

**Requirements for Connection of Non Generating
Facilities to
THE CENTRAL MAINE POWER COMPANY
Transmission System**

December 15, 2018

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REVISION HISTORY

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The Central Maine Power
Company Transmission System

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Note changes as follows:
Revised Language Changes will be Underlined

Page #	Revised Language
6	<p>3.6 Disconnecting Devices</p> <p>For non-generator connections to the ITO system, the ITO may require that the disconnecting device be equipped with motor operators and with capability to be supervisory controlled from the ITO ECC. The disconnecting device shall be mechanically lockable in the open position with an ITO padlock in order to provide a visible, physical electric isolation of the Facility. When the disconnecting device is operated to the open position, the ITO must be able to remotely disable all tripping signals and return the system to a normal operating state. The disconnecting device shall be identified with a designated equipment number acceptable to the ITO's ECC naming convention and must be accessible to the ITO at all times. <u>This device shall be known as the Demarcation Point (DP). Regardless of ownership of the switch, the DP shall be under jurisdiction of the ITO Energy Control Center (ECC) and shall be operated only by order of the ECC.</u></p>
6	<p>3.7 Disturbance Monitoring</p> <p>In order to determine the performance of the overall Transmission System and to determine causes of system disturbances, NPCC may require the installation of disturbance monitors at specific locations and specific types (e.g. sequence of events recording, fault recording or dynamic recording). The Facility must install disturbance-monitoring equipment with sufficient capability to permit adequate analysis of electrical disturbances on the Transmission System as required by NPCC. The Facility Owner is responsible for meeting other NPCC requirements related to disturbance monitoring equipment per NPCC Document B-28, NPCC Document B-26 and NPCC Document C-17 (available at www.NPCC.org). ISO-NE OP 22, Disturbance Monitoring Requirements must be followed.</p>
8	<p>4.5 Scheduled Outages and Maintenance Coordination</p> <p><u>When taking facilities out of service or when requesting switching, the CMP Transmission Coordinator must receive a notification request for operation of the DP switch or DP maintenance. For transmission lines 69kV and above, the notification must be received 120 days in advance or upon receipt of ISO-NE approval of your outage,</u></p>

	<p><u>whichever comes first. Below 69kV, the notification must be received 30 days in advance or upon receipt of ISO-NE approval of your outage, whichever comes first. The notification is made by emailing:</u></p> <p>group.cmptranscoord@cmpco.com</p>
<p>9</p>	<p>4.6 Switching, Tagging, Grounding, and Isolation Rules</p> <p><u>Strict adherence to established Switching, Tagging, and Grounding procedures must be maintained for the safety and protection of all personnel. All switching operations of the Demarcation Point (DP) will be performed in accordance with the ITO's switching and tagging procedures. The ITO will lock this switch in the appropriate position (open or closed) based upon ITO requirements..</u></p> <p>When taking facilities out of service or when requesting switching, the CMP Transmission Coordinator must receive a notification request for operation of the DP switch or DP maintenance. For transmission lines 69kV and above, the notification must be received 120 days in advance or upon receipt of ISO-NE approval of your outage, whichever comes first. Below 69kV, the notification must be received 30 days in advance or upon receipt of ISO-NE approval of your outage, whichever comes first. The notification is made by emailing:</p> <p>group.cmptranscoord@cmpco.com</p>
<p>11</p>	<p>5.3 Other Protection Requirements</p> <p>See NPCC Document A-2, NPCC Document A-5, and NPCC Directory # 7. (Available at www.NPCC.org)</p>

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1. GENERAL INFORMATION

This document provides an overview of the process and requirements to interconnect wholesale non-generating facilities (municipal utilities, merchant transmission owners, etc) to the Central Maine Power Company (CMP) Transmission System.

Interconnecting new or modified generation facilities is covered in a separate document.

Customers requesting retail electric service should contact CMP directly.

Central Maine Power Company will also be referred to as the Interconnecting Transmission Owner (ITO). Safety, reliability, and power quality are of utmost importance and, as such, careful study of each proposed installation and the identification of appropriate interconnection requirements is necessary before a facility is allowed to begin interconnected operation. The basic standard is that no interconnection can have an adverse impact on the reliability of the transmission system throughout the New England region. This standard is based on CMP's requirements as well as the requirements of the MPUC, the Regional Transmission Organization (RTO or Independent System Operator-New England ("ISO-NE")), NPCC, NERC, FERC, or other authorities having jurisdiction.

