FACILITY CONNECTION REQUIREMENTS

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1. INTRODUCTION

The purpose of this document is to provide guidelines for the Allegheny Power operating companies (Monongahela Power Company, The Potomac Edison Company, and West Penn Power Company) and the Allegheny Energy Transmission subsidiaries hereinafter referred to collectively as "AP" or "the Company", in order to comply with all applicable national, regional and AP planning and operating standards. For the purpose of this document, the term "AP transmission system" shall mean those facilities of the AP operating companies and the Allegheny Energy Transmission subsidiaries operating at voltages above 100 kV.

This document conveys the basic technical and reliability requirements necessary for a safe and unobjectionable interconnection and is available online at www.alleghenypower.com under the Business Customers section. The interconnections include generation, transmission or end-user facility additions and/or modifications which request interconnection with or plan to interconnect with the AP transmission system. A review of this entire document will be performed on an annual basis, or more frequently as needed. These requirements are applicable to all facilities interconnecting with the AP transmission system, both Company owned as well as facilities owned by other parties.

2. FACILITY INTERCONNECTION PROCESS

2.1 Generation and Merchant Transmission

All proposed generation and merchant transmission interconnections with AP's transmission system must be filed with PJM. The scope of the interconnection studies is determined in accordance with the Transmission Planning process described in PJM Manual 14. All analyses and studies performed are in accordance with these sections, which provide information on the evaluation of Generation and Transmission Interconnection Service Requests. Generally, the following three types of studies will be completed:

- A Feasibility Study is performed to provide a high level approximation of the transmission-related costs to accommodate the interconnection and alternative plans to meet established reliability criteria. The PJM thermal criteria are 100% of the continuous rating for base case and 100% of the emergency rating for contingencies. Voltage screening is performed using criteria outlined in PJM Manual 3 Section 3.
- System Impact Studies are required to provide a more detailed evaluation of the requested interconnection. Stability studies are documented in the System Impact study.
- After acceptable completion of the System Impact Studies, a Facilities Study will be required to determine the detailed facility interconnection requirements. The Facilities Study will address other supporting (non-transmission) facilities, network upgrades, detailed cost estimates and construction schedule.

AP and representatives from other impacted transmission systems will participate in these studies. A report documenting the assumptions, results, and conclusions of the interconnection studies will be made available to the requester of the interconnection study. The status of all new or modified generation and transmission facilities is located on the PJM website in the PJM Transmission & Generation Queues.

2.2 End-User and Transmission

AP will perform studies involving end-user requests to interconnect with the AP transmission system or participate in studies involving requests from other transmission entities to interconnect with the AP transmission system, through coordination with PJM and other impacted transmission systems when necessary. These studies will include power flow, short circuit, power quality and stability analysis as required which will be determined via the planning study process as provided in the AP Engineering Manual Section 19 Subject Index 8 where the study process and documentation required to determine the impact of the new or modified facility on the interconnected transmission system is outlined. Any facility upgrades necessary to maintain the reliability of the interconnected transmission system will also be addressed. Results of the planning study shall be shared with the customer, other impacted transmission system owners and PJM where applicable. The proposed service will be detailed in the form of an AP Project Plan issued by the Transmission Planning department.

2.3 AP Interconnection Process

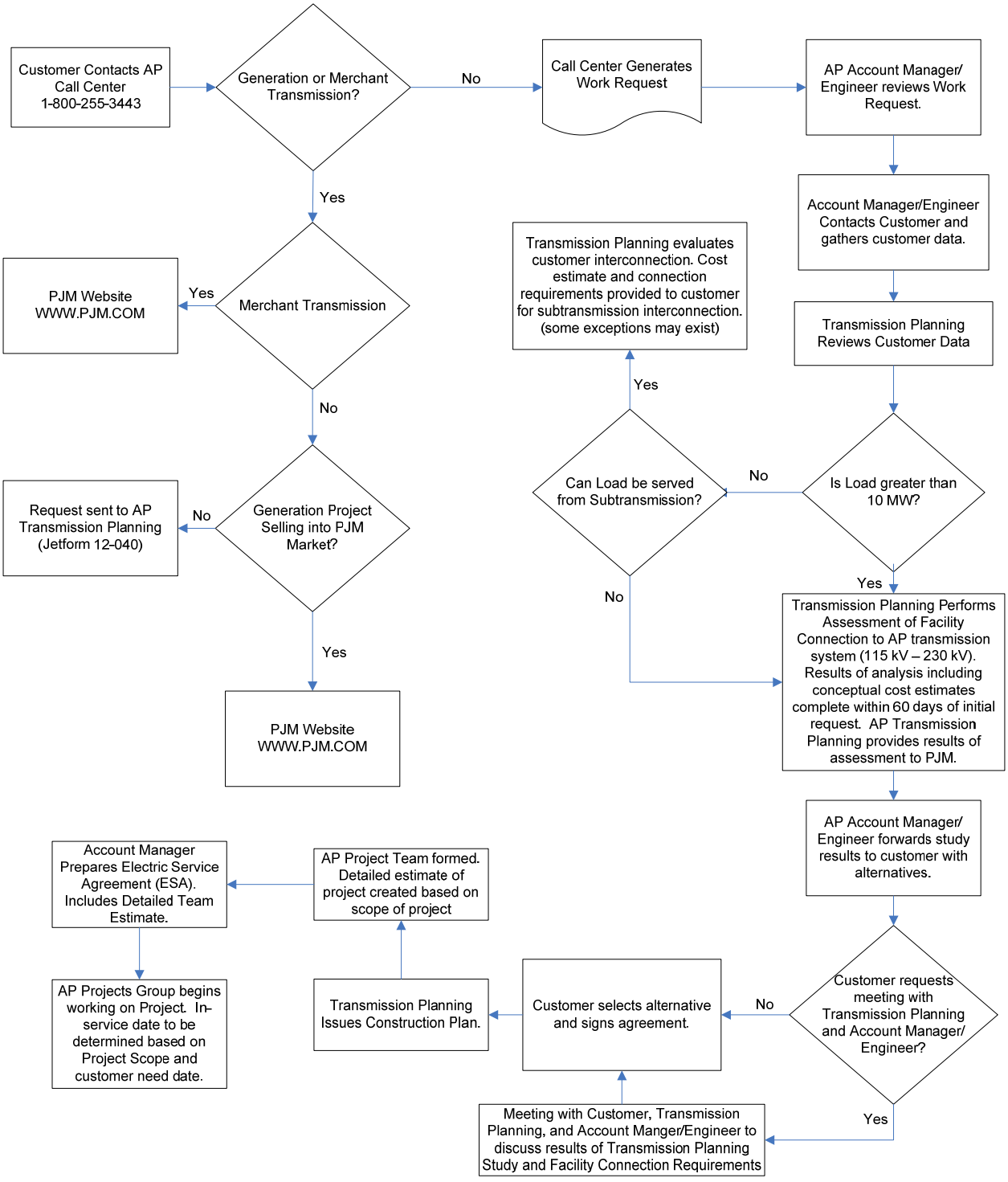

Figure 1: AP Interconnection Process Flowchart

3. GENERATION FACILITIES CONNECTION REQUIREMENTS

The following generation facility interconnection requirements for interconnecting with the AP transmission system can also be downloaded from the password protected PJM Transmission Owner Standards webpage at www.pjm.com/planning/trans-standard.html. PJM will issue a password only after study agreements have been executed by both parties.

3.1 Scope

This document shall apply to all generator interconnections connected at the sub-transmission and transmission system voltage level regardless of size and intent to sell power beyond the point of interconnection. This document shall apply to generators and distributed generation with an aggregate size of greater than 2 MW, nominal, at the point of interconnection on the distribution system regardless of intent to sell power beyond the point of interconnection. These requirements do not apply to automatic transfer schemes in which load is transferred between the AP and the generator in a momentary make-before-break operation provided the duration of synchronizing/paralleling the sources is less than 100 ms, except Paragraph 3 – Voltage Fluctuation requirements in the AP Engineering Manual, Service Quality section 6.0 shall apply. These requirements do not apply to emergency or standby generation automatic transfer schemes with non-paralleling (break-before-make) operation.

NOTE 1:

Several governmental and industry standard organizations publish documents that deal with certain portions or aspects of the interconnection. This document does not conflict nor is it intended to conflict with these governmental or industry standards. However, this document may not contain all of the requirements in a standard that are necessary for interconnection. Rather this document attempts to communicate the basic technical requirements necessary for a safe and unobjectionable interconnection installation. It is the responsibility of the generator owner to understand and comply with all applicable industry Codes and Standards as well as governmental regulations.

This document also does not communicate the requirements of a facility specific Operation and Maintenance agreement with AP and PJM necessary to outline the power production operation / schedule and future maintenance.

One purpose of these Interconnection Policy and Guidelines is to implement the final Generation Interconnection Rules adopted by the Federal Energy Regulatory Commission (FERC) on August 19, 2003 in FERC Order No. 2003. This order requires all FERC-jurisdictional electric utilities, including AP, to use standardized generation interconnection procedures and agreements for all pending or new requests to interconnect a generator larger than 20 MW at

transmission voltage, subject to certain regional differences. The generator should review the PJM Open Access Transmission Tariff (OATT), and the latest North American Electric Reliability Corporation (NERC) documents on reliability, in particular TPL-001 through -004, MOD-011 & MOD-013, and FAC-001 & -002. For further information, please refer to these documents.

The FERC Order established a pro forma Large Generation Interconnection Procedure (LGIP) and Large Generation Interconnection Agreement (LGIA). The LGIP and LGIA will be incorporated in the Open Access Transmission Tariffs (OATTs) managed by PJM. Another purpose of the policy and guidelines is to document the detailed technical requirements for interconnection not included in the LGIP or LGIA, as allowed by the FERC Order.

Interconnected generators shall comply with the following industry standards were applicable: IEEE 1547 – Standard for Interconnecting Distributed Resources with Electric Power Systems, PJM Large Generator Interconnection "Applicable Technical Requirements and Standards", the National Electrical Code, Article 690 – Solar Photovoltaic Systems, Article 692 – Fuel Cell Systems and Article 705 – Interconnected Electric Power Production Sources, and the National Electrical Safety Code.

NOTE 2:

See AP Engineering Manual Section 19, S.I. 35 for requirements concerning interconnection facilities with small generator installations of 2 MW nominal, or less at the distribution system voltage level.

3.2 General

Interconnection of electric generators, generation facilities and distributed generation requires many technical and safety aspects to be considered prior to the connection of the equipment. These technical and safety aspects shall be considered for all modes of facility operation including normal, abnormal, maintenance, and contingent operations. Abnormal conditions arise on the AP circuits that require a response from the interconnected generator. This response contributes to the safety of utility maintenance personnel and the general public, as well as the avoidance of damage to connected equipment, including the generator(s). **Personnel and public safety shall not be compromised.** AP operations shall not be disrupted nor shall AP equipment be harmed or damaged with the interconnection or operation of generators. Neighboring customers shall not have their service quality, operations or equipment adversely affected by the connection or operation of generators.

Listed below is the priority for evaluating technical and safety aspects concerning the connection of generators and generation facilities:

1. Safety
   Personnel Protection
   Public Safety

2. Operation / Service Quality
   Regional Electric Reliability
   AP Operation and Equipment
   Neighboring Customer Service Quality, Operation and Equipment

3. Generator Owner/Operator Considerations
   Operation, Equipment and Service Quality
   Ability for the generator or generation facility to offset load or produce revenue

Beyond these safety, operation, reliability, and service quality requirements, generators shall be permitted to operate their facilities as they see fit to offset load or produce revenue. Sale of energy produced shall be contracted with PJM. AP shall have no obligation to purchase excess energy produced except as provided in existing Tariffs such as net metering. Generators shall be permitted to generate inadvertent energy into AP, provided no personal safety, public safety, reliability, operational or service quality issues exist.
In some cases, AP will need to provide a line extension to generating facilities. Generator owner financing/payment for AP supplied facilities may be required as described in Company's line extension policy and filed tariffs.

The specific voltage and connection requirements are dependant on many factors including customer load characteristics and the capacity and configuration of the AP distribution, sub-transmission or transmission system at the point of service. AP system planning will determine these requirements through investigation and study.

AP requires a planning study for each generator or generating facility that meets the requirements of this document. Customer/developer shall provide all technical information necessary to perform the individual analyses. Information from the Developer and/or equipment manufacturer will be needed to model the generating facility in the Power Technologies, Inc. (PTI), PSS/E program. Specific generator model data is required from the customer/developer/manufacturer to meet the input requirements of the program.

Appendices E, F, G and H of the PTI, PSS/E Program Operation Manual: Volume II describes the necessary information. Data and model parameters from other modeling programs such as the ones used for the General Electric PSLF software are not acceptable as input into the PSS/E program. It is the responsibility of the customer/developer to provide the proper data to run the PSS/E study. System Planning cannot be responsible for converting the data and model parameters from other programs to run the PSS/E studies.

