

PJM Manual 14C:

Interconnection Facilities, and Network Upgrade
Construction

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Prepared by
System Planning Division

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Approval

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Jason R Shoemaker, Manager

Interconnection Projects

Current Revision

Revision 16 (07/26/2023):

Interconnection Process Reform Changes

- All Sections of this manual were reviewed and updated to incorporate the new interconnection process changes and terminology filed in Docket ER22-2110-000. Process diagrams were updated to reflect the new process terminology, or deleted if outdated.
- Introduction
 - o Definition of Transition Date for the new interconnection process
- Section 1
 - o The Summary of Agreements section distinguishes between those agreements applicable prior to the Transition Date, and agreements applicable prior to the Transition Date.
 - o Minor clarifying changes made to the descriptions of agreements applicable prior to the Transition Date. New definitions provided for the new agreements applicable prior to the Transition Date.
 - o References to the Tariff form for the related interconnection related agreements have been added.
- Manual Ownership changed from Augustine Caven to Jason Shoemaker.

Introduction

Welcome to the PJM Manual for Generation and Transmission Interconnection Facilities, and Network Upgrades Construction. In this Section you will find:

- What you can expect from the PJM Manuals in general (see “About PJM Manuals”).
- What you can expect from this PJM Manual (see “About This Manual”).
- How to use this manual quickly and easily (see “Using This Manual”).

About PJM Manuals

The PJM Manuals are the instructions, rules, procedures, and guidelines established for the operation, planning, and accounting requirements of the PJM RTO and the PJM Energy Market. The manuals are grouped under the following categories:

- Transmission
- PJM Energy Market
- Generation and transmission interconnection
- Reserve
- Accounting and billing
- PJM administrative services
- Miscellaneous

For a complete list of all PJM Manuals, go to the “Library” section at [PJM.com](https://www.pjm.com).

About This Manual

This PJM Manual, ***Interconnection Facilities and Network Upgrade Construction***, is part of the PJM Manual 14 series family. This manual guides developers of generation and merchant transmission projects through the PJM Regional Transmission Expansion Plan (RTEP) project lifecycle process from agreement execution to commercial operation and construction agreement closeout. Additionally, it also describes the process around tracking projects driven by reliability criteria, enhanced market efficiency or Public Policy requirements.

Intended Audience

The intended audiences for this PJM Manual for Interconnection Facilities and Network Upgrade Construction are:

- Project Developers’ respective engineering, construction and operations staff, and consultants
- Upgrade Customers’ respective engineering, construction and operations staff and consultants
- Transmission Owners’ respective engineering and construction staff and consultants
- Designated Entities’ respective engineering and construction staff and consultants

- PJM Members
- PJM Staff

Note:

Prior to the Transition Date, the Interconnection Service Agreement (ISA) was the form agreement included in the Tariff used to facilitate interconnection to PJM's transmission system, which used term "Interconnection Customer" to refer to generation interconnection customers, similar to the Project Developer. While the ISA is no longer used for interconnection to the transmission system, pre-existing ISAs remain active. On and after the Transition Date, the Generation Interconnection Agreement (GIA) is used as the form agreement included in the Tariff to facilitate interconnection to PJM's transmission system.

The Tariff defines the Transition Date as the later of: (i) the effective date of PJM's Docket No. ER22-2110 transition cycle filing seeking FERC acceptance of Tariff, Part VII (which is January 3, 2023) or (ii) the date by which all AD2 and prior queue window Interconnection Service Agreements or wholesale market participation agreements have been executed or filed unexecuted. Because this second condition happened last, this date establishes the Transition Date.

References

There are other PJM documents that provide both background and detail on other topics.

- PJM Manual for [Generation and Transmission Interconnection Process Overview \(M-14A\)](#)
- PJM Manual for [Regional Planning Process \(M-14B\)](#)
- PJM Manual for [Generator Operational Requirements \(M-14D\)](#)
- PJM Manual for [Upgrade and Transmission Interconnection Requests \(M-14E\)](#)
- PJM Manual for [Competitive Planning Process \(M-14F\)](#)
- PJM Manual for [Generation Interconnection Requests \(M-14G\)](#)
- [PJM Manual for New Service Request Process \(M-14H\)](#)¹
- PJM Manual for [Control Center and Data Exchange Requirements \(M-01\)](#)
- PJM Manual for [Transmission Operations \(M-03\)](#)
- PJM Manual for [Energy Management System \(EMS\) Model Updates and Quality Assurance \(QA\) \(M-03A\)](#)

Using This Manual

We believe that explaining concepts is just as important as presenting the procedures. This philosophy is reflected in the way we organize the material in this manual. We start each section with an overview. Then, we present details, procedures or references to procedures found in other PJM manuals.

¹ Manual 14H applies to New Service Requests submitted pursuant to Tariff, Part VIII,

What You Will Find In This Manual

- A table of contents that lists multiple levels of subheadings within each of the sections
- An approval page that lists the required approvals and a brief outline of the current revision
- Sections containing the specific guidelines, requirements, or procedures including PJM actions and Project Developer/PJM Member actions.
- Attachments that include additional documents, forms, or tables that support this manual.
- A section at the end detailing all previous revisions of this PJM Manual

Section 1: Summary of Agreements

Welcome to the *Summary of Agreements* section of the ***PJM Manual for Interconnection Facilities and Network Upgrade Construction***. In this section you will find an overview of the different types of agreements that are an outcome of the PJM RTEP study process and discussion around the aspects of the agreements that have a significant bearing on project implementation in a majority of cases.

Agreements discussed in this section are summarized in the tables below. Further information on the terms and conditions to be incorporated and made part of each Tariff form of interconnection related agreement may be found in section 1 of the Manual.

Note: For agreements entered into after the Transition Date:

1. The Interconnection Service Agreement (ISA) and Interconnection Construction Service Agreement (ICSA) have been replaced by the Generation Interconnection Agreement (GIA).
2. In addition, the Interim Interconnection Service Agreement has been replaced by the Engineering and Procurement Agreement. Previously executed ISAs, ICSAs, and IISAs will still remain in effect unless otherwise terminated.

The following table includes agreements applicable prior to the Transition Date:

| Agreement | Tariff Form |
|--|---|
| Interconnection Service Agreements (ISA) | Part VI, Attachment O |
| Wholesale Market Participation Agreement | Was not a form tariff agreement in Part VI (prior to Transition Date) |
| Interconnection Construction Service Agreements (ICSA) | Part VI, Attachment P |
| Upgrade Construction Service Agreements (UCSA) | Part VI, Attachment GG |
| Interim Interconnection Service Agreements (IISA) | Part VI, Attachment O-1 |

The following table includes agreements applicable after the Transition Date:

| Agreement | Tariff Form |
|---|--------------------|
| Generation Interconnection Agreement Combined with Construction Service Agreement (GIA) | Part IX, Subpart B |
| Wholesale Market Participation Agreement (WMPA) | Part IX, Subpart C |
| Engineering and Procurement Agreement (E&P Agreement) | Part IX, Subpart D |

| | |
|---|--------------------|
| Upgrade Construction Service Agreement (UCSA) | Part IX, Subpart E |
| Cost Responsibility Agreement (CRA) | Part IX, Subpart F |
| Necessary Study Agreement (NSA) | Part IX, Subpart G |
| Network Upgrade Cost Responsibility Agreement (NUCRA) | Part IX, Subpart H |
| Construction Service Agreement (CSA) | Part IX, Subpart J |

1.1 Interconnection Service Agreement (ISA)

ISAs were the form of agreement used to facilitate interconnection to the PJM transmission system entered into by Interconnection Customers prior to the Transition Date. Upon completion of the System Impact Study, or the Interconnection Facilities Study if required, the Transmission Provider (PJM) would furnish an Interconnection Service Agreement to be executed by the Interconnection Customer, the Transmission Owner (TO) and PJM. The form for the ISA was found in the PJM Tariff, Attachment O. In addition to Standard Terms and Conditions the ISA defines project specific rights and obligations as follows:

- Security
- Cost
- Interconnection Customer milestones
- Power factor requirements
- Description of Customer Facility
- Generator Specification (size, fuel type, overview of equipment, name, etc.)
- Merchant transmission
- Maximum Facility Output (MFO)
- Rights
- Capacity Interconnection Rights/Injection/Withdrawal Rights
Single line diagram with Point of Interconnection identified
- Metering requirements and ownership
- Transmission Owner specifications and standards

The ISA was the standard agreement developed for generation and controllable flow transmission projects whose Point of Interconnection was FERC-jurisdictional.

The ISA further identifies any changes in construction responsibility from the Standard Option for Transmission Owner Interconnection Facilities due to the Interconnection Customer/ Developer exercising the Negotiated Contract Option or Option to Build. See PJM Tariff, Attachment P, Appendix 2, Section 3.2.2 and Section 3.2.3.

1.1.1 ISA Project Milestones

Project milestones are defined in section 6 of the ISA. Milestones provide critical project measuring points and help communicate to team members the timeframe and scope of high level project goals.

ISAs were typically written to include the standard project milestones listed below, but milestones can be added or altered to customize the agreement to suit the tracking needs of all involved parties.

- The Interconnection Customer must maintain compliance with pre-ISA milestones as stated in section 212.5.
 - o Site permits – The Interconnection Customer must demonstrate that it has obtained any necessary local, county, and state site permits.
 - o Acquisition of major electrical equipment – The Interconnection Customer must demonstrate that it has signed a memorandum of understanding for the acquisition of generating units (including wind turbines and solar inverters) and other major electrical equipment such as main power transformers/GSUs, breakers, control buildings, PV Tracking equipment, PV panels, etc. for the project.
 - o Fuel Delivery and Water Agreements - The Interconnection Customer must demonstrate that it has entered a fuel delivery agreement and water agreement, if necessary, and that it controls any necessary rights-of-way for fuel and water interconnections.
- Substantial site work – The Interconnection Customer is to demonstrate that 20% of site work is complete by the specified date. Additionally, the Interconnection Customer must submit certified drawings of the Customer Interconnection Facilities to the Transmission Owner and PJM for their review.
- Delivery of major electrical equipment – The Interconnection Customer must demonstrate that some or all of the major electrical material has been received at the project site by the milestone date.
- Commercial operation – The Interconnection Customer must make a commercial sale into PJM’s wholesale market of the project’s energy output or demonstrate the use of the facility’s energy output by the milestone date.
- As-Built documentation – The Interconnection Customer must provide certified documentation and electrical modeling data as required for verifying that the facilities constructed align with the PJM studies and agreements.

Interconnection Customers may request milestone extensions for delays that were outside of their control and that could not have been avoided by exercising due diligence per section 212.5 of the PJM Tariff.

1.1.2 Security

Pursuant to PJM Tariff, Part VI, sections 211, 212.4 (b) and 213.4 (b) Security in a form acceptable to PJM is collected at the execution of the applicable service agreement and is held through settlement of final invoices. Security is not a deposit. In the event of an uncured Breach under the applicable agreement involving non-payment of an invoice, Security shall be called upon to pay such invoice. Please see the PJM Tariff, Part VI, section 212.4(b) for details on how Security is calculated, adjusted and finally returned.

1.1.2.1 Deferred Security

The Interconnection Customer may request to defer the collection of Security by up to 120 days after the Interconnection Customer executes the ISA. The Security to be deferred may only be for Local Upgrades or Network Upgrades for which no other Interconnection Customer with a completed System Impact Study has a cost responsibility as described in the ISA.

The Interconnection Customer pays a deposit that is the greater of \$200,000 or 125% of the estimated costs to be incurred for work and/or procurement activities done by the Transmission Owner during the first 120-day period. The deferred security deposit is in addition to the required project Security as listed in the Specifications Section of the ISA.

Of the deferred Security deposit, \$100,000 will be non-refundable and in the case where the Interconnection Customer terminates the ISA or is otherwise withdrawn, it will be used to fund any outstanding invoices including any costs for re-studies due to the project's removal.

Through the period prior to full Security being posted, the deferred Security deposit will be used to pay project invoices, starting with the non-refundable portion. Upon posting of full project Security, the Interconnection Customer can request that any remaining refundable portion of the deferred Security deposit be returned. Any remaining portion of the deferred Security deposit will be returned upon Initial Operation.

Please see the PJM Tariff, Part VI, Section 212.4(c) for the details on deferred Security.

1.1.3 Rights

For Interconnection Customers, the ISA confers Capacity Interconnection Rights for Generation Interconnection Customers, and injection and withdrawal rights for merchant D.C. and/or fully controllable A.C. transmission projects and any applicable Incremental Delivery Rights, Available Transfer Capability Revenue Rights and Auction Revenue Rights.

The rights that can be granted under an ISA are found in the PJM Tariff, Attachment O, Section 2.0.

1.1.3.1 Capacity Interconnection Rights

Any Capacity Interconnection Rights granted to the generation interconnection project will be detailed in section 2.0 of the Specifications section of the ISA. For additional information on Capacity Resource status versus Energy Resource status please see Manual 14A.

1.1.3.2 Interim Capacity Interconnection Rights

If a project reaches Initial Operation prior to the date their Capacity Interconnection Rights become effective or before completion of all required Network Upgrades, the Interconnection Customer may request that PJM perform an interim deliverability study. The study output may grant interim Capacity Interconnection Rights that are only in effect for the year studied.

1.1.3.3 Injection/Withdrawal Rights

Any firm or non-firm injection or withdrawal Rights from PJM's transmission system via a merchant DC or controllable AC transmission facilities will be detailed in section 2.0 of the Specifications of the ISA. Manual 14E provides additional information describing the rights available to merchant transmission projects. The interim Transmission Injection Rights are granted through the same process as detailed above for Interim Capacity Interconnection Rights.

For additional information on the ISA, refer to the Interconnection Service Agreement section in Manual 14A.

1.2 Interconnection Construction Service Agreement (ICSA)

Prior to the Transition Date, the Interconnection Construction Service Agreement (ICSA) set forth in Tariff, Part VI, Attachment P was the companion agreement to the ISA and was used for projects that require the construction of Interconnection Facilities and Network Upgrades as defined in the ISA Specifications section 3.0. The ICSA detailed the following items:

- Project scope
- Construction responsibilities of the involved parties
- Ownership of transmission and customer interconnect facilities
- Schedule of major construction work.

The ICSA Standard Terms and Conditions specify how the construction will be performed and the auxiliary processes such as project suspension, Option to Build, and Breach.

The ICSA was executed among the Interconnection Customer, PJM and the Transmission Owner. In the case that there are multiple affected Transmission Owners, a separate ICSA will be executed with each one. Prior to the Transition Date, the form of an ICSA was found in the PJM Tariff, Attachment P. Upon completion of construction and satisfactory completion of terms under the ICSA, Appendix 2, Section 14, PJM will terminate the ICSA.

1.3 Wholesale Market Participation Agreement (WMPA)

Generators planning to connect to the local distribution systems at locations that are not under FERC jurisdiction and wish to participate in PJM's market need to execute a PJM Wholesale Market Participation Agreement (WMPA). FERC jurisdiction is determined by whether a previous wholesale sale has taken place at the Point Of Interconnection or if the Wholesale Market Participant has received Qualifying Facility status prior to entering PJM's interconnection process. Similar to an ISA, the WMPA confers any rights associated with the interconnection of a generator as a Capacity Resource and/or Energy Resource and any operational restrictions or other limitations on which those rights depend. The WMPA does not define the obligations of the Wholesale Market Participant regarding the cost responsibility for any required upgrades to the distribution system, but can contain required Local Upgrades or Network Upgrades to the Transmission System.

The WMPA is executed between PJM, the Wholesale Market Participant and any affected Transmission Owner(s). Construction responsibility should be defined in an interconnection agreement (IA) between the Wholesale Market Participant and any affected distribution facility owners. PJM is not a party to the IA.

WMPA milestones typically follow those discussed in the GIA section and can contain an additional milestone for the execution of the Interconnection Agreement.

Any Capacity Interconnection Rights are detailed in section 2 of the WMPA specification section and are the same as those conferred under the GIA.

Prior to the Transition Date, there was no form of WMPA under the Tariff. As of the Transition Date, the form for the WMPA can be found in the PJM Tariff Part IX, Subpart C.

1.4 Interim Interconnection Service Agreement (IISA)

Prior to the Transition Date, under certain circumstances, an Interconnection Customer may wish to initiate project construction activities on an expedited basis prior to completion of the Interconnection Studies. One example of such a circumstance is to request that orders be placed for equipment or materials that have a long lead time for delivery. To initiate such an advance of construction activities, the applicant may request execution of an Interim Interconnection Service Agreement (IISA) for those construction activities being advanced. The form of an IISA is found in the PJM Tariff, Attachment O-1.

Security required under the IISA is calculated as the total estimated costs of all activities being advanced under the agreement. The IISA binds the Interconnection Customer to all costs incurred for the construction activities being advanced pursuant to the terms of the PJM Tariff. While PJM agrees to provide the applicant with the good faith estimate, determined in coordination with the affected Transmission Owner(s) for the costs of the Interconnection Facilities and other charges that may be incurred for the work being advanced, such estimate shall not be binding. The Interconnection Customer must agree through execution of the IISA to compensate PJM and the affected Transmission Owner(s) for all costs incurred due to the advanced activities.

Prior to the Transition Date, the form for Interim ISA was found in the PJM Tariff, Attachment O-1. Tariff, Attachment O-1, Section 7.0(a) states that unless it is otherwise described in the Specifications of the IISA, the agreement does not authorize Interconnection Service for the Interconnection Customer. As of the Transition Date, the Interim ISA has been revised and renamed as an Engineering & Procurement Agreement, the form of which is located in Tariff, Part IX, Subpart D.

1.5 Upgrade Construction Service Agreement (UCSA)

The terms and conditions of an Upgrade Construction Service Agreement (UCSA) govern the construction activities associated with the upgrade of capability on PJM bulk electric system in order to accommodate an Upgrade Request. Facilities constructed under an UCSA are not owned by an Upgrade Customer. All ownership rights of the physical facilities are retained by the respective Transmission Owner following the completion of construction. PJM and the Upgrade Customer execute a separate UCSA with each impacted transmission owner. An Upgrade Customer retains the right, but not the obligation (“Option to Build”), to design, procure, construct and install all or any portion of the Stand Alone Network Upgrades. Prior to the Transition Date, the form for UCSA was found in Tariff, Attachment GG. The form for the UCSA applicable as of the Transition Date can be found in the PJM Tariff, Part IX, Subpart E.

