



PSEG

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Organization: Electric Distribution
Manual: Information and Requirements for Electric Service
Section: Chapters 1, 2, 4, 6 and Appendix

Tracking Number: 05-077
Date: January 6, 2006
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Contact Information: 973-430-6628
Page(s) Effected: 1-3, 5, 6, 7, 8, 11, 12, 13, 15; 2-2, 3, 4; 4-3, 4; 6-5, 6, 8, 9, 10, 12, 13, 14; A-19, 22, 51, 89 and 90.

Description:

This material replaces material in Chapters 1, 2, 4, 6, and the Appendix of the Green Book and becomes Revision 2.

Information and Requirements for Electric Service

Rev 02

January 6, 2006

Record of Revisions

Revision Number	Revision Date	Sections Revised	Reason for Revision
REV 01	June 1, 2005	All	Revised entire <i>Information and Requirements for Electric Service Manual</i> .
REV 02	January 6, 2006	Chapters 1, 2, 4, 6 and Appendix	Additional material in Chapters 1, 2, 4, 6 and Appendix pages A-19, 51, 89 and a new table on A-90.

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Chapter 1 – General

1. Purpose

This publication has been issued by the Public Service Electric and Gas Company (PSE&G) to inform its current and prospective customers, as well as their contractors, engineers and architects, about PSE&G's specific service characteristics and installation requirements. Compliance with these service characteristics and installation requirements is necessary in order to provide for a safe working environment for both PSE&G employees and the customer, and to permit PSE&G to supply safe, adequate and reliable electric service to all its customers. In addition to these written requirements, other practices and procedures may be applicable and recommended by PSE&G based upon its experience, as well as industry practice. It is urged that these recommendations be followed.

The information contained herein is general. It is the responsibility of the customer to consult with a PSE&G representative in advance of installation (preferably at the planning stage) to determine the type of service to be supplied and to review the requirements specific to each customer's particular installation. Compliance with these requirements should help to eliminate delays in obtaining electric service and allow PSE&G to safely deliver its customer's energy needs in a timely manner.

PSE&G reserves the right to revise the information contained herein whenever PSE&G deems it appropriate. Thus, it is the responsibility of the customer, or the person responsible for the installation, to contact PSE&G prior to commencing the installation to confirm that the information relied upon in this book is still current. This information will also be available on the PSE&G website at www.pseg.com.

This PSE&G publication entitled *Information and Requirements for Electric Service* supersedes all previous editions of the PSE&G publication entitled *Electric Service Installation Information and Requirements*, which was commonly referred to as the *Green Book*.

This publication is not intended to supersede the *Tariff for Electric Service* of PSE&G (PSE&G Electric Tariff), as filed with the New Jersey Board of Public Utilities (BPU). This document has been made a part of the PSE&G Electric Tariff by reference. The PSE&G Electric Tariff sets forth the rate schedules and the standard terms and conditions governing the supply of electric service. A copy of the PSE&G Electric Tariff is available on the PSE&G website at www.pseg.com.

The service characteristics and installation requirements set forth herein are based upon the applicable sections of the *National Electrical Code*, the *National Electrical Safety Code*, as well as other standards or specifications specifically referred to herein, and that are available from the American National Standards Institute, Inc. or the National Electrical Manufacturers Association.

2. Clarifications

The initial application for electric service, and any questions concerning matters such as rate schedules, billing or applications for service should be referred to your Service Consultant at the Construction Inquiry Center. Questions concerning the application, or interpretation of PSE&G installation requirements, should also be referred to the Service Consultant at the Construction Inquiry Center.

The references made herein to any governmental authority and to any authorized agency are general. Any questions involving the application or interpretation of their requirements should be referred directly to the authority or agency involved.

Under any provision of this document, any review made by PSE&G of the customer's plans and/or specifications, any examination made by PSE&G of the actual design, construction and/or installation of the customer's equipment, and/or any determination made by PSE&G in connection with any such review or examination will be solely for the purpose of permitting PSE&G, consistent with its statutory, regulatory and contractual obligations to its customers, to:

- a. determine whether the design, construction and installation of such facilities is compatible with the PSE&G system; and
- b. ensure that the provision of service to the customer, based on the expected use of the service, will not adversely affect the integrity, reliability or safe operation of the PSE&G system.

PSE&G's review or examination, and any determination made in connection therewith, is not intended to be, nor will same be made by PSE&G for the purpose of, nor should same be interpreted, construed and/or relied upon by the customer, or any other person or entity, as an endorsement, approval, confirmation and/or warranty of or by PSE&G relative to any aspect of the design, construction or installation of the customer's facilities, their safety, reliability, economic and/or technical feasibility, performance and/or operational capability and/or the suitability of same for their intended purpose(s). The customer shall not represent to any third-party that PSE&G's review was undertaken for any reason other than the reasons expressly stated in this publication.

3. Definitions of Terms

3.1 Approved

Refers to listed materials and methods meeting the requirements of the current editions of the *National Electrical Code* and the *National Electrical Safety Code*, or the inspection authorities having jurisdiction, or a nationally recognized testing laboratory approval.

3.2 Atypical Conditions

The following are examples of atypical conditions:

1. Refers to cases where underground distribution lines or service connections in overhead zones are required due to conditions beyond the control of PSE&G, or are requested by the customer and approved by PSE&G, or are required due to a local

ordinance. The excess costs of such underground construction, less the estimated costs of the equivalent overhead construction, with such net costs grossed up for income tax effects, shall be paid by the customer as a non-refundable contribution.

2. Refers to circumstances where PSE&G may require customer agreements for a longer term than is specified in the Tariff, may require customer contributions toward the cost of the facilities, or may establish other charges where: (1) a large expenditure or special investment by PSE&G is either necessary for the supply of service, or has been requested by the customer; (2) oversized transformers, feeders, or other special facilities must be installed to serve a customer whose electric service is intermittent, momentary or subject to violent fluctuations; (3) the electrical capacity required to serve the customer's equipment is out of proportion to its typical use of electric service for occasional or low load factor purposes, or is for short durations; or (4) service characteristics requested by the customer differ from those normally supplied for a similar size and type of load as specified in this manual.

3.3 Buried Underground Distribution (BUD)

Refers to the system in which the distribution lines and service conductors, with minor exceptions, are required to be buried directly in earth or in underground conduits. Requirements are governed by the *New Jersey Administrative Code* (N.J.A.C.) 14:5-4.1, *Regulation for Residential Electric Underground Extensions* of the regulations of the New Jersey Board of Public Utilities (BPU).

3.4 Cold Sequence

Refers to a meter installation where a disconnecting device is on the line side of the meter.

3.5 Customer

Is used to designate either the present or prospective user of PSE&G's electric service, and/or their designated agent, contractor, engineer or architect.

3.6 Designated Growth Area

Refers to an area designated for growth as detailed in N.J.A.C. 14:3-8.2., and which is depicted on the New Jersey State Planning Commission's State Plan Policy Map, as of the date Service is requested by the customer.

3.7 Distribution Revenue

Refers to PSE&G revenue associated only with its provision of Distribution Service, and as is calculated in Section 3.2 (f) of the *Standard Terms and Conditions of the Tariff*.

3.8 Distribution Service

Refers to a service supplied at nominal voltages of 600 Volts through 13,200 Volts.

3.9 Electric Installation

Refers to the complete electrical wiring and equipment installation at the customer's premises.

3.10 Emergency Standby Generators

Refers to generators that normally operate when PSE&G's service is unavailable, and which shall be connected in a manner approved by PSE&G. Consult your local PSE&G wiring inspector for details.

3.11 Energy Management or Load Management

Refers to a system whereby PSE&G provides customers with energy usage data.

3.12 Extension

Refers to the construction or installation of plant and/or facilities by PSE&G used to provide Service from existing or new plant and/or facilities to one or more new customers, and also refers to the plant and/or facilities themselves. An Extension also includes the Service Drop, Service Run, and any conductors, poles or supports, cable, conduit, rights of way, land, site restoration, handholes, manholes, vaults, line transformers, protection devices, metering equipment and other means of providing Service from existing plant and/or facilities to each unit or structure to be served.

An Extension begins at the existing PSE&G infrastructure, and for overhead Extensions of Service, an Extension ends at the point where the Service Drop connects to the building, or where the Jurisdictional Inspection Authority has responsibility for electrical facility inspection, but also includes the meter. In this case, the building served is the customer's facility that electrically interconnects with the PSE&G Extension. For underground Extensions, the Extension ends at, and includes, the meter unless it is impractical to place the meter at the end of the PSE&G facilities, or where the Jurisdictional Inspection Authority has responsibility for electrical facility inspection, although in any case the meter is considered part of the Extension.

Plant and/or facilities installed to supply the increased load of existing customers are also considered an Extension where either: 1) PSE&G facilities of the required voltage or number of phases did not previously exist, or 2) existing PSE&G facilities are upgraded or replaced due to a customer's new or additional electrical load. The new plant and/or facilities installed also must be nominally physically and electrically continuous from the beginning to the end of the Extension.

PSE&G facilities used exclusively for the purpose of providing lighting service under Rate Schedules BPL or PSAL are not considered part of an Extension.

3.13 E1 Notification

Refers to a formal request for information concerning all customer needs, that is created in PSE&G's Distribution Work Management System (**DWMS**). (Formerly referred to as an "ESI".)

3.14 Hot Sequence

Refers to a meter installation where a disconnecting device is on the load side of the meter.

3.15 Mains

Refer to the PSE&G distribution lines that are located along the streets, highways or on private property when used or intended for use for common distribution (more than one customer).

3.16 Metalclad Switchgear

Refers to a metal structure containing a main switching and interrupting device and other associated equipment. A separate grounded metal compartment is required for the metering transformers, buses and connections.

3.17 NRTL

Means a nationally recognized testing laboratory, such as Underwriters Laboratories or "UL".

3.18 Non-Growth Area

Refers to an area that is not in a Designated Growth Area.

3.19 Non-Utility Generators

Refers to electric service customers that are privately owned generators, cogenerators or small power producers, and that operate in parallel with PSE&G's electric system. In some cases, energy may flow in either direction through the interconnection, and bi-directional or separate in and out meters shall be installed to meter these customers.

3.20 Point of Connection

Refers to the point where facilities installed by PSE&G are connected to the customer's facilities.

- a. The point of connection for overhead secondary services is at the service head on the customer's building or structure, and adjacent to the first point of attachment of the service drop to the building or structure.
- b. The point of connection for underground secondary services, including BUD from underground mains, is:
 1. For outdoor meter locations – at the meter mounting equipment; or
 2. For indoor meter locations – just within the building wall at the point where the service run enters the building, or at the splice box just outside the building.
- c. The point of connection for underground secondary services from overhead mains is at the termination of the underground service cable on the PSE&G pole.

- d. The point of connection for secondary services served from transformers on a mat or pad is the secondary terminals of such transformers, except in Buried Underground Distribution (**BUD**) systems.
- e. The point of connection for primary, subtransmission, or transmission services will be indicated by PSE&G upon request, or when plans are submitted for approval.
- f. Due to the nature of Outdoor Lighting service provided by PSE&G pursuant to Rate Schedules BPL and PSAL, there is no point of connection for such service.

3.21 Premises

Refers to a tract of land including any buildings, appurtenances and improvements thereon or any part thereof.

3.22 Primary Service

Refers to service supplied at nominal distribution circuit voltages above 600 Volts supplied from PSE&G's distribution system, Where the customer owns the distribution transformer and is responsible for any voltage transformers for its own secondary service requirements.

3.23 PSE&G

Refers to the Public Service Electric and Gas Company.

3.24 Secondary Service

Refers to service supplied at nominal voltages of 600 Volts or less.

3.25 Service

Refers to the supply of electricity to the customer.

3.26 Service Drop

Refers to the portion of an overhead service run from the last pole to the point of connection to the customer's facilities.

3.27 Service Entrance Installation

Refers to the service entrance wiring and equipment installed at the customer's premises.

3.28 Service Entrance Interrupting Device

Refers to a circuit breaker or fused load interrupter switch included as part of the Service Entrance Installation and designed to serve as:

1. A load switching mechanism to open or close a circuit under normal operation by non-automatic means; and

2. An automatic isolating mechanism to interrupt any short circuits within the customer's installation, where such short circuits have not already been satisfactorily interrupted by other devices.

3.29 Service Run

Refers to the poles, conduits and conductors (including handholes, manholes, vaults, and transformer pads) between PSE&G mains and the point of connection to the customer's facilities.