All proposed generation facilities interconnecting to AP's transmission system shall be coordinated and reviewed through the Transmission Planning process described in PJM Manual 14. All analyses and studies performed are in accordance with these sections, which provide information on the evaluation of Generation and Transmission Interconnection Service Requests.

The status of all new or modified generation facilities can be located in the PJM Generation Queues on the PJM website.

For units above 10MVA selling power into the PJM market (where PJM is relying on that power, known as capacity reserve) a ring bus arrangement on the delivery side transmission (possibly sub-transmission) system shall be employed (see over 10MW Generation drawing). The purpose of this is to avoid a two contingency condition, which are the loss of the transmission line and the loss of the generation. Referring to the drawing, a Ring Bus arrangement allows for the generation to continue to operate on a loop feed line by allowing breakers A & B to trip for a fault on line 1 and C & B to trip for a fault on line 2 For a generation problem breakers A&C will trip, but the transmission line will still be maintained. This arrangement also allows for maintenance of the breakers without removing any lines or the generating facility from service. An exception to the ring bus requirement may be made in the case of interconnection to a radial circuit. For this type of interconnection, the requirements will be reviewed on a case-by-case basis.

3.3 Safety Requirements

1. The generators or generating facility shall not energize AP circuit when AP's circuit is de-energized for any reason.
2. Upon de-energization of AP circuit by AP, all generation must be automatically disconnected from AP and remain disconnected for a period of not less than two minutes after re-energizing of AP circuit. Automatic disconnection shall occur within a maximum of 2 seconds of de-energizing AP circuit so an unintentional island is not formed. Reference Table 1 in Response to Abnormal Voltage.
3. AP will automatically reclose AP circuits after tripping operation(s) occur. Generation facility shall not affect automatic reclosing of AP circuit.
4. All generators must cease parallel operation upon notification by AP personnel if such operation is determined to be unsafe, is deleterious to the supply of service to other customers, or interferes with system operation, service restoration, or maintenance.
5. The AP distribution, sub-transmission and transmission systems are effectively grounded wye-connected systems. The grounding scheme of the generation interconnection shall not cause overvoltages that exceed the rating of AP connected equipment and shall not disrupt the coordination of the ground fault protection on the AP circuit. Where applicable, generation facilities shall comply with AP Engineering Manual section 13.

6. Generating facility's circuit interrupting devices shall have sufficient interrupting capacity for all faults that might exist at the point of common coupling. Maximum available RMS symmetrical fault current at the interconnection location from AP system is available by AP System Planning personnel.
7. The generating facility shall have a readily accessible, lockable, load-break, visible-break isolation device located at the point of common coupling accessible without notice by AP personnel. The generating facility circuit breaker, isolation switch(es) shall be permitted to fulfill the visible-break requirement provided the open isolation switch(es) are clearly visible from the AP substation fence.
8. The generating facility connecting to the AP transmission, subtransmission or distribution system shall comply with the guidelines for insulation coordination provided in the AP Engineering Manual Section 14.
9. The generating facility's electrical system installation shall comply with current edition of the National Electrical Safety Code or applicable portions of the National Electrical Code at the time of acceptance testing.

3.4 Reliable Operations

1. **System Design, Installation and Maintenance:** The generation owner/developer assumes sole responsibility to design, install and maintain their system to comply with all technical requirements and properly operate on the AP system.
2. **Output Monitoring:** Each generating unit of 250 kVA or more or aggregate of 250 kVA generation or more at a single point of common coupling shall have provisions for monitoring its connection status, real power output, reactive power output, and voltage at the point of interconnection.
3. **Protective System:** The generating facility is responsible to protect against faults or disturbances on the AP system. The generation owner is also responsible for ensuring that the protective system and the associated devices are maintained in reliable operating condition. AP reserves the right to inspect and test all protective equipment and assure its correct operation. Unreliable operation of protective system equipment shall be considered a safety issue.
4. **Responsibility:** The generation owner is solely responsible for the installation, operation and maintenance of any equipment used to interconnect with AP and is liable for any claims, demands, suits, actions and judgments, and all costs expenses, pecuniary or other loss which may arise directly or indirectly from any act or omission of the generation owner, its agents, servants or employees, particularly caused by improper installation, improper operation, or defective equipment.

3.5 Service Quality

1. **General:** All voltage and frequency parameters specified in these requirements shall be met at the point of common coupling (PCC), unless otherwise stated.

2. **Voltage Regulation:** The generating facility shall not actively regulate the voltage at the PCC. The generator(s) shall not cause the AP service voltage at other customers to go outside the requirements of ANSI C84.1-1995 Range A.
3. **Voltage Fluctuation:** The generator(s) shall synchronize and parallel and/or transfer load with AP circuit without causing a voltage fluctuation at the point of common coupling greater than +/- 5% of the prevailing voltage level. Generators and generation equipment shall meet the flicker requirements of *IEEE 1453 – Recommended Practice for Measurement and Limits of Voltage Fluctuations and Associated Light Flicker on AC Power Systems* during normal, paralleling or load transfer operation. Engineering Manual Section 46, SI 02 on Flicker provides further application information on voltage fluctuation and flicker.
4. **Harmonics:** Generators or generating equipment shall not inject non-sinusoidal current nor adversely affect voltage, frequency or wave shape of power supplied at the point of common coupling. Generators and generating equipment shall meet both the voltage and current harmonic limit requirements of *IEEE 519 – Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems.* Engineering Manual Section 46, SI 01 on Harmonics provides further application information on voltage and current harmonics and limits.
5. **Response to Abnormal Voltage:** The protection functions of the interconnection system shall detect the effective (rms) or fundamental frequency value of each phase-to-neutral voltage. When any voltage is in a range given in Table 1 of the IEEE Standard 1547, the generating facility shall cease to energize AP within the clearing time as indicated. Clearing time is the time between the start of the abnormal condition and the generating facility ceasing to energize AP circuit. All generating equipment and control voltage set points and clearing times shall be field adjustable.

   The voltages shall be detected at the PCC. The voltage detection shall be permitted at the point of generation connection when any of the following conditions exist:
   a. The interconnection equipment is pre-certified to pass a non-islanding test for the system to which it is to be connected.
   b. The aggregate generating capacity is less than 50% of the total Local Electric Power System (EPS) minimum annual integrated electrical demand for a 15-minute time period, and export of real or reactive power by the generating facility to AP circuit is not permitted.

6. **Response to Abnormal Frequency:** When the system is in a range given in Table 2 of the IEEE Standard 1547, the generating facility shall cease to energize the AP circuit with the clearing time as indicated. Clearing time is the time between the start of the abnormal condition and the generating facility ceasing to energize the AP circuit. The frequency set points shall be field adjustable. Adjustable under-frequency trip settings shall be coordinated with AP Planning as necessary.

7. **Reconnection to AP Circuit:** After a voltage or frequency disturbance, no generation reconnection shall take place until the voltage at the PCC is within Range B of ANSI C84.1-1995, Table 1 of the IEEE Standard 1547, and frequency range of 59.3 Hz to 60.5 Hz. The interconnection system shall include a delay of not less than two minutes to delay reconnection after the steady state voltage and frequency are restored to the ranges identified above.

3.6 Voltage, Reactive Power & Power Factor Control

AP's transmission system is designed to operate reliably over a wide range of loads, weather conditions, generation dispatch, and contingencies. Operating within the guidelines of a schedule minimizes the effects of contingencies, and also reduces circulating reactive current and transmission losses. PJM defines default generator voltage schedules in its Manual 3 Section 3. For guidelines on voltage and reactive power control refer to PJM Manual 14D Section 7. Generator power factor control guidelines are provided in PJM Manual 14B Section 2.

3.7 Financial Obligation of the Generation Owner or Developer

The generation owner or developer shall reimburse AP fully for the costs to interconnect the generator to the extent allowed by the FERC Order and applicable OATT.
The following are examples (but not a complete list) of the Interconnection Costs that may be the responsibility of the owner/developer:

1. Study analyses and related expenses to determine:
   a. The feasibility to interconnect;
   b. The transmission facilities required for interconnection;
   c. The AP system upgrades required for the interconnection;
   d. Construction and project schedules;
   e. Cost estimates and other related information; and
   f. Maintenance on transmission facilities required for interconnection.
2. Preparation and presentation of study results to appropriate regional oversight committees or planning groups.
3. Land and rights-of-way, including any required licensing or permitting.
4. The owner/developer's Interconnection Facilities.
5. Meter installation, testing, and maintenance, including all parts and other related labor.
6. Meter reading and scheduling.
7. Telemetry installation, testing, and maintenance, including all parts and other related labor.
8. Operating expenses, including communication circuits.
9. AP protective device installation, testing, equipment cost, and related labor.
10. Owner/developer's protective device and interlock review of design, inspection, and test witnessing.

11. Programming costs to incorporate generation data into AP's Energy Management System (EMS).

Any cost responsibilities detailed in the facility specific generation interconnection agreement between AP and the owner/developer or producer that conflict with this section will take precedence over these Guidelines.

3.8 Construction, Ownership, Operation

AP shall construct, own and operate all transmission facilities constructed for the interconnection of a owner/developer's generation to the AP transmission system that are determined to be part of the transmission system Network Facilities, as defined in Final Rules. AP shall own all AP Interconnection Facilities and System Upgrades that AP determines that it is appropriate to own. This includes, but is not limited to, revenue meters, relaying, control systems, breakers, switches, bus work, and transmission lines. AP may, at its option, contract with the generating facility owner/developer/operator (Producer) or a third party for construction of any or all of these facilities. The PJM OATT Section 83.2.3 outlines the Producer's "Option to Build" the AP facilities. The Producer will normally construct and own, at a minimum all Producer Interconnection Facilities, unless the parties agree in the generation interconnection agreement that AP will construct these facilities.

If the Producer plans to contract with AP to operate or maintain the Producer's Interconnection Facilities, specific design considerations are required that go beyond the minimum technical requirements described in this document. To ensure the safety of AP personnel and to minimize the opportunity for human error, the Producer is required to use certain AP design standards or certain approved equipment manufacturers which may include but are not limited to: control panel layouts, ground grid designs, personal ground attachments placed in approved locations, electrical clearances, and lighting of the electrical equipment for night operating. The Producer will pay for the training of AP personnel, if required, to operate and maintain this Producer-owned equipment. The Producer will be required to maintain their own stock of any necessary spare/emergency parts and make them available to AP maintenance personnel or contract employees.

All equipment, whether provided by AP or the Producer, whose operation or failure can result in the separation of the AP System, must conform to the technical specifications of this Policy and Guidelines.

3.9 Protective Relaying and Control Systems

1. **General:** Protective relaying and control systems installed in the Transmission Owner Interconnection Facility and the generation interconnection facilities within the scope of this document shall adhere to the requirements of PRC-001, PRC-004, PRC-005, and all applicable AP standards. The specific requirements outlined in this section are to be

considered minimum protection requirements. In recognition of the variables that can affect protection system requirements (variations in available fault current, system stability requirements, system configuration, voltage level, etc.) additional protection system requirements shall be assessed and may be required on a case-by-case basis. When the final protection requirements are known, AP will provide the Interconnection Customer with documentation from a previously completed similar substation including protection one-lines, detailed schematics, detailed control panel layout and wiring, equipment wiring, and control building layout drawings. This documentation is to be used by the Interconnection Customer as a model for engineering the specific Transmission Owner Interconnection Facility. AP will provide the manufacturer, type, and model number of all protective relays that are to be used. All protective relays are to be microprocessor based and meeting the requirements of ANSI/IEEE Standard C37.90. Any deviation from the supplied documentation or relay types must be pre-approved in writing by the AP Metering & System Protection Engineering department.

AP will develop and supply all of the protective relay settings necessary for the Transmission Owner Interconnection Facility and will review the Customer Facility relay settings to check for proper coordination and adherence to applicable industry standards.

Remote monitoring and control of the Transmission Owner Interconnecting Facility is required through the AP Supervisory Control and Data Acquisition System (SCADA). The specific manufacturer, type, and model number of the Remote Terminal Unit to be installed will be supplied to the Interconnection Customer.

Where required by ECAR Document 14, a Digital Fault Recorder (DFR) is to be installed. The specific manufacturer, type and model number of the DFR will be supplied to the Interconnection Customer.

A fiber-optic communications circuit between the Transmission Owner Interconnection Facility and the Customer Facility (OPGW or ADSS cable) is required for transmission lines > 115kV for protective relay functions (line differential and transfer-trip), control and monitoring.

AP reserves the right to have an on-site inspector observe the installation, testing, and function checking of the protective relay and control systems. AP Control Technicians and Substation Electricians will perform the final energization and commissioning of the substation.