1.1 ISO-NE & ITO Review & Approval

ISO-NE Inc. is the Regional Transmission Organization (RTO) for New England. All wholesale Interconnecting Transmission Customers in New England (and therefore in Maine on the ITO system) must comply with the ISO-NE FERC Electric Tariff No. 3, referred to as the Open Access Transmission Tariff (OATT). This Tariff contains the requirements for applying for wholesale Transmission Service.

ISO-NE and ITO will review Transmission System parameters in relation to the proposed point of interconnection to determine any necessary changes to the Transmission System in order to accept the project. ISO-NE and ITO will verify that the design meets the required interconnection standards, perform necessary interconnection studies, and may conduct a functional field test of the Transmission Customer's system before the Facility will be allowed to commence interconnected operation. ISO-NE and/or ITO will provide the Customer written approval for interconnected operation within the T&D system.

1.2 Application for Transmission Service

Any customer requesting new or modified wholesale transmission service must submit a Completed Application to the ISO for:

- Regional Network Service, which is provided by the ISO under Part II.B of the ISO-NE OATT; and

- Local Service, which is provided by the individual ITOs under Schedule 21 of the ISO-NE OATT.
- Building and interconnecting an Elective Transmission Upgrade

Applications are available on the ISO web site at the following link:

<http://www.iso-ne.com/trans/services/index.html>

Additional detail about the application and review process can be found on the ISO web site and in the following sections of the ISO OATT:

Section II – ISO New England Open Access Transmission Tariff

- PartII.B Regional Network Service (RNS)
Schedule 9 – Regional Network Service
- PartII.24 Through or Out Service (T/Out)
Schedule 8 – Through or Out Service; The Pool PTF Rate
- PartII.27 MTF Service, CSC Transmission Service
Schedule 18 – MTF Service
- PartII.28 Local Point-to-Point Service
Schedule 21 – Local Service
- PartII.29 OTF Service, Phase I/II Transmission Service
Schedule 20A – Point-to-Point Service over Phase I/II HVDC
Transmission Facilities
- Part II.G System Planning, Additions and Modifications to Non-PTF
Schedule 21 – Local Service
- Part II.50 Additions to or Upgrades to PTF
Schedule 12 – Interconnection of Elective Transmission Upgrades

1.3 Interconnection Studies

The Open Access Transmission Tariff (OATT), the ISO-NE Transmission, Markets and Services Tariff (“ISO-NE Tariff”), and Schedule 21 will provide detailed descriptions of the transmission study options and requirements (System Impact Study, or Facilities Study). Either ISO-NE or ITO will process the application, and if needed will prepare the requested study agreement per the OATT. The Customer will provide any necessary upfront deposit to cover the estimated study costs. The study will result in a final report that will determine the feasibility and/or system impact to the T&D system and identify any required system enhancements. If the Customer requests a Facilities Study to be

performed, either ISO-NE or ITO will submit a Facilities Study Agreement per the OATT.

1.4 Interconnection Costs

The Customer may be required to pay some or all of the costs for any system enhancements required to allow connection to the transmission system.

1.5 Design Approval

The final decision of new facilities or modifications to existing facilities required to meet the Transmission Customer's request, will generally come from a Facilities Study. ITO will review and provide written approval for the facility's design which is required to meet these interconnection requirements.

1.6 Initial Inspection and Testing

Prior to the initial synchronization to the transmission system, the interconnection facilities must be inspected, calibrated, and functionally tested. ITO will inspect the interconnection facilities and will either perform or observe the functional testing.

2. TYPES OF CONNECTED CIRCUIT CONFIGURATIONS

The typical connection between the Facility-Owned Interconnection Facilities and the Transmission System will be designed in a way to minimize the adverse reliability impacts to the Transmission System. It will also allow ITO to operate the Transmission System without degradation in the event of failure of the Facility. Some typical arrangements for facilities connected to existing ITO substations include a breaker and a half bus and a breakered ring bus. Likewise, connections of facilities to an existing transmission line may vary depending on the location of the Point of Interconnection ("POI") and the Transmission System schemes already in place.

3. DESIGN REQUIREMENTS FOR CONNECTION

The Facility Owner is responsible for installing appropriate equipment and facilities so that the Facility does not degrade ITO's safety and operating standards. The Facility Owner is also responsible for meeting any applicable federal, state, and local codes along with any applicable NERC or ISO-NE requirements. The minimum Transmission System connection requirements are as follows.

3.1 Frequency

Transmission facilities shall provide balanced, symmetrical, three-phase power at a nominal frequency of 60 Hz.