3.30 Subtransmission Service

Refers to a service supplied at nominal voltages of 26,400 Volts through 69,000 Volts. There is some limited amount of 13,200 Volt Subtransmission Service still in service, but this voltage is no longer available to new Subtransmission Service customers in the PSE&G system.

3.31 Tariff

Refers to the applicable rates, schedules and electric service terms and conditions under which all service is rendered by PSE&G, and which is approved by and on file with the New Jersey Board of Public Utilities.

3.32 Temporary Service

Refers to a service intended to be used for a limited period, such as for construction, exhibition, or carnival purposes. The Temporary Service facilities will be removed at the completion of its use.

3.33 Transmission Service

Refers to service supplied at nominal transmission circuit voltages of 138,000 Volts and above.

4. Ownership, Maintenance and Removal of Apparatus Provided by or for PSE&G

These conditions must be followed:

1. Transformers, network protectors, meters, meter mounting equipment, instrument transformers, auxiliary metering equipment, enclosures for metering equipment, SCADA and telemetering equipment, overhead and underground lines and other appurtenances now or previously furnished by PSE&G and installed in or on the customer's premises remain the property of PSE&G. All reasonable care shall be exercised to prevent loss or damage to these facilities. PSE&G may remove this equipment when, in the opinion of PSE&G, such facilities are no longer required by the customer.
2. Under certain circumstances, it may be necessary for PSE&G to install equipment including transformers, network protectors, switches, metering equipment or other

equipment including wire and cable, in or on the customer's premises and in facilities provided by the customer for PSE&G's use, including but not limited to: manholes, handholes, vaults, conduit and ductbanks. The customer is responsible for maintaining its privately owned manholes, handholes, vaults, conduit, ductbanks and similar facilities at its sole expense unless such facilities were built for PSE&G's use and to PSE&G specifications and requirements, and were subjected to PSE&G inspection and approval of construction. Thereafter, PSE&G will repair and maintain such facilities subject to specific limitations referenced in other sections of this manual.

3. In the event that PSE&G will be installing oil-filled equipment on the customer's premises, the customer shall comply with the requirements shown in Section 17 of this chapter and all the pertinent environmental regulations.

5. PSE&G Responsibility for Electric Installations

PSE&G does not make new electric installations or repairs on the customer's premises beyond the "point of connection" other than on PSE&G owned equipment. Where an underground service continues through or under a building PSE&G may install wire at the customer's expense. PSE&G assumes no responsibility for the condition of the customer's electric installations, or for accidents, fires or failures that may occur as a result of the condition of these electric installations.

6. Application for Service

The following items must be reviewed by the customer as part of their application for service:

1. Before any additions, alterations or upgrades to a customer's electric service installation or equipment are made, PSE&G must be notified through your Service Consultant at the Construction Inquiry Center. All new wiring shall be installed to comply with all rules and regulations in effect at the time the additions or alterations are made. The new wiring or equipment must not be connected until such work has been approved by the inspection authority having jurisdiction. The customer shall be held solely responsible for any damage to PSE&G facilities, or customer equipment, resulting from failure to comply with this requirement.
2. In order to obtain service, the customer or his agent must contact the Service Consultant at the Construction Inquiry Center in the area where the customer's installation is located, and as far in advance of the start of construction, or date of occupancy, as possible.
3. The Service Consultant at the Construction Inquiry Center will initiate an E1 Notification, make arrangements for supply of service where necessary, furnish rate schedules, identify the type of service to be supplied, explain any special requirements and charges for the service, and verify the availability of the size of service requested. The Construction Inquiry Center will consult the local Electric Distribution Division office to confirm the type of service to be supplied to a particular location. The local Electric Distribution Division office representative will

confirm the requirements for the service entrance installation and service entrance equipment with the customer. At that time, the Service Consultant shall inform the customer whether they are in a Growth Area or Non-Growth Area. If the Service Consultant can not make a clear determination, they will contact the New Jersey Department of Community Affairs, Office of Smart Growth, for a final determination. The customer is also free to contact the Office of Smart Growth regarding their area designation.

4. Information concerning the type of service to be supplied by PSE&G, and any associated technical requirements, must be requested by the customer before making any financial commitments or purchasing electrical materials or equipment. When Metalclad Switchgear is to be installed, the customer will supply PSE&G with 3 sets of drawings prior to purchasing the equipment, in order to obtain PSE&G's approval that such switchgear meets its requirements. PSE&G will not be responsible for any customer mistakes that result from a disregard of these requirements.
5. When PSE&G is requested to furnish an entire electric system to new residential buildings and mobile homes within an approved subdivision having three or more building lots, or to new multiple-occupancy buildings not more than four stories in height, this service is subject to the provisions of New Jersey Administrative Code (**N.J.A.C.**) 14:5-4.1 et. seq., *Regulation for Residential Electric Underground Extensions* of the New Jersey Administrative Code. This Regulation provides that extensions of electric lines within such subdivisions shall be made underground. Where this Regulation is applicable, PSE&G will install a Buried Underground Distribution (**BUD**) system that will normally involve a cost to the applicant, based on unit costs in the Schedule of Charges which is part of the *Tariff for Electric Service* and which is on file with the Board of Public Utilities.
6. The developer, builder or owner of the subdivision, should carefully review the requirements of the BUD Regulation prior to submitting its application to PSE&G. Refer to the N.J.A.C. for the Regulation or request how to get a copy of the BUD Regulation from the Board of Public Utilities, Two Gateway Center, Newark, New Jersey 07102.

7. Application for Wiring Inspection

In order to meet the customer's construction schedule, an "Application for Wiring Inspection," PSE&G form 432, is required **before work is started by the customer**. This form notifies the Wiring Inspection group of the local Electric Distribution Division office that the customer's proposed work is scheduled to be started. As soon as practicable, the customer shall arrange a meeting with the PSE&G Wiring Inspector at the site for the purpose of identifying the point of connection and service entrance equipment location. PSE&G will review the customer's proposed service entrance equipment for conformance with PSE&G specifications, and will furnish any other information concerning the requirements for service.

8. Inspection and Acceptance of Customer's Installations

The following items pertain to the inspection and acceptance of customer's installations:

1. PSE&G does not inspect customer wiring beyond the meter. Before electric service is provided, PSE&G will require a Certificate of Approval (Cut-in card) for the entire electrical installation. PSE&G will refuse to connect with any customer's installation, or make additions or alterations to the existing service connection, without receiving a certificate approving the customer's electrical installation. PSE&G may refuse to connect to any customer's installation, or make additions or alterations to the existing service connection, when it is not in accordance with the *National Electrical Code* and with the *Standard Terms and Conditions* of the Tariff. Certificates are issued by the local municipal code official; a Federal, State or County Agency; or any other agency authorized to perform such functions and services as may be designated and approved by the New Jersey Board of Public Utilities. PSE&G may inspect the service entrance installation upon notification of its completion by the customer. Certificates of Approval should be hand carried or mailed by the inspection agency to PSE&G. However, to expedite service, certificates may be telecommunicated to PSE&G by an authorized inspection agency. Telecommunicated certificates must be followed up with the original certificate. Certificates of Approval, also known as **Cut-in cards will not be accepted from contractors or customers**.
2. It is the customer's responsibility to contact the local municipal construction code office, or other inspection authority having jurisdiction, to apply for the appropriate municipal electrical inspection. Information concerning municipal inspection fees and schedules may be obtained from the local municipal construction code office.
3. Where building alterations or rewiring make relocation of the meter and/or service drop necessary, the new location must be approved by PSE&G. The new wiring must also be approved by the inspection authority having jurisdiction before PSE&G will change the meter or relocate the service to the new location. All persons, except authorized employees or agents of PSE&G, are forbidden to remove, relocate, or otherwise alter the PSE&G meter and its connections without prior approval from PSE&G. Attention is called to the applicable New Jersey statutes referenced in this Chapter.
4. Changes requested by the customer to the location of the existing service run, if approved by PSE&G, shall be made at the customer's expense. In the event PSE&G approves such a change in location, existing service facilities shall be utilized when they are adequate for the customer's load.

9. Permits

PSE&G will make application for any street opening permits required for installing its service connections, and shall not be required to furnish service until after such permits are granted. The customer shall be required to pay the permit fee or other charge, if any, for permission to open the street. The customer shall obtain and present without charge to PSE&G all documents providing for easements or rights-of-way, and all permits

(except street opening permits), consents, and certificates necessary for the introduction of service.

10. **Prevention of Damage to Underground Electric and Gas Facilities**

Prior to the start of excavation or demolition, all contractors are required by New Jersey State Law to make proper notification to the One-Call Damage Prevention System, at 1-800-272-1000, to allow operators of underground facilities to temporarily locate and mark their facilities. All temporary markouts shall conform to the requirements of N.J.A.C. 14:2, "*Protection of Underground Facilities: One-Call Damage Prevention System.*" See Exhibit 28 of this document.

When markouts are performed by PSE&G, all underground electric markouts shall be marked with the letter designation "E" and shall be made in High Visibility Safety Red. All gas markouts shall be marked with the letter designation "G", and be made in High Visibility Safety Yellow. These colors are in accordance with ANSI Standard Z53.1, and the Uniform Color Code of the Utility Location and Coordination Council.

The following are general guidelines for markouts requested through the One-Call System:

1. Markout requests shall be made a minimum of 3 business days, but not more than 10 business days, **prior** to the start of excavation or demolition.
2. PSE&G shall complete the temporary markout of its underground facilities within 3 business days of notification by the One-Call System, and the contractor should plan accordingly.
3. The request for markout of facilities is valid for 10 business days from the date of notification. Any excavation or demolition occurring after 10 business days from the date of notification shall require a new notification.
4. The request for markout for excavation or demolition work started within the 10 business day period, is valid for 45 business days from the original request date. After the start of excavation or demolition, the contractor is responsible to protect and preserve any markout that is made by PSE&G or any other operators of underground facilities.
5. Any excavation or demolition work continuing longer than 30 business days from the original request date requires a new notification to be made by the contractor prior to the end of the original 30 business day period.

11. **Sealing of Meters and Devices**

All meters, and devices containing unmetered wiring, will be sealed by PSE&G. All unmetered wiring within a building shall be so enclosed as to be inaccessible. In the event that access to the sealed devices is required, the customer should contact the Wiring Inspection Department at the local Electric Distribution Division office for

assistance. Attention is also called to the applicable New Jersey statute regarding theft of service issues given in the following Section.

12. Theft of Service and Tampering

In the event the customer, his agent, architect, engineer or contractor discovers one or more of the following:

1. The existence of foreign wires, conduits, cables, conductors, meters or other devices at or connected to the equipment of PSE&G;
2. The absence of meters or equipment that would ordinarily be expected to be present in order to accurately measure electric use;
3. That tampering with the meters or other equipment of PSE&G has occurred; and
4. In the event any of the above is discovered, theft of service should be suspected. Do not work on the equipment without first reporting the situation to the PSE&G Wire Inspector, or by telephoning **1-800-882-0145**. PSE&G will respond and further direct you on how to proceed. **If you work on equipment that has been tampered with, you may compromise your safety and risk serious injury to yourself or others.**

Tampering with PSE&G equipment and facilities is unauthorized and illegal.

If questions regarding customer obligations and liabilities regarding theft of service or tampering arise, the *Theft of Service* regulations can be found in New Jersey Statute 2C:20-8.

13. Expediting Electric Service

The following items will serve to expedite service:

1. The customer must contact the Service Consultant at the Construction Inquiry Center as soon as practicable to determine if adequate service of the type desired is available at the customer's location. PSE&G may, under the terms and conditions of its *Tariff for Electric Service*, require from customers any of the following: deposits, service connection charges, minimum guarantees, facilities charges, easements, or other special arrangements before supplying service.
2. The customer must apply for:
 - a. An authorized agency electrical inspection at its respective location: and
 - b. A PSE&G wiring inspection at the local Electric Distribution Division office, as soon as practicable. PSE&G will not issue meter mounting equipment or any other necessary metering equipment until such applications have been made.
3. The customer must notify the local inspection authority as soon as all electrical work is completed.
4. The customer must notify the local PSE&G inspection department as soon as the service entrance installation, including grounding, is completed.

5. If a pole line or underground line extension is required, any roads, streets and easement areas should be accessible and graded soon enough to permit passage and use of construction vehicles for the installation of the line facilities in advance of the required service date. If access to a pole line and/or underground line is required for installation, or for future operations and maintenance activities, and the pole line and/or underground line is not constructed along a paved area, the customer shall have an access route planned along the pole line and/or underground line that is capable of supporting heavy vehicles needed for work on the line. This route shall be paved, or have another access design that would need to be pre-approved by PSE&G as to its suitability. Curbs must be installed prior to the start of any PSE&G work.
6. Direct buried underground extensions installed by PSE&G will not be made during winter months when soils are frozen. It is vital that a developer's construction plan is coordinated with PSE&G so as to permit construction of such underground facilities during the warmer months of the year.
7. All PVC conduits shall be NRTL listed as approved for electrical use, otherwise the installation will not pass inspection.

