



Ohio Valley Electric Corporation – Indiana-Kentucky Electric Corporation Option to Build Requirements

Since its inception in the 1950's, Ohio Valley Electric Corporation (OVEC) and its wholly-owned subsidiary, Indiana-Kentucky Electric Corporation (IKEC, both companies together referred to collectively as OVEC), has contracted with American Electric Power Service Corporation (AEP) to perform certain engineering services, including transmission planning, on OVEC's behalf. Because of this close relationship, OVEC follows the AEP Interconnection Requirements and Option to Build Requirements.

On December 1, 2018, OVEC was integrated into the PJM RTO as a Transmission Owning member. As such, OVEC also complies with all PJM Interconnection requirements.

For additional information on OVEC's Interconnection Requirements, contact:

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The remainder of this document contains the AEP Building Guidelines.



AEP Transmission Grid Development

Independent Power Producer (IPP) Option to Build Guidelines

Revision: 4

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Description: Expectations and requirements for Interconnection Customers



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Purpose

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/>

These Guidelines do not apply in the Electric Reliability Council of Texas (ERCOT).

Scope

This document identifies AEP’s expectations and requirements for Interconnection Customers that have elected the OTB in the PJM and SPP regions. These Guidelines apply to all OTB projects involving any of the Transmission Owners of the American Electric Power system.

The contractual requirements for OTB projects are set forth in the appropriate Interconnection Agreements for each RTO (“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

To best facilitate sharing of information, a single point of contact must be established between AEP and Interconnection Customers. All information and requests must be administered through each party’s primary contact. The AEP point of contact may change once the Interconnection Agreements have been executed.

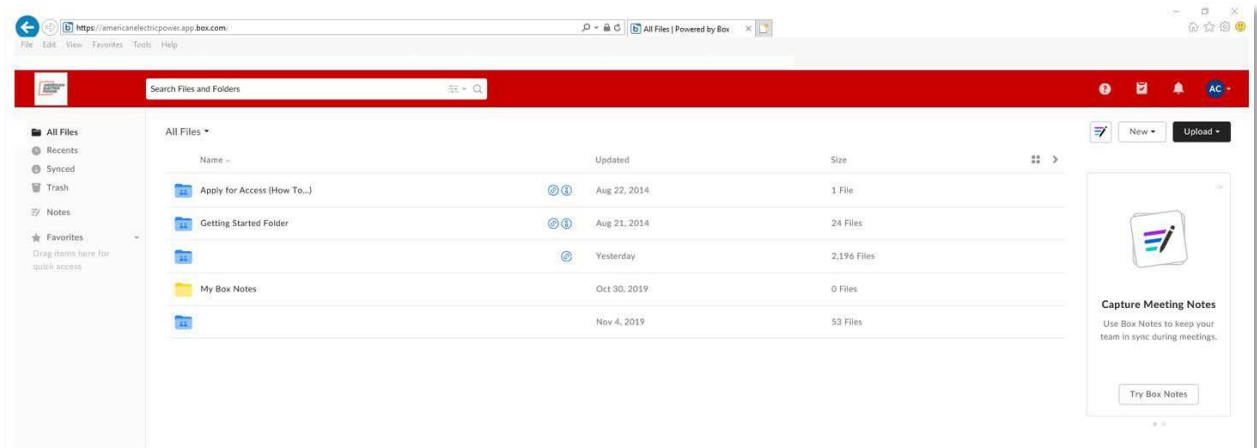
For OTB projects, Interconnection Customers must direct any questions concerning technical requirements, scope, and schedule to the AEP primary contact in the form of written “Requests for Information.” This will assist AEP in tracking responses and ensuring that the questions are directed to the appropriate 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 the primary contact. Be sure to include the following: date, time, subject matter, and proposed attendee list.
Request for Information	Submit through the BOX.com website.

Project Documents and Drawings

As part of AEP’s Enterprise Cyber Security Program, Interconnection Customers must submit 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 fashion.



