SECTION L1-D

REVENUE-METERING REQUIREMENTS

FOR DISTRIBUTION LOAD-ONLY ENTITIES

PG&E INTERCONNECTION HANDBOOK

PURPOSE

The purpose of this section is to help Direct Access (DA) and Bundled Service load-only entities connected at distribution voltages, to satisfy Independent System Operator (ISO) metering standards, CPUC-approved metering standards and PG&E requirements for measuring and registering electricity supplied to them.

Loads connecting at distribution voltages and participating in ISO load management programs shall be in accordance with the relevant metering protocols established by the ISO, or prior to establishing of such protocols, the metering requirements established by PG&E, the Participating Transmission Owner (PTO), or Utility Distribution Company (UDC). For purposes of this handbook, distribution and transmission level is defined in PG&E's Electric Rule 2. Any exceptions to this section shall be addressed on an individual case basis and must be approved by PG&E. These arrangements may involve Special Facilities, and may require other operating or service agreements, as approved by PG&E and other local governing authorities Such as the ISO.

For non-ISO connected loads, metering requirements shall be in compliance with PG&E and local governing authorities and must satisfy the requirements specified below.

L1-D.1 Revenue Metering Requirements For Load Entities

For purposes of this section, metering requirements for distribution service are differentiated into two basic types: 1) wholesale (TOs and metered entities) and 2) retail (end-users).

L1-D.1.1 Wholesale Service

For wholesale service interconnections (other than TO's), the Load Entity shall normally provide, install, own and maintain all revenue metering related equipment, including all items provided and maintained by PG&E or a Meter Service Provider (MSP) listed under "Retail Service" below. Wholesale entities must meet the ISO metering standards, CPUC-approved metering standards and PG&E requirements,

and must enter into a Meter Service Agreement (MSA) with the ISO, and also in certain instances, the UDC. The MSA specifies requirements regarding retrieval of load data and accessibility by the ISO.

The wholesale Load Entity is obligated to ensure the meters are certified and comply with ISO meter standards and accuracy requirements.

All Load Entities are advised that they need to contact PG&E local Account Services representatives for PG&E requirements.

L1-D.1.2 End Users (Retail Service)

L1-D.1.2.1 PG&E Direct Access Rule 22:

- PG&E Rule 22 governs interconnection and operating requirements for DA entities. According to Rule 22, entities will have the opportunity to acquire their electric power needs under three options: 1) Bundled Utility Services -traditional service from the UDC (PG&E), 2) DA - purchases energy from various suppliers, and related services from Energy Service Providers, ESPs.
- For Bundled Utility Services, PG&E, in most cases, continues to own, provide and, in all cases continues to maintain metering equipment including the meter, and continues to read the meter. For entities or customers returning to Bundled service, the Load Entity may also own the meter at the UDC's discretion if it can be read by the UDC and it meets the UDC's requirements.
- For DA services, the Load Entity, UDC, or ESPs may own the hourly meter. The ESP can be its own MSP or hire an MSP to maintain metering equipment and be its own MDMA or hire an MDMA to read the meter and manage metered data. The ESP may contract the metering services and/or metered data management services to PG&E.
- Per CPUC Decision D.97-10-087 on October 30, 1997, revenue metering transformers are part of the distribution system and shall remain the UDCs' responsibility.
- Regardless of meter ownership, PG&E retains the right to physically access any hourly or monthly meter data. In addition, PG&E also has the right to read, test and inspect the said meters on PG&E's system.
- All entities must refer to most recent version of PG&E's Rule 22 for more details.

L1-D.1.2.2 PG&E, as an MSP, will provide, install, maintain and test the following meter equipment:

- Combination revenue-metering voltage and current transformers. These shall be three, single-phase, voltage and current transformers. Appendix C shows a typical piece of equipment for distribution pole top metering.
- Wiring from the base of the revenue-metering transformers to the meters, in conduits. Conduits may be metallic or non-metallic.
- Metersrecorders and associated metering equipment.

The Load Entity or ESP shall reimburse PG&E for the materials and labor cost associated with installation of the metering equipment according to the local governing authority approved tariffs. (E-EUS, E-ESP or through a CPUC approved Meter sale or lease agreement).

L1-D.1.2.3 PG&E, as an MDMA, will provide the following meter data services:

- Read the raw data from interval meter.
- Validate, edit and estimate the data to a "settlement quality" form.
- Place the settlement quality data on the MDMA server and, if necessary, usage adjustment.