14. Access to Customer's Premises

PSE&G must have the right of reasonable access to customer's premises, and to all equipment furnished by PSE&G, at all reasonable times for the purposes of: inspecting a customer's premises incident to the rendering of service; the reading of meters; or the inspecting, testing or repairing of PSE&G's facilities used in connection with supplying the service; or for the removal of its equipment. The customer shall obtain, or cause to be obtained, all security clearance approval permits needed by PSE&G for access to its facilities. Only authorized employees of PSE&G, or duly authorized government officials, can have access to PSE&G facilities.

For the mutual protection of the customer and PSE&G, all company employees carry identification cards, which shall be shown upon request.

15. Customer Requested Shutdown

Customers requesting a shutdown to their electric service shall provide PSE&G with advance notice. Please call PSE&G to determine the appropriate advance notice that is required to arrange for a shutdown and review any other requirements. PSE&G will normally disconnect the service for a customer requested shutdown without cost under the following conditions:

- PSE&G's work can be performed during normal working hours and during non-inclement weather, operating conditions permitting, or
- PSE&G's work is not within the normal work day but the shutdown can be performed by shift personnel.

PSE&G shall bill the customer for the following types of shutdowns:

- Guaranteed shutdowns;

- Shutdowns requiring construction crews for atypical conditions;
- Where the customer, for their convenience, requests a shutdown when the customer's work can be performed in an alternative manner not requiring a shutdown; or
- Shutdowns requested during non-normal working hours or on weekends, or shutdowns involving atypical conditions.

The customer will pay PSE&G for the shutdown cost before PSE&G performs the work. PSE&G may charge a flat rate for the shutdown or bill at a "time and material" rate for more complex shutdowns.

16. Smart Growth Related Customer Charges and Contributions

16.1 Extensions - General Provisions

Where it is necessary for PSE&G to construct an Extension to serve the requirements of a customer, PSE&G may require a deposit or contribution from the customer to cover all or part of the cost of the Extension, which must be paid to PSE&G prior to any work being performed, based upon the estimated cost of the job. See Section 3 of the *Standard Terms and Conditions of the Tariff* for further details of how such charges are determined. During construction, the charges may be increased if severe conditions such as excessive rock or other unknown conditions are found during excavation or project work.

16.2 Charges for Extensions - Non-Growth Areas

Customers requesting service in designated Non-Growth Areas will be charged, as a non-refundable contribution, the full cost of any Extension, grossed up for income tax effects, installed in conjunction with the provision of service.

16.3 Exemptions from Non-Growth Area Charges

Charges for an Extension in a non-growth area in the following cases shall be based on the methodology given in Section 16.4 below, as if they were located in a Designated Growth Area, even if the PSE&G facilities providing such service are located in a Non-Growth Area:

- a. Where the new PSE&G facilities are installed solely to furnish service to an agricultural building or structure whose sole use is the production, storage, packing or processing of agricultural or horticultural products, provided that the majority of these products were produced on a New Jersey commercial farm, as defined in N.J.S.A. 4:1C-3; or
- b. Where authorized in writing by the New Jersey Board of Public Utilities in accordance with the provisions of N.J.A.C. 14:3-8.8, where the project would provide a significant public good or where compliance with Smart Growth regulations would cause an extraordinary hardship for the customer.

16.4 Charges for Extensions - Designated Growth Areas

Customers requesting service in Designated Growth Areas may be charged a deposit for service. The amount of such deposit will be determined by PSE&G by comparing the estimated Distribution Revenue to the applicable costs of the Extension. The detailed explanation, by customer type, of such deposits, if required, is contained in Section 3.8 of the *Standard Terms and Conditions of the Tariff*.

16.5 Charges for Extensions - Mixed Designated Growth and Non-Growth Applications

For a customer requesting service to an area comprising both a Designated Growth Area and a Non-Growth Area, the costs of the Extension shall be apportioned between the Areas in accordance with Section 3.9 of the *Standard Terms and Conditions of the Tariff*.

The amount of deposit and/or non-refundable contribution charged the Applicant shall be based upon the methodologies as specified for each area, as detailed in Sections 3.7 and 3.8 of the *Standard Terms and Conditions of the Tariff*.

16.6 Charges for Increased Load

When it is necessary for PSE&G to construct, upgrade, or install facilities necessary to service the additional requirements of existing customers located in either a Growth or Non-Growth Area, and these facilities do not meet the definition of an Extension, PSE&G may require a deposit from the customer to cover all or part of the investment necessary to supply service. Any such deposit will be calculated in accordance with Section 3.11 of the *Standard Terms and Conditions of the Tariff*.

16.7 Changes in Smart Growth Regulations

In the event of any changes to the Smart Growth regulations or interpretations thereof, that cause a conflict between the procedures outlined in this Section and the regulations, the language of PSE&G's electric Tariff incorporating such changes shall govern.

17. Environmental Issues

17.1 Application for Service

The customer must identify any pertinent environmental concerns related to the project, including but not limited to soil contamination or the presence of wetlands, when it makes its application for a new, relocated or upgraded service. PSE&G must be advised by the customer whether its project is, or will be, constructed upon a formerly utilized property, a "Brownfield" contaminated site, and/or a deed restricted site in either an urban or suburban area. Documentation must be presented to PSE&G regarding any and all contamination known to exist at the project site. PSE&G requires that all areas to be used for installing our facilities shall be uncontaminated.

Please note that failure to advise PSE&G of unacceptable environmental conditions, when discovered by PSE&G, may cause all site work to cease for the safety of our employees, our assigned contractors and the public, until an acceptable resolution of the issue is accomplished by the customer.

17.2 Spill Prevention, Control and Countermeasure Plan (SPCC-40 CFR 112)

- 17.2.1** If the customer currently has an SPCC Plan, it must be modified to meet the SPCC regulatory requirements in the event that PSE&G installs oil-filled equipment on the customer's property to serve its load.
- 17.2.2** If the customer is currently below the threshold for requiring an SPCC Plan, and the installation of PSE&G oil-filled equipment triggers the need for such a Plan, then the customer needs to file an SPCC Plan, and include PSE&G's oil-filled equipment as part of their application, including the design of all required engineering controls. The customer is responsible for the cost of installation of any controls required by the Plan to accommodate PSE&G's oil filled equipment.
- 17.2.3** If the installation of PSE&G's oil-filled equipment does not elevate the customer's facility to the level where it requires an SPCC Plan, the customer may still want to design the placement area for the oil-filled equipment using appropriate engineering controls in the event that future equipment added to the facility may require a Plan. This way the customer would avoid retrofitting controls at that time.

Chapter 2 – Characteristics of Electric Service

1. General

The following items discuss some of PSE&G's service characteristics and practices:

1. The standard service supplied by PSE&G is alternating current with a nominal frequency of 60 Hertz (cycles per second).
2. The type of service designated by PSE&G will be in accordance with its *Tariff for Electric Service* and may depend upon the facilities available at the customer's location. **Customers with computer operations or other sensitive equipment are expected to provide their own isolation equipment to protect its facility from PSE&G system voltage dips, spikes, surges and harmonics.** The manufacturers of such sensitive equipment should be consulted to determine what auxiliary devices are needed before the customer purchases computers and other sensitive equipment such as microprocessors and robotics. The customer shall insure that no harmonics or transients are introduced onto the PSE&G system due to any equipment installed at its premises. (See Chapter 6 Voltage Sensitive Equipment of this document for more information.)
3. Customers shall typically receive the standard PSE&G service supply that is available at its location, including the number and size of circuits, type of service, capacity, location of PSE&G plant and point of connection. Where special facilities which differ from those normally supplied by PSE&G for a given size and type of load are specifically requested by the customer, these special facilities may not be considered a part of the normal facilities covered by the Tariff. If it is practical to install these facilities, such special facilities may be made available upon payment of a facilities charge or a deposit as determined by PSE&G. Such charges may be subjected to an additional tax gross-up due to their effect on PSE&G's taxable income under the provisions of the *Internal Revenue Code*.
4. If a customer specifically requests, and PSE&G agrees to supply, three-phase service for a load for which PSE&G would normally specify a single-phase service, a charge based on the amount by which these three-phase facilities exceed in cost the estimated cost of the single-phase facilities shall be billed to the customer as a charge for special facilities, without any revenue or minimum service credit. This charge, which is in addition to the usual line extension and service connection charges for single-phase service, will be based upon appropriate unit costs, including any necessary additional costs in poles, pole accessories, primary conductors, transformers, and secondary conductors. No additional charge is made for any three-phase facilities that are already available and are adequate for the customer's load.
5. PSE&G will make every effort to provide the customer with the service characteristics requested. The determination will be dependent upon various factors including the following: size and type of load, availability of the facilities, location, cost to supply the service, expected customer revenue, future plans for the area, and any special operating conditions. After considering these factors, the type of service to be supplied shall be determined at the discretion of PSE&G, and may

differ from the customer's request. A customer contribution may be required if the projected revenue is insufficient to cover the cost of providing the requested service. The customer may also be responsible for a Feasibility Study Charge for engineering or cost estimates related to requests for a plan of supply different from that designated by PSE&G, in accordance with Section 5 of this chapter.

6. Three-phase service is susceptible to a phenomenon known as single-phasing, due to the interruption of one or two phases of the three-phase supply. This condition may be caused by any number of factors in the utility system or the customer's wiring, including single-phase to ground faults, wires down due to storms, vehicle pole hit accidents, or blown fuses. Under certain limited circumstances, three-phase customers may receive sustained low voltage on one or two phases until normal service can be restored. The customer's equipment shall be suitable or adequately protected to accept this type of service.
7. For real estate developments, or for several customers in the same general area who apply simultaneously, the principles given in paragraphs 3 and 4 above are applied to the individual customers to determine the type of service to be specified. The total charge, if any, is then made to the developer or allocated among the individuals in the same manner as similar charges for line extensions.
8. Any transformation of the service voltage shall be done by and at the customer's expense.
9. Where applicable, PSE&G recommends that the customer consider specifying motors that operate at 240 or 480 volts rather than 208 volts due to improved motor operation, particularly if the customer's load is principally electrically powered, or if long runs of wiring are involved. For 208 volt services, resistance heating appliances such as ranges and water heaters should be equipped with coils rated at 208 volts for satisfactory operation.
10. Services must be grounded when required by the *National Electrical Code*, State or municipal authorities, or when the service available is of the grounded type.
11. The types of services supplied by PSE&G are shown in Table 2-1. kVA guidelines shown are subject to a separate determination in each case. The customer shall design its equipment bracing based upon its maximum service size, not its connected load. For non-standard sizes, such as services for cell tower sites, DOT installations, pumping stations, or non-residential pools, the customer shall discuss the application with PSE&G. Secondary connections to PSE&G transformers 500 kVA and above shall be in accordance with **Exhibit 29**.
12. PSE&G will furnish the appropriate transformers for supplying secondary customers in overhead zones. Such transformers will be one of the following types:
 - a. Pole-mounted
 - b. Pad-mounted located at the customer site; or
 - c. Located in a customer-furnished exterior vault

Unless extenuating conditions exist at the customer's site that preclude using all of the above listed options, submersible-type transformers and transformer installations in interior vaults shall not be used for providing service to secondary

customers in overhead radial distribution zones. This policy is based upon higher equipment installation and maintenance costs, poor accessibility, reduced reliability and longer outage restoration times associated with this type of equipment. PSE&G has sole discretion on whether to install submersible transformers, or to place transformers in interior vaults.

Table 2-1: Recommended Secondary Service kVA Demands

Recommended Secondary Service kVA Demands						
Type of Service	Volts	Maximum Service Size	Overhead Service	Underground Service	Pad Mounted Transformer	Underground Network
Single-Phase, Two-Wire	120	30A	3.6 kVA max	3.6 kVA max	3.6 kVA max	3.6 kVA max
Single-Phase Three-Wire	120/240	400A*	100 kVA max	100 kVA max	167 kVA max	N/A
Single-Phase Three-Wire	120/208	100A	20 kVA max	20 kVA max	20 kVA max	20 kVA max
Three-Phase, Three-Wire	240	400A*	55-300 kVA	55-300 kVA	150-1500 kVA	N/A
Three-Phase, Four-Wire	120/240	400A	15-150 kVA	15-150 kVA	N/A	N/A
Three-phase, four-wire	120/208	4000A	55-300 kVA	55-300 kVA	150-1500 kVA	20 kVA min
Three-Phase, Four-Wire	277/480	4000A	55-300 kVA	55-300 kVA	150-3000 kVA	1000-3000 kVA

Note: *Normally for 120/240 volt service from pad mounted transformers, the maximum service size is 400 amperes. Under certain operating conditions, permission may be granted for installation of 600 amperes service equipment for an individual 120/240 volt load. Consult the local Electric Distribution Division office for requirements.