1.6 Generation Interconnection Agreement (GIA)

Upon completion of Phase III System Impact Study, or Phase I or Phase II System Impact Studies if accelerated, PJM will furnish a Generation Interconnection Agreement to be executed by the Project Developer, the Transmission Owner (TO) and PJM. The form for the GIA is found

in the PJM Tariff Part IX, Subpart B. In addition to Standard Terms and Conditions the GIA defines project specific rights and obligations as follows:

- Security
- Cost
- Project Developer milestones
- Power factor requirements
- Description of Customer Facility
- Generator Specification (size, fuel type, overview of equipment, name, etc.)
- Merchant transmission requirements
- Maximum Facility Output (MFO)
- Rights, including:
 - Capacity Interconnection Rights
 - Injection/Withdrawal Rights
 - Construction responsibility and ownership
 - Single line diagram with Point of Interconnection identified
 - Metering requirements and ownership
- Transmission Owner specifications and standards

The GIA is the standard agreement developed for generation and controllable flow transmission projects whose Point of Interconnection is FERC-jurisdictional.

The GIA further identifies any changes in construction responsibility from the Standard

Option for Transmission Owner Interconnection Facilities and Transmission Owner Upgrades due to the Project Developer exercising the Negotiated Contract Option or Option to Build. See GIA Schedule L, Section 11.2.2 and Section 11.2.3.

1.6.1 GIA Project Milestones

Project milestones are defined in section 6 of the GIA. Milestones provide critical project measuring points and help communicate to team members the timeframe and scope of high level project goals.

GIAs are typically written to include the standard project milestones listed below, but milestones can be added or altered to customize the agreement to suit the tracking needs of all involved parties.

- The Project Developer must maintain compliance with pre-GIA milestones as stated in PJM Tariff, Part VIII, Subpart E, Section 429.
- Substantial site work – The Project Developer must demonstrate that 20% of site work is complete by the specified date. Additionally, the Project Developer must submit initial drawings, certified by a professional engineer, of the Project Developer Interconnection Facilities to the Transmission Owner and PJM for their review.

- Delivery of major electrical equipment – The Project Developer must demonstrate that some or all of the generating units have been received at the project site by the milestone date.
- Commercial operation – The Project Developer must demonstrate commercial operation, which includes achieving Initial Operation (as described at section 1.4 of Appendix 2 of the *pro forma* GIA), making commercial sales or use of energy, and as applicable obtaining capacity qualification in accordance with the requirements of the Reliability Assurance Agreement Among Load Serving Entities in the PJM region by the milestone date. Other commercial operations may apply if the GIA is for an increase in the Maximum Facility Output or Capacity Interconnection Rights associated with a facility that it already in operation.
- As-Built documentation – The Project Developer must provide certified documentation must provide certified documentation demonstrating that “as-built” Generating Facility or the Merchant Transmission Facilities, and Project Developer Interconnection Facilities are in accordance with applicable PJM studies and agreements. The Project Developer must also provide PJM with “as-built” electrical modeling data or confirm that previously submitted data remains valid.

The following milestones may also be established within the GIA, section 6 if mutually agreed upon, and if these requirements have not been met earlier:

- Fuel delivery agreement and water agreement – Project Developer must demonstrate it has entered into a fuel delivery agreement and water agreement, if necessary, and that it controls any necessary rights-of-way for fuel and water interconnection by the milestone date.
- Local, county, and state site permits agreement – Project Developer must obtain all necessary local, county, and state site permits by the milestone date
- Acquisition of major electrical equipment – Project Developer must demonstrate that it has signed a memorandum of understanding for the acquisition of generating units (including wind turbines and solar inverters) and other major electrical equipment such as main power transformers/GSUs, breakers, control buildings, PV Tracking equipment, PV panels, etc. for the project.

In the event that the Project Developer has not provided evidence of the 100 percent Site Control required at specific Decision Point, and Project Developer provides evidence acceptable to PJM Provider demonstrating that it is in negotiations with appropriate entities to meet the applicable Site Control requirements, the following milestone will be incorporated in the GIA, section 6:

- Evidence of 100% Site Control – Project Developer shall provide evidence of 100 percent Site Control for the Generating Facility or Merchant Transmission Facility, Interconnection Facilities, and, if applicable, the Stand Alone Network Upgrades necessary to interconnect the project to the Transmission System no later than six months after the effective date of this GIA.

No extension of this milestone shall be granted, and failing to meet this milestone will result in the Project Developer’s Interconnection Request and the GIA deemed terminated and withdrawn.

Except as stated above, Project Developers may request milestone extensions for delays that were outside of their control and that could not have been avoided by exercising due diligence per PJM Tariff, Part VIII, Subpart E, section 429(B)(3).

Project Developers shall also have a one-time option to extend any milestone (other than any milestone related to Site Control) for a total period of one year regardless of cause. Other milestone dates stated in the Generation Interconnection Agreement shall be deemed to be extended coextensively with Project Developer's use this provision.

1.6.2 Security

Pursuant to Tariff, Part VIII, section 410(A)(1)(a)(i) and the *pro forma* GIA section 5.0 and Appendix 2, section 11.2.1, the Project Developer will provide PJM the Security, as a letter of credit from an agreed provider or in a form reasonably acceptable to PJM, at or before the execution of the GIA, which:

- (a) shall be reduced as portions of the work are completed, and/or
- (b) shall be increased or decreased as required to reflect adjustments to Project Developer's cost responsibility, as determined in accordance with the applicable Tariff provisions, to correspond with changes in the Scope of Work developed in accordance with PJM's scope change process for interconnection projects.

Security is not a deposit. In the event of a Breach of the GIA by the Project Developer, and the Project Developer fails to pay an amount due within five days from the receipt of notice of the Breach, PJM may use Security to cure the Breach. If PJM uses Security to cure the Breach, the Project Developer shall be in automatic Default and its project and the GIA shall be deemed terminated and withdrawn.

Please see Tariff, Part VIII, section 410(A)(1)(a)(i) and the *pro forma* GIA, Appendix 2, sections 11.2.1 for details on how Security is calculated, adjusted and finally returned. Part VIII, Subpart C, sections 406(A)(2) and (3), 408(A)(2)(d), and 410(A)(1) describe the security requirements applicable to New Service Requests subject to acceleration.

1.6.3 Rights

For Project Developers, the Capacity Interconnection Rights, Energy Resources, Transmission Injection Rights and Transmission Injection Rights that can be granted under a GIA are found in the GIA Specifications Section 2.0.

1.6.3.1 Capacity Interconnection Rights

Any Capacity Interconnection Rights, including interim Capacity Interconnection Rights, granted to the generation interconnection project will be detailed in section 2.0 of the Specifications section of the GIA. For additional information on Capacity Resource status versus Energy Resource status please see Manual 14H.

1.6.3.2 Interim Capacity Interconnection Rights

If a project reaches Initial Operation prior to the date their Capacity Interconnection Rights become effective or before completion of all required Network Upgrades, the Project Developer may request that PJM perform an interim deliverability study. The study output may grant interim Capacity Interconnection Rights that are only in effect for the year studied.

1.6.3.3 Injection/Withdrawal Rights

Any firm or non-firm Transmission Injection or Withdrawal Rights from PJM's transmission system via a Merchant DC Transmission Facilities or Controllable AC Merchant Transmission Facilities will be detailed in section 2.0 of the Specifications of the GIA. Manual 14H provides additional information describing the rights available to merchant transmission projects. The interim Transmission Injection Rights are granted through the same process as for Interim Capacity Interconnection Rights.

1.6.4 Interconnection Construction Terms and Conditions

The standard terms and conditions for interconnection construction are incorporated within the GIA, Schedule L, and are necessary for projects that require the construction of Interconnection Facilities and Network Upgrades as defined in the GIA Specifications section 3.0. These terms and conditions address the following items among other things:

- Project scope
- Construction responsibilities of the involved parties
- Ownership Interconnection Facilities and Transmission Owner Upgrades
- Schedule of major construction work
- Details on how the construction will be performed

In the case that there are multiple affected Transmission Owners, a separate stand-alone Construction Service Agreement (CSA) (see Section 1.8 of this manual) will be executed with each one.

1.7 Engineering and Procurement Agreement (E&P Agreement)

Under certain circumstances, a Project Developer may wish to expedite the engineering and procurement of certain long-lead items, prior to completion of the Interconnection Studies, in order to advance the implementation of the Interconnection Request. To initiate an advance of such activities, the applicant may request execution of an Engineering and Procurement Agreement (E&P Agreement). The form of an E&P Agreement is found in the PJM Tariff, Part IX, Subpart D.

On or before the effective date of an the E&P Agreement, the Project Developer shall provide Security to PJM (for the benefit of the Transmission Owner), which is calculated as the total estimated costs of all engineering and procurement activities being advanced under the agreement. While PJM agrees to provide the applicant with the good faith estimate, determined in coordination with the affected Transmission Owner(s) for the costs of the activities being advanced, such estimate shall not be binding. The E&P Agreement binds the Project Developer to the actual costs incurred for the engineering and procurement activities being advanced, whether greater or lesser than the amount of the Security provided. The Project Developer must agree through execution of the EPAE&P Agreement to compensate PJM and the affected Transmission Owner(s) for all costs incurred due to the advanced activities.

1.8 Construction Service Agreement (CSA)

A stand-alone Construction Service Agreement (CSA) may be implemented under circumstances where Developer Party as defined in the CSA:

1. has requested Long-Term Firm Point-To-Point Transmission Service or Network Integration Transmission Service from Transmission Provider pursuant to the PJM Tariff and requires Network Upgrades;
2. is an Affected System Customer that requires Network Upgrades; or
3. is a Project Developer that requires Network Upgrades to the system of a Transmission Owner with which its Generation Facility or Merchant Transmission Facility does not directly interconnect.

Unless Security has already been provided under a separate Generation Interconnection Agreement, on or before the effective date of the CSA, the Developer Party shall provide Security prior to the effective date of the CSA to PJM, which is intended to collateralize the Costs incurred by Transmission Owner to construct the Network Upgrades identified in Appendix I to the CSA, less any Costs already paid by Developer Party. The CSA binds the Project Developer to pay those costs, whether greater or lesser than the amount of the Security specified in section 2.1 of the CSA, will continue regardless of whether the Developer Party takes Transmission Service pursuant to the terms of the Transmission Service Agreement, if applicable.

1.9 Necessary Study Agreement (NSA)

In the event that a Project Developer has notified PJM that it plans to undertake modifications to its Generating Facility or Merchant Transmission Facility, that upon completion may have a material impact on the Transmission System, a Necessary Study may be required. Necessary Study is defined as PJM's assessment to determine whether a planned modification (as outlined under Appendix 2, section 3. 1 of the GIA) will have a permanent material impact on the Transmission System and to identify the additions, modifications, or replacements to the Transmission System, if any, that are necessary, in accordance with Good Utility Practice, and/or to maintain compliance with Applicable Laws and Regulations or Applicable Standards, to accommodate the planned modifications.

In order to perform a Necessary Study, PJM and the Project Developer must execute a Necessary Study Agreement (NSA), setting the terms and conditions for the study. The form for the NSA can be found in the PJM Tariff, Part IX, Subpart G.

As of the effective date of the NSA, the Project Developer shall provide PJM an initial deposit of \$25,000 for the performance of the Necessary Studies. PJM's good faith estimate for the time of completion of the Necessary Study is within 270 days of the date the PJM approves the dynamic model and data submitted by the Project Developer, according the specifications outlined within the NSA. The Project Developer will be responsible for the actual costs incurred by PJM to perform such studies.

1.10 Network Upgrade Cost Responsibility Agreement (NUCRA)

The Network Upgrade Cost Responsibility Agreement (NUCRA) refers to the agreement entered into by two or more Project Developers and PJM, relating to construction of Common Use Upgrades (i.e., Network Upgrades needed for interconnection of Generation or Merchant Transmission Facilities for more than one Project Developer that share cost responsibility) and coordination of the construction and interconnection of associated Generating Facilities. A separate NUCRA will be executed for each set of Common Use Upgrades on the system of a specific Transmission Owner that is associated with the interconnection of a Generating Facility. The form for the NUCRA can be found in the PJM Tariff, Part IX, Subpart H.

On or before the effective date of the NUCRA, all Project Developers shall provide the required Security to PJM, which is defined for each Project Developer within their GIA, section 5, or a stand-alone CSA, or other relevant NUCRAs to which the Project Developer is a party. The required Security is based on the Common Use Upgrade cost responsibility, which is a percentage of the total estimated cost of each Common Use Upgrade.

The NUCRA includes the identified Common Use Upgrades, the cost responsibility for the Project Developers that share cost responsibility, as well as the standard and any non-standard terms and conditions for the agreement.

Section 2: Generation Interconnection Agreement Implementation Phase Overview

Welcome to the Generation Interconnection Agreement (GIA) implementation phase Overview section of the ***PJM Manual for Interconnection Facilities and Network Upgrade Construction***. This section presents the work breakdown structure (WBS) for the GIA implementation phase along with descriptions of the various major activities and deliverables within each category. These provisions also apply to the stand-alone CSA. The following information is presented in this section:

- An overview of the typical major activities involved with interconnecting a Customer Facility
- Descriptions of the different types of system upgrades that may accompany an interconnection project
- Description of the PJM Interconnection Coordinator role

2.1 Overview

To effectively coordinate a portfolio of Generation and Merchant Transmission projects, PJM takes a Project Management Model approach to the implementation phase of the GIA of interconnection projects.

2.2 GIA Implementation Phase Work Breakdown Structure (WBS)

An effective tool for managing the activities and deliverables associated with interconnection projects is a work breakdown structure (WBS). The WBS can be used as a foundation for coordination of nearly all other aspects of projects. For example, project schedules, cost estimates, project documentation and communication formats can all be derived from the basic WBS.

The major categories of focus in the implementation phase are the Transmission Owner Facilities, Customer Facilities, and generator markets and operations. The following category and sub-category descriptions are provided to explain the significance of each component of the WBS. Clearly, just about every project is different and requires a certain level of customization to the specific nuances of the project, but spelling out major activities in this manner provides a baseline from which PJM, Transmission Owners and Project Developers can customize as appropriate. Moreover, these major activities can also be considered as the minimum project activities (where applicable) that PJM is interested in tracking through the GIA implementation phase life cycle.

2.2.1 Application to Regional Transmission Expansion Plan (RTEP) Queue and Cycle Based Projects

PJM Manual 14C applies to the engineering and construction implementation phase for all types of RTEP projects. The project controls detailed herein are applicable to generation interconnection projects, Merchant Transmission projects, Incremental Auction Revenue Rights projects, Long Term Firm Transmission Service Requests, and Network Upgrades required for the reliable interconnection of the associated project.

In addition, if construction of facilities is required for non-FERC jurisdictional interconnections with executed Wholesale Market Participation Agreements (WMPAs), the same project controls outlined in this Manual 14C would apply.

The project controls outlined in Manual 14C also apply to cases where an Engineering and Procurement Agreement is executed and financial Security is collected by PJM for the purpose of initiating implementation phase activities before the completion of the Interconnection Studies, such as performing engineering or purchasing long lead time equipment.

2.2.2 Large Generation Resources/Small Generation Resources

PJM Manual 14H outlines the study phase process differences between large generation resources (greater than 20MW) and small generation resources (20MW or less). While there are distinct differences in the paths that these types of projects take in the study process, once the projects move into the implementation phase, the same project controls outlined in this Manual 14C generally apply to both large generation resources and small generation resources.

2.2.3 Transmission Owner Facilities

Transmission Owner facilities include all Transmission Owner Interconnection Facilities and Transmission Owner Upgrades, including Network Upgrades, that will be owned and maintained by the Transmission Owner once a project is in service. The work on Transmission Owner facilities is typically performed by the respective Transmission Owners. However, as detailed in the PJM Tariff and discussed later in this manual, a Project Developer may elect to exercise the Option to Build alternative during the GIA execution phase per the provisions of the agreement.

2.2.4 Transmission Owner Interconnection Facilities

Transmission Owner Interconnection Facilities, as defined by the PJM Tariff, Part VIII, Subpart A are required to be completed in order for the project to move forward to Stage One energization as defined by the GIA, Schedule L, Section 11.8(A). This is the point at which the generator is interconnected with the transmission system and backfeed power is available to the Customer Facility for testing and commissioning. The main Transmission Owner Interconnection Facility project activities are listed below.

- Real Estate, Siting, and Permits – Represents activities including facilities siting, acquisition of critical land use, environmental, state and local permits, and acquisition of real estate/right of way
- Detailed Design – Includes completion of Transmission Owner Interconnection Facilities engineering and detailed design activities that were not completed in the Facilities Study phase
- Major Electrical Equipment Delivery – Activities that represent the duration of the procurement, fabrication and delivery to site for major electrical equipment and material associated with the Transmission Owner Interconnection Facilities
- Construction and Testing – Activities that represent the duration of the major construction and testing tasks related to the Transmission Owner Interconnection Facilities. This would include all pre-outage construction and testing activities
- Interconnection (Stage One) Energization – Reflects the outages required for performing final connections, commissioning and testing activities, and represents the interconnection of the Customer Facilities to the electrical grid

2.2.5 Network Upgrades

Network Upgrades, as defined by the PJM Tariff, Part I, are identified on the basis of load flow, short circuit, deliverability and stability analysis as part of the RTEP process, and can include work such as breaker replacements or upgrades, new transformers or other substation equipment. Network Upgrades can also include construction of new transmission lines, reconductoring of transmission lines between substations, and interconnection substations. Not all projects require Network Upgrades. The cost allocation methodologies for Network Upgrades are discussed in PJM Manual 14H.

PJM will track and may request detailed updates on each of the following major activities for all Network Upgrades.

- Real Estate, Siting, and Permits – Represents activities including the facilities siting, acquisition of critical land use, environmental, state and local permits, and acquisition of real estate/right of way
- Detailed Design – Includes completion of Network Upgrade engineering and detailed design activities that were not completed in the Facilities Study phase
- Major Electrical Equipment Delivery – Activities that represent the duration of the procurement, fabrication and delivery for major electrical equipment and material associated with the Network Upgrades
- Construction and Testing– Activities that represent the duration of the major construction and testing tasks related to the Network Upgrades. This would include all pre-outage construction and testing activities.
- Network Upgrade Complete – Represents the completion of the respective Network Upgrades. PJM determines the required completion dates for Network Upgrades in accordance with Project Developer commercial operation milestone and the RTEP analysis.

