

SUPPLEMENT TO
SPECIFICATIONS FOR
ELECTRICAL INSTALLATIONS

OPERATION & MAINTENANCE
REQUIREMENTS
FOR SERVICES ABOVE 600 VOLTS

ELECTRIC SYSTEM BULLETIN No. 755

JUNE 2003

(Supersedes all previous issues of ESB 755.)

Niagara Mohawk

A **National Grid** Company



TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
1.0 INTRODUCTION.....	2
1.1 PURPOSE	2
1.2 SCOPE.....	3
1.3 DEFINITIONS.....	3
1.4 REFERENCES.....	3
2.0 GENERAL.....	3
2.1 CUSTOMER'S RESPONSIBILITY.....	3
2.2 COOPERATION.....	4
3.0 COMPLIANCE.....	4
3.1 INSPECTION.....	4
3.2 OPERATING PROTOCOL WITH THE COMPANY'S SUPPLY.....	4
3.3 NON-COMPLIANCE.....	5
4.0 ROUTINE MAINTENANCE - CUSTOMER'S SERVICE FACILITIES.....	5
4.1 GENERAL.....	5
4.2 CUSTOMER'S QUALIFIED PERSONNEL AND TOOLS.....	6
4.3 COMPANY-CONTROLLED SPACES IN CUSTOMER ELECTRICAL FACILITIES.....	6
4.4 PROTECTIVE RELAY TESTING.....	7
4.5 AFFIRMATION OF MAINTENANCE RECORDS.....	7
5.0 REPAIR OF CUSTOMER'S SERVICE FACILITIES.....	7
5.1 NOTIFICATION.....	7
5.2 PRE-ENERGIZATION REVIEW.....	8
5.3 PROJECT MANAGEMENT.....	8
<u>EXHIBIT 1:</u> SAMPLE CUSTOMER FORM FOR ACCESS TO ENERGIZED SPACES THAT ARE CONTROLLED BY THE COMPANY.....	9
<u>EXHIBIT 2:</u> SAMPLE CUSTOMER LETTER OF AFFIRMING PREVENTIVE MAINTENANCE OF SERVICE EQUIPMENT SERVED ABOVE 600 VOLTS.....	10

1.0 INTRODUCTION

1.1 PURPOSE

1. The Company's Tariff, PSC No. 207, states that the Company is not responsible for the adequacy or safety of the Customer's equipment or wiring. Further, the Company reserves the right to discontinue service whenever the Customer fails to maintain such equipment and wiring in a safe and adequate condition or fails to utilize electricity in such a manner as to avoid interference with the service furnished by the Company to other customers, or with the use of service by the Customer or others.
2. This Supplement to **Electrical System Bulletin (ESB) #750** and to **ESB's #752, #753, #756A, #756B and #758** provides general operation, maintenance and repair requirements and recommendations for a Customer who is supplied by a Company designated voltage in excess of 600 volts.
3. It is important that the Customer and their engineer or contractor obtain and refer to the Specifications for Electrical Installations (**ESB #750**, latest revision) and applicable supplement (**ESB #752 or #753 or #756A or #756B or #758**) in conjunction with this supplement.

1.2 SCOPE

1. These requirements are essential to maintain satisfactory service compatible with the electrical supply to the Customer and to others served by the Company System.
2. This bulletin does not cover the Customer's complete electrical installation maintenance requirements, but concern only those points in which the Customer and their qualified electrical contractor and the Company have a mutual interest.

1.3 DEFINITIONS

Notes: (1) The following are terms defined as used in this publication.

- (2) For other definitions refer to the "**Specifications for Electrical Installations**" (ESB#750), Section 2.

"**Controller**" is the Company's designated person controlling the opening and closing of the Company's supply circuits.

"**Designated Person**" refers to the National Electrical Safety Code term used in NESC Rule 442.

"**Qualified Persons**" refers to the National Electrical Code and National Electrical Safety Code definitions of "qualified person" and "qualified".