2. Service from the Primary System

PSE&G will supply service at a nominal 4,160 volts or nominal 13,200 volts, three-phase, four-wire as required, where available and as warranted by the conditions specified in Table 2-2. In certain areas where PSE&G expects to convert to 13,200 volt supply, the supply may initially be furnished at a nominal 4,160 volts, but service and transforming facilities shall be designed for future operation at a nominal 13,200 volts. The customer should design its service entrance facilities, cables, switchgear and transformers to take the eventual conversion from 4,160 volts to 13,200 volts into account. The customer is also responsible for any billing metering equipment required, including PSE&G's meter relocation costs. PSE&G will provide the customer with an

estimated time for when such conversion is scheduled, if known at the time service is requested. Such service will not be supplied from a distribution circuit that supplies only secondary network load.

3. Service from the Subtransmission System

PSE&G will supply service at a nominal 26,400 volts, three-phase, three-wire, where available and warranted by the conditions specified in Table 2-2. In certain restricted areas this supply may be at a nominal 13,200 volts initially, but service and transforming facilities shall be designed for future operation at a nominal 26,400 volts. Such service will not be available from 26,400 volt circuits supplying a secondary network.

PSE&G will supply service at a nominal 69,000 volts, three-phase, three-wire, where available and warranted by conditions specified in Table 2-2. In certain restricted areas this supply may be at nominal 26,400 volts initially, but service and transforming facilities shall be designed for future operation at a nominal 69,000 volts. Such service will not be available from 69,000 volt circuits supplying a secondary network.

4. Service from the Transmission System

PSE&G will supply Transmission Service at a nominal 138,000 or 230,000 volts, three-phase, three-wire or four-wire, for very large loads or where required by special conditions. PSE&G may require that service and transforming facilities installed for a nominal 138,000 volt service be designed for future operation at 230,000 volts.

Table 2-2: Recommended Primary, Subtransmission and Transmission Service kVA Demands

Type of Service	Volts	Levels of Demand
Three-Phase, Four-Wire	4,160	500 - 3,000 kVA
Three-Phase, Four-Wire	13,200	500 - 5,000 kVA
Three-Phase, Three-Wire	26,400	3,000 - 30,000 kVA
Three-Phase, Three-Wire	69,000	over 30,000 kVA
Three-Phase, Three-Wire	138,000	over 30,000 kVA
Three-Phase, Four-Wire	138,000	over 30,000 kVA
Three-Phase, Three-Wire	230,000	over 30,000 kVA
Three-Phase, Four-Wire	230,000	over 30,000 kVA

5. Feasibility Study Charges

The following are general requirements for feasibility studies:

1. A Feasibility Study Charge may be charged to a customer for engineering or cost estimates when that customer requests a plan of supply different from that designated by PSE&G.
2. Authority to establish such charges is in Section 3.3 - Atypical Operating Conditions, of the *Standard Terms and Conditions* of the Tariff.
3. Upon a customer request for service to a new or additional load, PSE&G will determine the preferred method of serving that load, including designation of the electric service voltage.
4. If the customer requests a plan of supply different from that designated by PSE&G, PSE&G will initially provide up to 10 person-hours of cost estimating resources at no charge to the customer. These resources will be used to provide one or more conceptual estimates (also known as "office estimates") of the total job, and the amount of the customer contribution required, if any. The customer should be aware that these estimated costs may vary significantly from more detailed engineering cost estimates.
5. If the customer requests a more detailed engineering cost estimate (also known as a "budget estimate") for an alternate supply plan, the customer shall be required to furnish PSE&G a deposit in the amount of \$10,000 from which the costs to develop the estimate will be charged. Any unspent funds remaining from this deposit will be returned to the customer at the completion of the detailed cost estimate.
6. For extremely large, complex, or unusual projects or requested changes in supply plans, the local Electric Distribution Division office may increase the amount of the deposit required for providing a detailed engineering cost estimate.
7. In those cases where a Feasibility Study Charge is applicable (i.e. beyond the first 10 person-hours of labor), it will include the cost of all engineering and design labor, outside services, supervision, overheads and office costs (drawings, printing services, telephone, etc.). The charges shall not include the planned cost of electric distribution equipment or supplies not yet purchased (such as transformers, conductors or poles) or field preparation work not yet performed (such as trenching and safety mark outs).
8. Once PSE&G has begun constructing a service (either the original or another alternate plan of supply), the customer, in addition to any additional Feasibility Study Charges for the alternate supply plan, shall be responsible for any PSE&G costs or expenses related to the original supply plan that cannot be utilized in the requested revisions, and all equipment purchased by PSE&G that cannot reasonably and timely be used for the supply to other customers, and any field preparation work already performed.
9. Customer payment of any Feasibility Study Charges, or refunding of such unused portion of a customer deposit, shall have no impact on any other customer contribution required related to supplying service including those for: temporary services; any requested special equipment; excess facilities required as a result of

the application of either the electric Line Extension and Service Connection policy;
or any other customer contributions or deposits required by PSE&G.

Chapter 4 – Service Entrance Installations

Note For on-time electric service:



- Apply for meter installation as early as possible, but no less than 6 to 8 weeks in advance of the necessary service date.
- Before beginning work, apply with your local inspection agency and for a PSE&G wiring inspection.
- After the local inspection Certificate of Approval is received and PSE&G inspection is complete, service will be connected without delay.

1. General

The following general requirements apply to service entrance installations:

1. Except as otherwise provided herein, the customer shall furnish and install the service entrance equipment on the premises.
2. PSE&G will install the revenue meters, test switches and other directly associated metering equipment. PSE&G will furnish the metering transformers for installation by the customer in a manner approved by PSE&G.
3. All service entrance equipment shall be of a type accepted by PSE&G and shall be installed according to the requirements of all federal, State, county and municipal authorities having jurisdiction, PSE&G requirements, and the current editions of the *National Electrical Code* and the *National Electrical Safety Code*. The location of the point of connection and the type of metering equipment will be provided by PSE&G.
4. Connections made ahead of the main service equipment for emergency equipment such as fire pumps, exit lights, and emergency control power shall only be made where specifically accepted by PSE&G, and approved by the inspection authorities having jurisdiction. A separate meter may be required.
5. For conduit fittings on the line side of the meter, removable plates shall have provisions for sealing or be made non-removable by means of breakneck screws or by peening over existing screw heads or other PSE&G approved methods. There is no objection to these fittings on the load side of meters, whether indoors or outdoors.
6. PSE&G will seal or lock meters and all enclosures containing meters, associated metering equipment, service entrance interrupting devices and wiring ahead of the meter. No one except a duly authorized employee of PSE&G is permitted to break or remove a PSE&G seal or lock, unless previously arranged with PSE&G. The customer will provide spare fuses for installation by PSE&G.
7. PSE&G will specify an outdoor meter location for residential service where practical. Meters for industrial and commercial customers may be located inside or outside. The customer shall provide a protective enclosure where required. PSE&G will specify the meter location and the type of equipment it will furnish.

8. Customers that are non-utility generators (**NUGs**) or net metering installations, will be required to install facilities in addition to those normally required by PSE&G. These additional facilities are typically required for safety, relay protection, metering and equipment indication purposes, and will be specified by PSE&G on a case-by-case basis.

2. Grounding

The following requirements apply to grounding:

1. The customer shall provide, install and connect, in accordance with the current edition of the *National Electrical Code* and the *National Electrical Safety Code*, all grounding of services and service equipment, and install any required grounding of equipment furnished by PSE&G. Proper grounding is essential to ensure safe working conditions and proper operations of electrical equipment and systems.
2. The path to ground from circuit, equipment or conductor enclosures shall be permanent and continuous and shall have ample current carrying capacity to conduct safely any normal or transient currents likely to be imposed on it. The ground path shall have a sufficiently low impedance to limit the potential voltage above ground, and to facilitate the operation of the over-current devices of the circuit during all seasons of the year.
3. Where a neutral service conductor is brought in to a customer's installation, this conductor shall be connected to the grounding facilities of the installation at the service entrance switch or cabinet in accordance with the current editions of the *National Electrical Code* and the *National Electrical Safety Code*. Neutrals for underground services in overhead zones shall be insulated and fully rated.
4. The customer's grounding conductor shall not be connected in, or pass through, the meter enclosure or metering transformer enclosure.
5. Where a metal fence enclosure is used around a high voltage installation, the fence shall be connected to the ground bus of the installation at as many points as may be necessary to provide adequate protection in accordance with the current editions of the *National Electrical Code* and the *National Electrical Safety Code*. All grounding electrodes at such an installation shall be interconnected.
6. All plans for service installations submitted to PSE&G for acceptance shall show the provisions for grounding.

3. Secondary Service Entrance Installations for Overhead Connection from Overhead Mains

The following requirements apply to secondary service entrance installations for overhead connection from overhead mains:

1. Where the service run is to be overhead from the PSE&G overhead mains or transformer, the customer shall install the service entrance installation up to and including the service head. It is the customer's responsibility to provide suitable

support for the attachment of a service hook for the service and to install the service hook. This support and hook must be capable of withstanding the pull of the service drop conductors.

2. Where a support must be erected to provide sufficient height for the point of attachment of the service drop, it shall be attached to the building and have adequate strength to withstand the pull of the service drop and shall be subject to approval by PSE&G. At locations where there are no buildings or structures, service may be provided to an approved free standing pole or timber supplied, installed and maintained by the customer. This pole should be fully treated pine, cedar, or equivalent wood, set 6 feet deep and with a cross section at the ground line of approximately 64 square inches (9 inches in diameter). Where, in the opinion of PSE&G, a terminal pole is required to attach the service run, PSE&G reserves the right to install such a pole at the customer's expense. This pole will remain the property of PSE&G.
3. The service head and service run shall be out of reach from porches, windows, doors and fire escapes and shall be clear of awnings, fire escapes, building projections and other obstructions as required by the *National Electrical Code*. If the size of the service entrance conductors is No. 1 AWG or smaller, the conductors shall extend 2 feet out of the service head; if larger than No. 1 AWG, they shall extend 3 feet out of the service head.
4. The following drawings are included in the Appendix of this manual:
 - Exhibit 1 – Service Entrance Clearance
 - Exhibit 2 – Outdoor Socket Overhead Secondary Service
 - Exhibit 2A – Unacceptable Service Location
 - Exhibit 3 – Indoor Enclosure Overhead Secondary Service
 - Exhibit 4 – Service Entrance Mast – Galvanized Rigid Steel Conduit
 - Exhibit 4A – Service Entrance Masts Specifications

4. Secondary Service Entrance Installations for Underground Connection from Overhead Mains

The following requirements apply to secondary service entrance installations for underground connection from overhead mains:

1. Where the service conductors are to be run underground from the PSE&G overhead mains or transformer, the customer shall make the installation as provided in Chapter 3 – Service Runs. PSE&G will not replace a customer installed conduit and/or cable for increased load requirements, damage due to overload conditions, or problems caused by improper installation such as settlement or terrain changes.
2. Aluminum conduit may be used above ground if exposed, but shall not be used at or below ground or when installed in concrete for service runs.
3. Conduit shall not be less than 2 inches for single-phase 100 amp services, or less than 2 1/2 inches for 100 amp three-phase services, (for services less than 100

amps, 1 1/4 inch conduit is acceptable). For 200 amp single phase services 2 1/2 inch conduit is required, and no less than 3 inch conduit shall be used for 200 amp three-phase services. Conduit runs shall be installed in a water-tight manner or shall be arranged for suitable drainage, whichever may be specified by PSE&G. The service conduit shall be located as designated by PSE&G, and shall extend up the pole not less than 8 feet and not more than 11 feet above ground level. Conduit entering the building shall be effectively grounded in accordance with the *National Electrical Code*. Conduit runs shall be constructed using one material, for example all steel or all PVC. (See **Exhibits 5 and 7.**)

