONDUITS AND FITTINGS SHALL BE FIELD SUPPLIED. (REUSE EXISTING AS MUCH AS POSSIBLE)
7. NOTE: CONTACT GARY LAMPE (NETWORK ENGINEERING) AT (330) 384-5497 WHEN THE MOTOR OPERATOR HAS BEEN MOUNTED. HE WILL ARRANGE FOR A TECHNICIAN TO INSTALL THE WIRELESS COMMUNICATION DEVICE AT THE STRUCTURE. PLEASE CONTACT GARY LAMPE AT LEAST (5) DAYS PRIOR TO THE NEED FOR THE DEVICE.

ST. JOSEPH TOWNSHIP
FLORENCE TOWNSHIP
WILLIAMS COUNTY



LOCATION MAP

POLE NO. IN FIELD		#7128		#7157		#7158						PLANT ADDITION TOTAL				RETIREMENT TOTAL			
POLE NO. ON DRAWING		#10		#3		#6						UNIT QUANTITY		ESTIMATED COST		UNIT QUANTITY		ESTIMATED COST	
REMOVED POLE - YEAR SET																			
UNITS		P	R	P	R	P	R	P	R	P	R	EST.	ACTUAL	LABOR	MAT'L	EST.	ACTUAL	LABOR	MAT'L
	1																		
INSULATOR: 69kV SUSP (3-UNIT EQUIVALENT)	2	6		6		6						18							
	3																		
CLAMP: STRAIN (5/16" ALUMOWELD)	4	2		2		2						6							
CLAMP: STRAIN (636 KCMIL 37 STRAND AA)	5	6	6	6	6	6	6					18				18			
CLAMP: SUSP (5/16" ALUMOWELD)	6		1		1		1									3			
ASSEMBLY: 69kV GW DE	7	2		2		2						6							
ASSEMBLY: 69kV COND DE	8	6		6		6						18							
BRACKET: GROUND WIRE	9		1		1		1									3			
ARMOR ROD: 5/16" ALUMOWELD	10		1		1		1									3			
SWITCH: 69kV, 1-WAY, 1200A BRIDGES, MOTOR OP (W/ SCADA)	11	1		1		1						3							
SWITCH: 69kV, KPF (W-206), MOTOR OP (W/SCADA)	12		1		1		1									3			
ARCING HORNS: BRIDGES TYPE FOR 69kV SWITCH	13	3				3						6							
VACUUM INT: BRIDGES TYPE FOR 69kV SWITCH	14			3								3							
GROUND SWITCH HANDLE (FE STD 18-335)	15	1		1		1						3							
GROUND SWITCH HANDLE (FE STD 18-334)	16		1		1		1									3			
BONDING: SWITCH	17	1		1		1						3							
FUSED DISCONNECT SWITCH FOR 120V AC	18	REUSE		REUSE		REUSE						REUSE							
DISTRIBUTION: 120V AC SUPPLIED TO SW. CABINET	19	REG		REG		REG						REG							
	20																		
POLE TO EXTENSION: 5' FIBERGLASS	21					1						1							
CONNECTOR: COMPRESSION (5/16" ALUMOWELD)	22	1		1		1						3							
CONNECTOR: 4-HOLE TERMINAL (636 KCMIL 37 STRAND AA)	23	6		6		6						18							
	24																		
	25																		
WIRE: 5/16" ALUMOWELD	26	TRANSFER		TRANSFER		TRANSFER						TRANSFER							
WIRE: 636 KCMIL 37 STRAND AA (3 PHASE)	27	TRANSFER		TRANSFER		TRANSFER						TRANSFER							
												TOTAL				TOTAL			

DATE START	DATE FINISH	BY	COMPLETION DATA VERIFIED BY	DATE	ENTERED ON RECORD MAPS BY	DATE

Example 1

Date

Company Name
Company Contact
Company Address

Attention: Contact Name

Subject: Independent Engineering Certification

Reference: Project Name

Gentlemen:

Per the requirements of the Interconnection Agreement, the power flow over the Interconnection Facilities to supply the for each of the next ten (10) years will not be more than 5.0% of the projected annual power exported through the Interconnection Facilities.

The attached calculation indicates that approximately KWh per year will be exported from the Plant to over the interconnection, based upon the design and typical on-line run time for similar facilities. It is anticipated that approximately KWh per year will be imported to the Plant from over the interconnection, based upon the plant start-up power requirements and typical maintenance down time for similar facilities.

Based upon these calculations, we are confident that power flows to the Plant from will not approach 5% of the total power flow over the interconnection for each of the first ten years after the facility enters service. Consequently, it is our professional opinion that the cost of the interconnection should not be deemed to be a Contribution In Aid of Construction ("CIAC") pursuant to U.S. Internal Revenue Service Notices 88-129 and 90-60.

Please contact me if you have any questions or require additional information on this matter.

Sincerely,

Name
Licensed Professional Engineer

Licensed Professional Engineer
Stamp & Seal

TA-3: 95/5 Power Flow Certificate

By.

Date:
Rev. #:

PURPOSE

The purpose of this calculation is to estimate the power flows over the KV interconnection between the Plant and the Substation of .

ASSUMPTIONS:

1) Average Gross Power Output per Combustion Gas Turbine Generator Set • = KW
2) Average Parasitic Load per Combustion Gas Turbine Generator Set = KW
3) Number of Combustion Gas Turbine Generator Sets =
4) Average Plant Auxiliary Parasitic Load ••• = KW
5) Average Generator Set On-Line Run Time Percentage*** = %
6) Average Number of Hours per Year = Hr/Yr
7) Average Plant Maintenance Down Time Percentage **' = %
8) Average Generator Set Start-Up Time Percentage'"" = %

CALCULATIONS:

1) Gross Power Generation = (# of Units) X (Gross Power Output per Unit) X (On-Line Run Time Percentage) X (# Hours per Year)

Gross Power Generation = ( ) X (KW) X ( ) X (Hr/Yr)

Gross Power Generation = KWh/Yr

2) Plant Parasitic Load = [(# of Units) X (Load per Unit) + (Plant Auxiliary Load)] X (On-Line Run Time Percentage) X (# Hours per Year)

Plant Parasitic Load =[( ) X (KW) + (KW)] X ( ) X (Hr/Yr)

Plant Parasitic Load = KWh/Yr

3) Annual Power Flow from Plant to Energy = (Gross Power Generation) - (Plant Parasitic Load)

Annual Power Flow from Plant to Energy = KWh/Yr - KWh/Yr

Annual Power Flow from Plant to Energy = KWh/Yr

4) Plant Maintenance Power = (Plant Auxiliary Load) X (Maintenance Down Time Percentage) X (# Hours per Year)

Plant Maintenance Power = (KW) X ( ) X (Hr/Yr)

Plant Maintenance Power = KWh/Yr

5) Gen Set Start-Up Power = (Load per Unit) X (Gen Set Start-Up Time Percentage) X (# Hours per Year)

Gen Set Start-Up Power = (KW) X ( ) X (Hr/Yr)

Gen Set Start-Up Power = KWh/Yr

TA-3: 95/5 Power Flow Certificate

6) Annual Power Flow from to Plant = (Plant Maintenance Power) + (Gen Set Start-Up Power)

Annual Power Flow from to Plant = KWh/Yr + KWh/Yr

Annual Power Flow from to Plant = KWh/Yr

7) Total Annual Power Flow Over Interconnection = (Power Flow from Plant to) +
(Power Flow from to Plant)

Total Annual Power Flow Over Interconnection = KWh/Yr + KWh/Yr

Total Annual Power Flow Over Interconnection = KWh/Yr

8) Power Flow to Plant as Percentage of Total Power Flow Over Interconnection $\frac{\text{(Power Flow from to Plant) X 100\%}}{\text{(Total Power Flow Over Interconnection)}}$

Power Flow to Plant as Percentage of Total Power Flow Over Interconnection = $\frac{\text{(KWhlYr) X 100\%}}{\text{KWh/Yr}}$

Power Flow to Plant as Percentage of Total Power Flow Over Interconnection = %

NOTES:

Example 2

Date

Company Name
Company Contact
Company Address

Attention: Contact Name

Subject: Independent Engineering Certification

Reference: Project Name

Gentlemen:

Per the requirements of the Interconnection Agreement, the power flow over the Interconnection Facilities to supply the for each of the next ten (10) years will not be more than 5.0% of the projected annual power exported through the Interconnection Facilities.

This statement is substantiated by the following:

1. Name, Title, predicts an annual net production of MWHrs into the grid and an annual cumulative non-operation time of hours.

2. Each of the wind turbines consumes approximately kW during nonoperational periods. Assuming the worst case that all units are non-operational at the same time, the power flow over the Interconnection Facility to supply the turbines over the annual non-operating hours amounts to kW or MWHrs.

3. Additionally, the padmount transformers have a total no load loss of kW. Again, assuming the worst case that all units are down concurrently, this amounts to a power flow of MWHrs through the Interconnection Facility to the Windfarm over the annual non-operating hours.

Based on the above, the estimated maximum annual power flow through the Interconnection Facility to the Windfarm would be MWHrs, or % of the annual predicted net generation of MWHrs and well below the 5% threshold.

TA-3: 95/5 Power Flow Certificate

My qualifications for making this statement are that I am a Licensed Professional Electrical Engineer in the states of and have been actively involved in wind generation related projects, as well as numerous other projects, since . My resume is available upon request. Please contact me if you have any questions or require additional information on this matter.

Sincerely,

Name
Licensed Professional Engineer

Licensed Professional Engineer
Stamp & Seal

Section 3 Contents

FirstEnergy

Master Milestone Checklist - NJ

Project:

Phase / Requirements Document Section	MLST	Applicable		Opt to Build		Milestone Number	MILESTONE	Business Unit Assigned	Milestone or Deliverable Complete Date	Comments
		Yes	No	Yes	No					
Conduct Feasibility Study	**Y**					**S.1**	**Transmit Attach N to Start Feasibility Study**	**Agreements Support**		
Conduct Feasibility Study	**Y**					**S.2**	**Transmission Provider Queue Closes**	**Agreements Support**		
Conduct Feasibility Study	**Y**					**S.3**	**Conduct Feasibility Kickoff - External**	**Agreements Support**		
Conduct Feasibility Study	**Y**					**S.4**	**Transmission Provider Model Lock Down**	**Agreements Support**		
Conduct Feasibility Study	**Y**					**S.5**	**Transmission Provider Transmits Model**	**Agreements Support**		
Conduct Feasibility Study	**Y**					**S.6**	**Feasibility Report Completed by Transmission Owner**	**Agreements Support**		
Conduct Feasibility Study	**Y**					**S.7**	**Interconnection Customer Executes System Impact Study Agreement**	**Agreements Support**		
Conduct System Impact Study	**Y**					**S.8**	**Transmission Provider Transmit Model**	**Agreements Support**		
Conduct System Impact Study	**Y**					**S.9**	**System Impact Report Completed by Transmission Owner**	**Agreements Support**		
Conduct System Impact Study	**Y**					**S.10**	**Interconnection Customer Executes Facility Study Agreement**	**Agreements Support**		
Conduct Facility Study	**Y**					**S.11**	**Conduct Facility Study Kickoff - External**	**Agreements Support**		
Conduct Facility Study	**Y**					**S.12**	**Transmission Provider Transmit Model**	**Agreements Support**		
Conduct Facility Study	**Y**					**S.13**	**Interconnection Customer Submits Environmental Impact Study**	**Agreements Support**		
Conduct Facility Study	**Y**					**S.14**	**Transmission Owner Accepts Environmental Impact Study**	**Agreements Support**		
Conduct Facility Study	**Y**					**S.15**	**Facility Report Completed by Transmission Owner**	**Agreements Support**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Reg. Siting & Environmental Permitting	N					C.1.2	Permit Plan Template	ED Siting, Surveying, ROW Engineering		Permit Plan Template to be included in Facility Study Report
Conduct Facility Study	**Y**					**S.16**	**Facility Study, ISA, CSA Issued (from Transmission Provider to Interconnection Customer)**	**Agreements Support**		
ISA/CSA	**Y**					**C.1**	**Fully Executed ISA/CSA Agreements by All Parties**	**Agreements Support**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Reg. Siting & Environmental Permitting	N					C.1.1	Electric Transmission Facilities Siting and Permitting White Paper (for New Jersey, Pennsylvania or Ohio based on project location)	ED Siting, Surveying, ROW Engineering		
Tax & Accounting	N					C.1.1	95/5 Power Flow Certificate	Tax		Required to be provided within 45 days after execution o CSA/ISA
Project Kick-off Meeting (Internal)	**Y**					**C.2**	**Transmission Owner conducts Internal Project Kick-Off Meeting**	**Project Management/ Agreements Support**		
Project Kick-off Meeting (External)	**Y**					**C.3**	**Transmission Provider conducts External Project Kick-Off Meeting with All Parties**	**Project Management/ Agreements Support**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Agreements Support	N					C.1.2	Project Team Contact List	Agreements Support		
Agreements Support	N					C.1.3	Project Change Request Form	Project Management/ Agreements Support		
Agreements Support	N					C.1.4	Outage Readiness Notification	Agreements Support		
Reg. Siting & Environmental Permitting	N					C.1.3	Sample of previous FE siting and permitting applications when requested by Interconnection Customer	ED Siting, Surveying, ROW Engineering		
Reg. Siting & Environmental Permitting	N					C.2.1	Draft Permit Plan	ED Siting, Surveying, ROW Engineering		
Substation	N					B.2	Vendor Contact Information	Substation Engineering		
Substation	N					B.10.1	Testing & Commissioning Requirements	Substation Maintenance		
Transmission	N					B.3.1	Vendor Contact Information	Transmission Engineering		
Transmission	N					B.6.1	Transmission Line Connection Requirements to existing TO transmission line	ED-Planning		
Transmission	N					B.8.1	Transmission Line Standard Material Requirements for design and construction	Transmission Engineering		
Transmission	N					B.9.1	Transmission Line Right-of-Way Requirements	ED Siting, Surveying, ROW Engineering		
Transmission	N					B.10.1	Testing & Commissioning Requirements	Transmission Engineering		
Transmission	N					B.10.2	TO Audit of Facilities Pre-Energization	Transmission Engineering		
Revenue Metering	N					B.1.1	Revenue Metering Equipment Specifications - Requirements for Transmission Connected Facilities - Energy Delivery Planning and Protection (www.firstenergycorp.com/feconnect/Requirements_for_Transmission_Connected_Facilities.html)	Metering		
Revenue Metering	N					B.2.10.1	Application for Electrical Service - General	For Application Specific Issues: Customer Support		
Revenue Metering	N					B.2.10.2	Application for Station Power Service	For Application Specific Issues: Customer Support		
Revenue Metering	N					B.2.10.3	Application and Agreement for Backup and Maintenance Service	For Application Specific Issues: Customer Support		
Revenue Metering	N					C.2.4	Written notice to suppliersupport@firstenergycorp.com is required when the Interconnection Customer obtains Generation and Transmission from a third party.	For Application Specific Issues: Customer Support		
Communications	N					C.1.1	Telecommunications Protection Design Standard	IT-Network Engineering/Planning		
Communications	N					C.1.2	Telecommunications Protection Design – Metallic Cable (The Positron Design)	IT-Network Engineering/Planning		
Communications	N					C.1.3	Telecommunications Protection Design – Fiber Optic Cable (The RLH Design)	IT-Network Engineering/Planning		
Communications	N					C.1.4	High Voltage Protection Form (Verizon Example)	IT-Network Engineering/Planning		
Communications	N					C.1.5	SCADA Points List – Example Form	IT-Network Engineering/Planning		
Communications	N					C.1.6	Optical Power Measurement Form	IT-Network Engineering/Planning		
Communications	N					C.1.8	Transport to Remote Controlled Line Switches (IT-NET-STD-DSGN-EMS-TRANS-002 , Guidelines for designing and installing the communications path and SCADA control for remote controlled line switches)	IT-Network Engineering/Planning		
Tax & Accounting	N					B.2.1.4	Cost Data Template - Substation	Accounting Policy & Control		
Tax & Accounting	N					B.2.1.4	Cost Data Template - Transmission	Accounting Policy & Control		
Engineering	**Y**					**C.4**	**Interconnection Customer Submits ISA/CSA Insurance Certificates to Transmission Owner**	**Agreements Support**		
Engineering	**Y**					**C.5**	**Transmission Owner Accepts ISA/CSA Insurance Certificates**	**Agreements Support**		
Engineering	**Y**					**C.6**	**Transmission Owner Submits ISA/CSA Insurance Certificates to Interconnection Customer**	**Agreements Support**		
Engineering	**Y**					**C.7**	**Interconnection Customer Accepts ISA/CSA Insurance Certificates**	**Agreements Support**		
Engineering	**Y**					**C.8**	**Interconnection Customer Submits Preliminary Real Estate Plan to Transmission Owner**	**Agreements Support**		
Engineering	**Y**					**C.9**	**Transmission Owner Accepts Preliminary Real Estate Plan and provides below deliverables to the Interconnection Customer**	**Sub Engr/Trans Engr**		

FirstEnergy

Master Milestone Checklist - NJ

Project:

Phase / Requirements Document Section	MLST	Applicable		Opt to Build		Milestone Number	MILESTONE	Business Unit Assigned	Milestone or Deliverable Complete Date	Comments
		Yes	No	Yes	No					
Source Document	N					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Substation	N					B.4	TO's Interconnection Substation Name & Substation Number	Substation Engineering		
Substation	N					B.5.1	Protection Requirements for TO Interconnection Facilities	ED-Protection		
Substation	N					B.5.2	Inter-tie Relay Requirements for Customer Interconnection Facilities	ED-Protection		
Transmission	N					B.4.1	Transmission Line Name and Transmission Line Number	Transmission Engineering		
Transmission	N					B.4.2	Transmission Line Pole Numbers	Transmission Engineering		
Transmission	N					B.4.3	Transmission Line Switch Numbers	Transmission Engineering		
Engineering	**Y**					**C.10**	**Transmission Owner Submits Letter of Notice to Affected Property Owners**	**Agreements Support**		
Engineering	**Y**					**C.11**	**Interconnection Customer Submits and Transmission Owner Accepts all executed Deeds / Easements / Access Agreements to Transmission Owner**	**Real Estate Services**		
Source Document	N					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Real Estate	N					C.1.1	Easement	Real Estate Services		
Real Estate	N					C.2.1	Site Access Agreement	Real Estate Services		
Real Estate	N					C.5.1	Legal description and survey of fee property being conveyed, including all lot split requirements	Real Estate Services		
Real Estate	N					C.5.2	Legal description for new transmission easement	Real Estate Services		
Real Estate	N					C.5.3	Legal description for new distribution easement	Real Estate Services		
Real Estate	N					C.5.4	Legal description for any other energy related facilities that may be required	Real Estate Services		
Real Estate	N					C.5.5	Legal description for ingress-egress easement to a dedicated public roadway	Real Estate Services		
Real Estate	N					C.5.6	Survey drawing that shows the new easements along with the location of existing easements or other existing facilities on the property. Names of adjoining property owners on survey drawings. Basic drawing features - title block, north arrow, legend, graph scale	Real Estate Services		
Vegetation Management	N					C.1.2	Property and Easement descriptions	Real Estate Services		
Engineering	**Y**					**C.12**	**Transmission Owner Submits Application, Letter of Notification or similar filing to state regulatory agency (NJBPU, PaPUC, OPSB)**	**ED Siting, Surveying, ROW Engineering**		
Source Document	N					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Vegetation Management	N					C.1.1	Right-of-Way Drawings	Transmission Engineering		
Reg. Siting & Environmental Permitting	N					C.2.3	Requirements for Specific Regulatory Siting Filings (See Site Specific Permit Plan)	ED Siting, Surveying, ROW Engineering		
Transmission	N					C.1.1.8	Right-of-way Drawings and Property and Easement Descriptions	ED Siting, Surveying, ROW Engineering		
Engineering	**Y**					**C.13**	**State regulatory agency approves Application, Letter of Notification or similar filing**	**ED Siting, Surveying, ROW Engineering**		
Source Document	N					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Reg. Siting & Environmental Permitting	N					C.2.3	Requirements for Specific Regulatory Siting Filings (See Site Specific Permit Plan)	ED Siting, Surveying, ROW Engineering		
Engineering	**Y**					**C.14**	**Interconnection Customer Submits Final Environment Permit Plan to Transmission Owner**	**ED Siting, Surveying, ROW Engineering**		
Source Document	N					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Reg. Siting & Environmental Permitting	N					C.2.1	Final Permit Plan	ED Siting, Surveying, ROW Engineering		
Engineering	**Y**					**C.15**	**Transmission Owner Accepts Final Environment Permit Plan**	**Agreements Support**		
Engineering	**Y**					**C.16**	**Interconnection Customer submits all Environmental Permit Applications to Transmission Owner**	**ED Siting, Surveying, ROW Engineering**		
Source Document	N					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Reg. Siting & Environmental Permitting	N					C.2.2.1.1	Draft regulatory siting and environmental permitting studies	ED Siting, Surveying, ROW Engineering		
Reg. Siting & Environmental Permitting	N					C.2.2.1.2	Generic Text of Project description, location, construction, etc.	ED Siting, Surveying, ROW Engineering		
Reg. Siting & Environmental Permitting	N					C.2.2.1.3	Draft regulatory siting and environmental permit submittals	ED Siting, Surveying, ROW Engineering		
Engineering	**Y**					**C.17**	**Transmission Owner Accepts all Environmental Permit Applications**	**Agreements Support**		
Engineering	**Y**					**C.18**	**Interconnection Customer Submits Environmental Permit Applications to Agencies**	**Agreements Support**		
Engineering	**Y**					**C.19**	**Agency Issues Environmental Permits to Interconnection Customer**	**ED Siting, Surveying, ROW Engineering**		
Source Document	N					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Reg. Siting & Environmental Permitting	N					C.2.2.1.4	All available drafts of regulatory siting and permitting approvals	ED Siting, Surveying, ROW Engineering		
Reg. Siting & Environmental Permitting	N					C.2.2.1.5	Agency Permit-required Notices to start construction	ED Siting, Surveying, ROW Engineering		
Engineering	**Y**					**C.20**	**Interconnection Customer Submits Approved Environmental Permits to Transmission Owner**	**Agreements Support**		
Engineering	**Y**					**C.21**	**Transmission Owner Accepts Approved Permits**	**Agreements Support**		
Engineering	**Y**					**C.22**	**Interconnection Customer submits Revenue Metering Design Package for Customer Facility**	**Metering**		
Source Document	N					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Revenue Metering	N					C.1.1	Single line diagram showing revenue metering in the Interconnection Customer's step-up substation	Metering		
Revenue Metering	N					C.1.2	Estimated power flows to and from the Interconnection Customer's step-up substation at all revenue metering points	Metering		
Revenue Metering	N					C.1.3	Proposed revenue metering current transformer (CT) and voltage transformer (VT) specifications including manufacturer, type, ratios, accuracy ratings, and burden ratings	Metering		
Revenue Metering	N					C.1.4	Proposed revenue meter specifications including manufacturer, type, and model number	Metering		
Revenue Metering	N					C.1.5	Conductor type, length, resistance per phase, and reactance per phase for the transmission line between the Interconnection Customer's step-up substation and the Point of Interconnection (if applicable)	Metering		
Revenue Metering	N					C.1.6	Three-line schematic and wiring diagrams showing all CT and VT connections to revenue meters	Metering		
Engineering	**Y**					**C.23**	**Transmission Owner accepts Revenue Metering Design Package for Customers Interconnection Facility**	**Agreements Support**		
Engineering	**Y**					**C.24**	**Interconnection Customer Submits Below Grade Interconnection Facilities Engineering Package to Transmission Owner**	**Substation Engineering**		
Source Document	N					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Communications	N					C.2.2	Substation conduit detail design drawing	IT-Network Engineering/Planning		
Substation	N					C.1.1	Bill of Materials	Substation Engineering		
Substation	N					C.1.4	Balance of Design Drawings	Substation Engineering		
Substation	N					C.1.5	Specifications - Major Equipment	Substation Engineering		
Substation	N					C.1.6	Engineering Calculations	Substation Engineering		
Substation	N					C.3.1.1	Below Grade Interconnection Facilities Engineering Package	Substation Engineering		
Engineering	**Y**					**C.25**	**Transmission Owner Accepts Below Grade Interconnection Facilities Engineering Package**	**Agreements Support**		
Source Document	N					**Item Number**	**Item Description**		**Completed Date**	**Comments**

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Master Milestone Checklist - NJ

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Phase / Requirements Document Section	MLST	Applicable		Opt to Build		Milestone Number	MILESTONE	Business Unit Assigned	Milestone or Deliverable Complete Date	Comments
		Yes	No	Yes	No					
Engineering	**Y**					**C.26**	**Interconnection Customer Submits Above Grade Interconnection Facilities Engineering Package to Transmission Owner**	**Substation Engineering**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Substation	N					C.2	Project Data & Drawings Submitted to the TO	Substation Engineering		
Substation	N					C.3.1.2	Above Grade Interconnection Facilities Engineering Package	Substation Engineering		
Engineering	**Y**					**C.27**	**Transmission Owner Accepts Above Grade Interconnection Facilities Engineering Package**	**Agreements Support**		
Engineering	**Y**					**C.28**	**Interconnection Customer Submits Relay & Control Interconnection Facilities Engineering Package to Transmission Owner**	**Substation Engineering**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Substation	N					C 3.1.3	Relay & Control Interconnection Facilities Engineering Package	Substation Engineering		
Communications	N					C.2.3	Substation control house rack layout drawing	IT-Network Engineering/Planning		
Communications	N					C.2.6	SCADA/RTU Points List – completed form	IT EMS Operations		
Communications	N					C.2.8	RTU Schematic	IT EMS Operations		
Engineering	**Y**					**C.29**	**Transmission Owner Accepts Relay & Control Interconnection Facilities Engineering Package**	**Agreements Support**		
Engineering	**Y**					**C.30**	**Interconnection Customer Submits Transmission Line Engineering Package to Transmission Owner**	**Transmission Engineering**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Vegetation Management	N					C.1.3	Plan Profile Drawings	Transmission Engineering		
Vegetation Management	N					C.1.4	Property Owner Provision Plans	Real Estate Services		
Transmission	N					C.1.1.1.1	Geotechnical Reports	Transmission Engineering		
Transmission	N					C.1.1.1.2	Survey Reports	Transmission Engineering		
Transmission	N					C.1.1.2	Bill of Materials	Transmission Engineering		
Transmission	N					C.1.1.3	Field Report	Transmission Engineering		
Transmission	N					C.1.1.4	Single Line Diagram	Transmission Engineering		
Transmission	N					C.1.1.5	Plan and Profile Drawing(s)	Transmission Engineering		
Transmission	N					C.1.1.6	Structure Drawings	Transmission Engineering		
Transmission	N					C.1.1.7	Wire Arrangement	Transmission Engineering		
Transmission	N					C.1.1.9	Balance of Design Drawings	Transmission Engineering		
Transmission	N					C.1.1.10.1	Highway Crossing Drawings	Transmission Engineering		
Transmission	N					C.1.1.10.2	Highway Crossing Permit Applications	Transmission Engineering		
Transmission	N					C.1.1.10.4	Railroad Crossing Drawings	Transmission Engineering		
Transmission	N					C.1.1.10.5	Railroad Crossing Permit Applications	Transmission Engineering		
Transmission	N					C.1.1.10.7	River Crossing Drawings	Transmission Engineering		
Transmission	N					C.1.1.10.8	River Crossing Permit Applications	Transmission Engineering		
Transmission	N					C.1.1.10.10	FAA Required Drawings	Transmission Engineering		
Transmission	N					C.1.1.10.11	FAA Required Permit Applications	Transmission Engineering		
Transmission	N					C.1.1.11	Specifications - Major Equipment	Transmission Engineering		
Transmission	N					C.1.1.12	Engineering Calculations	Transmission Engineering		
Substation	N					C.1.7.1	Geotechnical Reports	Substation Engineering		
Substation	N					C.1.7.2	Survey Reports	Substation Engineering		
Engineering	**Y**					**C.31**	**Transmission Owner Accepts Transmission Line Engineering Package**	**Agreements Support**		
Site Construction	**Y**					**C.32**	**Interconnection Customer submits Notice to Start Construction of Interconnection Facilities to Transmission Owner and Transmission Provider**	**Project Management/ Agreements Support**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Insurance	N					C.1.1	Workers Compensation - Statutory	Insurance Risk Management		
Insurance	N					C.1.2	Employers Liability - $1,000,000 (minimum)	Insurance Risk Management		The highlighted coverage's will be evidenced on one (1) certificate by FE
Insurance	N					C.1.3	Commercial General Liability – $1,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.1.4	Comprehensive Automobile Liability - $1,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.1.5	Excess/Umbrella Liability - $20,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.1.6	Professional Liability - $10,000,000 (minimum)*	Insurance Risk Management		*$10 Million limit is for CSA only. $5 Million minimum is required for ISA
Insurance	N					B.2.1	Additional Insured	Insurance Risk Management		
Insurance	N					C.2.1	Workers Compensation - Statutory	Insurance Risk Management		
Insurance	N					C.2.2	Employers Liability - $1,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.2.3	Commercial General Liability – $1,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.2.4	Comprehensive Automobile Liability - $1,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.2.5	Excess/Umbrella Liability - $20,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.2.6	Professional Liability - $10,000,000 (minimum)*	Insurance Risk Management		
Vegetation Management	N					C.1.5.1	Notification of Inspection of Vegetation Clearing Activities - Pre-construction	Vegetation Management		
Vegetation Management	N					C.1.5.2	Notification of Inspection of Vegetation Clearing Activities - Construction (provide date for vegetation clearing during construction)	Vegetation Management		
Reg. Siting & Environmental Permitting	N					C.2.2.1.6	Regulatory and permitting approvals	ED Siting, Surveying, ROW Engineering		
Reg. Siting & Environmental Permitting	N					C.2.3	Requirements for Specific Regulatory Siting Filings (See Site Specific Permit Plan)	ED Siting, Surveying, ROW Engineering		
Reg. Siting & Environmental Permitting	N					C.2.4	Specific Environmental Permits - Before Construction (See Site Specific Permit Plan)	ED Siting, Surveying, ROW Engineering		
Reg. Siting & Environmental Permitting	N					C.2.4	Special Environmental Permits and Authorizations	ED Siting, Surveying, ROW Engineering		
Substation	N					C.1.2	Property Plan	Substation Engineering		
Substation	N					C.1.3	Single Line Diagram	Substation Engineering		