1.4 REFERENCES

1. Applicable standards for maintenance, operation, and safety of Customer-owned high voltage installations include, but are not limited to:
 - NETA-MTS "Maintenance Testing Specifications for Electrical Power Distribution Equipment and Systems"
 - NFPA 70B "Recommended Practice for Electrical Equipment Maintenance"
 - NFPA 70E "Electrical Safety Requirements for Employee Workplaces"
 - IEEE/ANSI C2 "National Electrical Safety Code"
 - IEEE Std 902 "IEEE Guide for Maintenance, Operation, and Safety of Industrial and Commercial Power Systems"
 - IEEE Std 1048 "IEEE Guide for Protective Grounding of Power Lines"
 - OSHA 29 CFR 1910, Subpart R, Special Industries, Section 269 – Power Generation, Transmission and Distribution Installations
 - OSHA 29 CFR 1910, Subpart S, Electrical, Section 301 – Electrical Utilization Equipment
2. Supplemental Company Specifications include:
 - ESB No. 752 - Service above 15,000 volts
 - ESB No. 753 - Primary Meter Pole
 - ESB No. 756A - Parallel Generation Requirements – Covered by the NYS Standard Interconnection Requirements
 - ESB No. 756B - Parallel Generation Requirements – Requirements Over 300kVA or Where Interconnected Over 15kV
 - ESB No. 758 - Primary Service to Metal Enclosed Gear

All ESB's are available at <http://www.NiagaraMohawk.com/electricalspecifications>

2.0 GENERAL

2.1 CUSTOMER'S RESPONSIBILITY

1. The Customer's electric service equipment and its installation shall conform to the Company requirements and specifications as applicable in the Purpose section above.

2. The Customer shall be responsible to have all electrical and physical design documents prepared and updated by a design professional, in accordance with **Section 1.7** of **ESB #750**, and as further detailed in either **ESB #752** or **#753** or **#756A** or **#756B** or **#758**.
3. The Customer has the responsibility to provide qualified persons to operate and maintain, in good working order, their service equipment or generation under their ownership that is directly involved with the Company's system, see the Company's **ESB #750** and either **ESB #752** or **#753** or **#756A** or **#756B** or **#758**.
4. The Company requires the Customer to perform protective device calibration and functional testing by qualified persons of any device that operates the Customer's or Generator-owner's main disconnect and overcurrent device necessary for protection coordination with the Company's electric supply connection.
5. If relay settings are altered, they shall be reviewed by the Company for acceptance. Unauthorized setting changes place the Company's system and the Customer's facility at risk.

2.2 COOPERATION

1. The information the Customer or their qualified electrical contractor furnishes to the Company under this bulletin shall be in writing.
2. It is the responsibility of the Customer to ensure the test results meet manufacturer requirements. Receipt of such information by the Company shall not be construed to be an approval of the Customer's facility in regard to its overall safety or adequacy.
3. The Company will advise the Customer concerning any contribution which may be required of them for materials supplied and work performed by the Company associated with the Customer's maintenance or repair activity in accordance with the Company's filed tariff.

3.0 COMPLIANCE

3.1 INSPECTION

1. Refer to **ESB #750, Section 1.8** for inspection requirements for new or changed electrical facilities. For these, the Customer must obtain approval from a certified inspection agency.
2. The Company reserves the right to have an authorized representative examine the Customer's installation for equipment having an effect on the Company's system before it is energized to insure compliance with Company service requirements.

3.2 OPERATING PROTOCOL WITH THE COMPANY'S SUPPLY

1. The Company shall supply operating instructions to the Customer which define the switching protocol for all equipment of mutual interest with the Company. The operating instructions will be based on the following information from the Customer:
 - Contact personnel and telephone numbers and
 - Single-line diagram described in either **ESB #752** or **#753** or **#756A** or **#756B** or **#758** of the Customer's primary and secondary equipment directly involved with the Company's system.
2. The Customer is responsible for maintaining this information up-to-date and notifying the Company of any changes. These operating instructions shall be followed in all operations involving the Customer's service equipment directly involved with the Company's system.
3. The Customer is responsible for developing operating instructions for the balance of their electrical system.

4. Customer personnel or equipment shall not come closer than the following distances to any Company-owned energized overhead conductor: (From New York State High Voltage Proximity Act - 1989.)

600V ≤ 50kV	>50kV ≤ 115kV	230kV	345kV
10 ft.	15 ft.	17 ft.	20 ft.