4. When PVC (non-metallic) conduit is used it shall be Schedule 80 Electrical Grade above ground and Schedule 40 (minimum) Electrical Grade below ground and NRTL listed.
5. Where, in the opinion of PSE&G, a handhole is required in an underground conduit run, it shall be furnished according to PSE&G specifications. A copy of the necessary specifications may be obtained at any of PSE&G's local Electric Distribution Division offices.
6. Service entrance conductors shall be provided by the customer long enough to reach the secondary mains or the transformer on the pole. Not more than two sets of service conductors will be permitted on a pole, and not more than three phase conductors and the neutral conductor shall be installed in a single conduit. The neutral wire shall be insulated and shall be the same size as the conductors. A separate grounding conductor is not permitted. The service conductors shall terminate in a bushing made temporarily rain tight, which later will be sealed by PSE&G. Underground service entrance conductors should be of ample size to carry the connected load with a voltage drop not exceeding one percent, and in no case shall they be sized less than No. 6 AWG. The installation shall be at least 2 feet below the ground level, and the trench shall be left open until the installation has been inspected and approved by PSE&G.
7. The following exhibits are included in the Appendix of this manual:
 - Exhibit 5 – Secondary Distribution Service Entrance – Underground Connections from Overhead Mains
 - Exhibit 7 – Specifications for Customer Installed Underground Service Conduit – Overhead Zone

5. Secondary Service Entrance Installations for Connections from Underground Mains

The following requirements apply to secondary service entrance installations for connections from underground mains, and any charges will be determined in accordance with Chapter 1, Section 16 of this manual and the Tariff:

1. For secondary service entrance installations from underground mains, PSE&G will furnish and install the service conduit run from its mains to a point approximately 18 inches outside the customer's foundation wall. The customer shall install the conduit run from the meter or service entrance equipment to a point approximately

18 inches outside the customer's foundation wall for PSE&G to connect to. The customer shall install and maintain the foundation opening to accommodate the service conduit. This conduit run shall terminate underground, in a fitting(s) that will permit connection with the service conduit run installed by PSE&G. Where the customer's conduit run is not readily accessible, PSE&G recommends that a spare conduit(s) be installed for future purposes. All conduit(s) installed by the customer for the service entrance must be of the type and size specified by PSE&G for the service conductors. If approved by PSE&G, the service entrance trenching work may be performed by the customer. In the event that the customer has landscaping or hardscaping that would be disturbed by PSE&G while installing the service run, the customer shall be responsible for the restoration costs, or bringing its connection point out to the curb line or clear of such landscaping or hardscaping, in accordance with Chapter 3, Section 1, paragraph 9.

2. In BUD systems with outdoor meter locations, the customer shall install any conduit required for the service entrance installations.
3. PSE&G will install the service run conductors from its mains to the point of connection as provided in Chapter 3 – Service Runs.

6. Secondary Distribution Service Equipment

The following requirements apply to secondary distribution service equipment:

1. Where, in the customer's opinion, unusual conditions make it desirable to install service equipment of a type other than the PSE&G recommended standard, the local Electric Distribution Division – Inspection Department shall be consulted for their specific approval.
2. The service entrance equipment and meters shall be in a location which is unobstructed, readily accessible and convenient for the regular or emergency visits of PSE&G employees. Indoor meter locations shall in general be adjacent to the service entrance. Where such a location is not practical, permission must be obtained from the Electric Distribution Division – Inspection Department to locate the equipment at another suitable location designated by PSE&G.
3. Metered and unmetered wiring shall not be installed in a common raceway.
4. Billing meters shall normally be **Hot Sequence**; that is, billing meters shall be on the line side of customer disconnect devices, overcurrent devices, etc.
5. Under certain circumstances, billing meters shall be **Cold Sequence**; that is, a disconnect device or devices will be permitted on the line side of the meters (only if the devices are locked and sealed by PSE&G to prevent access to unmetered conductors), and any one of the following statements is true:
 - The installation is to be served by a 265/460 volt or 277/480 volt network.
 - The meters are to be set in a 265/460 volt or 277/480 volt stacked meter socket.

For all other situations not covered above, the local PSE&G Wire Inspector shall be consulted.

6. No branch circuits or devices other than those specifically approved by PSE&G are permitted on the supply side of the meter. Potential sensing is permitted on duplicate service equipment. Control power for duplicate service automatic transfer devices which require connection to incoming cables is permitted only with specific approval from PSE&G. Motor size, current draw and operation time/cycle must be indicated on switchgear prints for PSE&G review. This control power is limited to motor operation only, and a current limiting device, with size and location specified by PSE&G, must be installed and located under PSE&G seal. No other devices or uses are permitted on the supply side of the meter.
7. The local Electric Distribution Division office will supply, upon request, the maximum design short circuit duty available at the point of connection. All service entrance equipment shall be specified to meet this requirement. Specific short circuit duty information for fuse and circuit breaker coordination studies will be supplied upon request of the customer.
8. The customer shall not install lightning arresters, surge suppressors or similar devices on the supply (incoming) side of the secondary service entrance interrupting device.
9. Construction details and meter mounting equipment arrangements for various types of services are shown in diagrams that may be obtained from the local Electric Distribution Division – Wiring Inspection Department.

7. Specifications for Primary Service

The following requirements apply to specifications for primary service:

1. The local Electric Distribution Division office will provide primary service specifications to customers upon request. These specifications are for the customer's guidance only, and outline general PSE&G requirements for the customer's equipment. Any detailed engineering is to be performed by the customer or such agent as the customer may designate. PSE&G may be consulted with in this process.
2. Billing meters shall normally be **Cold Sequence**, that is a disconnect device shall be located on the line side of the meters, unless otherwise requested by PSE&G
3. The primary switchgear should be arranged so that the service enters through an incoming section that may include lightning arrestors, followed by a section containing an isolating switch and then a separate metering section, where PSE&G's metering transformers will be mounted.
4. PSE&G's review of major electrical equipment and approval of the final electrical plan must be secured by the customer before major equipment is purchased, or construction is started. Detailed plans shall be prepared by the customer and three copies submitted to PSE&G for review.

8. Requirements for Switchgear Review

The following requirements apply to switchgear review:

1. The local Electric Distribution Division office will provide a specification for each customer switchgear installation. This specification is for the guidance of the customer, and outlines general PSE&G requirements for customer equipment. Any detailed engineering is to be performed by the customer or such agent as the customer may designate. PSE&G may be consulted with in this process.
2. PSE&G's review of major electrical equipment, and approval of the final electrical plans, must be secured by the customer before any switchgear is purchased and construction is started. Detailed plans shall be prepared by the customer and three copies submitted to PSE&G for review.
3. Any service installation requiring one or more sets of current transformers must be formally submitted by the customer for acceptance by the local Electric Distribution Division. As a minimum, the following information is required for PSE&G review:
 - Site Plan indicating location and details of the switchgear room
 - Profiles showing the arrangement and dimensions of the switchgear
 - Electrical one-line diagram from PSE&G's source through the customer's switchgear
 - Interrupting ratings shall be indicated on main fault clearing devices
 - Fault withstand rating shall be indicated on all bus work
 - Manufacturer model numbers and ratings shall be supplied
 - Connector specifications for actual connection to PSE&G service conductors
4. All NUGs that connect to PSE&G facilities must submit their major electrical equipment and final electrical design plans to PSE&G for review and approval before ordering major equipment. See Section 9 (Non-Utility Generators) below and Chapter 6 Section 7 (Non-Utility Generators and/or Parallel Operations with PSE&G) for further information.
5. The following drawings are included in the Appendix of this manual:
 - Exhibit 16 – Minimum Clearances and Bus Arrangement for Bar Type Current Transformers 200 to 800 Ampere Secondary
 - Exhibit 17 – Mounting Dimensions for Current Transformers in Cubicle – Window Type 800 Ampere to 4000 Ampere Secondary

9. Non-Utility Generators (NUGs)

The local Electric Distribution Division office will provide requirements to be followed by all NUGs. Before major electrical equipment is ordered and detailed design is started, a preliminary plan including a single line diagram must be submitted by the applicant for PSE&G's review and approval. Written acceptance must be obtained from PSE&G, stating that the customer's design is suitable for connecting its facilities to the PSE&G system. NUG customers that export power into the PSE&G system may also need to

contact the PJM Regional Transmission Organization (**PJM RTO**) regarding interconnection of its facilities, the details of which may be found at <www.pjm.com>. See Chapter 6, Section 7 of this document for more information.

Chapter 6 – Customer’s Installations

1. General

The following are general requirements for customer installations:

1. Wiring installed on the customer's premises must conform to all requirements and regulations set forth in the current editions of the *National Electrical Code* and the *National Electrical Safety Code*. Authorities having jurisdiction may have additional requirements that must be met in order to obtain a Certificate of Approval (Cut-in Card).
2. PSE&G must be notified before any additions or alterations are made to a customer's electrical installation or equipment.
3. The customer's wiring shall be so installed and connected that the service load will be balanced.
4. Motors, welders and other utilization apparatus shall be supplied, installed, connected, operated and maintained so that PSE&G's service to other local customers is not affected.
5. If the use of certain equipment by the customer would cause objectionable voltage fluctuations or flicker, or would require electrical capacity out of proportion to the energy used for occasional, intermittent, momentary or short durations, and with a low load factor, the written approval of PSE&G shall be obtained before connecting such equipment. The customer or his agent shall provide information on the operating characteristics of this equipment to the Service Consultant at the Construction Inquiry Center prior to its installation.
6. The average power factor of a customer's load under operating conditions, at the point where the electric service is metered, shall be not less than 85%. If below 85%, the customer may be required by PSE&G to furnish, install and maintain at its expense, corrective apparatus such as capacitors that will increase the power factor on the entire installation to not less than 85%.
7. Where neon, fluorescent or other types of lighting or sign equipment having low power factor characteristics is installed or moved to a new location, the customer may be required to furnish, install and maintain at its expense corrective apparatus which will increase the power factor of the individual units or the entire installation to not less than 90%.

2. Motors – Starting Current

The following are general requirements for motors:

1. The inrush of current caused by a motor when it starts is usually much greater than the normal load current of the motor. The exact relation differs with the different sizes, speeds and types of motors. While this starting current exists for only a short time, it may cause objectionable dips in voltage, sometimes causing flickering lights to the customer or other customers served from the same system. PSE&G will

determine what constitutes objectionable voltage dips. The customer shall be responsible for any corrective measures deemed necessary by PSE&G.

2. In predominantly residential areas and small commercial installations, the maximum motor starting currents and minimum demands listed in Tables 6-1 and 6-2 shall apply. These ratings are based on not more than four starts per hour with long periods of continuous operation under maximum load conditions, except that domestic laundry equipment duty cycles are also acceptable. PSE&G shall be consulted where these conditions cannot be met, or where equipment ratings and/or starting characteristics exceed the values in Tables 6-1 and 6-2.

Table 6-1: Equipment and Motors Rated in Horsepower (hp)

Voltage Class	Motor Size	Total Locked Rotor Current Not to Exceed	Minimum Demand
120 Volts, Single-Phase	All Motors	50 Amps	—
208 or 240 Volts, Single-Phase	2 hp or less	60 Amps	—
	3 hp	80 Amps	—
	4 hp	100 Amps	—
	5 hp	120 Amps	—
	6 hp	140 Amps	—
	6.5 hp and greater	150 Amps	—
208 or 240 Volts, Three-Phase	2 hp or less	50 Amps	—
	3 hp	64 Amps	10 KW
	4 hp	78 Amps	10 KW
	5 hp	92 Amps	10 KW
	6 hp	106 Amps	10 KW
	7 hp	120 Amps	10 KW
	10 hp	162 Amps	20 KW
	15 hp	232 Amps	20 KW
	20 hp	292 Amps	30 KW
	460 or 480 Volts, Three-Phase	All Motors	Use 1/2 value of 208/240 Volt, Three-Phase Motors
Note: Three-phase supply is not normally available for residential service.			

Table 6-2: Air Conditioning or Heat Pump Equipment Rated in Btu

Voltage Class	Capacity	Total Locked Rotor Current Not to Exceed	Minimum Demand
120 Volts, Single-Phase	All	50 Amps	—

Table 6-2: Air Conditioning or Heat Pump Equipment Rated in Btu (Cont'd)

Voltage Class	Capacity	Total Locked Rotor Current Not to Exceed	Minimum Demand
208 or 240 Volts, Single-Phase	20,000 Btuh or less	60 Amps	—
	25,000 Btuh	75 Amps	—
	30,000 Btuh	90 Amps	—
	35,000 Btuh	105 Amps	—
	40,000 Btuh	120 Amps	—
	50,000 Btuh	150 Amps	—
208 or 240 Volts, Three-Phase	20,000 Btuh or less	50 Amps	—
	30,000 Btuh	75 Amps	10 KW
	40,000 Btuh	100 Amps	10 KW
	50,000 Btuh	125 Amps	10 KW
	60,000 Btuh	135 Amps	10 KW
	75,000 Btuh	150 Amps	10 KW
	100,000 Btuh	175 Amps	20 KW
	150,000 Btuh	225 Amps	20 KW
	200,000 Btuh	275 Amps	30 KW
225,000 Btuh	300 Amps	30 KW	
460 or 480 Volts, Three-Phase	All	Use 1/2 value of 208/240 Volt, Three-Phase	
Note: Three-phase supply is not normally available for residential service.			

