Revision 2.0

Transmission Interconnection Guide

AMERICAN TRANSMISSION COMPANY

Transmission – Transmission Interconnection Guide

(An ATC Business Practice)

Revision 2.0
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American Transmission Company (ATC) is a member of the Midwest Independent Transmission System Operator (Midwest ISO)[1]. ATC owns, plans, constructs, operates, maintains and will expand its Transmission Facilities to provide adequate and reliable transmission of electric power. ATC provides nondiscriminatory service to all customers, supporting effective competition in energy markets without favoring any market participant. ATC owns approximately 9,400 miles of transmission lines and more than 500 substations in portions of Wisconsin, Michigan, Minnesota and Illinois and is interconnected with generating facilities, other transmission facilities and load serving facilities owned by municipalities, cooperatives, independent power producers and investor-owned utilities. In general, ATC accommodates additions or modifications to its transmission system for interconnections with other Interconnection Parties according to the requirements of the Midwest ISO's Open Access Transmission, Energy, and Operating Reserve Markets Tariff (Midwest ISO ASM Tariff). ATC will collaborate with Midwest ISO and the Interconnection Party in development and implementation of the appropriate interconnection solution in response to the Interconnection Party's requested need. The Interconnection Party is directed to contact ATC Interconnection Services in order to develop an Interconnection Request for each of the following types of project:

1. Interconnection of new Transmission Facilities to the ATC Transmission System.
2. Modifications to existing interconnected Transmission Facilities.

This Transmission - Transmission Interconnection Guide (Guide) is intended to supplement the Midwest ISO requirements and address both ATC's role as well as the Interconnection Party's role in the transmission interconnection process.

Any questions or requests for additional information concerning a transmission interconnection to the ATC Transmission System should be directed to:

gioanotices@atcllc.com
ATC Interconnection Services
262-506-6700

[1] Capitalized terms are defined in the Appendix A: Glossary of Terms at the end of this Guide or the Midwest ISO's Open Access Open Access Transmission, Energy, and Operating Reserve Markets Tariff.

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1 Introduction

1.1 Purpose

As a Transmission-only utility, ATC partners with its interconnected and interconnecting customers as well as neighboring transmission system owner(s) (Interconnection Party(ies)) for long-term, successful transmission interconnections. This Guide describes the minimum requirements for the connection of an Interconnection Party's facilities to the ATC Transmission System or the modification of an existing transmission interconnection. Additional specific facility requirements will be identified during studies conducted in connection with the particular Interconnection Party-proposed project. This process is administered by ATC under the auspices of the Midwest ISO.

In accordance with Attachment FF-ATCLLC of the Midwest ISO ASM Tariff (Attachment FF-ATCLLC),[2] a "Transmission – Transmission Interconnection" is the interconnection of Transmission Facilities owned by parties other than ATC interconnected to or which are proposed to be interconnected to the Transmission Facilities of ATC, and which are operated, or when constructed, will operate at a voltage greater than 50 kV or which are used by the owner to transmit bulk quantities of energy for or on behalf of itself or its customers under the terms of the Midwest ISO ASM Tariff or other comparable transmission service tariff, or pursuant to a contract or agreement and which have been classified by the owner or the appropriate state regulatory authority as Transmission Facilities in accordance with the applicable provisions of Order No. 888 (FERC's "seven-factor test").[3]

As a member company of the Midwest ISO, ATC participates in Transmission to Transmission planning, on both a regional basis (through the Midwest ISO Transmission Expansion Plan (MTEP) process, for example) and a sub-regional basis, in order to fulfill ATC's obligation to provide interconnection service and open access transmission service for the benefit of all users of the ATC Transmission Facilities under state and federal law. This enables ATC to assure the availability of reliable transmission service for the use and benefit of all users of the ATC Transmission Facilities. This planning is performed consistent with the Midwest ISO ASM Tariff, Midwest ISO Business Practices, as well as Appendix B of the Agreement of Transmission Facilities Owners to Organize the Midwest Independent Transmission System Operator, Inc., a Delaware Non-Stock Company in accordance with FERC Planning Principles delineated in Order No. 890.[4]

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[2] *See* Attachment FF of the Midwest ISO ASM Tariff
https://www.midwestiso.org/Library/Tariff/Pages/Tariff.aspx.

[3] *See* Promoting Wholesale Competition Through Open Access Non-discriminatory Transmission Services by Public Utilities; Recovery of Stranded Costs by Public Utilities and Transmitting Utilities, Order No. 888, 61 FR 21540 (May 10, 1996), FERC Stats. & Regs. ¶ 31,036 (1996) at 31,771.

[4] *See* Preventing Undue Discrimination and Preference in Transmission Service, Order No. 890, 72 FR 12,266 (March 15, 2007), FERC Stats. & Regs. ¶ 31,241.

Although ATC will be performing an assessment of the proposed transmission interconnection, the Midwest ISO ASM Tariff, primarily as specified in Attachment FF-ATCLLC that describes ATC's local planning process, governs the process, including the necessary studies to be performed by the Midwest ISO. This process governs the interconnection of new or modified Transmission Facilities subject to the Midwest ASM ISO Tariff, including ATC-owned Transmission Facilities.
ATC utilizes the Midwest ISO Transmission-Transmission Interconnection Agreement template to define the business relationships between ATC, the Interconnection Party and the Midwest ISO for its transmission interconnections. Article Seven of that agreement pertains to procedures for notification of modifications. The template is available from the Midwest ISO or ATC upon request. This Guide generally applies to the interconnection of new Transmission Facilities.

New transmission system interconnections at existing ATC substations will be designed utilizing this Guide while accommodating previous interconnection requirements and limitations. If the Interconnection Party is considering any modification(s) to an existing ATC Transmission System interconnection that may be reasonably anticipated to impact the ATC Transmission System, the Interconnection Party shall notify ATC in writing of the proposed modification(s) and ATC will work together with the Interconnection Party to determine the best means of how to proceed with the implementation of the proposed modifications consistent with the Midwest ISO planning process.

1.2 ATC's Role

Upon receipt of a request to modify or create a transmission to transmission interconnection to the ATC Transmission System, ATC will coordinate the evaluation of the proposed system change and any construction of the proposed Transmission Facilities with the requestor (Interconnection Party) and will include the Midwest ISO, consistent with the Midwest ISO ASM Tariff for an evaluation of the proposed project as part of the Midwest ISO MTEP, as defined in Attachment FF of the Midwest ISO ASM Tariff.

The purpose of the coordination is for ATC to develop a coordinated assessment of the proposed Transmission Facilities in order to identify any alternatives to any project identified in ATC's Ten Year Assessment. This assessment may include a project that may have been identified by one or more of the owners of those interconnected Transmission Facilities as a Transmission Facilities construction project to be engaged in by the other Transmission Facilities owner(s) for which one or more project identified by ATC could be an alternative. This assessment may also be determined by the Midwest ISO to be combined with the proposed project of one or more other transmission owners to provide for a modified project that produces more appropriate reliability or economic benefits or is less costly overall.

The ATC assessment typically consists of various types of planning analyses as well as design engineering and construction feasibility studies. The ATC Interconnection Services group coordinates ATC's collaboration with the Interconnection Party and the ATC Planning group coordinates with the Midwest ISO throughout the interconnection process.

1.3 Legal and Regulatory Requirements

1.3.1 FERC

Throughout the interconnection process, ATC adheres to the FERC Standards of Conduct as well as the rules relating to Critical Energy Infrastructure Information.