Files related to Interconnection Agreements, the AEP Substation Commissioning Checklist App, and information and documents related to the Transfer of Operational Control/Ownership may be shared via other channels.

Note: Unless specifically excluded herein, information shared outside of Box.com will be considered invalid.

Users are provided a username 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>



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 Agreements. The Interconnection Agreements contain confidentiality provisions addressing the handling of confidential information exchanged by the parties.



Safety

Interconnection Customers and their contractors, employees and agents must comply with all federal, state, and local laws and regulations and other requirements of the Interconnection Agreements applicable to the areas where construction activity is occurring.

In addition, Interconnection Customers must comply with AEP safety requirements while working on AEP controlled property or working in a station or on a line after operational control has been transferred to AEP.



Contractors, Vendors, and Warranties

Contractors and Vendors

As set forth in the Interconnection Agreements, Interconnection Customers are required to use AEP’s approved contractors and major equipment vendors. A list can be found in the AEP Transmission Studies and Requirements section within the Required Postings page on AEP.com, labeled as “Approved Contractors and Major Equipment Vendors”:

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

AEP updates this document on an as-needed basis. Interconnection Customers must confirm that they are referencing the most current version on the AEP website.

Warranties

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

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

AEP updates this document on an as-needed basis. Interconnection Customers should confirm that they are referencing the most current version on the AEP website.

Interconnection Customers must obtain warranties that meet the required durations, and the warranties must be included with the Interconnection Customer’s 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 must provide AEP copies of all the contracts and purchase orders including the warranties prior to the ownership transfer. If the warranty provisions are not satisfactory, the closing may be delayed until Interconnection Customers correct the deficiencies.



Technical Requirements

AEP

Requirements for Connection

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

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

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

AEP updates this document on an as-needed basis. Interconnection Customers must confirm that they are referencing the most current version on the AEP website.

Additional information will be provided after Interconnection Agreements are executed.

Project Specific Engineering and Design Standards

Interconnection Customers must follow AEP Standards. AEP will provide the applicable standards and drawings via Box.com after the Interconnection Agreements are executed. Interconnection Customers can discuss the standards with AEP during the [Engineering Reviews](#).



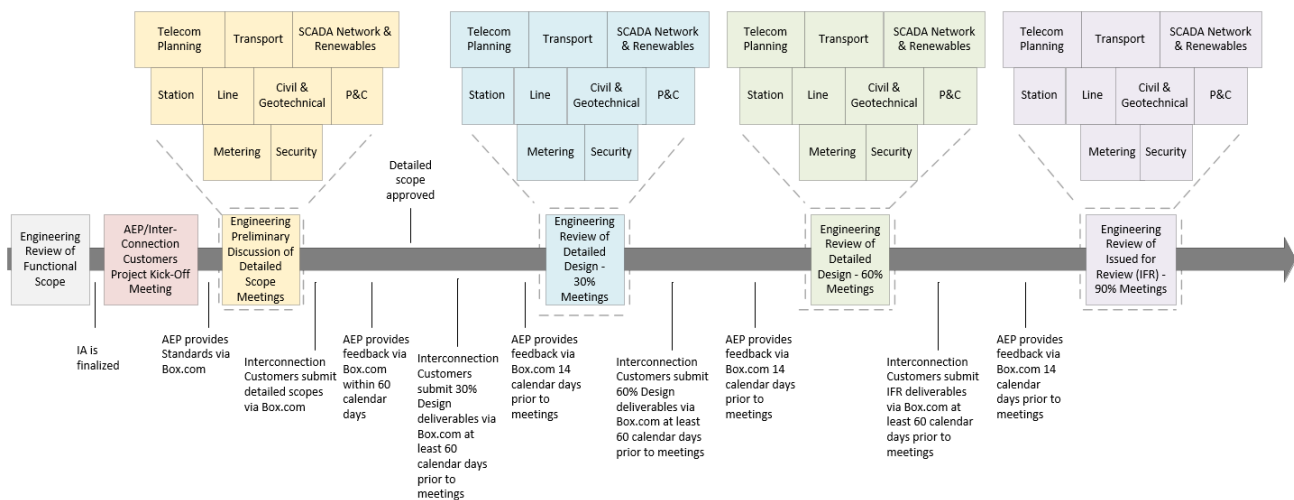
Other Entities

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 Interconnection Agreements 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” identified in the timeline above, Interconnection Customers can ask questions regarding the AEP functional scopes and standards. This must include discussions identifying the responsible party for each portion of the scope. Following these meetings, Interconnection Customers submit their detailed scope via Box.com. This must include:

- Written scope (separate scopes are required for each engineering discipline)
- Layout plan
- Electrical one-line diagrams
- Control house panel layout
- Relay, Instrumentation and Metering (RIM)/Automatic Reclosing Operation (ARO) notes
- Metering scope, including instrument transformers (current transformers and voltage transformers) and the meter design
- Map showing proposed transmission line alignment and structure locations

- Preliminary Design Criteria and Scoping Summary Document (DCSS) that addresses the following:
 - Clearance criteria used to design Right of Way (ROW) width
 - Conductor and shield wire data (type, stranding, size, total area, unit weight, Rated Breaking Strength, etc.)
 - Design cable tensions
 - Summary of conductor and shield wire hardware
 - Summary of vibration analysis input (average annual minimum temperature, average annual temperature, etc.)
 - Summary of Lightning Performance and Grounding Criteria
 - Type(s) of insulators and insulation criteria
 - Summary of galloping criteria and evaluation
 - Table of conductor loading (temperature, ice, and wind) and Clearance Designation for in-span clearance checks for conductor to ground and underlying and/or conflicting objects
 - Table of in-span minimum clearances from the conductor to ground and other underlying/conflicting objects
 - Table of additional clearance requirements for crossings (crossing description, crossing type, conductor loading, cable condition, minimum required clearance, etc.)
 - Swing angle criteria
 - Summary of proposed under build design parameters, including the location of under build, type of under build, typical attachment heights, and wire types and tensions used in the design of the line
 - Description of standard structure type(s) and typical structures as well as protective coatings
 - Table of weather cases applied to wires
 - Structure deflection criteria and conductor loading for deflection analysis
 - Summary of maintenance load case, uplift parameters, wind pressure and shape factors
 - Other related documents

The appropriate AEP disciplines – illustrated in the Timeline of Engineering Reviews and Deliverables at the beginning of this section - will review and provide feedback. This cycle shall continue until AEP is comfortable approving the detailed scope.

AEP will also review and provide feedback on the 30%, 60% and 90% detailed designs described in the upcoming sections.

Engineering Review of Detailed Design – 30%

At least 60 calendar days prior to the “Engineering Review of Detailed Design – 30% Meetings”, Interconnection Customers must provide:

Station

- Grading plan
- Erosion control plans
- Storm water management plans
- Grounding plan
- Raceway plan
- Foundation plan
- Foundation design drawings
- Layout plan
- Electrical one-line diagrams
- Electrical assembly plans and section views
- Structure design drawings
- Bill of material (BOM): The primary list of all essential components that are required to construct the project; at a minimum each item on the BOM should include an:
 - Item number
 - Description
 - Quantity
- Metering related drawings

Line

- Updated DCSS
 - 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, 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

Protection and Control (P&C)

- Accurate detailed protection and control design package. This package must 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
 - RIM and ARO notes
 - Detailed scope
 - P&C front views
 - Key plan or Drop in Control Module (DICM) layout drawings
- Carrier current diagram (if applicable)
- Metering related drawings

Telecom Planning and Transport Engineering

A drawing(s) clearly showing the following:

- Diverse fiber entries (if fiber is present)
- Fiber construction from the dead end into the station
- Dual conduit paths and entrances (if 138kV or above)
- Rack(s) to be utilized for telecom equipment
 - Separate rack for fiber, to include the fiber distribution cabinet
 - Telecom rack(s) located in a separate line up from the panels
 - Telecom rack(s), to include a fuse panel capable of supporting 50 amps of power
- Fuse panel(s) located at the top of the rack supporting the equipment

- Power feed to the fuse panel (power feed provided by the Interconnection Customer)
- Dual power feed from the fuse panel to telecom equipment

Supervisory Control and Data Acquisition (SCADA) Network and Renewables Engineering

A drawing(s) clearly showing dual feeds (using 5-amp fuses) for the station router and switches. This is typically provided from the same DC fuse block panel provided for Transport Engineering.