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Phase / Requirements Document Section	MLST	Applicable		Opt to Build		Milestone Number	MILESTONE	Business Unit Assigned	Milestone or Deliverable Complete Date	Comments
		Yes	No	Yes	No					
Transmission	N					C.1.1.10.3	Approved Highway Crossing Permits	Transmission Engineering		
Transmission	N					C.1.1.10.6	Approved Railroad Crossing Permits	Transmission Engineering		
Transmission	N					C.1.1.10.9	Approved River Crossing Permits	Transmission Engineering		
Transmission	N					C.1.1.10.12	Approved FAA Permits	Transmission Engineering		
Transmission	N					C.1.2	Drawings Issued for Construction	Transmission Engineering		
Communications	N					C.1.7	TO Required Communications Materials and Equipment List	IT EMS Operations		
Tax & Accounting	N					C.2.1.1.1	Completed Cost Data Templates with Estimated Cost Data	Accounting Policy & Control		
Site Construction	**Y**					**C.33**	**Interconnection Customer submits Notice to Start Construction of Transmission Line to Transmission Owner and Transmission Provider**	**Project Management/ Agreements Support**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Insurance	N					C.1.1	Workers Compensation - Statutory	Insurance Risk Management		
Insurance	N					C.1.2	Employers Liability - $1,000,000 (minimum)	Insurance Risk Management		The highlighted coverage's will be evidenced on one (1) certificate by FE
Insurance	N					C.1.3	Commercial General Liability – $1,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.1.4	Comprehensive Automobile Liability - $1,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.1.5	Excess/Umbrella Liability - $20,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.1.6	Professional Liability - $10,000,000 (minimum)*	Insurance Risk Management		*$10 Million limit is for CSA only. $5 Million minimum is required for ISA
Insurance	N					B.2.1	Additional Insured	Insurance Risk Management		
Insurance	N					C.2.1	Workers Compensation - Statutory	Insurance Risk Management		
Insurance	N					C.2.2	Employers Liability - $1,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.2.3	Commercial General Liability – $1,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.2.4	Comprehensive Automobile Liability - $1,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.2.5	Excess/Umbrella Liability - $20,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.2.6	Professional Liability - $10,000,000 (minimum)*	Insurance Risk Management		
Vegetation Management	N					C.1.5.1	Notification of Inspection of Vegetation Clearing Activities - Pre-construction	Vegetation Management		
Vegetation Management	N					C.1.5.2	Notification of Inspection of Vegetation Clearing Activities - Construction (provide date for vegetation clearing during construction)	Vegetation Management		
Reg. Siting & Environmental Permitting	N					C.2.2.1.6	Regulatory and permitting approvals	ED Siting, Surveying, ROW Engineering		
Reg. Siting & Environmental Permitting	N					C.2.3	Requirements for Specific Regulatory Siting Filings (See Site Specific Permit Plan)	ED Siting, Surveying, ROW Engineering		
Reg. Siting & Environmental Permitting	N					C.2.4	Specific Environmental Permits - Before Construction (See Site Specific Permit Plan)	ED Siting, Surveying, ROW Engineering		
Reg. Siting & Environmental Permitting	N					C.2.4	Special Environmental Permits and Authorizations	ED Siting, Surveying, ROW Engineering		
Substation	N					C.1.2	Property Plan	Substation Engineering		
Substation	N					C.1.3	Single Line Diagram	Substation Engineering		
Transmission	N					C.1.1.10.3	Approved Highway Crossing Permits	Transmission Engineering		
Transmission	N					C.1.1.10.6	Approved Railroad Crossing Permits	Transmission Engineering		
Transmission	N					C.1.1.10.9	Approved River Crossing Permits	Transmission Engineering		
Transmission	N					C.1.1.10.12	Approved FAA Permits	Transmission Engineering		
Transmission	N					C.1.2	Drawings Issued for Construction	Transmission Engineering		
Communications	N					C.1.7	TO Required Communications Materials and Equipment List	IT EMS Operations		
Tax & Accounting	N					C.2.1.1.1	Completed Cost Data Templates with Estimated Cost Data	Accounting Policy & Control		
Outage	**Y**					**C.34**	**Interconnection Customer Submits Completed Outage Readiness Notification to Transmission Owner**	**ATSI Transmission System Dispatching**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Agreements Support	N					C.2.2	Completed Outage Readiness Notification	ATSI-Transmission System Dispatching		
Transmission	N					C.1.3	GPS Locations of Transmission Line Structures	ED Siting, Surveying, ROW Engineering		
Transmission	N					C.1.6.1	Red Line As-Built Drawings (Pre-Outage) provided to the TO's Transmission Engineer	Transmission Engineering		
Transmission	N					C.1.8.1	Manufacturer Drawings provided to the TO's print distribution list	Transmission Engineering		
Transmission	N					C.1.8.2	Factory Test Reports including hard copy and electronic format	Transmission Engineering		
Transmission	N					C.1.8.3	Instruction Books including hard copy and electronic format	Transmission Engineering		
Transmission	N					C.1.8.4	Warranty Assignments issued to the TO	Transmission Engineering		
Transmission	N					C.1.9	Construction Field Test Reports issued to the TO	Transmission Engineering		
Revenue Metering	N					C.2.1	Application for Electrical Service - General	For Application Specific Issues: Customer Support		
Revenue Metering	N					C.2.2	Application for Station Power Service	For Application Specific Issues: Customer Support		
Revenue Metering	N					C.2.3	Application and Agreement for Backup and Maintenance Service	For Application Specific Issues: Customer Support		
Communications	N					C.2.1	E911 Address Confirmation - Provided in Outage Readiness Notification	ATSI- Transmission System Dispatching		
Communications	N					C.2.4	Copies of Telco service orders, including projected due dates	IT-Network Engineering/Planning		
Outage	**Y**					**C.35**	**Transmission Owner Accepts Outage Readiness Notification and Submits to Transmission Provider**	**ATSI Transmission System Dispatching**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Substation	N					B.9.1	Relay Settings for TO Interconnection Facilities	ED-Protection		
Substation	N					B.9.2	Inter-tie Relay Settings at Customer Facilities	ED-Protection		
Outage	**Y**					**C.36**	**Transmission Provider Approves Outage Request**	**Agreements Support**		

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Phase / Requirements Document Section	MLST	Applicable		Opt to Build		Milestone Number	MILESTONE	Business Unit Assigned	Milestone or Deliverable Complete Date	Comments
		Yes	No	Yes	No					
Outage	**Y**					**C.37**	**Interconnection Customer submits Notice of Completion for Interconnection Facilities to Transmission Owner and Transmission Provider (Includes both Interconnection Customer and Transmission Owner Substations and any associated Transmission Line Facilities for Interconnection)**	**Project Management/ Agreements Support**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Agreements Support	N					C.2.1	Completed Project Change Request Form	Agreements Support		
Agreements Support	N					C.2.3	Notice of Completion	Agreements Support		
Real Estate	N					C.3.1	Assignment of Easement	Real Estate Services		
Real Estate	N					C.4.1	General Warranty Deed	Real Estate Services		
Vegetation Management	N					C.1.5.3	Notification of Inspection of Vegetation Clearing Activities - Post-Construction	Vegetation Management		
Reg. Siting & Environmental Permitting	N					C.2.2.1.7	Construction status, inspection reports, regulatory comments and notices	ED Siting, Surveying, ROW Engineering		
Reg. Siting & Environmental Permitting	N					C.2.2.1.8	Agency Permit-required Completion notices and regulatory acceptance	ED Siting, Surveying, ROW Engineering		
Substation	N					C.6.1.1.1	Red Line As-Built Set (Pre-Outage) kept at TO Interconnection Substation	Substation Engineering		
Substation	N					C.6.1.1.2	Red Line As-Built Set (Pre-Outage) sent to TO Substation Engineer	Substation Engineering		
Revenue Metering	N					C.1.7	Manufacturer's certified accuracy test reports for the revenue meter, CTs, and VTs	Metering		
Revenue Metering	N					C.1.8	Revenue meter program information including but not limited to loss compensation values (if applicable), 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)	Metering		
Revenue Metering	N					C.1.9	Revenue meter telephone number	Metering		
Communications	N					C.2.5	Completed copy of High Voltage Protection Form, including Telco provided calculations	IT-Network Engineering/Planning		Telco provided calculations
Communications	N					C.2.7	Fiber optic cable power measurement test results.	IT-Network Engineering/Planning		
Communications	N					C.2.9	RTU/HMI Configuration Files	IT EMS Operations		
Communications	N					C.2.10	OTDR Traces Test Results	IT-Network Engineering/Planning		
Communications	N					C.2.11	Communication Equipment Mfr Manuals and Warranty Information	IT-Network Engineering/Planning		
Communications	N					C.2.12	Communication Equipment Spares List	IT-Network Engineering/Planning		
Communications	N					C.2.13	Notification that RTU Communication Circuits are ready for Transmission Owner Testing	IT-Network Engineering/Planning		
Communications	N					C.2.14	Notification that RTU is ready for Transmission Owner Testing	IT EMS Operations		
Communications	N					C.2.15	Wave Trap on site ready for Transmission Owner Testing	IT-Infrastructure-Network Field Ops		
Communications	N					C.2.16	Power Line Carrier on ready for Transmission Owner Testing	IT-Infrastructure-Network Field Ops		
Tax & Accounting	N					C.2.1.1.2	Updated Cost Data Templates with Actual Cost Data	Accounting Policy & Control		
Outage	**Y**					**C.38**	**Transmission Owner Accepts Notice of Completion for Interconnection Facilities**	**Project Management/ Agreements Support**		
Outage	**Y**					**C.39**	**Transmission Owner Submits Notice of Successful Inspection & Testing of Interconnection Facilities to Interconnection Customer and Transmission Provider (Stage 1)**	**Agreements Support/ Project Management**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Agreements Support	N					C.1.5	Notice of Successful Inspection and Testing of Facilities	Agreements Support/ Project Management		
Outage	**Y**					**C.40**	**Interconnection Customer submits Notice of Transfer of Operational Control to Transmission Owner and Transmission Provider**	**Agreements Support/ Project Management**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Agreements Support	N					C.2.4	Verification of successful operation of telemetering system	Project Management/ Agreements Support		
Agreements Support	N					C.2.5	Verification of transfer of utilities	Agreements Support/ Customer Support		
Agreements Support	N					C.2.6	Notice of Transfer of Operational Control	Project Management/ Agreements Support		
Outage	**Y**					**C.41**	**Interconnection Customer submits Notice of Completion for Customer Generator to Transmission Owner and Transmission Provider (Stage 2)**	**Project Management/ Agreements Support**		
Outage	**Y**					**C.42**	**Transmission Owner Accepts Notice of Completion for Customer Generator**	**Project Management/ Agreements Support**		
Outage	**Y**					**C.43**	**Transmission Owner Submits Notice of Successful Inspection & Testing of Customer Generator to Interconnection Customer and Transmission Provider (Stage 2)**	**Agreements Support/ Project Management**		
Energization	**Y**					**C.44**	**Successful Energization of Interconnection Facilities (Stage 1)**	**ATSI Transmission System Dispatching/ Project Management/ Agreements Support**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Agreements Support	N					C.2.1	Completed Project Change Request Form	Agreements Support		
Substation	N					C.6.1.2.1	Red Line As-Built Set (at Energization) kept at TO Interconnection Substation	Substation Engineering		
Substation	N					C.6.1.2.2	Red Line As-Built Set (at Energization) sent to FE Substation Engineering	Substation Engineering		
Transmission	N					C.1.6.2	Red Line As-Built Drawings (Post-Energization) provided to the TO's Transmission Engineer	Transmission Engineering		
Revenue Metering	N					C.1.10	Notice that the revenue meter is receiving current and voltage inputs from the CTs and VTs and is ready for real-time communications through the dedicated voice grade analog telephone circuit.	Metering		
Energization	**Y**					**C.45**	**Successful Customer Generator Energization (Stage 2)**	**ATSI Transmission System Dispatching/ Project Management/ Agreements Support**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Substation	N					C.7.1.4	Instruction Books including hard copy and electronic format	Substation Engineering		
Substation	N					C.7.1.5	Warranty Assignments to TO	Substation Engineering		
Substation	N					C.8.1	Construction Field Test Reports	Substation Services		
Close-out	**Y**					**C.46**	**Transmission Owner Submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer and Transmission Provider**	**Agreements Support/ Project Management**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Reg. Siting & Environmental Permitting	N					C.2.4	Specific Environmental Permits - After Construction (See Site Specific Permit Plan)	ED Siting, Surveying, ROW Engineering		

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Phase / Requirements Document Section	MLST	Applicable		Opt to Build		Milestone Number	MILESTONE	Business Unit Assigned	Milestone or Deliverable Complete Date	Comments
		Yes	No	Yes	No					
Agreements Support	N					C.1.6	Notice of Acceptance of Facilities	Agreements Support		
Close-out	**Y**					**C.47**	**Interconnection Customer Submits Bill of Sale & Notice of Transfer of Title to Transmission Owner and Transmission Provider**	**Agreements Support**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Agreements Support	N					C.2.1	Completed Project Change Request Form	Agreements Support		
Agreements Support	N					C.2.7	Notice of Transfer of Title	Agreements Support		
Agreements Support	N					C.2.8	Bill of Sale	Agreements Support		
Agreements Support	N					C.2.9	Applicable Federal Energy Regulatory Commission (FERC) filing	Agreements Support		
Substation	N					C.6.2.1	Final Record As-Built Drawings issued to TO	Substation Engineering		
Substation	N					C.7.1.1	Manufacturer's Drawings including hard copy and electronic format	Substation Engineering		
Substation	N					C.7.1.2	Factory Test Reports including hard copy and electronic format	Substation Engineering		
Substation	N					C.7.1.3	Transformer Manufacturer Test Reports	Substation Engineering		
Transmission	N					C.1.1.13	Manufacturer Drawings	Transmission Engineering		
Transmission	N					C.1.7.1	Final Record As-Built Drawings issued to the TO	Transmission Engineering		
Revenue Metering	N					C.2.1.1	Interconnection Customer Verifies Billing Entity, Address and Contact Information (Information provided on Outage Readiness Notification)	Customer Support		
Revenue Metering	N					C.2.2.1	Interconnection Customer Verifies Billing Entity, Address and Contact Information (Information provided on Outage Readiness Notification)	Customer Support		
Tax & Accounting	N					C.2.1.1.3	Final Cost Data Templates with as-built Actual Cost	Accounting Policy & Control		
Close-out	**Y**					**C.48**	**Transmission Owner Executes and Submits Bill of Sale & Transfer of Title to Interconnection Customer and Transmission Provider**	**Agreements Support**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Insurance	N					B.1.3	Renewal certificate	Insurance Risk Management		Renewals should be provided annually and verification o current certificates should be done upon completion of the project
Agreements Support	N					C.1.7	Notice of Approval of Documentation	Agreements Support		
Close-out	**Y**					**C.49**	**Interconnection and Generator Facility In-Service**	**Agreements Support/ Project Management**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Revenue Metering	N					C.2.3	Written notice as outlined in the Application and Agreement for Backup and Maintenance when the Interconnection Customer either takes or plans to take Backup or Maintenance power.	For Application Specific Issues: Power Billing		

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Phase / Requirements Document Section	MLST	Applicable		Opt to Build		Milestone Number	MILESTONE	Business Unit Assigned	Milestone or Deliverable Complete Date	Comments
		Yes	No	Yes	No					
Conduct Feasibility Study	**Y**					**S.1**	**Transmit Attach N to Start Feasibility Study**	**Agreements Support**		
Conduct Feasibility Study	**Y**					**S.2**	**Transmission Provider Queue Closes**	**Agreements Support**		
Conduct Feasibility Study	**Y**					**S.3**	**Conduct Feasibility Kickoff - External**	**Agreements Support**		
Conduct Feasibility Study	**Y**					**S.4**	**Transmission Provider Model Lock Down**	**Agreements Support**		
Conduct Feasibility Study	**Y**					**S.5**	**Transmission Provider Transmits Model**	**Agreements Support**		
Conduct Feasibility Study	**Y**					**S.6**	**Feasibility Report Completed by Transmission Owner**	**Agreements Support**		
Conduct Feasibility Study	**Y**					**S.7**	**Interconnection Customer Executes System Impact Study Agreement**	**Agreements Support**		
Conduct System Impact Study	**Y**					**S.8**	**Transmission Provider Transmit Model**	**Agreements Support**		
Conduct System Impact Study	**Y**					**S.9**	**System Impact Report Completed by Transmission Owner**	**Agreements Support**		
Conduct System Impact Study	**Y**					**S.10**	**Interconnection Customer Executes Facility Study Agreement**	**Agreements Support**		
Conduct Facility Study	**Y**					**S.11**	**Conduct Facility Study Kickoff - External**	**Agreements Support**		
Conduct Facility Study	**Y**					**S.12**	**Transmission Provider Transmit Model**	**Agreements Support**		
Conduct Facility Study	**Y**					**S.13**	**Interconnection Customer Submits Environmental Impact Study**	**Agreements Support**		
Conduct Facility Study	**Y**					**S.14**	**Transmission Owner Accepts Environmental Impact Study**	**Agreements Support**		
Conduct Facility Study	**Y**					**S.15**	**Facility Report Completed by Transmission Owner**	**Agreements Support**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Reg. Siting & Environmental Permitting	N					C.1.2	Permit Plan Template	ED Siting, Surveying, ROW Engineering		
Conduct Facility Study	**Y**					**S.16**	**Facility Study, ISA, CSA Issued (from Transmission Provider to Interconnection Customer)**	**Agreements Support**		
ISA/CSA	**Y**					**C.1**	**Fully Executed ISA/CSA Agreements by All Parties**	**Agreements Support**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Reg. Siting & Environmental Permitting	N					C.1.1	Electric Transmission Facilities Siting and Permitting White Paper (for New Jersey, Pennsylvania or Ohio based on project location)	ED Siting, Surveying, ROW Engineering		
Tax & Accounting	N					C.1.1	95/5 Power Flow Certificate	Tax		Required to be provided within 45 days after execution o CSA/ISA
Project Kick-off Meeting (Internal)	**Y**					**C.2**	**Transmission Owner conducts Internal Project Kick-Off Meeting**	**Project Management/ Agreements Support**		
Project Kick-off Meeting (External)	**Y**					**C.3**	**Transmission Provider conducts External Project Kick-Off Meeting with All Parties**	**Project Management/ Agreements Support**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Agreements Support	N					C.1.2	Project Team Contact List	Agreements Support		
Agreements Support	N					C.1.3	Project Change Request Form	Project Management/ Agreements Support		
Agreements Support	N					C.1.4	Outage Readiness Notification	Agreements Support		
Reg. Siting & Environmental Permitting	N					C.1.3	Sample of previous FE siting and permitting applications when requested by Interconnection Customer	ED Siting, Surveying, ROW Engineering		
Reg. Siting & Environmental Permitting	N					C.2.1	Draft Permit Plan	ED Siting, Surveying, ROW Engineering		
Substation	N					B.2	Vendor Contact Information	Substation Engineering		
Substation	N					B.10.1	Testing & Commissioning Requirements	Substation Maintenance		
Transmission	N					B.3.1	Vendor Contact Information	Transmission Engineering		
Transmission	N					B.6.1	Transmission Line Connection Requirements to existing TO transmission line	ED-Planning		
Transmission	N					B.8.1	Transmission Line Standard Material Requirements for design and construction	Transmission Engineering		
Transmission	N					B.9.1	Transmission Line Right-of-Way Requirements	ED Siting, Surveying, ROW Engineering		
Transmission	N					B.10.1	Testing & Commissioning Requirements	Transmission Engineering		
Transmission	N					B.10.2	TO Audit of Facilities Pre-Energization	Transmission Engineering		
Revenue Metering	N					B.1.1	Revenue Metering Equipment Specifications - Requirements for Transmission Connected Facilities - Energy Delivery Planning and Protection (www.firstenergycorp.com/feconnect/Requirements_for_Transmission_Connected_Facilities.html)	Metering		
Revenue Metering	N					B.2.10.1	Application for Electrical Service - General	For Application Specific Issues: Customer Support		
Revenue Metering	N					B.2.10.2	Application for Station Power Service	For Application Specific Issues: Customer Support		
Revenue Metering	N					B.2.10.3	Application and Agreement for Backup and Maintenance Service	For Application Specific Issues: Customer Support		
Revenue Metering	N					C.2.4	Written notice to suppliersupport@firstenergycorp.com is required when the Interconnection Customer obtains Generation and Transmission from a third party.	For Application Specific Issues: Customer Support		
Communications	N					C.1.1	Telecommunications Protection Design Standard	IT-Network Engineering/Planning		
Communications	N					C.1.2	Telecommunications Protection Design – Metallic Cable (The Positron Design)	IT-Network Engineering/Planning		
Communications	N					C.1.3	Telecommunications Protection Design – Fiber Optic Cable (The RLH Design)	IT-Network Engineering/Planning		
Communications	N					C.1.4	High Voltage Protection Form (Verizon Example)	IT-Network Engineering/Planning		
Communications	N					C.1.5	SCADA Points List – Example Form	IT-Network Engineering/Planning		
Communications	N					C.1.6	Optical Power Measurement Form	IT-Network Engineering/Planning		
Communications	N					C.1.8	Transport to Remote Controlled Line Switches (IT-NET-STD-DSGN-EMS-TRANS-002 , Guidelines for designing and installing the communications path and SCADA control for remote controlled line switches)	IT-Network Engineering/Planning		
Tax & Accounting	N					B.2.1.4	Cost Data Template - Substation	Accounting Policy & Control		
Tax & Accounting	N					B.2.1.4	Cost Data Template - Transmission	Accounting Policy & Control		
Engineering	**Y**					**C.4**	**Interconnection Customer Submits ISA/CSA Insurance Certificates to Transmission Owner**	**Agreements Support**		
Engineering	**Y**					**C.5**	**Transmission Owner Accepts ISA/CSA Insurance Certificates**	**Agreements Support**		
Engineering	**Y**					**C.6**	**Transmission Owner Submits ISA/CSA Insurance Certificates to Interconnection Customer**	**Agreements Support**		
Engineering	**Y**					**C.7**	**Interconnection Customer Accepts ISA/CSA Insurance Certificates**	**Agreements Support**		
Engineering	**Y**					**C.8**	**Interconnection Customer Submits Preliminary Real Estate Plan to Transmission Owner**	**Agreements Support**		
Engineering	**Y**					**C.9**	**Transmission Owner Accepts Preliminary Real Estate Plan and provides below deliverables to the Interconnection Customer**	**Sub Engr/Trans Engr**		

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Phase / Requirements Document Section	MLST	Applicable		Opt to Build		Milestone Number	MILESTONE	Business Unit Assigned	Milestone or Deliverable Complete Date	Comments
		Yes	No	Yes	No					
Source Document	N					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Substation	N					B.4	TO's Interconnection Substation Name & Substation Number	Substation Engineering		
Substation	N					B.5.1	Protection Requirements for TO Interconnection Facilities	ED-Protection		
Substation	N					B.5.2	Inter-tie Relay Requirements for Customer Interconnection Facilities	ED-Protection		
Transmission	N					B.4.1	Transmission Line Name and Transmission Line Number	Transmission Engineering		
Transmission	N					B.4.2	Transmission Line Pole Numbers	Transmission Engineering		
Transmission	N					B.4.3	Transmission Line Switch Numbers	Transmission Engineering		
Engineering	**Y**					**C.10**	**Transmission Owner Submits Letter of Notice to Affected Property Owners**	**Agreements Support**		
Engineering	**Y**					**C.11**	**Interconnection Customer Submits and Transmission Owner Accepts all executed Deeds / Easements / Access Agreements to Transmission Owner**	**Real Estate Services**		
Source Document	N					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Real Estate	N					C.1.1	Easement	Real Estate Services		
Real Estate	N					C.2.1	Site Access Agreement	Real Estate Services		
Real Estate	N					C.5.1	Legal description and survey of fee property being conveyed, including all lot split requirements	Real Estate Services		
Real Estate	N					C.5.2	Legal description for new transmission easement	Real Estate Services		
Real Estate	N					C.5.3	Legal description for new distribution easement	Real Estate Services		
Real Estate	N					C.5.4	Legal description for any other energy related facilities that may be required	Real Estate Services		
Real Estate	N					C.5.5	Legal description for ingress-egress easement to a dedicated public roadway	Real Estate Services		
Real Estate	N					C.5.6	Survey drawing that shows the new easements along with the location of existing easements or other existing facilities on the property. Names of adjoining property owners on survey drawings. Basic drawing features - title block, north arrow, legend, graph scale	Real Estate Services		
Vegetation Management	N					C.1.2	Property and Easement descriptions	Real Estate Services		
Engineering	**Y**					**C.12**	**Transmission Owner Submits Application, Letter of Notification or similar filing to state regulatory agency (NJBPU, PaPUC, OPSB)**	**ED Siting, Surveying, ROW Engineering**		
Source Document	N					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Vegetation Management	N					C.1.1	Right-of-Way Drawings	Transmission Engineering		
Reg. Siting & Environmental Permitting	N					C.2.3	Requirements for Specific Regulatory Siting Filings (See Site Specific Permit Plan)	ED Siting, Surveying, ROW Engineering		
Transmission	N					C.1.1.8	Right-of-way Drawings and Property and Easement Descriptions	ED Siting, Surveying, ROW Engineering		
Engineering	**Y**					**C.13**	**State regulatory agency approves Application, Letter of Notification or similar filing**	**ED Siting, Surveying, ROW Engineering**		
Source Document	N					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Reg. Siting & Environmental Permitting	N					C.2.3	Requirements for Specific Regulatory Siting Filings (See Site Specific Permit Plan)	ED Siting, Surveying, ROW Engineering		
Engineering	**Y**					**C.14**	**Interconnection Customer Submits Final Environment Permit Plan to Transmission Owner**	**ED Siting, Surveying, ROW Engineering**		
Source Document	N					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Reg. Siting & Environmental Permitting	N					C.2.1	Final Permit Plan	ED Siting, Surveying, ROW Engineering		
Engineering	**Y**					**C.15**	**Transmission Owner Accepts Final Environment Permit Plan**	**Agreements Support**		
Engineering	**Y**					**C.16**	**Interconnection Customer submits all Environmental Permit Applications to Transmission Owner**	**ED Siting, Surveying, ROW Engineering**		
Source Document	N					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Reg. Siting & Environmental Permitting	N					C.2.2.1.1	Draft regulatory siting and environmental permitting studies	ED Siting, Surveying, ROW Engineering		
Reg. Siting & Environmental Permitting	N					C.2.2.1.2	Generic Text of Project description, location, construction, etc.	ED Siting, Surveying, ROW Engineering		
Reg. Siting & Environmental Permitting	N					C.2.2.1.3	Draft regulatory siting and environmental permit submittals	ED Siting, Surveying, ROW Engineering		
Engineering	**Y**					**C.17**	**Transmission Owner Accepts all Environmental Permit Applications**	**Agreements Support**		
Engineering	**Y**					**C.18**	**Interconnection Customer Submits Environmental Permit Applications to Agencies**	**Agreements Support**		
Engineering	**Y**					**C.19**	**Agency Issues Environmental Permits to Interconnection Customer**	**ED Siting, Surveying, ROW Engineering**		
Source Document	N					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Reg. Siting & Environmental Permitting	N					C.2.2.1.4	All available drafts of regulatory siting and permitting approvals	ED Siting, Surveying, ROW Engineering		
Reg. Siting & Environmental Permitting	N					C.2.2.1.5	Agency Permit-required Notices to start construction	ED Siting, Surveying, ROW Engineering		
Engineering	**Y**					**C.20**	**Interconnection Customer Submits Approved Environmental Permits to Transmission Owner**	**Agreements Support**		
Engineering	**Y**					**C.21**	**Transmission Owner Accepts Approved Permits**	**Agreements Support**		
Engineering	**Y**					**C.22**	**Interconnection Customer submits Revenue Metering Design Package for Customer Facility**	**Metering**		
Source Document	N					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Revenue Metering	N					C.1.1	Single line diagram showing revenue metering in the Interconnection Customer's step-up substation	Metering		
Revenue Metering	N					C.1.2	Estimated power flows to and from the Interconnection Customer's step-up substation at all revenue metering points	Metering		
Revenue Metering	N					C.1.3	Proposed revenue metering current transformer (CT) and voltage transformer (VT) specifications including manufacturer, type, ratios, accuracy ratings, and burden ratings	Metering		
Revenue Metering	N					C.1.4	Proposed revenue meter specifications including manufacturer, type, and model number	Metering		
Revenue Metering	N					C.1.5	Conductor type, length, resistance per phase, and reactance per phase for the transmission line between the Interconnection Customer's step-up substation and the Point of Interconnection (if applicable)	Metering		
Revenue Metering	N					C.1.6	Three-line schematic and wiring diagrams showing all CT and VT connections to revenue meters	Metering		
Engineering	**Y**					**C.23**	**Transmission Owner accepts Revenue Metering Design Package for Customers Interconnection Facility**	**Agreements Support**		
Engineering	**Y**					**C.24**	**Interconnection Customer Submits Below Grade Interconnection Facilities Engineering Package to Transmission Owner**	**Substation Engineering**		
Source Document	N					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Communications	N					C.2.2	Substation conduit detail design drawing	IT-Network Engineering/Planning		
Substation	N					C.1.1	Bill of Materials	Substation Engineering		
Substation	N					C.1.4	Balance of Design Drawings	Substation Engineering		
Substation	N					C.1.5	Specifications - Major Equipment	Substation Engineering		
Substation	N					C.1.6	Engineering Calculations	Substation Engineering		
Substation	N					C.3.1.1	Below Grade Interconnection Facilities Engineering Package	Substation Engineering		
Engineering	**Y**					**C.25**	**Transmission Owner Accepts Below Grade Interconnection Facilities Engineering Package**	**Agreements Support**		
Source Document	N					**Item Number**	**Item Description**		**Completed Date**	**Comments**

