PUBLIC UTILITIES COMMISSION
505 Van Ness Avenue
San Francisco CA 94102-3298

Pacific Gas & Electric Company
ELC (Corp ID 39)
Status of Advice Letter 7060E
As of September 19, 2024

Subject: Incorporating IEEE 519 Harmonics Limits within PG&E Electric Rule 2

Division Assigned: Energy

Date Filed: 11-03-2023

Date to Calendar: 11-10-2023

Authorizing Documents: None

Disposition:	**Accepted**
Effective Date:	**12-03-2023**

Resolution Required: No

Resolution Number: None

Commission Meeting Date: None

CPUC Contact Information:

edtariffunit@cpuc.ca.gov

AL Certificate Contact Information:

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(279)789-6209
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PUBLIC UTILITIES COMMISSION
505 Van Ness Avenue
San Francisco CA 94102-3298

To: Energy Company Filing Advice Letter

From: Energy Division PAL Coordinator

Subject: Your Advice Letter Filing

The Energy Division of the California Public Utilities Commission has processed your recent Advice Letter (AL) filing and is returning an AL status certificate for your records.

The AL status certificate indicates:

Advice Letter Number
Name of Filer
CPUC Corporate ID number of Filer
Subject of Filing
Date Filed
Disposition of Filing (Accepted, Rejected, Withdrawn, etc.)
Effective Date of Filing
Other Miscellaneous Information (e.g., Resolution, if applicable, etc.)

The Energy Division has made no changes to your copy of the Advice Letter Filing; please review your Advice Letter Filing with the information contained in the AL status certificate, and update your Advice Letter and tariff records accordingly.

All inquiries to the California Public Utilities Commission on the status of your Advice Letter Filing will be answered by Energy Division staff based on the information contained in the Energy Division's PAL database from which the AL status certificate is generated. If you have any questions on this matter please contact the:

Energy Division's Tariff Unit by e-mail to
edtariffunit@cpuc.ca.gov

Pacific Gas and Electric Company®

Sidney Bob Dietz II
Director
Regulatory Relations

Pacific Gas and Electric Company
300 Lakeside Drive
Oakland, CA 94612

November 3, 2023

Advice 7060-E
(Pacific Gas and Electric Company ID U 39 E)

Public Utilities Commission of the State of California

Subject: **Incorporating IEEE 519 Harmonics Limits within PG&E Electric Rule 2**

Purpose

The main purpose of this letter is to update Pacific Gas & Electric's (PG&E) Electric Rule 2 to incorporate IEEE 519 Standard for Harmonic Control in Electric Power Systems. Currently, Electric Rule 2 states that a customer cannot create a harmful waveform that causes interference with PG&E's operation and other customers' service. Incorporating IEEE 519 into this tariff will provide clarification and definition to the meaning of "harmful waveform" and further set limits for PG&E and its customers. Adopting IEEE 519 will allow PG&E to enforce and ensure compliance to the new harmonic limits for new electric services and mitigate a growing power quality concern caused by harmful harmonic distortion in the interest of safety and reliability. The changes to will only impact new business.

There are two other changes to Electric Rule 2 regarding service voltage. The first is to remove the distinction between Class A & B circuits and their separate voltage limits. PG&E no longer uses two voltage classifications for residential and commercial customers; all secondary customers will be served voltage +/-5% of nominal. The second is to remove the 2400V 3-wire option from primary standard service voltages, as we can no longer provide this service.

Background

PG&E has experienced an increased number of complaints related to harmonic distortion on the distribution circuits. Voltage harmonic distortion has increased over the years due to the evolving electrical loads primarily caused by customer installation and operation of certain equipment, devices or apparatus considered as nonlinear loads for the purpose of energy efficiency. Examples that include variable frequency drive (VFD), motor speed control, and limited current inrush for large motors have a side effect of creating high current harmonic emission. Unregulated current harmonics have led to voltage harmonics beyond the recommended limits of IEEE 519.

Due to the higher levels harmonic distortion, customers are experiencing issues operating their equipment connected to our distribution system.

Updating Rule 2 does not mitigate current problem but it is the first step. Other utilities in California and in the United States have adopted IEEE 519 Harmonic limits in their respective tariffs.

Tariff Revisions

Modifications to Electric Rule 2 - *Description of Service* are provided as Attachment 1. For convenience, redline versions of the tariff revisions are included as Attachment 2.

This submittal would not increase any current rate or charge, cause the withdrawal of service, or conflict with any rate schedule or rule.