Engineering Review of Detailed Design – 60%

At least 60 calendar days prior to the “Engineering Review of Detailed Design – 60% Meetings”, Interconnection Customers must provide:

Station

- Grading plan, sections and detail drawings
- Erosion control plans
- Storm water management plans
- Grounding plan
- Raceway plan
- Lighting plan
- Foundation plan
- Foundation design drawings
- Layout plan
- Electrical one-line diagrams
- Electrical assembly plans 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
- BOM: The primary list of all essential components that are required to construct the project; at a minimum each item on the BOM should include an:
 - Item number
 - Description
 - Quantity
- Metering related drawings

Line

- Final DCSS
- 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

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

Telecom Planning and Transport Engineering

A drawing(s) clearly showing the following:

- Diverse fiber entries (if fiber is present)
- Fiber construction from the dead end into the station
- Dual conduit paths and entrances (if 138kV or above)
- Rack(s) to be utilized for telecom equipment
 - Separate rack for fiber, to include the fiber distribution cabinet
 - Telecom rack(s) located in a separate line up from the panels
 - Telecom rack(s), to include a fuse panel capable of supporting 50 amps of power
- Fuse panel(s) located at the top of the rack supporting the equipment
- Power feed to the fuse panel (power feed provided by the Interconnection Customer)
- Dual power feed from the fuse panel to telecom equipment

SCADA Network and Renewables Engineering

A drawing(s) clearly showing dual feeds (using 5-amp fuses) for the station router and switches. This is typically provided from the same DC fuse block panel provided for Transport Engineering.

Engineering Review of IFR – 90%

At least 60 calendar days prior to the “Engineering Review of Issued for Review (IFR) – 90% Meetings”, Interconnection Customers must provide:



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Station

- Grading plan, sections, and detail drawings
- Erosion control plans
- Storm water management plans
- Grounding plan
- Raceway plan
- Lighting plan
- Foundation plan
- Foundation design drawings
- Layout plan
- Electrical one-line diagrams
- Electrical assembly plans 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.

- BOM: The primary list of all essential components that are required to construct the project; at a minimum each item on the BOM should include an:
 - Item number
 - Description
 - Quantity
- Metering related drawings

Line

- Final 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

- Accurate detailed protection and control design package; this package must 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 schedules (indoor and outdoor)
- Metering related drawings
- Station relay settings file package for review; this package must 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

Telecom Planning and Transport Engineering

If changes have occurred since the 60% drawing(s) was issued, an updated version(s) must be provided showing the following:

- Diverse fiber entries (if fiber is present)
- Fiber construction from the dead end into the station
- Dual conduit paths and entrances (if 138kV or above)
- Rack(s) to be utilized for telecom equipment
 - Separate rack for fiber, to include the fiber distribution cabinet
 - Telecom rack(s) located in a separate line up from the panels
 - Telecom rack(s), to include a fuse panel capable of supporting 50 amps of power
- Fuse panel(s) located at the top of the rack supporting the equipment



- Power feed to the fuse panel (power feed provided by the Interconnection Customer)
- Dual power feed from the fuse panel to telecom equipment

SCADA Network and Renewables Engineering

If changes have occurred since the 60% drawing(s) was issued, an updated version(s) must be provided. This must clearly show dual feeds (using 5-amp fuses) for the station router and switches. This is typically provided from the same DC fuse block panel provided for Transport Engineering.

IFC, FMP and As-Built Drawings

Issued for Construction (IFC) Drawings

After completing the engineering review meetings and updating all drawings per AEP comments, Interconnection Customers must provide AEP with PDF copies of all IFC drawings and final copies of all associated documents and calculations sheets via Box.com. All of these items must be provided to AEP at the same time they are provided to the Interconnection Customer's construction contractor(s).