1.3.2 State

The states in which ATC operates have their own requirements for Transmission Facility siting and construction. This Guide is not intended to describe those requirements. The Interconnection Party will be responsible for compliance with the specific state requirements and processes for the assets they will permit, construct and own. ATC will be responsible for the permitting, construction and ownership of its assets. Further information regarding these requirements and processes is available from the pertinent state regulatory agency:

- Public Service Commission of Wisconsin - http://www.psc.wi.gov/

- Michigan Public Service Commission - http://www.michigan.gov/mpsc/
- Minnesota Public Utilities Commission - http://www.puc.state.mn.us/
- Illinois Commerce Commission - http://www.icc.illinois.gov/

1.3.3 NERC

With respect to the ATC Transmission System, ATC is registered as a Transmission Owner, Transmission Operator, Transmission Planner, and Planning Coordinator with Regional Entities the Midwest Reliability Organization and Reliability*First* Corporation under the requirements of the Electric Reliability Organization, the North American Electric Reliability Corporation (NERC). Interconnection to the ATC Transmission System does not remove any of the obligations the Interconnection Party may have under the requirements of NERC. The planning for the interconnection of new or modified transmission interconnections most directly fall under NERC Mandatory Reliability Standard FAC-002, although other standards may apply.

ATC further advises that it will not assume any NERC reliability responsibilities aside from those listed above. The Transmission to Transmission Interconnection Agreement (T-TIA) between ATC and an Interconnection Party's organization is not a delegation of, nor the transfer of either party's NERC functional responsibilities from one party to the other.

2 Process

The specific steps and requirements of the process for modifying existing or interconnecting new transmission facilities to the ATC transmission facilities are set forth in detail below. This Guide is intended to provide the Interconnection Party with information concerning how ATC can assist and work together with the Interconnection Party throughout this interconnection process.

2.1 Initiation and Development

An Interconnection Party request for interconnection to the ATC Transmission System begins with a formal communication to ATC via submission of the Transmission Interconnection Request Form (TIRF) to ATC.[5] . In addition to the formal mechanisms, ATC encourages communication between ATC and the Interconnection Party prior to and during the development of the Interconnection Request.

An Interconnection Party request for modification of an existing transmission to transmission interconnection also begins with the submission of the TIRF.

[5] An example of this form can be found on the ATC website at the "Connection to the Grid" page http://www.atcllc.com/wp-content/uploads/2013/08/TIRF-082313.pdf as well as Appendix C of this Guide.

A. TRANSMISSION SERVICE

As determined by FERC, a request for interconnection to the ATC Transmission System does not constitute a request for transmission service. The process described herein is not sufficient, nor intended to determine the capability of the transmission network to supply the electric load power and energy requirements. In addition, a signed T-TIA between ATC, the Interconnection Party and the Midwest ISO does not provide the Interconnection Party with any rights to transmission service.

An Interconnection Party desiring transmission service from the Midwest ISO over the ATC Transmission System must follow the procedures of the Midwest ISO ASM Tariff in requesting transmission service.

B. TRANSMISSION TO TRANSMISSION INTERCONNECTION REQUESTS STEPS

1. Whether for new or modification of existing transmission to transmission interconnection assets, the Interconnection Party submits a TIRF to ATC to initiate the planning for and development of the Interconnection Facilities.

2. The Interconnection Party provides sufficient information to ATC documenting the need for the interconnection and the alternatives to be considered. In addition, known information regarding coordination with regional plans, or the proposed design of the facilities (e.g. breakers, capacity needs, project timelines, etc.) is requested. Depending on the level of information provided by the Interconnection Party, ATC may need to perform additional analysis, which may be performed at the Interconnection Party's expense.

3. ATC will review the supplied information and determine any issues as well as the next steps for additional analysis. A likely next step would be development of a mutually agreeable document describing the planning analyses needed to be performed consistent with NERC standards and ATC planning criteria. The result of these analyses will be a study report documenting the conclusions and a proposed electrical design for the new or modified transmission to transmission interconnection. During this process, ATC and the Interconnection Party will need to coordinate with the Midwest ISO as described in the Midwest ISO ASM Tariff.

To the extent that the parties have made assessments of their respective Transmission Facilities and have determined that there are one or more Transmission Facilities construction projects that warrants further study to determine whether a coordinated solution may be more appropriate, the parties shall agree upon the model or assessment tool to be used, and shall supply sufficient information to permit both parties to perform the evaluation or assessment of their respective systems in order to determine whether there is a coordinated Transmission Facilities construction project, or one or more alternatives to one or more Transmission Facilities construction projects proposed in such Transmission Facilities assessment that could be constructed, either by one or the

other, or jointly, that would provide the same or greater Transmission system benefit at a lower cost, or a greater benefit to both Transmission systems.

In regards with any assessment performed, the parties shall agree upon the criteria to be employed or otherwise incorporated in the evaluation, study or other assessment to be performed. In no event shall the criteria to be used be contrary to the mandatory reliability requirements of NERC or Regional Entity, but such criteria may be more restrictive or more conservative. The results of each party's assessment or the output of any model or assessment tool shall be shared with the other party or parties participating in such coordinated regional planning. To the extent that each party has performed the same or similar assessment, evaluation or analysis and have arrived at different results or different conclusions, the parties shall follow the process described in Attachment FF-ATCLLC.

4. Upon completion of the planning analyses, ATC will submit information on proposed facilities within its footprint to the Midwest ISO for consideration in the Midwest ISO regional planning process and inclusion in the Midwest ISO MTEP, in accordance with the Midwest ISO ASM Tariff and Business Practices. The Interconnection Party is responsible for the coordination regarding its assets with its planning coordinator.

5. Prior to ATC initiating design engineering, procurement, construction or installation of any ATC Transmission System facilities related to the proposed interconnection to the ATC Transmission System, a T-TIA (or an amendment to an existing T-TIA) must be executed between ATC, the Midwest ISO and the Interconnection Party. The T-TIA will not define the terms and conditions under which ATC will construct the facilities to interconnect the new Interconnection Facilities and, in some cases, upgrades to portions of the ATC Transmission System. A facilities construction agreement between the Interconnection Party and ATC will be used for that purpose as well as allocating the costs of the new or modified Transmission Facilities, and as necessary, ATC system upgrades between the Interconnection Party and ATC. Once the T-TIA is executed, ATC will proceed with the interconnection process and the T-TIA will be filed with the applicable regulatory agency.

6. The costs associated with any Transmission Facilities construction project determined by such Transmission – Transmission planning to be reasonably necessary shall be allocated in accordance with the requirements of any applicable state regulatory authority having jurisdiction over the siting of some or all of the construction, and, to the extent governed by the Midwest ISO or PJM transmission tariffs, in accordance with the provisions of the respective tariffs, or as otherwise may be agreed to by the Transmission Owners proposing the construction of such Transmission Facilities.

2.2 Interconnection Studies

ATC will work with the Interconnection Party through the study process and include the Midwest ISO as necessary. The basic process involves:

a. Application Review

b. Planning Analyses

- Studies includes short circuit, stability and power flow analysis, as appropriate, to determine the appropriate new, modified or additional Transmission Facilities needed to accommodate the Interconnection Party's Interconnection Request.

c. Design, Permitting and Construction.

2.3 Data Requirements

Throughout the studies and interconnected operation of the Transmission Facility, certain information is required from the Interconnection Party. ATC will assign key lead contacts during the interconnection process from ATC's interconnection services and planning groups to assist the Interconnection Party in the determination and sharing of the needed information. This information will include, but not be limited to, impedances (i.e. sequence data), line charging, facility limits, protection systems, real-time telemetry points and maintenance records.

2.4 Coordination with Local Utilities

Transmission interconnection projects may require significant coordination with local electric utilities. As a transmission-only company, ATC does not provide local distribution utility services, but as a business partner promoting effective competition in energy markets without favoring any market participant, ATC supports the interconnection of new Transmission Facilities to the ATC Transmission System. The Interconnection Party is responsible for compliance with the requirements of the local distribution utilities. While this Guide is not intended to describe those requirements in detail, there are a number of typical issues that warrant consideration early in the interconnection process:

a. Facilities locations and potential conflicts
   - Overhead distribution facilities.
   - Underground distribution facilities.
   - Environmental issues such as wetlands, storm water run off.

b. Metering
   - Balancing Authority Area metering.
   - Revenue metering.

c. Temporary construction and permanent service.
   - Substation power.