3. Total locked rotor current is the steady state current taken from the supply line with motor rotor or rotors locked, with all other power consuming components including a current reducing starter, if used, connected in the starting position, and with rated voltage and frequency applied.
4. Where the equipment contains more than one motor and some motors are arranged for sequential starting, the above tables apply to that combination of power consuming components simultaneously started that produces a higher starting current than any other combination. The interval between successive steps shall not be less than one-half second.
5. Where the design of the equipment is such that unequal currents appear in the supply wires, the tables apply to the supply wire carrying the largest current.
6. For two-phase motors the locked rotor currents specified in the tables shall be multiplied by the appropriate phase correction factor, e.g., 0.866.
7. In commercial or industrial areas, the starting current limitation per step, when the starting frequency does not exceed one start per hour, for single-phase and polyphase motors up to 240 volt rating, shall be 100 amperes plus 1½ amperes per horsepower of connected load. The connected load in horsepower may consist of motors, lights, etc. including the motor under consideration. Higher starting currents may be acceptable in certain cases for motors that start infrequently, and upon receipt of a customer application accompanied by complete data on the proposed operating cycle and motor characteristics, PSE&G will determine the permissible starting currents. This rule applies to installations having 300

- horsepower or less connected load. For larger installations PSE&G will determine what starting currents are permissible.
8. A motor or motors may be started "across-the-line" if the total locked-rotor current does not exceed the limitations given above. Current limiting starters may be used for motors requiring higher starting currents provided the current drawn in both the starting and the running position, as measured on the line side of the starter, does not exceed the limitations given above. When a starter is used, an appropriate time interval will of necessity be required for each step.
 9. In group installations of two or more motors supplied from the same service, the starting current limit per step for the largest motor shall be the limit for any other motors in the group. Motors started simultaneously shall be considered as one motor equal to the combined starting current of the group.
 10. Before purchasing motors, the customer should always consult PSE&G to determine the type of service to be supplied.
 11. It is desirable that all motors over one horsepower be three-phase if three-phase service is to be supplied. Where practicable, dual voltage single-phase motors should be connected for 220 or 230 volt operation where 120/240 volt secondary service is to be supplied. Single-phase motors rated for 115/230 volt operation should be connected for 115 volt operation where 120/208 volt service is to be supplied.
 12. PSE&G reserves the right, in case of doubt about correct starting current values, to accept motors for connection to its service only after a test has been made to determine the starting current required.

3. Motor Installations

The following are general requirements for motor installations:

1. Motor installations must conform to the requirements of the current edition of the *National Electrical Code*, the *National Electrical Safety Code* and PSE&G.
2. Where overload releases are required they shall have an adjustable current setting and either a fixed or an adjustable time setting. The time setting should provide adequate thermal protection for the motor windings, and adjustable elements should be capable of providing a maximum delay consistent therewith.
3. It is recommended that automatically operated small motors such as those used on refrigerators, oil burners and air conditioners, be individually equipped with time-delay thermal element protection.
4. Three-phase service is susceptible to a phenomenon known as single-phasing, due to the interruption of one or two phases of the three-phase supply. This may be caused by a number of factors in the utility system or the customer's wiring, including single-phase to ground faults, wires down due to storms, vehicle pole hit accidents, or blown fuses. Three-phase customers may receive sustained low voltage on one or two phases until normal service can be restored by PSE&G. The customer's equipment shall be adequately protected for these conditions if three-phase service is supplied.

5. Undervoltage (low-voltage) protection may be necessary on motors, or groups of motors, to meet the safety requirements of the *National Electrical Code* or the *National Electrical Safety Code*. The use of instantaneous low-voltage devices is generally undesirable, and therefore time-delay undervoltage devices should be used. The time lag of time-delay undervoltage devices should be adjustable to at least two seconds and should be adjusted to meet the requirements of the specific installation. Undervoltage protection should not be used on service switches or breakers.
6. Low voltage releases and over-current protection are not required on intermittent duty motors such as elevator, crane, hoist, and drag line motors.
7. The direction of phase rotation of the alternating current supply is carefully maintained by PSE&G, but motors for elevators, cranes, hoists and apparatus requiring constant direction of rotation such as vertical pumps should be equipped with suitable protection against possible phase reversal.
8. PSE&G does not recommend the installation of adjustable speed drives (**ASD's**) on existing or new open-delta transformer services due to ASD performance issues. An alternative is for PSE&G to provide, where available or conditions permit, a closed delta supply allowing full capacity of the ASD/motor combination. There may be additional charges for provision of this type of service, depending on what PSE&G facilities are currently in the area. Where the provision of a closed delta service is impractical due to availability and/or cost, and an open-delta service already exists or will be provided, the ASD loads will either need to be de-rated or the ASD itself must be oversized for the intended application. Please review this issue with PSE&G prior to purchasing equipment.

4. Welders, Furnaces and Intermittent or Fluctuating Loads

PSE&G should be consulted before the customer purchases apparatus of this type. Because of the nature and method of operations, welders, furnaces and intermittent or fluctuating loads will not be accepted for service by PSE&G until a thorough investigation of each case has been made. It will be necessary to know the location of the load and its complete electrical characteristics, and typically special service arrangements and service equipment will be required. PSE&G may require the customer to eliminate objectionable voltage dips, or PSE&G may install additional transformers and line facilities to correct the condition, and establish an appropriate customer contribution or Facilities Charge for this equipment. See the forms contained in Chapter 7 for more details on information required by PSE&G for this equipment.

So far as practicable, loads of this type shall be balanced across all three phases of the customer's electrical service.

5. Ranges, Ovens and Heaters

Domestic and commercial loads of this type shall be balanced on the service so far as practicable. The amount of current drawn when any unit or combination of units is switched on shall not exceed the amount of current that would be permitted for

corresponding conditions of motor starting as described in Section 2, Motors – Starting Current, above.

6. Gaseous Tube Lighting or Sign Equipment

The following requirements apply to gaseous tube lighting or sign equipment:

1. Where neon, fluorescent or other types of lighting or sign equipment having low power factor characteristics are installed or moved to a new location, the customer may be required to furnish, install and maintain at its own expense corrective apparatus which will increase the power factor of the individual units or the entire installation to not less than 90%.
2. Where a customer proposes using athletic field lighting fixtures that will utilize a 1500 W metal-halide lamp design, service shall be provided from a three-phase supply. The customer's lighting ballasts shall be connected phase to phase in order to avoid potential incompatibilities between the lighting ballast and the lamp design, and the voltage characteristics of PSE&G's system.

7. Non-Utility Generators (NUGs) and/or Parallel Operations with PSE&G

The following requirements apply to non-utility generators and/or parallel operations with PSE&G:

1. Whenever customer-owned generating facilities (“Non Utility Generators” or “NUGs”) are installed for self-generating purposes and may export excess power into PSE&G's system, and/or parallel operation of the customer's generating equipment with the PSE&G system is requested, the generator installation shall conform with the NUG Requirements section of PSE&G's *Plant Engineering Policies and Procedures Manual*, copies of which are available on request from the local Electric Distribution Division office.
2. For small NUGs that are not eligible for Net Metering, the interconnection requirements of N.J.A.C. 14:4-9, “Net Metering and Interconnection Standards for Class I Renewable Energy Systems” shall not apply. PSE&G representatives will review the NUG proposal, inspect the customer's installation and will advise on any changes and/or additions or modifications required for interconnection where necessary. The NUG equipment shall not be operated in parallel with the PSE&G system until the required changes and/or additions or modifications have been made, and the final written acceptance by PSE&G and any governmental authority having jurisdiction have been received. Further information can be found at the PSE&G website <www.pseg.com>.
3. Customer-owned generation shall not be connected within a C.T. or P.T. cabinet or any cabinet containing PSE&G metering equipment.
4. If the NUG wishes to sell its power into the wholesale power market, it shall be required to meet the interconnection requirements of the PJM Regional Transmission Organization (“PJM”), copies of which can be found at

<www.pjm.com>. The NUG would deal directly with PJM for all interconnection studies, and make all payments for studies and any interconnection costs directly to PJM.

5. Whenever a customer's generating equipment will not be operated in parallel with the PSE&G system, but is to be kept available for standby or emergency use, the customer shall install the necessary equipment to prevent parallel operation. PSE&G must approve the equipment design proposed for each individual case. For any proposed exceptions, consult the local PSE&G Wiring Inspector.
6. The customer should design any emergency power system in accordance with Chapter 7 of the *National Electrical Code*. The design should take into account the use of time-delay relays in both the startup and shutdown phases of the emergency generator's operation. Some time delay built into the generator startup control logic may be desirable in order to avoid unnecessary generator operation due to momentary problems on the PSE&G system. Likewise, upon restoration of service by PSE&G, shutdown of the generator should be delayed until the voltage has stabilized, and the generator has had a sufficiently long enough operating period to ensure good performance in the future. The customer should discuss time delay settings with PSE&G, and operating recommendations with the generator manufacturer.
7. When PSE&G's service has been interrupted for any reason, the PSE&G system may re-energize the service without prior notice to the customer. Where a NUG operates a generator in parallel with the service furnished by PSE&G, the NUG is responsible for providing a means of automatic disconnection from PSE&G's system when power is interrupted.
8. The customer should discuss with PSE&G the design of any parallel operating generators using closed transition automatic transfer switches prior to purchasing any equipment. If an automatic transfer switch is utilized for a parallel operating generator, and PSE&G approves its use in a "closed transition" mode, then the duration of the closed transition should be less than 5 seconds.
9. The electrical protection of the equipment in the NUG substation or other electrical facilities is the sole responsibility of the NUG. PSE&G's interconnection equipment is intended solely for the protection of the PSE&G system, and to provide for the safety of its workers and the general public.

8. Net Metering

The following requirements apply to net metering:

1. For the purpose of this Section, a customer-generator is a customer that generates energy on the customer's side of the meter. Net Metering of a qualified customer provides for the billing or crediting, as applicable, of energy usage by measuring the difference between the amount of electricity delivered by PSE&G to the Net Metering customer in a given billing period and the electricity delivered by the Net Metering customer into the PSE&G Distribution System. PSE&G will select and supply the type of meter(s) that will enable the measurement of the energy for the billing or crediting of energy delivered as indicated above.