- 3.2.4.1 No activities shall be permitted which compromise the electrical or structural integrity of the overhead electric facilities.
- 3.2.4.2 No activities shall be permitted which prevent or inhibit the Company from exercising reasonable ingress and egress along the Company's Right-of-Way.
5. At the Customer's request, the Company will provide isolation and grounding guarantees at the Customer's service disconnect or Company isolation point on the supply line ahead of the Customer's service equipment. However, the Customer's qualified personnel shall not rely on the Company's grounding provisions for their safety. The Customer's qualified personnel shall supply their own protective grounds and/or follow their own safety procedures to work on their equipment.
6. The Company will provide nomenclature for Customer's labeling of the main disconnect switch and other electrical equipment referred to in the Company's switching instructions. The Customer shall make provisions for and maintain the labeling of this equipment and any necessary Company mark-up tag holder.
7. NO WORK SHALL BE PERFORMED ON THE MAIN DISCONNECT SWITCH WHILE THE COMPANY'S INCOMING LINE IS ENERGIZED. Notify the Company and arrange for an interruption and a guarantee before doing any work at or near this section. In addition, a grounding guarantee may be requested.
8. The Customer's qualified person(s) shall operate within established Company mark-up rules in any switching operations with the Company for their equipment that both the Company and the Customer have a mutual interest. Customers supplied at 115kV and higher voltage service shall provide the Company with a minimum 7 working day advance written notice for switching requests.
9. The Customer shall recognize and abide by the Company's mark-up rules. The Customer shall conduct their switching based on their switching practices insuring that the Company's mark up is not jeopardized or modified.

Company mark-up tags are used to prohibit operation of electrical devices and indicate that employees are at work. Equipment shall be placed in their protective position and rendered inoperable by locking and tagging. Tags alone may be used when the equipment can not be rendered inoperable by locking. The Customer shall never operate a device that bears a Company mark-up tag.

3.3 NON-COMPLIANCE

Failure to adequately operate, maintain or repair electric service facilities as described in this bulletin will subject the Customer to the terms and conditions of the Company's tariff, PSC No. 207, and individual interconnection agreements resulting, ultimately, in discontinuance of service. See **Sections 3 and 11 in ESB #750**.

4.0 ROUTINE MAINTENANCE - CUSTOMER'S SERVICE FACILITIES

4.1 GENERAL

1. Proper preventative maintenance and/or diagnostic testing are important to the operation of the equipment and shall be performed in accordance with manufacturer's instructions as a minimum.

2. See **Section 1.4** “References” for publications that could be helpful in setting up a maintenance program along with equipment manufacturer instructions.
3. The Company does not provide any spare parts for the Customer's installation. The Customer should determine their inventory of spare parts for fuses, circuit breakers, fault interrupters, switchgear, and other electrical equipment essential to minimize their interruption time.
4. The Customer shall ensure their service equipment, including fuses, is suitable for the available supply characteristics, such as device interrupting capability. Upon request, the Company can provide the Customer the available system characteristics at the service point.
5. Periodic verification of ground grid integrity and ground grid resistance to remote earth is recommended to ensure safe step and touch potentials within the Customer’s facility.

4.2 CUSTOMER’S QUALIFIED PERSONNEL AND TOOLS

1. It is the Customer’s responsibility to provide qualified personnel, properly equipped with safety equipment tested for the circuit voltage involved, to perform all switching or other work on their facility.
2. The Company does not provide any operating tools or test equipment for the Customer's use. The Customer shall provide their own operating equipment such as tongs, insulating switching sticks, insulated rubber gloves, grounds, ground bails, studs and grounding sticks; voltage detection equipment, etc. needed for the safe performance of operating functions. This operating equipment shall be properly maintained and tested according to the manufacturer's instructions.