Field Marked Print (FMP) and As-Built Drawings

When construction is complete and the OTB facilities are ready for energization, Interconnection Customers must:

- Leave a paper copy of any project-related FMP and as-built drawings at the substation before demobilization
- Provide AEP with updated CAD (AEP standard format) and PDF copies of all FMP and as-built drawings, associated documents and calculation sheets via Box.com.

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 and cyber security strategy, including a tiered structure to define what level of security is required at each transmission station or control center. AEP's physical and cyber security strategy and the details of these measures are considered confidential.

Additional information will be provided once the Interconnection Agreements 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, that may have a significant cost impact. 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. These requirements are found on the NERC website:

<https://www.nerc.com/pa/Stand/Pages/USRelStand.aspx>

The screenshot below is an example of the requirements to be found on the NERC website. This is not an all-inclusive list.

Family	Standard Version	Title
CIP	CIP-002-5.1a	Cyber Security — BES Cyber System Categorization
CIP	CIP-003-8	Cyber Security — Security Management Controls
CIP	CIP-004-6	Cyber Security — Personnel & Training
CIP	CIP-005-7	Cyber Security — Electronic Security Perimeter(s)
CIP	CIP-006-6	Cyber Security — Physical Security of BES Cyber Systems
CIP	CIP-007-6	Cyber Security — System Security Management
CIP	CIP-008-6	Cyber Security — Incident Reporting and Response Planning
CIP	CIP-009-6	Cyber Security — Recovery Plans for BES Cyber Systems
CIP	CIP-010-4	Cyber Security — Configuration Change Management and Vulnerability Assessments
CIP	CIP-011-2	Cyber Security — Information Protection
CIP	CIP-012-1	Cyber Security – Communications between Control Centers
CIP	CIP-013-2	Cyber Security - Supply Chain Risk Management
CIP	CIP-014-3	Physical Security



AEP Station Service Power

Station service power for the transmission substation(s) to be turned over to AEP as part of the OTB 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 which must 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 must be established in accordance with AEP standards.

Interconnection Customers are responsible for contacting the respective AEP Operating Companyⁱ to request connection. If the electrical substation is outside of AEP Operating Company service territory, Interconnection Customers must 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. If a connection is established with the local utility, the Interconnection Customer must assist in transferring the station service arrangement to AEP if needed.

Additional information is available in the “Connection Requirements for the AEP Transmission System”. 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>

AEP updates this document on an as-needed basis. Interconnection Customers must confirm that they are referencing the most current version on the AEP website.

Additional information will be provided after Interconnection Agreements are executed.

Siting, Outreach, Environmental, Real Estate and ROW

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, real estate and ROW 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>

AEP updates this document on an as-needed basis. Interconnection Customers must confirm that they are referencing the most current version on the AEP website.

In order to avoid delays, Interconnection Customers exercising the OTB will be required to provide documentation prior to the start of construction. AEP reserves the right to require additional documents throughout the lifecycle of the project. Examples include stormwater pollution prevention plans, long term post construction stormwater maintenance plans, etc. The specific documents that may be required will vary based upon the scope and location of the OTB facilities.

Refer to the [Transfer of Ownership of Fee Real Property section](#) later in this document for additional details on the transfer of real estate.

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

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 must be referenced to ensure compliance during the construction of applicable lines.

Additional information will be provided after Interconnection Agreements are executed.