2.2.6 Generating and Merchant Transmission Facilities

Generating and Merchant Transmission Facilities are defined in the PJM Tariff, Part VIII, Subpart A, section 400. PJM acknowledges that there is a broad range of activities related to the construction of these facilities, however, the following major activities are common and applicable to most projects:

- Engineering and Design – Engineering and Design activities related to the Generation or Merchant Transmission Facility construction
- Major Permits – Represents the completion of acquisition activities for all critical land use, air, water, environmental and operating permits
- Major Electrical Equipment Delivery –Activities that represent the duration of the procurement, fabrication and delivery for major critical path electrical equipment and material (i.e. CTGs, STGs, major piping, etc.)
- Substantial Site Work – Major site construction activities which are initiated with the site preparation and are typically considered complete with the end of civil construction activities.
- Major Foundation Work – Includes all major foundation work applicable to the facility construction

- Generation Facility or Merchant Facility Construction – The construction activities related to physically and electrically interconnecting these facilities to the Transmission System.
- Interconnection (Stage One) Energization – Typically is associated with the transmission outages required for performing final connections and testing activities, and represents the task of completing the interconnection of the Interconnection Facilities and the Transmission Owner Upgrades to the Transmission System. This also includes energizing some or all of the Generating or Merchant Transmission Facility.
- Unit Construction – Includes the erection of all major Generating or Merchant Transmission Facility equipment, for example turbines, generators, switchgear, etc.
- Unit Commissioning – Represents the commissioning period for the unit(s), from commissioning testing to synchronization and through injection of test energy
- Injection of Test Energy – Subset of unit commissioning, but an important task for PJM System Operations in the analysis and scheduling of load flows. See the ‘Test Energy’ section of Manual 14D for additional information.
- Stage Two Energization – Initial synchronization to the Transmission System of each unit at the Generating Facility or the applicable facilities for the Merchant Transmission Facilities and the energization of the remainder of all required facilities and upgrades.
- Commercial Operation – Milestone date where the project makes its first commercial energy sale or use of the facility’s energy output.

2.2.7 Generator Markets and Operations

The Generator Markets and Operations section of the GIA implementation phase WBS includes the integration of the Transmission Owner Facilities and the Generating or Merchant Transmission Facility construction with the applicable PJM internal organizations that need to be engaged in order to achieve all of the requirements prior to commercial operation of the facility. Please review the PJM Manual 14D for details.

2.3 GIA Implementation Phase Team Role Clarity

One of the keys to effectively achieving the respective project goals and milestones is through clearly defined roles and effective communication between all parties. The focus of this manual is the ‘Agreement Implementation Phase’.

2.4 Interconnection Coordinator Role Description and Responsibilities

For the GIA implementation phase, the PJM Interconnection Coordinator assumes the responsibility to ensure that all of the activities, deliverables and milestones on the GIA implementation phase WBS are achieved through the facilitation of an inter-organizational team consisting of PJM, Transmission Owner, and Project Developer personnel. The PJM Interconnection Coordinator serves as the single point of contact who solicits the support of the respective team members in order to effectively facilitate the resolution of issues and coordinate the activities that are critical to meeting the project milestones. Each interconnection project will be assigned an Interconnection Coordinator.

The key responsibilities that the PJM Interconnection Coordinator implements with the support of the project team include, but are not limited to the following:

- Primary PJM contact in the implementation phase from the GIA/E&P Agreement/ stand-alone CSA/WMPA/ UCSA execution phase through commercial operation of the Customer Facility
- Facilitates the resolution of technical issues
- Project Controls – project milestone tracking, cost tracking, etc.
- Reviews Transmission Owner invoices to ensure invoiced amounts match projected work and are in line with the latest project estimates
- Facilitates the resolution of invoicing issues between the Project Developer and the Transmission Owner
- Facilitates the resolution of agreement/Tariff Issues, project conflicts, and dispute resolution as necessary
- Manages the scope change process as appropriate (See “Generator and Merchant Transmission Project Agreement Scope Change Process” section below)
- Performs periodic construction site reviews of Transmission Owner Facilities and Generating or Merchant Transmission Facility construction sites to assess status of construction and facilitate applicable project issues
- Manages increases/decreases in Security as applicable
- Facilitates the modeling of the project in PJM operations and markets models
- Supports telemetry design and implementation to ensure operational and revenue data requirements are met
- Engages PJM Client Managers and Market Settlements department to lead the setup of the project’s eDART and market account(s)
- May coordinate regular project meetings in lieu of TO and Project Developer submitted monthly status reports
- Supports the integration of queue and Cycle-based projects with PJM Operations and Markets departments through outage coordination

Section 3: Agreement Implementation Phase Processes

Welcome to the Agreement Implementation Phase Processes section of the **PJM Manual for Interconnection Facilities and Network Upgrade Construction**. This section provides details about the project controls concepts and tools that PJM uses to facilitate the completion of the agreement implementation phase for generation and merchant transmission projects.

The following items are reviewed in this section:

- Schedule and milestone tracking
- Cost tracking
- Project billing process
- Scope change process
- Project meetings
- Project site reviews
- Project suspension
- Outage coordination
- Project communication, reporting and documentation
- Generator as-built data
- Dispute resolution
- Breach, cure and default procedure
- Project assignment
- Project closeout

3.1 Schedule and Milestone Tracking

The accurate tracking of both Transmission Owner facilities and Generating Facility schedules is critical for PJM to successfully coordinate not only the timely achievement of Project Developers project goals, but also to effectively coordinate the RTEP. PJM must rely on the support of Transmission Owners and Project Developers to supply accurate schedule updates on a regular basis for PJM to integrate into the RTEP database. The minimum schedule information required by PJM to be provided on a regular basis is listed below.

As of the Transition Date, the Interconnection Service Agreement (ISA) and Interconnection Construction Service Agreement (ICSA) was replaced by the Generation Interconnection Agreement (GIA). The term Interconnection Customer was replaced by Project Developer. ISAs and CSAs executed prior to the Transition Date that have not otherwise terminated are still in effect.

3.1.1 Transmission Owner Schedule Tracking

- Interconnection Facilities
 - o Current progress/status

- o Current projected completion date
- o Current percent complete
- o Actual completion date
- o Cash flow/estimated cost of completion
- o Comparison to estimated cost
- o Projected Stage One energization date (backfeed)
- Network Upgrades
 - o Current progress/status
 - o Current projected completion date
 - o Current percent complete
 - o Actual completion date
 - o Cash flow/estimated cost of completion
 - o Comparison to estimated cost
- In addition, PJM uses input from routine project status meetings and communications with Transmission Owners and Project Developers to update the RTEP database accordingly.
- PJM will apply particular attention on the Stage One energization (i.e. backfeed power) target date, since this date is critical for integration of projects into PJM Markets and Operations and may require the completion of Network Upgrades.
- PJM will review test energy schedule and output to coordinate the completion of required Network Upgrades to support interconnection.

Per the FERC Market Efficiency Order, PJM has established an RTEP transmission project website which is updated based on status reports submitted by Transmission Owners and Project Developers. Transmission Owners and Project Developers should use the following standardized guidelines for assigning percent complete information to PJM:

- Engineering and Planning (EP) Status: 0% - 25% (includes engineering, detailed design, material procurement, resource planning)
- Under Construction (UC) Status: 26% - 100%
 - o 26% - 90% - Construction Activities
 - o 91% - 100% - Testing and Inspection

3.1.2 Generating Facility Construction Schedule Tracking

GIA Schedule L, Section 11.6 requires that each constructing entity issue status reports on a monthly basis regarding the status of construction of Interconnection Facilities. PJM acknowledges that most Generating Facility construction schedules are unique to the respective project and there is a broad range of information that can be provided. Routine schedule task updates are required to be provided to PJM from Project Developers in their own preferred customized format (i.e. Microsoft Project, Excel spreadsheet, etc.) or can be provided through regular project status meetings. PJM is interested in summary level schedule updates from

Project Developers, but at a minimum, PJM requires the status information for each of the items below:

- Start date
- Completion date target
- Current activity percent complete

Major items to be addressed in the Project Developers' monthly updates:

- Engineering and design
- Major electrical equipment delivery
- Substantial site work
- Major foundation work
- Project Developer Interconnection Facility construction
- Stage One energization
- Unit construction
- Unit commissioning
- Injection of test energy
- Stage Two energization

3.2 Cost Tracking

The Transmission Owner is to supply PJM and the Project Developer with an estimated quarterly cash flow. This provides the Project Developer with an understanding of upcoming invoice amounts and helps to insulate the Transmission Owner from the financial risk of the project.

Tracking of current estimated costs for Transmission Owner Interconnection Facilities and Network Upgrades activities is critical for PJM's facilitation of the RTEP. In addition, changes in costs may trigger the need for an adjustment in project Security and can impact Project Developer's business decisions. It is important for PJM and the Project Developer to be made aware of any major changes in the current estimated costs at completion for any project upgrade during the course of the life cycle of these activities in a timely manner, rather than after the work is complete. It is also important for PJM to have the most accurate cost data for use in the cost allocation process for Network Upgrades that may be assigned to more than one Project Developer.

The RTEP is dynamic, and therefore PJM must rely on the support of Transmission Owners to supply, on a regular basis, accurate cost estimate projection updates for PJM to integrate into the RTEP database.

3.2.1 Transmission Owner Cost Estimate Projection Tracking

- At a minimum, PJM requires that the Transmission Owner provide the following information to PJM on a regular basis.

- o Transmission Owner Interconnection Facilities
- o Current projected cost at completion
- o Comparison to estimated cost
- Network Upgrades
 - o Current projected cost at completion
 - o Comparison to estimated cost

Upgrade cost updates may be provided in conjunction with regular project status meetings, and should also be in alignment with the PJM scope change process for revisions.

Transmission Owners should note that the cost projections provided should only include Contributions in Aid of Construction (CIAC) tax gross-up amounts if applicable (reference the GIA, Schedule G). A Project Developer agrees to conform to IRS requirements for non-taxable status via GIA language contained in Schedule G. Therefore, the Project Developer is not required to supply supporting documentation unless there has been an IRS determination against the project.

3.3 Project Billing Process

3.3.1 Cost Responsibility

The Project Developer is responsible for all of the costs associated with the interconnection of the Generating Facility as specified in the PJM Tariff, Part I, Section 217. These Costs may include, but are not limited to the Transmission Owner's work on Transmission Owner Interconnections Facilities and Network Upgrades. The Project Developer is also responsible for any costs incurred during the integration of the project into PJM Operations and Markets.

3.3.2 Transmission Owner Billing Guidelines

In order to establish clarity and ensure compliance with the billing requirements in FERC Order 2003, PJM implemented a system of standardized Transmission Owner invoice forms. The TO standard invoice form for the GIA implementation phase is included in this manual in Attachment A, "Transmission Owner Standard Invoice Form F".

For projects governed by a WMPA, billing for work performed by the Transmission Owner will occur directly between the Transmission Owner and the Project Developer and be governed by the terms and conditions of the two-party project interconnection agreement.

PJM requires that Transmission Owners provide billing information on the invoice form throughout the GIA implementation phase to maintain accuracy within PJM's accounting system and also to support the accounting needs of the Project Developers. Continuity in Transmission Owner invoicing information will assist in the timely processing and payment of invoices, and minimize the volume of information requests to the Transmission Owners related to invoices.

The following sections contain guidelines for Transmission Owner billing to PJM.

3.3.2.1 Quarterly Billing

The Transmission Owner is to provide an invoice to PJM on a quarterly basis for work to be performed in the subsequent quarter. This is necessary to ensure consistency with cash flows as required by Order 2003.

Transmission Owners are required to submit a completed Form F for each Transmission Owner Interconnection Facility item (Project Identifier) and each respective Network Upgrade (Network Upgrade #) in addition to the Transmission Owner's invoice cover sheets.

The initial invoice should be submitted to PJM prior to the start of work.

Upon the execution of the GIA, the TO should evaluate and update any cash flow information provided previously. This cash flow can be reviewed with the project team at the construction kickoff meeting. Subsequent quarterly invoicing should follow the projected cash flow, and adjustments to the project cash flow should be discussed with all parties.

Transmission Owners that do not submit timely invoices prior to work are at risk of creating an imbalance with respect to Security collected for the project and possibly render inaccurate any projected cash flow information.

In order for PJM to efficiently process invoices by the 5th of the next month, Transmission Owners should submit quarterly invoices to PJM by the 25th of the month prior to the quarter reflected by the billing. PJM cannot guarantee that billing will be included in the next invoicing cycle (5th business day of the next month) if invoices are not received by the above date.

Transmission Owner billing is to be based on calendar quarter:

- For the initial invoice, the invoice should include the projected costs for work to be completed during the remaining months of the current calendar quarter.
- The second invoice for the first full calendar quarter would then be submitted to PJM prior to the beginning of the next calendar quarter.
- Transmission Owners should provide a quarterly billing form each quarter during the entire duration of the construction work. If there are particular quarters where there are no projected costs, the TO should submit a quarterly billing invoice form (PJM TO Standard Invoice Form F) only if there is a change in the "Estimated Cost at Completion" amounts. The TO invoice cover sheet is not required in this case.

PJM requires the Transmission Owner provide the following breakdown of cost information on the submitted Form F (note: costs are TO scheduled expenditures):

- Major electrical equipment costs
- TO labor costs
- Outside services/subcontractor costs
- Miscellaneous costs (i.e. easement or right-of-way fees, permits, etc.)
- CIAC tax gross-up costs (if applicable)

The above cost breakdown information is required for each of the following columns in Form F: 'Projected Amount Next Period (Current Invoice)', 'Previous Cumulative Amount', 'Cumulative Amount Billed to Date' and 'Total Estimated Amount at Completion'. The 'Total Estimated

Amounts at Completion' should reflect the cost estimates breakdown as described in the GIA or those adjusted through a scope change.

The 'Total Original Cost for Upgrade/Project Identifier' field should be the original total, unallocated cost for that specific Project Identifier (Transmission Owner Interconnection Facilities cost) or Network Upgrade. The 'Total Revised Cost for Upgrade/Project Identifier' field should be the current approved cost as reflected by any scope changes documented through the scope change process.

3.3.2.2 Suspension Billing

For a project with an agreement prior to the Transition Date and entering suspension, the TO is required to perform a cost true-up to ensure there are no outstanding project costs open against the project while it is in suspension. If a project is under suspension, a quarterly billing invoice form is not required. This will not apply to projects with agreements issued after the Transition Date because suspension is not an option in those agreements.

3.3.2.3 Final Invoice

The Transmission Owner is required to provide the final Form F and invoice to PJM within 120 days after completion of construction and installation activities required per the

GIA Appendix 2, Section 11.2.3. The Transmission Owner will mark the final invoice as "Final".

Acknowledging the various scenarios for the timing of completion of Transmission Owner Interconnection Facilities or Network Upgrades, the completion of Interconnection Facilities/ Network Upgrades is generally considered to be in alignment with the following guidelines:

- Transmission Owner Interconnection Facilities - completion date is the date of Stage One energization of Transmission Owner Interconnection Facilities in accordance with the GIA Schedule L, Section 11.8.1.
- Network Upgrades – completion date is prior to the date of Stage Two energization of Interconnection Facilities in accordance with the GIA Schedule L, Section 11.8.3.

3.3.2.4 Adjustments to Security During Construction

The PJM Interconnection Coordinator will make adjustments to Security and balance amounts retained as appropriate through the course of construction in accordance with PJM Tariff provisions and the scope change process.

Reductions in Security can be requested by the Project Developer as work on Network Upgrades completes. It is typical PJM practice to holdback 25% of the estimated cost of the work until the financial close out to ensure sufficient Security is in place to cover any cost overruns.

Any remaining Security will be returned after the cost true-up occurs with the Transmission Owner's submittal of the final project invoice to PJM.

3.3.2.5 Quarterly Cost Reconciliation

A Project Developer may request, at the time of the execution of the GIA that quarterly cost reconciliation be done. The quarterly cost reconciliation will be done at a maximum frequency of one quarter in arrears (i.e. the third quarterly invoice would provide the reconciliation for the first quarter). Attachment A includes an example of how the quarterly cost reconciliation cells on the

TO Standard Invoice Form F could be filled out for a typical project with construction work billed on an advanced quarterly basis.

3.3.3 Project Developer Billing/Statements

The billing format and sequencing outlined in the previous section (Transmission Owner Billing Guidelines) enables PJM to provide the advanced quarterly billing to the Project Developer for cost responsibility for work to be performed on Transmission Owner Interconnection Facilities and Network Upgrades as required by the PJM Tariff.

3.3.3.1 Project Developer Billing

On the 5th business day of each month, PJM sends invoices via email only for shortfalls in accounts to Project Developers.

The Project Developer invoices consist of the following components:

- Email message stating the purpose and content of the email
- PJM invoice attachment
- SAP summary report attachment
- SAP current activity from previous billing report – line item report attachment
- A separate email is sent for copies of Transmission Owner Invoices.

Per the PJM Tariff, the Project Developer is required to pay invoiced amounts within 20 calendar days of the receipt of the invoice. The failure by a Project Developer to make a timely payment of an invoice can lead to project termination. Breach, Cure, and Default procedures are outlined in the GIA Appendix 2, Section 15.

In the event a Project Developer chooses to dispute all or portions of an invoice, GIA Appendix 2, Section 11.2.4 or UCSA, Appendix III, Section 9.4 details the dispute process.

3.3.3.2 Project Developer Monthly Statements

On the 15th business day of each month, PJM sends a statement via email to all Project Developers for projects that have entered the GIA implementation phase.

The Project Developer monthly statements consist of the following components:

- Email message stating the purpose and content of the email
- SAP summary report by phase attachment
- SAP line item detail report (project total history) attachment

3.3.4 Project Cost Reconciliation Process

- PJM performs a cost reconciliation at the end of the GIA implementation phase of Project Developer projects and when a project enters suspension. As the party controlling the transfer of funds between the Project Developer and the Transmission Owner, PJM requires the cost reconciliation to be completed as part of the invoicing process.

- Standard support documents for cost reconciliation are PJM SAP reports, Transmission Owner invoices and support documentation, and PJM created cost summaries, when network upgrades are allocated to multiple projects.