2. **Subtransmission Interconnection with Generation Between 2 – 10 MW:** Figure 1 shows the "Applicable Technical Requirements and Standards" that apply to all new large generator interconnections between 2 – 10 MW. The specific requirements are described below and shown in the figure. These

show the minimum requirements and may change for a specific application or specific location on the electrical system.

a. The point of common coupling (PCC) is at subtransmission voltage.
b. The generator shall be a three-phase generator.
c. The generator step up transformer shall be grounded wye on the utility (or primary) side.
d. Interconnection relaying shall operate the Circuit Breaker (52) on the generator side as shown in the figures and shall consist of the following:
    i. 25 Synchronism Check Relay
    ii. 27 Under Voltage Relay
    iii. 50/51 Facility Overcurrent Protection
    iv. 50/51N Neutral Overcurrent Protection (Ground Fault)
    v. 59 Over Voltage (phase to ground) Relay
    vi. 59G Over Voltage (Zero-sequence) Relay
    vii. 67/67N Directional Overcurrent
    viii. 81 Over and 81 Under Frequency Relay
    ix. 87 Differential
e. AP shall provide its own circuit breaker(s) and associated equipment located on the utility side of the drawing. This drawing may not show all of the protective equipment and relaying owned and operated by AP. The AP circuit breaker installation shall be accessible by AP personnel to operate, without notice, during system emergencies and outage restoration activities.
f. The generating facility owner/developer shall provide its own high voltage circuit breaker with visible, hook stick operated, isolation switches. The generating facility circuit breaker installation shall be accessible by AP personnel to operate, without notice, during system emergencies and outage restoration activities. Generating facility owner/developer may be required to provide an indication (auxiliary or pallet switch) to AP to indicate the position (open or closed) of the generator circuit breaker. The high voltage, power circuit breaker and disconnect switch shall meet the requirements of Part g. – Circuit Breaker Specifications.
g. Circuit Breaker Specifications:
    i. Circuit breaker shall be suitable for the application such as available fault current, BIL, load current, and etc. as determined by ANSI C37 standards.
    ii. Circuit breaker tripping circuit (125 V DC) shall be wired with utility grade interconnecting relaying as described in Section d. above.
    iii. This breaker shall also have overcurrent relaying suitable for the particular application.
        1. Overcurrent relaying shall consist of the following and permit operation in a manner designed for the generation facility:
            a. 50/51 instantaneous overcurrent / time overcurrent relay (phase current - 3)

b. 50/51G instantaneous overcurrent / time overcurrent relay (ground fault)

iv. Potential transformers (3) shall be on the line side of the breaker.

v. The breaker shall have local tripping capability such as a pushbutton or other means clearly identified for AP personnel.

vi. The disconnect switch(es) shall be used to provide a visible opening in the high voltage circuit. The disconnect switch(es) shall be permitted to be non-load break, hook stick operated.

h. All metering shall be required as documented in the interconnection study and meet PJM requirements (PJM Manual 14D Section 4). All metering CTs and PTs shall be revenue metering grade.

i. Retail Meter shall be metering package specified and installed by AP as appropriate for the load and particular rate schedule.

j. Generating facility owner/developer shall also provide all necessary metering, telemetry and control information as documented in the results of the interconnection study and PJM requirements (PJM Manual 14D Section 4) to reliably operate the power system and dispatch the generator equipment.

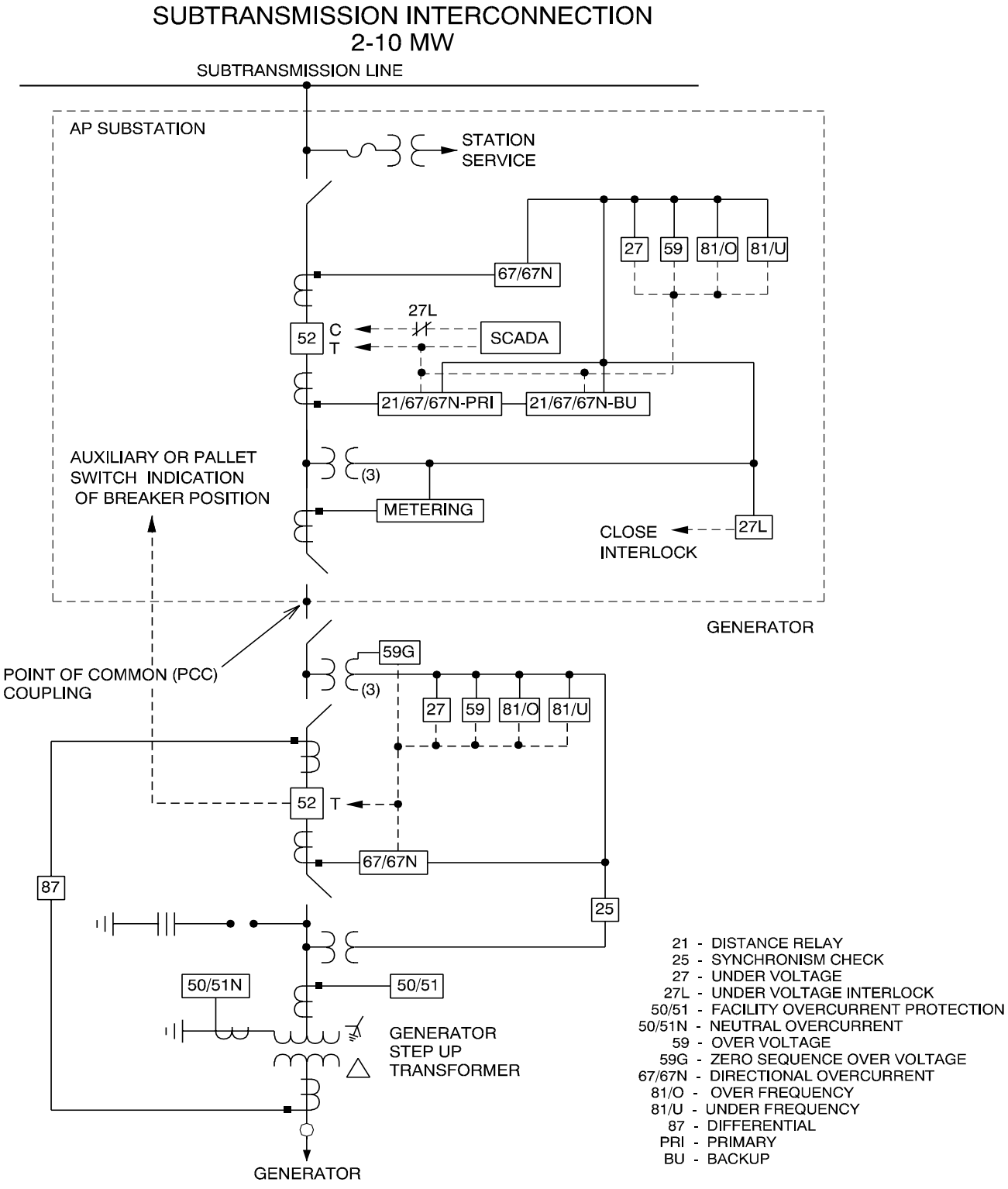

Figure 2: Subtransmission Interconnection 2-10 MW

3. **Subtransmission Interconnection with Generation Greater than 10 MW:** Figure 2 shows the "Applicable Technical Requirements and Standards" that apply to all new large generator interconnections greater than 10 MW. The specific requirements are described below and shown in the figure. These show the minimum requirements and may change for a specific application or specific location on the electrical system.
   a. The point of common coupling (PCC) is at subtransmission voltage.
   b. The generator shall be a three-phase generator.
   c. The generator step up transformer shall be grounded wye on the utility (or primary) side.
   d. Interconnection relaying shall operate the Circuit Breaker (52) on the generator side as shown in the figures and shall consist of the following:
      i. 25 Synchronism Check Relay
      ii. 27 Under Voltage Relay
      iii. 50/51 Facility Overcurrent Protection
      iv. 50/51N Neutral Overcurrent Protection (Ground Fault)
      v. 59 Over Voltage (phase to ground) Relay
      vi. 59G Over Voltage (Zero-sequence) Relay
      vii. 67/67N Directional Overcurrent
      viii. 81 Over and 81 Under Frequency Relay
      ix. 87 Differential
   e. AP shall provide its own circuit breaker(s) and associated equipment located on the utility side of the drawing. This drawing may not show all of the protective equipment and relaying owned and operated by AP. The AP circuit breaker installation shall be accessible by AP personnel to operate, without notice, during system emergencies and outage restoration activities.
   f. The generating facility owner/developer shall provide its own high voltage circuit breaker with visible, hook stick operated, isolation switches. The generating facility circuit breaker installation shall be accessible by AP personnel to operate, without notice, during system emergencies and outage restoration activities. Generating facility owner/developer may be required to provide an indication (auxiliary or pallet switch) to AP to indicate the position (open or closed) of the generator circuit breaker. The high voltage, power circuit breaker and disconnect switch shall meet the requirements of Part g. – Circuit Breaker Specifications.
   g. Circuit Breaker Specifications:
      i. Circuit breaker shall be suitable for the application such as available fault current, BIL, load current, and etc. as determined by ANSI C37 standards.
      ii. Circuit breaker tripping circuit (125 V. DC) shall be wired with utility grade interconnecting relaying as described in Section d. above.
      iii. This breaker shall also have overcurrent relaying suitable for the particular application.

1. Overcurrent relaying shall consist of the following and permit operation in a manner designed for the generation facility:
    a. 50/51 instantaneous overcurrent / time overcurrent relay (phase current - 3)
    b. 50/51G instantaneous overcurrent / time overcurrent relay (ground fault)

iv. Potential transformers (3) shall be on the line side of the breaker.

v. The breaker shall have local tripping capability such as a pushbutton or other means clearly identified for AP personnel.

vi. The disconnect switch(es) shall be used to provide a visible opening in the high voltage circuit. The disconnect switch(es) shall be permitted to be non-load break, hook stick operated.

h. All metering shall be required as documented in the interconnection study and meet PJM requirements (PJM Manual 14D Section 4). All metering CTs and PTs shall be revenue metering grade.

i. Retail Meter shall be metering package specified and installed by AP as appropriate for the load and particular rate schedule.

j. Generating facility owner/developer shall also provide all necessary metering, telemetry and control information as documented in the results of the interconnection study and PJM requirements (PJM Manual 14D Section 4) to reliably operate the power system and dispatch the generator equipment.