3 Interconnection Facility Requirements

In addition to applicable design standards identified in the respective T-TIA, the Interconnection Party and ATC must agree on the most appropriate and applicable substation/transmission/protection design guides, standards, and specifications to be used, for the design of and procurement for the interconnection of the Interconnection Party facility. The ATC design guides, standards, and specifications are available upon request.

It is important to note that ATC design standards apply to ATC Transmission System facilities and that the Interconnection Party's design standards apply to the Interconnection Party's facilities unless otherwise specifically noted in the following sections.

In the event that such ATC design guides, standards or specifications do not address a particular item or issue, ATC requires that the Interconnection Party and ATC agree on the use of nationally-recognized standards, guides or specifications to ensure that the Interconnection Party's Interconnection Facilities are designed in accordance with Good Utility Practice and any applicable Mandatory Reliability Standards. In the event that there is a conflict between any mandatory standard, guide or specification and ATC's design guides, standards and material/construction specifications, the more restrictive design guides, standards and specifications will apply.

3.1 Transmission Substation Configurations

Typically, transmission interconnections will be made between existing substation facilities of ATC and the Interconnecting Party. The Interconnection Facilities to support the interconnection will include the appropriate disconnecting means and metering installed at the involved substations. The configuration of a new ATC interconnection substation, if required, will depend on several factors including, but not limited to the number of the transmission system elements connected, the nominal voltage of the Transmission Facilities being interconnected, and whether or not any of the transmission lines are part of a black-start restoration path. ATC and the Interconnection Party will work together in the design of the Interconnection Facilities consistent with the T-TIA.

3.2 Demarcation and Ownership

The Point of Interconnection will be the Point of Change of Ownership between the Interconnection Party and ATC.

3.3 Procedures for Coordinated Joint Studies of New Facilities and Their Impacts on the Interconnected Transmission Systems

Please refer to section 2.2 above for additional details.

3.4 Procedures for Notification of New or Modified Facilities to Others (Those Responsible for the Reliability of the Interconnected Transmission Systems) as soon as Feasible

Please refer to section 2.1 above for additional details.

3.5 Reserved

3.6 Reserved

3.7 Voltage Level and MW and MVAR Capacity or Demand at the Point of Interconnection

3.7.1 Voltage Level

New interconnections must effectively address the voltage requirements of both this section and in Section 3.13. ATC operates transmission facilities predominantly at nominal system voltages of 69, 138, 345 kV. For the purposes of this guide, any reference to 138kV voltage levels shall also encompass interconnections to ATC's 115 kV system as well. ATC will discuss with the Interconnection Party on a case-by-case basis requirements associated with interconnections to the relatively small amount of 161 and 230 kV facilities owned and operated by ATC.

3.7.1.1 Basic Impulse Insulation Level

The substation equipment and bus systems shall be designed for the voltage ratings shown below. Substations designed for 230kV and 161kV shall be dealt with as an exception. New substations energized at 115kV shall be built to 138kV ratings in accordance with Table 5. Additions to existing substations energized at 115kV or 138kV, with 550kV BIL construction shall be continued similar to their original design and in all other cases consideration shall be given to the existing substation design.

Table 5: Equipment Voltage Ratings[3]

Nominal Operating Voltage (phase-to-phase)	345 kV	138 kV	69 kV
Nominal Phase-to-Phase Voltage	345 kV	138 kV	69 kV
Nominal Phase-to-Ground Voltage	200 kV	80 kV	40 kV
Maximum of the Nominal Phase-to-Phase Voltage	362 kV	145 kV	72.5 kV
Maximum of the Nominal Phase-to-Ground Voltage	209 kV	84 kV	42 kV
Basic Insulation Level (BIL)	1300 kV[2]	650 kV[1]	350 kV

1. In some remote locations and transformers a 550 kV BIL may be acceptable.
2. In some remote location and transformers a 1050 kV BIL may be acceptable.
3. Note: The ATC bandwidth for Operating Voltage is ± 5% of the Nominal Operating Voltage

3.7.2 MW and MVAR Capacity or Demand at the Point of Interconnection

ATC and the Interconnection Party will work together in the design of the Interconnection Facilities to provided sufficient MW and MVAR capacity at the Point of Interconnection for both current and future needs of both parties as determined by the collaborative Interconnection Facilities Study(ies).

3.8 Breaker Duty and Surge Protection

3.8.1 Fault Current

Interconnection Party facilities connected to ATC's Transmission System can be subjected to fault levels that are largely the product of system characteristics and interconnection impedance. The Interconnection Party's facilities must possess sufficient fault interrupting and momentary withstand ratings to meet the maximum expected fault current, with appropriate margin for future system growth. ATC and the Interconnection Party will coordinate with each other in a manner that will provide the transmission contribution to the fault current levels at the Point of Interconnection from either transmission system at the request of either party.

3.8.2 Continuous Current Ratings

ATC will endeavor to design facilities for the maximum continuous load that the Interconnection Party forecasts in the interconnection request or the next highest ATC standard rating for equipment beyond the maximum continuous rating of the Interconnection Party's facilities. The minimum continuous rating for new ATC substation facilities will be 2,000 amps. The minimum continuous rating for new ATC transmission line tap switches will be 1,200 amps. Any consideration of planned or emergency overloads are to be provided for in the TIRF.

3.8.3 Transient and Fault Duty Ratings

Interconnection Party Facilities are to be designed to include sufficient fault interrupting and momentary withstand ratings to meet the maximum expected transmission system requirements, with appropriate margin for future system growth. Equipment fault ratings will be determined for each interconnection as part of the project development process.

3.8.4 Surge Protection and Shielding

All Interconnection Facility equipment must be adequately designed to meet surge protection and shielding requirements. ATC and the Interconnection Party will coordinate with each other in a manner that will provide the necessary data at the request of either party.

3.9 System Protection and Coordination

The Interconnection Party is responsible for the overall safe and effective operation of their Transmission Facilities. ATC and the Interconnection Party will coordinate with

each other in a manner that will provide coordinated protection of the new or modified transmission Interconnection Facilities.

Certain protective devices (relays, circuit breakers, etc.) that are specified by ATC must be installed at the location where the Interconnection Party desires to connect with the ATC Transmission System. The purpose of these devices is to promptly disconnect the Interconnection Party's Transmission Facilities from the ATC Transmission System whenever faults or abnormal operating conditions occur. Other modifications to the electrical system configuration or protective relays may be required in order to accommodate the transmission interconnection. Both Parties agree to document the protective equipment at the Point of Interconnection via the T-TIA or other appropriate documents.

ATC will not be responsible for the primary protection of equipment in the Interconnection Party's substation or Transmission Facility. Protective devices (e.g. relays, circuit breakers) must be installed by the Interconnection Party to the full extent required by all applicable standards to disconnect the Interconnection Party's Transmission Facilities from the ATC Transmission System whenever a fault or abnormality occurs (including local breaker-failure tripping). Such equipment must coordinate with existing ATC equipment and provide comparable levels of protection as practiced on the ATC Transmission System. The protective devices differ with the size of the installation. The specific requirements will be determined in the Interconnection Facilities Studies. Major factors generally determining the type of protective devices required include:

1. The type and size of the Interconnection Party's transmission equipment.
2. The location and system voltage level of the Interconnection Party's connection to the ATC Transmission System.
3. The manner in which the installation will operate (one-way versus two-way power flow).

All transmission interconnections to the ATC Transmission System shall be designed to avoid safety hazards or to avoid adversely affecting the quality of electric transmission service to ATC customers. Any facilities constructed by the Interconnection Party that will be ultimately owned by ATC shall be designed using ATC substation and transmission design and material standards, which will be made available upon request.