2. To qualify for Net Metering, a customer-generator must generate Class 1 renewable energy as defined in N.J.A.C. 14:4-8.2. Further, to qualify for Net Metering, a customer-generator's Annual Peak Demand without the customer's generating system must be less than 10 megawatts, the generating system cannot exceed the electric needs of the customer's facility, as applicable, and the generating system is limited to a maximum size of 2 megawatts, as set in N.J.A.C. 14:4-9 "Net Metering and Interconnection Standards for Class I Renewable Energy Systems."
3. In addition to the requirements of N.J.A.C. 14:4-9, a Net Metering customer shall ascertain and comply with the requirements of PSE&G which are available on the NJ Clean Energy Program website, at www.njcep.com and the PSE&G website at www.pseg.com; and as applicable, to be found in this document. See Exhibit 27. In addition, the Net Metering customer shall be responsible for meeting all applicable safety and power quality requirements as approved by: the *National Electrical Code*; the *National Electrical Safety Code*; accredited NRTL standards, such as Underwriters Laboratories UL 1741; and Institute of Electrical and Electronics Engineers standards, guides and practices, specifically IEEE Standard 929, and IEEE Standard 1547 and its subparts.
4. Prior to interconnecting with the PSE&G Distribution System, the Net Metering customer is required to submit an application to the New Jersey Board of Public Utilities, according to the procedure specified on the New Jersey Clean Energy Program website.
5. The review procedures for analyzing Net Metering applications requesting interconnection of customer-generator facilities are divided into three separate Levels by the New Jersey regulations:
 - Level 1 - inverter-based customer-generator facilities, which have a power rating of 10 kW or less;
 - Level 2 - customer-generator facilities with a power rating of 2 MW or less; and
 - Level 3 - customer-generator facilities with a power rating of 2 MW or less, which do not qualify for either Level 1 or Level 2 treatment due to more complicated interconnection requirements

These procedures can be reviewed in depth at N.J.A.C. 14:4-9.7 through 14:4-9.9.
6. If a customer-generator facility's proposed point of service is on a spot or area network, the interconnection shall meet the following requirements, in addition to all the other requirements in N.J.A.C. 14:4-9:
 - For a customer-generator facility that will be connected to a spot network circuit, the aggregate generation capacity connected to that spot network from all other customer-generator facilities that may be on that circuit, including the customer-generator facility itself, shall not exceed 5% of the spot network's maximum load;
 - For a customer-generator facility that utilizes inverter based protective functions, which will be connected to an area network, the customer-generator facility, combined with other energy exporting customer-generator facilities on the load side of network protective devices, shall not exceed 10% of the minimum annual

load on the network, or 500 kW, whichever is less. For the purposes of this paragraph, the percent of minimum load for a solar electric generation customer-generator facility shall be calculated based on the minimum load occurring during an off-peak daylight period;

- For a customer-generator facility that will be connected to a spot or an area network that does not utilize inverter based protective functions, or for an inverter based customer-generator facility that does not meet the requirements of Sections 1 and 2 above, the customer-generator facility shall utilize reverse power relays or other protection devices that ensure no export of power from the customer-generator facility can occur, including inadvertent export (under fault conditions) that could adversely affect other protective devices on the network.
7. The customer-generator facility shall not create an imbalance between the two sides of the 240 volt service, which is greater than 20% of the nameplate rating of the service transformer.
 8. Single-phase inverters for photovoltaic systems, and AC modules in interactive photovoltaic systems, shall not be connected to three-phase power systems unless the interconnected system is designed so that significant unbalanced voltages cannot result. Three-phase inverters, and three-phase AC modules in interactive photovoltaic systems, shall have all phases automatically de-energized upon loss of voltage, or when unbalanced voltages occur in one or more phases, unless the interconnected system is designed so that significant unbalanced voltages will not result.
 9. If a customer-generator facility is to be connected to a three-phase, three wire primary distribution line, a three-phase or single-phase generator shall be connected phase-to-phase.
 10. If a customer-generator facility is to be connected to a three-phase, four wire primary distribution line, a three-phase or single phase generator shall be connected line-to-neutral and shall be effectively grounded.
 11. Once PSE&G receives the customer's application and any fees required, PSE&G may choose to order a phone line for the customer's meter. This phone line is used for remote communication with the customer's meter for accurate billing and reconciliation of net metering accounts. There is no charge to the customer for provision of this phone service by PSE&G, however, the customer must plan to provide access for the phone company to install its phone connection adjacent to PSE&G's meter, as depicted in Exhibit 27 of the Appendix to this document. If a phone line is required, once the phone connection has been installed and is activated, PSE&G will inspect the customer's installation, and if found acceptable, will install the new meter.
 12. New Jersey's regulations require compliance with the *National Electrical Code*, but do not require that the disconnect switch be located outside the building so that it can be accessed at all times. Such "external" switches provide a means for isolating the customer's generation from its main distribution panel when the customer is away, and allows for testing and maintenance of the installation, and work on the local electrical system, without interrupting the customer's service. In addition, the

use of an external disconnect switch ensures a safe working environment for utility personnel. If the customer chooses to install a readily accessible, external disconnect switch, PSE&G, upon its approval of the location of the switch, shall credit the residential customer's account \$50 once the customer's generating system is operational and the customer is taking service under PSE&G's net metering tariff. When requested, PSE&G shall meet with the customer prior to installation to review the location of the external switch.

13. If an external disconnect switch is not utilized, then an externally-located plaque shall be installed at the meter location to indicate the presence of the Customer-Generator Facility and where its disconnecting means is located, in accordance with Article 690 of the *National Electrical Code* (2005), and in particular, Article 690.56. If the customer does not have an external meter, the plaque shall be placed in the vicinity of the service entrance or lateral. The plaque shall be made of a permanent-type material, such as "Lamicoid" or equal, and be yellow with black lettering.
14. In accordance with Article 690 of the *National Electrical Code* (2005), and in particular, Article 690.14(D), for utility-interactive inverters mounted in not-readily accessible locations, a permanent plaque or directory, denoting all electrical power sources on or in the premises, shall be installed at each service equipment location, and at the locations of all electric power production sources capable of being interconnected with the utility. Plaques shall be made of a permanent-type material, such as "Lamicoid" or equal, and be yellow with black lettering.
15. Customer-generator facilities shall not be connected within a C.T. or P.T. cabinet or any cabinet containing PSE&G metering equipment.

9. Fire Alarms and Exit Lights

The following requirements apply to fire alarms and exit lights:

1. Where service is supplied for other uses, and where the *National Electrical Code* requires a main disconnecting means ahead of a multiple metered installation, the fire alarm or exit light circuit may be connected ahead of the main disconnecting means. This circuit must have its own disconnecting means and over-current device, and will be separately metered. Where the fire alarm or exit light circuit can be connected to the existing service entrance conductors on the line side of the service disconnecting means, and can be metered by connecting the existing meter also ahead of the service disconnecting means in accordance with the *National Electrical Code*, the circuit will not require a separate meter. Any meters required, unless treated otherwise due to operating reasons of PSE&G, will be billed separately.
2. Where the load is so small that metering is impracticable, as in the case of some types of fire alarm circuits, the billing of such service may be on an estimated basis at the option of PSE&G. Costs for this type of service may be obtained from the Service Consultant at the Construction Inquiry Center. Such use will be billed separately, or combined with the use shown on the customer's other existing meter, in accordance with the practice for metered circuits as stated above. No energy consuming devices, other than signalling lamps, bells or horns with an individual

rating not greater than 100 watts or 1/8 horsepower, shall be connected to such form of unmetered circuit.

3. Where no service is to be used other than fire alarms or exit or emergency lights, the service entrance installations shall be provided as required in Chapter 4 – Service Entrance Installations.

10. Voltage Sensitive Equipment

The following requirements apply to voltage sensitive equipment:

1. Computers, variable speed drives, solid state devices, process equipment and other power sensitive equipment are very susceptible to many types of power disturbances and variations. Although PSE&G makes every reasonable effort to avoid problems on the utility system, various situations outside its control may still result in unwanted power disturbances affecting customer's sensitive equipment and systems. Equipment manufacturers, utilities and other experts agree that proper protection and mitigation of harmful power disturbances is best accomplished as electrically close to the affected equipment as practicable. Customers with equipment or processes sensitive to power variations and disturbances are expected to provide their own isolation from voltage sags, impulses, harmonics and other transient phenomena originating either from within the customer's facility or on PSE&G's system.
2. Customers planning on installing new equipment or processes with critical power requirements, should contact PSE&G to discuss the compatibility of the proposed equipment with other existing customer installations and utility electrical facilities and systems in the area.
3. The manufacturer of customer utilization and process equipment should be consulted to determine the need for any specialized power conditioning devices. Various technical guides, recommendations and standards should also be consulted when contemplating facility or equipment upgrades. A few of the applicable references include the latest versions of the following:
 - *National Electrical Code*
 - Federal Information Processing Standards (FIPS) 94: *Guideline on Electrical Power For ADP Installations*
 - IEEE Recommended Practice for: *Powering and Grounding Sensitive Electronic Equipment*, IEEE Std. 1100
 - IEEE Recommended Practice for: *Grounding of Industrial and Commercial Power Systems*, IEEE Std. 142
 - IEEE Standard for: *Interconnecting Distributed Resources with Electric Power Systems*, IEEE Std. 1547
 - IEEE Recommended Practice for: *Emergency and Standby Power Systems for Industrial and Commercial Applications*, IEEE Std. 446
 - IEEE Recommended Practices and Requirements for: *Harmonic Control in Electrical Power Systems*, IEEE Std. 519

- National Electrical Manufacturers Association Standard for: *Motors and Generators*, NEMA MG-1
- 4. The customer shall ensure that no excessive harmonics or transients are introduced on to the PSE&G system. This may require special power conditioning equipment or filters. The IEEE Std. 519 is used as a guide in determining appropriate design requirements.
- 5. PSE&G is available to consult with customers in determining the susceptibility of power equipment and systems to the effects of power variations and disturbances. PSE&G, upon request, may also assist customers in the evaluation of appropriate protection and mitigation technologies.

11. Load Management Services

PSE&G offers Energy Evaluation Services to industrial and commercial customers. These services include internet access to billing and usage data, Demand Pulses only, or both Time & Demand Pulses. With this data the customer can operate Load Management equipment, obtain load profiles, and can access computer billing data at certain monthly intervals. Contact the Large Customer Support group at **1-800-664-4761** for more information on obtaining these services.

Monthly charges for the Energy Evaluation Services reflect the continuous services and maintenance costs incurred by PSE&G in supplying these services. Charges listed in the Tariff cover the installation and maintenance of equipment that PSE&G supplies to provide the service requested by the customer.

12. Police and Fire Systems

Police and fire systems mounted on poles on public highways will be metered if practicable, but otherwise may at the option of PSE&G be billed at a flat rate. Costs for this latter type of service may be obtained from your Service Consultant at the Construction Inquiry Center.

13. Traffic Signal Systems and Roadway Lighting

The following requirements apply to traffic signal systems and roadway lighting:

1. Traffic signal systems and roadway lighting may be installed without metering at the option of the Department of Transportation (**DOT**) provided, however, that if the DOT intends to install other loads such as receptacles, lighting, cameras, etc., the service shall be metered. If such loads are not currently installed, but may be added in the future, a meter hub should be installed for future metering purposes. If the meter hub is to be installed within the pedestal, the hub shall be located 6 inches from the top of the cabinet. The PSE&G single point of contact for the DOT at the local Electric Distribution Division office should be contacted for information on this type of service.

2. For traffic signal systems or roadway lighting supplied at 277/480 volts or single-phase 480 volts, PSE&G requires that a disconnect switch be installed ahead of the meter, and mounted on the outside of the cabinet. This disconnect switch shall be in a NEMA 3R enclosure, and shall be lockable with customer's lock. The cover of the disconnect switch shall have provisions to accept a PSE&G seal. Grounds for the customer's equipment shall not be carried through PSE&G's meter panel.
3. Before actual construction is begun at the site, but after the DOT preconstruction meeting, the customer and/or its contractor, shall contact the local Electric Distribution Division Wiring Inspection Department to arrange for a site meeting to verify service type and location.
4. PSE&G shall inspect any trenches as soon as possible, but the contractor must schedule the inspection at least one day ahead.
5. DOT shall be designing their installation in accordance with PE-OSHA, which requires a 10 foot spacing between their equipment and the PSE&G secondary.

14. Cellular Antenna Sites

The following requirements apply to cellular antenna sites:

1. For service connections to cellular antennas approved for location on PSE&G transmission poles or towers, contact the Wiring Inspection group at the local Electric Distribution Division office for requirements for service type and meter arrangements.
2. For service connections to a new cellular antenna site that is not located on or at a PSE&G facility, and where there are no existing cellular antennas, the first customer to connect is responsible for building all facilities that will be expected for all the antenna needs at this site. PSE&G's standard design will require a 4 meter panel be installed for either a single-phase or three-phase service connection, with blanks installed for future meters. In special cases, where only one customer will ever be connected at a site, a single-phase service with one meter may be allowed after consultation with PSE&G.
3. In the event that there is an existing cellular antenna service on a site, and a subsequent customer wishes to attach to this structure where the existing service is not capable of supplying the new customer, that customer shall be responsible for rebuilding the service to accept its load at its sole cost. The new facilities will be built as described above, unless PSE&G's Wiring Inspector agrees to a different design.
4. Where the customer wishes to attach a new antenna to an existing building or other structure, and there is an existing service for that facility, if there is sufficient existing service equipment and space to add another meter, the antenna could be served from the existing customer's service with the prior approval of PSE&G's local Electric Distribution Division Wiring Inspection Department. PSE&G may require the customer to build a four meter stack if additional antennas may be added in the future.