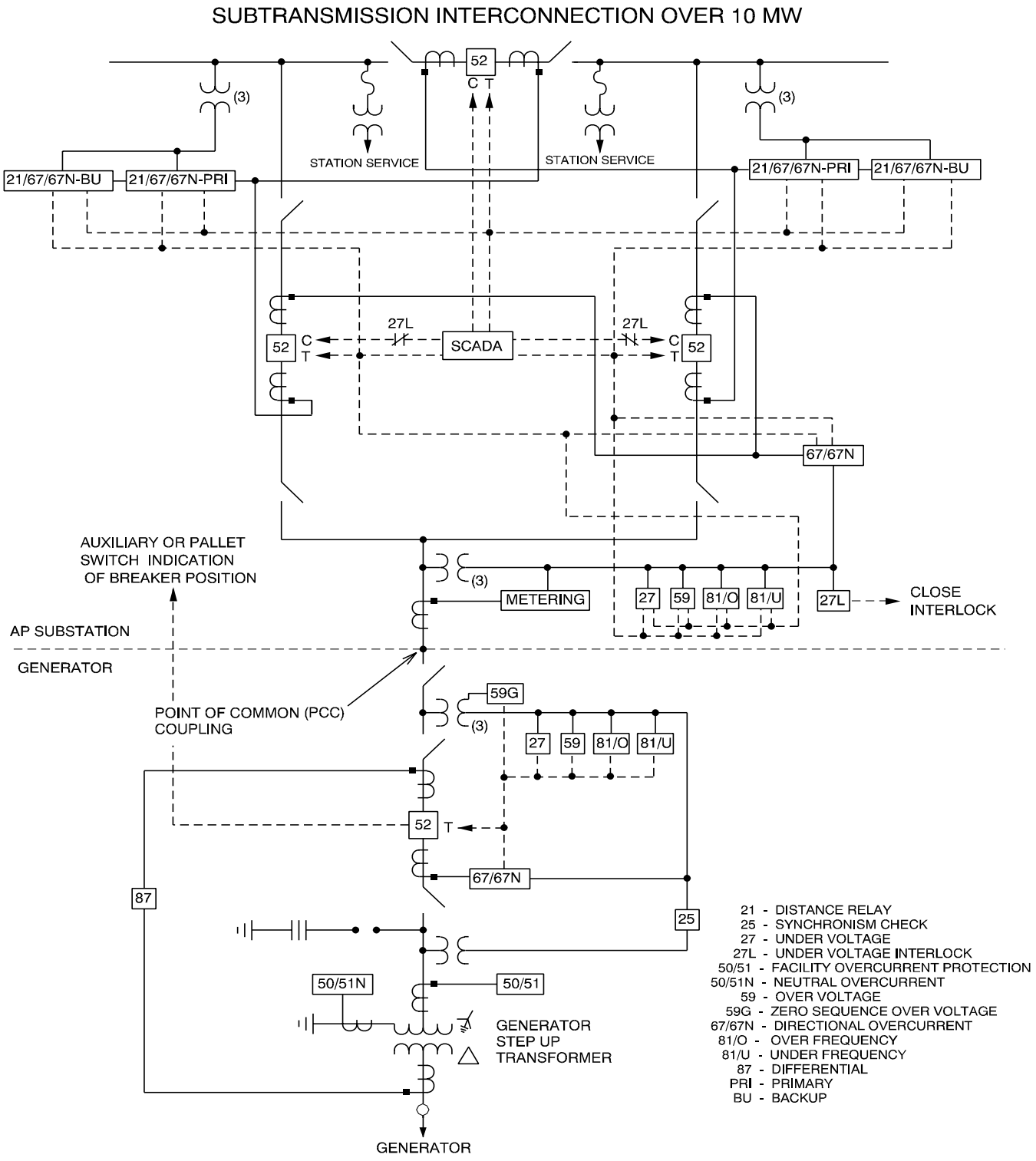

Figure 3: Subtransmission Interconnection over 10 MW

4. **Transmission Interconnection at Voltages of 115 kV and 138 kV:**
   Figure 3 shows the "Applicable Technical Requirements and Standards" that apply to all new large generator interconnections to the transmission system at voltages of 115 kV and 138 kV. The specific requirements are described below and shown in the figure. These show the minimum requirements and may change for a specific application or specific location on the electrical system.
   a. The point of common coupling (PCC) is at transmission voltage.
   b. The generator shall be a three-phase generator.
   c. The generator step up transformer shall be grounded wye on the utility (or primary) side.
   d. Interconnection relaying shall operate the Circuit Breaker (52) on the generator side as shown in the figures and shall consist of the following:
      i. 25 Synchronism Check Relay
      ii. 27 Under Voltage Relay
      iii. 50/51 Facility Overcurrent Protection
      iv. 50/51N Neutral Overcurrent Protection (Ground Fault)
      v. 50 BF Breaker Failure
      vi. 59 Over Voltage (phase to ground) Relay
      vii. 59G Over Voltage (Zero-sequence) Relay
      viii. 67/67N Directional Overcurrent
      ix. 68 Blocking Relay
      x. 81 Over and 81 Under Frequency Relay
      xi. 87 Differential
      xii. 87L Line Differential
   e. AP shall provide its own circuit breaker(s) and associated equipment located on the utility side of the drawing. This drawing may not show all of the protective equipment and relaying owned and operated by AP. The AP circuit breaker installation shall be accessible by AP personnel to operate, without notice, during system emergencies and outage restoration activities.
   f. The generating facility owner/developer shall provide its own high voltage circuit breaker with visible, hook stick operated, isolation switches. The generating facility circuit breaker installation shall be accessible by AP personnel to operate, without notice, during system emergencies and outage restoration activities. Generating facility owner/developer may be required to provide an indication (through fiber optic circuit) to AP to indicate the position (open or closed) of the generator circuit breaker. The high voltage, power circuit breaker and disconnect switch shall meet the requirements of Part g. – Circuit Breaker Specifications.
   g. Circuit Breaker Specifications:
      i. Circuit breaker shall be suitable for the application such as available fault current, BIL, load current, and etc. as determined by ANSI C37 standards.

ii. Circuit breaker tripping circuit (125 V. DC) shall be wired with utility grade interconnecting relaying as described in Section d. above.
iii. This breaker shall also have overcurrent relaying suitable for the particular application.
    1. Overcurrent relaying shall consist of the following and permit operation in a manner designed for the generation facility:
        a. 50/51 instantaneous overcurrent / time overcurrent relay (phase current - 3)
        b. 50/51G instantaneous overcurrent / time overcurrent relay (ground fault)
iv. Potential transformers (3) shall be on the line side of the breaker.
v. The breaker shall have local tripping capability such as a pushbutton or other means clearly identified for AP personnel.
vi. The disconnect switch(es) shall be used to provide a visible opening in the high voltage circuit. The disconnect switch(es) shall be permitted to be non-load break, hook stick operated.

h. All metering shall be required as documented in the interconnection study and meet PJM requirements (PJM Manual 14D Section 4). All metering CTs and PTs shall be revenue metering grade.
i. Retail Meter shall be metering package specified and installed by AP as appropriate for the load and particular rate schedule.
j. Generating facility owner/developer shall also provide all necessary metering, telemetry and control information as documented in the results of the interconnection study and PJM requirements (PJM Manual 14D Section 4) to reliably operate the power system and dispatch the generator equipment.
k. Station Service transformers to power loads at the transmission interconnection substation are available as an option as shown in Figure 3. However, a separate connection from a nearby 34.5 kV or 12.5 kV distribution line is the preferred option to provide station service.

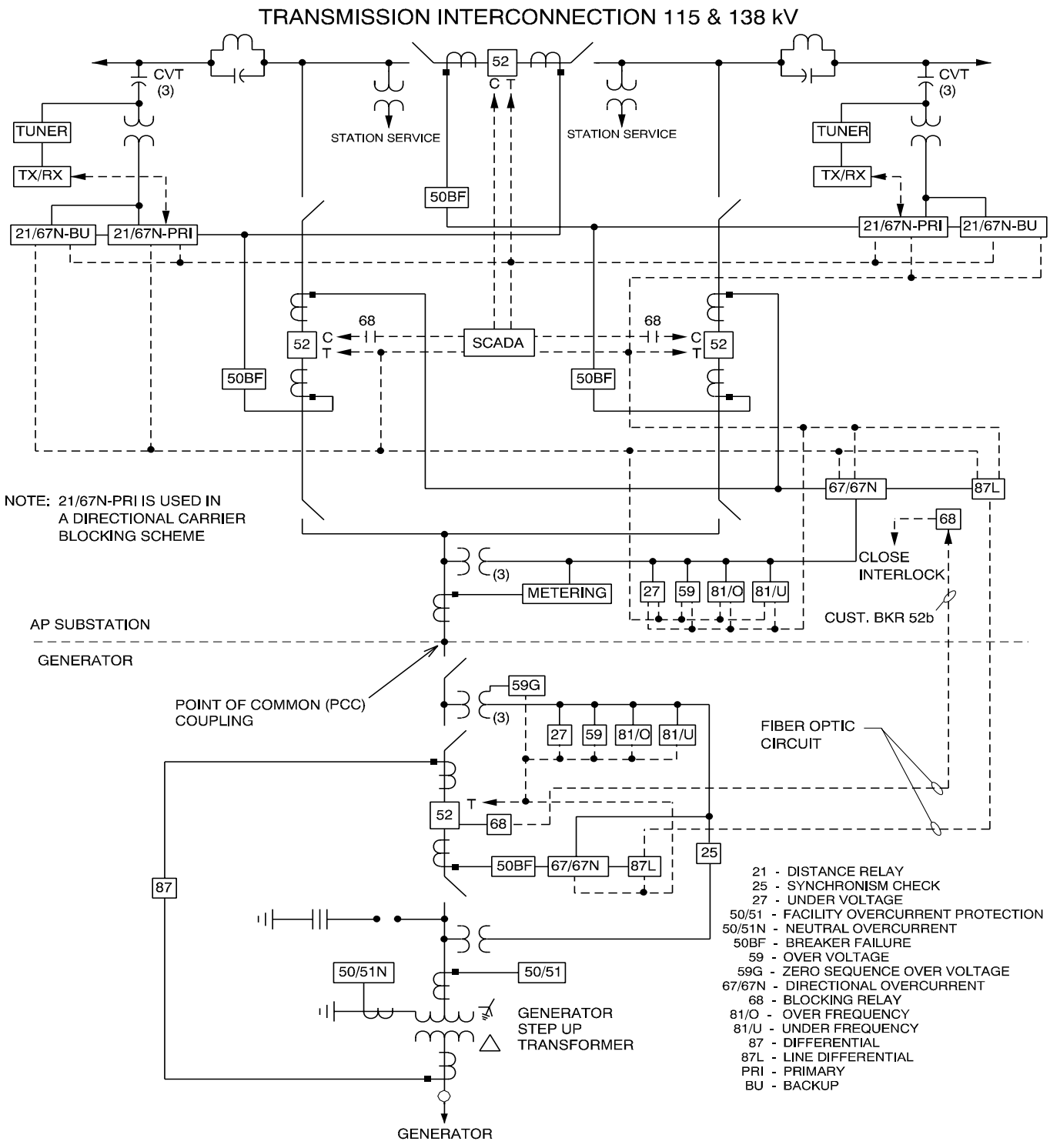

Figure 4: Transmission Interconnection 115 & 138 kV

5. **Transmission Interconnection at Voltages of 230 kV, 345 kV and 500 kV:** Figure 4 shows the "Applicable Technical Requirements and Standards" that apply to all new large generator interconnections at voltages 230 kV, 345 kV and 500 kV. The specific requirements are described below and shown in the figure. These show the minimum requirements and may change for a specific application or specific location on the electrical system.
   a. The point of common coupling (PCC) is at transmission voltage.
   b. The generator shall be a three-phase generator.
   c. The generator step up transformer shall be grounded wye on the utility (or primary) side.
   d. Interconnection relaying shall operate the Circuit Breaker (52) on the generator side as shown in the figures and shall consist of the following:
      i. 25 Synchronism Check Relay
      ii. 27 Under Voltage Relay
      iii. 50/51 Facility Overcurrent Protection
      iv. 50/51N Neutral Overcurrent Protection (Ground Fault)
      v. 50 BF Breaker Failure
      vi. 59 Over Voltage (phase to ground) Relay
      vii. 59G Over Voltage (Zero-sequence) Relay
      viii. 67/67N Directional Overcurrent
      ix. 68 Blocking Relay
      x. 81 Over and 81 Under Frequency Relay
      xi. 87 Differential
      xii. 87L Line Differential
   e. AP shall provide its own circuit breaker(s) and associated equipment located on the utility side of the drawing. This drawing may not show all of the protective equipment and relaying owned and operated by AP. The AP circuit breaker installation shall be accessible by AP personnel to operate, without notice, during system emergencies and outage restoration activities.
   f. The generating facility owner/developer shall provide its own high voltage circuit breaker with visible, hook stick operated, isolation switches. The generating facility circuit breaker installation shall be accessible by AP personnel to operate, without notice, during system emergencies and outage restoration activities. Generating facility owner/developer may be required to provide an indication (through fiber optic circuit) to AP to indicate the position (open or closed) of the generator circuit breaker. The high voltage, power circuit breaker and disconnect switch shall meet the requirements of Part g. – Circuit Breaker Specifications.
   g. Circuit Breaker Specifications:
      i. Circuit breaker shall be suitable for the application such as available fault current, BIL, load current, and etc. as determined by ANSI C37 standards.

ii. Circuit breaker tripping circuit (125 V. DC) shall be wired with utility grade interconnecting relaying as described in Section d. above.
iii. This breaker shall also have overcurrent relaying suitable for the particular application.
    1. Overcurrent relaying shall consist of the following and permit operation in a manner designed for the generation facility:
        a. 50/51 instantaneous overcurrent / time overcurrent relay (phase current - 3)
        b. 50/51G instantaneous overcurrent / time overcurrent relay (ground fault)
iv. Potential transformers (3) shall be on the line side of the breaker.
v. The breaker shall have local tripping capability such as a pushbutton or other means clearly identified for AP personnel.
vi. The disconnect switch(es) shall be used to provide a visible opening in the high voltage circuit. The disconnect switch(es) shall be permitted to be non-load break, hook stick operated.

h. All metering shall be required as documented in the interconnection study and meet PJM requirements (PJM Manual 14D Section 4). All metering CTs and PTs shall be revenue metering grade.
i. Retail Meter shall be metering package specified and installed by AP as appropriate for the load and particular rate schedule.
j. Generating facility owner/developer shall also provide all necessary metering, telemetry and control information as documented in the results of the interconnection study and PJM requirements (PJM Manual 14D Section 4) to reliably operate the power system and dispatch the generator equipment.

Station Service transformers to power loads at the transmission interconnection substation are available as an option for 230 kV interconnections as shown in Figure 4. This equipment is not available at 345 and 500 kV system voltages. A separate connection from a nearby 34.5 kV or 12.5 kV distribution line is the preferred option for 230 kV and required for 345 kV and 500 kV systems to provide station service for these interconnections.

