



*AEP Transmission Grid Development*

# Independent Power Producer (IPP) Option to Build Guidelines

**Revision: 1**

**Effective Date: 9/14/2020**

Description: Expectations and requirements for Interconnection Customers



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## Purpose

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This document is published to provide guidelines to generators (“Interconnection Customers”) that have elected to exercise the option to build (“OTB”) transmission facilities as part of the interconnection of their generation facilities. These guidelines apply to OTB projects within the following Regional Transmission Organizations (RTO):

- PJM Interconnection - <https://www.pjm.com/>
- Southwest Power Pool (SPP) - <https://spp.org/>

## Scope

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This document identifies AEP’s expectations and requirements for Interconnection Customers that have elected the OTB in the PJM and SPP regions.

The contractual requirements for OTB projects are set forth in the Interconnection Service Agreement, the Interconnection Construction Service Agreement in PJM, and the Generator Interconnection Agreement in SPP (“Interconnection Agreements”). These Guidelines are not intended to modify the requirements of the Interconnection Agreements or applicable tariffs. In the event there are any conflicts between these Guidelines and the Interconnection Agreements or tariffs, the Interconnection Agreements and the tariffs take precedence.

## Primary Contact

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To best facilitate sharing of information, a single point of contact shall be established between AEP and Interconnection Customers. All information and requests should be administered through each party’s primary contact.

For OTB projects, Interconnection Customers should direct any questions concerning technical requirements, scope and schedule to the AEP primary contact in the form of written “Requests for Information.” This will assist AEP in tracking responses and ensuring that the questions are directed to the appropriate group(s) within AEP.

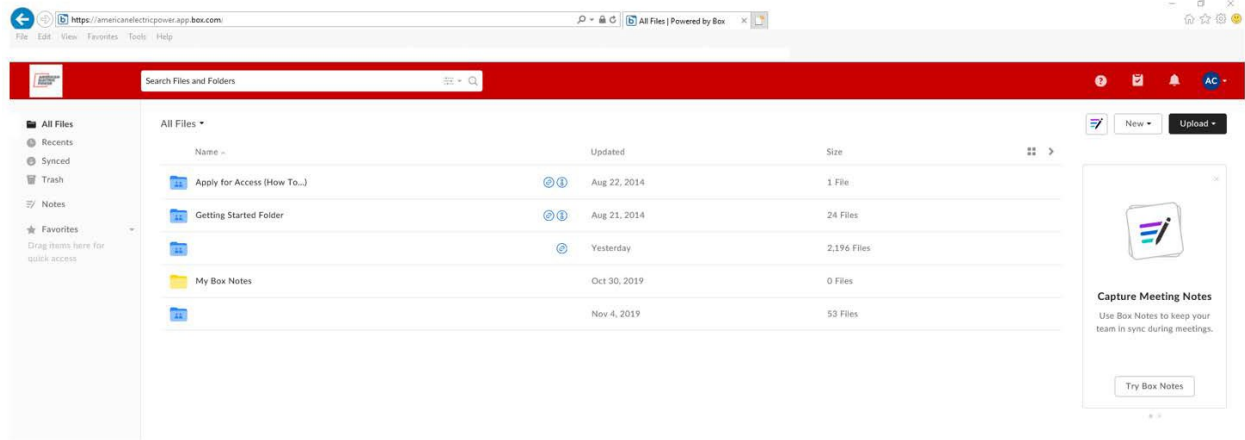
The following table outlines the types of communications as well as the methodology to be utilized.

Action	Communication Methodology
Meeting Request	Email to primary contact. Be sure to include the following: date, time, subject matter, and proposed attendee list.

Action	Communication Methodology
Request for Information	Submitted through BOX.com

## Project Documents and Drawings

As part of AEP’s Enterprise Cyber Security Program, Interconnection Customers must submit all electronic documents through AEP’s Enterprise cloud based solution with BOX.com. Utilizing this service provides the ability to monitor and control both data content and data access ensuring consistent, secure transfer of information in a standardized way.