3.3.5 Summary of Financial Responsibilities

3.3.5.1 Transmission Owner Responsibilities

- Timely billing and cost tracking during the GIA implementation phase
- Effective scope change process usage
- Adequate completion of TO standard invoice form
- Timely submission of final invoice and Form F
- Submittal of reconciliation of actual costs versus invoiced costs as required
- Supports customer audits as requested

3.3.5.2 Project Developer Responsibilities

- Support of scope change process if applicable
- Timely payment of PJM invoices
- Maintain interconnection invoice log to compare to PJM statements

3.3.5.3 PJM Responsibilities

- Facilitation of billing and cost tracking issues throughout the interconnection process
- Provide invoices as required and monthly statements to Project Developer throughout the interconnection process
- Effective follow-up with Project Developer on payment of invoices within 20 days; Breach procedures are outlined in the GIA Appendix 2, Section 15.
- Effective scope change process facilitation
- Generate project actual cost summaries as needed
- Reconcile final account balances between Project Developer and Transmission Owner
- Facilitate completion of financial closeout documentation
- Manage requests for increases/decreases in Security
- Manage deferred Security process with requirements for full Security and release of non-refundable Security upon initial operation
- Review Transmission Owner invoices for reasonableness and process, including splitting Network Upgrade cost allocations when more than one project in a Cycle has financial responsibility

3.4 Generation and Merchant Transmission Project Scope Change Process

The scope change process is to be utilized during the implementation phase of Project Developer projects. The intent of the scope change process is to improve the administration of Interconnection Facilities and Network Upgrade construction, and to reduce the need for amendments to project agreements that were previously required when significant changes in the scope, cost or schedule occurred due to circumstances that were unforeseen at the time of agreement execution. The scope change process provides for a clear method of documentation of project changes. This results in Project Developers being informed about scope changes in a timely manner, increased communication between the Transmission Owner, Project Developers and PJM, and fewer disputed issues at the end of projects. The scope change process is not intended to be used to change any of the milestone set forth in the GIA or other relevant agreement.

Many of the changes that normally occur on a typical interconnection project are minor and they do not have a meaningful impact on the cost or scheduled completion of work. However, if in the judgment of any party, the changes in the cost of required facilities or in the time required for their completion are sufficiently large to have a meaningful impact on the total cost or timing for completing the Interconnection Facilities and Network Upgrades, then the scope change process is designed to be the appropriate instrument to document such changes.

The scope change process is applicable to those projects with three-party GIAs, CSAs, UCSAs, E&P Agreements, and WMPAs. The scope change process can only be applied to previously defined impacts related to an interconnection project as defined in the applicable agreement. If a particular scope change results in the requirement of a new impact not previously included in PJM's interconnection studies, then an amended agreement will need to be executed. **The scope change process is not intended to be used to change any of the milestone set forth in the GIA or other relevant agreement, and will not be used to change a project's fuel type.**

Thus, the process is applicable to any changes that affect the currently defined scope of an Project Developer project. For example, the scope change process would apply in the case of a previously defined Network Upgrade that requires construction of a new segment of transmission line in the event that detailed design or initial excavations for the new transmission towers revealed unexpected subsurface conditions that required altering the foundation design, and thus the projected cost and/or schedule for completion of the tower foundations. Another typical application of the scope change process would be the case where the TO has determined that due to a six month delay in the delivery of a circuit breaker that is required to complete a breaker replacement network upgrade, the in-service date for that particular network upgrade will be significantly delayed, and the revised schedule of work in Schedule L of the GIA would be reflected in the scope change form. The scope change process is designed to have the flexibility to be initiated by the Transmission Owner, Project Developer, or PJM

Any work initiated before PJM dispositions the scope change shall be considered work done at risk.

The following are typical situations where a Project Developer, Transmission Owner or PJM may initiate the scope change process:

- Transmission Owner:
 - o Significant cost overrun projected during the implementation phase
 - o Identification of additional scope not identified in the Facilities Study but identified later during detailed design
 - o Delay in major project tasks (i.e. backfeed power energization or completion of a Network Upgrade)
- Project Developer:
 - o Change in project scope resulting in modification to Transmission Owner Facilities scope
 - o Change in Generating Facility equipment characteristics
- PJM:
 - o Notification to Project Developer about changes to network upgrade requirements due to retool analysis
 - o Notification to Project Developer to modify Security amount or Letter of Credit (LOC) expiration date

If an initiated scope change results in a significant cost increase, the scope change process is used to identify any additional Security amount required to be provided by the Project Developer without having to execute an amended agreement.

The scope change process provides for the Transmission Owner and Project Developer acknowledgment, though not their approval, of each scope change. Refusal to acknowledge the scope change will not, however, preclude implementation of a change that PJM finds to be appropriate and reasonable and is determined to be in accordance with the PJM Tariff.

The Project Developer will remain responsible, in accordance with the PJM Tariff, for the full cost of the required upgrades. Should the Project Developer continue to dispute the appropriateness of a scope change and/or any increased costs related to it, it may invoke the PJM Tariff dispute resolution procedures.

Please refer to Attachment B of this manual for the Generator and Merchant Transmission Scope Change Form.

3.5 Project Site Reviews

PJM performs site visits on Project Developer projects to coordinate with Project Developers and Transmission Owners, assist the Project Developer project in making a successful transition into PJM's operations and markets, review items under dispute, and verify compliance with agreement milestones and/or progress towards integration (back-feed, turnover for Option to Build etc.).

Site reviews allow PJM to assess the status of Transmission Owner and/or Generating Facility Construction. Also a better working relationship with the site project manager can be developed to improve the level of coordination with PJM internal organizations.

A site visit may be conducted to all applicable upgrades for Project Developer projects, during the construction and start-up phases.

When performing site visits, PJM will abide by all applicable safety rules including wearing of personal protective equipment such as hard hats, safety shoes, eye protection, and fire resistant clothing. In addition, a hazard awareness briefing is recommended prior to the inspection to make everyone aware of the hazards at the site and the energization status of the equipment. Special precautions and site specific items need to be discussed during this awareness briefing.

The coordination between PJM and the site is usually handled through the PJM Interconnection Coordinator assigned to the project and the local project/construction manager. The objective is to establish communications early in the project and obtain regular updates. These updates are necessary to ensure the coordination of other activities related to this project, such as line outages, completion of other upgrades, and other critical scheduled activities. Site visits can normally be conducted around other routine activities at the facility, such as regular status meetings, scheduling meetings, or site walkdowns.

Typical items reviewed during a Generating Facility site visit may include the milestones from the agreement(s), site work status, electrical equipment delivery, and energization schedule. The objective is to make sure that the project is progressing, giving PJM enough information to coordinate other related on-going activities, such as Network Upgrades, metering, and integration into System Operations.

During the site visit, digital photos and notes may be taken. These are for internal PJM reports and database updates. The photos and notes may be used for equipment delivery verification, schedule progression, one-line diagram verification, or other appropriate schedule activities.

In summary, site visits help PJM not only ensure the reliability of the transmission system by making sure upgrades are progressing and completed as required, but also help facilitate the coordination of other behind the scenes activities within PJM.

3.6 Outage Coordination

The PJM Tariff requires that Transmission Owners and Project Developers coordinate all transmission system outages with PJM in accordance with the PJM System Operations outage planning procedures. In addition to the detailed planning that is required by the PJM System Operations outage planning procedures, Transmission Owners and Project Developers can support PJM's long range planning of outages by supplying the PJM Interconnection Coordinator with schedule updates so that long range outage planning information can be integrated into the PJM outage planning schedules. Additionally, the test energy plan provided by the Project Developers prior to Stage Two Energization is integrated into the outage planning process in conjunction with requested outages.

During the agreement implementation phase, the PJM Interconnection Coordinator will provide assistance, as required, in coordinating outages with PJM System Operations and will facilitate the resolution of major outage related issues between PJM System Operations, Project Developers, and Transmission Owners. PJM outage requirements are described in detail in PJM Manual 03.

3.7 Project Suspension

Projects with an ICSA, UCSA or WMPA that were issued prior to the Transition Date may elect to suspend that work for a year and up to three years under certain circumstances. Project suspension pushes out the agreement milestone dates coextensively for the duration of the suspension time. WMPA suspension must be supported by the accompanying two-party Interconnection Agreement. Agreements issued after the Transition Date will no longer allow suspension. A Project Developer will have a one-time option to extend any milestone (other than any milestone related to Site Control) for a total period of one year regardless of cause. Other milestone dates stated in the GIA shall be deemed to be extended coextensively with Project Developer's use of this provision.

Projects that have entered the New Services Queue after February 1, 2011 and received an ICSA, UCSA or WMPA that was issued prior to the Transition Date are governed by the following rule: a single project suspension or cumulative suspensions greater than a year in length will not be granted if they are deemed to be a Material Modification, meaning it cannot affect any later Queue Position.

In the event that a Project Developer initiates project suspension, the PJM Interconnection Coordinator will facilitate the completion of the following activities in accordance with the PJM Tariff:

- Confirm receipt of suspension notification from Project Developer Confirm that Project Developer suspension notification meets PJM Tariff requirements
- Evaluate agreement milestones and amend as required
- Update PJM database (project status)
- Assess impact on Network Upgrades/baseline upgrades
- Facilitate Transmission Owner completion of high level assessment of known risks
- Evaluate Transmission Owner suspension costs
- Facilitate billing process for Transmission Owner suspension costs (including cost reconciliation and refunding of significant TO funds that may have been already collected but will not be used as projected)

Under Appendix 2, the ICSA, Section 3.4.2, it is the project's responsibility to notify PJM and the TO to re-initiate project work prior to the expiration of available suspension time. Failure to provide notice before the end of the suspension time period will result in the project being terminated. Under these circumstances, the Interconnection Coordinator will send the termination letter to the Project Developer with a copy also sent to the TO.

For projects that have gone through a period of suspension, and construction activities are resumed by the Project Developer, the PJM Interconnection Coordinator will facilitate the completion of the following activities:

- Confirm receipt of the notification from Project Developer that the project is coming off of suspension, and provided the notification to the Transmission Owner
- Assess the current impact on Network Upgrades/Baseline Upgrades

- Facilitate the Transmission Owner's evaluation and confirmation of the current schedule and estimated costs
- Complete the scope change process for revisions to Project Developer agreement milestones, TO schedule, and cost impacts, as applicable
- Update the PJM database

3.8 Project Communication, Reporting and Documentation

The following are the main types of standard reporting and documentation that are required throughout the agreement implementation phase:

3.8.1 Project Drawings

The GIA section 6 substantial site work milestone and Appendix 2, section 4.1.1 require the Project Developer to submit initial drawings certified by a professional engineer for the Project Developer Interconnection Facilities to the Transmission Owner and PJM. The Transmission Owner and PJM will review the submitted drawings against the design that was analyzed in the planning model and return comments within 45 days. Drawings not commented on in that period will be considered approved as-is. All drawings submitted are considered Confidential Information. GIA Schedule L, Section 11.2.3.8 sets forth additional requirement if the Option to Build is elected.

3.8.2 Monthly Construction Reports

The GIA Schedule L, Section 11.6 requires that each Transmission Owner and Project Developer engaged in GIA implementation activities provide each other (and PJM) with monthly (at a minimum) status reports. PJM requests that the project schedule task and cost estimate information detailed in the Schedule and Milestone Tracking section of this manual be incorporated in these monthly status reports.

3.8.3 Project Meetings

In order for PJM to effectively coordinate the implementation phase of interconnection projects, Project Developer and Transmission Owners should include PJM in regular project status meetings.

PJM participation in regular project meetings provides the following benefits:

- Better collaboration between the Project Developer and Transmission Owners
- PJM can more proactively facilitate project integration with internal PJM organizations, and involve the appropriate PJM contacts at the right time
- Elevation of PJM's awareness of project issues and status with respect to schedule activities
- More efficient coordination of transmission system outages

Regular project meetings may be held in lieu of Transmission Owner and Project Developer submitting monthly status reports.

3.8.4 Test Energy Schedule

Prior to Stage Two Energization, the Project Developer is required to supply PJM with a test energy schedule of maximum hourly output MWs in order for PJM to determine any system constraints and to better coordinate Project Developer outage planning. Depending on the potential reliability impact, the test energy schedule may be required several months prior to energization. For additional information on test energy please review that section of Manual 14D.

3.8.5 Notice of Completion

The Project Developer is required by the GIA Schedule L, section 10.3.3 to notify PJM and the applicable Transmission Owner in writing upon completion of the following:

- The Generating Facility
- The Project Developer Interconnection Facilities
- Any Transmission Owner Interconnection Facilities and Stand-Alone Network Upgrades for which the Project Developer has completed through exercising the 'Option to Build' alternative

Attachment C contains a template with suggested wording for the notice of completion.

There are additional documentation requirements for projects that have elected 'Option to Build'. The details for the submission of the 'Option to Build' documentation can be found in that section of this document.

3.9 Generator As-Built Data Requirements

In order to reflect as-built information in PJM's planning models, PJM requires that Project Developers provide updates to generator electrical modeling data originally provided to PJM for the initial planning studies. This as-built data is then used in the subsequent planning studies by PJM, so the accuracy of this data is critical.

The Project Developer is required to provide PJM with the requested as-built electrical modeling data (or confirm that previously submitted data is valid) within one (1) month following commercial operation of the generating unit (s). As-built generator data (i.e. GSU, attachment line, etc.) must be provided for each generating unit.

3.10 Dispute Resolution

For billing disputes, PJM will facilitate the dispute resolution process with the Transmission Owners and Project Developer in accordance with the GIA, Appendix 2, Section 11.1.2 and 11.2.4. All other types of disputes shall be submitted in accordance with GIA, Appendix 2, Section 20. All disputes must be initiated in writing by a disputing party to PJM, and the PJM Interconnection Coordinator will confirm that the dispute initiation documentation meets the PJM Tariff requirements, notify the PJM Alternate Dispute Resolution Committee and PJM management, identify the appropriate PJM Tariff dispute resolution path that the disputed issue will follow, and facilitate the process between the parties.

3.11 Breach, Cure and Default

Breach is defined in Part I of the PJM Tariff. A party found in Breach is provided a notice describing in reasonable detail the nature of the Breach and, if applicable, any steps that will be necessary to cure the Breach. In the event of Breach other than a failure to pay any amount when due, the Breaching Party may clear the breach within 30 days or work in good faith beyond the 30 day period on all reasonable and appropriate steps to clear the breach. In the event of Breach for failure to pay any amount when due, the Breaching Party must cure the Breach within five days from the receipt of notice of the Breach, and PJM may use Security to cure such Breach. If PJM uses Security to cure such Breach, Project Developer shall be in automatic Default and its project and the GIA Agreement shall be deemed terminated and withdrawn. Breaching Parties that do not cure the breach will be found in default of their agreement(s).

Additional details for the Breach, Cure and Default process can be found in the following agreements:

- GIA, Appendix 2, Section 15
- UCSA, Appendix 2, Section 13.0
- WMPA, Appendix 2, Section 6
- E&P Agreement, Section 21

Additionally, Tariff Parts I and Part VIII, Part 400, Definitions D define Default.

3.12 Assignments and Entity Changes

A party to a PJM service agreements listed below may assign its rights, duties and obligations under the agreement in connection with the sale, merger, or transfer of properties, but only in accordance with the assignment provisions of the agreement. Details for the different forms of assignment, and the requirements for prior consent, can be found in the following agreements in the sections identified:

- GIA, Appendix 2, Section 12
- WMPA, Section 2.5
- UCSA, Appendix 3, Section 10

Consent to assignment agreement templates can be found on the PJM website at <https://www.pjm.com/planning/services-requests/new-service-requests.aspx>.

A Project Developer or Wholesale Market Participant seeking to transfer ownership interests in a PJM agreement, or make changes to the corporate name or contact information shall provide the following documentation to PJM:

- Written notification to the VP of Planning, PJM Interconnection, L.L.C. identifying the updated name and contact information for the Project Developer or Wholesale Market Participant (refer to Attachment G for entity change notification forms);
- An IRS Form W9 reflecting the new entity name and address, as applicable;

- A certificate of good standing from the acquiring entity's state of organization, as applicable;
- A list of the current officers of the acquiring entity, as applicable; and
- A public copy of the application filed with the Federal Energy Regulatory Commission pursuant to section 203 of the Federal Power Act, as applicable.

If a document listed above is not applicable to the requested change, the Project Developer or Wholesale Market Participant shall explain why it is inapplicable.

If the Project Developer or Wholesale Market Participant will be assigning a PJM agreement to a new entity, and prior consent is required or requested, PJM will draft a consent to assignment agreement to be executed by all parties to the PJM agreement, as well as by the assignee. Alternatively, if the current entity represented in the PJM agreement is making a change to the corporate name or contact information, or is assigning the PJM agreement to an affiliate such that no prior consent is required, PJM will draft an agreement to amend to be executed by all parties to the PJM agreement, and by the assignee as applicable.

3.13 Project Closeout

When the Generating Facility makes a commercial energy sale or the facility's energy output is used and all Transmission Owner and Project Developer activities required per the applicable agreement have been completed. The project moves into the "operation phase". The GIA remains in effect until it is terminated under section 16 of the Standard Terms and Conditions in GIA, Appendix 2.

Operation phase coordination activities are handled by the PJM Client Management and Operations Support Division and are detailed in PJM Manual 14D.

Section 4: Technical and Construction Requirements

Welcome to the *Technical and Construction Requirements* section of the ***PJM Manual for Interconnection Facilities and Network Upgrade Construction***. In this section you will find an overview of both the technical requirements for generator and merchant transmission interconnections in the PJM regions and the construction specifications for the attachment and Network Facilities needed to accommodate generator and/or merchant transmission interconnections in the PJM regions.

- Description of the technical requirements and where to find the technical requirements of the particular Transmission Owner for generator and merchant transmission interconnections in a specific PJM region (see “Transmission Owner Standards”).
- Description of the construction standards and specifications for Interconnection Facilities and Network Upgrades and where to find the construction standards for a particular Transmission Owner to accommodate generator and/or merchant transmission interconnections in a specific PJM region (see “Construction Standards”).
- Description of the technical requirements and where to find PJM’s technical requirements is found in the following PJM manuals:
 - o M-01
 - o M-03
 - o M-14D

4.1 Transmission Owner Standards

4.1.1 Need for Interconnection Technical Requirements

The PJM transmission grid provides the means for delivering the output of interconnected generators to the load centers of the PJM energy and capacity markets. As a FERC accepted Regional Transmission Organization (RTO), PJM administers the process for the interconnection of generators to the PJM transmission grid. To ensure that the PJM transmission grid is operated in a safe and reliable manner, all generator and merchant transmission projects interconnected to the PJM transmission grid must be installed according to the established technical requirements for good utility practice.