3.2 System Protection

Protective relaying is required to protect personnel and equipment from the effects of hazards introduced to the Transmission System through natural and man made events. The protective relaying should be set such as to isolate the piece of faulty equipment as quickly as possible by operating the minimum number of devices and minimizing the effect to the rest of the interconnected power system. The Facility Owner is responsible for providing adequate protection to its facilities and to ITO-Owned Interconnection Facilities under any transmission operating condition, whether or not their facilities are in operation. Configurations which result in a “three terminal” protective relaying scheme are generally not permitted because of degraded fault clearing performance on the ITO transmission system and the added complexity of the schemes.

3.2.1 Quality of Protection System Equipment & Ratings

Protection system components must perform under extreme environmental and electrical transient conditions. Therefore, equipment ratings must meet or exceed ANSI and IEEE Standards, i.e., all protective relays must meet or exceed ANSI/IEEE Standard C37.90-2005. In addition, protection systems must include design, maintenance, and testing features as follows:

1. Equipment Quality

The Intertie Protection System equipment, including auxiliary equipment and instrument transformers, must be utility grade (of suitable quality, proven design and commonly used in similar applications).

2. Primary Wiring

All primary or high-voltage wiring of CTs, VTs, breakers, etc., shall be in accordance with all applicable sections of the National Electrical Safety Code, State Codes, Local Codes, ITO standards and all standards of prudent electrical practice.

3. Secondary Wiring

All secondary wiring and connections on the Intertie Protection System and its associated equipment shall meet all requirements of applicable National, State, and Local Electrical Codes and all standards of prudent electrical practice.

3.3 Interrupting Device/Breaker Duty

The Facility Owner shall provide three-phase circuit interrupting device(s) with appropriate protective relaying systems. The device(s) shall isolate the Facility from the ITO electrical system for all faults, loss of the ITO supply, or abnormal

operating conditions (listed in Section 3.2) regardless of whether or not the Facility is operating.

This device shall be capable of interrupting the greater of the maximum available fault current at that location. The description of the operating time, separate operating power, dual protective trip circuits, etc. are describing bulk power system (BPS) requirements. The ITO will provide the following short circuit data for the Delivery Point: 3 phase fault MVA and single line to ground fault amps. The three-phase device shall interrupt all three phases simultaneously and shall have maximum operation time of 2 cycles or less for 345 kV and 3 cycles or less for 115 kV from time of energization of the trip coils(s). The tripping control of the circuit-interrupting device shall be powered independently of the Transmission System or Facility AC sources in order to permit operation upon loss of the Transmission System connection or the Facility AC supply.

Generally, automatic reclosing of the Facility's interrupting device is not desired. If the Facility's configuration requires automatic reclosing, the ITO will provide the specific reclosing times for the Facility's interrupting devices. It is the Facility Owner's responsibility to design and maintain their interrupting device(s), contingent on ITO approval, to properly isolate the Facility upon loss of the ITO connection until the appropriate ITO facilities are returned to service.

3.4 System Grounding

The Facility must be electrically grounded in such a way that coordination is maintained with the ITO protective relay system, and that the ITO facilities will be protected from deleterious voltages during fault conditions. Specific grounding requirements will be established on a case-by-case basis.

3.4.1 Insulation and Insulation Coordination

Essential to the stable operation of the transmission system is proper coordination of the system's insulation strength. Internal insulation of equipment and external insulation of transmission lines and substation buses is required. Basic Lightning Impulse Level (BIL) for the ITO conforms to IEEE Standard 1313-1996 for Transmission voltages at 34kV, 115kV, and 345kV. The Electrical System Parameters are located in Live Link at Section 3.3 of the Design Basis Manual for Central Maine Power Company Substations including Protection and Control Philosophy.

3.5 Voice Communication Circuit

The Facility Owner may be required to establish a dedicated voice communication circuit from the Facility to the ITO Energy Control Center ("ECC") to permit coordination of the synchronization and operation of the Facility.

3.6 Disconnecting Devices

For non-generator connections to the ITO system, the ITO may require that the disconnecting device be equipped with motor operators and with capability to be supervisory controlled from the ITO ECC. The disconnecting device shall be mechanically lockable in the open position with an ITO padlock in order to provide a visible, physical electric isolation of the Facility. When the disconnecting device is operated to the open position, the ITO must be able to remotely disable all tripping signals and return the system to a normal operating state. The disconnecting device shall be identified with a designated equipment number acceptable to the ITO's ECC naming convention and must be accessible to the ITO at all times. This device shall be known as the Demarcation Point (DP). Regardless of ownership of the switch, the DP shall be under jurisdiction of the ITO Energy Control Center (ECC) and shall be operated only by order of the ECC.

3.7 Disturbance Monitoring

ISO-NE OP 22, Disturbance Monitoring Requirements must be followed.