4.3 COMPANY-CONTROLLED SPACES IN CUSTOMER ELECTRICAL FACILITIES

1. Line terminations and the metering transformer compartments of the Customer's switchgear will be locked by the Company when the Company's work is completed and marked clear with the Company’s Controller.
2. Customer access: The Company's control of electric spaces in Customer-owned electric facilities is for the sole purpose of protecting the integrity of the Company's energy supply and security of the utility metering equipment.
 - 4.3.2.1 See **Section 3.2** for isolation and grounding guarantees at the Customer's service disconnect or Company isolation point on the supply line ahead of the Customer's service equipment.
 - 4.3.2.2 When the Customer does not require a guarantee on the supply line and needs access to Company-controlled electrical spaces for their maintenance purposes, the Company in its sole judgment may determine the ability to grant access to the Customer for the duration established by the Company. When granted, the Company will witness the Customer's placement of their lock immediately after the removal of the Company's lock. Upon notification by the Customer that their work is complete, the Customer shall relinquish access back to the Company and the Company's lock shall be placed immediately upon the removal of the Customer's lock. In each case the transfer shall occur in the presence of both parties. The Company will check its electrical equipment for any signs of tampering.
 - 4.3.2.3 At the sole discretion of the Company, access may be granted to energized spaces controlled by the Company. Such access requires the execution of the agreement in **Exhibit 1**.
 - 4.3.2.4 In the event that the required access is of short duration and the Company's representative remains on site, to avoid a second trip, it is understood they are doing so without any supervisory or oversight capacity relative to the Customer.

4.4 PROTECTIVE RELAY TESTING

1. The Customer's qualified personnel shall perform calibration and functional checks on all Company-designated protective relay devices (typically 50/51 and 50/51N for load customers and for those with parallel generator(s) including 27, 59, 81, and if any 51V and 64 devices are used). It is the Customer's responsibility to determine suitable relay maintenance intervals based on manufacturer's instructions and site specific criteria such as temperature, dust, age of the relays, etc. However, the Customer shall not exceed the following maximum intervals:
 - Microprocessor Relays: 6 years
 - Electro-mechanical Distance/Directional Relays (e.g., 21, 32, 67): 4 years
 - Electro-mechanical Overcurrent/Over/Under Voltage Relays (e.g., 50/51, 27, 59): 6 years
 - Certain relaying schemes require 2-year maintenance intervals due to NERC regulations. The Customer shall be informed separately by the Company if they fall under this requirement.
2. Protective Devices associated with NY SIR Distributed Generation projects:
Protective device maintenance criteria are identified in a test plan provided by the Customer and accepted by the Company. The execution of the plan is by the Customer's qualified person. The Customer shall maintain logs of their periodic verification checks of the type tested devices according to the PSC's required interval and produce documentation to the Company upon request. See **ESB # 756A**.

4.5 AFFIRMATION OF MAINTENANCE RECORDS

1. Copies of test records of major station equipment and protective devices, for example breaker, transformer, outdoor switches, and relays, shall be maintained by the Customer on their premise and be made available to the Company upon request.
2. In addition, the Customer shall submit a written affirmation to the Company that indicates, as a minimum, the recent date and the description of the maintenance activities specified in **Section 4.5.1** above that were performed and by whom including installation document references. See **Exhibit 2** for a sample letter to be used and signed by the Customer when reporting any maintenance performed to the Company.
3. All written affirmations shall be sent to the Company's assigned Account Manager. If written affirmation is not received within 30 days after completion of the verification activities, it is the Company's intent to enforce this requirement as specified in **Section 3.3** above.
4. If changes were noted by the Customer in their written affirmation, the Company will review the changes for acceptance in accordance with the ESB 750 series bulletin in effect.

5.0 REPAIR OF CUSTOMER'S SERVICE FACILITIES

5.1 NOTIFICATION

1. The Customer shall notify the Company for any repair work associated with their fuse, switch, breaker, high voltage fault interrupter, transformer, and relay devices being planned for their electric service facilities with a schedule.
2. The Customer shall follow the operating protocol and isolation and grounding guarantee requirements in **Section 3.2** for repair activities with their electric service facilities.