Construction

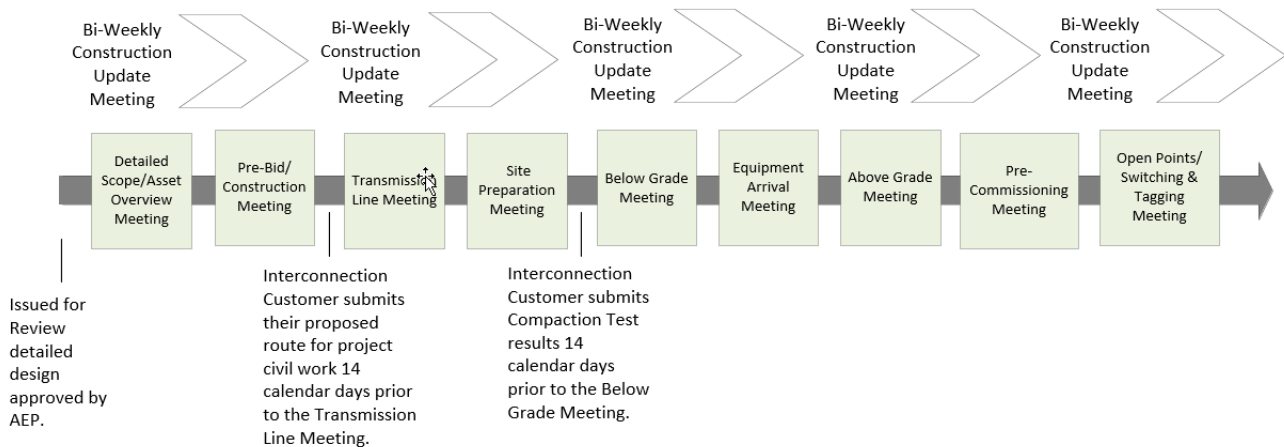
Meetings

A series of meetings will take place between the Interconnection Customer and AEP in advance of, and during, the construction process.

A bi-weekly construction update meeting will be held to discuss updates, current issues/questions, etc. The AEP Substation Commissioning Checklist App will also be reviewed.

AEP may request separate meetings to discuss specific construction topics. A list of potential meetings is provided below. These will typically take place after AEP has approved the IFR detailed design. Note that the meetings required will vary based upon the scope of the project.

- Detailed Scope/Asset Overview
- Pre-Bid/Construction
- Transmission Line
- Site Preparation
- Below Grade
- Equipment Arrival
- Above Grade
- Pre-Commissioning
- Open Points/Switching and Tagging



Oversight

AEP Energy Delivery Representatives (EDRs) have the right to access the work site periodically during project execution. The Interconnection Customer must provide the appropriate EDR with a set of IFC prints, all required environmental permits, and inform the EDRs of any field changes to the IFCs during construction.

EDRs and other AEP representatives will visit the site regularly to inspect and observe the following:

- Work quality and performance of defined work scope
- Condition of delivered equipment and materials
- Construction progress

Upon request by AEP, Interconnection Customer must submit to AEP the P&C technician names that will be performing work. AEP may reject any P&C technician from performing work by giving written notice of such rejection to the Interconnection Customer. Reasons may include:

- P&C technician is not qualified to perform the work
- For safety, security, or other reasonable business decision

Upon request by AEP, the Interconnection Customer's P&C personnel shall personally meet with AEP's representatives prior to beginning work or during the performance of work.

Interconnection Customer agrees that the following are minimum requirements regarding or relating to the Interconnection Customer's P&C technicians performing work:

- All P&C testing and commissioning activities, including the development of supporting documentation, must be performed by AEP vetted and approved P&C technicians.
- The vetted and approved lead P&C technician must be on-site to perform testing and commissioning activities. Virtual testing and commissioning activities are not allowed. Virtual testing and commissioning practices are defined as the Interconnection Customer utilizing a remote subject matter expert to lead P&C activities.
- All P&C technicians assigned to the project must be present during testing and commissioning activities, including but not limited to cable pulling and terminating.

Hold Points

Throughout the construction process, EDRs may request hold points for inspection. After the Interconnection Agreement is executed, more information will be provided in the AEP Substation Commissioning Checklist App and process documents. The Interconnection Customer must include all hold points in the project construction schedule and must provide a five (5) business day notice to the appropriate EDR for upcoming hold point activities.

The Interconnection Customer must use an AEP approved third-party to perform inspections of structural fill, retaining walls, and rock pin anchors or other earth retaining devices.