3.8 Unbalanced Electric Conditions

3.8.1 Voltage Balance

Voltage unbalance is defined as the maximum phase deviation from average as specified in ANSI C84.1, "American National Standard for Electric Power Systems and Equipment – Voltage Ratings, 60 Hertz."

3.8.2 Current Balance

Phase current unbalance attributable to the Facility's combined load shall not exceed that which would exist with balanced equipment in service, measured at the Point of Interconnection.

4. REQUIREMENTS FOR OPERATION

The Facility Owner will be responsible for operating their Facility in a safe manner, and with full cooperation under the supervision of the ITO ECC, security coordinators or ISO-NE.

Only under the direct supervision of the ECC will the Facility at any time energize any part of the Transmission System facilities that have been de-energized.

Failure to comply has the potential to cause hazard or injury to personnel or to the public as well as damage to equipment and thus make the Facility Owner liable for such damages.

The minimum requirements for operation of facilities on the Transmission System are contained herein.

4.1 Synchronization

The Facility will own, test, and maintain equipment that will synchronize the facilities to the Transmission System. The Facility Owner assumes all responsibility for properly synchronizing their facilities with the Transmission System. Upon loss of the ITO supply, the Facility shall immediately be separated from the Transmission System. Synchronizing of facilities to the Transmission System may be, at ITO's discretion, performed under the direction of the ITO ECC.

4.2 Voltage Range

Voltage limits for transmission facilities connected to the T&D system will be determined by ITO. Any facility may be required to provide voltage support to the T&D system by operating their facility at any point within the facilities capability curve as directed by Energy Control Center, the Distribution Criteria, and IUSA Planning Criteria.

4.3 Power Quality

4.3.1 Power Factor

For end users, the expected power factor of their load must be provided to ITO. Depending on the location on the transmission system, ITO may require the end user to improve its power factor. For connections with transmission systems, reactive flow between the two systems will be addressed in the interconnection agreement.

4.3.2 Step Voltage Change and Flicker

A sudden (step) voltage change at the Point of Common Coupling, caused by the facilities must not exceed 3% of the nominal voltage. Flicker, or the impression of fluctuating brightness, if caused by repetitive voltage fluctuation of the facility, will be assessed according to IEEE Std. 1453-2004.

4.3.3 Harmonic Content

The harmonic content of the voltage and current waveforms on the T&D system must be restricted to levels which will not cause any interference or equipment operating problems for customers. Minimum requirements for limitations of harmonic content on the T&D system shall comply with IEEE Standard 519.

Harmonic problems will also be addressed on a complaint basis. If ITO determines that the facility is the cause of a harmonic problem, then that facility must be removed from the T&D system until the condition is resolved. In addition, all costs associated with research and corrective action, including settlements paid to other customers, will be at that facilities expense.

4.4 Islanded Generation Limits

Under certain circumstances, ITO may request that the facility serve local distribution load while isolated from ITO. To accommodate these situations, the voltage and frequency limits will be specified by ITO. These will be reviewed and approved by ITO on a case-by-case basis.

4.5 Scheduled Outages and Maintenance Coordination

The Facility Owner is to consult with the Central Maine Power Energy Control Center (“ECC”) for any scheduled Facility outages that affect the Transmission System. The ECC will consult with the Facility Owner regarding the timing of scheduled maintenance of the Transmission System facilities that might reasonably be expected to affect the Facility-Owned Interconnection Facilities.

When taking facilities out of service or when requesting switching, the CMP Transmission Coordinator must receive a notification request for operation of the DP switch or DP maintenance. For transmission lines 69kV and above, the notification must be received 120 days in advance or upon receipt of ISO-NE approval of your outage, whichever comes first. Below 69kV, the notification must be received 30 days in advance or upon receipt of ISO-NE approval of your outage, whichever comes first. The notification is made by emailing:

group.cmptranscoord@cmpco.com

4.6 Switching, Tagging, Grounding, and Isolation Rules

Strict adherence to established Switching, Tagging, and Grounding procedures must be maintained for the safety and protection of all personnel. All switching operations of the Demarcation Point (DP) will be performed in accordance with

the ITO's switching and tagging procedures. The ITO will lock this switch in the appropriate position (open or closed) based upon ITO requirements..

4.7 Operational Requirements

Utility T&D systems are designed to provide safe, reliable service to all customers. Customers operating in parallel with the T&D system must not operate in a manner which results in unacceptable service to customers. Customers whose operation of equipment results in unacceptable service to customers or adversely affects the T&D system must immediately correct any problems by performing modifications to equipment as necessary to prevent the recurrence of those problems. If necessary, ITO will discontinue the facility interconnection service until the problems have been corrected.

During maintenance, testing, or repair of T&D facilities, ITO may request the facility to discontinue parallel operations. Such maintenance may require opening of the tie disconnect switch.