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Phase / Requirements Document Section	MLST	Applicable		Opt to Build		Milestone Number	MILESTONE	Business Unit Assigned	Milestone or Deliverable Complete Date	Comments
		Yes	No	Yes	No					
Engineering	**Y**					**C.26**	**Interconnection Customer Submits Above Grade Interconnection Facilities Engineering Package to Transmission Owner**	**Substation Engineering**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Substation	N					C.2	Project Data & Drawings Submitted to the TO	Substation Engineering		
Substation	N					C.3.1.2	Above Grade Interconnection Facilities Engineering Package	Substation Engineering		
Engineering	**Y**					**C.27**	**Transmission Owner Accepts Above Grade Interconnection Facilities Engineering Package**	**Agreements Support**		
Engineering	**Y**					**C.28**	**Interconnection Customer Submits Relay & Control Interconnection Facilities Engineering Package to Transmission Owner**	**Substation Engineering**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Substation	N					C 3.1.3	Relay & Control Interconnection Facilities Engineering Package	Substation Engineering		
Communications	N					C.2.3	Substation control house rack layout drawing	IT-Network Engineering/Planning		
Communications	N					C.2.6	SCADA/RTU Points List – completed form	IT EMS Operations		
Communications	N					C.2.8	RTU Schematic	IT EMS Operations		
Engineering	**Y**					**C.29**	**Transmission Owner Accepts Relay & Control Interconnection Facilities Engineering Package**	**Agreements Support**		
Engineering	**Y**					**C.30**	**Interconnection Customer Submits Transmission Line Engineering Package to Transmission Owner**	**Transmission Engineering**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Vegetation Management	N					C.1.3	Plan Profile Drawings	Transmission Engineering		
Vegetation Management	N					C.1.4	Property Owner Provision Plans	Real Estate Services		
Transmission	N					C.1.1.1.1	Geotechnical Reports	Transmission Engineering		
Transmission	N					C.1.1.1.2	Survey Reports	Transmission Engineering		
Transmission	N					C.1.1.2	Bill of Materials	Transmission Engineering		
Transmission	N					C.1.1.3	Field Report	Transmission Engineering		
Transmission	N					C.1.1.4	Single Line Diagram	Transmission Engineering		
Transmission	N					C.1.1.5	Plan and Profile Drawing(s)	Transmission Engineering		
Transmission	N					C.1.1.6	Structure Drawings	Transmission Engineering		
Transmission	N					C.1.1.7	Wire Arrangement	Transmission Engineering		
Transmission	N					C.1.1.9	Balance of Design Drawings	Transmission Engineering		
Transmission	N					C.1.1.10.1	Highway Crossing Drawings	Transmission Engineering		
Transmission	N					C.1.1.10.2	Highway Crossing Permit Applications	Transmission Engineering		
Transmission	N					C.1.1.10.4	Railroad Crossing Drawings	Transmission Engineering		
Transmission	N					C.1.1.10.5	Railroad Crossing Permit Applications	Transmission Engineering		
Transmission	N					C.1.1.10.7	River Crossing Drawings	Transmission Engineering		
Transmission	N					C.1.1.10.8	River Crossing Permit Applications	Transmission Engineering		
Transmission	N					C.1.1.10.10	FAA Required Drawings	Transmission Engineering		
Transmission	N					C.1.1.10.11	FAA Required Permit Applications	Transmission Engineering		
Transmission	N					C.1.1.11	Specifications - Major Equipment	Transmission Engineering		
Transmission	N					C.1.1.12	Engineering Calculations	Transmission Engineering		
Substation	N					C.1.7.1	Geotechnical Reports	Substation Engineering		
Substation	N					C.1.7.2	Survey Reports	Substation Engineering		
Engineering	**Y**					**C.31**	**Transmission Owner Accepts Transmission Line Engineering Package**	**Agreements Support**		
Site Construction	**Y**					**C.32**	**Interconnection Customer submits Notice to Start Construction of Interconnection Facilities to Transmission Owner and Transmission Provider**	**Project Management/ Agreements Support**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Insurance	N					C.1.1	Workers Compensation - Statutory	Insurance Risk Management		
Insurance	N					C.1.2	Employers Liability - $1,000,000 (minimum)	Insurance Risk Management		The highlighted coverage's will be evidenced on one (1) certificate by FE
Insurance	N					C.1.3	Commercial General Liability – $1,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.1.4	Comprehensive Automobile Liability - $1,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.1.5	Excess/Umbrella Liability - $20,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.1.6	Professional Liability - $10,000,000 (minimum)*	Insurance Risk Management		*$10 Million limit is for CSA only. $5 Million minimum is required for ISA
Insurance	N					B.2.1	Additional Insured	Insurance Risk Management		
Insurance	N					C.2.1	Workers Compensation - Statutory	Insurance Risk Management		
Insurance	N					C.2.2	Employers Liability - $1,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.2.3	Commercial General Liability – $1,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.2.4	Comprehensive Automobile Liability - $1,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.2.5	Excess/Umbrella Liability - $20,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.2.6	Professional Liability - $10,000,000 (minimum)*	Insurance Risk Management		
Vegetation Management	N					C.1.5.1	Notification of Inspection of Vegetation Clearing Activities - Pre-construction	Vegetation Management		
Vegetation Management	N					C.1.5.2	Notification of Inspection of Vegetation Clearing Activities - Construction (provide date for vegetation clearing during construction)	Vegetation Management		
Reg. Siting & Environmental Permitting	N					C.2.2.1.6	Regulatory and permitting approvals	ED Siting, Surveying, ROW Engineering		
Reg. Siting & Environmental Permitting	N					C.2.3	Requirements for Specific Regulatory Siting Filings (See Site Specific Permit Plan)	ED Siting, Surveying, ROW Engineering		
Reg. Siting & Environmental Permitting	N					C.2.4	Specific Environmental Permits - Before Construction (See Site Specific Permit Plan)	ED Siting, Surveying, ROW Engineering		
Reg. Siting & Environmental Permitting	N					C.2.4	Special Environmental Permits and Authorizations	ED Siting, Surveying, ROW Engineering		
Substation	N					C.1.2	Property Plan	Substation Engineering		
Substation	N					C.1.3	Single Line Diagram	Substation Engineering		

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Phase / Requirements Document Section	MLST	Applicable		Opt to Build		Milestone Number	MILESTONE	Business Unit Assigned	Milestone or Deliverable Complete Date	Comments
		Yes	No	Yes	No					
Transmission	N					C.1.1.10.3	Approved Highway Crossing Permits	Transmission Engineering		
Transmission	N					C.1.1.10.6	Approved Railroad Crossing Permits	Transmission Engineering		
Transmission	N					C.1.1.10.9	Approved River Crossing Permits	Transmission Engineering		
Transmission	N					C.1.1.10.12	Approved FAA Permits	Transmission Engineering		
Transmission	N					C.1.2	Drawings Issued for Construction	Transmission Engineering		
Communications	N					C.1.7	TO Required Communications Materials and Equipment List	IT EMS Operations		
Tax & Accounting	N					C.2.1.1.1	Completed Cost Data Templates with Estimated Cost Data	Accounting Policy & Control		
Site Construction	**Y**					**C.33**	**Interconnection Customer submits Notice to Start Construction of Transmission Line to Transmission Owner and Transmission Provider**	**Project Management/ Agreements Support**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Insurance	N					C.1.1	Workers Compensation - Statutory	Insurance Risk Management		
Insurance	N					C.1.2	Employers Liability - $1,000,000 (minimum)	Insurance Risk Management		The highlighted coverage's will be evidenced on one (1) certificate by FE
Insurance	N					C.1.3	Commercial General Liability – $1,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.1.4	Comprehensive Automobile Liability - $1,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.1.5	Excess/Umbrella Liability - $20,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.1.6	Professional Liability - $10,000,000 (minimum)*	Insurance Risk Management		*$10 Million limit is for CSA only. $5 Million minimum is required for ISA
Insurance	N					B.2.1	Additional Insured	Insurance Risk Management		
Insurance	N					C.2.1	Workers Compensation - Statutory	Insurance Risk Management		
Insurance	N					C.2.2	Employers Liability - $1,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.2.3	Commercial General Liability – $1,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.2.4	Comprehensive Automobile Liability - $1,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.2.5	Excess/Umbrella Liability - $20,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.2.6	Professional Liability - $10,000,000 (minimum)*	Insurance Risk Management		
Vegetation Management	N					C.1.5.1	Notification of Inspection of Vegetation Clearing Activities - Pre-construction	Vegetation Management		
Vegetation Management	N					C.1.5.2	Notification of Inspection of Vegetation Clearing Activities - Construction (provide date for vegetation clearing during construction)	Vegetation Management		
Reg. Siting & Environmental Permitting	N					C.2.2.1.6	Regulatory and permitting approvals	ED Siting, Surveying, ROW Engineering		
Reg. Siting & Environmental Permitting	N					C.2.3	Requirements for Specific Regulatory Siting Filings (See Site Specific Permit Plan)	ED Siting, Surveying, ROW Engineering		
Reg. Siting & Environmental Permitting	N					C.2.4	Specific Environmental Permits - Before Construction (See Site Specific Permit Plan)	ED Siting, Surveying, ROW Engineering		
Reg. Siting & Environmental Permitting	N					C.2.4	Special Environmental Permits and Authorizations	ED Siting, Surveying, ROW Engineering		
Substation	N					C.1.2	Property Plan	Substation Engineering		
Substation	N					C.1.3	Single Line Diagram	Substation Engineering		
Transmission	N					C.1.1.10.3	Approved Highway Crossing Permits	Transmission Engineering		
Transmission	N					C.1.1.10.6	Approved Railroad Crossing Permits	Transmission Engineering		
Transmission	N					C.1.1.10.9	Approved River Crossing Permits	Transmission Engineering		
Transmission	N					C.1.1.10.12	Approved FAA Permits	Transmission Engineering		
Transmission	N					C.1.2	Drawings Issued for Construction	Transmission Engineering		
Communications	N					C.1.7	TO Required Communications Materials and Equipment List	IT EMS Operations		
Tax & Accounting	N					C.2.1.1.1	Completed Cost Data Templates with Estimated Cost Data	Accounting Policy & Control		
Outage	**Y**					**C.34**	**Interconnection Customer Submits Completed Outage Readiness Notification to Transmission Owner**	**ATSI Transmission System Dispatching**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Agreements Support	N					C.2.2	Completed Outage Readiness Notification	ATSI-Transmission System Dispatching		
Transmission	N					C.1.3	GPS Locations of Transmission Line Structures	ED Siting, Surveying, ROW Engineering		
Transmission	N					C.1.6.1	Red Line As-Built Drawings (Pre-Outage) provided to the TO's Transmission Engineer	Transmission Engineering		
Transmission	N					C.1.8.1	Manufacturer Drawings provided to the TO's print distribution list	Transmission Engineering		
Transmission	N					C.1.8.2	Factory Test Reports including hard copy and electronic format	Transmission Engineering		
Transmission	N					C.1.8.3	Instruction Books including hard copy and electronic format	Transmission Engineering		
Transmission	N					C.1.8.4	Warranty Assignments issued to the TO	Transmission Engineering		
Transmission	N					C.1.9	Construction Field Test Reports issued to the TO	Transmission Engineering		
Revenue Metering	N					C.2.1	Application for Electrical Service - General	For Application Specific Issues: Customer Support		
Revenue Metering	N					C.2.2	Application for Station Power Service	For Application Specific Issues: Customer Support		
Revenue Metering	N					C.2.3	Application and Agreement for Backup and Maintenance Service	For Application Specific Issues: Customer Support		
Communications	N					C.2.1	E911 Address Confirmation - Provided in Outage Readiness Notification	ATSI- Transmission System Dispatching		
Communications	N					C.2.4	Copies of Telco service orders, including projected due dates	IT-Network Engineering/Planning		
Outage	**Y**					**C.35**	**Transmission Owner Accepts Outage Readiness Notification and Submits to Transmission Provider**	**ATSI Transmission System Dispatching**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Substation	N					B.9.1	Relay Settings for TO Interconnection Facilities	ED-Protection		
Substation	N					B.9.2	Inter-tie Relay Settings at Customer Facilities	ED-Protection		
Outage	**Y**					**C.36**	**Transmission Provider Approves Outage Request**	**Agreements Support**		

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Master Milestone Checklist - OH
Project:

Phase / Requirements Document Section	MLST	Applicable		Opt to Build		Milestone Number	MILESTONE	Business Unit Assigned	Milestone or Deliverable Complete Date	Comments
		Yes	No	Yes	No					
Outage	**Y**					**C.37**	**Interconnection Customer submits Notice of Completion for Interconnection Facilities to Transmission Owner and Transmission Provider (Includes both Interconnection Customer and Transmission Owner Substations and any associated Transmission Line Facilities for Interconnection)**	**Project Management/ Agreements Support**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Agreements Support	N					C.2.1	Completed Project Change Request Form	Agreements Support		
Agreements Support	N					C.2.3	Notice of Completion	Agreements Support		
Real Estate	N					C.3.1	Assignment of Easement	Real Estate Services		
Real Estate	N					C.4.1	General Warranty Deed	Real Estate Services		
Vegetation Management	N					C.1.5.3	Notification of Inspection of Vegetation Clearing Activities - Post-Construction	Vegetation Management		
Reg. Siting & Environmental Permitting	N					C.2.2.1.7	Construction status, inspection reports, regulatory comments and notices	ED Siting, Surveying, ROW Engineering		
Reg. Siting & Environmental Permitting	N					C.2.2.1.8	Agency Permit-required Completion notices and regulatory acceptance	ED Siting, Surveying, ROW Engineering		
Substation	N					C.6.1.1.1	Red Line As-Built Set (Pre-Outage) kept at TO Interconnection Substation	Substation Engineering		
Substation	N					C.6.1.1.2	Red Line As-Built Set (Pre-Outage) sent to TO Substation Engineer	Substation Engineering		
Revenue Metering	N					C.1.7	Manufacturer's certified accuracy test reports for the revenue meter, CTs, and VTs	Metering		
Revenue Metering	N					C.1.8	Revenue meter program information including but not limited to loss compensation values (if applicable), 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)	Metering		
Revenue Metering	N					C.1.9	Revenue meter telephone number	Metering		
Communications	N					C.2.5	Completed copy of High Voltage Protection Form, including Telco provided calculations	IT-Network Engineering/Planning		Telco provided calculations
Communications	N					C.2.7	Fiber optic cable power measurement test results.	IT-Network Engineering/Planning		
Communications	N					C.2.9	RTU/HMI Configuration Files	IT EMS Operations		
Communications	N					C.2.10	OTDR Traces Test Results	IT-Network Engineering/Planning		
Communications	N					C.2.11	Communication Equipment Mfr Manuals and Warranty Information	IT-Network Engineering/Planning		
Communications	N					C.2.12	Communication Equipment Spares List	IT-Network Engineering/Planning		
Communications	N					C.2.13	Notification that RTU Communication Circuits are ready for Transmission Owner Testing	IT-Network Engineering/Planning		
Communications	N					C.2.14	Notification that RTU is ready for Transmission Owner Testing	IT EMS Operations		
Communications	N					C.2.15	Wave Trap on site ready for Transmission Owner Testing	IT-Infrastructure-Network Field Ops		
Communications	N					C.2.16	Power Line Carrier on ready for Transmission Owner Testing	IT-Infrastructure-Network Field Ops		
Tax & Accounting	N					C.2.1.1.2	Updated Cost Data Templates with Actual Cost Data	Accounting Policy & Control		
Outage	**Y**					**C.38**	**Transmission Owner Accepts Notice of Completion for Interconnection Facilities**	**Project Management/ Agreements Support**		
Outage	**Y**					**C.39**	**Transmission Owner Submits Notice of Successful Inspection & Testing of Interconnection Facilities to Interconnection Customer and Transmission Provider (Stage 1)**	**Agreements Support/ Project Management**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Agreements Support	N					C.1.5	Notice of Successful Inspection and Testing of Facilities	Agreements Support/ Project Management		
Outage	**Y**					**C.40**	**Interconnection Customer submits Notice of Transfer of Operational Control to Transmission Owner and Transmission Provider**	**Agreements Support/ Project Management**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Agreements Support	N					C.2.4	Verification of successful operation of telemetering system	Project Management/ Agreements Support		
Agreements Support	N					C.2.5	Verification of transfer of utilities	Agreements Support/ Customer Support		
Agreements Support	N					C.2.6	Notice of Transfer of Operational Control	Project Management/ Agreements Support		
Outage	**Y**					**C.41**	**Interconnection Customer submits Notice of Completion for Customer Generator to Transmission Owner and Transmission Provider (Stage 2)**	**Project Management/ Agreements Support**		
Outage	**Y**					**C.42**	**Transmission Owner Accepts Notice of Completion for Customer Generator**	**Project Management/ Agreements Support**		
Outage	**Y**					**C.43**	**Transmission Owner Submits Notice of Successful Inspection & Testing of Customer Generator to Interconnection Customer and Transmission Provider (Stage 2)**	**Agreements Support/ Project Management**		
Energization	**Y**					**C.44**	**Successful Energization of Interconnection Facilities (Stage 1)**	**ATSI Transmission System Dispatching/ Project Management/ Agreements Support**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Agreements Support	N					C.2.1	Completed Project Change Request Form	Agreements Support		
Substation	N					C.6.1.2.1	Red Line As-Built Set (at Energization) kept at TO Interconnection Substation	Substation Engineering		
Substation	N					C.6.1.2.2	Red Line As-Built Set (at Energization) sent to FE Substation Engineering	Substation Engineering		
Transmission	N					C.1.6.2	Red Line As-Built Drawings (Post-Energization) provided to the TO's Transmission Engineer	Transmission Engineering		
Revenue Metering	N					C.1.10	Notice that the revenue meter is receiving current and voltage inputs from the CTs and VTs and is ready for real-time communications through the dedicated voice grade analog telephone circuit.	Metering		
Energization	**Y**					**C.45**	**Successful Customer Generator Energization (Stage 2)**	**ATSI Transmission System Dispatching/ Project Management/ Agreements Support**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Substation	N					C.7.1.4	Instruction Books including hard copy and electronic format	Substation Engineering		
Substation	N					C.7.1.5	Warranty Assignments to TO	Substation Engineering		
Substation	N					C.8.1	Construction Field Test Reports	Substation Services		
Close-out	**Y**					**C.46**	**Transmission Owner Submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer and Transmission Provider**	**Agreements Support/ Project Management**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Reg. Siting & Environmental Permitting	N					C.2.4	Specific Environmental Permits - After Construction (See Site Specific Permit Plan)	ED Siting, Surveying, ROW Engineering		

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Master Milestone Checklist - OH
Project:

Phase / Requirements Document Section	MLST	Applicable		Opt to Build		Milestone Number	MILESTONE	Business Unit Assigned	Milestone or Deliverable Complete Date	Comments
		Yes	No	Yes	No					
Agreements Support	N					C.1.6	Notice of Acceptance of Facilities	Agreements Support		
Close-out	**Y**					**C.47**	**Interconnection Customer Submits Bill of Sale & Notice of Transfer of Title to Transmission Owner and Transmission Provider**	**Agreements Support**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Agreements Support	N					C.2.1	Completed Project Change Request Form	Agreements Support		
Agreements Support	N					C.2.7	Notice of Transfer of Title	Agreements Support		
Agreements Support	N					C.2.8	Bill of Sale	Agreements Support		
Agreements Support	N					C.2.9	Applicable Federal Energy Regulatory Commission (FERC) filing	Agreements Support		
Substation	N					C.6.2.1	Final Record As-Built Drawings issued to TO	Substation Engineering		
Substation	N					C.7.1.1	Manufacturer's Drawings including hard copy and electronic format	Substation Engineering		
Substation	N					C.7.1.2	Factory Test Reports including hard copy and electronic format	Substation Engineering		
Substation	N					C.7.1.3	Transformer Manufacturer Test Reports	Substation Engineering		
Transmission	N					C.1.1.13	Manufacturer Drawings	Transmission Engineering		
Transmission	N					C.1.7.1	Final Record As-Built Drawings issued to the TO	Transmission Engineering		
Revenue Metering	N					C.2.1.1	Interconnection Customer Verifies Billing Entity, Address and Contact Information (Information provided on Outage Readiness Notification)	Customer Support		
Revenue Metering	N					C.2.2.1	Interconnection Customer Verifies Billing Entity, Address and Contact Information (Information provided on Outage Readiness Notification)	Customer Support		
Tax & Accounting	N					C.2.1.1.3	Final Cost Data Templates with as-built Actual Cost	Accounting Policy & Control		
Close-out	**Y**					**C.48**	**Transmission Owner Executes and Submits Bill of Sale & Transfer of Title to Interconnection Customer and Transmission Provider**	**Agreements Support**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Insurance	N					B.1.3	Renewal certificate	Insurance Risk Management		Renewals should be provided annually and verification o current certificates should be done upon completion of the project
Agreements Support	N					C.1.7	Notice of Approval of Documentation	Agreements Support		
Close-out	**Y**					**C.49**	**Interconnection and Generator Facility In-Service**	**Agreements Support/ Project Management**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Revenue Metering	N					C.2.3	Written notice as outlined in the Application and Agreement for Backup and Maintenance when the Interconnection Customer either takes or plans to take Backup or Maintenance power.	For Application Specific Issues: Power Billing		

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Master Milestone Checklist - PA

Project:

Phase / Requirements Document Section	MLST	Applicable		Opt to Build		Milestone Number	MILESTONE	Business Unit Assigned	Milestone or Deliverable Complete Date	Comments
		Yes	No	Yes	No					
Conduct Feasibility Study	**Y**					**S.1**	**Transmit Attach N to Start Feasibility Study**	**Agreements Support**		
Conduct Feasibility Study	**Y**					**S.2**	**Transmission Provider Queue Closes**	**Agreements Support**		
Conduct Feasibility Study	**Y**					**S.3**	**Conduct Feasibility Kickoff - External**	**Agreements Support**		
Conduct Feasibility Study	**Y**					**S.4**	**Transmission Provider Model Lock Down**	**Agreements Support**		
Conduct Feasibility Study	**Y**					**S.5**	**Transmission Provider Transmits Model**	**Agreements Support**		
Conduct Feasibility Study	**Y**					**S.6**	**Feasibility Report Completed by Transmission Owner**	**Agreements Support**		
Conduct Feasibility Study	**Y**					**S.7**	**Interconnection Customer Executes System Impact Study Agreement**	**Agreements Support**		
Conduct System Impact Study	**Y**					**S.8**	**Transmission Provider Transmit Model**	**Agreements Support**		
Conduct System Impact Study	**Y**					**S.9**	**System Impact Report Completed by Transmission Owner**	**Agreements Support**		
Conduct System Impact Study	**Y**					**S.10**	**Interconnection Customer Executes Facility Study Agreement**	**Agreements Support**		
Conduct Facility Study	**Y**					**S.11**	**Conduct Facility Study Kickoff - External**	**Agreements Support**		
Conduct Facility Study	**Y**					**S.12**	**Transmission Provider Transmit Model**	**Agreements Support**		
Conduct Facility Study	**Y**					**S.13**	**Interconnection Customer Submits Environmental Impact Study**	**Agreements Support**		
Conduct Facility Study	**Y**					**S.14**	**Transmission Owner Accepts Environmental Impact Study**	**Agreements Support**		
Conduct Facility Study	**Y**					**S.15**	**Facility Report Completed by Transmission Owner**	**Agreements Support**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Reg. Siting & Environmental Permitting	N					C.1.2	Permit Plan Template	ED Siting, Surveying, ROW Engineering		
Conduct Facility Study	**Y**					**S.16**	**Facility Study, ISA, CSA Issued (from Transmission Provider to Interconnection Customer)**	**Agreements Support**		
ISA/CSA	**Y**					**C.1**	**Fully Executed ISA/CSA Agreements by All Parties**	**Agreements Support**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Reg. Siting & Environmental Permitting	N					C.1.1	Electric Transmission Facilities Siting and Permitting White Paper (for New Jersey, Pennsylvania or Ohio based on project location)	ED Siting, Surveying, ROW Engineering		
Tax & Accounting	N					C.1.1	95/5 Power Flow Certificate	Tax		Required to be provided within 45 days after execution o CSA/ISA
Project Kick-off Meeting (Internal)	**Y**					**C.2**	**Transmission Owner conducts Internal Project Kick-Off Meeting**	**Project Management/ Agreements Support**		
Project Kick-off Meeting (External)	**Y**					**C.3**	**Transmission Provider conducts External Project Kick-Off Meeting with All Parties**	**Project Management/ Agreements Support**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Agreements Support	N					C.1.2	Project Team Contact List	Agreements Support		
Agreements Support	N					C.1.3	Project Change Request Form	Project Management/ Agreements Support		
Agreements Support	N					C.1.4	Outage Readiness Notification	Agreements Support		
Reg. Siting & Environmental Permitting	N					C.1.3	Sample of previous FE siting and permitting applications when requested by Interconnection Customer	ED Siting, Surveying, ROW Engineering		
Reg. Siting & Environmental Permitting	N					C.2.1	Draft Permit Plan	ED Siting, Surveying, ROW Engineering		
Substation	N					B.2	Vendor Contact Information	Substation Engineering		
Substation	N					B.10.1	Testing & Commissioning Requirements	Substation Maintenance		
Transmission	N					B.3.1	Vendor Contact Information	Transmission Engineering		
Transmission	N					B.6.1	Transmission Line Connection Requirements to existing TO transmission line	ED-Planning		
Transmission	N					B.8.1	Transmission Line Standard Material Requirements for design and construction	Transmission Engineering		
Transmission	N					B.9.1	Transmission Line Right-of-Way Requirements	ED Siting, Surveying, ROW Engineering		
Transmission	N					B.10.1	Testing & Commissioning Requirements	Transmission Engineering		
Transmission	N					B.10.2	TO Audit of Facilities Pre-Energization	Transmission Engineering		
Revenue Metering	N					B.1.1	Revenue Metering Equipment Specifications - Requirements for Transmission Connected Facilities - Energy Delivery Planning and Protection (www.firstenergycorp.com/feconnect/Requirements_for_Transmission_Connected_Facilities.html)	Metering		
Revenue Metering	N					B.2.10.1	Application for Electrical Service - General	For Application Specific Issues: Customer Support		
Revenue Metering	N					B.2.10.2	Application for Station Power Service	For Application Specific Issues: Customer Support		
Revenue Metering	N					B.2.10.3	Application and Agreement for Backup and Maintenance Service	For Application Specific Issues: Customer Support		
Revenue Metering	N					C.2.4	Written notice to suppliersupport@firstenergycorp.com is required when the Interconnection Customer obtains Generation and Transmission from a third party.	For Application Specific Issues: Customer Support		
Communications	N					C.1.1	Telecommunications Protection Design Standard	IT-Network Engineering/Planning		
Communications	N					C.1.2	Telecommunications Protection Design – Metallic Cable (The Positron Design)	IT-Network Engineering/Planning		
Communications	N					C.1.3	Telecommunications Protection Design – Fiber Optic Cable (The RLH Design)	IT-Network Engineering/Planning		
Communications	N					C.1.4	High Voltage Protection Form (Verizon Example)	IT-Network Engineering/Planning		
Communications	N					C.1.5	SCADA Points List – Example Form	IT-Network Engineering/Planning		
Communications	N					C.1.6	Optical Power Measurement Form	IT-Network Engineering/Planning		
Communications	N					C.1.8	Transport to Remote Controlled Line Switches (IT-NET-STD-DSGN-EMS-TRANS-002 , Guidelines for designing and installing the communications path and SCADA control for remote controlled line switches)	IT-Network Engineering/Planning		
Tax & Accounting	N					B.2.1.4	Cost Data Template - Substation	Accounting Policy & Control		
Tax & Accounting	N					B.2.1.4	Cost Data Template - Transmission	Accounting Policy & Control		
Engineering	**Y**					**C.4**	**Interconnection Customer Submits ISA/CSA Insurance Certificates to Transmission Owner**	**Agreements Support**		
Engineering	**Y**					**C.5**	**Transmission Owner Accepts ISA/CSA Insurance Certificates**	**Agreements Support**		
Engineering	**Y**					**C.6**	**Transmission Owner Submits ISA/CSA Insurance Certificates to Interconnection Customer**	**Agreements Support**		
Engineering	**Y**					**C.7**	**Interconnection Customer Accepts ISA/CSA Insurance Certificates**	**Agreements Support**		
Engineering	**Y**					**C.8**	**Interconnection Customer Submits Preliminary Real Estate Plan to Transmission Owner**	**Agreements Support**		
Engineering	**Y**					**C.9**	**Transmission Owner Accepts Preliminary Real Estate Plan and provides below deliverables to the Interconnection Customer**	**Sub Engr/Trans Engr**		