Users are provided a user name and password granting appropriate access to the site. AEP’s BOX.com account is accessed via the following link:

<https://americanelectricpower.account.box.com/login>

**Note:** Information shared outside of this methodology is considered invalid.

## Confidentiality

If a party plans to share confidential information, the information must be appropriately identified as confidential at the time of disclosure in accordance with the applicable Interconnection Agreement(s). The Interconnection Agreement(s) contain confidentiality provisions addressing the handling of confidential information exchanged by the parties.



## Safety

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Interconnection Customers and their contractors, employees and agents must comply with AEP's safety policies applicable to the areas where construction activity is occurring. Copies of AEP's safety policies can be provided upon request. Interconnection Customers must comply with any additional safety procedures directed by AEP during the course of the work.



# Contractors, Vendors, and Warranties

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## Contractors and Vendors

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As set forth in the Interconnection Agreement(s), Interconnection Customers are required to use AEP's approved contractors and major equipment vendors. A list can be found in the following locations labeled as "Approved Contractors & Major Equipment Vendors":

PJM: The American Electric Power page within the Transmission Owner Engineering and Construction Standards on PJM.com.

<https://www.pjm.com/planning/design-engineering/to-tech-standards/private-aep.aspx>

SPP: The AEP Transmission Studies and Requirements section within the Required Postings page on AEP.com.

<https://www.aep.com/requiredpostings/AEPTransmissionStudies>

This document is updated on an as-needed basis, therefore Interconnection Customers should validate the version they are referencing is the most up-to-date version on the website.

## Warranties

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AEP has established minimum requirements for equipment warranties. The requirements can be found on the Suppliers page of AEP.com, labeled as "Transmission and Distribution Material and Equipment Warranty Terms":

<https://www.aep.com/b2b/suppliers>

This document is updated on an as-needed basis, therefore Interconnection Customers should validate the version they are referencing is the most up-to-date version on the AEP website.

Interconnection Customers must obtain warranties that meet the required durations and the warranties must be included with the Interconnection Customers contracts and purchase orders. The warranties must be assignable to AEP.

As part of the transfer of ownership from Interconnection Customers to AEP, Interconnection Customers will be required to assign warranties to AEP. Interconnection Customers will need to provide AEP copies of all the contracts and purchase orders including the warranties prior to the closing of the ownership transfer. If the warranty provisions are not satisfactory, the closing may be delayed until Interconnection Customers correct the deficiencies.



# Technical Requirements

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## AEP

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Interconnection Customers must follow the Requirements for Connection of New Facilities or Changes to Existing Facilities Connection to the AEP Transmission System (“Requirements for Connection”).

AEP developed the requirements in this document to ensure the transmission system’s integrity when providing new or materially modified facility connections. Interconnection Customers are responsible for obtaining the requirements from the RTO within which their operation exists.

The “Requirements for Connection” contains the minimum requirements acceptable for both affiliated and non-affiliated connections to the AEP transmission system. The processes and requirements contained within this document will guide the planning of new facility installations as well as the upgrading of existing facilities, and may need to be supplemented with additional details in some specific cases.

The “Requirements for Connection” can be found in the AEP Transmission Studies and Requirements section within the Required Postings page on AEP.com:

<https://aep.com/requiredpostings/AEPTransmissionStudies>

This document is updated on an as-needed basis, therefore Interconnection Customers should validate the version they are referencing is the most up-to-date version on the AEP website.

Additional information will be provided after an Interconnection Agreement(s) is executed.