Interconnection Customer shall maintain satisfactory operating communications with the System Operator and Interconnecting Transmission Owner in accordance with applicable provisions of ISO New England Operating Documents, Applicable Reliability Standards, or successor documents.

4.8 Transmission Tariffs

ISO New England has in place the ISO New England Open Access Transmission Tariff (OATT) that was approved by FERC to provide transmission service. This tariff contains the rates for transmission services, including rates for ancillary services offered by the ITO and the ISO.

4.9 Operating Restrictions

CMP reserves the right to request that the Facility reduce its load or to disconnect service to any Facility when consistent with Good Utility Practice and when necessary to alleviate any transmission constraint or Emergency.

5. PROTECTIVE RELAYING

The protective relaying scheme for interfacing with ITO facilities will be determined on a case-by-case basis, based on the location, size of the facility, and configuration. ITO will provide functional and performance requirements and in some cases relay settings for protective relays at the Facility Owner facilities that can have an impact on the reliability of the Transmission System. The functional requirements and relay settings will be based upon those outlined in NPCC and ITO's protection philosophy. ITO reserves the right to specify the protective relay type and manufacturer.

5.1 Parallel Facility

The Facility Owner is solely responsible for protecting its own equipment in such a manner that electrical faults, disturbances, inadvertent phase unbalance, single phasing, or operations on the Transmission System do not cause damage to the Facility Owner's equipment.

The Facility Owner's protection scheme shall be designed to separate their system from the Transmission System under the following conditions:

- For faults within the Facility Owner's equipment in the protection zone which overlaps the interconnection.
- For faults in the adjacent ITO owned or operated system which overlaps the interconnection.
- Whenever the ITO supplied electrical source is unavailable.

The interconnect relays must be dedicated to protection of the interconnection and separate from any relays applied to the facility, even if this results in redundant relay functions.

The protective relays required by ITO and any auxiliary-tripping relay associated with those relays shall be utility-grade devices. Utility grade relays are defined as follows:

1. Meet ANSI/IEEE Standard C37.90, "Relays and Relay Systems Associated with Electric Power Apparatus."
2. Have relay test facilities to allow testing without unwiring or disassembling the relay.
3. Have appropriate test plugs/switches for testing the operation of the relay.
4. Have targets to indicate relay operation.

ITO may elect to specify settings, or alternatively may elect to review and approve Facility Owner specified relay settings for the ITO-required relays to assure coordination between the Facility protective equipment and the Transmission System relays. It is the Facility Owner's responsibility to determine that their internal protective equipment coordinates with the required ITO protective equipment and is adequate to meet all applicable standards to which the Facility is subject. ITO further reserves the right to modify relay settings when deemed necessary to avoid safety hazards to utility personnel or the public and to prevent any disturbance, impairment, or interference with ITO's ability to serve other customers.

5.2. ITO Facilities

If at any time it is determined that the use of the above relay systems cannot provide adequate protection to the ITO system, the Facility Owner shall, at their expense, furnish and install additional relaying as requested by the ITO. This may include a transfer trip receiver(s) at the Facility-Owned Interconnection Facilities to receive tripping signals originating from an ITO location(s). This additional protection would also necessitate, at the Facility Owner's expense, the purchase and installation of transfer trip equipment at the ITO location(s) and a communication channel between the ITO location(s) and the Facility.

5.3 Other Protection Requirements

See NPCC Directory # 7. (Available at www.NPCC.org)

6. TESTING & MAINTENANCE

The Facility Owner will have full responsibility for the routine testing and maintenance of the interconnection equipment, including the Intertie Protection System, the Facility Owner Protection System, the Unit Step-up Transformer, the Intertie Circuit Breaker, and the Station Battery and Charging System. ITO will monitor maintenance on the Intertie Equipment, including protection system(s), transformer(s), Intertie Circuit Breaker(s), and Station Battery (ies) and Charging System(s), etc.

ITO is primarily interested in the performance of the total facility to ensure that the facility operates with no adverse impact to the T&D system. Therefore the Facility Owner is expected to maintain the facility and all of its support systems. The Facility Owner is also responsible for tree trimming and vegetation control in accordance with ITO vegetation control standards for any portion of the intertie where a fault could affect the operation of ITO's T&D system.

As a minimum, Facility Owners must perform all periodic maintenance and testing according to: The recommended manufacturer's maintenance and test

guidelines; the requirements specified in this document; and specifications found in reference documentation of controlling authorities.