PJM, as the Transmission Provider, will ensure that the generation and/or merchant transmission Project Developer has access to the applicable technical requirements of the Transmission Owner.

4.1.2 Application of Interconnection Technical Requirements

As specified in the form of Generation Interconnection Agreement, Schedule L, Section 10.2A “Applicable Technical Requirements and Standards shall apply to the design, procurement, construction and installation of the Interconnection Facilities, Transmission Owner Upgrades and Merchant A.C. Transmission Facilities only to the extent that the provisions thereof relate to the design, procurement, construction and/or installation of such facilities.” The requirements and standards shall be identified in GIA Schedule D, WMPA Schedule E, or UCSA, Appendix I.

4.1.3 Technical Requirements on the PJM Website

The PJM Tariff under Part I and Part VIII, section 4.00, Definitions A, establishes the requirement that those certain technical requirements and standards applicable to interconnections of generation and/or transmission facilities shall be publicly available through postings on Transmission Provider’s internet website. Accordingly, PJM makes the documents containing Applicable Technical Requirements and Standards for each Transmission Owner available through its internet website www.pjm.com under the directory titled “Design, Engineering & Construction” at <http://pjm.com/planning/design-engineering/to-tech-standards.aspx>.

4.2 Construction Standards

4.2.1 Need for Construction Standards

The facilities of the PJM transmission grid, while operated by PJM, are comprised of the physical facilities owned by the various Transmission Owners). While the facilities of the various Transmission Owners are operated by PJM as a fully interconnected transmission network, the physical facilities of each individual Transmission Owner are designed to the particular construction standards of that Transmission Owner. Such construction standards for a particular Transmission Owner include but are not limited to:

- Transmission system voltage levels
- Spacing and clearance requirements
- Equipment design specifications
- Family of material and equipment sizes
- Fully compatible system protection schemes
- List of Approved Contractors
- List of approved manufacturers and vendors of major transmission-related equipment

While particular construction standards may vary among the various Transmission Owners, all such standards are derived from those generally accepted industry standards developed by the American National Standards Institute (ANSI), the Institute of Electrical and Electronics Engineers, Inc. (IEEE) and the National Electric Safety Code. The Transmission Owners have selected their various construction standards to facilitate operation, maintenance and repair or replacement of the various components utilized on their portion of the overall PJM transmission grid. Thus, it is essential that any additions, upgrades or other changes to the transmission facilities of any particular Transmission Owner must be designed and installed to the construction standards of that Transmission Owner. PJM, as the Transmission Provider, will ensure that any Constructing Entities authorized to perform construction activities under the “Option to Build” provisions of the PJM Tariff to interconnect with the facilities of a Transmission Owner, or to install or upgrade facilities within the transmission system of a Transmission Owner, has access to the established construction standards of that Transmission Owner.

4.2.2 Application of Transmission Owner Construction Standards

The conditions applicable to a Project Developer exercising its “Option to Build” are specified in GIA, Schedule L, Section 11.2.3.8. Among the provisions included under the Option to Build is: “Project Developer shall submit to the Transmission Owner and Transmission Provider

initial drawings, certified by a professional engineer, of the Transmission Owner Interconnection Facilities that Project Developer arranges to build under the Option to Build. The Transmission Owner shall review the drawings to assess the consistency of Project Developer’s design of the pertinent Transmission Owner Interconnection Facilities with Applicable Standards and the Facilities Study.”

4.2.3 Construction Standards on the PJM Website

The GIA, Schedule L, Section 11.2.3.1 states that “Project Developer shall have the option (“Option to Build”), to assume responsibility for the design, procurement and construction of the Transmission Owner Interconnection Facilities and Stand-Alone Network Upgrades.” If a Project Developer wishes to exercise the Option to Build, the Project Developer must have ready access to the construction standards for the Transmission Owner(s) system where such facilities are to be installed. GIA, Schedule L, Section 11.2.3.5 establishes the requirement that “Transmission Provider shall publish each Transmission Owner’s List of Approved Contractors in a PJM Manual and shall make such manual available on its internet website.” Accordingly, PJM makes the documents containing the applicable construction standards for each Transmission Owner available through its internet website www.pjm.com under the directory titled “Design, Engineering & Construction” at <http://pjm.com/planning/design-engineering/to-tech-standards.aspx>.

In supporting interconnection projects which refer to a specific ITO Standard revision, all historical ITO interconnection standards versions shall also be available on a separate link under the directory titled “Design, Engineering & Construction” at <http://pjm.com/planning/design-engineering/to-tech-standards.aspx>.

Section 5: Option to Build

Welcome to the *Option to Build* section of the ***PJM Manual for Interconnection Facilities and Network Upgrade Construction***. In this section you will find an overview of the additional requirements related to implementation of a project that has elected the Option to Build provision of the PJM Tariff.

5.1 Option to Build

The PJM Tariff allows for a Project Developer to exercise the Option to Build alternative during the GIA execution phase.

The PJM Tariff provisions related to timeframes for initiation of the Option to Build are outlined in PJM Manual 14H.

5.1.1 Approved Contractors and Manufacturers

PJM will facilitate the process for Transmission Owners to provide a List of Approved Contractors and Manufacturers as required in accordance with the GIA, Schedule L, Section 11.2.3.5.

PJM will facilitate the TO review, approval/disapproval, and addition of contractors or manufacturers to the List of Approved Contractors and manufacturers if requested by the Project Developer.

5.1.2 Drawing Review

The Project Developer is required to provide drawings certified by a professional engineer of any Transmission Owner Interconnection Facilities and/or Network Upgrades being constructed under the Option to Build provision of the GIA to PJM and the Transmission Owner. The Transmission Owner will review and comment on Project Developer drawings within 60 days after the receipt of drawings. PJM will facilitate and provide oversight for this process. Drawings that are not commented on within the 60 day period are to be considered approved as-is. All drawings submitted are considered Confidential Information.

5.1.3 Inspection, Testing, and Energization

For facilities built by the Project Developer, the PJM Tariff requires that the documentation described below be exchanged between the involved parties prior to synchronization of the Generating or Merchant Transmission Facility with the transmission system. Attachment C contains templates with suggested wording for the notices below.

- Notification of inspection/testing results - Within 10 days after satisfactory inspection and/or testing of Interconnection Facilities and/or Stand-Alone Network Upgrades built by the Project Developer (including, if applicable, inspection and/or testing after correction of defects or failures), the Transmission Owner shall confirm in writing to the Project Developer and Transmission Provider that they successfully inspected and tested facilities are acceptable for energization (reference, GIA, Schedule L, Section 11.7.5)
- Transfer of operational control - Prior to energization, the Project Developer shall have delivered to the Transmission Owner and Transmission Provider a written notice transferring to the Transmission Owner and Transmission Provider operational control

over any Transmission Owner Interconnection Facilities that Project Developer has constructed (reference GIA, Schedule L, Sections 11.8.1 and 11.8.3).

- Acceptance of facilities - Within five days after determining that Interconnection Facilities and/or Transmission Owner Upgrades have been successfully energized, the Transmission Owner shall issue a written notice to the Project Developer accepting the Interconnection Facilities and/or Transmission Owner Upgrades built by the Project Developer that were successfully energized (reference, GIA, Schedule L, Section 11.9)
- Transfer of title documentation – Within 30 days after the receipt of the notice of acceptance, the Project Developer shall deliver to the Transmission Owner, for the Transmission Owner's review and approval, all of the documents and filings necessary to transfer to the Transmission Owner title to any Transmission Owner Interconnection Facilities and/or Transmission Owner Upgrades constructed by the Project Developer, and to convey to the Transmission Owner any easements and other land rights to be granted by the Project Developer (reference, GIA, Appendix 2, Section 23.3.5).
- Approval of transfer of title documentation – The Transmission Owner, after a review which is not to be unreasonable withheld, delayed or conditioned, will provide written notice to the Project Developer of their approval.
- Within 30 days after its receipt of the Transmission Owner's written notice of approval of the documentation, the Project Developer, in coordination and consultation with the Transmission Owner, shall make any necessary filings at the FERC or other governmental agencies for regulatory approval of the transfer of title (reference, GIA, Appendix 2, Section 23.3.5).
- Within 20 days after the issuance of the last order granting a necessary regulatory approval becomes final (i.e., is no longer subject to rehearing), the Project Developer shall execute all necessary documentation and shall make all necessary filings to record and perfect the Transmission Owner's title in such facilities and in the easements and other land rights to be conveyed to the Transmission Owner (reference, GIA, Appendix 2, Section 23.3.5).

Section 6: Baseline and Supplemental Upgrade Projects

Welcome to the *Baseline and Supplemental Upgrade Projects* section of the ***PJM Manual for Interconnection Facilities and Network Upgrade Construction***. In this section you will find the tracking process for baseline and supplemental upgrade projects.

6.1 Baseline Upgrade Projects

Baseline upgrades are projects primarily required to eliminate base-case reliability criteria violations found in the PJM Regional Transmission Expansion Plan.

PJM assigns construction responsibility for each baseline upgrade pursuant to Schedule 6 of the PJM Operating Agreement (OA), 'Regional Transmission Expansion Planning Protocol', which governs the process for planning the expansion and enhancement of transmission facilities to meet reliability criteria and to enhance market efficiency. Upgrades are reviewed at the PJM Transmission Expansion Advisory Committee (TEAC) and then approved by the PJM Board. PJM sends each Transmission Owner a letter communicating the baseline upgrade construction responsibilities. The TO then acknowledges the letter and provides any comments back to PJM.

For Greenfield projects that are eligible to be designated to a non-incumbent, PJM notifies each Designated Entity of its designation to construct the baseline upgrade project. The construction designation process for baseline RTEP projects is outlined in section 1.5.8 of the PJM OA. Manual 14B details the process for identifying criteria violations, determining system upgrades to mitigate those violations and the designation of construction responsibility.

Attachment F contains the checklist for the new equipment energization process to be utilized by Transmission Owners and Designated Entities from inception to energization of upgrade projects.

6.1.1 RTEP Agreements

6.1.1.1 Designated Entity Agreement (DEA)

Greenfield transmission projects that originate through an RTEP proposal window will utilize the Designated Entity Agreement (DEA) to assign construction responsibility for the identified project to the Designated Entity. The Designated Entity Agreement is a two party agreement between the Designated Entity and PJM. The terms and conditions of the agreement govern the construction period of the transmission project and define specific rights and obligations of the parties. The form for the DEA can be found in the PJM Tariff, Attachment KK.

DEA Milestones and Milestone Dates

Milestones are defined in Schedule C of the DEA. Milestones provide critical project measuring points and help communicate to team members the timeframe and scope of high level project goals.

The DEA is typically written to include the standard project milestones listed below, but milestones can be added or altered to customize the agreement to suit the tracking needs of all involved parties.

- Execute Interconnection Coordination Agreement - Designated Entity must execute the Interconnection Coordination Agreement with Transmission Owner or request the agreement be filed unexecuted.
- Demonstrate adequate Project financing - Designated Entity must demonstrate that adequate project financing has been secured. Project financing must be maintained for the term of the DEA.
- Acquisition of all necessary federal, state, county, and local site permits – Designated Entity must demonstrate that all required federal, state, county and local site permits have been acquired.
- Substantial site work completed – Designated Entity must demonstrate that at least 20% of Project site construction is completed. Additionally the Designated Entity must submit updated ratings and the final project drawings to the Transmission Provider.
- Demonstrate required ratings – Designated Entity must demonstrate that the project meets all required electrical ratings.
- Required project in-service date - Designated Entity must: (i) demonstrate that the Project is completed in accordance with the Scope of Work in Schedules B of the DEA; (ii) meets the criteria outlined in Schedule D of the DEA; and (iii) is under Transmission Provider operational dispatch.

A Designated Entity may request milestone extensions per the project modification process described in Section 4.3 of the DEA and detailed in this manual.

Security

The Designated Entity is required to supply project Security that is calculated as 3% of the PJM estimated costs for the portion of the transmission project being assigned to the Designated Entity. A Letter of Credit, which meets PJM criteria, or cash are acceptable forms of Security. Security is required to be maintained through the term of the DEA.

6.1.1.2 Interconnection Coordination Agreement (ICA)

The Interconnection Coordination Agreement (ICA) provides for the coordination required between the Designated Entity and Transmission Owner(s) for a greenfield transmission project selected through an RTEP proposal window and was determined to require a DEA. The ICA is required in those circumstances where the Designated Entity is not a signatory to the Consolidated Transmission Owners Agreement (CTOA). The ICA formalizes the coordination responsibilities between the Transmission Owner and Designated Entity during the construction phase of the project. There will be an ICA required with each different Transmission Owner who is required to coordinate work with the Designated Entity to facilitate the connection of the identified transmission project to the system. The form for the ICA can be found in the PJM Tariff, Attachment LL.

6.1.2 Tracking

Once upgrades have been identified and approved, the PJM Interconnection Coordinator is responsible for tracking the status and completion of projects with the assistance of the Transmission Owners and Designated Entities. PJM may request additional information regarding projects consistent with PJM Manual 14B, section 1.4.2.3. Any permit or certificate

delays that are anticipated to impact the projected in-service date should be timely communicated to PJM. Regular updates need to include the following:

- General status of engineering and construction (including any relevant regulatory siting authority approval necessary for the project and the status of such approval)
- Percent complete (report should follow 'percent complete' guidance given in the 'Schedule and Milestone Tracking' section')
- Current target in-service date or actual completion date
- Applicable outage information, in the form of outage ticket numbers
- Cost update

Note:

The PJM Tariff, Schedule 12 contains cost allocations for baseline upgrade projects.

Statements of actual costs incurred on PJM baseline upgrades are a part of that entity's Attachment H filings to FERC under PJM's Tariff. This is pursuant to Section 205 of the Federal Power Act and Part 35 of the FERC regulations and completed in support of annual transmission revenue requirements.

6.1.2.1 Cost Tracking

Project updates including engineering progress, cost estimates, and constructions updates shall be reported as part of the regular status updates. At a minimum the TO shall provide updates to PJM, as needed, for the following project status updates and milestones or acknowledge that the current estimate is accurate:

- Acceptance of Construction Responsibility;
- Status change from Engineering & Procurement to Under Construction; and
- Status Change to In-Service

6.1.3 Projects Subject to a Designated Entity Agreement

Those projects subject to a Designated Entity Agreement (DEA) have additional reporting requirements relative to the agreement milestones as well as other agreement provisions discussed below. This section describes the processes and agreement provisions relevant to the implementation phase of these projects.

6.1.3.1 Project Communication, Reporting and Documentation

Quarterly Status Reports

The DEA, Section 4.4 requires that the Designated Entity provide a quarterly (at a minimum) status report. The report is required to contain, but not be limited to the following:

- Current engineering and construction status
- Project completion percentage, including milestone completion
- Current target project or phase completion date(s)
- Applicable outage information

- Cost expenditures to date and revised projected cost estimates for completion
- Status of milestone completion

Project Coordination Meetings

Effective coordination between the Designated Entity, the interconnected Transmission Owners and PJM should be achieved through regular project meetings. Project meetings provide the following benefits:

- Effective collaboration and communication surrounding project technical aspects
- Elevation of project issues with respect to schedule activities
- Efficient coordination of transmission system outages

Regular project coordination meetings may be held in lieu of the Designated Entity's submitted quarterly status reports.

Project Financing Milestone

The Designated Entity must demonstrate adequate financing per the milestone provided in Schedule C of the DEA. One of the following may be provided as demonstration of adequate financing:

- Firm commitment letter from a financial institution(s) or unaffiliated company acceptable to PJM
 - PJM may use existing PJM Tariff criteria for acceptability of the financial institution or the unaffiliated company itself
 - Commitment amount must be appropriate to the relevant phase of the project financing plan
- and/or, Documentation equivalent to above.

6.1.3.2 Design Standards

As described in section 4.0 of the DEA, the Designated Entity shall design, engineer, procure, install and construct, and maintain the project in accordance with applicable reliability principles, guidelines and standards, the Operating Agreement, and Good Utility Practice. Minimum design standards, which have been developed by the Designated Entity Design Standards Taskforce and approved by the Planning Committee, shall be posted on PJM's website and shall be applicable to projects subject to a DEA. To the extent that the work relates to the interconnection of the project to Transmission Owner facilities, the applicable technical requirements and standards of the Transmission Owner to which the project interconnects with will apply. Technical requirements and standards of the Transmission Owner(s) to whose facilities a project will interconnect must be posted on the PJM website and shall apply to all entities that would interconnect to the Transmission Owner's transmission facilities. The Designated Entity's design standards would be applicable to the design of its facilities except where necessary for coordination with the interconnected facilities. All parties must coordinate the design and implementation at the point of interconnection following the interconnecting Transmission Owner's posted applicable technical standards, or other mutually agreed to solution. When interconnecting to multiple Transmission Owners' systems, all parties must coordinate to achieve a mutually agreed upon solution.

As discussed in Section 4 of this manual and as specified by the PJM Tariff Attachment P, Appendix 2, PJM Transmission Owners are required to provide to PJM the Transmission Owner Applicable Technical Requirements and Standards along with a List of Approved Contractors. PJM makes this information available publically on PJM’s website for use by Project Developers and others. If a Designated Entity is not currently a PJM TO where such information is already posted, the Designated Entity should submit its applicable standards and list of vendors and contractors to PJM for review and posting within 18 months of execution of the DEA.

6.1.3.3 Upgrade Project Modification Process

The DEA, Section 4.3.0 provides for revisions to the project scope and schedule through the project modification process. It is through this process that the scope, schedule or non-standard terms and conditions within the DEA are changed to reflect the evolution of the project through the implementation phase. The project modification process provides for a clear method to document project changes, which facilitates good communication and results in all parties being informed of changes in a timely manner.

The project modification process is designed to have the flexibility to be initiated by the Designated Entity or PJM. The ‘Upgrade Project Designated Entity Agreement Modification Form’ can be found in Attachment E.