## Other Entities

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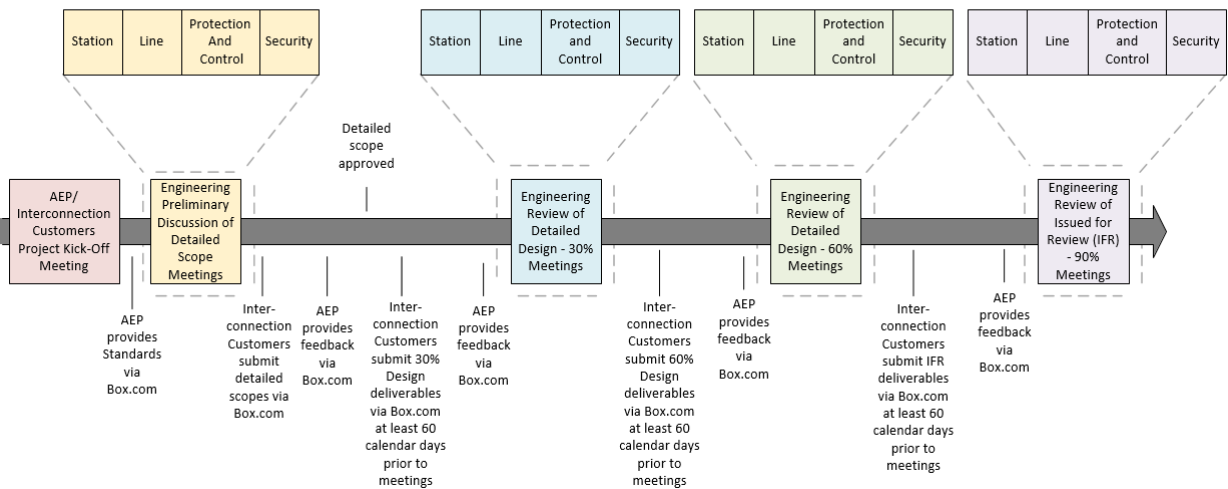
Interconnection Customers are responsible to conform to all applicable national, state and local laws, ordinances, rules, regulations, codes, NERC Reliability Standards, and Regional Reliability Standards.



# Engineering Reviews

Each RTO has defined a series of studies that must take place prior to an Interconnection Agreement(s) being completed. Following this, Interconnection Customers must need a process to obtain input, feedback, review and approval from AEP on engineering documents.

Timeline of Engineering Deliverables and Reviews



## Engineering Preliminary Discussion of Detailed Scope

During the Preliminary Discussion of Detailed Scope meetings, Interconnection Customers can ask questions regarding the AEP functional scopes and standards. Following these meetings, Interconnection Customers submit their detailed scope via Box.com. AEP will review and provide feedback. This cycle shall continue until AEP is comfortable approving the detailed scope.

## Engineering Review of Detailed Design – 30%

At least 60 calendar days prior to these meetings, Interconnection Customers shall provide:

### Station

- Grading drawings

- Erosion control plans
- Storm water and erosion control plans
- Grounding plan
- Raceway plan
- Foundation plan
- Foundation design drawings
- Location plan
- Electrical one-line diagrams
- Electrical assembly plan and section views
- Structure design drawings

## Line

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- Power Line Systems – Computer Aided Design and Drafting (PLS-CADD) .bak file containing:
  - Final line route and preliminary structure placement
  - Preliminary access roads, material yards, wire-pull setups, staging area, Right-of-Way (ROW) blowout areas, and other special considerations
  - All data gathered during the line siting process attached as a .dxt, .shp, or other attachments
  - Preliminary material list including the manufacturer/vendor, manufacturer part number, and quantity
  - Plan and profile drawings (PLS-CADD generated plan and profile sheets)
  - Structure and insulator types, configuration, and loading diagrams

## P&C

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- Accurate detailed protection and control design package. This package shall be accompanied with an explanation of why each scheme was selected
- Any scope of work variations along with proposed solutions
- Proof that sound protection judgment has been applied

- Proof of proposed functionality
- Design deliverables
  - One-line
  - Relay, Instrumentation and Metering (RIM) and Automatic Reclosing Operation (ARO) notes
  - Detailed scope
  - P&C front views
  - Key plan or Drop in Control Module (DICM) layout drawings

## **Engineering Review of Detailed Design – 60%**

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At least 60 calendar days prior to these meetings, Interconnection Customers shall provide:

### **Station**

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- Grading drawings
- Erosion control plans
- Storm water and erosion control plans
- Grounding plan
- Raceway plan
- Lighting plan
- Foundation plan
- Foundation design drawings
- Location plan
- Electrical one-line diagrams
- Electrical assembly plan and section views
- DICM physical drawings
- Structure design drawings
- Foundation calculations
- Structural analysis calculations
- Bus loading calculations

- Shielding calculations
- Grounding calculations
- Battery and charger calculations
- AC station service calculations

## Line

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- PLS-CADD .bak file containing:
  - Final line route and preliminary structure placement
  - Preliminary access roads, material yards, wire-pull setups, staging area, ROW blowout areas, and other special considerations
- Updated material list including the manufacturer/vendor, manufacturer part number, quantity, and source
- Plan and profile drawings (PLS-CADD generated plan and profile sheets)
- Structure and insulator types, configuration, and loading diagrams
- Foundation design drawings
- Foundation calculations
- Any electrical study calculations performed during the detailed design phase (i.e. induced voltage studies, etc.)