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Master Milestone Checklist - PA

Project:

Phase / Requirements Document Section	MLST	Applicable		Opt to Build		Milestone Number	MILESTONE	Business Unit Assigned	Milestone or Deliverable Complete Date	Comments
		Yes	No	Yes	No					
Source Document	N					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Substation	N					B.4	TO's Interconnection Substation Name & Substation Number	Substation Engineering		
Substation	N					B.5.1	Protection Requirements for TO Interconnection Facilities	ED-Protection		
Substation	N					B.5.2	Inter-tie Relay Requirements for Customer Interconnection Facilities	ED-Protection		
Transmission	N					B.4.1	Transmission Line Name and Transmission Line Number	Transmission Engineering		
Transmission	N					B.4.2	Transmission Line Pole Numbers	Transmission Engineering		
Transmission	N					B.4.3	Transmission Line Switch Numbers	Transmission Engineering		
Engineering	**Y**					**C.10**	**Transmission Owner Submits Letter of Notice to Affected Property Owners**	**Agreements Support**		
Engineering	**Y**					**C.11**	**Interconnection Customer Submits and Transmission Owner Accepts all executed Deeds / Easements / Access Agreements to Transmission Owner**	**Real Estate Services**		
Source Document	N					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Real Estate	N					C.1.1	Easement	Real Estate Services		
Real Estate	N					C.2.1	Site Access Agreement	Real Estate Services		
Real Estate	N					C.5.1	Legal description and survey of fee property being conveyed, including all lot split requirements	Real Estate Services		
Real Estate	N					C.5.2	Legal description for new transmission easement	Real Estate Services		
Real Estate	N					C.5.3	Legal description for new distribution easement	Real Estate Services		
Real Estate	N					C.5.4	Legal description for any other energy related facilities that may be required	Real Estate Services		
Real Estate	N					C.5.5	Legal description for ingress-egress easement to a dedicated public roadway	Real Estate Services		
Real Estate	N					C.5.6	Survey drawing that shows the new easements along with the location of existing easements or other existing facilities on the property. Names of adjoining property owners on survey drawings. Basic drawing features - title block, north arrow, legend, graph scale	Real Estate Services		
Vegetation Management	N					C.1.2	Property and Easement descriptions	Real Estate Services		
Engineering	**Y**					**C.12**	**Transmission Owner Submits Application, Letter of Notification or similar filing to state regulatory agency (NJBPU, PaPUC, OPSB)**	**ED Siting, Surveying, ROW Engineering**		
Source Document	N					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Vegetation Management	N					C.1.1	Right-of-Way Drawings	Transmission Engineering		
Reg. Siting & Environmental Permitting	N					C.2.3	Requirements for Specific Regulatory Siting Filings (See Site Specific Permit Plan)	ED Siting, Surveying, ROW Engineering		
Transmission	N					C.1.1.8	Right-of-way Drawings and Property and Easement Descriptions	ED Siting, Surveying, ROW Engineering		
Engineering	**Y**					**C.13**	**State regulatory agency approves Application, Letter of Notification or similar filing**	**ED Siting, Surveying, ROW Engineering**		
Source Document	N					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Reg. Siting & Environmental Permitting	N					C.2.3	Requirements for Specific Regulatory Siting Filings (See Site Specific Permit Plan)	ED Siting, Surveying, ROW Engineering		
Engineering	**Y**					**C.14**	**Interconnection Customer Submits Final Environment Permit Plan to Transmission Owner**	**ED Siting, Surveying, ROW Engineering**		
Source Document	N					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Reg. Siting & Environmental Permitting	N					C.2.1	Final Permit Plan	ED Siting, Surveying, ROW Engineering		
Engineering	**Y**					**C.15**	**Transmission Owner Accepts Final Environment Permit Plan**	**Agreements Support**		
Engineering	**Y**					**C.16**	**Interconnection Customer submits all Environmental Permit Applications to Transmission Owner**	**ED Siting, Surveying, ROW Engineering**		
Source Document	N					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Reg. Siting & Environmental Permitting	N					C.2.2.1.1	Draft regulatory siting and environmental permitting studies	ED Siting, Surveying, ROW Engineering		
Reg. Siting & Environmental Permitting	N					C.2.2.1.2	Generic Text of Project description, location, construction, etc.	ED Siting, Surveying, ROW Engineering		
Reg. Siting & Environmental Permitting	N					C.2.2.1.3	Draft regulatory siting and environmental permit submittals	ED Siting, Surveying, ROW Engineering		
Engineering	**Y**					**C.17**	**Transmission Owner Accepts all Environmental Permit Applications**	**Agreements Support**		
Engineering	**Y**					**C.18**	**Interconnection Customer Submits Environmental Permit Applications to Agencies**	**Agreements Support**		
Engineering	**Y**					**C.19**	**Agency Issues Environmental Permits to Interconnection Customer**	**ED Siting, Surveying, ROW Engineering**		
Source Document	N					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Reg. Siting & Environmental Permitting	N					C.2.2.1.4	All available drafts of regulatory siting and permitting approvals	ED Siting, Surveying, ROW Engineering		
Reg. Siting & Environmental Permitting	N					C.2.2.1.5	Agency Permit-required Notices to start construction	ED Siting, Surveying, ROW Engineering		
Engineering	**Y**					**C.20**	**Interconnection Customer Submits Approved Environmental Permits to Transmission Owner**	**Agreements Support**		
Engineering	**Y**					**C.21**	**Transmission Owner Accepts Approved Permits**	**Agreements Support**		
Engineering	**Y**					**C.22**	**Interconnection Customer submits Revenue Metering Design Package for Customer Facility**	**Metering**		
Source Document	N					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Revenue Metering	N					C.1.1	Single line diagram showing revenue metering in the Interconnection Customer's step-up substation	Metering		
Revenue Metering	N					C.1.2	Estimated power flows to and from the Interconnection Customer's step-up substation at all revenue metering points	Metering		
Revenue Metering	N					C.1.3	Proposed revenue metering current transformer (CT) and voltage transformer (VT) specifications including manufacturer, type, ratios, accuracy ratings, and burden ratings	Metering		
Revenue Metering	N					C.1.4	Proposed revenue meter specifications including manufacturer, type, and model number	Metering		
Revenue Metering	N					C.1.5	Conductor type, length, resistance per phase, and reactance per phase for the transmission line between the Interconnection Customer's step-up substation and the Point of Interconnection (if applicable)	Metering		
Revenue Metering	N					C.1.6	Three-line schematic and wiring diagrams showing all CT and VT connections to revenue meters	Metering		
Engineering	**Y**					**C.23**	**Transmission Owner accepts Revenue Metering Design Package for Customers Interconnection Facility**	**Agreements Support**		
Engineering	**Y**					**C.24**	**Interconnection Customer Submits Below Grade Interconnection Facilities Engineering Package to Transmission Owner**	**Substation Engineering**		
Source Document	N					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Communications	N					C.2.2	Substation conduit detail design drawing	IT-Network Engineering/Planning		
Substation	N					C.1.1	Bill of Materials	Substation Engineering		
Substation	N					C.1.4	Balance of Design Drawings	Substation Engineering		
Substation	N					C.1.5	Specifications - Major Equipment	Substation Engineering		
Substation	N					C.1.6	Engineering Calculations	Substation Engineering		
Substation	N					C.3.1.1	Below Grade Interconnection Facilities Engineering Package	Substation Engineering		
Engineering	**Y**					**C.25**	**Transmission Owner Accepts Below Grade Interconnection Facilities Engineering Package**	**Agreements Support**		
Source Document	N					**Item Number**	**Item Description**		**Completed Date**	**Comments**

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Master Milestone Checklist - PA

Project:

Phase / Requirements Document Section	MLST	Applicable		Opt to Build		Milestone Number	MILESTONE	Business Unit Assigned	Milestone or Deliverable Complete Date	Comments
		Yes	No	Yes	No					
Engineering	**Y**					**C.26**	**Interconnection Customer Submits Above Grade Interconnection Facilities Engineering Package to Transmission Owner**	**Substation Engineering**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Substation	N					C.2	Project Data & Drawings Submitted to the TO	Substation Engineering		
Substation	N					C.3.1.2	Above Grade Interconnection Facilities Engineering Package	Substation Engineering		
Engineering	**Y**					**C.27**	**Transmission Owner Accepts Above Grade Interconnection Facilities Engineering Package**	**Agreements Support**		
Engineering	**Y**					**C.28**	**Interconnection Customer Submits Relay & Control Interconnection Facilities Engineering Package to Transmission Owner**	**Substation Engineering**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Substation	N					C 3.1.3	Relay & Control Interconnection Facilities Engineering Package	Substation Engineering		
Communications	N					C.2.3	Substation control house rack layout drawing	IT-Network Engineering/Planning		
Communications	N					C.2.6	SCADA/RTU Points List – completed form	IT EMS Operations		
Communications	N					C.2.8	RTU Schematic	IT EMS Operations		
Engineering	**Y**					**C.29**	**Transmission Owner Accepts Relay & Control Interconnection Facilities Engineering Package**	**Agreements Support**		
Engineering	**Y**					**C.30**	**Interconnection Customer Submits Transmission Line Engineering Package to Transmission Owner**	**Transmission Engineering**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Vegetation Management	N					C.1.3	Plan Profile Drawings	Transmission Engineering		
Vegetation Management	N					C.1.4	Property Owner Provision Plans	Real Estate Services		
Transmission	N					C.1.1.1.1	Geotechnical Reports	Transmission Engineering		
Transmission	N					C.1.1.1.2	Survey Reports	Transmission Engineering		
Transmission	N					C.1.1.2	Bill of Materials	Transmission Engineering		
Transmission	N					C.1.1.3	Field Report	Transmission Engineering		
Transmission	N					C.1.1.4	Single Line Diagram	Transmission Engineering		
Transmission	N					C.1.1.5	Plan and Profile Drawing(s)	Transmission Engineering		
Transmission	N					C.1.1.6	Structure Drawings	Transmission Engineering		
Transmission	N					C.1.1.7	Wire Arrangement	Transmission Engineering		
Transmission	N					C.1.1.9	Balance of Design Drawings	Transmission Engineering		
Transmission	N					C.1.1.10.1	Highway Crossing Drawings	Transmission Engineering		
Transmission	N					C.1.1.10.2	Highway Crossing Permit Applications	Transmission Engineering		
Transmission	N					C.1.1.10.4	Railroad Crossing Drawings	Transmission Engineering		
Transmission	N					C.1.1.10.5	Railroad Crossing Permit Applications	Transmission Engineering		
Transmission	N					C.1.1.10.7	River Crossing Drawings	Transmission Engineering		
Transmission	N					C.1.1.10.8	River Crossing Permit Applications	Transmission Engineering		
Transmission	N					C.1.1.10.10	FAA Required Drawings	Transmission Engineering		
Transmission	N					C.1.1.10.11	FAA Required Permit Applications	Transmission Engineering		
Transmission	N					C.1.1.11	Specifications - Major Equipment	Transmission Engineering		
Transmission	N					C.1.1.12	Engineering Calculations	Transmission Engineering		
Substation	N					C.1.7.1	Geotechnical Reports	Substation Engineering		
Substation	N					C.1.7.2	Survey Reports	Substation Engineering		
Engineering	**Y**					**C.31**	**Transmission Owner Accepts Transmission Line Engineering Package**	**Agreements Support**		
Site Construction	**Y**					**C.32**	**Interconnection Customer submits Notice to Start Construction of Interconnection Facilities to Transmission Owner and Transmission Provider**	**Project Management/ Agreements Support**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Insurance	N					C.1.1	Workers Compensation - Statutory	Insurance Risk Management		
Insurance	N					C.1.2	Employers Liability - $1,000,000 (minimum)	Insurance Risk Management		The highlighted coverage's will be evidenced on one (1) certificate by FE
Insurance	N					C.1.3	Commercial General Liability – $1,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.1.4	Comprehensive Automobile Liability - $1,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.1.5	Excess/Umbrella Liability - $20,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.1.6	Professional Liability - $10,000,000 (minimum)*	Insurance Risk Management		*$10 Million limit is for CSA only. $5 Million minimum is required for ISA
Insurance	N					B.2.1	Additional Insured	Insurance Risk Management		
Insurance	N					C.2.1	Workers Compensation - Statutory	Insurance Risk Management		
Insurance	N					C.2.2	Employers Liability - $1,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.2.3	Commercial General Liability – $1,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.2.4	Comprehensive Automobile Liability - $1,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.2.5	Excess/Umbrella Liability - $20,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.2.6	Professional Liability - $10,000,000 (minimum)*	Insurance Risk Management		
Vegetation Management	N					C.1.5.1	Notification of Inspection of Vegetation Clearing Activities - Pre-construction	Vegetation Management		
Vegetation Management	N					C.1.5.2	Notification of Inspection of Vegetation Clearing Activities - Construction (provide date for vegetation clearing during construction)	Vegetation Management		
Reg. Siting & Environmental Permitting	N					C.2.2.1.6	Regulatory and permitting approvals	ED Siting, Surveying, ROW Engineering		
Reg. Siting & Environmental Permitting	N					C.2.3	Requirements for Specific Regulatory Siting Filings (See Site Specific Permit Plan)	ED Siting, Surveying, ROW Engineering		
Reg. Siting & Environmental Permitting	N					C.2.4	Specific Environmental Permits - Before Construction (See Site Specific Permit Plan)	ED Siting, Surveying, ROW Engineering		
Reg. Siting & Environmental Permitting	N					C.2.4	Special Environmental Permits and Authorizations	ED Siting, Surveying, ROW Engineering		
Substation	N					C.1.2	Property Plan	Substation Engineering		
Substation	N					C.1.3	Single Line Diagram	Substation Engineering		

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Master Milestone Checklist - PA
Project:

Phase / Requirements Document Section	MLST	Applicable		Opt to Build		Milestone Number	MILESTONE	Business Unit Assigned	Milestone or Deliverable Complete Date	Comments
		Yes	No	Yes	No					
Transmission	N					C.1.1.10.3	Approved Highway Crossing Permits	Transmission Engineering		
Transmission	N					C.1.1.10.6	Approved Railroad Crossing Permits	Transmission Engineering		
Transmission	N					C.1.1.10.9	Approved River Crossing Permits	Transmission Engineering		
Transmission	N					C.1.1.10.12	Approved FAA Permits	Transmission Engineering		
Transmission	N					C.1.2	Drawings Issued for Construction	Transmission Engineering		
Communications	N					C.1.7	TO Required Communications Materials and Equipment List	IT EMS Operations		
Tax & Accounting	N					C.2.1.1.1	Completed Cost Data Templates with Estimated Cost Data	Accounting Policy & Control		
Site Construction	**Y**					**C.33**	**Interconnection Customer submits Notice to Start Construction of Transmission Line to Transmission Owner and Transmission Provider**	**Project Management/ Agreements Support**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Insurance	N					C.1.1	Workers Compensation - Statutory	Insurance Risk Management		
Insurance	N					C.1.2	Employers Liability - $1,000,000 (minimum)	Insurance Risk Management		The highlighted coverage's will be evidenced on one (1) certificate by FE
Insurance	N					C.1.3	Commercial General Liability – $1,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.1.4	Comprehensive Automobile Liability - $1,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.1.5	Excess/Umbrella Liability - $20,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.1.6	Professional Liability - $10,000,000 (minimum)*	Insurance Risk Management		*$10 Million limit is for CSA only. $5 Million minimum is required for ISA
Insurance	N					B.2.1	Additional Insured	Insurance Risk Management		
Insurance	N					C.2.1	Workers Compensation - Statutory	Insurance Risk Management		
Insurance	N					C.2.2	Employers Liability - $1,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.2.3	Commercial General Liability – $1,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.2.4	Comprehensive Automobile Liability - $1,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.2.5	Excess/Umbrella Liability - $20,000,000 (minimum)	Insurance Risk Management		
Insurance	N					C.2.6	Professional Liability - $10,000,000 (minimum)*	Insurance Risk Management		
Vegetation Management	N					C.1.5.1	Notification of Inspection of Vegetation Clearing Activities - Pre-construction	Vegetation Management		
Vegetation Management	N					C.1.5.2	Notification of Inspection of Vegetation Clearing Activities - Construction (provide date for vegetation clearing during construction)	Vegetation Management		
Reg. Siting & Environmental Permitting	N					C.2.2.1.6	Regulatory and permitting approvals	ED Siting, Surveying, ROW Engineering		
Reg. Siting & Environmental Permitting	N					C.2.3	Requirements for Specific Regulatory Siting Filings (See Site Specific Permit Plan)	ED Siting, Surveying, ROW Engineering		
Reg. Siting & Environmental Permitting	N					C.2.4	Specific Environmental Permits - Before Construction (See Site Specific Permit Plan)	ED Siting, Surveying, ROW Engineering		
Reg. Siting & Environmental Permitting	N					C.2.4	Special Environmental Permits and Authorizations	ED Siting, Surveying, ROW Engineering		
Substation	N					C.1.2	Property Plan	Substation Engineering		
Substation	N					C.1.3	Single Line Diagram	Substation Engineering		
Transmission	N					C.1.1.10.3	Approved Highway Crossing Permits	Transmission Engineering		
Transmission	N					C.1.1.10.6	Approved Railroad Crossing Permits	Transmission Engineering		
Transmission	N					C.1.1.10.9	Approved River Crossing Permits	Transmission Engineering		
Transmission	N					C.1.1.10.12	Approved FAA Permits	Transmission Engineering		
Transmission	N					C.1.2	Drawings Issued for Construction	Transmission Engineering		
Communications	N					C.1.7	TO Required Communications Materials and Equipment List	IT EMS Operations		
Tax & Accounting	N					C.2.1.1.1	Completed Cost Data Templates with Estimated Cost Data	Accounting Policy & Control		
Outage	**Y**					**C.34**	**Interconnection Customer Submits Completed Outage Readiness Notification to Transmission Owner**	**ATSI Transmission System Dispatching**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Agreements Support	N					C.2.2	Completed Outage Readiness Notification	ATSI-Transmission System Dispatching		
Transmission	N					C.1.3	GPS Locations of Transmission Line Structures	ED Siting, Surveying, ROW Engineering		
Transmission	N					C.1.6.1	Red Line As-Built Drawings (Pre-Outage) provided to the TO's Transmission Engineer	Transmission Engineering		
Transmission	N					C.1.8.1	Manufacturer Drawings provided to the TO's print distribution list	Transmission Engineering		
Transmission	N					C.1.8.2	Factory Test Reports including hard copy and electronic format	Transmission Engineering		
Transmission	N					C.1.8.3	Instruction Books including hard copy and electronic format	Transmission Engineering		
Transmission	N					C.1.8.4	Warranty Assignments issued to the TO	Transmission Engineering		
Transmission	N					C.1.9	Construction Field Test Reports issued to the TO	Transmission Engineering		
Revenue Metering	N					C.2.1	Application for Electrical Service - General	For Application Specific Issues: Customer Support		
Revenue Metering	N					C.2.2	Application for Station Power Service	For Application Specific Issues: Customer Support		
Revenue Metering	N					C.2.3	Application and Agreement for Backup and Maintenance Service	For Application Specific Issues: Customer Support		
Communications	N					C.2.1	E911 Address Confirmation - Provided in Outage Readiness Notification	ATSI- Transmission System Dispatching		
Communications	N					C.2.4	Copies of Telco service orders, including projected due dates	IT-Network Engineering/Planning		
Outage	**Y**					**C.35**	**Transmission Owner Accepts Outage Readiness Notification and Submits to Transmission Provider**	**ATSI Transmission System Dispatching**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Substation	N					B.9.1	Relay Settings for TO Interconnection Facilities	ED-Protection		
Substation	N					B.9.2	Inter-tie Relay Settings at Customer Facilities	ED-Protection		
Outage	**Y**					**C.36**	**Transmission Provider Approves Outage Request**	**Agreements Support**		

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Master Milestone Checklist - PA
Project:

Phase / Requirements Document Section	MLST	Applicable		Opt to Build		Milestone Number	MILESTONE	Business Unit Assigned	Milestone or Deliverable Complete Date	Comments
		Yes	No	Yes	No					
Outage	**Y**					**C.37**	**Interconnection Customer submits Notice of Completion for Interconnection Facilities to Transmission Owner and Transmission Provider (Includes both Interconnection Customer and Transmission Owner Substations and any associated Transmission Line Facilities for Interconnection)**	**Project Management/ Agreements Support**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Agreements Support	N					C.2.1	Completed Project Change Request Form	Agreements Support		
Agreements Support	N					C.2.3	Notice of Completion	Agreements Support		
Real Estate	N					C.3.1	Assignment of Easement	Real Estate Services		
Real Estate	N					C.4.1	General Warranty Deed	Real Estate Services		
Vegetation Management	N					C.1.5.3	Notification of Inspection of Vegetation Clearing Activities - Post-Construction	Vegetation Management		
Reg. Siting & Environmental Permitting	N					C.2.2.1.7	Construction status, inspection reports, regulatory comments and notices	ED Siting, Surveying, ROW Engineering		
Reg. Siting & Environmental Permitting	N					C.2.2.1.8	Agency Permit-required Completion notices and regulatory acceptance	ED Siting, Surveying, ROW Engineering		
Substation	N					C.6.1.1.1	Red Line As-Built Set (Pre-Outage) kept at TO Interconnection Substation	Substation Engineering		
Substation	N					C.6.1.1.2	Red Line As-Built Set (Pre-Outage) sent to TO Substation Engineer	Substation Engineering		
Revenue Metering	N					C.1.7	Manufacturer's certified accuracy test reports for the revenue meter, CTs, and VTs	Metering		
Revenue Metering	N					C.1.8	Revenue meter program information including but not limited to loss compensation values (if applicable), 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)	Metering		
Revenue Metering	N					C.1.9	Revenue meter telephone number	Metering		
Communications	N					C.2.5	Completed copy of High Voltage Protection Form, including Telco provided calculations	IT-Network Engineering/Planning		Telco provided calculations
Communications	N					C.2.7	Fiber optic cable power measurement test results.	IT-Network Engineering/Planning		
Communications	N					C.2.9	RTU/HMI Configuration Files	IT EMS Operations		
Communications	N					C.2.10	OTDR Traces Test Results	IT-Network Engineering/Planning		
Communications	N					C.2.11	Communication Equipment Mfr Manuals and Warranty Information	IT-Network Engineering/Planning		
Communications	N					C.2.12	Communication Equipment Spares List	IT-Network Engineering/Planning		
Communications	N					C.2.13	Notification that RTU Communication Circuits are ready for Transmission Owner Testing	IT-Network Engineering/Planning		
Communications	N					C.2.14	Notification that RTU is ready for Transmission Owner Testing	IT EMS Operations		
Communications	N					C.2.15	Wave Trap on site ready for Transmission Owner Testing	IT-Infrastructure-Network Field Ops		
Communications	N					C.2.16	Power Line Carrier on ready for Transmission Owner Testing	IT-Infrastructure-Network Field Ops		
Tax & Accounting	N					C.2.1.1.2	Updated Cost Data Templates with Actual Cost Data	Accounting Policy & Control		
Outage	**Y**					**C.38**	**Transmission Owner Accepts Notice of Completion for Interconnection Facilities**	**Project Management/ Agreements Support**		
Outage	**Y**					**C.39**	**Transmission Owner Submits Notice of Successful Inspection & Testing of Interconnection Facilities to Interconnection Customer and Transmission Provider (Stage 1)**	**Agreements Support/ Project Management**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Agreements Support	N					C.1.5	Notice of Successful Inspection and Testing of Facilities	Agreements Support/ Project Management		
Outage	**Y**					**C.40**	**Interconnection Customer submits Notice of Transfer of Operational Control to Transmission Owner and Transmission Provider**	**Agreements Support/ Project Management**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Agreements Support	N					C.2.4	Verification of successful operation of telemetering system	Project Management/ Agreements Support		
Agreements Support	N					C.2.5	Verification of transfer of utilities	Agreements Support/ Customer Support		
Agreements Support	N					C.2.6	Notice of Transfer of Operational Control	Project Management/ Agreements Support		
Outage	**Y**					**C.41**	**Interconnection Customer submits Notice of Completion for Customer Generator to Transmission Owner and Transmission Provider (Stage 2)**	**Project Management/ Agreements Support**		
Outage	**Y**					**C.42**	**Transmission Owner Accepts Notice of Completion for Customer Generator**	**Project Management/ Agreements Support**		
Outage	**Y**					**C.43**	**Transmission Owner Submits Notice of Successful Inspection & Testing of Customer Generator to Interconnection Customer and Transmission Provider (Stage 2)**	**Agreements Support/ Project Management**		
Energization	**Y**					**C.44**	**Successful Energization of Interconnection Facilities (Stage 1)**	**ATSI Transmission System Dispatching/ Project Management/ Agreements Support**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Agreements Support	N					C.2.1	Completed Project Change Request Form	Agreements Support		
Substation	N					C.6.1.2.1	Red Line As-Built Set (at Energization) kept at TO Interconnection Substation	Substation Engineering		
Substation	N					C.6.1.2.2	Red Line As-Built Set (at Energization) sent to FE Substation Engineering	Substation Engineering		
Transmission	N					C.1.6.2	Red Line As-Built Drawings (Post-Energization) provided to the TO's Transmission Engineer	Transmission Engineering		
Revenue Metering	N					C.1.10	Notice that the revenue meter is receiving current and voltage inputs from the CTs and VTs and is ready for real-time communications through the dedicated voice grade analog telephone circuit.	Metering		
Energization	**Y**					**C.45**	**Successful Customer Generator Energization (Stage 2)**	**ATSI Transmission System Dispatching/ Project Management/ Agreements Support**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Substation	N					C.7.1.4	Instruction Books including hard copy and electronic format	Substation Engineering		
Substation	N					C.7.1.5	Warranty Assignments to TO	Substation Engineering		
Substation	N					C.8.1	Construction Field Test Reports	Substation Services		
Close-out	**Y**					**C.46**	**Transmission Owner Submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer and Transmission Provider**	**Agreements Support/ Project Management**		
Source Document	**N**					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Reg. Siting & Environmental Permitting	N					C.2.4	Specific Environmental Permits - After Construction (See Site Specific Permit Plan)	ED Siting, Surveying, ROW Engineering		

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Master Milestone Checklist - PA
Project:

Phase / Requirements Document Section	MLST	Applicable		Opt to Build		Milestone Number	MILESTONE	Business Unit Assigned	Milestone or Deliverable Complete Date	Comments
		Yes	No	Yes	No					
Agreements Support	N					C.1.6	Notice of Acceptance of Facilities	Agreements Support		
Close-out	**Y**					**C.47**	**Interconnection Customer Submits Bill of Sale & Notice of Transfer of Title to Transmission Owner and Transmission Provider**	**Agreements Support**		
Source Document	N					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Agreements Support	N					C.2.1	Completed Project Change Request Form	Agreements Support		
Agreements Support	N					C.2.7	Notice of Transfer of Title	Agreements Support		
Agreements Support	N					C.2.8	Bill of Sale	Agreements Support		
Agreements Support	N					C.2.9	Applicable Federal Energy Regulatory Commission (FERC) filing	Agreements Support		
Substation	N					C.6.2.1	Final Record As-Built Drawings issued to TO	Substation Engineering		
Substation	N					C.7.1.1	Manufacturer's Drawings including hard copy and electronic format	Substation Engineering		
Substation	N					C.7.1.2	Factory Test Reports including hard copy and electronic format	Substation Engineering		
Substation	N					C.7.1.3	Transformer Manufacturer Test Reports	Substation Engineering		
Transmission	N					C.1.1.13	Manufacturer Drawings	Transmission Engineering		
Transmission	N					C.1.7.1	Final Record As-Built Drawings issued to the TO	Transmission Engineering		
Revenue Metering	N					C.2.1.1	Interconnection Customer Verifies Billing Entity, Address and Contact Information (Information provided on Outage Readiness Notification)	Customer Support		
Revenue Metering	N					C.2.2.1	Interconnection Customer Verifies Billing Entity, Address and Contact Information (Information provided on Outage Readiness Notification)	Customer Support		
Tax & Accounting	N					C.2.1.1.3	Final Cost Data Templates with as-built Actual Cost	Accounting Policy & Control		
Close-out	**Y**					**C.48**	**Transmission Owner Executes and Submits Bill of Sale & Transfer of Title to Interconnection Customer and Transmission Provider**	**Agreements Support**		
Source Document	N					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Insurance	N					B.1.3	Renewal certificate	Insurance Risk Management		Renewals should be provided annually and verification o current certificates should be done upon completion of the project
Agreements Support	N					C.1.7	Notice of Approval of Documentation	Agreements Support		
Close-out	**Y**					**C.49**	**Interconnection and Generator Facility In-Service**	**Agreements Support/ Project Management**		
Source Document	N					**Item Number**	**Item Description**		**Completed Date**	**Comments**
Revenue Metering	N					C.2.3	Written notice as outlined in the Application and Agreement for Backup and Maintenance when the Interconnection Customer either takes or plans to take Backup or Maintenance power.	For Application Specific Issues: Power Billing		

Item		Applicable		Option to Build		Need by Milestone		For reference and record keeping purposes		
Item Number	Description	Yes	No	Yes	No	Milestone Number	Milestone Description	FE Contact	Date Issued	Comment
	TRANSMISSION OWNER PROVIDED DOCUMENTS									
C.1.2	Project Team Contact List					C.3	Transmission Provider conducts External Project Kick-Off Meeting with all Parties	Agreements Support		
C.1.3	Project Change Request Form					C.3	Transmission Provider conducts External Project Kick-Off Meeting with all Parties	Project Management/ Agreements Support		
C.1.4	Interconnection Customer Outage Readiness Notification					C.3	Transmission Provider conducts External Project Kick-Off Meeting with all Parties	Agreements Support		
C.1.5	Notice of Successful Inspection and Testing of Facilities					C.39	Transmission Owner Submits Notice of Successful Inspection & Testing of Interconnection Facilities to Interconnection Customer and Transmission Provider (Stage 1)	Agreements Support/ Project Management		
C.1.6	Notice of Acceptance of Facilities					C.46	Transmission Owner Submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer and Transmission Provider	Agreements Support		
C.1.7	Notice of Approval of Documentation					C.48	Transmission Owner Executes and Submits Bill of Sale & Transfer of Title to Interconnection Customer and Transmission Provider	Agreements Support		
	INTERCONNECTION CUSTOMER PROVIDED DOCUMENTS									
C.2.1	Completed Project Change Request Form					C.37, C.44, C.47	Interconnection Customer submits Notice of Completion for Interconnection Facilities to Transmission Owner and Transmission Provider (Includes both Interconnection Customer and Transmission Owner Substations) Successful Energization of Interconnection Facilities (Stage 1) Interconnection Customer Submits Bill of Sale & Notice of Transfer of Title to Transmission Owner and Transmission Provider	Agreements Support		
C.2.2	Completed Interconnection Customer Outage Readiness Notification					C.34	Interconnection Customer Submits Completed Outage Readiness Notification to Transmission Owner	ATSI-Transmission System Dispatching		
C.2.3	Notice of Completion					C.37	Interconnection Customer submits Notice of Completion for Interconnection Facilities to Transmission Owner and Transmission Provider (Includes both Interconnection Customer and Transmission Owner Substations and any associated Transmission Facilities for Interconnection)	Agreements Support		
C.2.4	Verification of successful operation of telemetering system					C.40	Interconnection Customer submits Notice of Transfer of Operational Control to Transmission Owner and Transmission Provider	Project Management/ Agreements Support		
C.2.5	Verification of transfer of utilities					C.40	Interconnection Customer submits Notice of Transfer of Operational Control to Transmission Owner and Transmission Provider	Agreements Support/ Customer Support		
C.2.6	Notice of Transfer of Operational Control					C.40	Interconnection Customer submits Notice of Transfer of Operational Control to Transmission Owner and Transmission Provider	Project Management/ Agreements Support		
C.2.7	Notice of Transfer of Title					C.47	Interconnection Customer Submits Bill of Sale & Notice of Transfer of Title to Transmission Owner and Transmission Provider	Agreements Support		
C.2.8	Bill of Sale					C.47	Interconnection Customer Submits Bill of Sale & Notice of Transfer of Title to Transmission Owner and Transmission Provider	Agreements Support		
C.2.9	Applicable Federal Energy Regulatory Commission (FERC) filing					C.47	Interconnection Customer Submits Bill of Sale & Notice of Transfer of Title to Transmission Owner and Transmission Provider	Agreements Support		

Wholesale Generation Interconnection Customer Documentation Checklist

Real Estate

Item		Applicable		Option to Build		Need by Milestone		For reference and record keeping purposes		
Item Number	Description	Yes	No	Yes	No	Milestone Number	Milestone Description	FE Contact	Date Issued	Comment
	INTERCONNECTION CUSTOMER PROVIDED DOCUMENTS									
C.1.1	Easement (Perpetual)					C.11	Interconnection Customer Submits and Transmission Owner Accepts all executed Deeds/ Easements/ Access Agreements to Transmission Owner	Real Estate Services		
C.2.1	Site Access Agreement					C.11	Interconnection Customer Submits and Transmission Owner Accepts all executed Deeds/ Easements/ Access Agreements to Transmission Owner	Real Estate Services		
C.3.1	Assignment of Easement					C.37	Interconnection Customer submits Notice of Completion for Interconnection Facilities to Transmission Owner	Real Estate Services		
C.4.1	General Warranty Deed					C.37	Interconnection Customer submits Notice of Completion for Interconnection Facilities to Transmission Owner	Real Estate Services		
C.5.1	Legal description and survey of fee property being conveyed, including all lot split requirements					C.11	Interconnection Customer Submits and Transmission Owner Accepts all executed Deeds/ Easements/ Access Agreements to Transmission Owner	Real Estate Services		
C.5.2	Legal description for new transmission easement					C.11	Interconnection Customer Submits and Transmission Owner Accepts all executed Deeds/ Easements/ Access Agreements to Transmission Owner	Real Estate Services		
C.5.3	Legal description for new distribution easement					C.11	Interconnection Customer Submits and Transmission Owner Accepts all executed Deeds/ Easements/ Access Agreements to Transmission Owner	Real Estate Services		
C.5.4	Legal description for any other energy related facilities that may be required					C.11	Interconnection Customer Submits and Transmission Owner Accepts all executed Deeds/ Easements/ Access Agreements to Transmission Owner	Real Estate Services		
C.5.5	Legal description for ingress-egress easement to a dedicated public roadway					C.11	Interconnection Customer Submits and Transmission Owner Accepts all executed Deeds/ Easements/ Access Agreements to Transmission Owner	Real Estate Services		
C.5.6	Survey drawing that shows the new easements along with the location of existing easements or other existing facilities on the property. Names of adjoining property owners on survey drawings. Basic drawing features - title block, north arrow, legend, graphic scale					C.11	Interconnection Customer Submits and Transmission Owner Accepts all executed Deeds/ Easements/ Access Agreements to Transmission Owner	Real Estate Services		

Wholesale Generation Interconnection Customer Documentation Checklist

Vegetation Management

Item		Applicable		Option to Build		Need by Milestone		For reference and record keeping purposes		
Item Number	Description	Yes	No	Yes	No	Milestone Number	Milestone Description	FE Contact	Date Issued	Comment
	INTERCONNECTION CUSTOMER PROVIDED DOCUMENTS									
C.1.1	Right-of-Way drawings					C.12	Transmission Owner Submits Letter of Notification to PUC	Transmission Engineering		
C.1.2	Property and Easement descriptions					C.11	Interconnection Customer Submits and Transmission Owner Accepts all executed Deeds/ Easements/ Access Agreements to Transmission Owner	Real Estate Services		
C.1.3	Plan Profile Drawings					C.30	Interconnection Customer Submits Transmission Line Engineering Package to Transmission Owner	Transmission Engineering		
C.1.4	Property Owner Provision Plans					C.30	Interconnection Customer Submits Transmission Line Engineering Package to Transmission Owner	Real Estate Services		
C.1.5.1	Notification of scheduled Inspection of Vegetation Clearing Activities - Pre-construction					C.32 & C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	Vegetation Management		
C.1.5.2	Notification of scheduled Inspection of Vegetation Clearing Activities - Construction (provide date for vegetation clearing during construction)					C.32 & C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	Vegetation Management		
C.1.5.3	Notification of scheduled Inspection of Vegetation Clearing Activities - Post-Construction					C.37	Interconnection Customer submits Notice of Completion for Interconnection Facilities to Transmission Owner and Provider	Vegetation Management		

Wholesale Generation Interconnection Customer Documentation Checklist

Insurance

Item		Applicable		Option to Build		Need by Milestone		For reference and record keeping purposes		
Item Number	Description	Yes	No	Yes	No	Milestone Number	Milestone Description	FE Contact	Date Issued	Comment
	TRANSMISSION OWNER PROVIDED DOCUMENTS									
	CSA/ISA									
B.1.3	Renewal certificate					C.48	Transmission Owner Executes and Submits Bill of Sale & Transfer of Title to Interconnection Customer and Transmission Provider	Insurance Risk Management		Renewals should be provided annually and verification of current certificates should be done upon completion of the project
C.1.1	Workers Compensation - Statutory					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	Insurance Risk Management		
C.1.2	Employers Liability - $1,000,000 (minimum)					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	Insurance Risk Management		
C.1.3	Commercial General Liability – $1,000,000 (minimum)					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	Insurance Risk Management		
C.1.4	Comprehensive Automobile Liability - $1,000,000 (minimum)					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	Insurance Risk Management		
C.1.5	Excess/Umbrella Liability - $20,000,000 (minimum)					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	Insurance Risk Management		
B.2.1	Additional Insured					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	Insurance Risk Management		The highlighted coverage's will be evidenced on one (1) certificate by FE
C.1.6	Professional Liability - $10,000,000 (minimum)*					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	Insurance Risk Management		*$10 Million limit is for CSA only. $5 Million minimum is required for ISA
	INTERCONNECTION CUSTOMER PROVIDED DOCUMENTS									
	CSA/ISA									
B.1.3	Renewal certificate					C.48	Transmission Owner Executes and Submits Bill of Sale & Transfer of Title to Interconnection Customer and Transmission Provider	Insurance Risk Management		Renewals should be provided annually and verification of current certificates should be done upon completion of the project
B.2.1	Additional Insured					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	Insurance Risk Management		
C.2.1	Workers Compensation - $1,000,000 (minimum)					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	Insurance Risk Management		
C.2.2	Employers Liability - $1,000,000 (minimum)					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	Insurance Risk Management		
C.2.3	Commercial General Liability – $1,000,000 (minimum)					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	Insurance Risk Management		
C.2.4	Comprehensive Automobile Liability - $1,000,000 (minimum)					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	Insurance Risk Management		
C.2.5	Excess/Umbrella Liability - $20,000,000 (minimum)					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	Insurance Risk Management		
C.2.6	Professional Liability - $10,000,000 (minimum)*					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	Insurance Risk Management		

Wholesale Generation Interconnection Customer Documentation Checklist

Regulatory Siting and Environmental Permitting Checklist

Substations, Transmission Lines, Distribution Lines and Fiber Optic Lines - NJ

Item		Applicable		Option to Build		Need by Milestone		For reference and record keeping purposes		
Item Number	Description	Yes	No	Yes	No	Milestone Number	Milestone Description	FE Contact	Date Issued	Comment
	TRANSMISSION OWNER PROVIDED DOCUMENTS									
C.1.1	Electric Transmission Facilities Siting and Permitting White Paper (for New Jersey, Pennsylvania or Ohio based on project location)					C.1	Fully Executed ISA/CSA Agreements by All Parties	ED Siting, Surveying, ROW Engineering		
C.1.2	Permit Plan Template					S.15	Facility Report Completed by Transmission Owner	ED Siting, Surveying, ROW Engineering		Permit Plan Template to be included in Facility Study Report
C.1.3	Sample of previous FE siting and permitting applications when request by Interconnection Customer					C.3	Transmission Provider conducts External Project Kick-Off Meeting with All Parties	ED Siting, Surveying, ROW Engineering		
	INTERCONNECTION CUSTOMER PROVIDED DOCUMENTS									
C.2.1	Draft Permit Plan					C.3	Transmission Provider conducts External Project Kick-Off Meeting with All Parties	ED Siting, Surveying, ROW Engineering		
C.2.1	Final Permit Plan					C.14	Interconnection Customer Submits Final Environment Permit Plan to Transmission Owner	ED Siting, Surveying, ROW Engineering		
C.2.2.1.1	Draft regulatory siting and environmental permitting studies					C.16	Interconnection Customer submits all Environmental Permit Applications to Transmission Owner	ED Siting, Surveying, ROW Engineering		
C.2.2.1.2	Generic Text of Project description, location, construction, etc.					C.16	Interconnection Customer submits all Environmental Permit Applications to Transmission Owner	ED Siting, Surveying, ROW Engineering		
C.2.2.1.3	Draft regulatory siting and environmental permit submittals					C.16	Interconnection Customer submits all Environmental Permit Applications to Transmission Owner	ED Siting, Surveying, ROW Engineering		
C.2.2.1.4	All available drafts of regulatory siting and permitting approvals					C.19	Agency Issues Environmental Permits to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
C.2.2.1.5	Agency Permit-required Notices to start construction					C.19	Agency Issues Environmental Permits to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
C.2.2.1.6	Regulatory and permitting approvals					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line to Transmission Owner and Transmission Provider	ED Siting, Surveying, ROW Engineering		
C.2.2.1.7	Construction status, inspection reports, regulatory comments and notices					C.37	Interconnection Customer submits Notice of Completion for Interconnection Facilities to Transmission Owner and Transmission Provider	ED Siting, Surveying, ROW Engineering		
C.2.2.1.8	Agency Permit-required Completion notices and regulatory acceptance					C.37	Interconnection Customer submits Notice of Completion for Interconnection Facilities to Transmission Owner and Transmission Provider	ED Siting, Surveying, ROW Engineering		
See Below	Requirements for Specific Regulatory Siting Filings (listed below)					C.12 or C.13 C.32 or C.33	Transmission Owner Submits Application, Letter of Notification or similar filing to state regulatory agency (NJBPU, PaPUC, OPSB) State regulatory agency approves Application, Letter of Notification or similar filing Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line to Transmission Owner and Transmission Provider	ED Siting, Surveying, ROW Engineering		
See Below	Specific Environmental Permits - Before Construction (listed below)					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line to Transmission Owner and Transmission Provider	ED Siting, Surveying, ROW Engineering		
See Below	Specific Environmental Permits - After Construction (listed below)					C.46	Transmission Owner submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
C.2.3	**SPECIFIC REGULATORY SITING FILINGS (as applicable to specific projects)**					C.12 or C.13 C.32 or C.33	Transmission Owner Submits Application, Letter of Notification or similar filing to state regulatory agency (NJBPU, PaPUC, OPSB) State regulatory agency approves Application, Letter of Notification or similar filing Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line to Transmission Owner and Transmission Provider	ED Siting, Surveying, ROW Engineering		
C.2.3.1.1	**Local municipal filings or applications (applicable to all distribution and transmission substations and lines)**					C.12	Transmission Owner Submits Application, Letter of Notification or similar filing to state regulatory agency (NJBPU, PaPUC, OPSB)	ED Siting, Surveying, ROW Engineering		
	Service documents associated with municipal filings and applications					C.12	Transmission Owner Submits Application, Letter of Notification or similar filing to state regulatory agency (NJBPU, PaPUC, OPSB)	ED Siting, Surveying, ROW Engineering		
	Applications to be submitted to local municipality					C.12	Transmission Owner Submits Application, Letter of Notification or similar filing to state regulatory agency (NJBPU, PaPUC, OPSB)	ED Siting, Surveying, ROW Engineering		
	Service documents associated with Applications					C.12	Transmission Owner Submits Application, Letter of Notification or similar filing to state regulatory agency (NJBPU, PaPUC, OPSB)	ED Siting, Surveying, ROW Engineering		
	Public Notices associated with Applications					C.12	Transmission Owner Submits Application, Letter of Notification or similar filing to state regulatory agency (NJBPU, PaPUC, OPSB)	ED Siting, Surveying, ROW Engineering		
	Discovery, interrogatory and other documents associated with Applications					C.12	Transmission Owner Submits Application, Letter of Notification or similar filing to state regulatory agency (NJBPU, PaPUC, OPSB)	ED Siting, Surveying, ROW Engineering		
C.2.3.1.2	**Appeal filings to the New Jersey Board of Public Utilities**					C.12	Transmission Owner Submits Application, Letter of Notification or similar filing to state regulatory agency (NJBPU, PaPUC, OPSB)	ED Siting, Surveying, ROW Engineering		
	Service documents associated with appeal filings					C.12	Transmission Owner Submits Application, Letter of Notification or similar filing to state regulatory agency (NJBPU, PaPUC, OPSB)	ED Siting, Surveying, ROW Engineering		
	Appeal filings to be submitted to NJ BPU					C.12	Transmission Owner Submits Application, Letter of Notification or similar filing to state regulatory agency (NJBPU, PaPUC, OPSB)	ED Siting, Surveying, ROW Engineering		
	Service documents associated with appeal filings					C.12	Transmission Owner Submits Application, Letter of Notification or similar filing to state regulatory agency (NJBPU, PaPUC, OPSB)	ED Siting, Surveying, ROW Engineering		
	Public Notices associated with appeal filings					C.13	State regulatory agency approves Application, Letter of Notification or similar filing	ED Siting, Surveying, ROW Engineering		
	Discovery, interrogatory and other documents associated with appeal filings					C.13	State regulatory agency approves Application, Letter of Notification or similar filing	ED Siting, Surveying, ROW Engineering		
	Other (describe)					C.13	State regulatory agency approves Application, Letter of Notification or similar filing	ED Siting, Surveying, ROW Engineering		
C.2.4	**SPECIFIC ENVIRONMENTAL PERMITS - BEFORE CONSTRUCTION (as applicable to specific projects)**					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line to Transmission Owner and Transmission Provider	ED Siting, Surveying, ROW Engineering		
	National Environmental Policy Act (NEPA) - Environmental Assessment (EA) or Impact Statement (EIS)					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Threatened & Endangered Species Act Consultation					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Migratory Bird Treaty Act & Bald and Golden Eagle Protection Act Compliance					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Section 106 NHPA Compliance					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Section 404 Clean Water Act Permit Nationwide Permit					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Section 404 Clean Water Act Permit Individual Permit					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	State Programmatic General Permit - 17 (Tidal Lagoons)					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
C.2.4.1.3	**Freshwater Wetlands Protection Act Program (FWPAP) Compliance**					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Section 401 Water Quality Certification(WQC)					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
C.2.4.1.1	**Section 402 - NPDES Permit for Discharge of stormwater from Construction Activities**					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		

Item		Applicable		Option to Build		Need by Milestone		For reference and record keeping purposes		
Item Number	Description	Yes	No	Yes	No	Milestone Number	Milestone Description	FE Contact	Date Issued	Comment
	Co-permittee for NPDES Permit for Discharge of stormwater from Construction Activities					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
C.2.4.1.5	Approved Erosion & Sediment Control Plan					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Approved Postconstruction stormwater Management Plan					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Surface Water Permit for Construction Dewatering					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
C.2.4.1.2	**Flood Hazard Area Control Act Permit**					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Other (describe)					C.46	Transmission Owner submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
C.2.4	**SPECIFIC ENVIRONMENTAL PERMITS - AFTER CONSTRUCTION (as applicable to specific projects)**					C.46	Transmission Owner submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
	NOT of NPDES Permit for Discharge of stormwater from Construction Activities					C.46	Transmission Owner submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
	Other (describe)					C.46	Transmission Owner submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
C.2.4	**SPECIAL ENVIRONMENTAL PERMITS AND AUTHORIZATIONS (as applicable to specific projects)**					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line to Transmission Owner and Transmission Provider	ED Siting, Surveying, ROW Engineering		
	National Forest and Park Special Use Permits					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Appalachian Trail Access Authorization					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	NJ Forest and Park Right of Way Permit					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Tidelands Conveyance License/Grant					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Green Acres Approval					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	NJ Pinelands Certificate of Filing					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
C.2.4.1.4	**Highlands Construction Compliance**					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Hackensack Meadowlands Permit					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Coastal Construction Permits					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Other (describe)					C.32 or C.34	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	SPECIFIC ENGINEERING PERMITS (as applicable to specific projects)					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line to Transmission Owner and Transmission Provider	ED Siting, Surveying, ROW Engineering		
	Corps of Engineers Section 10 Permit					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Federal Aviation Administration Notification					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	NJDOT Aviation Obstruction Permit					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Federal Right-of -Way Permit					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	DOT Over-sized Load Permit					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	DOT Right-of-Way Permit					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	NJ Turnpike Right 0f Way Permit					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Railroad Crossing Permit					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Other (describe)					C.32 or C.34	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		

Wholesale Generation Interconnection Customer Documentation Checklist

Regulatory Siting and Environmental Permitting Checklist

Substations, Transmission Lines, Distribution Lines and Fiber Optic Lines - OH

Item		Applicable		Option to Build		Need by Milestone		For reference and record keeping purposes		
Item Number	Description	Yes	No	Yes	No	Milestone Number	Milestone Description	FE Contact	Date Issued	Comment
	TRANSMISSION OWNER PROVIDED DOCUMENTS									
C.1.1	Electric Transmission Facilities Siting and Permitting White Paper (for New Jersey, Pennsylvania or Ohio based on project location)					C.1	Fully Executed ISA/CSA Agreements by All Parties	ED Siting, Surveying, ROW Engineering		
C.1.2	Permit Plan Template					S.15	Facility Report Completed by Transmission Owner	ED Siting, Surveying, ROW Engineering		
C.1.3	Sample of previous FE siting and permitting applications when request by Interconnection Customer					C.3	Transmission Provider conducts External Project Kick-Off Meeting with All Parties	ED Siting, Surveying, ROW Engineering		
	INTERCONNECTION CUSTOMER PROVIDED DOCUMENTS									
C.2.1	Draft Permit Plan					C.3	Transmission Provider conducts External Project Kick-Off Meeting with All Parties	ED Siting, Surveying, ROW Engineering		
C.2.1	Final Permit Plan					C.14	Interconnection Customer Submits Final Environment Permit Plan to Transmission Owner	ED Siting, Surveying, ROW Engineering		
C.2.2.1.1	Draft regulatory siting and environmental permitting studies					C.16	Interconnection Customer submits all Environmental Permit Applications to Transmission Owner	ED Siting, Surveying, ROW Engineering		
C.2.2.1.2	Generic Text of Project description, location, construction, etc.					C.16	Interconnection Customer submits all Environmental Permit Applications to Transmission Owner	ED Siting, Surveying, ROW Engineering		
C.2.2.1.3	Draft regulatory siting and environmental permit submittals					C.16	Interconnection Customer submits all Environmental Permit Applications to Transmission Owner	ED Siting, Surveying, ROW Engineering		
C.2.2.1.4	All available drafts of regulatory siting and permitting approvals					C.19	Agency Issues Environmental Permits to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
C.2.2.1.5	Agency Permit-required Notices to start construction					C.19	Agency Issues Environmental Permits to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
C.2.2.1.6	Regulatory and permitting approvals					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line to Transmission Owner and Transmission Provider	ED Siting, Surveying, ROW Engineering		
C.2.2.1.7	Construction status, inspection reports, regulatory comments and notices					C.37	Interconnection Customer submits Notice of Completion for Interconnection Facilities to Transmission Owner and Transmission Provider	ED Siting, Surveying, ROW Engineering		
C.2.2.1.8	Agency Permit-required Completion notices and regulatory acceptance					C.37	Interconnection Customer submits Notice of Completion for Interconnection Facilities to Transmission Owner and Transmission Provider	ED Siting, Surveying, ROW Engineering		
See Below	Requirements for Specific Regulatory Siting Filings (listed below)					C.12 or C.13 C.32 or C.33	Transmission Owner Submits Application, Letter of Notification or similar filing to state regulatory agency (NJBPU, PaPUC, OPSB) State regulatory agency approves Application, Letter of Notification or similar filing Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line to Transmission Owner and Transmission Provider	ED Siting, Surveying, ROW Engineering		
See Below	Specific Environmental Permits - Before Construction (listed below)					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line to Transmission Owner and Transmission Provider	ED Siting, Surveying, ROW Engineering		
See Below	Specific Environmental Permits - After Construction (listed below)					C.46	Transmission Owner submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
C.2.3	**SPECIFIC REGULATORY SITING FILINGS (as applicable to specific projects)**					C.12 or C.13 C.32 or C.33	Transmission Owner Submits Application, Letter of Notification or similar filing to state regulatory agency (NJBPU, PaPUC, OPSB) State regulatory agency approves Application, Letter of Notification or similar filing Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line to Transmission Owner and Transmission Provider	ED Siting, Surveying, ROW Engineering		
C.2.3.2.1	Construction Notices to be submitted to the Ohio Power Siting Board for transmission substations and/or transmission lines					C.12	Transmission Owner Submits Application, Letter of Notification or similar filing to state regulatory agency (NJBPU, PaPUC, OPSB)	ED Siting, Surveying, ROW Engineering		
	Service documents associated with Construction Notices					C.12	Transmission Owner Submits Application, Letter of Notification or similar filing to state regulatory agency (NJBPU, PaPUC, OPSB)	ED Siting, Surveying, ROW Engineering		
C.2.3.2.1	Letters of Notification to be submitted to the Ohio Power Siting Board for transmission substations and/or transmission lines					C.12	Transmission Owner Submits Application, Letter of Notification or similar filing to state regulatory agency (NJBPU, PaPUC, OPSB)	ED Siting, Surveying, ROW Engineering		
	Service documents associated with Letters of Notification					C.12	Transmission Owner Submits Application, Letter of Notification or similar filing to state regulatory agency (NJBPU, PaPUC, OPSB)	ED Siting, Surveying, ROW Engineering		
C.2.3.2.1	Application to be submitted to the Ohio Power Siting Board for transmission substations and/or transmission lines					C.12	Transmission Owner Submits Application, Letter of Notification or similar filing to state regulatory agency (NJBPU, PaPUC, OPSB)	ED Siting, Surveying, ROW Engineering		
	Service documents associated with Applications					C.12	Transmission Owner Submits Application, Letter of Notification or similar filing to state regulatory agency (NJBPU, PaPUC, OPSB)	ED Siting, Surveying, ROW Engineering		
	Public Notices associated with Applications					C.13	State regulatory agency approves Application, Letter of Notification or similar filing	ED Siting, Surveying, ROW Engineering		
	Discovery, interrogatory and other documents associated with Applications					C.13	State regulatory agency approves Application, Letter of Notification or similar filing	ED Siting, Surveying, ROW Engineering		
	Submittals related to implementation of OPSB and other agency imposed conditions in approvals of Construction Notices, Letters of Notification and Application, and other permit filings					C.13	State regulatory agency approves Application, Letter of Notification or similar filing	ED Siting, Surveying, ROW Engineering		
	Other (describe)					C.13	State regulatory agency approves Application, Letter of Notification or similar filing	ED Siting, Surveying, ROW Engineering		
C.2.4	**SPECIFIC ENVIRONMENTAL PERMITS - BEFORE CONSTRUCTION (as applicable to specific projects)**					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line to Transmission Owner and Transmission Provider	ED Siting, Surveying, ROW Engineering		
C.2.4.2.1	**NPDES Permit for Discharge of stormwater from Construction Activities - Ohio EPA**					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Co-permittee for NPDES Permit for Discharge of stormwater from Construction Activities					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
C.2.4.2.2	Stormwater Pollution Prevention Plan					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
C.2.4.2.5 & C.2.4.2.6	**Section 404 Clean Water Act Nationwide Permits - USACE**					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Utility Line Activities Permit (Nationwide Permit 12)					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Nationwide Permit Pre-Construction Notification					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Bank Stabilization Permit (Nationwide Permit 13)					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Nationwide Permit Pre-Construction Notification					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Linear Transportation Projects Permit (Nationwide Permit 14)					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Nationwide Permit Pre-Construction Notification									
	Section 401 Water Quality Certification(WQC) - Ohio EPA					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
C.2.4.2.4	**Section 404 Clean Water Act Permit Individual Permit - USACE**					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Isolated Wetland Permit - Ohio EPA					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		