The following are some typical situations where a Designated Entity or PJM may initiate the upgrade project modification process:

- DE initiated:
 - o Significant routing change from what has been proposed
 - o Adjustments to where a line terminates within a substation
 - o Significant electrical parameter changes
- PJM initiated:
 - o Changes driven from RTEP analysis, such as a change in line termination positions within a substation or electrical parameter changes

If the revisions captured by the scope change process are deemed material to the project, the DEA will be amended and refiled.

6.1.3.4 Breach, Cure, Re-Evaluation and Default

Breach is defined in Section 7.0 of the DEA. A party found in breach is provided a notice describing in reasonable detail the nature of the breach and, if applicable, any steps that will be necessary to cure the breach. The breaching party may clear the breach within 30 days or work in good faith beyond the 30 day period on all reasonable and appropriate steps to clear the breach in accordance with Section 7.3 of the DEA.

If the breach is not cured, PJM will re-evaluate the project per Schedule 6, Section 1.5.8(k) of the Operating Agreement. That analysis can result in one of the following:

- Retain the project in the RTEP
- Remove the project from the RTEP
- Include an alternative project in the RTEP

If the project is retained in the RTEP, PJM will determine if the project designation will remain with the current Designated Entity or be changed to the incumbent Transmission Owner. Any RTEP change made relative to a project re-evaluation originating from a project breach will be presented to the Transmission Expansion Advisory Committee and approved by the PJM Board.

6.1.3.5 Project Closeout

Prior to energization, the project is required to submit as-built data to PJM and to demonstrate that all required electrical ratings have been achieved.

The project DEA and ICAs remain in effect until the following project goals have been reached:

- The Designated Entity executes the Consolidated Transmission Owners Agreement
- The project has been completed in accordance with the terms and conditions of the DEA
- The project meets all relevant required planning criteria
- The project is under Transmission Provider's operational dispatch

6.1.4 Project Site Visit

Baseline upgrades may be inspected during the construction phase to determine schedule adherence, and possibly after energization, to verify the as-built configuration matches the PJM system models.

6.1.5 Backbone Projects

Backbone upgrade projects are transmission system baseline RTEP projects which have a major impact on equipment and facilities at or above 500kV and typically, but do not always, span multiple Transmission Owner zones. Due to their size, complexity, and impact to operations and markets, backbone projects are tracked more closely than typical baseline upgrade projects and may have a dedicated webpage on pjm.com used to communicate project status. The 'Backbone Projects' page can be found in the 'Planning' area under the 'RTEP Upgrades & Status' tab.

6.1.5.1 Project Sponsor Auction Parameter Requirements

Project sponsors of backbone upgrades are required to submit certain information to PJM prior to the project being included in the planning parameters of a PJM Capacity auction as specified in the PJM Tariff, Attachment DD, Section 5.11A.

For PJM Base Residual Auctions (BRA), no later than 60 days before the auction parameters are posted the project sponsor must:

- Submit a critical path project schedule
- The project schedule must demonstrate that the project will be in service prior to the start of the Delivery Year
- The sponsor must certify that the schedule is reasonably achievable

The schedule must also contain, at a minimum, estimated completion dates for the following tasks:

- Right-of-way acquisition
- Engineering and design

- Equipment procurement
- Construction permitting
- Construction activities

Submit a list of certificates of public convenience required by the project with the following:

- A list of the states in which the project is subject to the requirement to obtain a certificate of public convenience and necessity or equivalent approval
- A description of the nature and current status of each approval

For PJM Incremental Auctions, no later than 60 days before the auction parameters are posted the project sponsor must:

- Submit a critical path project schedule.
- A project schedule and list of certificates of public convenience must be provided and meet all of the parameters given under the BRA schedule section above.

For the First Incremental Auction, a corporate officer submits and certifies that the project schedule demonstrates that 50% of the right-of-way, by linear distance, has been secured.

For the Second Incremental Auction, a corporate officer submits and certifies that the project schedule demonstrates that 75% of the right-of-way, by linear distance, has been secured.

For the Third Incremental Auction, a corporate officer submits and certifies that the project schedule demonstrates that 100% of the right-of-way, by linear distance, has been secured.

No later than 30 days prior to the applicable auction, PJM or an independent third party will audit the project schedule and affirm if that it is reasonable and the project remains on target to meet the in-service date. The audit may include site visits as necessary.

6.1.6 Upgrade Delays

If a baseline upgrade is not complete by the PJM required date, the responsible Transmission Owner is required to develop a plan to complete the work. PJM Interconnection Planning will make a risk assessment and determine if any controlling actions or contingency plans need to be put in place to mitigate criteria violations. PJM Markets will be made aware if the project's delay has potential significant economic or congestion related impacts.

6.1.7 Cost Changes

Significant cost increases to baseline upgrades can change the analysis done to solve criteria violations and need to be communicated to PJM as they are discovered. PJM will use the new cost data to re-analyze the criteria violation and determine if a different, more economical solution is better suited to solve the issue.

6.1.8 Completion

Upon completion of a baseline upgrade, the Transmission Owner notifies PJM that the agreed upon resolution to the criteria violation has been completed. Additionally, the Transmission Owner is required to ensure the following items are completed:

- Equipment topology and contingency model information is submitted to PJM per Manual M03A

- If necessary, new ratings have been submitted to PJM
- Date of baseline upgrade completion communicated to PJM
- If necessary, update PJM Operational Manual 03

6.2 Supplemental Upgrade Projects

Supplemental upgrades are projects originated by the Transmission Owner that are not driven by an applicable PJM criterion. These projects are used as inputs to the RTEP models. There is a FERC requirement that any system upgrade(s) to the bulk electric system be presented at a public meeting and so, these upgrades are discussed at a PJM TEAC meeting.

Attachment F contains the checklist for the new equipment energization process to be utilized by Transmission Owners from inception to energization of supplemental projects.

6.2.1 Tracking

The PJM Interconnection Coordinator is responsible for tracking the completion of supplemental upgrades. PJM may request additional information regarding projects consistent with PJM Manual 14B, section 1.4.2.3. Any permit or certificate delays that are anticipated to impact the projected in-service date should be timely communicated to PJM. Regular updates from the Transmission Owner need to include the following:

- General status of engineering and construction (including any relevant regulatory siting approval necessary for the project and the status of such approval)
- Percent complete (Transmission Owners should follow 'percent complete' guidance given in the 'Schedule and Milestone Tracking' section)
- Current target in-service date or actual completion date

6.2.1.1 Supplemental Cost Tracking

Project updates including engineering progress, cost estimates, and construction updates shall be reported as part of the regular status updates. At a minimum the TO shall provide updates to PJM, as needed, for the following project status updates and milestones or acknowledge that the current estimate is accurate:

- Posting of the Local Plan
- Status change from Engineering & Procurement to Under Construction; and
- Status change to In-Service

6.2.2 Upgrade Delays

If a supplemental upgrade is not completed by the originally forecasted date, the responsible Transmission Owner is required to validate that no criteria violations are caused by the delay in the current or future planning years. Additionally, PJM must be notified of the delay and the new target date to ensure that the appropriate planning models are updated and analyzed for any reliability violations. Reliability violations found in this analysis will lead to the creation of baseline upgrades.

6.2.3 Completion

Upon completion of a supplemental upgrade, the Transmission Owner notifies PJM that the agreed upon resolution to the criteria violation has been completed. Additionally, the Transmission Owner is required to ensure the following items are completed:

- Equipment topology and contingency model information is submitted to PJM per Manual M03A
- New ratings have been submitted to PJM
- Date of supplemental upgrade completion communicated to PJM
- If necessary, update PJM Operational Manual 03



Attachment A: Transmission Owner Standard Invoice Form F

Attachment A includes the PJM Transmission Owner Standard Invoice Form F used during the GIA implementation phase.

Transmission Owners submit a completed Form F for each Transmission Owner Interconnection Facility item (Project Identifier) and each respective Network Upgrade (Network Upgrade number) in addition to the Transmission Owner invoice cover sheets. Note that the columns marked "Present Allocation" and "Reallocation" are for PJM use only and should not be filled in by the Transmission Owner. Invoices submitted by Transmission Owners without the appropriate forms attached will be returned to the Transmission Owner unprocessed.

Additional supporting details may be provided, but the attached invoice form is designed to be used by Transmission Owners as the minimum supporting documentation for Transmission Owner invoice cover sheets.

INVOICE # DATE:

TRANSMISSION OWNER:
Transmission Owner to complete all shaded blocks

| CONSTRUCTION * (see below) | | |
|-------------------------------|------|----------------|
| Project Identifier / Upgrade# | NAME | INVOICE AMOUNT |
| | | \$ - |

(note: this cell is linked to total current invoice amount below)

Total Original Cost for Upgrade / Queue #: \$0.00
Total Revised Cost for Upgrade / Queue #: \$0.00 (if applicable)

| CONSTRUCTION * Support Documentation | | | | Cost Reconciliation* | | |
|---|--|----------------------------|----------------------------------|--|---------------------------------------|------------------------------------|
| | Total Projected Amount Next Period (Current Invoice) | Previous Cumulative Amount | Cumulative Amount Billed to Date | Total Upgrade Estimated Amount At Completion | Committed Costs through (insert date) | Actual Costs through (insert date) |
| Major Equipment / Material Costs | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Transmission Owner Labor Costs | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Outside Services/ Subcontractor Costs | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Miscellaneous Costs (provide specifics) | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| SUBTOTAL | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| CIAC Tax Gross-up (if applicable) | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| TOTAL | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |

Blue shaded text cells to be used for comments to document previous reconciliation of costs in subsequent invoices

* Cost Reconciliation columns to be used if Project Developer requests quarterly cost reconciliation

Exhibit 1: Transmission Owner Standard Invoice Form F



| Original Upgrade Cost | | \$340,000 | | | | | |
|-----------------------|--------------------------------------|--|----------------------------|----------------------------------|--|---------------------------------------|------------------------------------|
| Revised Upgrade Cost | | \$400,000 | | | | | |
| | | Total Projected Amount Next Period (Current Invoice) | Previous Cumulative Amount | Cumulative Amount Billed to Date | Total Upgrade Estimated Amount At Completion | Committed Costs through (insert date) | Actual Costs through (insert date) |
| 1 st Qtr | Major Equipment / Material Costs | \$70,000 | | \$70,000 | \$100,000 | | |
| | Transmission Owner Labor Costs | \$80,000 | | \$80,000 | \$200,000 | | |
| | Outside Services/Subcontractor Costs | \$40,000 | | \$40,000 | \$40,000 | | |
| | Miscellaneous Costs | | | | | | |
| | SUBTOTAL | \$190,000 | | \$190,000 | \$340,000 | | |
| 2 nd Qtr | Major Equipment / Material Costs | \$20,000 | \$70,000 | \$90,000 | \$120,000 | | |
| | Transmission Owner Labor Costs | \$90,000 | \$80,000 | \$170,000 | \$240,000 | | |
| | Outside Services/Subcontractor Costs | | \$40,000 | \$40,000 | \$40,000 | | |
| | Miscellaneous Costs | | | | | | |
| | SUBTOTAL | \$110,000 | \$190,000 | \$300,000 | \$400,000 | | |
| 3 rd Qtr | Major Equipment / Material Costs | \$30,000 | \$90,000 | \$120,000 | \$120,000 | \$65,000 | \$50,000 |
| | Transmission Owner Labor Costs | \$50,000 | \$170,000 | \$220,000 | \$240,000 | \$77,000 | \$77,000 |
| | Outside Services/Subcontractor Costs | | \$40,000 | \$40,000 | \$40,000 | \$40,000 | \$0 |
| | Miscellaneous Costs | | | | | | |
| | SUBTOTAL | \$80,000 | \$300,000 | \$380,000 | \$400,000 | \$182,000 | \$127,000 |
| 4 th Qtr | Major Equipment / Material Costs | \$0 | \$120,000 | \$120,000 | \$120,000 | \$90,000 | \$80,000 |
| | Transmission Owner Labor Costs | \$20,000 | \$220,000 | \$240,000 | \$240,000 | \$160,000 | \$160,000 |
| | Outside Services/Subcontractor Costs | | \$40,000 | \$40,000 | \$40,000 | \$40,000 | \$0 |
| | Miscellaneous Costs | | | | | | |
| | SUBTOTAL | \$20,000 | \$380,000 | \$400,000 | \$400,000 | \$290,000 | \$240,000 |

Exhibit 2: Example of GIA Phase Quarterly Cost Reconciliation

Attachment B: Generator and Merchant Transmission Project Scope Change Form

| Generator and Merchant Transmission Project Agreement Scope Change Form | | | |
|--|---|--|---|
| User Guide for completing this form: | | <input type="checkbox"/> To be filled in by Initiating Party | <input type="checkbox"/> To be filled in by PJM |
| | | <input type="checkbox"/> To be filled in by Project Developer or Transmission Owner upon acknowledgement of scope change | |
| PJM Scope Change #: <input type="text"/> | Scope Change Initiation Date: <input type="text"/> | | |
| Initiating Party: <input type="text"/> | | Contact Name: <input type="text"/> | |
| (TO, PD, PJM) | | | |
| TO = Transmission Owner PD = Project Developer | | | |
| Scope Change Type: | <input type="checkbox"/> Cost | <input type="checkbox"/> Attachment Facilities / Queue Number: | <input type="text"/> |
| | <input type="checkbox"/> Schedule | <input type="checkbox"/> Network Upgrade / Network Upgrade Number: | <input type="text"/> |
| | <input type="checkbox"/> Other | | |
| Description / Technical Justification for Scope Change (or Potential Scope Change): (attach additional documentation if necessary) | | | |
| <div style="background-color: #FFFF00; width: 100%; height: 100%;"></div> | | | |
| Previous Approved Cost: <input type="text"/> | Previous Approved Cost Date: <input type="text"/> | | |
| Scope Change Impact (projected): | | | |
| Cost: | <input type="text"/> (projected total cost increase / decrease) | | Orig. In-Serv Date: <input type="text"/> |
| Schedule: | <input type="text"/> (revised in-service date) | | |
| Other: | <input type="text"/> | | |
| PJM Disposition on Scope Change Type: | | | |
| Existing Impact: <input type="checkbox"/> | PJM Interconnection Planning Contact Name: <input type="text"/> | | |
| New Impact: <input type="checkbox"/> | Signature: <input type="text"/> | | |
| Date of PJM Disposition: <input type="text"/> | | | |
| Change in Security Required: Yes <input type="checkbox"/> No <input type="checkbox"/> | | | |
| | | Revised Total Security Amount Required (if "Yes"): <input type="text"/> | |
| | | Revised Expiration if Security is LOC: <input type="text"/> | |
| <small>Note: PJM disposition is an acknowledgement, and does not constitute an agreement or acceptance of the scope change.</small> | | | |
| Existing Impact: | | | |
| PD/TO acknowledgement of Scope Change: (note: for network upgrades, PJM will send this form to multiple Interconnection Customers, as required) | | | |
| Queue No: <input type="text"/> | | | |
| PD: <input type="text"/> | Project Developer: | | TO: <input type="text"/> |
| | (1) | | |
| PD Contact: <input type="text"/> | (2) | | TO Contact: <input type="text"/> |
| | (2) | | |
| Date of Acknowledgement: <input type="text"/> | (2) | | Date of Acknowledgement: <input type="text"/> |
| | (2) | | |
| PD Contact Signature: <input type="text"/> | (3) | | TO Contact Signature: <input type="text"/> |
| | (3) | | |
| <small>PD or TO Instructions:</small> | | | |
| <small>(1) Type PD or TO Contact Company Name</small> | | | |
| <small>(2) Type PD or TO Contact Name, and date of Acknowledgement, then email this form to PJM</small> | | | |
| <small>(3) Print copy of this form, sign in appropriate PD or TO box, then either mail original copy or email a scanned copy to PJM</small> | | | |
| <small>Note: The purpose of signing this form is to acknowledge the existence of a potential or actual scope change. This acknowledgement does not abrogate any audit rights or dispute resolution rights after subsequent payment per PJM Tariff (OATT) requirements.</small> | | | |
| New Impact: | | | |
| PJM to assign cost responsibility between PD and TO for New Impact. | | | |
| <input type="checkbox"/> | Baseline Upgrade | New Baseline Upgrade Number: | <input type="text"/> |
| <input type="checkbox"/> | Revised agreement required | New Network Upgrade Number: | <input type="text"/> |
| <input type="checkbox"/> | Joint TO / Gen cost responsibility | | |

Exhibit 3: Generator and Merchant Transmission Project Agreement Scope Change Form



Attachment C: Notification Templates

Notification of Suspension For ICSA

(suggested wording):

Notice of Suspension in reference to PJM Queue position [XX-XXX]

By issuance of this document, [INTERCONNECTION CUSTOMER] hereby notifies PJM, effective this [DATE] that are requesting the [TRANSMISSION OWNER(S)] to suspend all work under the Specifications section of the ICSA, Appendix II, Section 3.4.

This request for suspension is due to the following reason(s): [PROVIDE EXPLANATION FOR SUSPENSION HERE].

It is expected that the period of suspension should last for [ENTER EXPECTED DURATION OF SUSPENSION HERE].

The entity submitting this form attests that they have similarly notified the aforementioned Transmission Owner of this request for suspension as of [DATE].

The entity submitting this form acknowledges that under the PJM Tariff, Attachment P, Appendix 2, Section 3.4.2, it is the their responsibility to notify PJM and the TO to re-initiate project work prior to the expiration of available suspension time. Failure to provide written notice before the end of the suspension time period will result in the project being terminated. Under these circumstances, the Interconnection Coordinator will send the termination letter to the Interconnection Customer with a copy also sent to the TO. Furthermore, unless written notice is provided as stated, this notice of suspension will remain in effect regardless of the estimated duration specified above.

Notification of Suspension For WMPA

(suggested wording):

Notice of Suspension in reference to PJM Queue position [XX-XXX]

By issuance of this document, [WHOLESALE MARKET PARTICIPANT] hereby notifies PJM, effective this [DATE] that are requesting the [TRANSMISSION OWNER(S)] to suspend per Article 3, Section 3.1.

This request for suspension is due to the following reason(s): [PROVIDE EXPLANATION FOR SUSPENSION HERE].

It is expected that the period of suspension should last for [ENTER EXPECTED DURATION OF SUSPENSION HERE].