L1-D.1.2.4 All PG&E Load Entities will provide, install and maintain:

- The meter enclosure. The distance between the meter enclosure and the revenue-metering transformers must not exceed 50 feet to maintain the required metering accuracy. PG&E must approve any variance from this general rule. The enclosure must be located within and grounded to the substation ground grid. Access to meters and metering equpment must be readily available for PG&E's personnel to read and maintain metering equipment. The enclosure must be equipped with an auxiliary 120-volt duplex plug, an overhead light, a light switch adjacent to the door, and a ground bus connected to the ground and mounted near the bottom of the wall where the meters are to be located. Refer to PG&E's Green Book, Section 9, and Appendix D of this handbook.
- Meter panels specified by PG&E. Refer to PG&E's Green Book.
- All required conduit, junction boxes and the metering potential safety disconnect switch (60-amp, 3-pole, un-fused, knife disconnect that is lockable in the open and closed positions). A pull line must be installed in the conduit between the metering enclosure and the junction box at the base of the metering unit support structure to facilitate the MSP installing the metering unit secondary wires. Only the MSP's revenue-metering wire shall be installed in the conduit between the metering enclosure and the CT/PT units. Conduits may be metallic or non-metallic.
- Phone lines into the metering enclosure and establishment of phone service. Where telephone lines are required to read the meter, installation of phone lines into the metering enclosure and establishment of phone service are the customer responsibility. Where land line is not available and cellular cell signal is acceptable, the use of cellular phone is acceptable. If the meter phone lines cannot be dedicated to the meter, the Load Entity shall obtain prior approval from PG&E's local metering group to arrange for a line share switch to be used with the meter being the secondary phone user. Refer also to Section L1-D.3.
- The requirements for phone line termination at or in switchboards, panels, pole mounted meters and pedestals shall be:

- Generally, phone terminals should not be terminated on the switchboard or meter panels. The Load Entities should consult utilities and MSP's for locations of phone terminals.
- The phone terminals shall be installed as follows:
  - Within five (5) circuit feet from the centerline of meter, and
  - Between eighteen (18) inches (minimum) and seventy-two (72) inches (maximum) above finished grade.

- Where cellular phones are used, the same rules for phone termination as above shall apply, and the power supply shall be outside any (utility/MSP's) sealed section and be on load side of meter.

Note: All Load Entities interconnected at transmission level 60KV and above, will provide, install and maintain, and comply with the requirements detailed in Section L1-T of this handbook

L1-D.2 REQUIREMENTS OF REVENUE-METERING POINT

Revenue-metering must be installed at the point of service or ownership change. High-side revenue-metering is PG&E's standard installation and is required for all Load Entities at distribution voltage levels. Exceptions may be granted if the Load Entity can demonstrate that high-side revenue metering will create significant safety issues or impose extraordinary costs. Where low-side revenue metering is justified, a 2 percent adjustment factor shall be applied for each stage of transformation. Line losses shall be calculated as a function of the maximum load current through, and the electrical characteristics of, the line between the point of service and point of metering.

L1-D.3 COMMUNICATION CIRCUITS

The Load Entity may be obligated to bring as many as four communication lines into the metering enclosure for PG&E's use. In addition to the following, other communication requirements may apply; refer to Sections L2 and L3 of this manual:

- One phone line dedicated to revenue-metering. Refer to L1-D.1.2.4.
- One basic business line, although there may be alternatives to this requirement. Contact your local PG&E representative or the ISO.
- One line dedicated for the interruptible service, if interruptible service is selected by entity and the entity meets the underfrequency relay requirements per rate Schedules E-19 and E-20.

Note: underfrequency relay and related accessories shall be required if the Load Entity qualifies for and elects an interruptible rate schedule. At entity expense, PG&E shall provide the labor and equipment required for the installation. In addition to any phone lines required for metering or other purposes, the entity shall provide and pay for the additional, separate phone line (VG36, Type 3002, 4-wire, unconditioned, Class B circuit) obtained from the phone company for this relaying. The line will terminate at the Designated PG&E Electric Control Center (Appendix B). See Form L1-1 in Section L1T for assistance in properly ordering the leased alarm circuit. The alarm circuit will indicate to the operator that the load has been tripped by an underfrequency condition (see Figure L1-2 in Section L1T). See Figure L1-3 in Section L1T for typical underfrequency relay installation.

- One line dedicated for transfer trip, if required to meet protection standards and system integrity.

L1-D.4GROUND POTENTIAL RISE

The Load Entity shall determine the ground potential rise (GPR). The GPR value will determine what grade of telephone cable high-voltage protection equipment is required, as well as the minimum required dielectric strength of the cable insulating jacket. The information required to determine the GPR: 1) highest calculated fault current (PG&E provides this information); and 2) ground resistance (entity determines this information).