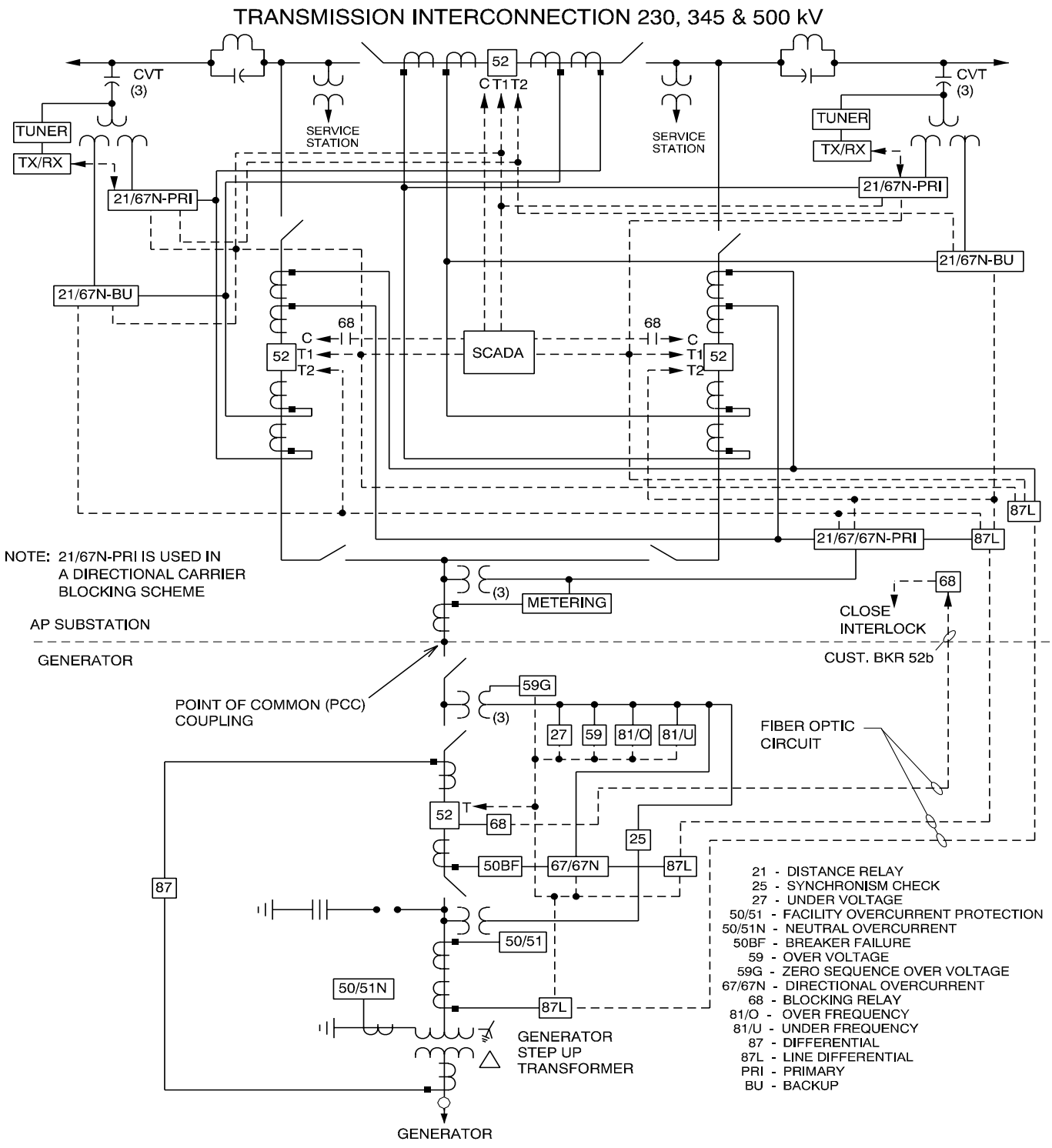

Figure 5: Transmission Interconnection 230, 345 & 500 kV

3.10 Acceptance Testing

1. The purpose of acceptance testing is to assure that the generator will operate successfully during all modes of operation including normal, abnormal, maintenance, emergency and contingent operations.
2. AP personnel shall witness or perform acceptance testing prior to the generator or generating facility being permitted to operate on the AP system.
3. Each generator shall pass the AP acceptance test when the owner/developer of the generator demonstrates that their equipment conforms to the requirements of this document and passes the requirements of Section 5. Interconnection Test Specifications and Requirements of IEEE 1547.
4. IEEE 1547.1 Standard for Conformance Test Procedures for Equipment Interconnecting Distributed Resources with Electric Power Systems contains the detailed requirements of acceptance testing.
5. Conformance tests shall be performed on all generation meeting the intent of this manual release. A qualified third party testing organization at the expense of the owner/developer shall perform these tests.
6. Each interconnected facility shall perform routine inspection and testing of its facilities and equipment as may be necessary to ensure the continued interconnection of its facility with the transmission system in a safe and reliable manner. On providing advance written notice, the Company may request reasonable additional testing of the interconnected facility for good cause.

3.11 Synchronizing Facilities

Procedures for synchronization and disconnection of generation facilities are provided in PJM Manual 14D Section 7. The OATT also requires that the following documentation be provided by the Interconnection Customer prior to synchronization of the Customer Facility with the transmission system:

- As-built drawings
- Pre-operation test reports
- Instruction manuals

3.12 Maintenance Coordination

The connected facility shall have an AP approved acceptance test and maintain all devices and control schemes for the protection of the AP Transmission system. The interconnected facility shall provide the Company access to areas under its control as reasonably necessary to permit the Company to perform its obligations such as operation and maintenance. All safety rules applicable to the area to which access is obtained shall be followed. When any 100 kV and above facility is or will be out of service, PJM must be notified. The connected facility shall provide an outage request to PJM in accordance with the procedures documented in the PJM Manual 14D Section 7.

3.13 Normal & Emergency Operating Conditions

The interconnected facility shall install and maintain satisfactory operating communications with the Transmission Provider's system dispatcher or its other designated representative and with the interconnected Transmission Owner. The interconnected facility owner shall:

- Provide standard voice line, dedicated voice line and facsimile communications at its facility control room through the use of the public telephone system.
- Provide and maintain backup communication links with both the Transmission Provider and interconnected Transmission Owner for use during abnormal conditions as specified by the Transmission Provider and interconnected Transmission Owner respectively.
- Provide the dedicated data circuit(s) necessary to provide Interconnection Customer data to the Transmission Provider and interconnected Transmission Owner as necessary to conform with applicable AP Standards.

Communications and procedures to be followed during normal and emergency operating conditions are provided in PJM Manual 14D Sections 3 and 7.

3.14 Voltage Level and MW and MVAR Capacity

All generators applying for interconnection to the AP system shall complete the form on the Feasibility Studies Data page at http://www.pjm.com/planning/feas-study-data.html. The purpose of this form is to submit data necessary for proper modeling of Generation Projects in the Feasibility Study phase. Data requested includes Fuel Type, Max Gross MW Output, Max Net MW Output, Generator Terminal Voltage, Transformer High side and low side voltage, Generator MVA, Generator Nominal Power Factor, etc.

3.15 AP Transmission Standards

Generation interconnection projects connecting to the AP system can download AP transmission standards from the PJM Transmission Owner Standards webpage at www.pjm.com/planning/trans-standard.html. A password will be issued by PJM upon request after study agreements have been executed by both parties.

4. TRANSMISSION FACILITIES CONNECTION REQUIREMENTS

The following transmission facility interconnection requirements for interconnecting with the AP transmission system can also be downloaded from the password protected PJM Transmission Owner Standards webpage at www.pjm.com/planning/trans-standard.html. PJM will issue a password only after study agreements have been executed by both parties.

4.1 Purpose

The purpose of this document is to define the policy and provide engineering guidelines for the AP operating companies (Monongahela Power Company, The Potomac Edison Company, and West Penn Power Company) and the Allegheny Energy Transmission subsidiaries hereinafter referred to collectively as "AP" or "the Company" concerning transmission interconnection facilities.

NOTE 1
Several governmental and industry standard organizations publish documents that deal with certain portions or aspects of the interconnection. This document does not conflict nor is it intended to conflict with these governmental or industry standards. However, this document may not contain all of the requirements in a standard that are necessary for interconnection. Rather this document attempts to communicate the basic technical requirements necessary for a safe and unobjectionable interconnection installation. It is the responsibility of the facility owner to understand and comply with all applicable industry Codes and Standards as well as governmental regulations.

This document also does not communicate the requirements of a facility specific Operation and Maintenance agreement with AP and PJM.

4.2 General

Listed below is the priority for evaluating technical and safety aspects concerning the connection of transmission facilities:

1. Safety
   - Personnel Protection
   - Public Safety

2. Operation / Service Quality
   - Regional Electric Reliability
   - AP Operation and Equipment
   - Neighboring Customer Service Quality, Operation and Equipment

Connection requirements are dependent on several factors including capacity and configuration of the transmission system at the point of interconnection. AP Transmission Planning will determine requirements by applying all applicable AP, PJM, and NERC standards.

AP requires a planning study for all facility additions 100 kV and above. Transmission facility owners requesting interconnection to the AP system shall provide all technical information necessary to perform the individual analyses. Information provided shall be in a format compatible with the Power Technologies, Inc. (PTI), PSS/E program. In addition to AP transmission studies, all proposed transmission facilities interconnecting to the AP

transmission system shall be coordinated and reviewed through the Transmission Planning process described in PJM Manual 14.

All transmission line interconnections are studied in accordance with the PJM Regional Transmission Expansion Planning (RTEP) Process. Merchant Transmission projects are evaluated according to the PJM process summarized below. PJM Manual 14 describes the process in detail.

- A Feasibility Study is performed to provide a high level approximation of the transmission-related costs to accommodate the interconnection and alternative plans to meet established reliability criteria. The PJM thermal criteria are 100% of the continuous rating for base case and 100% of the emergency rating for contingencies. Voltage screening is performed using criteria outlined in PJM Manual 3 Section 3.
- System Impact Studies are required to provide a detailed evaluation of the requested interconnection. Stability studies are documented in the System Impact study.
- After acceptable completion of the System Impact Study, a Facilities Study is required to determine the detailed facility interconnection requirements. The Facilities Study will address network upgrades, cost estimates and construction scheduling estimates in detail.

The status of all new merchant transmission projects can be located in the PJM Merchant Queues on the PJM website.

For all transmission lines connecting to the AP transmission system, the point of interconnection shall be located at either an existing or new AP station. Exceptions may be made on a case-by-case basis. At a minimum, all new stations shall be a ring bus arrangement. Other arrangements may be considered where appropriate.

4.3 Safety Requirements

1. The transmission facility shall not energize AP circuit when AP's circuit is de-energized for any reason.
2. The AP distribution, sub-transmission and transmission systems are effectively grounded wye-connected systems. The grounding scheme of the transmission interconnection facility shall not cause overvoltages that exceed the rating of AP connected equipment and shall not disrupt the coordination of the ground fault protection on the AP circuit. Where applicable, transmission facilities shall comply with AP Engineering Manual section 13.
3. The transmission facility's circuit interrupting devices shall have sufficient interrupting capacity for all faults that might exist at the point of common coupling. Maximum available RMS symmetrical fault current at the interconnection location from AP system is available from AP System Planning personnel.

4. The transmission facility shall have a readily accessible, lockable, load-break, visible-break isolation device located at the point of common coupling accessible without notice by AP personnel.
5. The transmission facility connecting to the AP transmission, subtransmission or distribution system shall comply with the guidelines for insulation coordination provided in the AP Engineering Manual Section 14.
6. The transmission facility's electrical system installation shall comply with current edition of the National Electrical Safety Code or applicable portions of the National Electrical Code at the time of acceptance testing.

4.4 Reliable Operations

1. **System Design, Installation and Maintenance:** The transmission facility owner/developer assumes sole responsibility to design, install and maintain their system to comply with all technical requirements and properly operate on the AP system.
2. **Protective System:** The transmission facility owner is also responsible for ensuring that the protective system and the associated devices are maintained in reliable operating condition. AP reserves the right to inspect and test all protective equipment and assure its correct operation. Unreliable operation of protective system equipment shall be considered a safety issue.
3. **Responsibility:** The transmission facility owner is solely responsible for the installation, operation and maintenance of any equipment used to interconnect with AP and is liable for any claims, demands, suits, actions and judgments, and all costs expenses, pecuniary or other loss which may arise directly or indirectly from any act or omission of the transmission facility owner, its agents, servants or employees, particularly cause by improper installation, improper operation, or defective equipment.

4.5 Service Quality

1. **General:** All voltage and frequency parameters specified in these requirements shall be met at the point of common coupling (PCC), unless otherwise stated.
2. **Voltage Fluctuation:** The transmission facility shall connect and disconnect from the AP system without causing a voltage fluctuation at the PCC greater than +/- 5% of the prevailing voltage level.
3. **Harmonics:** Transmission owner equipment shall not inject non-sinusoidal current nor adversely affect voltage, frequency or wave shape of power supplied at the PCC. AP Engineering Manual Section 46, SI 01 on harmonics provides additional application information on voltage and current harmonics and limits.
4. **Response to Abnormal Conditions**: AP shall review all protective relay settings and synchronizing for transmission interconnections.