The entity submitting this form attests that they have similarly entered into suspension with the aforementioned Transmission Owner as of [DATE].

The entity submitting this form acknowledges that under the PJM Tariff, Attachment P, Appendix 2, Section 3.4.2, it is the project's responsibility to notify PJM and the TO to re-initiate project work prior to the expiration of available suspension time. Failure to provide written notice before the end of the suspension time period will result in the project being terminated. Under these circumstances, the Interconnection Coordinator will send the termination letter to the Interconnection Customer with a copy also sent to the TO. Furthermore, unless written notice

is provided as stated, this notice of suspension will remain in effect regardless of the estimated duration specified above.

Notification of Recommencement of Construction From Suspension

(Suggested wording):

Notice of Recommencement of Construction from Suspension in reference to PJM Queue position [XX-XXX]

By issuance of this document, [INTERCONNECTION CUSTOMER] hereby notifies PJM, effective this [DATE] that are requesting the [TRANSMISSION OWNER(S)] to recommence all work, previously suspend as of [DATE PROJECT WAS PREVIOUSLY SUSPENDED] under this PJM Queue position.

The entity submitting this form attests that they have similarly notified the aforementioned Transmission Owner(s) of the recommencement of construction as of [DATE].

Note: Projects with an ICSA, UCSA or WMPA that were issued prior to the Transition Date may elect to suspend that work for a year and up to three years under certain circumstances. Agreements issued after the Transition Date will no longer allow suspension, and for these projects, the above suspension related notification templates will no longer be applicable.

Notification of Completion

(Suggested wording):

Notice of Completion in reference to PJM Project Identifier [XX-XXX]

By issuance of this document, ([PROJECT DEVELOPER]) hereby notifies [TRANSMISSION OWNER] that construction is complete for [DESCRIPTION OF FACILITIES] built by ([PROJECT DEVELOPER]).

PJM Project Identifier [XX-XXX] has the requirement to provide written documentation of the completed [DESCRIPTION OF FACILITIES] pursuant to Schedule L, Section 10.03.3 of the Project Identifier [XX-XXX] GIA.

[Projects subject to an ICSA entered into prior to **the Transition Date** should use the applicable Queue Position # rather than a Project Identifier and should reference Appendix 2, Section 2.3.3 of the applicable ICSA, and should use the term Interconnection Customer rather than Project Developer].

Notification of Inspection/Testing Results

(Suggested wording):

By issuance of this document, the [TRANSMISSION OWNER] hereby acknowledges the pre-energization acceptance of the [NAME] interconnection substation (PJM Project Identifier [XX]) built by the Project Developer.

PJM Project Identifier [XX] for the [NAME OF FACILITY] has the requirement to provide written documentation of the completed inspection and testing for the [NAME] interconnection substation, pursuant to Schedule L, Section 11.7.5 of the Project Identifier [XX] GIA.

A site walkdown was conducted on [DATE] and a punch list of action items has been compiled. Unresolved punch list items still need to be resolved but do not impact energization. Pre-energization commissioning and testing has been satisfactorily performed. Follow-up energization testing will be performed after the line reconfiguration work is completed.

[Projects subject to ICSA entered into prior to **the Transition Date** should use the applicable Queue Position # rather than a Project Identifier and should reference Appendix 2, Section 3.8.5 of the applicable ICSA, and should use the term Interconnection Customer rather than Project Developer].

Transfer of Operational Control

(Suggested wording):

PJM Project Identifier [XX] for the [NAME OF FACILITY] does, as required pursuant to Schedule L, Sections 11.8.1 and 11.3 of Project Identifier [XX] GIA, hereby transfer to [TRANSMISSION OWNER] operational control of the [NAME] interconnection substation as of the date written below. [PROJECT DEVELOPER] has delivered prior to this written instrument of transfer, the marked-up as-built drawings of the [NAME] interconnection substation. [PROJECT DEVELOPER] will ensure telemetering systems are operational and provide PJM and [TRANSMISSION OWNER] with telemetered data as specified in Appendix 2 section 8.5.2 of Project Identifier GIA before Stage Two energization (initial synchronization of any generators).

[Projects subject to ICSA entered into prior to **the Transition Date** should use the applicable Queue Position # rather than a Project Identifier and should reference Appendix 2, Sections 3.9.1, 3.9.3 and 8.5.2 of the applicable ICSA, and use the term Interconnection Customer rather than Project Developer]

Acceptance of Facilities

(Suggested wording):

By issuance of this document, the Transmission Owner [TRANSMISSION OWNER NAME], hereby acknowledges the acceptance of the facilities of the [NAME] Interconnection Switching Station and Transmission Tap built by the Project Developer, [PROJECT DEVELOPER NAME].

PJM requires written documentation of the acceptance of facilities constructed by the Project Developer, pursuant to Schedule L, section 11.9 of the Project Identifier [XX] GIA.

These facilities were energized on [DATE] and punch list items from the site inspection of [DATE] have been resolved.

[Projects subject to ICSA entered into prior to **the Transition Dates** should use the applicable Queue Position # rather than a Project Identifier and should reference Appendix 2, Section 3.10 of the applicable ICSA, and use the term Interconnection Customer rather than Project Developer]

Transfer of Title

(Suggested wording):

RE: Transfer to [TRANSMISSION OWNER] of the [NAME OF FACILITY] (PJM Project Identifier)

PJM Project Identifier for the [GENERATING FACILITY] does, required pursuant to Appendix 2, section 23.3.5 of the Project Identifier [XX] GIA, hereby transfer to [TRANSMISSION OWNER] the [NAME OF FACILITY] as of the date written below. [PROJECT DEVELOPER] transfer of Facilities requires a Bill of Sale to transfer and convey to [TRANSMISSION OWNER] certain items of personal property as hereinafter described.

Facilities transferred list includes:

- Description
- Quantity
- Supplier
- Catalogue Number
- Item reference to Bill of Material

[Projects subject to ICSA entered into prior to **the Transition Date** should use the applicable Queue Position # rather than a Project Identifier and should reference Appendix 2, section 5.5 of the applicable ICSA, and use the term Interconnection Customer rather than Project Developer].

Bill of Sale

(Suggested wording):

This Bill of Sale is made as of DATE ("Effective Date") by [GENERATING FACILITY] to [TRANSMISSION OWNER].

Witnesseth:

Whereas, [PROJECT DEVELOPER] and [TRANSMISSION OWNER] are parties to that certain Easement Agreement ("Easement Agreement"), dated DATE, with respect to certain real property located in XXX, as described therein ("Property");

Whereas, pursuant to the terms of this Bill of Sale, [PROJECT DEVELOPER] desires to transfer and convey to [TRANSMISSION OWNER] certain items of personal property as hereinafter described.

Now, therefore, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, effective as of the Effective Date, [PROJECT DEVELOPER] does hereby Grant, Sell, Transfer, Set Over, and Deliver to [TRANSMISSION OWNER], all of the equipment, facilities, and other personal properties located at the Property, including without limitation the personal property more particularly described on the facilities transferred list attached hereto and incorporated herein by this reference ("Personal Property"), free and clear of any and all liens, security interests and encumbrances.

[PROJECT DEVELOPER] hereby represents and warrants to [TRANSMISSION OWNER], that [PROJECT DEVELOPER] is the sole lawful owner of the Personal Property; that [PROJECT DEVELOPER] 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 [PROJECT DEVELOPER] has the right to transfer the Personal Property to [TRANSMISSION OWNER]

as aforesaid. Notwithstanding anything herein to the contrary, [PROJECT DEVELOPER] hereby covenants and agrees for the benefit of [TRANSMISSION OWNER] that [PROJECT DEVELOPER] will, for [PROJECT DEVELOPER] and [PROJECT DEVELOPER]'s successors and assigns, warrant and forever defend, at [PROJECT DEVELOPER]'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 Agreement, and shall survive termination, cancellation, or completion of this Bill of Sale and the Easement Agreement.

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

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, [PROJECT DEVELOPER] has caused this Bill of Sale to be duly executed and delivered as of the date and year first above written.

Signature of [PROJECT DEVELOPER]

[Projects subject to ICSA entered into prior to **the Transition Date** should use term Interconnection Customer rather than Project Developer].

Attachment D: (Deleted)

Attachment E: Upgrade Project Designated Entity Agreement Modification Form

| Upgrade Project Designated Entity Agreement Modification Form | | | | | | | |
|---|---|--|-------------------------------------|--|------------------------|--|---|
| <p style="text-align: center; margin: 0;">User guide for completing this form:</p> <table style="margin-left: auto; margin-right: auto; border: none;"> <tr> <td style="width: 20px; border: 1px solid black; background-color: #FFFFE0;"></td> <td style="font-size: 8px; padding: 2px;">To be filled in by Initiating Party</td> </tr> <tr> <td style="width: 20px; border: 1px solid black; background-color: #E0FFE0;"></td> <td style="font-size: 8px; padding: 2px;">To be filled in by PJM</td> </tr> <tr> <td style="width: 20px; border: 1px solid black; background-color: #E0E0FF;"></td> <td style="font-size: 8px; padding: 2px;">To be filled in by Designated Entity upon acknowledgement</td> </tr> </table> | | | To be filled in by Initiating Party | | To be filled in by PJM | | To be filled in by Designated Entity upon acknowledgement |
| | To be filled in by Initiating Party | | | | | | |
| | To be filled in by PJM | | | | | | |
| | To be filled in by Designated Entity upon acknowledgement | | | | | | |
| PJM Modification #: <input style="width: 80px;" type="text"/> <small>(Assigned by PJM)</small> | Modification Initiation Date: <input style="width: 150px;" type="text"/> <small>(Input by Initiating Party)</small> | | | | | | |
| Initiating Party: <input style="width: 450px;" type="text"/> <small>(DE, PJM) DE = Designated Entity Contact Name</small> | | | | | | | |
| Modification Type: Schedule: <input type="checkbox"/> Other: <input type="checkbox"/> | Baseline Upgrade Number: <input style="width: 100px;" type="text"/> | | | | | | |
| Description / Technical Justification for Project Modification: <small>(attach additional documentation if necessary)</small> <div style="border: 1px solid black; height: 100px; background-color: #FFFFE0; margin-top: 5px;"></div> | | | | | | | |
| Modification Impact: Schedule: <input style="width: 100px;" type="text"/> <small>(revised in-service date)</small> Orig. In-Serv Date: <input style="width: 100px;" type="text"/> Other: <input style="width: 100px;" type="text"/> | | | | | | | |
| PJM Disposition of Modification: <div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 45%;"> Change in Security Required : Yes <input type="checkbox"/> No <input type="checkbox"/> </div> <div style="width: 50%;"> PJM Interconnection Planning Contact: Name: <input style="width: 150px;" type="text"/> Date of PJM Disposition: <input style="width: 100px;" type="text"/> Revised <u>Total</u> Security Amount Required (if "Yes"): <input style="width: 100px;" type="text"/> Revised Expiration if Security is LOC: <input style="width: 100px;" type="text"/> </div> </div> <p style="font-size: 8px; margin-top: 5px;"><i>Note: PJM disposition is an acknowledgement, and does not constitute an agreement or acceptance of the scope change.</i></p> | | | | | | | |
| DE / TO Acknowledgement of Modification: <div style="margin-top: 10px;"> Designated Entity DE: <input style="width: 150px;" type="text"/> DE Contact: <input style="width: 150px;" type="text"/> Date of Acknowledgement: <input style="width: 100px;" type="text"/> DE Contact Signature: <input style="width: 150px; height: 20px;" type="text"/> </div> | | | | | | | |

Upgrade Project Designated Entity Agreement Modification Form

Attachment F: Checklist for New Equipment Energization Process

The following checklist has been created for use by Transmission Owners and Designated Entities as a guideline for what is required by PJM throughout the baseline/supplemental transmission upgrade process from inception to energization.

For more detailed information please refer to the training series: Transmission Planning, Modeling, and Energization which can be accessed from any of the following pages on PJM.com:

<http://www.pjm.com/planning/rtep-development.aspx>; <http://www.pjm.com/planning/rtep-development/powerflow-cases.aspx>

<http://www.pjm.com/planning/design-engineering.aspx>; <http://www.pjm.com/markets-and-operations/ops-analysis.aspx>

| Project Phase ¹ | Task | Delivery | Timeframe | PJM Manual Reference | PJM Contact Department | Comments |
|----------------------------|--|--------------------|------------------------------|----------------------|-----------------------------|----------|
| P | Submit minimum required rating (lines and xfmrs) | Email to contact | Before Project Approval | M-14B | Transmission Planning | |
| P | Submit planning model parameters | IDEV/ Project File | Before Project Approval | M-14B | Transmission Planning | |
| P | Submit planning contingency changes | CON File | Before Project Approval | M-14B | Transmission Planning | |
| P | Submit breaker diagrams | Email to contact | Before Project Approval | M-14B | Transmission Planning | |
| P | Project Description/Cost/ Time Estimate | Email to contact | Before Project Approval | M-14B | Transmission Planning | |
| EP | Construction Schedule/Project Sequence | Email to contact | 6-8 months prior to UC phase | M-14C | Infrastructure Coordination | |
| EP | Submit projected outage timeframes | Email to contact | 6-8 months prior to UC phase | M-14C | Infrastructure Coordination | |

| Project Phase ¹ | Task | Delivery | Timeframe | PJM Manual Reference | PJM Contact Department | Comments |
|----------------------------|--|------------------------------|--|----------------------|-----------------------------|----------|
| EP/UC | Quarterly updates | Email to contact | Upon CRL Acceptance, Status change from EP to UC or UC to IS | M-14C | Infrastructure Coordination | |
| EP/UC | Submit as built impedance and all other applicable equipment parameters (i.e. Tap Settings, Capacitor Size etc.) | eDART – Network Model Ticket | 6-12 months prior to IS | M-03A; 3.2 | Model Management | |
| EP/UC | Submit final In-Service Date | eDART – Network Model Ticket | 6-12 months prior to IS | M-03A; 3.2 | Model Management | |
| EP/UC | Submit target build date | eDART – Network Model Ticket | 6-12 months prior to IS | M-03A; 3.2 | Model Management | |
| EP/UC | Submit equipment names | eDART – Network Model Ticket | 6-12 months prior to IS | M-03A; 3.2 | Model Management | |
| EP/UC | Submit final one-line diagrams | eDART – Network Model Ticket | 6-12 months prior to IS | M-03A; 3.2 | Model Management | |
| EP/UC | Submit Transmission Outage Tickets | eDART | 2-12 months prior to IS | M-03; 4.2 | Transmission Operations | |

| Project Phase ¹ | Task | Delivery | Timeframe | PJM Manual Reference | PJM Contact Department | Comments |
|----------------------------|---|--------------|-----------------------------------|----------------------|--|----------|
| EP/UC | Submit Ratings (Lines and Transformers) | eDART – TERM | No later than 2 weeks prior to IS | M-03A; 3.2 | Real-Time Data Management TERMTickets@pjm.com | |
| EP/UC | Submit Telemetry | Email | No later than 2 weeks prior to IS | M-03A; 3.2 | Real-Time Data Management PJMTelemetrySupport@pjm.com | |
| EP/UC | Submit as-built data | Project File | IS Date | M-14B | Transmission Planning | |
| UC/IS | Notification of In-Service status | Email | Once facility is energized | M-14C | Infrastructure Coordination | |

Exhibit 4: New Equipment Energization Process Checklist

Note:

¹ Key: **P** = Pending (or before Pending), **EP** = Engineering and Procurement, **UC** = Under Construction, **IS** = In-Service

Note:

For maximum exposure to various members, identical copies of this table can be found in PJM Manuals 03A, 14B, and 14C

Attachment G: Notification Forms of Assignments and Entity Changes

G.1 Notification form of assignment related Entity name or address changes

[Instructions: A Project Developer or Wholesale Market Participant may use this letter form to notify PJM of a name or address change that arises from the assignment of PJM Service Agreement(s) to a new legal entity. Upon receipt, PJM will provide further instructions regarding (i) consents to assignment, as applicable, and (ii) required amendments to the Service Agreement(s). For more information and additional requirements, please reference PJM Manual 14C, section 3.12 (Assignments and Entity Changes), or contact your PJM Project Manager or PJM Member Relations. The Project Developer or Wholesale Market Participant is responsible for satisfying all requirements of PJM Manual 14C, section 3.12.]

**[INSERT/PLACE ON LETTERHEAD OF PROJECT DEVELOPER OR
WHOLESALE MARKET PARTICIPANT]**

Notification of Assignment

Attn: VP of Planning, PJM Interconnection, L.L.C.

PJM Project Identifier:

Current Project Developer/Wholesale Market Participant (“Customer” or “Assignor”) Information in Service Agreement(s)

Customer legal entity name:

Customer address for receipt of notices:

| | Name | Email | Phone |
|------------------------|------|-------|-------|
| Primary Contact | | | |

Assignment of Service Agreement(s) and Revised/New Customer Information (“Assignee”)

Revised/new customer legal entity name:

Revised/new customer address for receipt of notices:

Effective date, or expected effective date, of assignment of Service Agreement(s): _____

| | Name | Email | Phone |
|----------------------------|------|-------|-------|
| New Primary Contact | | | |

Description of Transaction

Brief description of the transaction giving rise to the assignment of the Service Agreement(s), including the nature of the transaction and the names and relationships of the parties:

Supporting Documentation:

[Instructions: To the extent not already provided to PJM pursuant to the requirements of PJM Manual 14C, section 3.12, attach the following documentation. If any of the listed documentation is inapplicable, not yet available, or has already been provided to PJM, please explain.]

1. A public copy of the application filed with the Federal Energy Regulatory Commission pursuant to section 203 of the Federal Power Act.
2. A certificate of good standing from the new legal entity's state of organization or formation.
3. A list of current officers of the new legal entity.
4. A copy of IRS Form W-9 for the new legal entity.

The undersigned warrants that the foregoing is true and correct, and that he/she is duly authorized by [Assignor] to provide this notice to PJM on its behalf.

Very truly yours,

[Assignor]

By: Date:

Acknowledged by:

[Assignee]

By: _____ Date: _____

[Projects subject to ICSA entered into prior to **the Transition Date** should use term Interconnection Customer rather than Project Developer].