Maintenance records are required to be maintained and must be made available to ITO during the annual inspections and biennial test and inspections. Specific equipment test data must be made available to ITO upon request to provide evidence that the equipment will operate as intended. Failure of the Facility Owner to provide proper testing and maintenance will result in the Facility Owner being notified and requested to take prompt corrective action within ten (10) days. Should the Facility Owner then fail to provide the proper testing and maintenance, ITO will discontinue the facility interconnection service until appropriate corrective action is taken and ITO approval is obtained.

If the interconnection equipment is not properly maintained, fails to perform its intended function, or has been modified from that approved by ITO, then ITO will give notice to correct the area of noncompliance or will open the interconnection. The time allowed for the Facility Owner to comply, while remaining on line, will depend upon ITO's assessment of the safety, reliability, and performance issues relating to the noncompliance.

ITO may inspect any of the intertie equipment, including the protection systems, whenever such an inspection is deemed necessary by ITO. This inspection may include tripping of the intertie and/or facility circuit breaker(s). The Facility Owner shall bear the cost of any necessary testing that may be requested by ITO.

All outage schedules and maintenance work will be coordinated through ITO.

The Facility Owner must implement a maintenance program consistent with acceptable industry practice so as to achieve a highly reliable interconnection. During site visits, ITO representatives will be interested in checking maintenance records and performing testing as follows:

6.1 Intertie Protection System

The Facility Owner must perform a relay calibration test every two (2) years using equipment of known accuracy. This biennial test shall include calibration and operational tests of individual relays and functional tests of the subsystems and the total system. Calibration checks will include verification of set points and voltage and current measurements. Operational and functional tests will include as many trips of the tie and/or facility breaker(s) as necessary, a synchronizing test, and any other test as may be required by ITO. Transfer trip equipment, where installed, will also be tested. During the biennial operational test, up-to-date design drawings must be made available to ITO personnel to allow for safe, reliable testing of the facility.

6.2 Intertie Circuit Breakers/Reclosers and Transformers

The Facility Owner will perform maintenance on these devices at a maximum interval not to exceed twenty-four (24) months. The Facility Owner must provide to ITO the identity and qualifications of the personnel who perform this maintenance and any associated testing. This maintenance must be coordinated with System Operations to obtain the proper zones of clearance.

6.3 Station Battery and Charging System

Batteries associated with the Intertie Protection System must have a high degree of reliability. To ensure that the Intertie Protection System performs its intended function, the Facility Owner must implement a battery preventative maintenance (PM) program to include periodic battery inspections and testing as approved by ITO. The reports from these battery inspections and tests shall be maintained by the Facility Owner and made available for review by ITO personnel during the periodic tests and inspections of the facility and at other times as requested by ITO.

- Battery Inspections per IEEE Std 450-2010 and IEEE Std 1188-2005

7. **METERING**

7.1. Responsibilities.

The ITO will install, own, operate, and maintain all metering equipment as required by ISO New England Operating Procedure No.18 and MPUC Chapter 320 as applicable. Facility Owner shall also provide space for required equipment and provide and install any mounting structures, foundations, cabinets, conduit, trenching or any other means required. Additional metering requirements for transmission interconnections are provided in the Central Maine Power Company's Handbook of Requirements for Electric Service and Meter Installation. A copy of this document will be provided to the requesting transmission entity.

7.2. Equipment Requirements.

Such metering equipment shall include standard types of meters, potential and current transformers, test switches, and such other appurtenances as necessary to meet the requirements of ISO-NE OP-18, MPUC and CMP. To the extent there is a possibility of flows of electricity in either direction, such metering equipment shall provide metering data for each direction of flow. If necessary, meters will have dynamic transformer and/or line compensation capabilities. The timing devices of all meters shall be maintained in Eastern Standard Time (EST) and shall be synchronized as closely as practicable.

7.3. Accuracy.

All metering equipment shall meet ISO-NE OP-18. The secondary wiring and burdens of the metering equipment will be configured so that they do not degrade the accuracy of the metering transformers (i.e. no non CMP equipment attached to the secondary wiring). Revenue meters will be equipped with mass memory storage for backup data in the event of communications problems. If any

metering equipment is found to be inaccurate by a margin of greater than that allowed under any applicable ISO, MPUC or ITO criteria, rules and standards, the ITO shall cause such metering equipment to be made accurate or replaced. In the event of a conflict between ISO or ITO criteria, ISO criteria shall govern.

7.4. Test and Calibration

ITO may test the metering equipment periodically. Tests are made in accordance with ITO's meter testing program (which complies with MPUC Chapter 32, ISO-NE O P18 and applicable ANSI standards) and are typically scheduled annually. The Facility Owners' representatives may be present to witness such tests.