4.6 Voltage, Reactive Power & Power Factor Control

AP's transmission system is designed to operate reliably over a wide range of loads, weather conditions, generation dispatch, and contingencies. The AP transmission system operates with normal operating voltages of 115 kV, 138 kV, 230 kV, 345 kV, 500 kV, and 765 kV. Voltages at all buses with in the AP system shall remain within the limits listed below.

Voltage	Hi (p.u.)	Low (p.u.)
765 kV	1.10	0.97
500 kV	1.10	0.97
345 kV	1.05	0.90
230 kV	1.05	0.90
138 kV	1.05	0.90
115 kV	1.05	0.90

Table 1: Voltage Levels

The power factor at the point of interconnection shall comply with the requirements outlined in PJM Manual 14 E Section 3.

4.7 Financial Obligation Of The Transmission Owner/Developer

The transmission owner/developer shall reimburse AP fully for the costs to interconnect the transmission facility.

The following are examples (but not a complete list) of the Interconnection Costs that may be the responsibility of the owner/developer:

1. Study analyses and related expenses to determine:
   a. The feasibility of the interconnection;
   b. The transmission facilities required for interconnection;
   c. The AP system upgrades required for the interconnection;
   d. Construction and project schedules;
   e. Cost estimates and other related information; and
   f. Maintenance on transmission facilities required for interconnection.
2. Preparation and presentation of study results to appropriate regional oversight committees or planning groups.
3. Land and rights-of-way, including any required licensing or permitting.
4. The owner / developer's Interconnection Facilities.
5. Meter installation, testing, and maintenance, including all parts and other related labor.
6. Meter reading and scheduling.
7. Telemetry installation, testing, and maintenance, including all parts and other related labor.
8. Operating expenses, including communication circuits.
9. AP protective device installation, testing, equipment cost, and related labor.

10. Owner/developer's protective device and interlock review of design, inspection, and test witnessing.
11. Programming costs to incorporate generation data into AP's Energy Management System (EMS).

Any cost responsibilities detailed in the facility specific transmission interconnection agreement between AP and the owner/developer or producer that conflict with this section will take precedence over these Guidelines.

4.8 Construction, Ownership, Operation

AP shall own all appropriate Interconnection Facilities and System Upgrades as determined by AP. This includes, but is not limited to, revenue meters, relaying, control systems, breakers, switches, and bus work. AP may, at its option, contract with the transmission facility owner/developer/operator or a third party for construction of any or all of these facilities.

If the transmission owner plans to contract AP to maintain facilities, specific design considerations are required that go beyond the minimum technical requirements described in this document. To ensure the safety of AP personnel and to minimize the opportunity for human error, the facility owner is required to use certain AP design standards or certain approved equipment manufacturers which may include but are not limited to: control panel layouts, personal ground attachments placed in approved locations, and electrical clearances. The facility owner will pay for the training of AP personnel, if required, to operate and maintain this equipment.

4.9 Protective Relaying and Control Systems

Protective relaying and control systems shall adhere to the requirements of PRC-001, PRC-004, PRC-005, and all applicable AP standards. The specific requirements outlined in this section are to be considered minimum protection requirements. In recognition of the variables that can affect protection system requirements (variations in available fault current, system stability requirements, system configuration, voltage level, etc.) additional system protection requirements shall be assessed and may be required on a case-by-case basis. When the final protection requirements are known, AP will provide the Interconnection Customer with AP protection one-lines, detailed schematics, detailed control panel layout and wiring, equipment wiring, and control building layout drawings. This documentation is to be used by the Interconnection Customer where applicable as a model for engineering the specific interconnection facility. AP will provide the manufacturer, type, and model number of all protective relays that are to be used. All protective relays are to be microprocessor based and meet the requirements of ANSI/IEEE Standard C37.90. Any deviation from the supplied documentation or relay types must be pre-approved in writing by the AP Metering & System Protection Engineering department.

AP will develop and supply all protective relay settings and review the customer relay settings to check for proper coordination. This process is necessary to insure the protective relaying adheres to all applicable industry standards.

Remote monitoring and control of the interconnecting facility is required through the AP supervisory control and data acquisition system (SCADA). The specific manufacturer, type, and model number of the remote terminal unit (RTU) to be installed will be supplied to the interconnection customer.

Where required by ECAR Document 14, a digital fault recorder (DFR) will be installed. The specific manufacturer, type and model number of the DFR will be supplied to the interconnection customer.

A fiber-optic communications circuit (OPGW or ADSS cable) is required for all new transmission lines > 100 kV on the AP system for protective relay functions (line differential and transfer-trip), control and monitoring.

AP reserves the right to have an on-site inspector observe the installation, testing, and function checking of the protective relay and control systems. AP Control Technicians and Substation Electricians will perform the final energization and commissioning of new facilities.

Listed below are the minimum requirements that apply to a transmission facility interconnection and may vary for a specific application or specific location on the electrical system.

a. The point of common coupling (PCC) is at transmission voltage.
b. Interconnection relaying shall operate the Circuit Breaker (52) on the transmission facility side and shall consist of the following:
    i. 25 Synchronism Check Relay
    ii. 27 Under Voltage Relay
    iii. 50/51 Facility Overcurrent Protection
    iv. 50/51N Neutral Overcurrent Protection (Ground Fault)
    v. 50 BF Breaker Failure
    vi. 59 Over Voltage (phase to ground) Relay
    vii. 59G Over Voltage (Zero-sequence) Relay
    viii. 67/67N Directional Overcurrent
    ix. 68 Blocking Relay
    x. 81 Over and 81 Under Frequency Relay
    xi. 87 Differential
    xii. 87L Line Differential
c. AP shall provide its own circuit breaker(s) and associated equipment located on the utility side of the drawing. This drawing may not show all of the protective equipment and relaying owned and operated by AP. The AP circuit breaker installation shall be accessible by AP personnel to operate, without notice, during system emergencies and outage restoration activities.
d. The transmission facility owner/developer shall provide its own high voltage circuit breaker with visible, hook stick operated, isolation switches. The

transmission facility circuit breaker installation shall be accessible by AP personnel to operate, without notice, during system emergencies and outage restoration activities. The high voltage, power circuit breaker and disconnect switch shall meet the requirements of Part e. – Circuit Breaker Specifications.

e. Circuit Breaker Specifications:
   i. Circuit breaker shall be suitable for the application such as available fault current, BIL, load current, and etc. as determined by ANSI C37 standards.
   ii. Circuit breaker tripping circuit (125 V. DC) shall be wired with utility grade interconnecting relaying
   iii. This breaker shall also have overcurrent relaying suitable for the particular application.
      1. Overcurrent relaying shall consist of the following and permit operation in a manner designed for the transmission facility:
         a. 50/51 instantaneous overcurrent / time overcurrent relay (phase current - 3)
         b. 50/51G instantaneous overcurrent / time overcurrent relay (ground fault)
   iv. Potential transformers (3) shall be on the line side of the breaker.
   v. The breaker shall have local tripping capability such as a pushbutton or other means clearly identified for AP personnel.
   vi. The disconnect switch(es) shall be used to provide a visible opening in the high voltage circuit. The disconnect switch(es) shall be permitted to be non-load break, hook stick operated.

f. All metering shall be required as documented in the interconnection study and meet PJM requirements in accordance with PJM Manual 01, Section 4 and 5. All metering CTs and PTs shall be revenue metering grade.

g. Retail Meter shall be metering package specified and installed by AP as appropriate for the load (if applicable) and particular rate schedule.

h. The transmission facility owner/developer shall also provide all necessary metering, telemetry and control information as documented in the results of the interconnection study and PJM requirements to reliably operate the power system.

4.10 Acceptance Testing

1. The purpose of acceptance testing is to assure that equipment will operate successfully during all modes of operation including normal, abnormal, maintenance, emergency and contingent operations.
2. AP personnel shall witness or perform acceptance testing prior to the facility being permitted to operate on the AP system.
3. Each interconnected facility shall perform routine inspection and testing of its facilities and equipment as may be necessary to ensure the continued interconnection of its facility with the transmission system in a safe and reliable manner. On providing advance written notice, the Company may

request reasonable additional testing of the interconnected facility for good cause.

4.11 Synchronizing Facilities

Sync-check relays may be required at the point of interconnection. Reclosing angles will be determined by AP Transmission Planning. For lines with generation connected, procedures for synchronization and disconnection of generation facilities are provided in PJM Manual 14D Section 7. The OATT also requires that the following documentation be provided by the Interconnection Customer prior to synchronization of the Customer Facility with the transmission system:

- As-built drawings
- Pre-operation test reports
- Instruction manuals

4.12 Operational and Maintenance Requirements

The operation of all transmission facilities shall meet the requirements outlined in PJM Manual 3. The connected facility shall have an AP approved acceptance test and maintain all devices and control schemes for the protection of the AP Transmission system. The interconnected facility shall provide the Company access to areas under its control as reasonably necessary to permit the Company to perform its obligations such as operation and maintenance. The Company shall comply with all safety rules applicable to the area to which access is obtained. Procedures provided in PJM Manual 36 should be followed during abnormal voltage and frequency conditions. Operation and maintenance of facilities must meet the requirements in PJM Manual 14E Section 3. When any 100 kV and above facility is or will be out of service, PJM must be notified as outlined in PJM Manual 3 Section 4.

4.13 Voltage Level , MW and MVAR Capacity

All Transmission projects connecting to the AP system shall provide at a minimum the following information.

- Proposed interconnection point with AP and all points of interconnection with other utilities.
- Operating voltage of proposed facility
- Positive and negative sequence impedance and charging on 100 MVA base.
- Capacity of facility, continuous and emergency (MVA or Amp Ratings)
- List of all shunt and series devices connected to facility (ex. Capacitors, Reactors, PAR’s, etc.)

4.14 Normal and Emergency Operating Conditions

The interconnected facility shall install and maintain satisfactory operating communications with the Transmission Provider's system dispatcher or its other designated representative and with the interconnected Transmission Owner. The interconnected facility owner shall:

- Provide standard voice line, dedicated voice line and facsimile communications at its facility control room through the use of the public telephone system.
- Provide and maintain backup communication links with both the Transmission Provider and interconnected Transmission Owner for use during abnormal conditions as specified by the Transmission Provider and interconnected Transmission Owner respectively.
- Provide the dedicated data circuit(s) necessary to provide Interconnection Customer data to the Transmission Provider and interconnected Transmission Owner as necessary to conform with applicable AP Standards."

4.15 AP Transmission Standards

Transmission interconnection projects connecting with the AP system can download AP transmission standards from the PJM Transmission Owner Standards webpage at www.pjm.com/planning/trans-standard.html. A password will be issued by PJM upon request after study agreements have been executed by both parties.

5. END USER FACILITIES CONNECTION REQUIREMENTS

5.1 Qualifications

Requirements for service from the AP transmission system are as follows:

1. Customer's estimated peak load shall be 10 MW or greater in accordance with filed tariffs. This peak load requirement may be waived in cases where transmission service is practical and economical to both AP and the customer. Rates for such service shall be in accordance with filed tariffs.

2. Customer shall accept service from the AP transmission system at a mutually satisfactory single delivery point as determined by AP and the customer.

3. The necessary transmission capacity, as determined by AP, must be available at or near the proposed service location. "Near" in this context is a distance no greater than that which the Company's line extension policy will permit.

4. If the necessary transmission capacity, as determined by AP, is not available at or near the proposed service location;

    a. AP will determine what construction or transmission system reinforcements will be required to provide the necessary transmission capacity at or near the proposed service location
    b. AP will provide the customer a high-level estimate of the costs of the required construction or transmission system reinforcement
    c. Refinement of the required construction or transmission system reinforcement and associated costs will not proceed beyond this stage until the customer signs a contract agreeing to cover all future engineering costs. The costs paid by the customer will be credited toward any out-of-pocket costs required to provide service or will be forfeited to the Company if the customer does not take service.

5.2 AP Impact Study Requirements

The specific voltage and connection requirements are dependent on many factors including customer load characteristics, capacity of the transmission system and configuration of the AP transmission system at the point of interconnection. These requirements will be determined via an assessment performed by AP Transmission Planning and documented in an AP Impact Study. The customer shall provide location of proposed interconnection and all relevant load and equipment data (voltage, MW, MVAR, etc.) including largest motor characteristics prior to AP performing an assessment of the proposed interconnection. The proposed service and any required construction or transmission system reinforcement will be detailed in the Impact Study report and subsequent plan issued by the AP Transmission Planning department.

5.3 Basic Service

Basic service from the transmission system consists of service at a single voltage at one location. The AP transmission system (115 kV, 138 kV or 230 kV) is an effectively grounded wye-connected system.