G.2 Notification form of non-assignment related Entity's name or address changes

[Instructions: A Project Developer or Wholesale Market Participant may use this letter form to notify PJM of a name or address change that does not arise from the assignment of PJM Service Agreement(s) to a new legal entity. Upon receipt, PJM will provide further instructions regarding required amendments to the Service Agreement(s). For more information and additional requirements, please reference PJM Manual 14C, section 3.12 (Assignments and Entity Changes), or contact your PJM Project Manager or PJM Member Relations. The Project Developer is responsible for satisfying all requirements of PJM Manual 14C, section 3.12.]

**[INSERT/PLACE ON LETTERHEAD OF PROJECT DEVELOPER OR
WHOLESALE MARKET PARTICIPANT]**

Notification of Change in Name or Address

Attn: VP of Planning, PJM Interconnection, L.L.C.

PJM Queue Number or Project Identifier:

Current Project Developer or Wholesale Market Participant (“Customer”) Information in the Service Agreement(s)

Customer name:

Customer address for receipt of notices:

| | Name | Email | Phone |
|------------------------|------|-------|-------|
| Primary contact | | | |

Revised Customer Information

Revised Customer name: [Enter “N/A” if name is not changing]

Revised address for receipt of notices: [Enter “N/A” if address is not changing]

Effective date of change:

| | Name | Email | Phone |
|----------------------------|------|-------|-------|
| New Primary contact | | | |

Supporting Documentation:

[Instructions: To the extent not already provided to PJM pursuant to the requirements of PJM Manual 14D, section 2.2, attach the following documentation. If any of the listed documentation is inapplicable, not yet available, or has already been provided to PJM, please explain.]

1. A copy of the name change filing certified by the Secretary of State from the state of organization or formation.
2. A list of current officers of the new legal entity.
3. An updated IRS Form W-9 reflecting the new company name/address.

The undersigned warrants that the foregoing is true and correct, and that they are duly authorized to provide this notice to PJM.

Very truly yours,

[Customer Name]

By: _____ Date: _____

[Projects subject to ICSA entered into prior to **the Transition Date** should use term Interconnection Customer rather than Project Developer rather than Project Developer].

Revision History

Revision 15 (03/22/2023):

Cover to Cover Periodic Review

- Section 1
 - Added ISA project milestones on Site Permits and Acquisition of major electrical equipment.
- Section 4
 - Added posting requirement of historical ITO interconnection standards.

Administrative Change (Approved by Augustine Caven 12/08/2022):

- Attachment G: Updated binary pronoun usage (e.g., “he/she” to a gender-neutral equivalent (e.g., “they,” etc.) in order to support PJM’s diversity, equity and inclusion efforts.

Administrative Change (06/04/2021):

- Updated manual ownership from Mark Sims to Augustine Caven

Revision 14 (01/27/2021):

This document is the fourteenth revision of the PJM Manual for Generation and Transmission Interconnection Facility Construction (M-14C). There are some editorial changes throughout this revision that reflect the current PJM Manual structure. The following is a summary of other significant content revisions in the document:

- Cover to Cover Periodic Review
- Introduction
 - Added Manual references of M-14F and M-14G
- Section 2
 - Revised Manual reference from M-14A to M-14G
- Section 3
 - Updated Consent to Assignment template Website link
 - Added detailed information required from IC on ownership interest change during implementation phase and the corresponding Agreement assignment and amendment process
- Section 5
 - Updated Option-to-Build facility’s title transfer process to the PJM OATT
- Section 6
 - Updated project cost tracking of RTEP baseline and supplemental projects to include permitting and approvals that impact project schedule

- o Updated periodic cost tracking process of RTEP baseline and supplemental projects
- Attachment F
 - o Updated RTEP project status code 'EP' for quarterly update task
- Attachment G
 - o Added new Attachment G, Notification Form of Assignments and Entity Changes

Revision 13 (08/23/2018):

This document is the thirteenth revision of the PJM Manual for Generation and Transmission Interconnection Facility Construction (M-14C). There are many editorial changes throughout this revision that reflect the current PJM organizational structure and OATT agreement naming conventions. The following is a summary of other significant content revisions in the document that reflect current PJM OATT provisions and PJM procedures:

- Approval
 - o Updated ownership from Suzanne Glatz to Mark Sims
- Section 1
 - o Revised the Security section to clarify when Security can be called upon
 - o Removed reference to ICSA from the WMPA section
- Section 2
 - o Removed reference of an ICSA executed with a WMPA
 - o Updated the key responsibilities of the project team to clarify what group has the task to setup eDART accounts
- Section 3
 - o Removed cost tracking responsibilities from the Interconnection Customer
 - o Clarified the process of making a cost change in Quarter Billing section
 - o Clarified that there are not cases where the scope change process can be used to change fuel type
 - o Added that the Transmission Owner's refusal to acknowledge a scope change will not preclude implementation of a change PJM finds appropriate
 - o Modified the timing when the Interconnection Customer is required to provide a test energy schedule
 - o Removed sections 3.8.6 and 3.8.7
 - o Revised the generator as-built data requirement
- Section 4
 - o Revised the Application of Interconnection Requirement per changes to the PJM OATT
- Cover to Cover Periodic Review

Revision 12 (06/22/2017):

- Section 6.1.3.2
 - o Incorporated requirements relevant to the new minimum design standards for Designated Entities which were developed by the Designated Entity Design Standards Task Force

Revision 11 (10/27/2016):

- Section 2 and 3
 - o Added clarifying reference to the agreements
- Section 6
 - o Added new section for DEA Design Standards

Administrative Change (10/01/2016):

- Attachment F:
 - o Added hyperlinks for Training Series: Transition Planning, Modeling and Energization
 - o Removed column entitled “Online Training Links”

Revision 10 (10/01/2016):

- Section 6
 - o Added references to new Attachment F
- Attachment F
 - o New attachment for New Equipment Energization Process Checklist

Revision 09 (07/28/2016):

Changes were based on a full content review of the Manual.

- Introduction
 - o Expanded audience to include potential and current Designated Entities
 - o Updated reference documents list
- Section 1 – Summary of Agreements
 - o Provided additional guidance on the deferred security process
- Section 3 – Agreement Implementation Phase Processes
 - o Changed the name of the section from ‘Agreement Implementation Phase Processes’ to ‘Generation and Merchant Transmission Agreement Implementation Phase Processes’
 - o Revised the name of the scope change process from ‘ISA/ICSA Scope Change Process’ to ‘Generation and Merchant Transmission Scope Change Project Agreement Scope Change Process’

- o Assignment – New Section
- Section 6 – Baseline and Supplemental Upgrade Projects
 - o Added information relative to the implementation of those RTEP projects subject to a Designated Entity Agreement, Interconnection Coordination Agreements and the processes for managing those projects
 - o RTEP Agreements – New Section
 - o Designated Entity Agreement and Interconnection Coordination Agreement – New Sections
 - o Projects Subject to a Designated Entity Agreement – New Section
 - o Section ‘Walkdowns’ changed to ‘Project Site Visit’
- Attachment B – ISA/ICSA Scope Change Form
 - o Change the name of the Attachment from ‘ISA/ICSA Scope Change Process’ to ‘Generator and Merchant Transmission Project Agreement Scope Change Form’
 - o Removed Exhibit 5, ‘ISA/ICSA Scope Change Process Diagram’
 - o Change the name of Exhibit 6 from ‘ISA/ICSA Scope Change Form’ to ‘Generator and Merchant Transmission Project Agreement Scope Change Form’
- Attachment C – Notification Templates
 - o Added ‘Notification for Suspension For ICSA’ template
 - o Added ‘Notification of Suspension For WMPA’
 - o Added ‘Notification of Recommencement of Construction From Suspension’
- Attachment E – Upgrade Project Designated Entity Agreement Modification Form
 - o Added new Attachment ‘Upgrade Project Designated Entity Agreement Modification Form’
 - o Added the new ‘Upgrade Project Designated Entity Agreement Modification Form’

Revision 08 (12/20/2012):

Changes were based on a Quality Project review of PJM’s Tariff.

- Introduction
 - o Editorial changes to better align with other 14 series manuals
- Section 1 – Summary of Agreements
 - o New section providing a high level review of agreements coming out of queue processes outlined in PJM Manual 14A and implemented through the processes covered in this manual
- Section 2 – Agreement Implementation Phase Overview
 - o Provided Tariff references in place of many definitions

- o Moved baseline / supplemental projects out of this section to keep focus on queue projects
- o Removed overview of Generator Markets and Operations and replaced with a reference to PJM Manual 14D
- o Updated PJM Team Role Clarity Diagram to reflect roles rather than organizational structure which changes over time
- o Reduced Role discussion to PJM Interconnection Coordinator to focus on queue project implementation phase
- Section 3 – Agreement Implementation Phase Processes
 - o Generalized language specific to ISA/ICSAs to include WMPA,UCSA and IISAs
 - o Moved baseline / supplemental projects out of this section to keep focus on queue projects
 - o Study phase billing guidelines moved to PJM Manual 14A
 - o Suspended Projects – updated to match recent tariff changes
 - o Project Communication, Reporting and Documentation
 - Project Drawings – updated to match recent tariff changes
 - Test Energy Schedule – new Section
 - o Breach, Cure and Default – new Section
- Section 4 – Technical and Construction Requirements
 - o Editorial Changes as Section was revised May 2012
- Section 5 – Option to Build
 - o Drawing Review – updated to match recent tariff changes
 - o Inspection, Testing, and Energization – moved templates to Attachment C
- Section 6 – Baseline and Supplemental Upgrade Projects
 - o New Section consolidating information moved from above Sections and providing a high level review of processes for tracking and reporting
- Attachment A – Transmission Owner Standard Invoice Form F
 - o Removed non-implementation phase invoice forms which will go into PJM Manual 14A
- Attachment C – Notification Templates
 - o Moved all templates into this attachment
 - o Removed Generator As-Built Data Form as section 3.9 includes link to form on PJM's website
- Attachment D – Notice and Documentation Checklist
 - o Added spreadsheet to help track notices required by different parties

- o Removed the Notification of Intent to Exercise Option to Build as this is part of PJM Manual 14A

Revision 07 (05/23/2012):

Updated information on access to Transmission Owner’s Applicable Technical Requirements and Standards.

Revision 06 (10/07/2011):

- Updated PJM’s contact information in Attachment C: Generator As Built Data form.

Revision 05 (04/01/2008):

This document is the fifth revision of the PJM Manual for Generation and Transmission Interconnection Facility Construction (M-14C). There are many editorial changes throughout this revision that reflect the current PJM organizational structure and OATT agreement naming conventions. The following is a summary of other significant content revisions in the document that reflect current PJM OATT provisions and PJM procedures:

- Introduction:
 - o Updated References section to reflect title change of Manual M14B.
- Section 1:
 - o Added “Application to Regional Transmission Expansion Plan (RTEP) section.
 - o Added “Large Generation Resources / Small Generation Resources” section.
 - o Updated “Transmission Owner Facilities” section.
 - o Updated “Network Upgrades” section.
 - o Added “Baseline Upgrades and Transmission Owner Identified Upgrades” section.
 - o Updated “Generator Markets and Operations / Participation in PJM Markets” section.
 - o “ISA / ICSA Implementation Phase Team Role Clarity” section – updated entire section including updates to Exhibit 2 : Interconnection Process Team Role Clarity Diagram to reflect current PJM organizational structure.
- Section 2:
 - o Updated “Schedule / Milestone Tracking” section.
 - o Updated “Transmission Owner Milestone Tracking” section.
 - o Updated “Customer Facility Construction Milestone Tracking” section.
 - o Updated “Transmission Owner Cost Estimate Projection Tracking” section.
 - o Updated “PJM Billing Process” section.
 - o Minor edits to “ISA / ICSA Scope Change Process” section.
 - o Minor edits to “Project Meetings” section.
 - o Updated “Project Site Reviews” section.

- o Added “Suspended Projects” section.
- o Minor edits to “Project Communication, Reporting and Documentation” section.
- o Added “Documentation Required by the Transmission Owner prior to Synchronization” section.
- o Updated “Dispute Resolution” section.
- o Updated “Project Closeout” section.
- Section 3:
 - o Updated OATT references in “Construction Standards” section.
- Section 4:
 - o Deleted “Small Resource Interconnection Coordination” section in its entirety and replaced with new “Option to Build” section. Small Resource Interconnection Coordination is now addressed in the more broad “Application to Regional Transmission Expansion Plan (RTEP) section.
- Attachment A:
 - o Updated Exhibit 3: Transmission Owner Standard Invoice Form Designation Table.
 - o Deleted TO Standard Invoice Forms A, B, and C; Revised Exhibit numbers.
- Attachment D:
 - o Added new Attachment D: Notification of Intent to Exercise Option to Build.

Revision 04 (03/03/06):

This document is the fourth revision of the PJM Manual for Generation and Transmission Interconnection Facility Construction (M-14C). The revisions include clarifications to the “PJM Billing Process” section of Section 2 to reflect changes made by the PJM OATT Housekeeping Filing effective 1/26/06. A summary of the significant revisions in the document that reflect current PJM OATT provisions and PJM procedures is as follows:

- Section 2: Revisions to “PJM Billing Process” section to reflect current OATT provisions:
 - o Feasibility and Impact Study Phase invoicing: clarified timeframe requirement for final invoice submittal to PJM.
 - o Facilities Study Phase invoicing: clarified timeframe requirement for final invoice submittal to PJM, and added reference to “Quarterly Cost Reconciliation” section.
 - o ISA / CSA Phase invoicing: clarified timeframe requirement for final invoice submittal to PJM, and added reference to “Quarterly Cost Reconciliation” section.
 - o Quarterly Cost Reconciliation: Expanded section to clarify requirements for initiation of quarterly cost reconciliation by Interconnection Customer.

Revisions were made on the following pages: 27-31.

Revision 03 (12/23/05):

This document is the third revision of the PJM Manual for Generation and Transmission Interconnection Facility Construction (M-14C). There are many changes in this revision that are editorial changes to reflect the current PJM organizational structure. In addition, the following is a summary of the concept of other significant content revisions in the document that reflect current PJM OATT provisions and PJM procedures:

- Introduction: Updated Exhibit 1 to include new PJM Manuals
 - Added note clarifying the use of the term “Interconnection Customer” throughout manual
 - Updated “What You Will Find in This Manual” section.
- Section 1:
- Updated “Attachment Facilities” and “Network Upgrades” sections. Updated “Generator Markets and Operations” section.
- Significant revisions to “ISA/CSA Implementation Phase Team Role Clarity” section to reflect current PJM organizational structure and responsibilities, including updating Exhibit 3.
- Section 2: Major revisions to “PJM Billing Process” section to reflect current OATT provisions:
 - Expanded update to “Transmission Owner Billing Guidelines” that includes outline of Transmission Owner guidelines by interconnection process phase and a new “Quarterly Cost Reconciliation” section.
 - Update to “Interconnection Customer Billing / Statements” section that includes current PJM Interconnection Customer billing procedures and a new “Project Cost Reconciliation Process” section.
 - Added new section titled “ISA / CSA Scope Change Process”.
 - Updated “Project Site Reviews” section.
 - Added new “Generator As-Built Data Requirements” section.
- Section 4: Changed “Small Resources (10 MW or less)” to “Small Resources (20 MW or less)”.
- Attachment A: Added new Attachment A: “Transmission Owner Standard Invoice Forms” which includes Exhibits 4-11.
- Attachment B: Added new Attachment B: “ISA / CSA Scope Change Process” which includes a process diagram for the ISA / CSA Scope Change Process (Exhibit 12) and the ISA/CSA Scope Change Form (Exhibit 13).
- Attachment C: Added new Exhibit C: “Generator As-built Data Form” which includes the standard format for Interconnection Customers to use to provide generator as-built data to PJM.

Revision 02 (04/11/04):

This document is the second revision of the PJM Manual for Generation and Transmission Interconnection Facility Construction (M-14C). The majority of changes in this revision are editorial changes to reflect the current PJM organizational structure, but the following is a summary of the concept of other significant content revisions in the document:

- Cover Sheet: Changed “Transmission” Planning Department to “Interconnection” Planning.
- Approval: Kenneth S. Seiler, Manager – Interconnection Planning indicated as PJM approving manager.
- Section 1: Added reference to ISA phase of Merchant Transmission Projects being covered under Manual M-14C.
- Exhibit 2: Added a block titled “Real Estate, Siting, & Permits” just above the “Detailed Design” block in the categories of Attachment Facilities and Network Upgrades.
- Section 1: Real Estate, Siting & Permitting was added to major milestone activities for Attachment Facilities and Network Upgrades.
- Section 1: Revised Network Upgrades description to include both construction of new transmission lines or reconductoring of existing lines between substations.
- Exhibit 3: Updated Interconnection Process Team Role Clarity Diagram.
- Section 1 & 2: Updated PJM organizational names to reflect current organizational structure (i.e. Interconnection Planning, Member Services, etc.)
- Section 1 & 2: Added reference in multiple locations to “Transmission Owner Identified Upgrades” as being included in the types of upgrades covered by this manual including milestone and cost tracking.
- Section 1: PJM Finance – added reference to ISA cost reconciliation.
- Section 1: PJM Internal Coordination – added multiple editorial changes throughout section.
- Section 2: PJM Billing Process – Divided section into “Transmission Owner Billing” and “Generator Billing / Statements”;
- Exhibit 4: Updated PJM Standard Invoice Form
- Section 2: Project Closeout – Revised PJM project management guidance for Post Generator Operation Phase to reflect PJM Generation Department as lead.

Revision 01 (04/11/03):

This document is the first revision of the PJM Manual for Generation and Transmission Interconnection Facility Construction (M-14C).

Manual M-14, Revision 01 (03/03/01) has been restructured to create four new manuals, with the addition of a fifth manual:

- M-14A: “Generation and Transmission Interconnection Process Overview”
- M-14B: “Generation and Transmission Interconnection Planning”

- M-14C: “Generation and Transmission Interconnection Facility Construction”
- M-14D: “Generator Operational Requirements”
- M-14E: “Merchant Transmission Specific Requirements”

Revision 00 (02/26/03):

This document is the initial release of the PJM Manual for Generation and Transmission Interconnection Facility Construction (M-14C).

Manual M-14, Revision 01 (03/03/01) has been restructured to create four new manuals:

- M-14A: “Generation and Transmission Interconnection Process Overview”
- M-14B: “Generation and Transmission Interconnection Planning”
- M-14C: “Generation and Transmission Interconnection Facility Construction”
- M-14D: “Generator Operational Requirements”