7.5. Location of Equipment.

Unless otherwise agreed upon, the location of the metering equipment will be at the Interconnection Point. If the Metering Point and the Interconnection Point are not at the same location, the metering equipment shall record measurements in a manner that accounts for losses occurring between the Metering Point and the Interconnection Point. Losses occurring between the Metering Point and the Interconnection Point shall be allocated pursuant to the applicable tariff. ITO will locate the site of the metering in accordance with the Handbook of Requirements.

Loss compensation is required if the metering equipment is not installed at the point of delivery. Loss compensation is determined based upon CMP Terms and Conditions 12.8 METER LOCATION ADJUSTMENT and ISO NE's OP-18 Metering and Telemetering Criteria.

When service is metered at a lower or higher voltage than the delivery voltage, the measured kWh will be increased or decreased by a fixed percentage or, at the option of the Company, a continuous on-site adjustment will be made through compensating metering equipment or a factor applied based on the transformer manufacturer's data.

If a fixed factor is used to compensate metering equipment, the fixed factor shall be calculated using the peak output rating of the facility. The fixed factor will take into account all transformer losses and line losses between the metering point and the point of delivery.

Loss compensation programmed into the meter is based on transformer and line characteristics.

When necessary to compensate for transformer losses, the following information is required; transformer primary voltage, transformer secondary voltage, full load

KVA, no load percent exciting current, no load Watt loss, full load percent impedance, and full load Watt loss.

When necessary to compensate for line losses, the following information is required; Volts line to line, charging kVARhs, line resistance in Ohms, and line inductance in Ohms.

8. SUPERVISORY CONTROL AND DATA ACQUISITION

ITO employs a Supervisory Control and Data Acquisition/Energy Management System (SCADA/EMS) to control and monitor the status of the T&D system. This SCADA/EMS system provides real time status of the T&D system and its components by collecting information from each installation via a Remote Terminal Unit (RTU). These RTUs are interconnected by data communications facilities to its primary SCADA/EMS computer. The SCADA/EMS computer is used by System Operations personnel who are responsible for power system operation and for interfacing with the ISO NE. According to ISO NE Operating Procedure OP18, facilities with 5 MVA or more of net generation must have an RTU to meet these requirements.

A. RTU Requirements

The Facility Owner's RTU must be compatible with ITO's SCADA/EMS computer. The preferred communications protocol to be used with such SCADA RTU equipment is DNP3 although the Leeds and Northrop CONITEL protocol may be permitted in special circumstances. Communication equipment design and procurement must be reviewed by ITO to ensure this compatibility.

The RTU must operate continuously to provide the information listed below. Any required maintenance or repair must be completed expeditiously to return the RTU to continuous operation.

B. Normal SCADA Requirements

Facilities that are required to install an RTU shall provide for the following telemetry.

1. Analog Data (for each generating unit)
 - Unit Net Real Power Output (Megawatts)
 - Unit Net Reactive Power Output (Megavars)
 - Unit Output Voltage (Kilovolts)
2. Digital Data (for each generating unit)
 - Unit Net Hourly Energy Output (Megawatthours)
 - Net Hourly Energy Input (Megawatthours) (where required)
3. OPEN/CLOSED Status of Each Facility Circuit Breaker

4. Scanning Frequency

The following are required scan rates for scanning the data quantities indicated:

- Analog data: scan every ten seconds.
- Status data: scan every two seconds.
- AGC data: scan every five seconds
(Automatic Generation Control)

C. Automatic Generation Control

For each unit participating in Automatic Generation Control (AGC), the following functionality shall be required in addition to the SCADA requirements listed in Section B, above.

1. Unit Control Status (Auto/Manual)
2. Raise/Lower AGC Adjustment by direct transmission of the AGC load target set point values to the unit's control computer or other regulating apparatus.

D. Additional SCADA Requirements

ITO, at its discretion, may require the following data quantities, measured at the point of interconnection with the T&D system, in addition to or in lieu of the quantities listed in Section B, above:

1. Analog Data
 - Net Real Power flow (Megawatts)
 - Net Reactive Power flow (Megavars)
 - System voltage (Kilovolts)
 - Automatic High and Low Operation Limit for each unit
2. Digital Data
 - Net Hourly Energy Output (Megawatthours)
 - Net Hourly Energy Input (Megawatthours)

3. Other Data

- OPEN/CLOSED status of each Circuit Breaker (if any) between the Facility Breakers referenced in Subsection B.3, above, and the point of interconnection with the T&D system.
- Miscellaneous trouble alarms (if any) associated with protective relay equipment considered vital to the protection of the transmission system. (Examples: "Loss of Transfer Trip Guard Tone", "Power Line Carrier Checkback Failure", and "Loss of Protective Relay DC.")