Protests

Anyone wishing to protest this submittal may do so by letter sent electronically via E-mail, no later than November 27, 2023, which is 24 days[1] after the date of this submittal. Protests must be submitted to:

CPUC Energy Division
ED Tariff Unit
E-mail: EDTariffUnit@cpuc.ca.gov

The protest shall also be electronically sent to PG&E via E-mail at the address shown below on the same date it is electronically delivered to the Commission:

Sidney Bob Dietz II
Director, Regulatory Relations
c/o Megan Lawson
E-mail: PGETariffs@pge.com

Any person (including individuals, groups, or organizations) may protest or respond to an advice letter (General Order 96-B, Section 7.4). The protest shall contain the following information: specification of the advice letter protested; grounds for the protest; supporting factual information or legal argument; name and e-mail address of the protestant; and statement that the protest was sent to the utility no later than the day on which the protest was submitted to the reviewing Industry Division (General Order 96-B, Section 3.11).

[1] The 20-day protest period concludes on a weekend and holiday; therefore, PG&E is moving this date to the following business day.

Effective Date

Pursuant to General Order (GO) 96-B, Rule 5.2, this advice letter is submitted with a Tier 2 designation. PG&E requests that this Tier 2 advice submittal become effective on regular notice, December 3, 2023**,** which is 30 calendar days after the date of submittal.

Notice

In accordance with General Order 96-B, Section IV, a copy of this advice letter is being sent electronically to parties shown on the attached list. Address changes to the General Order 96-B service list should be directed to PG&E at email address PGETariffs@pge.com. For changes to any other service list, please contact the Commission's Process Office at (415) 703-2021 or at Process_Office@cpuc.ca.gov. Send all electronic approvals to PGETariffs@pge.com. Advice letter submittals can also be accessed electronically at: http://www.pge.com/tariffs/.

/S/
Sidney Bob Dietz II
Director, Regulatory Relations
CPUC Communications

Attachments:
Attachment 1: Tariff
Attachment 2: Redline Tariff Revisions

California Public Utilities Commission

ADVICE LETTER SUMMARY

ENERGY UTILITY

MUST BE COMPLETED BY UTILITY (Attach additional pages as needed)

Company name/CPUC Utility No.: Pacific Gas and Electric Company (ID U39 E)

Utility type:
☑ ELC ☐ GAS ☐ WATER
☐ PLC ☐ HEAT

Contact Person: Kimberly Loo
Phone #: (279)789-6209
E-mail: PGETariffs@pge.com
E-mail Disposition Notice to: KELM@pge.com

EXPLANATION OF UTILITY TYPE
ELC = Electric GAS = Gas WATER = Water
PLC = Pipeline HEAT = Heat

(Date Submitted / Received Stamp by CPUC)

Advice Letter (AL) #: 7060-E

Tier Designation: 2

Subject of AL: Incorporating IEEE 519 Harmonics Limits within PG&E Electric Rule 2

Keywords (choose from CPUC listing): Rules

AL Type: ☐ Monthly ☐ Quarterly ☐ Annual ☑ One-Time ☐ Other:

If AL submitted in compliance with a Commission order, indicate relevant Decision/Resolution #:

Does AL replace a withdrawn or rejected AL? If so, identify the prior AL: No

Summarize differences between the AL and the prior withdrawn or rejected AL:

Confidential treatment requested? ☐ Yes ☑ No

If yes, specification of confidential information:
Confidential information will be made available to appropriate parties who execute a nondisclosure agreement. Name and contact information to request nondisclosure agreement/ access to confidential information:

Resolution required? ☐ Yes ☑ No

Requested effective date: 12/3/23

No. of tariff sheets: 30

Estimated system annual revenue effect (%): N/A

Estimated system average rate effect (%): N/A

When rates are affected by AL, include attachment in AL showing average rate effects on customer classes (residential, small commercial, large C/I, agricultural, lighting).

Tariff schedules affected: See Attachment 1

Service affected and changes proposed[1]: N/A

Pending advice letters that revise the same tariff sheets: N/A

[1]Discuss in AL if more space is needed.