3.9.1 Fault Clearing

A fully rated circuit breaker is normally required to be installed at the Point of Interconnection. Circuit breakers shall meet the latest applicable ANSI and IEEE standards and shall be suitable for the local environment and system operating conditions. Circuit breakers must be capable of interrupting present and future available fault current at the location at which they are being installed. Fault currents will increase on the ATC Transmission System over time. The Interconnection Party needs to periodically check fault levels to ensure their breaker meets these ever increasing values. It is expected that the installation meets the NEC/NESC and is certified by appropriate authorities to ensure safety of ATC personnel.

Application of ground-switches to trigger remote tripping is not an acceptable practice. Faults in the Interconnection Party's network must not trip existing transmission lines as a primary protection method.

The Interconnection Party must immediately and automatically isolate any faulted or failed equipment from the ATC Transmission System. This automatic equipment must be compatible with the existing transmission protection equipment.

ATC will require approval only for those portions of the Interconnection Party's design that pertain directly to the protection of the ATC Transmission System. ATC may make suggestions or comment on other areas; however, the Interconnection Party is responsible for the design of protection schemes associated with their Transmission Facilities.

3.9.2 Utility Relays

Protective and control relays are required for all Transmission Facilities interconnected to the ATC Transmission System. The applicable relays are described in the next section (3.9.3 Minimum Protection Requirements) or as designated by the Interconnection Facilities Study. The relays must:

1. Meet or exceed ANSI/IEEE Standards for protective relays (i.e., C37.90, C37.90.1, C37.90.2 and C37.90.3).
2. Have documentation covering application, testing, maintenance, and service.
3. Give positive indication of what caused a trip (Targets).
4. Have a means of testing that does not require disturbance to wiring (e.g. a draw-out case, test blocks, test switches, etc.).

3.9.3 Minimum Protection Requirements

The following functions are required at a minimum to protect ATC's equipment. The Interconnection Facilities Study will determine specific protective requirements.

a. Distance Phase, ground (21) with operation event recording.
b. Directional over current (67) with operation event recording.
c. Differential (87).
d. Breaker Failure with operation event recording.
e. Transfer Trip.

2. Additional protection functions may be required if the specific interconnection has unusual system characteristics. ATC and the Interconnection Party will jointly review the needs for additional protection functions on a case-by-case basis.

3.9.4 Redundant / Backup Protection

Relays protecting the ATC Transmission System shall be designed to ensure that the failure of a single protective relay or breaker will not result in failure to clear the fault. The design shall provide the necessary backup that will meet the ATC standards and regional protection requirements.

3.9.5 Test Switches

Each Party's protective relay design shall incorporate the necessary test switches to perform the tests required for the pre- and post – in-service testing discussed in Section 3.19. The required test switches will be placed such that they allow operation of lockout relays while preventing breaker failure operations and/or tripping of the Interconnection Facilities.

3.9.6 Design Changes After Being Placed In Service

Any modifications to the Interconnection Party facilities requiring ATC protective relaying and interlocks after the date the Transmission Facilities are placed in service, must be reviewed and approved by ATC prior to implementing any changes. Demonstration of relay calibration, trip tests, and on-line tests may be required depending on the extent of the design change. Setting changes of any interconnection protection or synchronizing device must be approved by ATC with a copy of the changes forwarded to the designated ATC representative. Any "Field Modification" or "As Built" AC/DC protection and synchronizing schematics associated with any ATC required interconnection device must be forwarded to the designated ATC representative.

3.9.7 Substation Power / Substation Services

If the Interconnection Party does not provide for its own source of AC substation power it must be provided externally. In this case, substation power shall be provided for in accordance with NERC, regional ISO and/or local state requirements. If the Interconnection Party is unable to provide its own substation power, AC substation power may be provided by the local distribution company.

If the Interconnection Party does provide for its own source of AC substation power and is constructed such that it is adjacent to the ATC facility, ATC may require AC substation power services for its facility be supplied from the Interconnection Party's facility. In this case the Interconnection Party will be expected to match the regional substation service voltage in use by ATC. The three most common voltages are: 1) 120/240 VAC single phase, three wire; 2) 120/208 VAC three phase, four wire; and 3) 120/240 VAC three phase, four wire. Provisions shall be made in the station power service to meter this usage.

3.10 Metering and Telecommunications

3.10.1 Communication Channel(s)

ATC may require that a communication channel and associated communication equipment be installed as part of the protective scheme. This channel may consist of power line carrier, leased telephone line, pilot wire circuit, fiber optic cable, radio, or other means. Communication channels may be needed for telemetry, SCADA, monitoring, relay/fault recorders, metering, or protection/control purposes. The Interconnection Facilities Study will determine the specific communication channel requirements.

3.10.2 Metering and Telemetry

The ATC Interconnection Facilities may require installation of metering equipment between the Interconnection Party and ATC Transmission System for operational purposes. The metering installation may include CTs, VTs, meters, recorders, remote communication unit (RTU) and any auxiliaries required by ATC. ATC may meter the Interconnection Party's Interconnection Facilities as needed to operate the Interconnection Facilities.

3.10.3 Supervisory Control and Data Acquisition (SCADA)

ATC Interconnection Facilities will be controlled and monitored by ATC system control center unless otherwise agreed to by a special operation agreement. Certain Interconnection Party substations may be monitored by ATC system control center as needed by ATC. The equipment data and statuses, which are to be provided, as applicable, include, but are not limited to what may be provided:

a. Breaker position.
b. Motor-operated disconnect position.
c. Bus voltage and alarming.
d. Loss of AC and DC voltage alarms.
e. Transmission line MW and Mvar values and amps.
f. Lockout relay status.
g. Other control and data points as necessary to provide comparable control and indication to ATC control standard.
h. Digital fault (transient)/dynamic recorder trouble alarm.
i. Protective relay malfunction alarms.
j. Energy accumulator or integrator.
k. Various alarms associated with substations.

3.10.4 Telemetry

The Interconnection Party shall provide ATC with real-time analog and digital facility data. The method in which the signals shall be transmitted to the ATC system operations center will be specified during the detail design of the Interconnection Facilities and Network Upgrades. The Interconnection Party shall provide the data to ATC in an acceptable format. If the Interconnection Party can not supply the data in an acceptable format like ICCP, then ATC will install an RTU at the Interconnection Facility to collect this information. Sections 3.8.5 through 3.8.9 below describes typical telemetry data to be provided to ATC.

3.10.5 Status of Circuit Breakers

3.10.5.1 Capable of disconnecting the Interconnection Party's facility from the ATC's Transmission System.

3.10.5.2 Capable of disconnecting any device that is required to be in service to meet the Interconnection Party's requirements for var compensation as part of the T-TIA.

3.10.6 Status of Relay Equipment

Status of relay equipment is required when the Interconnection Party's relay equipment is protecting, as primary or backup, any of ATC's Transmission System equipment.

3.10.7 Instantaneous MW and MVAR

Instantaneous megawatt and megavar values may be required for each Interconnection Party's facility.

3.10.8 Instantaneous Bus Voltages

3.10.8.1 Measured at the terminal of the Interconnection Party's facility.

3.10.8.2 Measured at any device installed to provide static or dynamic var compensation at the Interconnection Party's facility.

3.10.9 In-service and Readiness of:

3.10.9.1 Any power system stabilizer installed.

3.10.9.2 Automatic voltage regulator (AVR).

3.10.9.3 Any special protection system (SPS).

3.10.9.4 Any reactive compensation, whether static or dynamic.

3.10.10 Balancing Authority Metering

In addition to any metering that ATC may require as provided in Section 3.8.2, the Interconnection Party is responsible for working with an appropriate Balancing Authority and Local Balancing Authority to install necessary metering facilities, including instrument transformers within the Interconnection Party's substation. Prior to energizing the interconnection via the ATC Transmission System, the Interconnection Party must provide evidence of a Balancing Authority agreement to ATC.[6]

3.11 Grounding and Safety Issues

As set forth in the T-TIA, the Interconnection Party and ATC must agree to operate their respective facilities taking into account the ratings and capabilities of the facilities of the

[6] See ATC's Coordination of Balancing Authority Metering Boundary Modifications Business Practice at http://www.atcllc.com/wp-content/uploads/2012/10/Coordination-of-BA-Metering-Boundary-Mods-BP-Redline-082812.pdf

other party and shall not operate their system in a manner that would result in exceeding the operating limits or equipment ratings of the other party. This includes the coordination and use of appropriately sized grounding equipment.