E. SCADA Communication Requirements

The Facility Owner is responsible for the cost to install and maintain a continuous SCADA communications path between ITO's SCADA/EMS computer in Augusta and their RTU at the facility. Information can be transmitted via a telephone company provided circuit or via a private communications carrier. The utility Data Communications Network may be utilized for a fee to provide the connection to the ITO Control Center.

9. TRANSMISSION SYSTEM EMERGENCY

9.1. Emergency.

In the event of a Transmission System or capacity Emergency, the Facility Owner may be notified by ITO's ECC. Specific instructions may also be given regarding the operation of the Facility Owner's equipment. It is the Facility Owner's responsibility to ensure that the unit operators follow all instructions given by ITO's ECC during these emergencies.

10. COSTS INCURRED

Facility Owners shall reimburse all costs incurred by ITO to provide an interconnection of their Facility to the Transmission System. Facility owners may also be responsible for the costs of upgrades to CMP's or the regional transmission system caused by the interconnection of the Facility Owners equipment. The allocation of such costs will be done according to FERC pricing policy. The costs include but are not limited to:

1. All necessary facility modifications on the Transmission System to adequately accommodate the interconnection of the Facility Owner's facilities.

2. All communications circuits required for telemetering, protective relaying, and/or voice communications with the Facility.
3. All protective relaying and devices required for the protection of the Transmission System due to the addition of the Facility.
4. All protective relaying required for protecting the Facility from faults and abnormal system operating conditions.
5. ITO equipment replacements or modifications due to an increase in available short circuit fault current directly caused by the addition of the Facility Owner's equipment.
6. Calibration, testing, and maintenance of relays and protective devices provided by the Facility Owner for the protection of the Transmission System.
7. All telemetering equipment to provide necessary telemetry to the ITO ECC.
8. All studies performed by ITO pertaining to the Facility.

11. INSPECTION REQUIREMENTS

ITO personnel must inspect and approve the Facility before it can be energized. The inspection will focus on all substation equipment from the first protective fault-interrupting device to the Interconnection Point. This may include circuit breakers, circuit switchers, power fuses, instrument transformers, switches, surge arresters, bushings, relays and associated equipment (including battery and battery chargers). The inspection will consist of a visual inspection of all major equipment as well as review of required test results.

12. FINAL DOCUMENTATION

Prior to operation of a Facility, the Facility Owner shall supply to the ITO copies of all final electric one-line diagrams, equipment data, and schematic diagrams. Subsequent revisions affecting the Facility shall be documented with copies of the revised electric one-line and schematic diagrams.

13. APPROVALS

ITO reserves the right to review and approve/accept the equipment used, design, construction, testing, and maintenance of the protective equipment provided by the Facility for protection of the Transmission System.

Prior to the connection with, energizing of, or operation of the Facility, the Facility Owner shall obtain approval from or acceptance by ITO for the Facility, electrical equipment specifications, and operating procedures.

ITO will issue final approval for operation of the Facility. The ITO reserves the right to refuse operation of the Facility for failure of the Facility Owner to meet any of the requirements stated herein to ITO's satisfaction.

ITO's review, approval, or acceptance of the proposed Facility specifications, equipment, design, and plans shall not be construed as confirming or endorsing the design or warranting the safety, durability, reliability, adequacy, or otherwise of the Facility Owner's Facility.

14. COORDINATION WITH OTHER CODES, STANDARDS, AND AGENCIES

In addition to meeting those practices, methods, and standards and the requirements set forth in this document, as may be changed from time to time, the Transmission Facilities' equipment and installation shall conform to the latest revision of the National Electrical Safety Code (NESC), the National Electrical Code (NEC), and all other applicable Federal, State, and Local Government codes. These include American National Standards Institute (ANSI), Institute of Electrical and Electronics Engineers (IEEE), National Electrical Manufacturers Association (NEMA), Occupational Safety and Health Administration (OSHA), Environmental Protection Agency (EPA), Maine Department of Environmental Protection (MDEP), North American Electric Reliability Council (NERC), Federal Energy Regulatory Commission (FERC), Northeast Power Coordinating Council (NPCC), and ISO New England codes and standards, and comply with all mandated compliance standards.

15. INDEMNIFICATION

The Facility Owner, for itself, its successors, assigns and subcontractors will be required to pay, indemnify and save ITO, its successors and assigns, harmless from and against any and all court costs and litigation expenses, including legal fees, incurred or related to the defense of any action asserted by any person or persons for bodily injuries, death or property damage arising or in any manner growing out of the use and reliance upon the information provided by ITO. Reliance upon the information in this document shall not relieve the Facility Owner from responsibility for the protection and safety of the general public.