15. Community Antenna Television (CATV) Power Supplies

The following requirements apply to community antenna television (CATV) supplies:

1. For CATV 120 volt power supply pedestals, the customer will provide the service wires from the CATV power supply pedestal to the PSE&G transformer. If such service is to be installed in a joint trench, the customer shall install the service wire, and provide 3 feet of service wire coiled next to the transformer and left visibly above the ground. In the event that the customer must dig a new trench to the transformer, the trench shall have a minimum of 24 inches of clean cover over the wire, and enough service wire should be left coiled at the end of the customer-provided trench so that there would be 3 feet available at the transformer when all the trenching was completed. PSE&G will complete the remaining section of trench, and terminate the wire at the transformer.
2. For power supplies served underground from padmount transformers, the service shall terminate at a disconnect switch to be mounted on the outside of the power supply pedestal. The service shall enter the disconnect switch via conduit attached to the outside of the pedestal, either Schedule 40 PVC or rigid galvanized steel. Such conduit will extend a maximum of 18 inches below grade, and have a bushing to protect the service conductors. See **Exhibit 25A** for details.
3. For CATV power supplies mounted on a joint pole, see **Exhibit 25B** for details of installation.

Exhibit 7

Specifications for Customer Installed Underground Service Conduit

Overhead Zone

General

1. Before any field construction starts, any proposed variations from these specifications must have specific written approval from PSE&G, and the Electrical Contractor must contact the PSE&G Wiring Inspector to arrange for the necessary inspections. Failure to do this could result in delay and the unnecessary expense of exposing conduit for the inspectors. The Electrical Contractor should refer to the following sources of information: The current edition of this PSE&G document *Information and Requirements for Electric Service* for general PSE&G requirements, and to the local PSE&G Wiring Inspector for details on each specific job.
2. Conduit used below grade shall be galvanized rigid steel, intermediate grade, or schedule 40 or 80 electrical grade PVC. Aluminum conduit shall not be used at or below ground for service runs to be maintained by PSE&G. **Conduit runs shall be constructed using only one material; either galvanized rigid steel or all PVC.**
3. All cut ends of conduit shall be reamed to remove rough edges. Grounding bushings are required on steel conduit.
4. The minimum conduit size shall be a minimum 1-1/4 inch for 60 amp single-phase secondary service; 2 inch for 100 amp single-phase and 2-1/2 inch for 100 amp three-phase secondary service; 2-1/2 inch for 200 amp single-phase and 3 inch for 200 amp three-phase secondary service and 4 inch for primary service depending on the size of cable installed. Secondary lateral conduit shall extend to a minimum height of 8 feet or a maximum height of 11 feet above ground level, and can be either rigid galvanized steel or schedule 80 electrical grade PVC. See **Exhibit 5**. Primary lateral conduit shall terminate 4 feet above ground to facilitate the installation of a back plate and shield by PSE&G.
5. The conduit run shall have at least 24 inches of earth cover for secondary and 36 inches for primary. Trench depth shall not exceed 48 inches, unless prior approval has been obtained from PSE&G. The conduit shall be pitched to drain away from the building if that is practicable.
6. The conduit shall be installed with a minimum number of bends. Bends of rigid steel conduit shall be so made that the conduit will not become damaged and that the internal diameter of the conduit will not be effectively reduced.
7. Threadless couplings and connectors used with conduit shall be made water-tight. Where buried in masonry or concrete they shall be of the concrete-tight type, or where installed in wet locations, they shall be of the water-proof type.
8. The layout of primary conduit and handholes must be approved by PSE&G.
9. The radius of any conduit bend shall not be less than the following:

Table A-2: Minimum Radius of Conduit Bends

Conduit Diameter	Minimum Radius of Bends
1-1/4 inch	14 inch
1-1/2 inch	16 inch
2 inch	18 inch
2-1/2 inch	24 inch
3 inch	36 inch
3-1/2 inch	36 inch
4 inch	36 inch
5 inch	48 inch

10. The customer shall submit two copies of a drawing showing the plan and elevation of the proposed conduit run including the handholes. The drawings shall be submitted to the local Electric Distribution Division office **before starting construction**. One drawing will be returned with comments or approval.

No advance approval for conduit construction will be given to the Electrical Contractor prior to his submitting such specific information as length of straight conduit segments, horizontal bend angle and horizontal bend radius.

11. Where a handhole is required for pulling in one or two sets of secondary cables 500 kcmil or smaller, the customer shall install a PSE&G standard 28 inch x 30 inch handhole. Handholes shall be concrete. This handhole may be used for light traffic areas such as driveways and parking lots, but it shall not be located in streets. The following drawings may be obtained from a representative of the local Electric Distribution Division office:

Table A-3: Handhole Drawings for Secondary Cables

Item	Drawing Number
Handhole	DU-12-S-5201
Frame	DU-11-M-5135
Cover	DU-11-M-5136

12. The conduit for secondary cable shall enter the handhole in the center of the short walls, with its center line 27-1/2 inches below grade. When two conduits enter the handhole, they shall do so on 6 inch horizontal centers. No pulling irons are required; see paragraph 20.
13. Where a handhole is required for pulling in primary cable, the customer shall install a standard 28 inch x 60 inch handhole; however, larger manholes may be required

in special cases. This handhole may be used for light traffic areas such as driveways and parking lots but it shall not be located in streets. The following drawings may be obtained from the local Electric Distribution Division office:

Table A-4: Handhole Drawings for Primary Cables

Handhole Size	Light Traffic	Type	Handhole Size	Sidewalk	Type
28 inch x 60 inch	Handhole	DU-12-S-8282	28 inch x 60 inch	Handhole	DS-12-S-5342
	Frame	DU-12-M-8283		Frame	DU-12-M-5341
	(2) Covers	DU-11-M-5136		(2) Covers	DU-11-M-5136

14. The conduit for primary cables shall enter the handhole in the center of the short walls with its centerline 33 inches below grade. When two conduits enter the handhole, they shall do so on 6 inch horizontal centers. A pulling iron shall be installed in the center of each entrance wall opposite a conduit entrance, 6 inches above the centerline of the conduit; see paragraph 20.
15. The maximum size cables to be installed in a 28 inch x 60 inch handhole shall be: 4 kV, 750 kcmil, rubber insulated, lead-covered; and, 13 kV, 2/0 polyethylene insulated, with a protective jacket. This handhole is not suitable for the installation of 13 kV, paper-insulated cable.
16. There shall be a minimum of 12 inches of earth separation between the electric cables or conduit and any other subsurface utilities such as water, gas, etc: telephone may choose to bury their cables, random lay with electric conduit or cables. Electrical conduit shall not be cast in the same concrete envelope with any other subsurface pipes.
17. No more than two electric riser conduits shall be installed on a pole. If two electric conduits are installed on a pole they shall be as close together as the mounting straps permit. Riser conduit shall be installed on the quarter of the pole specifically designated by PSE&G for this purpose.
18. Where the supply line is on the opposite side of the street, PSE&G will install the service pole on the customer's side of the street and extend the overhead supply across the street. If an overhead crossing is impractical, PSE&G will install an underground crossing at the customer's expense (including street opening permit fees) including, if required, a handhole or manhole in the sidewalk area on the customer's side of the street. If approved in advance, under certain circumstances, it may be acceptable for the customer to have his contractor install the street crossing conduit and the curb line handhole or manhole.
19. A grounding bushing shall be installed on the metallic conduit ends at the pole riser and in the building or transformer pad. Where metallic conduit is used in manholes and handholes, the conduit shall be extended in the hole for a distance of 1-1/2 inches for attachment of the ground bushing, and a 1/0 copper bonding-jumper shall be installed between all the grounding bushings on each side of the handhole or manhole.

20. No more than three phase conductors and one neutral conductor shall be installed in a conduit. ISO-phasing is not allowed. Neutrals shall be insulated and the same size as the conductors. Separate grounds are not permitted in the conduit.
21. All conduit installations shall be inspected by a recognized electrical inspection authority and PSE&G before backfilling.
22. Where cables are to be installed by PSE&G, all customer-installed conduits shall contain an adequate pull line installed by the customer and firmly secured at both ends. This pull line shall be either 1/4 inch nylon, or 1/4 inch polypropylene rope.
23. A tag made of corrosion resistant material showing the house number of the service shall be secured to the top of the pole riser, or to the individual service runs if they are installed in a handhole.
24. When a conduit enters a box or other fittings, a bushing shall be provided to protect the conductor from any abrasion unless the design of the box or fitting is such as to afford equivalent protection.
25. Where underground service conduits are necessary for service from PSE&G's Subtransmission system, specific conduit requirements shall be obtained from PSE&G.

Construction Guidelines

1. These guidelines are established to assist customers in the design and layout of conduit systems that will be used and maintained by PSE&G. They are not used for PSE&G's own conduit design and layout.
2. These guidelines are to be used when the size of the cable to be installed does not exceed 500 kcmil at 600 volts or 4 kV, or 2/0 at 13 kV. When these cable sizes are exceeded, the conduit plans require special PSE&G approval.
3. The sum of all horizontal bend angles in a conduit run shall not exceed 135 degrees.
4. Underground service runs **not** encased in concrete shall have their location identified by a red warning ribbon that shall be placed in the trench at least 12 inches above the underground installation. This ribbon shall be of the "detectable" type, be at least 3 inches wide, and shall state "**Caution Buried Electric Line Below**" (Ideal 42-201 or similar product). Tape shall be visible at the exit points of the service from the ground, where applicable.

Exhibit 18

Service Runs

Secondary Connections to Terminals of PSE&G Equipment

General Instructions

1. Transformer mat installations – all work on the secondary side of the transformers, including the connections and connectors to the transformer terminals, will be done by and at the expense of the customer.
2. Padmounted transformer installations – the installation of the primary underground conduit or trenching for direct buried primary cable from the transformer pad to the selected PSE&G pole, and all work on the secondary side of the transformer including supplying the connectors and bolting them to the transformer terminals, will be done by and at the expense of the customer. See **Exhibit 29** for number of cables per phase by cable size needed to handle full transformer capacity.
3. These instructions shall also apply to current transformer installations.

Terminal Connectors

4. Connectors shall be made of a material suitable for use with the conductor material of the cable or wire they will be terminating.
5. The terminal connector shall be drilled to NEMA standards for transformers, and shall have at least two holes for terminating one or two conductors, and for three or four conductors the connector shall have four holes. Connections to the transformer terminal shall be made with 1/2 inch bolts and nuts, flat washers and Belleville washers (17/32 inch I.D. 1-3/8 inch O.D. tensile strength 5000 lbs.) for both copper and aluminum bus connections. Nuts, bolts, flat washers and Belleville washers shall be made of non-magnetic stainless steel. Bolts shall be long enough that they extend through the nuts, and several threads shall be visible upon completion of the connection.
6. Only terminals and connectors specifically approved for use with aluminum are to be used with aluminum conductors, including those for grounding and bonding. Terminals and connectors listed by an NRTL for use with aluminum are marked with the symbol "CU-AL" or "AL". The connections shall be prepared in accordance with **Exhibit 17**, Note 5. The connector pads shall be tin or silver-plated.

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-  **Hand dig and locate within 2 feet of a markout before operating any mechanized equipment**
-  **Protect and preserve markings**
-  **Plan excavation/demolition/blasting to avoid damage and minimize interference to underground facilities**
-  **Excavators shall immediately report any damage caused or discovered to the underground facility**

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SA001483-01-0411

Exhibit 29

Number Of Cables Per Phase By Cable Size Needed To Handle Full Transformer Capacity

Figure A.10: Number of Cables per Phase by Cable Size Needed to Handle Full Transformer Capacity

NUMBER OF CABLES PER PHASE BY CABLE SIZE NEEDED TO HANDLE FULL TRANSFORMER CAPACITY*												
CABLE SIZE (kcmil)	KVA	500	500	750	750	1000	1000	1500	2000	2500	3500	
AMPS		1388	602	2082	903	2776	1204	1806	2408	3010	1600	
VOLTS		120/208	277/480	120/208	277/480	120/208	277/480	277/480	277/480	277/480	**	**
350		5	2	8	3	12	4	7	10	11	6	15
500		4	2	7	3	10	3	5	8	10	5	13
750		3	1	5	2	7	3	4	5	7	3	9

* RATINGS ARE CONSERVATIVELY BASED ON ALL CABLES RUN IN THE SAME DUCT BANK AND SAME DIRECTION. WHERE POSSIBLE, THE NUMBER OF FEEDER CABLES TERMINATED ON THE TRANSFORMER LUGS SHOULD BE MINIMIZED BY USING THE LARGEST CABLE SIZE POSSIBLE.

** USE OF CONVERSION BOXES ON NETWORK TRANSFORMER SECONDARY LEADS TO CONVERT TO RADIAL UNITS CAN LIMIT THE OUTPUT OF LARGER TRANSFORMERS TO 1600 AMPS, IF THIS SMALLER UNIT IS EMPLOYED. THE 3500 AMP CONVERSION BOXES DO NOT LIMIT THE TRANSFORMERS.

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