Hold points may include, but are not limited to:

- Site Work
 - Structural fill and compaction test, if installed
 - Retaining walls, if installed
 - Rock pin anchors, if installed
 - Other earth retaining devices, if installed
 - Project civil works (station pad, roads to station and line structures, etc.)
- Below Grade
 - Foundations
 - Anchor bolts
 - Grounding grid (cadweld connections, etc.)
 - Trench system, buried cable, and conduit
- Above Grade
 - Steel
 - Breakers
 - Transformer(s)
 - Switches
 - Bus leads and bus welds
 - Minor equipment (current transformers, power transformers, surge arrestors, etc.)
 - DICM control cable/wiring
 - Station fence
 - Station rock cover
 - Grounding connections

- Testing and Commissioning
 - Physical
 - P&C
- Energization
 - Phasing checks
 - Entry/exit spans or jumper loops
 - Punch list
 - As-built drawing completion
 - Achievement of final stabilization and stormwater pollution prevention program (SWPPP) best management practices for removal; close-out documentation for other environmental permits the project required



Testing and Commissioning Oversight

All substation testing and commissioning work performed by non-AEP TFS personnel will be subject to AEP TFS oversight.

The AEP Substation Commissioning Checklist App and supporting forms must 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.

The Interconnection Customer's personnel (including its contractors) must use approved AEP TFS Procedures to perform and document testing. If a specific AEP TFS Procedure is not available for the activity, the Interconnection Customer must 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 "Connection Requirements for the AEP Transmission System". 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>

AEP updates this document on an as-needed basis. Interconnection Customers must confirm that they are referencing the most current version on the AEP website.



Transfer of Operational Control/Ownership

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

Transfer of Operational Control

Timing; Procedure

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 control agreement and a maintenance agreement that is negotiated and signed by both parties.

Interim Period

During the interim period following the transfer of operational control and prior to transfer of ownership, AEP will perform maintenance activities as set forth in the maintenance agreement. AEP will limit access to the station facilities to ensure the security of the transmission system. If Interconnection Customers desire access to the station facilities, Interconnection Customers must coordinate access with AEP, and while at the facilities, Interconnection Customers and their representatives will follow AEP site guidelines and AEP safety requirements.

If a maintenance agreement is not in place, Interconnection Customers must request all switching coordination and arrangements through AEP. All such switching and tagging procedures by the Interconnection Customer shall be in accordance with the AEP Transmission and Distribution Switching and Tagging Policy.

During the interim period, Interconnection Customers are 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 costs.

Additional information on NERC compliance standards is available in the “Connection Requirements for the AEP Transmission System”. 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>

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

Timing

The transfer of ownership begins 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 have been fully resolved; and any necessary regulatory or other third-party approvals have been obtained.

Due Diligence

To prepare the necessary ownership 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 must provide affidavits of completion and lien waivers or other evidence of final payment to its contractors and vendors.

Warranties

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 will be responsible for either providing the warranties directly or providing alternate arrangements satisfactory to AEP.

Transaction Agreement

The parties must execute an ownership transfer agreement as provided by AEP to address the terms of the transfer of the OTB Facilities. The ownership transfer agreement must 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, compliance, construction, and other matters arising from or related to the period of the Interconnection Customer's ownership.



Closing

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

Conveyance Free of Encumbrances

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

Transfer of real property in fee associated with the OTB Facilities must 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 the 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 will 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 Interconnection 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>

AEP updates this document on an as-needed basis. Interconnection Customers must confirm that they are referencing the most current version on the AEP website.

Claims; Litigation

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

Change Process

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.

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



Disputes

Formal dispute procedures are defined in the Interconnection Agreements. 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

Transmission Planning Reliability Criteria

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

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

The criteria are updated on an as-needed basis; therefore, Interconnection Customers must validate the version they are referencing is the most up-to-date version on the AEP website.

RTO Developed Documentation

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/>



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

AEP Indiana Michigan Power:
<https://www.indianamichiganpower.com/business/builders/CreateGreen>

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>