AP will modify or provide and install the following facilities at a minimum for this service. In some cases, customer financing may be required as described in Company's line extension policy and filed tariffs.

1. One three-phase line tap, operated at a voltage above 100 kV to interconnect the customer's facilities with the AP transmission system. AP shall provide and install all line side equipment to serve the customer and properly connect Company metering equipment. Customer's service point shall be on the load side of the metering equipment.

2. Protective and control equipment modifications within the AP system as AP considers necessary to integrate the new facilities into the AP transmission network and provide a reasonable degree of service reliability to the customer.

3. Metering transformers and equipment to measure the quantity of real and reactive power delivered to the customer through a single delivery point, including secondary wiring, cables, test or isolation switches and meter bases/sockets. The customer is responsible for providing the mounting structure(s) for the metering equipment specified as set forth in this document. To facilitate an efficient installation, the customer may be requested to aid in the installation of metering transformers, isolation switches, and metering cabling.

    a. Metering at 115kV, 138kV or 230kV is normal for all services in which the customer establishes a bus for the purpose of serving multiple transformers or extending a transmission line. Low voltage metering is acceptable for single transformer service installations; however, this installation shall be stipulated in the customer's Electric Service Agreement (ESA). Certified transformer test data is required when low voltage metering is implemented to facilitate loss compensation calculations.

5.4 Facilities Beyond Basic Service

Facilities beyond basic service may be negotiated if such facilities are compatible with the AP system. These include facilities to provide increased quality of service, such as additional lines, additional points of service, bypass facilities, or voltage regulation. Provision for financing additional facilities are described in each operating company's line extension policies and filed tariffs.

At the request of the customer, AP may provide additional facilities, beyond the service point, such as switching equipment, voltage regulation equipment, transformers, switchgear, etc. to provide increased service reliability, enhance customer flexibility, or for some other customer benefit. These additional facilities and services shall be generally owned by the customer and priced at mutually agreed upon prices.

5.5 General Customer Requirements

The customer shall provide and install the following facilities:

1. A power circuit breaker with associated protective relaying to provide both protection and a means to disconnect the customer's load from the AP transmission system. The customer's relay equipment and relay settings must be pre-approved by AP. An approved circuit-switcher may be substituted for the circuit breaker if the following conditions are met:

    a. Only a single transformer will be connected.
    b. The electrical distance between the circuit-switcher and the transformer does not exceed 50 feet.

c. The AP system fault current does not exceed the interrupting rating of the circuit-switcher.

2. Breaker isolation switches (line and load sides) or another acceptable means to gain a visible opening of breaker or circuit switcher.

3. Foundations and structures to accommodate:

    a. Transmission line dead-end
    b. Substation class lightning arresters
    c. Power line carrier blocking equipment
    d. Metering transformers and isolation switches for metering equipment
        i. Installation shall include a conduit system from the metering transformers to the meter rack

4. An acceptable enclosure or space in a control building for AP metering and relay equipment. If a control building is used, control building shall be environmentally controlled and double locked (customer/utility, with both having unrestricted access). Control building will house customer's 125 Volt DC control battery and control panel with protective relays for customer's equipment. Customer shall provide 125 Volt DC feed for Company's protective relays and equipment.

5. The customer's facilities shall in all ways comply with the current revision of the National Electrical Safety Code and applicable sections of the current National Electrical Code.

6. The Company shall be permitted to make periodic inspections of customer owned facilities during the construction phase to insure conformance with specifications and plans as mutually agreed upon. The customer shall, after its facilities are completed and in its judgment ready for service, give the Company ten (10) normal working days notice prior to the proposed "in-service" date. The customer's facilities shall be inspected for compliance with specifications by a Company authorized representative before energizing, i.e. interconnection with the Company's system. Arrangements for scheduling inspections are to be made through the Company's Customer Management Representative. Each interconnected facility shall perform routine inspection and testing of its facilities and equipment as may be necessary to ensure the continued interconnection of its facility with the transmission system in a safe and reliable manner. On providing advance written notice, the Company may request reasonable additional testing of the interconnected facility for good cause.

AP reserves the right to change the capacity and/or characteristics of the supplying system as deemed necessary to meet future system requirements. In such event, the customer shall agree to change, at its own expense, any equipment that is found to be inadequate by reason of such AP system changes.

5.6 Detailed Customer Requirements

The Company's Customer Management Representative must always be consulted regarding plans for a 115kV, 138kV or 230kV service before the customer purchases any equipment. Prior to releasing for manufacturing, the customer must submit for review by the Company, the following:

1. Switching structure equipment arrangement drawings covering that portion of customer's structure for
   a. The Company's line dead-end attachment
   b. Incoming station type arrester mounting
      1. 98kV MCOV, 120kV Duty Cycle (115kV/138kV) or,
      2. 180kV MCOV, 228kV Duty Cycle (230kV)
   c. Circuit-switcher mounting (where applicable)
   d. Breaker and breaker disconnect switches
   e. The Company's metering voltage and current transformers
   f. The Company's low voltage metering voltage and current transformer location (where applicable).

2. Specifications for:
   a. 115kV, 138kV or 230kV Vertical break horn gap switches
   b. Station type lightning arresters
      i. 98kV MCOV, 120kV Duty Cycle (115kV/138kV) or,
      ii. 180kV MCOV, 228kV Duty Cycle (230kV)
   c. Circuit-switcher (where applicable)
   d. Power circuit breaker
   e. Hookstick operated or gang-operated disconnect switches
   f. Protective relays and control equipment

3. Schematic and wiring diagrams for the circuit breaker including protective relaying and associated control.

4. Schematic and wiring diagrams for the circuit-switcher control mechanism and protective relaying (when applicable).

5. The customer must provide the Company's Engineering Team, through the Company's Customer Management Representative, three (3) sets of equipment arrangement, schematic and wiring diagrams.

5.7 Customer Equipment Arrangements

There are two basic arrangements of equipment as shown on one line diagrams in Figure #5 & Figure #6.

Other arrangements are possible; however, review and comment is required by a representative of the Company's Engineering Team.

1. High Voltage Breaker – Figure #1

This arrangement is required for all services in this guideline except those meeting the requirements for the installation of a circuit-switcher. The ampere rating, interrupting rating, bushing current transformer taps and all required settings for protective relays shall be reviewed and approved by the Company.
The circuit breaker is to have a 125 volt DC close and trip control and have a pneumatic, hydraulic or mechanical closing mechanism.

THE USE OF CAPACITOR TRIP DEVICES IS NOT ACCEPTABLE.

2. Circuit-Switcher – Figure #2

This arrangement is acceptable for service where only one three phase power transformer is to be installed and where available fault current does not exceed the rating of the interrupting device. The customer must accept full responsibility for damage or loss sustained by faults on his equipment which occur in the locally unprotected portion of his bus; that is the area between the Company's line attachment to the circuit-switcher and the high voltage leads connecting the transformer bushings. This area is protected remotely by the Company's line relays.

The circuit-switcher mechanism is to be of utility-grade design utilizing shunt trip solenoids for high-speed fault interruption. The mechanism control voltage is to be 125 Volts DC.

THE USE OF AN AC VOLTAGE CONTROLLED SWITCH OPERATING MECHANISM IS NOT ACCEPTABLE.

The customer must provide space for the future installation of a high voltage breaker and must agree to install this breaker should it ever be deemed necessary by the Company. Changes in fault current values beyond the interrupting rating of the circuit switcher would necessitate the installation of a high voltage breaker.