## P&C

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- A link to a single P&C Engineering (PCE) Issued for Review (IFR) PDF document that includes:
  - One-line
  - ARO and RIM notes
  - Detailed scope
  - P&C front views
  - Key plan or DICM layout drawings
  - Schematic drawings (includes panel, equipment, manufacturer, etc. and other relevant schematic drawings)
  - Bus wiring diagram (should denote phasing, equipment catalog IDs and orientation)
  - Carrier current diagram (if applicable)

- Any emails or correspondence related to design and functionality of the project

## Engineering Review of IFR – 90%

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At least 60 calendar days prior to these meetings, Interconnection Customers shall provide:

### Station

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- Grading drawings
- Erosion control plans
- Storm water and erosion control plans
- Grounding plan
- Raceway plan
- Lighting plan
- Foundation plan
- Foundation design drawings
- Location plan
- Electrical one-line diagrams
- Electrical assembly plan and section views
- DICM physical drawings
- Structure design drawings
- Foundation calculations
- Structural analysis calculations
- Bus loading calculations
- Shielding calculations
- Grounding calculations
- Battery and charger calculations
- AC station service calculations
- Voltage drop calculations
- Conduit and cable trench fill factor calculations

- Cable schedule drawings
- All other design drawings and calculations needed in order to provide a complete engineering package for the construction of the subject electrical substation facilities.

## Line

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- Final Design Criteria and Scoping Summary Document (DCSS)
- Final line route and structure placement
- Final access roads, material yards, wire-pull setups, staging area, ROW blowout areas, and other special considerations
- IFR PLS-CADD .bak file
- Final material list including the manufacturer/vendor, manufacturer part number, quantity, and source
- Final plan and profile drawings conforming to TLDS-002 specifications
- Final structure and insulator types, configuration, and loading diagrams
- Final foundation design drawings
- Final foundation calculations
- Final construction package as defined in TLDS-001 and TLDS-002

## P&C

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- Accurate detailed protection and control design package; this package shall be accompanied with an explanation of why each scheme was selected
- Any scope of work variations along with proposed solutions
- Proof that sound protection judgment has been applied
- Proof of proposed functionality
- A link to a single PCE IFR PDF document that includes:
  - One-line
  - ARO and RIM notes
  - Detailed scope
  - P&C front views

- Key plan or DICM layout drawings
- Schematic drawings (Includes panel, equipment, manufacturer, etc. and other relevant schematic drawings)
- Bus wiring diagram (should denote phasing, equipment catalog IDs and orientation)
- Carrier current diagram (if applicable)
- Any emails or correspondence related to design and functionality of the project
- Wiring diagrams (includes panel, equipment, manufacturer and other relevant wiring drawings)
- Cable schedule (indoor and outdoor)
- Station relay settings file package for review; this package shall include but is not limited to:
  - Relay Setting Request Forms (RSRF) - .xls version, not .pdf
  - Relay Setting Summary Forms (RSSF) .xls version, not .pdf
  - Settings Files - .rdb, .mdb, .urs
  - Architect Files - .scd
  - Calculation sheets - MathCAD or .xls version, not .pdf
  - Relay setting studies and other calculations, if available
  - Labels - .doc
  - Aspen Case - .olr

# Cyber and Physical Security

In its Critical Infrastructure Protection (CIP) standards, NERC has required all Transmission Owners to develop a strategy to address resiliency and physical security aspects of their critical substations. AEP used these requirements to develop an overall physical security strategy, including a tiered structure to define what level of security is required at each transmission station or control center. AEP’s physical security strategy and the details of the physical security measures are considered confidential. Additional information will be provided once the Interconnection Agreement(s) are executed.

Station projects requiring critical facility physical security measures typically see additional costs. The physical security measures typically include high security fencing combined with other measures appropriate for the specific site. Interconnection Customers are required to use AEP’s physical security standards, specifications, approved contractors and equipment vendors.