3.11.1 Effective Grounding

ATC maintains effective grounding on its transmission system facilities, as defined by NESC. All Interconnection Party facilities connected to the ATC Transmission System must be effectively grounded per the NESC requirement. These calculations should be made as if the ATC Transmission System was disconnected from the Interconnection Party. The Interconnection Party must meet the effective grounded system criterion independent of the ATC Transmission System.

3.11.2 Grounding System

The Interconnection Party is responsible for the appropriate grounding of their equipment. At the Point of Interconnection, the Interconnection Party's grounding equipment must be compatible with ATC's grounding equipment. The Interconnection Party shall submit the grounding system study and design for ATC review prior to construction. The ground grid design must comply with IEEE 80 and properly address site extremes. Site tests should be completed to determine soil resistivity prior to ground grid design. Post construction grid resistance testing should be performed to verify design assumptions and that the installation was completed per the ground grid design. ATC grounding standards are available upon request.

3.11.3 Safety Issues

All personnel switching, working on or in proximity to the Interconnection Facility will comply with all safety policies, manuals and procedures of the applicable Interconnection Party along with all applicable OSHA safety laws and federal, state, and local rules and regulations.

The Interconnection Party and ATC will agree to work together to develop appropriate switching procedures to be utilized at the Interconnection Facilities.

All Interconnection Party equipment must be designed physically and electrically to allow for the attachment of properly sized working grounds as specified in IEEE 1246 "Guide for Temporary Protective Grounding Systems Used in Substations."

3.12 Insulation and Insulation Coordination (Basic Impulse Insulation Level)

ATC and the Interconnection Party must ensure that all equipment is adequately protected from excessive system over-voltages. This includes selection of equipment Basic Impulse Insulation Level (BIL) and protective devices (e.g. surge arresters) to achieve proper insulation coordination across the transmission – transmission interconnection.

ATC designs its transmission facilities for the BILs shown in Table 1. Interconnections at 230kV or 161kV will be reviewed on an exception basis. New substations energized at 115kV will be built to 138kV ratings in accordance with 138 kV standards. Additions to existing substations energized at 115kV or 138kV, with 550kV BIL construction will be continued similar to their original design. In all other cases consideration will be given to the existing substation design.

Table 1: Basic Impulse Insulation Levels (BIL)			
Nominal Operating Voltage (phase-to-phase)	345 kV	138 kV	69 kV
Basic Insulation Level (BIL)	1300 kV[1]	650 kV[2]	350 kV
1. In some remote locations and transformers a 1050 kV BIL may be acceptable. 2. In some remote locations and transformers a 550 kV BIL may be acceptable.			

3.13 Voltage, Reactive Power, and Power Factor Control

3.13.1 Steady State Voltage Range

The Interconnection Party should expect a normal transmission operating voltage range of +/- 5% from nominal. During system contingency or emergency operation, ATC permits operating voltages to vary up to +/- 10% from nominal. The Interconnection Party's equipment should be designed with the appropriate equipment to operate and maintain adequate voltage under these conditions.

3.13.2 Transmission Line Reactive Capability

All interconnections will be reactive compensated pursuant to Good Utility Practice to ensure proper operation of the interconnection. The Interconnection Party must provide their own reactive support for their Transmission and Interconnection Facilities.

3.14 Power Quality Impacts

3.14.1 Voltage Flicker and Harmonics

ATC Planning Criteria and Operating Instructions limit harmonics, voltage flicker and voltage fluctuations. These documents are available upon request.

3.14.2 Frequency and Frequency Control

Energy delivered into the ATC Transmission System must be 60 Hz sinusoidal alternating current as a standard voltage. In accordance with Applicable Reliability Standards, the Interconnection Party will install both control and protective relaying equipment necessary to maintain proper transmission system frequency.

3.15 Equipment Ratings

The Interconnection Party and ATC must agree on the applicable substation/transmission/protection design guides, standards, and specifications to be used, for the design of and procurement for the interconnection of the Interconnection Party facility(ies). Both Parties will be afforded the opportunity to confirm the overall Interconnection Facility capabilities and identify the limiting transmission element within the Interconnection Facility.

As set forth in the T-TIA, the Interconnection Party and ATC will be obligated to operate their respective facilities taking into account the ratings and capabilities of the facilities of the other party and shall not operate their respective systems in a manner that would result in exceeding the operating limits or equipment ratings of the other party. This includes the coordination of the topics discussed in Sections 3.15.1 through 3.15.6 below.

3.15.1 Voltage and BIL Levels

See Section 3.7.1 above.

3.15.2 Current Ratings

ATC and the Interconnection Party shall coordinate Interconnection Facility equipment current ratings with each other during the design of the Interconnection Facilities.

3.15.3 Bus Spacing and Clearances

ATC substation and bus systems shall be designed to match existing layouts when applicable, but at a minimum, new equipment shall maintain clearances and spacing consistent with the current ATC design standards, available upon request. ATC and the Interconnection Party shall coordinate substation and bus systems clearances and spacing with each other during the design of the Interconnection Facilities.

3.15.4 Circuit Breakers

The ATC power circuit breakers at the substations are expected to be SF6 gas insulated, dead-tank type that conform to ANSI-C37. ATC and the Interconnection Party shall coordinate circuit breaker ratings with each other during the design of the Interconnection Facilities.

3.15.5 Disconnect Switches

ATC disconnect switches are expected to be three-phase, gang operated, horizontal-mounted, with station post insulators that conform to ANSI-C35.32. ATC and the Interconnection Party shall coordinate the application of disconnect switches with each other during the design of the Interconnection Facilities.

3.15.6 Voltage Transformers (VTs & CCVTs)

Wound voltage transformers (VTs) are preferred for all 138 kV and lower bus voltage sensing and non-power line carrier applications on ATC Transmission System facilities. Voltage transformers will conform to ANSI-C35.13. Capacitance Coupled Voltage Transformers will conform with ANSI C93.1. ATC and the Interconnection Party shall coordinate the application of these VTs & CCVTs with each other during the design of the Interconnection Facilities.

3.16 Synchronizing of Facilities

3.16.1 Synchronism

ATC requires a sync-check relay function to be included with all circuit breakers interconnecting the Interconnection Party's Transmission Facilities to the ATC Transmission System. The sync check function along with additional voltage monitoring functions will supervise the closing of the interconnecting circuit breaker.

Manual closing of interconnecting circuit breakers requires verification of synchronism using sync-scope to prevent out of synchronization closing. If this is also the point of generator synchronization, it is highly recommended to install additional automatic synchronizing equipment.

ATC and the Interconnection Party shall coordinate the application of these devices during the design of the Interconnection Facilities.

ATC Commissioning personnel shall witness the simultaneous three phase phasing test between the Interconnection Party's Transmission Facilities and the ATC Transmission System prior to closing the interconnecting circuit breaker.

3.16.2 Phase Rotation

The ATC Transmission System phase rotation is ABC counter-clockwise. The Interconnection Party should verify phase rotation with ATC before purchasing any equipment and proceeding with the Interconnection Facility construction.

3.17 Maintenance Coordination

3.17.1 Maintenance Notification

The Interconnection Party must notify ATC or Midwest ISO as provided for in the applicable Midwest ISO ASM Tariff of any unusual conditions including, but not limited to the following:

1. Partial operating capability due to equipment limitations.

2. Scheduled outage periods and return to service expectations. Return to service notification must be updated daily to reflect the recent progress or the lack of progress.

3.17.2 Maintenance

Interconnection equipment owned by the Interconnection Party should be maintained and inspected according to manufacturer recommendations, NERC, and/or industry standards. Procedures must be established for visual and operational inspections. Provisions should be established for equipment maintenance and testing.