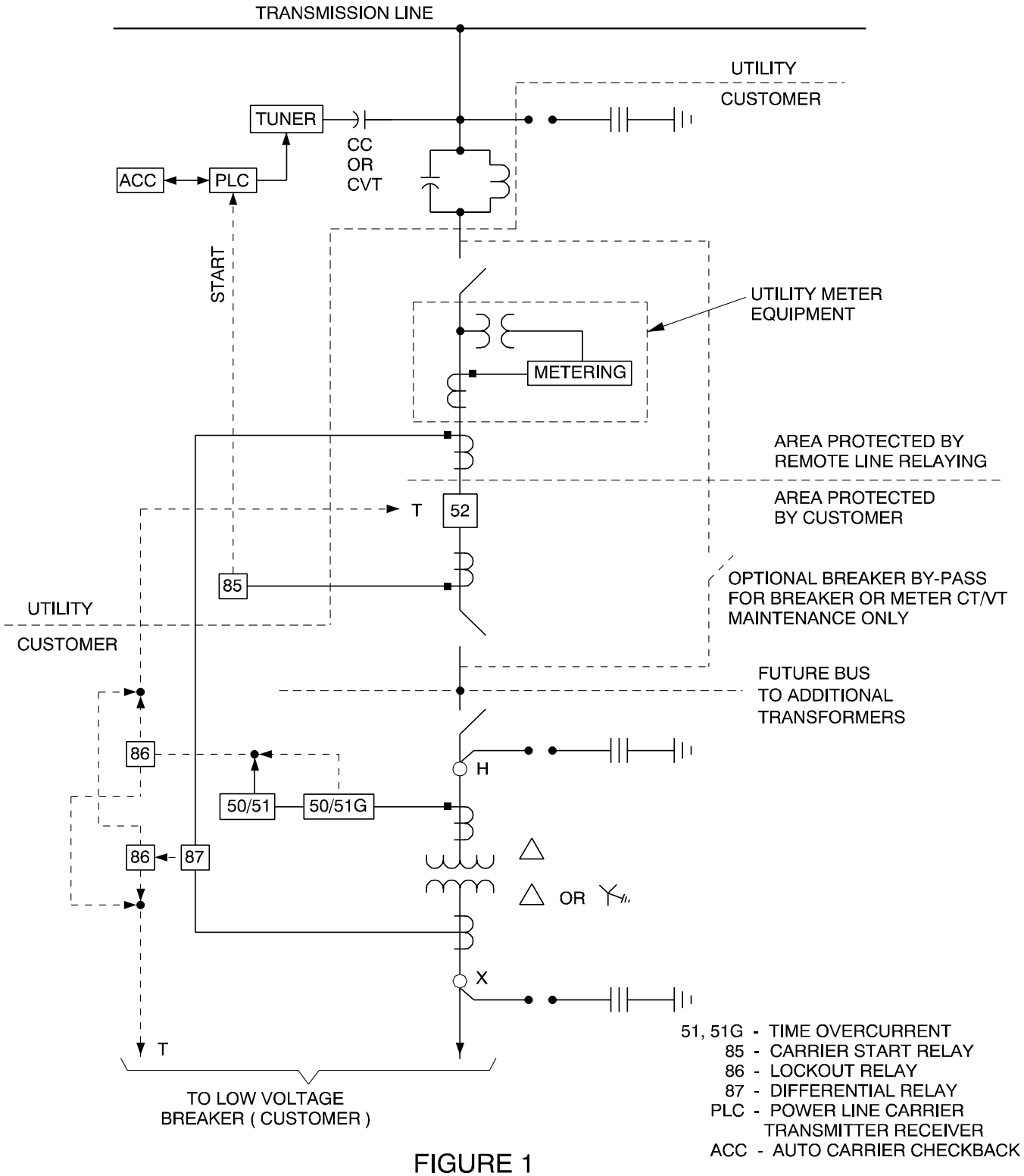

FIGURE 1
ONE LINE BREAKER INSTALLATION

Figure 6: One line breaker installation

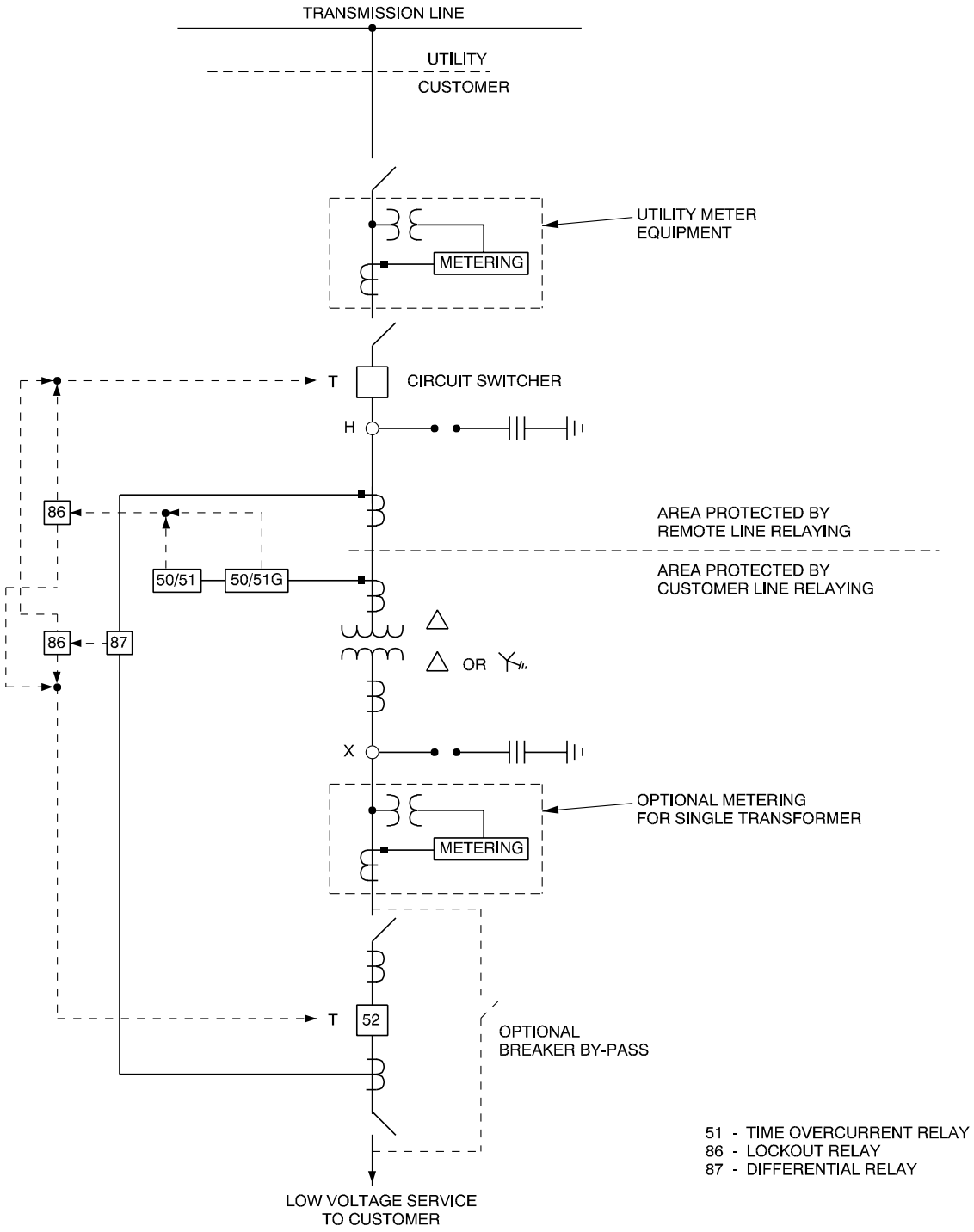

FIGURE 2
ONE LINE CIRCUIT SWITCHER / SINGLE TRANSFORMER INSTALLATION

Figure 7: One line circuit switcher/single transformer installation

5.8 Customer Equipment Specifications

1. Bus Supports – All bus supports shall be rated as follows:

   115kV – 550kV BIL
   138kV – 650kV BIL
   230kV – 900kV BIL

   Use the following caps and pin or station post insulators:

   115kV – NEMA TR-19 Cap & Pin, NEMA TR-286 Post
   138kV – NEMA TR-22 Cap & Pin, NEMA TR-288 Post
   230kV – NEMA TR-126 Cap & Pin, NEMA TR-304 Post

2. Switches - All switches shall conform to voltage class BIL ratings and insulators as described in Item 1 above. The minimum rating for air break and disconnect switches is as follows:

   115kV – 600A continuous, 20,000A momentary
   138kV – 600A continuous, 20,000A momentary
   230kV – 1200A continuous, 61,000A momentary

   The minimum momentary rating for the circuit interrupting switch is 40,000A (115kV, 138kV) or 43,750A (230kV).

3. Transformers – Transformers shall have their high voltage windings connected in delta. The low voltage winding connection is the customer's choice. Following is a list of suggested ratings for use:

   550kV BIL for 115kV/138kV, 900kV BIL for 230kV
   Impedance/High Voltage Taps per ANSI STD C57.12.00.9.2

   It is also suggested that use of one of the following Company standard low voltage ratings be used to correspond to the above high voltage ratings:

   7,560/13,090Y – with delta wye terminal board, 110kV BIL
   13,090Y/7,560 – without delta wye terminal board, 110kV BIL
   23,600 Grounded wye, 150kV BIL
   26,400 Grounded wye, 200kV BIL
   36,300 Grounded wye, 200kV BIL

4. Breakers - Breakers shall be oil or SF-6 type and rated within 121kV – 242kV depending on application voltage class. Breaker BIL shall be carefully selected based on system studies, insulation coordination, and surge protection provided. Consideration shall be given to insulation capabilities to ground and insulation capability across an open breaker to avoid open breaker flashover.

5. Dead-End Structures – Line dead-end structures shall be designed to withstand the following tensions:

   7000 lbs. per phase conductor.
   7000 lbs. per static conductor.

   The Company shall provide strain clamps for the phase and static conductors. Company ownership of the incoming line shall end at the strain clamps.

5.9 Customer Grounding

1. The customer is responsible for the design and installation of a protective grounding system. A drawing showing the installation of the proposed grounding system (Ref. IEEE 80) must be submitted to the Company's Engineering Team for review and comment. This drawing shall include the following pertinent information:

   - Size and type of grounding conductors.
   - Resistivity of soil (earth) at substation site. (Wenner's four-pin method, ANSI/IEEE Std. 81-1983 [3]).
   - Location and burial depth of grounding conductors.
   - Design impedance. (See Item 3 below).
   - Location and site of ground rods.
   - Method of bonding to fence, gates, structures and equipment.

2. The substation yard within the customer's fence and an apron area extending three feet beyond the customer's fence around the complete perimeter of the fence including any gate swing, shall be covered with gravel, limestone or sandstone chips to reduce touch and step potentials and maintain the grounding system integrity.

3. The completed grounding system shall be tested prior to connection of the Company's lines and neutral or ground conductors. Certified test results of the value of resistance in ohms, using IEEE 80 Fall-of-Potential Method is to be made available to the Company's Engineering Team.

5.10 Customer Equipment And System Protection

The circuit protection at the customer's service point must be coordinated with the customer's protective equipment on the load side as well as with the Company's protective equipment on the source side. Prior to purchasing any interconnection protective equipment, the customer must consult with the Company to establish specifications for required equipment.

In order to coordinate the protective scheme, the customer must furnish to the Company through the Customer Management Representative, a one-line

diagram similar to Figure #5 and Figure #6. The following information shall be included on the diagram:

1. Conductor size, material, spacing and circuit length for each circuit and/or bus.

2. The location, high voltage and low voltage rating, kVA rating and percent impedance of each power transformer.

3. The type of protection to be applied on the high voltage side of each power transformer.

    - Relays shall be specified by manufacturer, type, catalog number, time-current characteristics, ampere rating and the current transformer rating and ratio to be used.

4. The location of the largest motor (if applicable), type, voltage rating, horsepower ratings, starting method, inrush current and frequency of starting.

5. One set of 98kV MCOV class (180kV MCOV class @ 230kV) substation class arresters, as described in the above Detailed Customer Requirements Section, Subsection 1 and 2, shall be located within 100 conductor feet of the Company's metering transformers. Arresters mounted on the power transformer may satisfy this requirement in some instances, depending upon station arrangement.

The customer is responsible for specifying all protective equipment, their characteristics and protection coordination for his service entrance and distribution system. The Company will specify the associated phase to which the carrier coupling equipment must be connected. The Company will assist the customer in establishing protection coordination, but assumes no responsibility in the event the protection scheme fails to operate as desired.

5.11 Metering

The CUSTOMER SHALL FURNISH AND INSTALL the following equipment for the Company's metering system:

- Foundations and structures for mounting the metering current and voltage instrument transformers and transformer test switches. The customer or customer's contractor will install and make primary connections to the Company supplied metering current and voltage transformers. Transformers damaged during installation and primary connection will be replaced by the Company at the customer's expense.

- A rigid conduit system, two inch diameter with pull line, from the substation yard test switch enclosures to the secondary conduit box of the metering current and voltage transformers.

- A rigid conduit system, two inch diameter with pull line, from the substation yard test switch enclosures into the control building adjacent to the Company's meter equipment or to the Company's weatherproof meter enclosure mounted on the customer's fence, steel structure or building.

- A standard single party analog business phone circuit connected directly to the local telephone company's exchange for the purpose of remotely interrogating revenue metering data shall be supplied when possible. (Phone circuit to be put in the Company's name and the monthly service fee will be paid by the Company.)

- Access to 120 volt AC via a standard duplex outlet in close proximity to the Company's metering equipment to facilitate testing etc.

The Company will provide the following metering equipment and/or service:

- All meters, test switches, etc. mounted and wired for installation in the control building.

  NOTE: At the Company's discretion, the weatherproof enclosure with all metering equipment may be provided for mounting on the Customer's fence, steel structure or building, if so desired, for ease of access for data gathering or troubleshooting.

- Revenue accuracy instrument current (CT) and voltage (VT) transformers (Typically 2 – CTs and 3 – VTs.) The Company will provide structure mounting plate details for current and voltage transformers from the Company's approved suppliers.

- Two enclosures with test switches for mounting on an instrument transformer structure in the substation yard. (One for CTs and VTs).

- Secondary wiring and cables to connect the metering instrument transformers to the substation yard test switch and to either the meter equipment in the control building or the weatherproof enclosure in the substation yard. The Company will pull all required wires and cables in the conduit system furnished by the customer for the purpose of terminating all metering current and voltage transformer secondary circuits.

The customer must provide a suitable location for the meter equipment if located in the control building. The meter equipment shall have front access with a minimum of 36 inch clearance for purposes of reading, testing,

inspecting, servicing and exchanging equipment. This clearance applies also to rear access if necessary, should the meter equipment be mounted in a free standing enclosure. The conduit system for the meter cables shall be in close proximity to the meter equipment location and shall be accessible from an overhead cable tray or imbedded in a floor trough. The meter equipment shall be free from vibration and in a clean, ventilated, dry, safe and lighted location with an ambient temperature not to exceed 95°F. Locations which are in close proximity to moving objects, such as conveyor belts, rotating shafts, engines, motors, machinery or vehicles are not acceptable. The meter equipment should also be in a location which is within 150 cable feet of the substation yard metering instrument transformer test switch enclosure.

If changes are made in/at the customer's premises (control building), thereby making the existing meter equipment location unsafe, unsuitable or inadequate, the customer shall be required to provide a suitable alternative location for this metering equipment. If relocation of the meter equipment is necessary, the customer will be billed an appropriate service charge for this work.

All meters and metering equipment shall be locked/sealed on the customer's premises.

The customer is not permitted to install meters or instruments in the metering transformer secondary circuits. Metering data pulses and/or interval time pulses can/shall be provided to the customer from the Company's metering equipment for load control and/or monitoring systems at the customer's request. A designated fee is charged for this service.

5.12 Power Quality and Operational Issues

The harmonic currents that a customer may inject into the AP transmission system shall not exceed the limits established by AP as shown in the AP Engineering Manual Section 46. Voltage fluctuations on the AP system caused by customer equipment are limited to the flicker curve in the AP Engineering Manual Section 46 Subject Index 2. Operational issues due to power quality shall be addressed as documented in the AP Engineering Manual Section 46.

5.13 Voltage, Reactive Power & Power Factor

The transmission system within the AP service territory consists of nominal operating voltages of 115 kV, 138 kV, and 230 kV. Transmission voltages are operated between 0.90 and 1.05 per unit. AP transmission planning criteria including reactive power requirement guidelines are provided in Section 19, Subject Index 2 of the AP Engineering Manual. Power Factor requirements are included in the transmission tariff where applicable, and some states may have a power factor penalty in their rate base.

5.14 Synchronizing

Typically synchronizing of facilities does not apply to end users without any type of generation. When generation facilities are installed at a customer facility regardless of the intent to sell power beyond the point of interconnection, Section 3 above and the AP Engineering Manual Section 19 S.I. 35 shall be followed as applicable. This requirement does not apply to emergency or standby generation automatic transfer schemes with non-paralleling (break-before-make) operation.

5.15 Maintenance Coordination

The customer shall be responsible for the design, construction, installation, maintenance and ownership of all facilities on its side of the interconnection point. The connected facility shall be inspected by an AP approved inspector and shall maintain all devices and control schemes for the protection of the AP transmission system. Prior to performing maintenance on a transmission facility, the transmission outage is listed on the PJM OASIS. If sectionalizing is not possible without interrupting a customer, the customer will be notified of the outage by AP. If conflicts arise, AP will attempt to schedule the interruption at a mutually acceptable time.

5.16 Normal & Emergency Operating Conditions

The criteria for acceptable system performance for normal system conditions can be found in the AP Engineering Manual Section 19 Subject Index 2. During emergency operating conditions, PJM may implement emergency operating procedures up to the point of a Manual Load Dump Action. Documentation is provided in the AP Emergency Operations Manual Volume I Sections C-1 and C-5.

6. APPENDIX

6.1 Revision History

Version	Revision Date	Comments	Approval
0	08/21/2008	Consolidated multiple documents to form a new, single document to address generation, transmission and end user connection requirements.	General Manager, Transmission Planning