Interconnection Customers must construct the transmission facilities in compliance with all applicable NERC requirements for Critical Infrastructure Protection. The screen shot below is from the NERC website:

<https://www.nerc.com/pa/stand/Pages/ReliabilityStandardsUnitedStates.aspx?jurisdiction=United States>

Mandatory Standards Subject to Enforcement	
Standard Number	Title
<input type="checkbox"/> (BAL) Resource and Demand Balancing (9)	
<input checked="" type="checkbox"/> (CIP) Critical Infrastructure Protection (11)	
CIP-002-5.1a	Cyber Security — BES Cyber System Categorization
CIP-003-8	Cyber Security — Security Management Controls
CIP-004-6	Cyber Security - Personnel & Training
CIP-005-5	Cyber Security - Electronic Security Perimeter(s)
CIP-006-6	Cyber Security - Physical Security of BES Cyber Systems
CIP-007-6	Cyber Security - System Security Management
CIP-008-5	Cyber Security - Incident Reporting and Response Planning
CIP-009-6	Cyber Security - Recovery Plans for BES Cyber Systems
CIP-010-2	Cyber Security - Configuration Change Management and Vulnerability Assessments
CIP-011-2	Cyber Security - Information Protection
CIP-014-2	Physical Security





## Auxiliary Station Service Power

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Auxiliary station service power for the transmission substation(s) to be turned over to AEP as part of the Option-to-Build must be designed in accordance with AEP standards. A minimum of two sources (primary and backup) for Alternating Current (AC) power are required, both of these shall be from within the substation unless otherwise approved by AEP.

AEP will work with Interconnection Customers to determine which available options are acceptable from a redundancy and reliability standpoint. In instances where delivery from the local distribution system is required, that connection shall be established in accordance with AEP standards. Interconnection Customers are responsible for contacting the respective AEP Operating Company<sup>i</sup> to request connection. If the electrical substation is outside of AEP Operating Company service territory, Interconnection Customers shall contact the local utility, request connection to their distribution system, and adhere to their connection guidelines. To determine the service territory in which the facility is located, refer to the respective Utilities Commission for the state in which the facility will be located.

Additional information is available in the “Requirements for Connection”. This can be found in the AEP Transmission Studies and Requirements section within the Required Postings page on AEP.com.

<https://aep.com/requiredpostings/AEPTransmissionStudies>

This document is updated on an as-needed basis, therefore Interconnection Customers should validate the version they are referencing is the most up-to-date version on the AEP website.

Additional information will be provided after an Interconnection Agreement(s) is executed.



## Siting, Outreach, Environmental and Right-of-Way

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A document entitled “Standards and Expectations for Siting, Real Estate, Right-of-Way, and Environmental Permitting for Transmission Interconnection Projects” sets forth requirements for siting, outreach, environmental and right-of-way for OTB projects.

Interconnection Customers must follow these requirements. The document contains sections addressing:

- Coordination Requirements
- Siting Requirements
- Acquisition of ROW
- Acquisition of Real Estate in Fee Simple – Sub Station and Switch Yard Sites
- Environmental Permits and Compliance

This document can be found on the AEP Transmission Studies and Requirements section of the Required Postings page of AEP.com. It is labeled as “Standards and Expectations for Siting, Real Estate, Right-of-Way, and Environmental Permitting for Transmission Interconnection Projects”:

<https://www.aep.com/requiredpostings/AEPTransmissionStudies>

This document is updated on an as-needed basis, therefore Interconnection Customers should validate the version they are referencing is the most up-to-date version on the AEP website.

**Note:** If a state commission or other siting authority has approved a project, any deviation to the approved project may require approval of the commission or siting authority.



## Vegetation Management

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AEP's vegetation strategy is to clear the ROW to the maximum appropriate width by removing all woody-stemmed vegetation within the ROW and potential hazard trees off the ROW. AEP's vegetation strategy creates an environment to convert the vegetative cover types on the transmission ROW to low growing grass-forbs-herb covers that inhibit germination, establishment, and growth of most incompatible vegetative species. The NERC reliability standard of FAC-003 should be referenced to ensure compliance during the construction of applicable lines.

Additional information will be provided after an Interconnection Agreement(s) is executed.