ATC maintains the right to review the maintenance, calibration, and operation data of all protective equipment for protecting ATC facilities, ATC customers, and other Interconnected Parties. The Interconnection Party is responsible for providing the necessary test accessories (such as relay test plugs, instruction manuals, wiring diagrams, etc.) required to test these protective devices. Verification testing may include the tripping of the intertie breaker, as appropriate.

If ATC performs work on the premises of the Interconnection Party, ATC operating personnel may make an inspection of the work area. If ATC personnel deem working conditions to be hazardous, the Interconnection Party must correct the unsafe conditions before ATC personnel will perform their work.

3.18 Operational Issues (Abnormal Frequency and Voltages)

ATC and the Interconnection Party will work together to establish appropriate procedures, protocols and operating guides (if necessary) to account for and manage abnormal frequency, voltages or other operating limits on either party's transmission system in accordance with all appropriate industry standards, Mandatory Reliability Standards, and Good Utility Practice.

3.19 Inspection Requirements for Existing or New Facilities

3.19.1 Acceptance Testing, Inspection and Commissioning

ATC requires all Interconnection Parties proposing to interconnect to the ATC Transmission System be in compliance with the applicable testing and/or performance requirements as part of the Interconnection Facilities design.

3.19.2 General

Prior to energizing the interconnection equipment with the ATC Transmission System, the Interconnection Party and ATC will work together to insure that all pertinent contracts (such as the T-T IA) are signed and that all equipment modifications have been completed. The Interconnection Party is required to demonstrate the correct operation of all interface protective and control devices to ATC. ATC shall define and witness, but is not responsible for performing this demonstration.

The Interconnection Party must provide detailed information on the protective relaying, metering, and control (including sync-check) equipment that will interface with the ATC Transmission System.

Scheduling of demonstration testing should be coordinated through ATC with a minimum of fifteen business days notice. Any outage of ATC protection equipment must be requested and approved in accordance with ATC's System Operation Approval Procedure for System Protection Equipment and Communication Channel Outages. This procedure is available upon request.

ATC commissioning specifications and documentation requirements are available upon request and provides the specific criteria that ATC uses for ensuring its electrical equipment is properly tested and checked out.

Inspection and approval by ATC does not constitute a warranty or relieve the Interconnection Party of responsibility for the operating condition or installation of the equipment, and may not be relied upon by the Interconnection Party for that purpose. Once interconnected, ATC will retain the right to inspect the Interconnection Facilities at ATC's discretion.

3.19.3 Demonstration

The Interconnection Party and ATC shall follow the following steps in assuring that the Interconnection Facilities have been adequately tested prior to energization and interconnection to the ATC Transmission System.

- Construction Testing Documentation Review,
- Demonstration Tests,
- Post In-Service Test.

Details on the specific testing requirements are to be coordinated between ATC and the Interconnection Party as part of the Commissioning process.

3.19.4 Future Changes In Requirements

From time to time new requirements for testing, reporting, equipment and/or performance are established by NERC or Regional Entity for interconnections. The Interconnection Party should take steps so it is notified of any changes by the applicable entity. If an Interconnection Party fails to comply with these changes in requirements and ATC is required to pay monetary penalties as a result of the Interconnection Party actions or inactions, then ATC will bill the Interconnection Party for any monetary penalty resulting from the non-performance of the Interconnection Party.

3.19.5 Performance of Tests

The Interconnection Party must test all wire, cable, electrical equipment, and systems installed by the Interconnection Party or connected by the Interconnection Party to assure proper installation, adjustment, setting, connection, and functioning. Details on the specific testing requirements are to be coordinated between ATC and the Interconnection Party as part of the Commissioning process.

3.19.6 Testing Equipment

The Interconnection Party must provide all equipment necessary to perform the tests required by ATC. Details on the specific testing requirements are to be coordinated between ATC and the Interconnection Party as part of the Commissioning process.

3.19.7 ATC Supplied Equipment

Any ATC supplied equipment that is factory calibrated (transducers, pressure switches, tuners, etc.) shall be tested consistent with ATC testing practices. Details on the specific testing requirements are to be coordinated between ATC and the Interconnection Party as part of the Commissioning process.

3.19.8 Final Design / As-Built Documents

The Interconnection Party must at the time of demonstration testing have a complete set of construction drawings and documentation available. ATC and the Customer will coordinate together what information is required prior to demonstration testing. ATC shall be provided a duplicate copy of this documentation at least fifteen business days prior to demonstration testing. A coordination meeting with ATC should be held to clarify any questions on documentation or testing requirements at least one week before demonstration testing begins.

3.20 Communications and Procedures During Normal and Emergency Operating Conditions

ATC and the Interconnection Party will design the Interconnection Facilities to function properly under both Normal and Emergency Operating Conditions. General guidelines will be stated below, but any specific guidelines will be defined in the T-TIA between ATC and the Interconnection Party.

The Interconnection Party shall operate within the applicable guidelines of this document and any other specific requirements as stated in the T-TIA, if applicable.

3.20.1 Normal Conditions

The Interconnection Party must operate according to the instructions and approval given by the ATC system control center personnel:

1. The Interconnection Party has twenty-four hour support available.

3.20.2 Abnormal Conditions

ATC reserves the right to open the interconnection disconnecting device for any of the following reasons:

1. ATC line maintenance work on ATC Transmission System.
2. ATC Transmission System emergency.
3. Inspection of an Interconnection Party's substation equipment and protective equipment reveals a hazardous condition.

4. Failure of the Interconnection Party to provide maintenance and testing reports when required.
5. Interconnection Party's Transmission Facilities interfere with other ATC customers, other Interconnection Parties, or with the operation of the ATC Transmission System.
6. Interconnection Party has modified the Transmission Facilities that affects ATC equipment without the knowledge and approval of ATC or has not installed ATC required protective devices.
7. Personnel or public safety are threatened.
8. Interconnection Party fails to comply with applicable OSHA Safety Tagging and Lockout requirements or ATC Hold Card Procedures.

Changes to the ATC Transmission System or the addition of other Interconnection Party's facilities, loads, or generators in the vicinity of the Interconnection Facilities may require modifications to the interconnection protective devices. If such changes are required, the Interconnection Party may be subject to future charges for these modifications.

Effective Date: 4/30/13		**Revision: 2.0**
TITLE:	**Transmission – Transmission Interconnection Guide** Approved by: Tom Finco	**Page 26 of 34** Tom Finco, VP, External Relations & Policy

Revision History

Revision Information

Revision	Author	Date	Section	Description
2.0	John Raisler	4/30/13	Various	Updated and modified language of certain sections. Rearranged Section 3 to align with FAC-001 Requirements ordering of topics. Added Section 3.8.2 Continuous Current Ratings Added Section 2.8.3 Transient Fault Duty Ratings Added Section 3.9.5 Test Switches
1.0	John Raisler	05-26-10	All	New - Includes review by: System Protection, Operations, Commissioning, Safety, Substation Services, Environmental, Maintenance, Metering, Planning, Legal and Interconnection Services.

Appendix A: Glossary of Terms

Any capitalized terms not defined herein will have the meanings set forth in the Midwest ISO Tariff and NERC Glossary of Terms.

Applicable Reliability Standards: the requirements and guidelines of NERC, the applicable Regional Entity, and the Balancing Authority of the Transmission System to which the Interconnection Party facility is directly interconnected.

ATC Interconnection Facilities: all facilities and equipment owned by ATC from the Point of Interconnection as identified in the T-TIA. The ATC Interconnection Facilities are sole-use facilities and do not include Interconnection Facilities or Network Upgrades.

ATC Transmission System: the facilities owned by ATC subject to the administration of the Midwest ISO that are used to provide energy market, transmission, energy, and ancillary reserves market, interconnection services or Wholesale Distribution Service under the Midwest ISO ASM Tariff.