Clear Form

Protests and correspondence regarding this AL are to be sent via email and are due no later than 20 days after the date of this submittal, unless otherwise authorized by the Commission, and shall be sent to:

California Public Utilities Commission
Energy Division Tariff Unit Email:
EDTariffUnit@cpuc.ca.gov

Contact Name: Sidney Bob Dietz II, c/o Megan Lawson
Title: Director, Regulatory Relations
Utility/Entity Name: Pacific Gas and Electric Company

Telephone (xxx) xxx-xxxx:
Facsimile (xxx) xxx-xxxx:
Email: PGETariffs@pge.com

Contact Name:
Title:
Utility/Entity Name:

Telephone (xxx) xxx-xxxx:
Facsimile (xxx) xxx-xxxx:
Email:

CPUC
Energy Division Tariff Unit
505 Van Ness Avenue
San Francisco, CA 94102

Clear Form

Cal P.U.C. Sheet No.	Title of Sheet	Cancelling Cal P.U.C. Sheet No.
56690-E*	ELECTRIC RULE NO. 2 DESCRIPTION OF SERVICE Sheet 1	11257-E
56691-E	ELECTRIC RULE NO. 2 DESCRIPTION OF SERVICE Sheet 2	11896-E*
56692-E	ELECTRIC RULE NO. 2 DESCRIPTION OF SERVICE Sheet 4	14079-E
56693-E	ELECTRIC RULE NO. 2 DESCRIPTION OF SERVICE Sheet 5	11261-E
56694-E	ELECTRIC RULE NO. 2 DESCRIPTION OF SERVICE Sheet 6	11262-E
56695-E	ELECTRIC RULE NO. 2 DESCRIPTION OF SERVICE Sheet 7	11263-E
56696-E	ELECTRIC RULE NO. 2 DESCRIPTION OF SERVICE Sheet 8	31319-E
56697-E	ELECTRIC RULE NO. 2 DESCRIPTION OF SERVICE Sheet 9	27764-E
56698-E	ELECTRIC RULE NO. 2 DESCRIPTION OF SERVICE Sheet 10	27765-E
56699-E	ELECTRIC RULE NO. 2 DESCRIPTION OF SERVICE Sheet 11	27766-E
56700-E	ELECTRIC RULE NO. 2 DESCRIPTION OF SERVICE Sheet 12	27767-E
56701-E	ELECTRIC RULE NO. 2 DESCRIPTION OF SERVICE Sheet 13	11269-E
56702-E	ELECTRIC RULE NO. 2 DESCRIPTION OF SERVICE Sheet 14	11270-E
56703-E	ELECTRIC RULE NO. 2 DESCRIPTION OF SERVICE Sheet 15	11271-E

Cal P.U.C. Sheet No.	Title of Sheet	Cancelling Cal P.U.C. Sheet No.
56704-E	ELECTRIC RULE NO. 2 DESCRIPTION OF SERVICE Sheet 16	11272-E
56705-E	ELECTRIC RULE NO. 2 DESCRIPTION OF SERVICE Sheet 17	27768-E
56706-E	ELECTRIC RULE NO. 2 DESCRIPTION OF SERVICE Sheet 18	11274-E
56707-E	ELECTRIC RULE NO. 2 DESCRIPTION OF SERVICE Sheet 19	11275-E
56708-E	ELECTRIC RULE NO. 2 DESCRIPTION OF SERVICE Sheet 20	27769-E
56709-E	ELECTRIC RULE NO. 2 DESCRIPTION OF SERVICE Sheet 21	27770-E
56710-E	ELECTRIC RULE NO. 2 DESCRIPTION OF SERVICE Sheet 22	11278-E
56711-E*	ELECTRIC RULE NO. 2 DESCRIPTION OF SERVICE Sheet 23	51558-E
56712-E	ELECTRIC RULE NO. 2 DESCRIPTION OF SERVICE Sheet 24	50622-E
56713-E*	ELECTRIC RULE NO. 2 DESCRIPTION OF SERVICE Sheet 25	45471-E
56714-E	ELECTRIC RULE NO. 2 DESCRIPTION OF SERVICE Sheet 26	45472-E
56715-E*	ELECTRIC RULE NO. 2 DESCRIPTION OF SERVICE Sheet 27	45473-E
56716-E	ELECTRIC RULE NO. 2 DESCRIPTION OF SERVICE Sheet 28	45474-E
56717-E	ELECTRIC RULE NO. 2 DESCRIPTION OF SERVICE Sheet 29	45475-E

Cal P.U.C. Sheet No.	Title of Sheet	Cancelling Cal P.U.C. Sheet No.
56718-E*	ELECTRIC TABLE OF CONTENTS Sheet 1	56688-E
56719-E*	ELECTRIC TABLE OF CONTENTS Sheet 18	56689-E

ELECTRIC RULE NO. 2 Sheet 1
DESCRIPTION OF SERVICE

A. GENERAL

1. The type of service available at any particular location should be determined by inquiry at PG&E's local office or by using available online resources at PGE.com. (T)