## Testing and Commissioning Oversight

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All substation testing and commissioning work performed by non-AEP Transmission Field Service (TFS) personnel shall be subject to AEP TFS oversight.

The AEP Transmission Commissioning Checklist App and supporting forms shall be used to ensure that all station assets are properly tested and commissioned prior to energization, all applicable AEP Procedures, Standards, and Guides are followed, and that all testing is properly documented in the AEP asset management database.

Contract personnel shall use approved AEP TFS Procedures to perform and document testing. If a specific AEP TFS Procedure is not available for the activity, the contract personnel shall confirm with the local TFS project representatives on acceptable testing methods and necessary documentation. Interconnection Customers may be required to provide certain inputs within a timeline given by AEP.

Additional information is available in the "Requirements for Connection". This can be found in the AEP Transmission Studies and Requirements section within the Required Postings page on AEP.com.

<https://aep.com/requiredpostings/AEPTransmissionStudies>

This document is updated on an as-needed basis, therefore Interconnection Customers should validate the version they are referencing is the most up-to-date version on the AEP website.



## **Transfer of Operational Control/Ownership**

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Pursuant to the applicable Interconnection Agreements, Interconnection Customers must transfer to AEP operational control and ownership of the facilities constructed under the option-to-build provisions (the “OTB Facilities”). The following is a summary of the transfer process.

### **Transfer of Operational Control**

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#### **Timing; Procedure**

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Prior to energization of the OTB Facilities, Interconnection Customers must transfer operational control to AEP. Prior to any such transfer of operational control, Interconnection Customers must allow AEP to inspect the facilities to confirm that they are in compliance with the Interconnection Agreements and all applicable AEP standards and that they are ready for safe and reliable operation. Prior to transfer of operational control, Interconnection Customers must execute a transfer of operational agreement provided by AEP.

#### **Interim Period**

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During the interim period following the transfer of operational control and prior to transfer of ownership, AEP will limit access to the facilities. During the interim period, Interconnection Customers shall be responsible for all costs and regulatory obligations associated with ownership of the OTB Facilities, including, but not limited to, maintenance costs, insurance, and NERC compliance obligations. To the extent necessary, Interconnection Customers must make any necessary regulatory filings and obtain any necessary regulatory approvals to own in-service transmission facilities, including if applicable, obtaining a waiver of FERC’s requirements under Order Nos. 888, 889, and 890.

### **Transfer of Ownership**

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#### **Timing**

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The transfer of ownership occurs subsequent to energization of the OTB Facilities. The transfer will occur after: (a) AEP determines that any defects in the OTB Facilities have been corrected to its satisfaction; (b) after any claims or litigation related to the OTB Facilities has fully resolved; and (c) any necessary regulatory or other third party approvals have been obtained.



## Due Diligence

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To prepare the necessary transfer documents, Interconnection Customers must provide AEP with copies of all contracts, real estate documents, permits, correspondence with governmental authorities, and any other information requested by AEP necessary to conduct due diligence on the OTB Facilities. With respect to fee property, Interconnection Customers will provide AEP with the original owner's and Interconnection Customer's vesting deeds, the title policy insuring Interconnection Customer's purchase, and any exception documents enumerated on that policy. Interconnection Customers will provide AEP with the most current American Land Title Association ("ALTA") survey of the property and a copy of any environmental reports (including a Phase I report). Interconnection Customers shall provide affidavits of completion and lien waivers or other evidence of final payment to its contractors and vendors.

## Warranties

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At the closing, Interconnection Customers will be expected to transfer warranties from its vendors and contractors for all components of the OTB Facilities. Interconnection Customers must provide copies of all the contracts and purchase orders for such components for AEP to verify (a) that the terms of the warranties are sufficient, (b) that the warranties are contractually binding; and (c) that the warranties are transferable. If the warranties are deficient (not contractually valid, not in compliance with duration terms specified by AEP) or cannot be transferred, Interconnection Customers shall be responsible for either providing the warranties directly or providing alternate arrangements satisfactory to AEP.

## Transaction Agreement

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The parties must execute a transfer agreement as provided by AEP to address the terms of the transfer of the OTB Facilities. The transfer agreement shall include at a minimum (a) representations and warranties concerning the OTB Facilities and (b) indemnification provisions including, but not limited to, indemnifications for claims relating to siting, construction, and other matters arising from or related to the period of Interconnection Customer's ownership.