Balancing Authority: the responsible entity that integrates resource plans ahead of time, maintains load-generation balance within a Balancing Authority Area and supports the Eastern Interconnection frequency in real-time. (Note: For the ATC Transmission System, the Midwest ISO performs this function).

Balancing Authority Area: an electric power system or combination of electric power systems bounded by interconnection metering and telemetering to which a common generation control scheme is applied within the Balancing Authority in order to:

(i) match the power output of the generation resources within the electric power system(s) and energy delivered from or to entities outside the electric power system(s), with the demand (including losses) within the electric power system(s);

(ii) maintain scheduled interchange with other Balancing Authority Areas, within the limits of Good Utility Practice;

(iii) maintain the frequency of the electric power system(s) within reasonable limits in accordance with Good Utility Practice and Applicable Reliability Standards.

(Note: The Midwest ISO Balancing Authority Area is comprised of the electric power systems of the Midwest ISO member companies, including ATC).

Critical Energy Infrastructure Information: Defined as any information beyond mere location that would be useful to someone wishing to do damage to critical infrastructure, for example existing or proposed transmission facilities. This includes information that has already been publicly disclosed. FERC has established procedures for gaining access to the information

Electric Reliability Organization: the North American Electric Reliability Corporation authorized by the Federal Energy Regulatory Commission to promulgate, seek approval for, and enforce Mandatory Reliability Standards.

Federal Power Act: the Federal Power Act, as amended, 16 U.S.C. §§ 791a *et seq.*

FERC: the Federal Energy Regulatory Commission or its successor.

Good Utility Practice: any of the practices, methods and acts engaged in or approved by a significant portion of the electric industry during the relevant time period, or any of the practices, methods and acts which, in the exercise of reasonable judgment in light of the facts known at the time the decision was made, could have been expected to accomplish the desired result at a reasonable cost consistent with good business practices, reliability, safety and expedition. Good Utility Practice is not intended to be limited to the optimum practice, method, or act to the exclusion of all others, but rather intended to include acceptable practices, methods, or acts generally accepted in the region, including those practices required by Federal Power Act Section 215(a)(4).

Guide: this ATC published document entitled "Transmission – Transmission Interconnection Guide."

In-Service Date: the date upon which the Interconnection Party reasonably expects it will be ready to begin use of the ATC Interconnection Facilities to provide transmission service over the transmission systems of ATC and the Interconnection Party.

Interconnection Facilities: all facilities and equipment between the Interconnection Party's facility and the Point of Interconnection, including any modification, additions or upgrades that are necessary to physically and electrically interconnect the Interconnection Party's facility to the ATC Transmission System. Interconnection Facilities do not include Network Upgrades.

Interconnection Facilities Study: a study conducted by the Midwest ISO, or its agent, for the Interconnection Party to determine a list of facilities (including the ATC facilities, system protection facilities, and if such upgrades have been determined, Network Upgrades, distribution upgrades, generator upgrades, and upgrades on affected systems, as identified in the Interconnection System Impact Study), the cost of those facilities, and the time required to interconnect the Interconnection Pary's Interconnection Facilities with the ATC Transmission System.

Interconnection Feasibility Study: a preliminary evaluation of the system impact of interconnecting the Interconnection Party's Interconnection Facility to the ATC Transmission System.

Interconnection Party: any entity that proposes to interconnect Transmission Facility(ies) with ATC's Transmission System.

Interconnection Request: a Interconnection Party's request, in the form of a Transmission Interconnection Request Form, to interconnect a new transmission system facility, or to increase the capacity of, or make a material modification to the operating characteristics of, an existing transmission system facility that is interconnected with the ATC Transmission System.

Interconnection System Impact Study: an engineering study that evaluates the impact of the proposed interconnection on the safety and reliability of ATC Transmission System and, if applicable, the Interconnection Party's system. The study will identify and detail the system impacts that would result if the Interconnection Party's facility were interconnected without project modifications or system modifications, focusing on the adverse system impacts identified in the Interconnection Feasibility Study, or to study potential impacts, including but not limited to those identified in the initial scoping meeting.

Local Balancing Authority Area: an operational entity or a joint registration organization which is:

(i) responsible for compliance to NERC for the subset of NERC Balancing Authority Reliability Standards defined in the Balancing Authority Agreement for their local area within the Midwest ISO Balancing Authority Area,

(ii) a Party to Balancing Authority Agreement, excluding the Midwest ISO,

(iii) shown in Appendix A to the Balancing Authority Agreement.

(Note: Examples of Local Balancing Authority Areas within the ATC footprint include: Alliant Energy Corporate Services, Inc. on behalf of Wisconsin Power & Light Company, Integrys Energy Group, on behalf of Wisconsin Public Services Corporation and Upper Peninsula Power Company, Madison Gas & Electric Company, and Wisconsin Electric Power Company).

Mandatory Reliability Standards: those standards promulgated and approved by NERC as the Electric Reliability Organization, or any Regional Entity authorized to do so, as ratified and approved by the FERC that are applicable to ATC and the Interconnection Party.

Midwest Independent Transmission System Operator, Inc. (the Midwest ISO): the Regional Transmission Organization that administers the Midwest ISO ASM Tariff and provides transmission, energy and ancillary reserves markets services over the Transmission Facilities of its transmission-owning members in interstate commerce.

Midwest ISO ASM Tariff: the Midwest ISO Open Access Transmission, Energy and Operating Reserves Market Tariff under the terms of which open access transmission, energy and operating reserves market and interconnection services are offered, as filed with the FERC, and as amended or supplemented from time to time, or any successor tariff.

NERC: the North American Electric Reliability Corporation or its successor organization.

Network Upgrades: the additions, modifications, and upgrades to the ATC Transmission System required at or beyond the point at which the Interconnection Facilities connect to the ATC Transmission System to accommodate the interconnection of the Interconnection Party's facility to the ATC Transmission System.

Point of Interconnection or Point of Change of Ownership: the point, as set forth in the Transmission – Transmission Interconnection Agreement, where the Interconnection Party's Interconnection Facilities connect to the ATC Transmission Facilities.

Regional Entity: the entity or entities that have entered into a delegation agreement with NERC and that have responsibility for the audit and investigation of the compliance with Mandatory Reliability Standards. The Midwest Reliability Organization and Reliability*First* Corporation both function as Regional Entities for the ATC Transmission System.

Standards of Conduct: FERC Rules intended to protect open competition in energy markets and to prevent unfair advantage through access to and use of information not equally available to all.

Transmission – Transmission Interconnection Agreement (T-TIA): the form of the interconnection agreement. ATC utilizes the Midwest ISO Transmission – Transmission Interconnection Agreement template which is available from Midwest ISO upon request.

Transmission Interconnection Request Form (TIRF): used to initiate the formal communication of an interest by an Interconnection Party to interconnect Transmission Facilities to the ATC Transmission System.

Transmission Facilities: For the purpose of this Guide, means electric lines and related facilities that are operated at 50 kV and above.

Transmission Operator: any entity responsible for the reliability of its "local" transmission system, and that operates or directs the operations of the Transmission Facilities. ATC is the Transmission Operator for the ATC Transmission System.

Appendix B: References

The following list of references has been utilized in preparation of this document and/or should be consulted for further information/clarification. When the following publications/standards are superseded by an approved revision, the latest revision shall apply. Please consult with ATC for the current revision of these references.