Item		Applicable		Option to Build		Need by Milestone		For reference and record keeping purposes		
Item Number	Description	Yes	No	Yes	No	Milestone Number	Milestone Description	FE Contact	Date Issued	Comment
	National Environmental Policy Act (NEPA) Environmental Assessment (EA) or Impact Statement (EIS) - Lead Federal Agency (e.g. USACE, NPS, etc)					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
C.2.4.2.3	Threatened & Endangered Species Consultation - USF&W, ODNR					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Migratory Bird Treaty Act Compliance - USF&W, ODNR					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Section 106 National Historic Preservation Act (NHPA) Compliance - Ohio Historic Preservation Office, Advisory Council on Historic Preservation					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Temporary Water Withdrawal Facility Registration - ODNR					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Burn Permit - Ohio EPA					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Blasting Permit - Ohio EPA					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Other (describe)					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
C.2.4	SPECIFIC ENVIRONMENTAL PERMITS - AFTER CONSTRUCTION (as applicable to specific projects)					C.46	Transmission Owner submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
	NOT for NPDES Permit for Discharge of stormwater from Construction Activities - Ohio EPA					C.46	Transmission Owner submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
	Section 404 Construction Completion Reporting / Monitoring - USACE					C.46	Transmission Owner submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
	Section 10 Construction Completion Reporting					C.46	Transmission Owner submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
	Section 401 Construction Completion Reporting / Monitoring - Ohio EPA					C.46	Transmission Owner submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
	Other (describe)					C.46	Transmission Owner submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
	SPECIFIC ENGINEERING PERMITS (as applicable to specific projects)					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line to Transmission Owner and Transmission Provider	ED Siting, Surveying, ROW Engineering		
	ODOT Access Permit					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Railroad Crossing Permit					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	OH Turnpike Utility Right-of-Way Permit					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Federal Right-of -Way Permit - Dept. of Interior Bureau of Land Mgt					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	ODOT Special Hauling Permit					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	OH Turnpike Special Hauling Permit					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Section 10 River and Harbors Act Permit - USACE					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Federal Aviation Administration Notification					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	ODOT Air Traffic Obstruction Permit					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	SPECIAL ENGINEERING AUTHORIZATIONS (as applicable to specific projects)					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line to Transmission Owner and Transmission Provider	ED Siting, Surveying, ROW Engineering		
	National Forest and Park Special Use Authorizations - NFS, NPS					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	OH State Forest Special Use Authorization - ODNR					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	OH State Park Access Permits - ODNR					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	OH State Nature Preserves Access Permit - ODNR					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Canal Lands Lease - ODNR					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Coastal Construction Permit - ODNR					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Other (describe)					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		

FirstEnergy

Wholesale Generation Interconnection Customer Documentation Checklist

Regulatory Siting and Environmental Permitting Checklist

Substations, Transmission Lines, Distribution Lines and Fiber Optic Lines - PA

Item		Applicable		Option to Build		Need by Milestone		For reference and record keeping purposes		
Item Number	Description	Yes	No	Yes	No	Milestone Number	Milestone Description	FE Contact	Date Issued	Comment
	TRANSMISSION OWNER PROVIDED DOCUMENTS									
C.1.1	Electric Transmission Facilities Siting and Permitting White Paper (for New Jersey, Pennsylvania or Ohio based on project location)					C.1	Fully Executed ISA/CSA Agreements by All Parties	ED Siting, Surveying, ROW Engineering		
C.1.2	Permit Plan Template					S.15	Facility Report Completed by Transmission Owner	ED Siting, Surveying, ROW Engineering		
C.1.3	Sample of previous FE siting and permitting applications when requested by Interconnection Customer					C.3	Transmission Provider conducts External Project Kick-Off Meeting with All Parties	ED Siting, Surveying, ROW Engineering		
	INTERCONNECTION CUSTOMER PROVIDED DOCUMENTS									
C.2.1	Draft Permit Plan					C.3	Transmission Provider conducts External Project Kick-Off Meeting with All Parties	ED Siting, Surveying, ROW Engineering		
C.2.1	Final Permit Plan					C.14	Interconnection Customer Submits Final Environment Permit Plan to Transmission Owner	ED Siting, Surveying, ROW Engineering		
C.2.2.1.1	Draft regulatory siting and environmental permitting studies					C.16	Interconnection Customer submits all Environmental Permit Applications to Transmission Owner	ED Siting, Surveying, ROW Engineering		
C.2.2.1.2	Generic Text of Project description, location, construction, etc.					C.16	Interconnection Customer submits all Environmental Permit Applications to Transmission Owner	ED Siting, Surveying, ROW Engineering		
C.2.2.1.3	Draft regulatory siting and environmental permit submittals					C.16	Interconnection Customer submits all Environmental Permit Applications to Transmission Owner	ED Siting, Surveying, ROW Engineering		
C.2.2.1.4	All available drafts of regulatory siting and permitting approvals					C.19	Agency Issues Environmental Permits to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
C.2.2.1.5	Agency Permit-required Notices to start construction					C.19	Agency Issues Environmental Permits to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
C.2.2.1.6	Regulatory and permitting approvals					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line to Transmission Owner and Transmission Provider	ED Siting, Surveying, ROW Engineering		
C.2.2.1.7	Construction status, inspection reports, regulatory comments and notices					C.37	Interconnection Customer submits Notice of Completion for Interconnection Facilities to Transmission Owner and Transmission Provider	ED Siting, Surveying, ROW Engineering		
C.2.2.1.8	Agency Permit-required Completion notices and regulatory acceptance					C.37	Interconnection Customer submits Notice of Completion for Interconnection Facilities to Transmission Owner and Transmission Provider	ED Siting, Surveying, ROW Engineering		
See Below	Requirements for Specific Regulatory Siting Filings (listed below)					C.12 or C.13 C.32 or C.33	Transmission Owner Submits Application, Letter of Notification or similar filing to state regulatory agency (NJBPU, PaPUC, OPSB) State regulatory agency approves Application, Letter of Notification or similar filing Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line to Transmission Owner and Transmission Provider	ED Siting, Surveying, ROW Engineering		
See Below	Specific Environmental Permits - Before Construction (listed below)					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line to Transmission Owner and Transmission Provider	ED Siting, Surveying, ROW Engineering		
See Below	Specific Environmental Permits - After Construction (listed below)					C.46	Transmission Owner submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
C.2.3	**SPECIFIC REGULATORY SITING FILINGS (as applicable to specific projects)**					C.12 or C.13 C.32 or C.33	Transmission Owner Submits Application, Letter of Notification or similar filing to state regulatory agency (NJBPU, PaPUC, OPSB) State regulatory agency approves Application, Letter of Notification or similar filing Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line to Transmission Owner and Transmission Provider	ED Siting, Surveying, ROW Engineering		
C.2.3.3.1	Letters of Notification to be submitted to the Pennsylvania Public Utility Commission					C.12	Transmission Owner Submits Application, Letter of Notification or similar filing to state regulatory agency (NJBPU, PaPUC, OPSB)	ED Siting, Surveying, ROW Engineering		
	Service documents associated with Letters of Notification					C.12	Transmission Owner Submits Application, Letter of Notification or similar filing to state regulatory agency (NJBPU, PaPUC, OPSB)	ED Siting, Surveying, ROW Engineering		
C.2.3.3.1	Application to be submitted to the Pennsylvania Public Utility Commission					C.12	Transmission Owner Submits Application, Letter of Notification or similar filing to state regulatory agency (NJBPU, PaPUC, OPSB)	ED Siting, Surveying, ROW Engineering		
	Service documents associated with Applications					C.12	Transmission Owner Submits Application, Letter of Notification or similar filing to state regulatory agency (NJBPU, PaPUC, OPSB)	ED Siting, Surveying, ROW Engineering		
	Public Notices associated with Applications					C.13	State regulatory agency approves Application, Letter of Notification or similar filing	ED Siting, Surveying, ROW Engineering		
	Discovery, interrogatory and other documents associated with Applications					C.13	State regulatory agency approves Application, Letter of Notification or similar filing	ED Siting, Surveying, ROW Engineering		
	Other (describe)					C.13	State regulatory agency approves Application, Letter of Notification or similar filing	ED Siting, Surveying, ROW Engineering		
C.2.4	**SPECIFIC ENVIRONMENTAL PERMITS - BEFORE CONSTRUCTION (as applicable to specific projects)**					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line to Transmission Owner and Transmission Provider	ED Siting, Surveying, ROW Engineering		
C.2.4.3.1	**Section 402 Individual NPDES Permit for Discharge of stormwater from Construction Activities**					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line to Transmission Owner and Transmission Provider	ED Siting, Surveying, ROW Engineering		
C.2.4.3.2	Co-permittee for NPDES Permit for Discharge of stormwater from Construction Activities					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line to Transmission Owner and Transmission Provider	ED Siting, Surveying, ROW Engineering		
C.2.4.3.3 C.2.4.3.4	Approved Erosion & Sediment Control Plan					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line to Transmission Owner and Transmission Provider	ED Siting, Surveying, ROW Engineering		
	Approved Postconstruction stormwater Management Plan					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line to Transmission Owner and Transmission Provider	ED Siting, Surveying, ROW Engineering		
C.2.4.3.7	**River, Stream or Wetland Crossing General Permits & Small Project Permits**					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line to Transmission Owner and Transmission Provider	ED Siting, Surveying, ROW Engineering		
	PADEP GP-5 (General Permit 5:Utility Line Stream Crossing Permit)					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Start of Construction Notice- Conservation District					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Start of Construction Notice- PFBC					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	PADEP GP-7 (General Permit 7: Minor Road Crossing Permit)					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Start of Construction Notice- Conservation District					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Start of Construction Notice- PFBC					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	PADEP GP-8 (General Permit 8: Temporary Road Crossing Permit)					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Start of Construction Notice- Conservation District					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Start of Construction Notice- PFBC					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	PADEP Small Projects Permit					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Acknowledgement of Receipt of Permit to PADEP					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		

Item		Applicable		Option to Build		Need by Milestone		For reference and record keeping purposes		
Item Number	Description	Yes	No	Yes	No	Milestone Number	Milestone Description	FE Contact	Date Issued	Comment
	Acknowledgment of Apprisal of Permit Conditions to PADEP					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Start of Construction Notice - PADEP					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Start of Construction Notice - Conservation District					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Start of Construction Notice - PFBC					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Maintenance, Testing, Repair, Rehabilitation or Replacement of Water Obstructions and Encroachments Permit (GP-11)					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Start of Construction Notice- PFBC					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	PA Submerged Lands License Agreement					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	FE Executed Returned					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	PA Executed Received					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Pennsylvania State Programmatic General Permit - (SPGP-3)					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Floodplain Management Permit					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Acknowledgement of Receipt of Permit to PADEP					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Acknowledgment of Apprisal of Permit Conditions to PADEP					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Start of Construction Notice - PADEP					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Start of Construction Notice - Conservation District					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Start of Construction Notice - PFBC					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Section 10 River and Harbors Act Compliance					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Pre-Construction Notice (PCN)					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Work Commencement Form					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Army Corps of Engineers Nationwide Permit 12: Utility Line Activities					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Pre-Construction Notice (PCN)					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Work Commencement Form					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Army Corps of Engineers Nationwide Permit 13: Bank Stabilization					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Pre-Construction Notice (PCN)					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Work Commencement Form					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Army Corps of Engineers Nationwide Permit 14: Road Crossing					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Pre-Construction Notice (PCN)					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Work Commencement Form					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Section 404 Clean Water Act Individual Permit					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Acknowledgement of Receipt of Permit to PADEP					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Acknowledgment of Apprisal of Permit Conditions to PADEP					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Start of Construction Notice - PADEP					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Start of Construction Notice - Conservation District					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Start of Construction Notice - PFBC					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Section 401 Water Quality Certification					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	National Environmental Policy Act (NEPA) - Environmental Assessment (EA) or Impact Statement (EIS)					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Threatened & Endangered Species Act Consultation					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Migratory Bird Treaty Act & Bald and Golden Eagle Protection Act Compliance					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Section 106 National Historic Preservation Act Compliance					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Bank Rehabilitation, Bank Protection and Gravel Bar Removal Permit (PA-GP-3)					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		

Item		Applicable		Option to Build		Need by Milestone		For reference and record keeping purposes		
Item Number	Description	Yes	No	Yes	No	Milestone Number	Milestone Description	FE Contact	Date Issued	Comment
	Other (describe)					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
C.2.4	**SPECIFIC ENVIRONMENTAL PERMITS - AFTER CONSTRUCTION (as applicable to specific projects)**					C.46	Transmission Owner submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
C.2.4.3.5	**NOT of NPDES Permit for Discharge of stormwater from Construction Activities**					C.46	Transmission Owner submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
C.2.4.3.6	**Final E&S inspection report from County Conservation District**					C.46	Transmission Owner submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
C.2.4.3.8	**River, Stream or Wetland Crossing General Permits & Small Project Permits**					C.46	Transmission Owner submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
	PADEP GP-5 (General Permit 5:Utility Line Stream Crossing Permit)					C.46	Transmission Owner submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
	PADEP GP-7 (General Permit 7: Minor Road Crossing Permit)					C.46	Transmission Owner submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
	PADEP GP-8 (General Permit 8: Temporary Road Crossing Permit)					C.46	Transmission Owner submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
	PADEP Small Projects Permit					C.46	Transmission Owner submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
	Project Completion Notice - PADEP					C.46	Transmission Owner submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
	Project Completion Notice -Conservation District					C.46	Transmission Owner submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
	Project Completion Notice - PFBC					C.46	Transmission Owner submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
	PADEP Individual Permit					C.46	Transmission Owner submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
	Project Completion Notice - PADEP					C.46	Transmission Owner submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
	Project Completion Notice - Conservation District					C.46	Transmission Owner submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
	Project Completion Notice - PFBC					C.46	Transmission Owner submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
	Corps of Engineers PASPGP-3					C.46	Transmission Owner submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
	Project Completion Notice					C.46	Transmission Owner submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
	Corps of Engineers Nationwide Permit					C.46	Transmission Owner submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
	Work Completion Form					C.46	Transmission Owner submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
	Corps of Engineers Section 10 Permit					C.46	Transmission Owner submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
	Project Completion Notice					C.46	Transmission Owner submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
	PADEP Floodplain Permit					C.46	Transmission Owner submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
	Project Completion Notice - PADEP					C.46	Transmission Owner submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
	Project Completion Notice -Conservation District					C.46	Transmission Owner submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
	Project Completion Notice - PFBC					C.46	Transmission Owner submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
	Other (describe)					C.46	Transmission Owner submits Notice of Acceptance of Interconnection Facilities to Interconnection Customer	ED Siting, Surveying, ROW Engineering		
	SPECIFIC ENGINEERING PERMITS (as applicable to specific projects)					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line to Transmission Owner and Transmission Provider			
	DOT Right-of-Way Permit					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Railroad Crossing Permit					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Turnpike Right-of-Way Permit					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Federal Right-of -Way Grant					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Federal Aviation Administration Notification					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	DOT Special Hauling Permit					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Turnpike Over-Dimensional Vehicle Permit					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Blasting Permit					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Other (describe)					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	SPECIAL ENGINEERING AUTHORIZATIONS (as applicable to specific projects)					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line to Transmission Owner and Transmission Provider			
	PA State Forest Access Authorization					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	PA State Park Construction Authorization					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		

Item		Applicable		Option to Build		Need by Milestone		For reference and record keeping purposes		
Item Number	Description	Yes	No	Yes	No	Milestone Number	Milestone Description	FE Contact	Date Issued	Comment
	National Forest Special Use Permits					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	National Park Special Use Permits					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Coastal Construction Permits					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Appalachian Trail Access Authorization					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		
	Other (describe)					C.32 or C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	ED Siting, Surveying, ROW Engineering		

Wholesale Generation Interconnection Customer Documentation Checklist

Substation

Item		Applicable		Option to Build		Need by Milestone		For reference and record keeping purposes		
Item Number	Description	Yes	No	Yes	No	Milestone Number	Milestone Description	FE Contact	Date Issued	Comment
B	**TRANSMISSION OWNER PROVIDED DOCUMENTS**									
B.2	Vendor Contact Information					C.3	Transmission Provider conducts External Project Kick-Off Meeting with All Parties	Substation Engineering		
B.4	TO's Interconnection Substation Name & Substation Number					C.9	Transmission Owner Accepts Preliminary Real Estate Plan and provides below deliverables to the Interconnection Customer	Substation Engineering		
B.5.1	Protection Requirements for TO Interconnection Facilities					C.9	Transmission Owner Accepts Preliminary Real Estate Plan and provides below deliverables to the Interconnection Customer	ED-Protection		
B.5.2	Inter-tie Relay Requirements for Customer Interconnection Facilities					C.9	Transmission Owner Accepts Preliminary Real Estate Plan and provides below deliverables to the Interconnection Customer	ED-Protection		
B.9.1	Relay Settings for TO Interconnection Facilities					C.35	Transmission Owner Accepts Outage Readiness Notification and Submits to Transmission Provider	ED-Protection		
B.9.2	Inter-tie Relay Settings at Customer Facilities					C.35	Transmission Owner Accepts Outage Readiness Notification and Submits to Transmission Provider	ED-Protection		
B.10.1	Testing & Commissioning Requirements					C.3	Transmission Provider conducts External Project Kick-Off Meeting with All Parties	Substation Maintenance		
C	**INTERCONNECTION CUSTOMER PROVIDED DOCUMENTS**									
C.1.1	Bill of Materials					C.24	Interconnection Customer Submits Below Grade Interconnection Facilities Engineering Package to Transmission Owner	Substation Engineering		
C.1.2	Property Plan					C.32 & C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	Substation Engineering		
C.1.3	Single Line Diagram					C.32 & C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line	Substation Engineering		
C.1.4	Balance of Design Drawings					C.24	Interconnection Customer Submits Below Grade Interconnection Facilities Engineering Package to Transmission Owner	Substation Engineering		
C.1.5	Specifications - Major Equipment					C.24	Interconnection Customer Submits Below Grade Interconnection Facilities Engineering Package to Transmission Owner	Substation Engineering		
C.1.6	Engineering Calculations					C.24	Interconnection Customer Submits Below Grade Interconnection Facilities Engineering Package to Transmission Owner	Substation Engineering		
C.1.7.1	Geotechnical Reports					C.30	Interconnection Customer Submits Transmission Line Engineering Package to Transmission Owner	Substation Engineering		
C.1.7.2	Survey Reports					C.30	Interconnection Customer Submits Transmission Line Engineering Package to Transmission Owner	Substation Engineering		
C.2	Project Data & Drawings Submitted to the TO					C.26	Interconnection Customer Submits Above Grade Interconnection Facilities Engineering Package to Transmission Owner	Substation Engineering		
C.3.1.1	Below Grade Interconnection Facilities Engineering Package					C.24	Interconnection Customer Submits Below Grade Interconnection Facilities Engineering Package to Transmission Owner	Substation Engineering		
C.3.1.2	Above Grade Interconnection Facilities Engineering Package					C.26	Interconnection Customer Submits Above Grade Interconnection Facilities Engineering Package to Transmission Owner	Substation Engineering		
C 3.1.3	Relay & Control Interconnection Facilities Engineering Package					C.28	Interconnection Customer Submits Relay & Control Interconnection Facilities Engineering Package to Transmission Owner	Substation Engineering		
C.6.1.1.1	Red Line As-Built Set (Pre-Outage) kept at TO Interconnection Substation					C.37	Interconnection Customer submits Notice of Completion for Interconnection Facilities to Transmission Owner and Transmission Provider	Substation Engineering		
C.6.1.1.2	Red Line As-Built Set (Pre-Outage) sent to TO Substation Engineer					C.37	Interconnection Customer submits Notice of Completion for Interconnection Facilities to Transmission Owner and Transmission Provider	Substation Engineering		
C.6.1.2.1	Red Line As-Built Set (at Energization) kept at TO Interconnection Substation					C.44	Successful Energization of Interconnection Facilities (Stage 1)	Substation Engineering		
C.6.1.2.2	Red Line As-Built Set (at Energization) sent to TO Substation Engineering					C.44	Successful Energization of Interconnection Facilities (Stage 1)	Substation Engineering		
C.6.2.1	Final Record As-Built Drawings issued to TO					C.47	Interconnection Customer Submits Bill of Sale & Notice of Transfer of Title to Transmission Owner and Transmission Provider	Substation Engineering		
C.7.1.1	Manufacturer's Drawings including hard copy and electronic format					C.47	Interconnection Customer Submits Bill of Sale & Notice of Transfer of Title to Transmission Owner and Transmission Provider	Substation Engineering		
C.7.1.2	Factory Test Reports including hard copy and electronic format					C.47	Interconnection Customer Submits Bill of Sale & Notice of Transfer of Title to Transmission Owner and Transmission Provider	Substation Engineering		
C.7.1.3	Transformer Manufacturer Test Reports					C.47	Interconnection Customer Submits Bill of Sale & Notice of Transfer of Title to Transmission Owner and Transmission Provider	Substation Engineering		
C.7.1.4	Instruction Books including hard copy and electronic format					C.45	Successful Generator Energization by Customer (Stage 2)	Substation Engineering		
C.7.1.5	Warranty Assignments to TO					C.45	Successful Generator Energization by Customer (Stage 2)	Substation Engineering		
C.8.1	Construction Field Test Reports					C.45	Successful Generator Energization by Customer (Stage 2)	Substation Services		

Drawing Group	Description		Date Received	Comment
Below Grade				
04	Property (Site) Plan		With issuance of Construction Drawings to Field	
06	Bill of Material - Below Grade		" " " "	
15	Foundation Layouts & Details Group		" " " "	
	Foundation Plan		" " " "	
	Foundation Details		" " " "	
16	Conduit/Grounding Layout & Details Group		" " " "	
	Conduit Plan		" " " "	
	Conduit Details		" " " "	
	Grounding Plan		" " " "	
	Grounding Details		" " " "	
40	Miscellaneous Drawings Group		" " " "	
Above Grade				
06	Bill of Material - Above Grade		With issuance of Construction Drawings to Field	
13	Low Voltage Electrical Plan Group		" " " "	
	Electrical Plan View		" " " "	
	Electrical Elevation (or Section) Views		" " " "	
14	High Voltage Electrical Plan Group		" " " "	
	Electrical Plan View		" " " "	
	Electrical Elevation (or Section) Views		" " " "	
18	Steel Erection Diagrams Group		" " " "	
	Plan View		" " " "	
	Steel Details		" " " "	
23	Substation Nameplates		" " " "	
25	Conduit List		" " " "	
26	Circuit List		" " " "	
30	Control Building Plans and Details		" " " "	
40	Miscellaneous Drawings Group		" " " "	
	Telephone Protection Panel		" " " "	
Relay & Control (Indoor)				
00	Check off List		With issuance of Construction Drawings to Field	
01	Drawing List		" " " "	
02	One Line Diagram		" " " "	
03	AC One Line		" " " "	
05	DC One Line		" " " "	
06	Bill of Material - Relay & Control		" " " "	
07	Low Voltage Schematics Group		" " " "	
	Line Protection Schematics		" " " "	
	Breaker Protection Schematics		" " " "	
	Communications Schematics		" " " "	
	SCADA/HMI Schematics		" " " "	
	Miscellaneous Schematics		" " " "	
08	High Voltage Schematics Group		" " " "	
	Line Protection Schematics		" " " "	
	Breaker Protection Schematics		" " " "	

Drawing Group	Description		Date Received	Comment
	Communications Schematics		" " " " "	
	SCADA/HMI Schematics		" " " " "	
	Miscellaneous Schematics		" " " " "	
09	Low Voltage Equip. Detail Wiring Diagrams Group		" " " " "	
	Breaker Detail Wiring Diagrams		" " " " "	
	CVT Detail Wiring Diagrams		" " " " "	
10	High Voltage Equip. Detail Wiring Diagrams Group		" " " " "	
	Breaker Detail Wiring Diagrams		" " " " "	
	CVT Detail Wiring Diagrams		" " " " "	
11	Switchboard Front Views		" " " " "	
12	Switchboard Wiring Diagrams Group		" " " " "	
	Switchboard Detail Wiring Diagrams		" " " " "	
	SCADA/HMI Detail Wiring Diagrams		" " " " "	
24	Switchboard Nameplates		" " " " "	
40	Miscellaneous Drawings		" " " " "	
	Telephone Protection Panel		" " " " "	

Wholesale Generation Interconnection Customer Documentation Checklist

Substation – Red-line Drawing Details

Drawing Group	Description		Date Received	Comment
Below Grade				
04	Property (Site) Plan		Complete in Field prior to Energization	
06	Bill of Material - Below Grade		" " " " "	
15	Foundation Layouts & Details Group		" " " " "	
	Foundation Plan		" " " " "	
	Foundation Details		" " " " "	
16	Conduit/Grounding Layout & Details Group		" " " " "	
	Conduit Plan		" " " " "	
	Conduit Details		" " " " "	
	Grounding Plan		" " " " "	
	Grounding Details		" " " " "	
40	Miscellaneous Drawings Group		" " " " "	
Above Grade				
06	Bill of Material - Above Grade		Complete in Field prior to Energization	
13	Low Voltage Electrical Plan Group		" " " " "	
	Electrical Plan View		" " " " "	
	Electrical Elevation (or Section) Views		" " " " "	
14	High Voltage Electrical Plan Group		" " " " "	
	Electrical Plan View		" " " " "	
	Electrical Elevation (or Section) Views		" " " " "	
18	Steel Erection Diagrams Group		" " " " "	
	Plan View		" " " " "	
	Steel Details		" " " " "	
23	Substation Nameplates		" " " " "	
25	Conduit List		" " " " "	
26	Circuit List		" " " " "	
30	Control Building Plans and Details		" " " " "	
40	Miscellaneous Drawings Group		" " " " "	
Relay & Control (Indoor)				
00	Check off List		Complete in Field prior to Energization	
01	Drawing List		" " " " "	
02	One Line Diagram		" " " " "	
03	AC One Line		" " " " "	
05	DC One Line		" " " " "	
06	Bill of Material - Relay & Control		" " " " "	
07	Low Voltage Schematics Group		" " " " "	
	Line Protection Schematics		" " " " "	
	Breaker Protection Schematics		" " " " "	
	Communications Schematics		" " " " "	
	SCADA/HMI Schematics		" " " " "	
	Miscellaneous Schematics		" " " " "	

Wholesale Generation Interconnection Customer Documentation Checklist

Substation – Red-line Drawing Details

Drawing Group	Description		Date Received	Comment
08	High Voltage Schematics Group		" " " " "	
	Line Protection Schematics		" " " " "	
	Breaker Protection Schematics		" " " " "	
	Communications Schematics		" " " " "	
	SCADA/HMI Schematics		" " " " "	
	Miscellaneous Schematics		" " " " "	
09	Low Voltage Equip. Detail Wiring Diagrams Group		" " " " "	
	Breaker Detail Wiring Diagrams		" " " " "	
	CVT Detail Wiring Diagrams		" " " " "	
10	High Voltage Equip. Detail Wiring Diagrams Group		" " " " "	
	Breaker Detail Wiring Diagrams		" " " " "	
	CVT Detail Wiring Diagrams		" " " " "	
11	Switchboard Front Views		" " " " "	
12	Switchboard Wiring Diagrams Group		" " " " "	
	Switchboard Detail Wiring Diagrams		" " " " "	
	SCADA/HMI Detail Wiring Diagrams		" " " " "	
24	Switchboard Nameplates		" " " " "	
40	Miscellaneous Drawings		" " " " "	
	Telephone Protection Panel		" " " " "	

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Wholesale Generation Interconnection Customer Documentation Checklist

Substation – Record Drawing Details

Drawing Group	Description		Date Received	Comment
Below Grade				
04	Property (Site) Plan		45 days after release of red line as builts by Commissioning Engineers	
06	Bill of Material - Below Grade		" " " " "	
15	Foundation Layouts & Details Group		" " " " "	
	Foundation Plan		" " " " "	
	Foundation Details		" " " " "	
16	Conduit/Grounding Layout & Details Group		" " " " "	
	Conduit Plan		" " " " "	
	Conduit Details		" " " " "	
	Grounding Plan		" " " " "	
	Grounding Details		" " " " "	
40	Miscellaneous Drawings Group		" " " " "	
Above Grade				
06	Bill of Material - Above Grade		45 days after release of red line as builts by Commissioning Engineers	
13	Low Voltage Electrical Plan Group		" " " " "	
	Electrical Plan View		" " " " "	
	Electrical Elevation (or Section) Views		" " " " "	
14	High Voltage Electrical Plan Group		" " " " "	
	Electrical Plan View		" " " " "	
	Electrical Elevation (or Section) Views		" " " " "	
18	Steel Erection Diagrams Group		" " " " "	
	Plan View		" " " " "	
	Steel Details		" " " " "	
23	Substation Nameplates		" " " " "	
25	Conduit List		" " " " "	
26	Circuit List		" " " " "	
30	Control Building Plans and Details		" " " " "	
40	Miscellaneous Drawings Group		" " " " "	
Relay & Control (Indoor)				
00	Check off List		45 days after release of red line as builts by Commissioning Engineers	
01	Drawing List		" " " " "	
02	One Line Diagram		" " " " "	
03	AC One Line		" " " " "	
05	DC One Line		" " " " "	
06	Bill of Material - Relay & Control		" " " " "	
07	Low Voltage Schematics Group		" " " " "	
	Line Protection Schematics		" " " " "	