5.2 PRE-ENERGIZATION REVIEW

1. In the mutual interest to protect the Customer and the Company, the Company may require the submittal of satisfactory equipment test results according to manufacturer specifications.
2. The Customer's outdoor substation physical protection shall be in place in accordance with applicable codes and local requirements, i.e., fence, gates, signs, locks, grounding system. See the Company's ESB #752 or #758.
3. Modifications to Company-designated protective relay settings shall receive prior acceptance from the Company. Once accepted, the Company shall be provided two (2) weeks advance written notice by the Customer to witness calibration of the designated devices before energization.
 - 5.2.3.1 The Company at its sole discretion may review the test results performed by the Customer's qualified person for this verification on Company-designated protective equipment owned by the Customer. The Company's assurance of the Customer's field verification for non-type tested protective devices designated for utility interconnection will include at least the following:
 - (1) Confirmation of the Company's accepted relay settings,
 - (2) Functional checks of the designated relays,
 - (3) Customer supplied documentation:
 - For replaced instrument transformers, the relaying current transformer saturation curves from the manufacturer for protective relay circuits affecting the designated protective devices.
 - Letter stating that all Company-designated protective device control wiring, including the wiring from the instrument transformers, has been verified against the design drawings.
 - Letter stating the most recent calibration and test performed on protective relays affecting the designated protective devices.
 - 5.2.3.2 The Customer's qualified person shall submit to the Company a written summary of the satisfactory test results within five (5) business days after energization. Refer to **Exhibit 2** for a sample letter to affirm the results.
4. The Customer shall submit any proposed main fuse rating change to the Company for review and acceptance. The Customer shall ensure fuses used as the main protective device will be coordinated with their system and shall not be greater than the Company-specified maximum rating.
5. If repairs necessitate the alteration or replacement of electrical equipment or relaying schemes, the Customer shall provide documentation for review and acceptance by the Company based on the applicable ESB 750 series bulletins prior to re-energizing their facilities.

5.3 PROJECT MANAGEMENT

1. All outside communications to and from the Company, rate discussions, billing, energization coordination, etc. shall be directed through the Company's assigned Account Manager.
2. Technical aspects related to the Company's service requirements above 600 volts shall be directed through the Company's division Customer Facilities Engineer.

EXHIBIT 1: Sample Customer form for access to energized spaces that are controlled by the Company

Niagara Mohawk

A National Grid Company



Access to an Energized High Voltage Space Controlled by Niagara Mohawk

XYZ, Contractor, has requested that Niagara Mohawk, NM, remove the lock from the energized electrical space(s) located on the premises of ABC Company 123 ABC Avenue NYS City, NY 14208. Before NM will do so, Contractor shall certify that all persons who will work at this premise will be properly trained for the work and will be properly supervised during the work. Contractor shall also certify that, upon removal by NM of NM's lock, Contractor will immediately install Contractor's own lock and will continuously supervise admittance to the vault until the re-installation by NM of NM's lock.

SO CERTIFIED, this _____ day of _____, _____

CONTRACTOR _____ (See Note)

BY _____

Name _____

Officer Title _____

Date _____

(Note: Officer or owner of Contractor shall insert full corporate name and sign.)

EXHIBIT 2: Sample Customer Letter of Affirming Preventive Maintenance of Service Equipment Served Above 600 volts

<<Customer's letter head>>

Subject: Preventive Maintenance of ___kV Service Equipment at _____

Dear Niagara Mohawk Account Manager:

We have completed our preventive maintenance of the following equipment in accordance with your Company's service requirements and attest that the equipment is acceptable according to the manufacturer's instructions and specifications: <<include the following items as applicable>>

- outdoor gang-operated main disconnect switch
- metal-enclosed switchgear
- power transformers
- circuit breakers
- high voltage fault interrupters (i.e. circuit switchers)
- utility-designated protective relay devices (list as applicable 50/51 and 50/51N for load customers or for those with parallel generator(s) including 27, 59, 81, and if any 51V and 64 devices are used)

<<if applicable>>We are providing the following documentation in support of the accepted relay tests:

- certified calibration sheets of the settings as left on each device,
- updated short circuit and protective device coordination analysis of the high voltage overcurrent protective device and transformer protection system, and
- record of relaying instrument transformer secondary current and voltage checks.

<<where applicable>>In addition, we have verified for our outdoor substation:

- the integrity of the station ground grid meets the required ground grid resistance of ___ ohms for safe step and touch potentials within the station and
- the physical protection is in place in accordance with the utility service requirements and applicable codes and local requirements, i.e., fence, gates, signs, locks, grounding system.

Refer to the enclosed functional single-line diagram for the above equipment maintained and tested.

Our next planned preventive maintenance on this equipment is scheduled for _____ and we will apprise you in this same manner when that time draws near.

<<Customer Signature>>

<<Officer title>>