2. Alternating-current (AC) service will be regularly supplied at a frequency of approximately 60 Hertz (cycles per second). (T)

3. In areas where a certain standard secondary voltage is presently being served to one or more customers, an Applicant applying for new service in such areas may be required by PG&E to receive the same standard voltage supplied to existing customers. (T)

4. All electric services described in this rule are subject to the conditions in the applicable rate schedule and other pertinent rules. (T)

5. It is the responsibility of the Applicant to ascertain and comply with the requirements of governmental authorities having jurisdiction. (T)

6. Service to an Applicant is normally established at one delivery point, through one meter, and at one voltage class. Other arrangements for service at multiple service delivery points, or for services under different voltage classes, are permitted only where feasible and with the approval of PG&E. For purposes of this rule, distribution service voltage classes, delta or wye connected, are described as: (T) (T)

   a. 0-300 volt source, single- or three-phase.

   b. 301-600 volt source, three-phase.

   c. 601-3,000 volt source, three-phase.

   d. 3,001-5,000 volt source, three-phase.

   e. 5,001-15,000 volt source, three-phase.

   f. 15,001-25,000 volt source, three-phase.

(Continued)

ELECTRIC RULE NO. 2 Sheet 2
DESCRIPTION OF SERVICE

A. GENERAL (Cont'd.)

7. New direct-current (DC) or two-phase service is not available. Direct-current service and two-phase service is supplied only to existing customers who continue to operate existing DC or two-phase equipment. Such service is being gradually replaced by standard alternating-current service. (T) (T)

B. SERVICE DELIVERY VOLTAGES

1. Following are the standard service voltages normally available, although not all of them are or can be made available at each service delivery point:

Distribution Voltages			Transmission Voltages	
Single-phase Secondary	Three-phase Secondary	Three-phase Primary	Three-phase	
120/240, 3-wire	240/120, 4-wire	4,160, 3-wire*	60,000, 3-wire	(T)
120/208, 3-wire	240, 3-wire*	4,160Y/2,400, 4-wire*	70,000, 3-wire	|
	208Y/120, 4-wire	12,000, 3-wire	115,000, 3-wire	|
	480/3-wire**	12,000Y/6,930, 4-wire*	230,000, 3-wire	|
	480/277, 4-wire	17,200, 3-wire		|
	480Y/277, 4-wire	20,780, 3-wire		|
		20,780Y/12,000, 4-wire		(T)

* Limited availability, consult PG&E.
** This service is no longer available for new or rebuilt installations.

(Continued)

ELECTRIC RULE NO. 2 Sheet 4
DESCRIPTION OF SERVICE

C. VOLTAGE AND FREQUENCY CONTROL (Cont'd.)

1. CUSTOMER SERVICE VOLTAGES (Cont'd.)

a. (Cont'd.)

Nominal Two-Wire and Multi-Wire Service Voltage	Minimum Service Voltage to All Services (Distribution Circuits)	Maximum Service Voltage to All Services (Distribution Circuits)	
120	114	126	(T)
208	197	218	
240	228	252	
277	263	291	
480	456	504	(T)

1) For the purposes of energy conservation, PG&E's distribution voltages will be regulated to the extent practicable to maintain the lowest service voltages to all customers served on the distribution circuits while being within the noted minimum and maximum voltage ranges. (T)

(Continued)

ELECTRIC RULE NO. 2 Sheet 5
DESCRIPTION OF SERVICE

C. VOLTAGE AND FREQUENCY CONTROL (Cont'd.)

1. CUSTOMER SERVICE VOLTAGES (Cont'd.)

b. Exceptions to Voltage Limits

Voltage may be outside the limits specified when the variations:

1) Arise from the temporary action of the elements.

2) Are infrequent momentary fluctuations of a short duration.

3) Arise from service interruptions.

4) Arise from temporary separation of parts of the system from the main system.