Wholesale Generation Interconnection Customer Documentation Checklist

Substation – Record Drawing Details

Drawing Group	Description		Date Received	Comment
	Breaker Protection Schematics		" " " " "	
	Communications Schematics		" " " " "	
	SCADA/HMI Schematics		" " " " "	
	Miscellaneous Schematics		" " " " "	
08	High Voltage Schematics Group		" " " " "	
	Line Protection Schematics		" " " " "	
	Breaker Protection Schematics		" " " " "	
	Communications Schematics		" " " " "	
	SCADA/HMI Schematics		" " " " "	
	Miscellaneous Schematics		" " " " "	
09	Low Voltage Equip. Detail Wiring Diagrams Group		" " " " "	
	Breaker Detail Wiring Diagrams		" " " " "	
	CVT Detail Wiring Diagrams		" " " " "	
10	High Voltage Equip. Detail Wiring Diagrams Group		" " " " "	
	Breaker Detail Wiring Diagrams		" " " " "	
	CVT Detail Wiring Diagrams		" " " " "	
11	Switchboard Front Views		" " " " "	
12	Switchboard Wiring Diagrams Group		" " " " "	
	Switchboard Detail Wiring Diagrams		" " " " "	
	SCADA/HMI Detail Wiring Diagrams		" " " " "	
24	Switchboard Nameplates		" " " " "	
40	Miscellaneous Drawings		" " " " "	
	Telephone Protection Panel		" " " " "	

Wholesale Generation Interconnection Customer Documentation Checklist

Substation – Equipment Details

BM Item	Description		Document Specification	Date Received		Document Vendor Drawings	Date Received		Document Instruction Books	Date Received		Document Factory Test Reports	Date Received		Document Field Test Reports	Date Received		Document Warranty	Date Received
A -?	Battery & Charger		Per FE Standard			WRD			WRD			N/A			ACF			WRD	
B-?	Grounding		Per FE Specification			N/A			N/A			N/A			ACF			N/A	
F-?	??? kV Capacitor Voltage Transformers (CVT)		Per FE Standard			WRD			WRD			WRD			ACF			WRD	
K-?	??? kV Surge Arresters		Per FE Standard			WRD			WRD			WRD			ACF			WRD	
M-?	Concrete Foundations		Per FE Standard			N/A			N/A			N/A			ACF			N/A	
M-?	Control House		Per Go By Specification			WRD			WRD			N/A			N/A			WRD	
M-?	Fence		As Per FE Standard			WRD			N/A			N/A			N/A			WRD	
M-?	Geotechnical Testing		Per FE Specification			N/A			N/A			N/A			ACF			N/A	
M-?	Steel Structures		Per FE Standard			WRD			N/A			N/A			N/A			WRD	
P-?	??? kV Circuit Breakers		Per FE Standard			WRD			WRD			WRD			ACF			WRD	
P-?	??? kV Disconnect Switches		Per FE Standard			WRD			WRD			N/A			ACF			WRD	
R-?	??? kV Station Service Transformer		Per FE Standard			WRD			WRD			WRD			ACF			WRD	
S-?			Per FE Standard			WRD			WRD			WRD			ACF			WRD	
															(Programming)				
S-?	Protective Relay Switchboards		Per FE Standard			WRD			WRD			N/A			ACF			WRD	
S-?			Per FE Standard			WRD			WRD			N/A			ACF			WRD	
															(Programming)				

Wholesale Generation Interconnection Customer Documentation Checklist

Substation – Drawing Details (Approvals)

Drawing Group	Description	Drawing Submittal		Date Received	Date Reviewed	Comment		Calculations	Date Received	Date Reviewed
00	Check off List	1 Drawing		With last package issued for review				N/A		
01	Drawing List	1 Drawing		With last package issued for review				N/A		
02	One Line Diagram	1 Drawing		As soon as possible after project start				N/A		
03	AC One Line	1 Drawing		With Relay & Control Package Issued for Review				Station Service	With AC One Line	
04	Property (Site) Plan	Usually 1 Drawing, could be multiple drawings		As soon as possible after project start				N/A		
05	DC One Line	1 Drawing		With Relay & Control Package Issued for Review				Battery Sizing	With DC One Line	
06	Bill of Material - Below Grade	Multiple Sheets		With Below Grade Package Issued for Review				N/A		
06	Bill of Material - Above Grade	Multiple Sheets		With Above Grade Package Issued for Review						
06	Bill of Material - Relay & Control	Multiple Sheets		With Relay & Control Package Issued for Review						
07	Low Voltage Schematics	None or Multiple Drawings		With Relay & Control Package Issued for Review				N/A		
08	High Voltage Schematics	None or Multiple Drawings		With Relay & Control Package Issued for Review				N/A		
09	Low Voltage Equipment Detail Wiring Diagrams	None or Multiple Drawings		With Relay & Control Package Issued for Review				N/A		
10	High Voltage Equipment Detail Wiring Diagrams	None or Multiple Drawings		With Relay & Control Package Issued for Review				N/A		
11	Switchboard Front Views	1 Drawing		With Relay & Control Package Issued for Review				N/A		
12	Switchboard Wiring Diagrams	Multiple Drawings		With Relay & Control Package Issued for Review				N/A		
13	Low Voltage Electrical Plan	Multiple Drawings		With Above Grade Package Issued for Review				N/A		
14	High Voltage Electrical Plan	Multiple Drawings		With Above Grade Package Issued for Review				HV Rigid Bus Design	With Equipment Plan	
								Lightning	With Equipment Plan	
15	Foundation Layouts & Details	Multiple Drawings		With Below Grade Package Issued for Review				Foundations	With Foundation Plan	
16	Conduit Layout & Details			With Below Grade Package Issued for Review				Grounding	With Grounding Drawing	
18	Steel Erection Diagrams	Multiple Drawings		With Above Grade Package Issued for Review				N/A		
23	Substation Nameplates	Multiple Sheets		With Above Grade Package Issued for Review				N/A		
24	Switchboard Nameplates	Multiple Sheets		With Relay & Control Package Issued for Review				N/A		
25	Conduit List	Multiple Sheets		With Above Grade Package Issued for Review				N/A		
26	Circuit List	Multiple Sheets		With Above Grade Package Issued for Review				N/A		
30	Control Building Plans and Details	Multiple Drawings		With Above Grade Package Issued for Review				N/A		
40	Miscellaneous Drawings	Multiple Drawings as required								

Wholesale Generation Interconnection Customer Documentation Checklist

Transmission Line

Item		Applicable		Option to Build		Need by Milestone		For reference and record keeping purposes		
Item Number	Description	Yes	No	Yes	No	Milestone Number	Milestone Description	FE Contact	Date Issued	Comment
B	**TRANSMISSION OWNER PROVIDED DOCUMENTS**									
B.3.1	Vendor Contact Information					C.3	Transmission Provider conducts External Project Kick-Off Meeting with All Parties	Transmission Engineering		
B.4.1	Transmission Line Name and Transmission Line Number					C.9	Transmission Owner Accepts Preliminary Real Estate Plan and provides below deliverables to the Interconnection Customer	Transmission Engineering		
B.4.2	Transmission Line Pole Numbers					C.9	Transmission Owner Accepts Preliminary Real Estate Plan and provides below deliverables to the Interconnection Customer	Transmission Engineering		
B.4.3	Transmission Line Switch Numbers					C.9	Transmission Owner Accepts Preliminary Real Estate Plan and provides below deliverables to the Interconnection Customer	Transmission Engineering		
B.6.1	Transmission Line Connection requirements to existing TO transmission line					C.3	Transmission Provider conducts External Project Kick-Off Meeting with All Parties	ED-Planning		
B.8.1	Transmission Line Standard material requirements for design and construction					C.3	Transmission Provider conducts External Project Kick-Off Meeting with All Parties	Transmission Engineering		
B.9.1	Transmission Line Right-of-Way Requirements					C.3	Transmission Provider conducts External Project Kick-Off Meeting with All Parties	ED Siting, Surveying, ROW Engineering		
B.10.1	Testing and commissioning requirements					C.3	Transmission Provider conducts External Project Kick-Off Meeting with All Parties	Transmission Engineering		
B.10.2	TO Audit of Facilities Pre-energization					C.3	Transmission Provider conducts External Project Kick-Off Meeting with All Parties	Transmission Engineering		
C	**INTERCONNECTION CUSTOMER PROVIDED DOCUMENTS**									
C.1.1.1.1	Geotechnical Reports					C.30	Interconnection Customer Submits Transmission Line Engineering Package to Transmission Owner	Transmission Engineering		
C.1.1.1.2	Survey Reports					C.30	Interconnection Customer Submits Transmission Line Engineering Package to Transmission Owner	Transmission Engineering		
C.1.1.2	Bill of Materials					C.30	Interconnection Customer Submits Transmission Line Engineering Package to Transmission Owner	Transmission Engineering		
C.1.1.3	Field Report					C.30	Interconnection Customer Submits Transmission Line Engineering Package to Transmission Owner	Transmission Engineering		
C.1.1.4	Single Line Diagram					C.30	Interconnection Customer Submits Transmission Line Engineering Package to Transmission Owner	Transmission Engineering		
C.1.1.5	Plan and Profile Drawing(s)					C.30	Interconnection Customer Submits Transmission Line Engineering Package to Transmission Owner	Transmission Engineering		
C.1.1.6	Structure Drawings					C.30	Interconnection Customer Submits Transmission Line Engineering Package to Transmission Owner	Transmission Engineering		
C.1.1.7	Wire Arrangement					C.30	Interconnection Customer Submits Transmission Line Engineering Package to Transmission Owner	Transmission Engineering		
C.1.1.8	Right-of-way Drawings and Property and Easement Descriptions					C.12	Transmission Owner Submits Application, Letter of Notification or similar filing to state regulatory agency (NJBPU, PaPUC, OPSB)	ED Siting, Surveying, ROW Engineering		
C.1.1.9	Balance of Design Drawings					C.30	Interconnection Customer Submits Transmission Line Engineering Package to Transmission Owner	Transmission Engineering		
C.1.1.10.1	Highway Crossing Drawings					C.30	Interconnection Customer Submits Transmission Line Engineering Package to Transmission Owner	Transmission Engineering		
C.1.1.10.2	Highway Crossing Permit Applications					C.30	Interconnection Customer Submits Transmission Line Engineering Package to Transmission Owner	Transmission Engineering		
C.1.1.10.3	Approved Highway Crossing Permits					C.32 & C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line to Transmission Owner and Transmission Provider	Transmission Engineering		
C.1.1.10.4	Railroad Crossing Drawings					C.30	Interconnection Customer Submits Transmission Line Engineering Package to Transmission Owner	Transmission Engineering		
C.1.1.10.5	Railroad Crossing Permit Applications					C.30	Interconnection Customer Submits Transmission Line Engineering Package to Transmission Owner	Transmission Engineering		
C.1.1.10.6	Approved Railroad Crossing Permits					C.32 & C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line to Transmission Owner and Transmission Provider	Transmission Engineering		
C.1.1.10.7	River Crossing Drawings					C.30	Interconnection Customer Submits Transmission Line Engineering Package to Transmission Owner	Transmission Engineering		
C.1.1.10.8	River Crossing Permit Applications					C.30	Interconnection Customer Submits Transmission Line Engineering Package to Transmission Owner	Transmission Engineering		
C.1.1.10.9	Approved River Crossing Permits					C.32 & C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line to Transmission Owner and Transmission Provider	Transmission Engineering		
C.1.1.10.10	FAA Required Drawings					C.30	Interconnection Customer Submits Transmission Line Engineering Package to Transmission Owner	Transmission Engineering		
C.1.1.10.11	FAA Required Permit Applications					C.30	Interconnection Customer Submits Transmission Line Engineering Package to Transmission Owner	Transmission Engineering		
C.1.1.10.12	Approved FAA Permits					C.32 & C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line to Transmission Owner and Transmission Provider	Transmission Engineering		
C.1.1.11	Specifications - Major Equipment					C.30	Interconnection Customer Submits Transmission Line Engineering Package to Transmission Owner	Transmission Engineering		
C.1.1.12	Engineering Calculations					C.30	Interconnection Customer Submits Transmission Line Engineering Package to Transmission Owner	Transmission Engineering		
C.1.1.13	Manufacturer Drawings					C.47	Interconnection Customer Submits Bill of Sale & Notice of Transfer of Title to Transmission Owner and Transmission Provider	Transmission Engineering		
C.1.2	Drawings Issued for Construction					C.32 & C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line to Transmission Owner and Transmission Provider	Transmission Engineering		
C.1.3	GPS Locations of Transmission Line Structures					C.34	Interconnection Customer Submits Completed Outage Readiness Notification to Transmission Owner	ED Siting, Surveying, ROW Engineering		
C.1.6.1	Red Line As-Built Drawings (Pre-Outage) provided to the TO's Transmission Engineer					C.34	Interconnection Customer Submits Completed Outage Readiness Notification to Transmission Owner	Transmission Engineering		

Item		Applicable		Option to Build		Need by Milestone		For reference and record keeping purposes		
C.1.6.2	Red Line As-Built Drawings (Post-Energization) provided to the TO's Transmission Engineer					C.44	Successful Energization of Interconnection Facilities (Stage 1)	Transmission Engineering		
C.1.7.1	Final Record As-Built Drawings issued to the TO					C.47	Interconnection Customer Submits Bill of Sale & Notice of Transfer of Title to Transmission Owner and Transmission Provider	Transmission Engineering		
C.1.8.1	Manufacturer Drawings provided to the TO's print distribution list					C.34	Interconnection Customer Submits Completed Outage Readiness Notification to Transmission Owner	Transmission Engineering		
C.1.8.2	Factory Test Reports including hard copy and electronic format					C.34	Interconnection Customer Submits Completed Outage Readiness Notification to Transmission Owner	Transmission Engineering		
C.1.8.3	Instruction Books including hard copy and electronic format					C34	Interconnection Customer Submits Completed Outage Readiness Notification to Transmission Owner	Transmission Engineering		
C.1.8.4	Warranty Assignments issued to the TO					C34	Interconnection Customer Submits Completed Outage Readiness Notification to Transmission Owner	Transmission Engineering		
C.1.9	Construction Field Test Reports issued to the TO					C.34	Interconnection Customer Submits Completed Outage Readiness Notification to Transmission Owner	Transmission Engineering		

Wholesale Generation Interconnection Customer Documentation Checklist

Communications

Item		Applicable		Option to Build		Need by Milestone		For reference and record keeping purposes		
Item Number	Description	Yes	No	Yes	No	Milestone Number	Milestone Description	FE Contact	Date Issued	Comment
	TRANSMISSION OWNER PROVIDED DOCUMENTS									
C.1.1	Telecommunications Protection Design Standard					C.3	Project External Kick-Off	IT-Network Engineering/Planning		
C.1.2	Telecommunications Protection Design – Metallic Cable (The Positron Design)					C.3	Project External Kick-Off	IT-Network Engineering/Planning		
C.1.3	Telecommunications Protection Design – Fiber Optic Cable (The RLH Design)					C.3	Project External Kick-Off	IT-Network Engineering/Planning		
C.1.4	High Voltage Protection Form (Verizon Example)					C.3	Project External Kick-Off	IT-Network Engineering/Planning		
C.1.5	SCADA Points List – Example Form					C.3	Project External Kick-Off	IT-Network Engineering/Planning		
C.1.6	Optical Power Measurement Form					C.3	Project External Kick-Off	IT-Network Engineering/Planning		
C.1.7	TO Required Communications Materials and Equipment List					C.32 & C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line to Transmission Owner and Transmission Provider	IT EMS Operations		
C.1.8	Network Standards Design - Transport to Remote Controlled Line Switches (IT-NET-STD-DSGN-EMS-TRANS-002), Guidelines for designing and installing the communications path and SCADA control for remote controlled line switches.					C.3	Project External Kick-Off	IT-Network Engineering/Planning		
	INTERCONNECTION CUSTOMER PROVIDED DOCUMENTS									
C.2.1	E911 Address Confirmation - Provided in Outage Readiness Notification					C.34	Interconnection Customer Submits Completed Outage Request	ATSI- Transmission System Dispatching		
C.2.2	Substation conduit detail design drawing					C.24	Interconnection Customer Submits Below Grade Interconnection Facilities Engineering Package	IT-Network Engineering/Planning		
C.2.3	Substation control house rack layout drawing					C.28	Interconnection Customer Submits Relay & Control Interconnection Facilities Engineering Package to Transmission Owner	IT-Network Engineering/Planning		
C.2.4	Copies of telco service orders, including projected due dates					C.34	Interconnection Customer Submits Completed Outage Request	IT-Network Engineering/Planning		
C.2.5	Completed copy of High Voltage Protection Form, including telco provided calculations					C.37	Interconnection Customer submits Notice of Completion for Interconnection Facilities to Transmission Owner and Transmission Provider	IT-Network Engineering/Planning		Telco provided calculations
C.2.6	SCADA/RTU Points List – completed form					C.28	Interconnection Customer Submits Relay & Control Interconnection Facilities Engineering Package to Transmission Owner	IT EMS Operations		
C.2.7	Fiber optic cable power measurement test results.					C.37	Interconnection Customer submits Notice of Completion for Interconnection Facilities to Transmission Owner and Transmission Provider	IT-Network Engineering/Planning		
C.2.8	RTU Schematic					C.28	Interconnection Customer Submits Relay & Control Interconnection Facilities Engineering Package to Transmission Owner	IT EMS Operations		
C.2.9	RTU/HMI Configuration Files					C.37	Interconnection Customer submits Notice of Completion for Interconnection Facilities to Transmission Owner and Transmission Provider	IT EMS Operations		
C.2.10	OTDR Traces Test Results					C.37	Interconnection Customer submits Notice of Completion for Interconnection Facilities to Transmission Owner and Transmission Provider	IT-Network Engineering/Planning		
C.2.11	Communication Equipment Mfr Manuals and Warranty Information					C.37	Interconnection Customer submits Notice of Completion for Interconnection Facilities to Transmission Owner and Transmission Provider	IT-Network Engineering/Planning		
C.2.12	Communication Equipment Spares List					C.37	Interconnection Customer submits Notice of Completion for Interconnection Facilities to Transmission Owner and Transmission Provider	IT-Network Engineering/Planning		
C.2.13	Notification that RTU Communication Circuits are ready for Transmission Owner Testing					C.37	Interconnection Customer submits Notice of Completion for Interconnection Facilities to Transmission Owner and Transmission Provider	IT-Network Engineering/Planning		
C.2.14	Notification that RTU is ready for Transmission Owner Testing					C.37	Interconnection Customer submits Notice of Completion for Interconnection Facilities to Transmission Owner and Transmission Provider	IT EMS Operations		
C.2.15	Wave Trap on site ready for Transmission Owner Testing					C.37	Interconnection Customer submits Notice of Completion for Interconnection Facilities to Transmission Owner and Transmission Provider	IT-Infrastructure-Network Field Ops		
C.2.16	Power Line Carrier on site ready for Transmission Owner Testing					C.37	Interconnection Customer submits Notice of Completion for Interconnection Facilities to Transmission Owner and Transmission Provider	IT-Infrastructure-Network Field Ops		

Wholesale Generation Interconnection Customer Documentation Checklist

Revenue Metering and Electric Service Billing

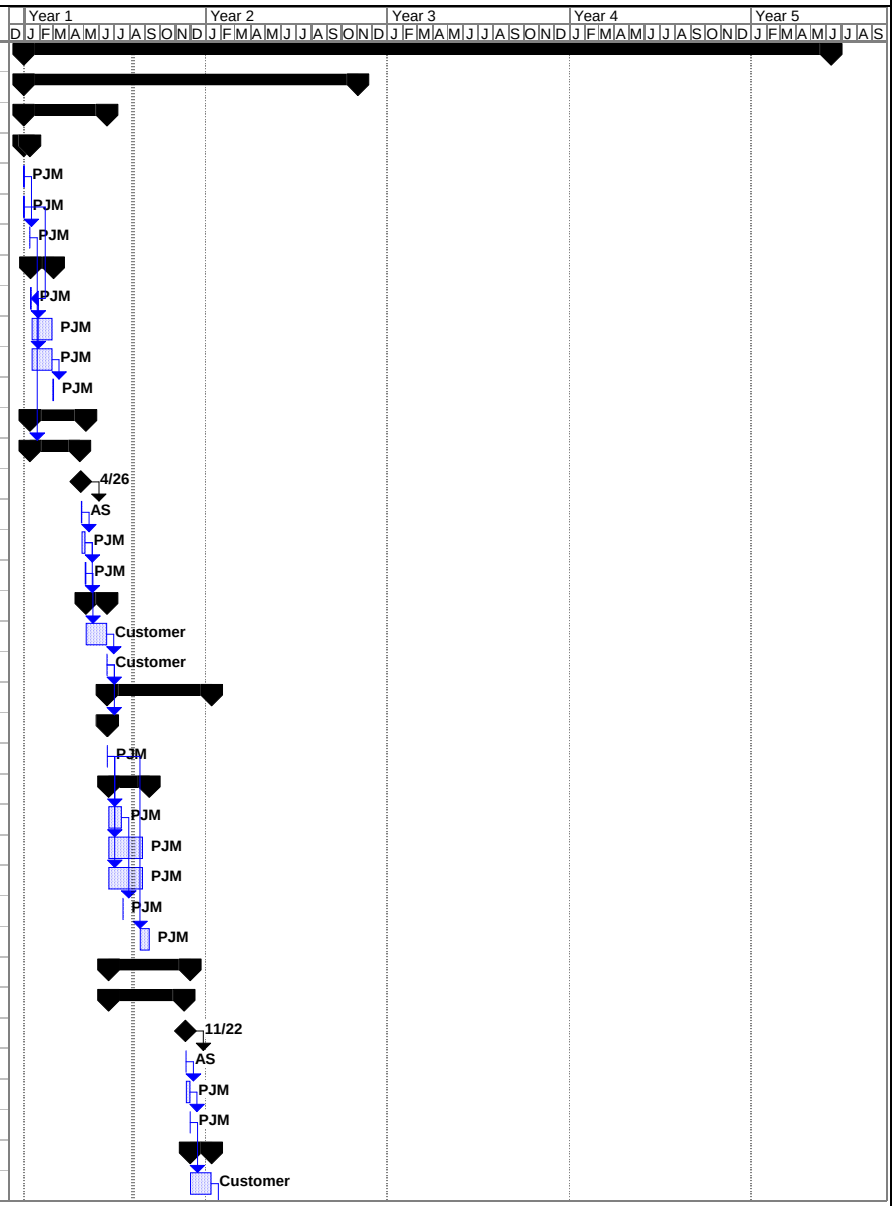
Item		Applicable		Option to Build		Need by Milestone		For reference and record keeping purposes		
Item Number	Description	Yes	No	Yes	No	Milestone Number	Milestone Description	FE Contact	Date Issued	Comment
	TRANSMISSION OWNER PROVIDED DOCUMENTS									
B.1.1	Revenue Metering Equipment Specifications - Requirements for Transmission Connected Facilities - Energy Delivery Planning and Protection (www.firstenergycorp.com/feconnect/Requirements_for_Transmission_Connected_Facilities.html)					C.3	Transmission Provider conducts External Project Kick-Off Meeting with All Parties	Metering		
B.2.10.1	Application for Electrical Service - General					C.3	Transmission Provider conducts External Project Kick-Off Meeting with All Parties (Outage Readiness Notification)	For Application Specific Issues: Customer Support		
B.2.10.2	Application for Station Power Service					C.3	Transmission Provider conducts External Project Kick-Off Meeting with All Parties (Outage Readiness Notification)	For Application Specific Issues: Customer Support		
B.2.10.3	Application and Agreement for Backup and Maintenance Service					C.3	Transmission Provider conducts External Project Kick-Off Meeting with All Parties (Outage Readiness Notification)	For Application Specific Issues: Customer Support		
	INTERCONNECTION CUSTOMER PROVIDED DOCUMENTS									
C.1.1	Single line diagram showing revenue metering in the Interconnection Customer's step-up substation					C.22	Interconnection Customer submits Revenue Metering Design Package for Customer Facility (Step-up Transformer)	Metering		
C.1.2	Estimated power flows to and from the Interconnection Customer's step-up substation at all revenue metering points					C.22	Interconnection Customer submits Revenue Metering Design Package for Customer Facility (Step-up Transformer)	Metering		
C.1.3	Proposed revenue metering current transformer (CT) and voltage transformer (VT) specifications including manufacturer, type, ratios, accuracy ratings, and burden ratings					C.22	Interconnection Customer submits Revenue Metering Design Package for Customer Facility (Step-up Transformer)	Metering		
C.1.4	Proposed revenue meter specifications including manufacturer, type, and model number					C.22	Interconnection Customer submits Revenue Metering Design Package for Customer Facility (Step-up Transformer)	Metering		
C.1.5	Conductor type, length, resistance per phase, and reactance per phase for the transmission line between the Interconnection Customer's step-up substation and the Point of Interconnection (if applicable)					C.22	Interconnection Customer submits Revenue Metering Design Package for Customer Facility (Step-up Transformer)	Metering		
C.1.6	Three-line schematic and wiring diagrams showing all CT and VT connections to revenue meters					C.22	Interconnection Customer submits Revenue Metering Design Package for Customer Facility (Step-up Transformer)	Metering		
C.1.7	Manufacturer's certified accuracy test reports for the revenue meter, CTs, and VTs					C.37	Interconnection Customer submits Notice of Completion for Interconnection Facilities to Transmission Owner and Transmission Provider	Metering		
C.1.8	Revenue meter program information including but not limited to loss compensation values (if applicable), billing data recorder channel assignments, recorder pulse weights (Ke), and read-only password for access to interval data by the FirstEnergy billing					C.37	Interconnection Customer submits Notice of Completion for Interconnection Facilities to Transmission Owner and Transmission Provider	Metering		
C.1.9	Revenue meter telephone number					C.37	Interconnection Customer submits Notice of Completion for Interconnection Facilities to Transmission Owner and Transmission Provider	Metering		
C.1.10	Notice that the revenue meter is receiving current and voltage inputs from the CTs and VTs and is read for real-time communications through the dedicated voice grade analog telephone circuit.					C.44	Successful Energization of Interconnection Facilities (Stage 1)	Metering		
C.2.1	Application for Electrical Service - General					C.34	Interconnection Customer Submits Completed Outage Readiness Notification to Transmission Owner	For Application Specific Issues: Customer Support		
C.2.1.1	Interconnection Customer Verifies Billing Entity, Address and Contact Information					C.47	Interconnection Customer Submits Bill of Sale & Notice of Transfer of Title to Transmission Owner and Transmission Provider	Customer Support		
C.2.2	Application for Station Power Service					C.34	Interconnection Customer Submits Completed Outage Readiness Notification to Transmission Owner	For Application Specific Issues: Customer Support		
C.2.2.1	Interconnection Customer Verifies Billing Entity, Address and Contact Information					C.47	Interconnection Customer Submits Bill of Sale & Notice of Transfer of Title to Transmission Owner and Transmission Provider	Customer Support		
C.2.3	Application and Agreement for Backup and Maintenance Service					C.34	Interconnection Customer Submits Completed Outage Readiness Notification to Transmission Owner	For Application Specific Issues: Customer Support		
C.2.3	Written notice as outlined in the Application and Agreement for Backup and Maintenance when the Interconnection Customer either takes or plans to take Backup or Maintenance power.					C.49	Interconnection and Generator Facility In-Service	For Application Specific Issues: Power Billing		
C.2.4	Written notice to suppliersupport@firstenergycorp.com is required when the Interconnection Customer obtains Generation and Transmission from a third party.					C.3	Transmission Provider conducts External Project Kick-Off Meeting with All Parties (Outage Readiness Notification)	For Application Specific Issues: Customer Support		

Wholesale Generation Interconnection Customer Documentation Checklist

Tax and Accounting

Item		Applicable		Option to Build		Need by Milestone		For reference and record keeping purposes		
Item Number	Description	Yes	No	Yes	No	Milestone Number	Milestone Description	FE Contact	Date Issued	Comment
	TRANSMISSION OWNER PROVIDED DOCUMENTS									
B.2.1.4	Cost Data Template - Substation					C.3	Transmission Provider conducts External Project Kick-Off Meeting with All Parties	Accounting Policy & Control		
B.2.1.4	Cost Data Template - Transmission					C.3	Transmission Provider conducts External Project Kick-Off Meeting with All Parties	Accounting Policy & Control		
	INTERCONNECTION CUSTOMER PROVIDED DOCUMENTS									
C.1.1	95/5 Power Flow Certificate					C.1	Fully Executed ISA/CSA Agreements by All Parties	Tax		Required to be provided within 45 days after execution of CSA/ISA
C.2.1.1.1	Completed Cost Data Templates with Estimated Cost Data					C.32 & C.33	Interconnection Customer submits Notice to Start Construction of Interconnection Facilities or Transmission Line to Transmission Owner and Transmission Provider	Accounting Policy & Control		
C.2.1.1.2	Updated Cost Data Templates with Actual Cost Data					C.37	Interconnection Customer submits Notice of Completion for Interconnection Facilities to Transmission Owner and Transmission Provider	Accounting Policy & Control		
C.2.1.1.3	Final Cost Data Templates with as-built Actual Cost					C.47	Interconnection Customer Submits Bill of Sale & Notice of Transfer of Title to Transmission Owner and Transmission Provider	Accounting Policy & Control		