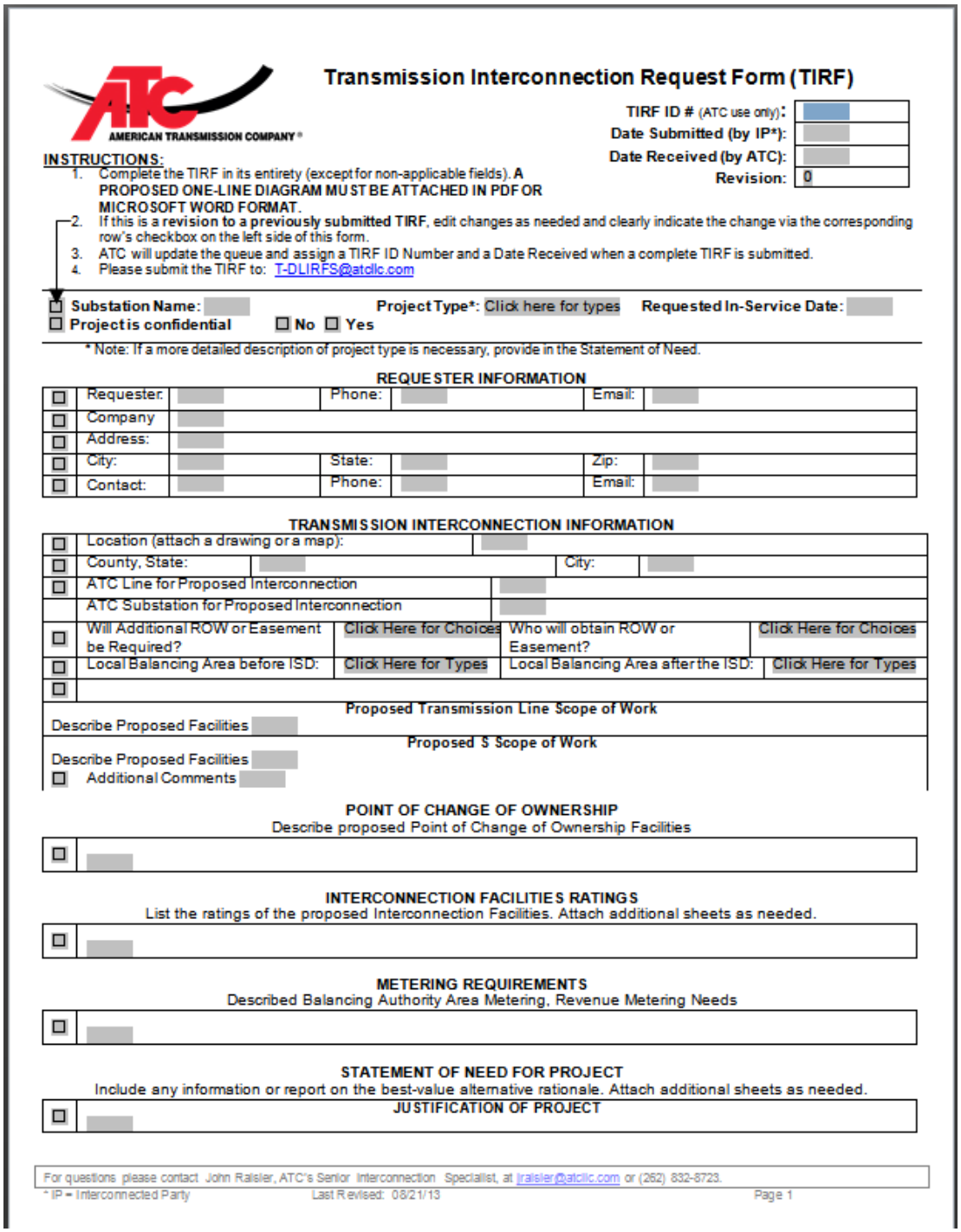
- ANSI C2-2002, National Electrical Safety Code.
- ANSI C84.1-1995 (R2005), Electric Power Systems and Equipment - Voltage Ratings (60HZ).
- IEEE Std. C37.106™ –2003, IEEE Guide for Abnormal Frequency Protection for Power Generating Plants,
- ANSI/ IEEE C37.90-1989, IEEE Standard for Relays and Relay Systems Associated with Electric Power Apparatus.
- IEEE Std C37.90.1-2002™ – 2002, IEEE Standard for Surge Withstand Capability (SWC) Tests for Relays and Relay Systems Associated with Electric Power Apparatus.
- IEEE Std C37.90.2™-2004, IEEE Standard for Withstand Capability of Relay Systems to Radiated Electromagnetic Interference from Transceivers.
- IEEE Std C37.90.3-2001, IEEE Standard Electrostatic Discharge Tests for Protective Relays.
- IEEE Std C37.95™ – 2002, IEEE Guide for Protective Relaying of Utility-Consumer Interconnections.
- IEEE Std 80-2000, IEEE Guide for Safety in AC Substation Grounding.
- IEEE Std-142-1991, IEEE Recommended Practice for Grounding of Industrial and Commercial Power Systems – IEEE Green Book (Color Book Series).
- IEEE Std-242-2001, IEEE Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems – IEEE Buff Book (Color Book Series).
- IEEE Std-446-1995, IEEE Recommended Practice for Emergency and Standby Power Systems for Industrial and Commercial Applications – IEEE Orange Book (Color Book Series).
- IEEE 519-1992, IEEE Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems.
- IEEE 1453™-2004, IEEE Recommended Practice for Measurement and Limits of Voltage Fluctuations and Associated Light Flicker on AC Power Systems

- IEEE Std-1100-1999, IEEE Recommended Practice for Powering and Grounding Electronic Equipment – IEEE Emerald Book (Color Book Series).

- NFPA 70- 2005, National Electrical Code

- OSHA Safety Tagging and Lockout Procedures.

Appendix C: Example Transmission Interconnection Request Form ("TIRF")



AMERICAN TRANSMISSION COMPANY®

Transmission Interconnection Request Form (TIRF)

TIRF ID # (ATC use only):	
Date Submitted (by IP*):	
Date Received (by ATC):	
Revision:	0

INSTRUCTIONS:

1. Complete the TIRF in its entirety (except for non-applicable fields). **A PROPOSED ONE-LINE DIAGRAM MUST BE ATTACHED IN PDF OR MICROSOFT WORD FORMAT.**
2. If this is **a revision to a previously submitted TIRF**, edit changes as needed and clearly indicate the change via the corresponding row's checkbox on the left side of this form.
3. ATC will update the queue and assign a TIRF ID Number and a Date Received when a complete TIRF is submitted.
4. Please submit the TIRF to: T-DLIRFS@atcllc.com

☐ **Substation Name:** **Project Type*:** Click here for types **Requested In-Service Date:**
☐ **Project is confidential** ☐ **No** ☐ **Yes**

* Note: If a more detailed description of project type is necessary, provide in the Statement of Need.

REQUESTER INFORMATION

☐	Requester:		Phone:	Email:	
☐	Company				
☐	Address:				
☐	City:		State:	Zip:	
☐	Contact:		Phone:	Email:	

TRANSMISSION INTERCONNECTION INFORMATION

☐	Location (attach a drawing or a map):			
☐	County, State:		City:	
☐	ATC Line for Proposed Interconnection			
	ATC Substation for Proposed Interconnection			
☐	Will Additional ROW or Easement be Required?	Click Here for Choices	Who will obtain ROW or Easement?	Click Here for Choices
☐	Local Balancing Area before ISD:	Click Here for Types	Local Balancing Area after the ISD:	Click Here for Types
☐				

Proposed Transmission Line Scope of Work

Describe Proposed Facilities

Proposed $ Scope of Work

Describe Proposed Facilities
☐ Additional Comments

POINT OF CHANGE OF OWNERSHIP
Describe proposed Point of Change of Ownership Facilities

☐

INTERCONNECTION FACILITIES RATINGS
List the ratings of the proposed Interconnection Facilities. Attach additional sheets as needed.

☐

METERING REQUIREMENTS
Described Balancing Authority Area Metering, Revenue Metering Needs

☐

STATEMENT OF NEED FOR PROJECT
Include any information or report on the best-value alternative rationale. Attach additional sheets as needed.

JUSTIFICATION OF PROJECT

☐

For questions please contact John Ralsler, ATC's Senior Interconnection Specialist, at jralsler@atcllc.com or (262) 832-8723.

* IP = Interconnected Party Last Revised: 08/21/13 Page 1