## Closing

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The closing of the transfer may occur simultaneously with execution of the transfer agreement if no regulatory or other third party approvals are needed. However, if the parties must obtain regulatory or other third party approvals, the closing will be deferred until after the necessary approvals have been obtained. At the closing of the transfer of ownership, Interconnection Customers agree to execute such bills of sale, deeds, assignments and other agreements in forms acceptable to AEP as may be necessary



to accomplish the transfer ownership of the OTB Facilities, including the real property interests related thereto, from Interconnection Customers to AEP.

## **Conveyance Free of Encumbrances**

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At the closing of the transfer of the OTB Facilities, Interconnection Customers must convey to AEP marketable title to the OTB Facilities, including all real and personal property, fixtures and other improvements constituting the OTB Facilities, free and clear of any and all liens and encumbrances, including mechanics and tax liens.

## **Transfer of Ownership of Fee Real Property**

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Transfer of real property in fee associated with the OTB Facilities shall be conveyed by General Warranty Deed, in fee simple, free and clear and unencumbered, subject only to such easements, conditions, and restrictions of record as may be reasonably acceptable to Transmission Owner; zoning and other governmental regulations, restrictions; and non-delinquent real estate taxes and assessments. Interconnection Customers agree to execute customary closing affidavits and documents and provide all necessary information, as required by the title company that will enable it to delete the standard exceptions from the title policy. Interconnection Customers shall be responsible for the cost of the title insurance policy. Additional requirements for the transfer of real property are set forth in the Standards and Expectations for Siting, Real Estate, Right-of-Way, and Environmental Permitting for Transmission Projects. This document can be found on the AEP Transmission Studies and Requirements section of the Required Postings page of AEP.com:

<https://www.aep.com/requiredpostings/AEPTransmissionStudies>

## **Claims; Litigation**

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AEP is not required to close on the transfer of the OTB Facilities if any claims are pending or threatened with respect to the real property or facilities.

## Change Process

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The RTOs have defined how scope, schedule or cost changes must be processed.

- PJM: The change process is documented in Manual 14C. At the time of this writing, this is addressed in Section 3.4, Generation and Merchant Transmission Project Agreement Scope Change Process.

<https://pjm.com/-/media/documents/manuals/m14c.ashx>

- SPP: The modification process is documented in Attachment V. At the time of this writing, this is addressed in Section 4.4, Modifications.

<http://opsportal.spp.org/documents/studies/SPP%20Tariff%20Attachment%20V%20Generator%20Interconnection%20Procedures.pdf>





## Disputes

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Formal dispute procedures are defined in the Interconnection Agreement(s). Informal disagreements should be addressed between the Primary Contacts for each party. This does not preclude the formal dispute procedures from being utilized.



## Appendix Materials

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### Transmission Planning Reliability Criteria

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AEP's Transmission Planning Reliability Criteria is available on the Required Postings page of AEP.com. The criteria is available for PJM and SPP.

<https://www.aep.com/requiredpostings/AEPTransmissionStudies>

### RTO Developed Documentation

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PJM and SPP have documentation available on their websites to assist Interconnection Customers.

- PJM:

<https://pjm.com/library/manuals.aspx#RegionalTransmissionPlanningProcessManuals>

- SPP:

<https://www.spp.org/engineering/generator-interconnection/>



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<sup>i</sup> AEP Appalachian Power: <https://www.appalachianpower.com/builders/GeneratingEquipment.aspx>

AEP Indiana Michigan Power:  
<https://www.indianamichiganpower.com/builders/GeneratingEquipment.aspx>

AEP Kentucky Power: <https://www.kentuckypower.com/builders/GeneratingEquipment.aspx>

AEP Ohio: <https://www.aepohio.com/builders/GeneratingEquipment.aspx>

AEP Public Service Company of Oklahoma:  
<https://www.psoklahoma.com/builders/GeneratingEquipment.aspx>

AEP Southwestern Electric Power Company:  
<https://www.swepco.com/builders/GeneratingEquipment.aspx>

AEP Texas: <https://www.aeptexas.com/builders/GeneratingEquipment.aspx>