ID	ID	Milestone Number	Task Name	Duration	Resource Names
1	**1**		**Wholesale Generator Interconnection Project**	**1159 days**	
2	**2**		**Study Phase**	**480 days**	
3	**3**		**CONDUCT FEASIBILITY STUDY**	**120 days**	
4	**4**		**Feasibility Study KickOff**	**9 days**	
5	5	S.1	Transmit Attach N to Start Feasibility Study	1 day	PJM
6	6	S.2	Transmission Provider Queue Closes	1 day	PJM
7	7	S.3	Conduct Feasibilty KickOff - External	1 day	PJM
8	**8**		**Feasibility Study Planning - Transmission Provider**	**32 days**	
9	9	S.4	Transmission Provider Model Lock Down	1 day	PJM
10	10		Transmission Provider Develops Load Flow Case & Draft Study	30 days	PJM
11	11		Transmission Provider Develops Short Circuit Case & Draft Stu	30 days	PJM
12	12	S.5	Transmission Provider Transmits Model	1 day	PJM
13	**13**		**Feasibility Study Planning - Transmission Owner**	**80 days**	
14	**14**		**Develop Feasibility Report**	**72 days**	
26	26	S.6	Feasibility Report Completed by Transmission Owner	1 day	EDPP
27	27		Transmit Feasibility Report to Transmission Provider	1 day	AS
28	28		Transmission Provider Review & Write Feasibility Report	5 days	PJM
29	29		Transmission Provider Issues Feasibility Report	1 day	PJM
30	**30**		**Customer Reviews Feasibility Report**	**31 days**	
31	31		Interconnection Customer Review Feasibility Report	30 days	Customer
32	32	S.7	Interconnection Customer Executes System Impact Study	1 day	Customer
33	**33**		**CONDUCT SYSTEM IMPACT STUDY**	**150 days**	
34	**34**		**System Impact Study - Initialize**	**1 day**	
35	35		Transmit System Impact Agreement	1 day	PJM
36	**36**		**System Impact Study Planning - Transmission Provider**	**60 days**	
37	37		Transmission Provider AC Model Lock Down	20 days	PJM
38	38		Transmission Provider Develops Load Flow Case & Draft Study	50 days	PJM
39	39		Transmission Provider Develops Short Circuit Case & Draft Stu	50 days	PJM
40	40	S.8	Transmission Provider Transmit Model	1 day	PJM
41	41		Transmission Provider Performs Stability Study	15 days	PJM
42	**42**		**System Impact Study Planning - Transmission Owner**	**118 days**	
43	**43**		**Develop System Impact Report**	**110 days**	
60	60	S.9	System Impact Report Completed by Transmission Owner	1 day	EDPP
61	61		Transmit System Impact Report to Transmission Provider	1 day	AS
62	62		Transmission Provider Review & Write System Impact Report	5 days	PJM
63	63		Transmission Provider Issues System Impact Report	1 day	PJM
64	**64**		**Customer Reviews System Impact Report**	**31 days**	
65	65		Interconnection Customer Review System Impact Report	30 days	Customer



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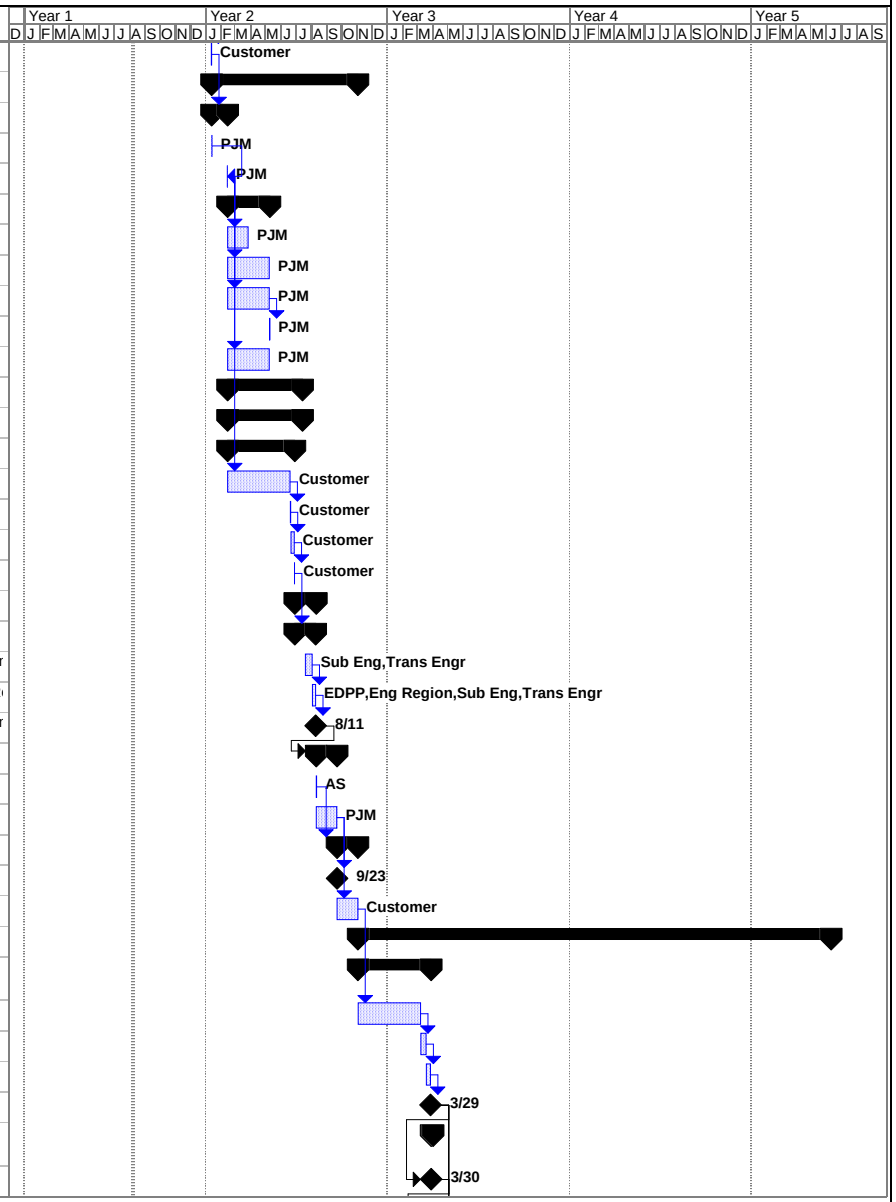
Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone

ID	ID	Milestone Number	Task Name	Duration	Resource Names
66	66	S.10	Interconnection Customer Executes Facility Study	1 day	Customer
67	**67**		**CONDUCT FACILITY STUDY**	**210 days**	
68	**68**		**Facility Study KickOff**	**22 days**	
69	69		Transmission Provider Transmit Facility Agreement	1 day	PJM
70	70	S.11	Conduct Facility Study KickOff - External	1 day	PJM
71	**71**		**Facility Study Planning - Transmission Provider**	**61 days**	
72	72		Transmission Provider AC Model Lock Down	30 days	PJM
73	73		Transmission Provider Develops Load Flow Case & Draft Study	60 days	PJM
74	74		Transmission Provider Develops Short Circuit Case & Draft Stu	60 days	PJM
75	75	S.12	Transmission Provider Transmit Model	1 day	PJM
76	76		Transmission Provider Performs Stability Study	60 days	PJM
77	**77**		**Facility Study Planning - Transmission Owner**	**109 days**	
78	**78**		**Develop Facility Report**	**109 days**	
95	**95**		**Submits Environmental Pre-Requisites - Interconnection Custo**	**97 days**	
96	96		Interconnection Customer Prepares Environmental Impact Stud	90 days	Customer
97	97	S.13	Interconnection Customer Submits Environmental Impact Study	1 day	Customer
98	98		Transmission Owner Reviews Environmental Impact Study	5 days	Customer
99	99	S.14	Transmission Owner Accepts Environmental Impact Study	1 day	Customer
100	**100**		**Finalize Facility Report - Transmission Owner**	**31 days**	
101	**101**		**Produce Facility Planning & Protection Requirements**	**30 days**	
106	106		Create Facility Report	10 days	Sub Eng,Trar
107	107		Review and Approve Facility Report by Transmission Owner	5 days	EDPP,Eng R
108	108	S.15	Facility Report Completed by Transmission Owner	1 day	Sub Eng,Trar
109	**109**		**Issue Facility Report to Transmission Provider**	**30 days**	
110	110		Transmit Facility Report to Transmission Provider	1 day	AS
111	111		Transmission Provider Review and Writes Facility Report	30 days	PJM
112	**112**		**Issue Facility Report to Interconnection Customer**	**30 days**	
113	113	S.16	Facility Study, ISA, CSA Issued (from Transmission Provider to	3 days	PJM
114	114		Interconnection Customer Review Facility Report	30 days	Customer
115	**115**		**Project Implementation**	**679 days**	
116	**116**		**ISA/CSA**	**105 days**	
117	117		CSA/ISA executed by Interconnection Customer	90 days	
118	118		CSA/ISA executed by Transmission Owner	7 days	
119	119		CSA/ISA executed by Transmission Provider	7 days	
120	120	C.1	Fully Executed ISA/CSA Agreements by All Parties	1 day	
121	**121**		**Project Kick-Off Meeting**	**2 days**	
122	122	C.2	Transmission Owner conducts Internal Project Kick-Off Meeting	1 day	



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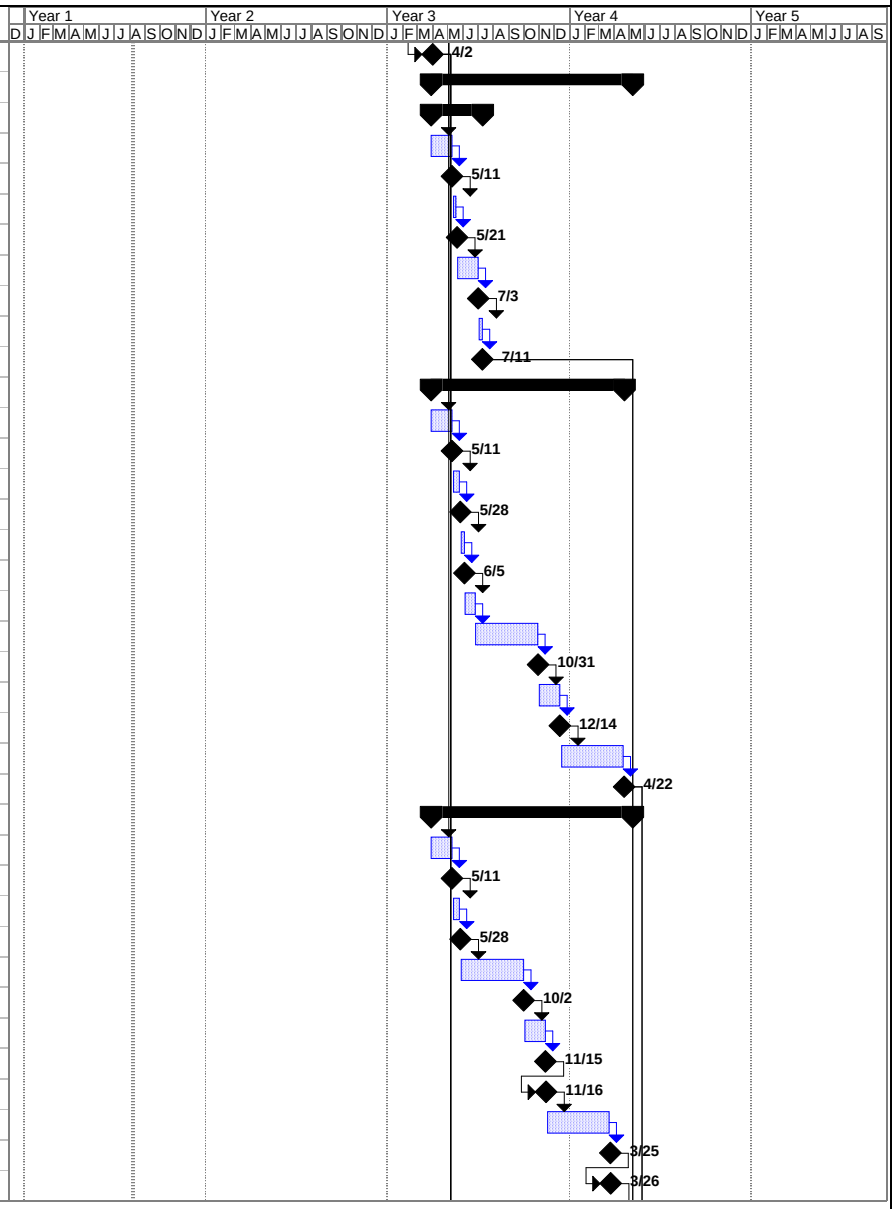
Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone

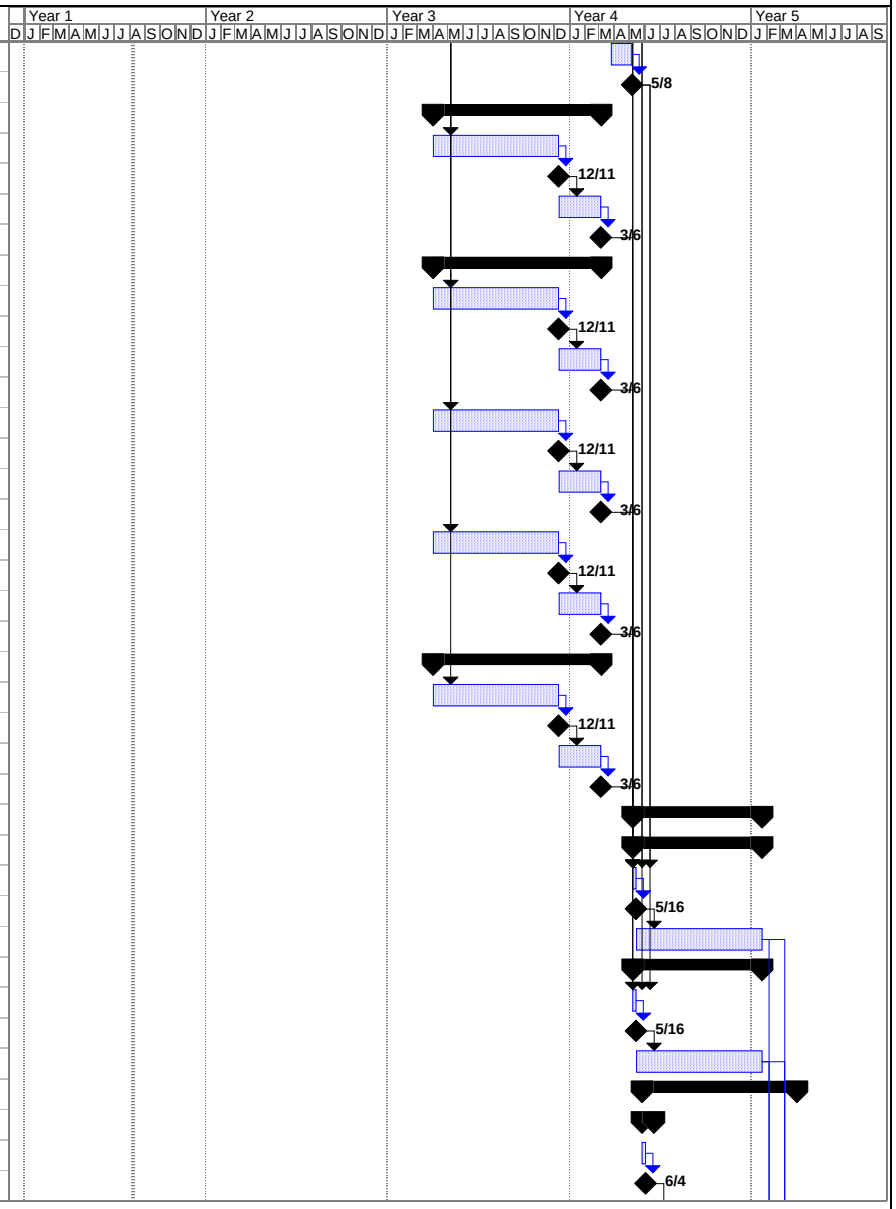
ID		ID	Milestone Number	Task Name	Duration	Resource Names
123		123	C.3	Transmission Provider conducts External Project Kick-Off Meeting w	1 day	
124		**124**		**Engineering**	**289 days**	
125		**125**		**Insurance Certificates**	**74 days**	
126		126		Interconnection Customer Prepares ISA/CSA Insurance Certific	30 days	
127		127	C.4	Interconnection Customer Submits ISA/CSA Insurance Certifica	1 day	
128		128		Transmission Owner Reviews ISA/CSA Insurance Certificates	5 days	
129		129	C.5	Transmission Owner Accepts ISA/CSA Insurance Certificates	1 day	
130		130		Transmission Owner Prepares ISA/CSA Insurance Certificates	30 days	
131		131	C.6	Transmission Owner Submits ISA/CSA Insurance Certificates t	1 day	
132		132		Interconnection Customer Reviews ISA/CSA Insurance Certifica	5 days	
133		133	C.7	Interconnection Customer Accepts ISA/CSA Insurance Certifica	1 day	
134		**134**		**Real Estate**	**277 days**	
135		135		Interconnection Customer Prepares Real Estate Plan	30 days	
136		136	C.8	Interconnection Customer Submits Real Estate Plan to Transmi	1 day	
137		137		Transmission Owner Reviews Real Estate Plan	10 days	
138		138	C.9	Transmission Owner Accepts Real Estate Plan	1 day	
139		139		Transmission Owner Prepares Letter of Notice to Affected Prop	5 days	
140		140	C.10	Transmission Owner Submits Letter of Notice to Affected Prope	1 day	
141		141		Required waiting period prior to any negotiations with Affected F	15 days	
142		142		Interconnection Customer Obtains Deeds / Easements / Acces	90 days	
143		143	C.11	Interconnection Customer submits all executed Deeds / Easem	2 days	
144		144		Transmission Owner Prepares Application, Letter of Notificatior	30 days	
145		145	C.12	Transmission Owner Submits Application, Letter of Notification	1 day	
146		146		State Regulatory Agency (NJBPU, PaPUC, OPSB) Reviews Le	90 days	
147		147	C.13	State Regulatory Agency (NJBPU, PaPUC, OPSB) Approves L	1 day	
148		**148**		**Environmental**	**289 days**	
149		149		Interconnection Customer Prepares Final Environment Permit F	30 days	
150		150	C.14	Interconnection Customer Submits Final Environment Permit Pl	1 day	
151		151		Transmission Owner Reviews Final Environment Permit Plan	10 days	
152		152	C.15	Transmission Owner Accepts Final Environment Permit Plan	1 day	
153		153		Interconnection Customer Prepares Environmental Permit Appl	90 days	
154		154	C.16	Interconnection Customer submits all Environmental Permit Apı	2 days	
155		155		Transmission Owner reviews all Environmental Permit Applicati	30 days	
156		156	C.17	Transmission Owner Accepts all Environmental Permit Applicat	1 day	
157		157	C.18	Interconnection Customer Submits Environmental Permit Applic	1 day	
158		158		Agency reviews Environmental Permit Applications	90 days	
159		159	C.19	Agency Issues Environmental Permits to Interconnection Custo	1 day	
160		160	C.20	Interconnection Customer Submits Approved Environmental Pe	1 day	



Project: as_milestones
Date: Fri 8/6/10

Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone

ID	ID	Milestone Number	Task Name	Duration	Resource Names
161	161		Transmission Owner Reviews Approved Permits	30 days	
162	162	C.21	Transmission Owner Accepts Approved Permits	1 day	
163	**163**		**Revenue Metering**	**242 days**	
164	164		Interconnection Customer Develops Revenue Metering Design	180 days	
165	165	C.22	Interconnection Customer Submits Revenue Metering Design P	1 day	
166	166		Transmission Owner Reviews Revenue Metering Design Packa	60 days	
167	167	C.23	Transmission Owner Accepts Revenue Metering Design Packa	1 day	
168	**168**		**Interconnection Facilities**	**242 days**	
169	169		Interconnection Customer Develops Engineering Packages for	180 days	
170	170	C.24	Interconnection Customer Submits Underground Interconnecti	1 day	
171	171		Transmission Owner Reviews Underground Interconnection Fa	60 days	
172	172	C.25	Transmission Owner Accepts Underground Interconnection Fa	1 day	
173	173		Interconnection Customer Develops Engineering Packages for	180 days	
174	174	C.26	Interconnection Customer Submits Overhead Interconnection F	1 day	
175	175		Transmission Owner Reviews Overhead Interconnection Facilit	60 days	
176	176	C.27	Transmission Owner Accepts Overhead Interconnection Faciliti	1 day	
177	177		Interconnection Customer Develops Engineering Packages for	180 days	
178	178	C.28	Interconnection Customer Submits Relay & Control Interconnec	1 day	
179	179		Transmission Owner Reviews Relay & Control Interconnection	60 days	
180	180	C.29	Transmission Owner Accepts Relay & Control Interconnection F	1 day	
181	**181**		**Transmission Line**	**242 days**	
182	182		Interconnection Customer Develops Engineering Packages for	180 days	
183	183	C.30	Interconnection Customer Submits Transmission Line Engineer	1 day	
184	184		Transmission Owner Reviews Transmission Line Engineering F	60 days	
185	185	C.31	Transmission Owner Accepts Transmission Line Engineering F	1 day	
186	**186**		**Site Construction**	**186 days**	
187	**187**		**Interconnection Facilities**	**186 days**	
188	188		Interconnection Customer Prepares Notice to Start Constructio	5 days	
189	189	C.32	Interconnection Customer submits Notice to Start Construction	1 day	
190	190		Interconnection Customer Performs Construction of Interconne	180 days	
191	**191**		**Transmission Line**	**186 days**	
192	192		Interconnection Customer Prepares Notice to Start Constructio	5 days	
193	193	C.33	Interconnection Customer submits Notice to Start Construction	1 day	
194	194		Interconnection Customer Performs Construction of Transmissi	180 days	
195	**195**		**Outage**	**223 days**	
196	**196**		**Outage Request**	**18 days**	
197	197		Interconnection Customer Prepares Outage Readiness Notifica	5 days	
198	198	C.34	Interconnection Customer Submits Completed Outage Readine	1 day	



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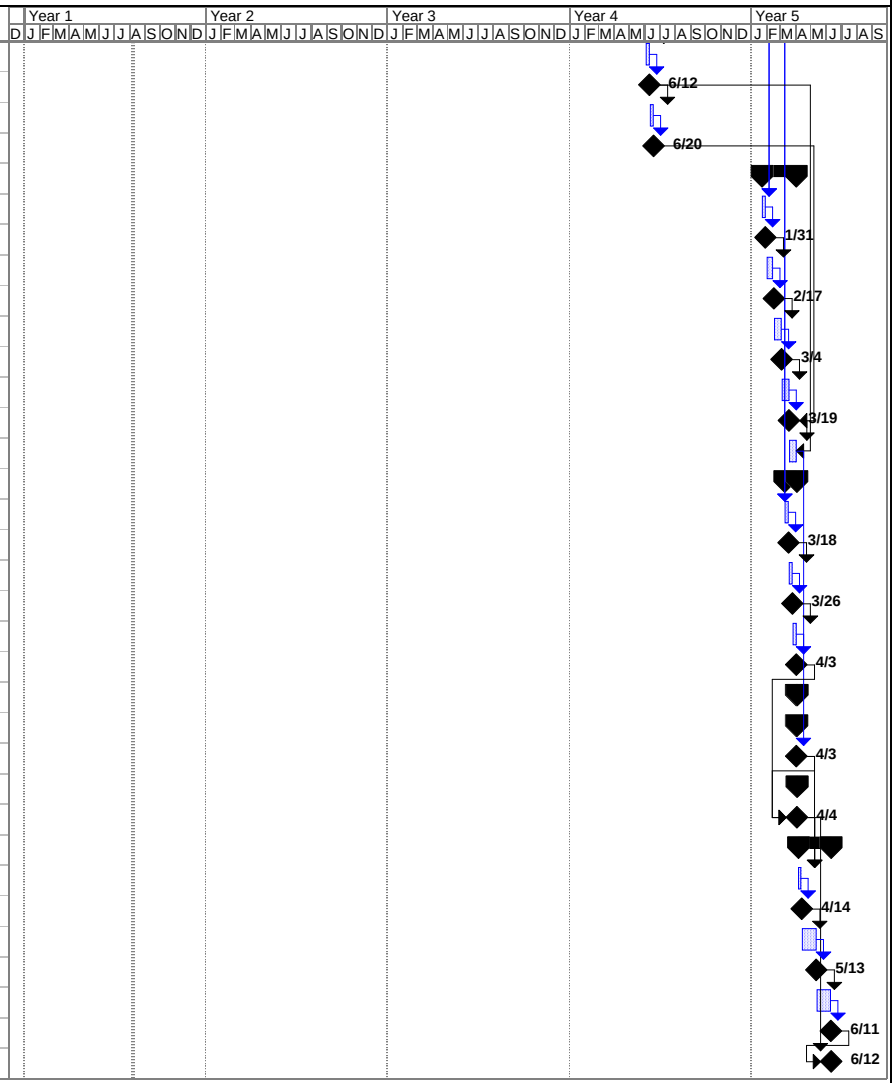
ID		ID	Milestone Number	Task Name	Duration	Resource Names
199		199		Transmission Owner Reviews Outage Readiness Notification F	5 days	
200		200	C.35	Transmission Owner Accepts Outage Readiness Notification Fo	1 day	
201		201		Transmission Provider Reviews Outage Readiness Notification	5 days	
202		202	C.36	Transmission Provider Approves Outage Readiness Notificatio	1 day	
203		**203**		**Stage 1**	**49 days**	
204		204		Interconnection Customer prepares Notice of Completion for Tr	5 days	
205		205	C.37	Interconnection Customer submits Notice of Completion for Tra	1 day	
206		206		Transmission Owner Reviews Notice of Completion for Transm	10 days	
207		207	C.38	Transmission Owner Accepts Notice of Completion for Transmi	1 day	
208		208		Transmission Owner Performs & Prepares Notice of Successfu	10 days	
209		209	C.39	Transmission Owner Submits Notice of Successful Inspection &	1 day	
210		210		Interconnection Customer prepares Notice of Transfer of Opera	10 days	
211		211	C.40	Interconnection Customer submits Notice of Transfer of Operati	1 day	
212		212		Transmission Owner performs Outage to tie-in Interconnection	10 days	
213		**213**		**Stage 2**	**18 days**	
214		214		Interconnection Customer prepares Notice of Completion for Cu	5 days	
215		215	C.41	Interconnection Customer submits Notice of Completion for Cus	1 day	
216		216		Transmission Owner Reviews Notice of Completion for Custom	5 days	
217		217	C.42	Transmission Owner Accepts Notice of Completion for Custome	1 day	
218		218		Transmission Owner Performs & Prepares Notice of Successfu	5 days	
219		219	C.43	Transmission Owner Submits Notice of Successful Inspection &	1 day	
220		**220**		**Energize**	**2 days**	
221		**221**		**Stage 1**	**1 day**	
222		222	C.44	Successful Energization of Interconnection Facilities (Stage 1)	1 day	
223		**223**		**Stage 2**	**1 day**	
224		224	C.45	Successful Generator Energization by Customer (Stage 2)	1 day	
225		**225**		**Close-Out**	**48 days**	
226		226		Transmission Owner Prepares Notice of Acceptance of Interconnec	5 days	
227		227	C.46	Transmission Owner Submits Notice of Acceptance of Interconnecti	1 day	
228		228		Interconnection Customer Prepares Bill of Sale & Notice of Transfer	20 days	
229		229	C.47	Interconnection Customer Submits Bill of Sale & Notice of Transfer c	1 day	
230		230		Transmission Owner Reviews Submittal of Bill of Sale & Notice of Tr	20 days	
231		231	C.48	Transmission Owner Executes and Submits Bill of Sale & Transfer o	1 day	
232		232	C.49	**Interconnection and Generator Facility In-Service**	1 day	



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Wholesale Generation Interconnection Manual Control Document Log

Version History

REV #	DATE	CHANGES BY	SHORT DESCRIPTION OF CHANGES MADE
0	05/03/2010	Initial Issuance	Initial Issuance
1	08/06/2010	Colleen R Williams	Changed disclaimer language per PJM