5) Are from causes beyond the control of PG&E.

c. It must be recognized that, because of conditions beyond the control of PG&E or customer, or both, there will be infrequent and limited periods when sustained voltages outside of the service voltage ranges will occur. Utilization equipment may not operate satisfactorily under these conditions, and protective devices may operate to protect the equipment.

d. The sustained service delivery voltages are subject to minor momentary and transient voltage excursions which may occur in the normal operation of PG&E's system. Subject to the limitations of C.1.a., above, the voltage balance between phases will be maintained by PG&E as close as practicable to 2½ percent maximum deviation from the average voltage between the three phases. (T)

(Continued)

ELECTRIC RULE NO. 2 Sheet 6
DESCRIPTION OF SERVICE

C. VOLTAGE AND FREQUENCY CONTROL (Cont'd.)

1. CUSTOMER SERVICE VOLTAGES (Cont'd.)

e. Where the operation of the Applicant's equipment requires unusually stable voltage regulation or other stringent voltage control beyond that supplied by PG&E in the normal operation of its system, the Applicant, at its expense, is responsible for installing, owning, operating, and maintaining any special or auxiliary equipment on the load side of the service delivery point as deemed necessary by the Applicant. (T)

f. The Applicant shall be responsible for designing and operating its service facilities between the service delivery point and the utilization equipment to maintain proper utilization voltage at the line terminals of the utilization equipment. (T)

2. CUSTOMER UTILIZATION VOLTAGES

a. All customer-owned utilization equipment must be designed and rated in accordance with the following utilization voltages specified by the American National Standard C84.1, if customer equipment is to give fully satisfactory performance: (T)

Nominal Utilization Voltage	Minimum Utilization Voltage	Maximum Utilization Voltage
120	110	125
208	191	216
240	220	250
277	254	289
480	440	500

(Continued)

ELECTRIC RULE NO. 2 Sheet 7
DESCRIPTION OF SERVICE

C. VOLTAGE AND FREQUENCY CONTROL (Cont'd.)

2. CUSTOMER UTILIZATION VOLTAGES (Cont'd.)

b. The differences between service and utilization voltages are allowances for voltage drop in customer wiring. The maximum allowance is 4 volts (120 volt base) for secondary service.

c. Minimum utilization voltages from American National Standard C84.1 are shown for customer information only as PG&E has no control over voltage drop in customer's wiring.

d. The minimum utilization voltages shown in a., above, apply to circuits supplying lighting loads. The minimum secondary utilization voltages specified by American National Standard C84.1 for circuits not supplying lighting loads are 90 percent of nominal voltages (108 volts on 120 volt base) for normal service. (T)

e. Motors used on 208 volt systems should be rated 200 volts or (for small single-phase motors) 115 volts. Motors rated 230 volts will not perform satisfactorily on these systems and should not be used. Motors rated 220 volts are no longer standard, but many of them were installed on existing 208 volt systems on the assumption that the utilization voltage would not be less than 187 volts (90 percent of 208 volts).

3. FREQUENCY

PG&E will exercise reasonable diligence and care to regulate and maintain its frequency within reasonable limits but does not guarantee same.

(Continued)

ELECTRIC RULE NO. 2 Sheet 8
DESCRIPTION OF SERVICE

D. GENERAL LOAD LIMITATIONS

1. SINGLE-PHASE SERVICE

a. Single-phase service normally will be three-wire, 120/240 volts (or three-wire 120/208 volts at certain locations as now or hereafter established by PG&E) where the size of any single motor does not exceed 7.5 horsepower (larger motors may be permitted at the option of PG&E). For any single-phase service, the maximum demand as determined by PG&E is limited to the capability of a 100 kVA transformer unless otherwise approved by PG&E. If the load requires a transformer installation in excess of 100 kVA, the service normally will be three-phase. (T) (T)

b. In locations where PG&E maintains a 120/208 volt secondary system, 3-wire single-phase service normally shall be limited to that which can be supplied by a main switch or service entrance rating of 200 amperes. Single-phase loads in these locations in excess of that which can be supplied by a 200 ampere main switch or service entrance rating normally will be supplied with a 208Y/120-volt, three-phase, 4-wire service.

(Continued)

ELECTRIC RULE NO. 2 Sheet 9
DESCRIPTION OF SERVICE

D. GENERAL LOAD LIMITATIONS (Cont'd.)

2. THREE-PHASE SERVICE (2,000 VOLTS OR LESS)

Nominal Voltage	Minimum Load Requirements	Maximum Demand Load Permitted	
a. Secondary service normally available from overhead primary distribution systems (this may require the installation of underground primary to supply a transformer at ground level.):			
208Y/120	Demand load justifies a 75 kVA transformer	1,000 kVA	(T) |
240*	5 hp, 3-phase connected	300 kVA	|
240/120	5 hp, 3-phase connected	300 kVA	|
480	30 kVA, 3-phase demand	3,000 kVA	|
480Y/277	30 kVA, 3-phase demand	3,000 kVA	(T)
b. Secondary service from underground primary distribution systems (where PG&E maintains existing 3-phase primary circuits):			
208Y/120	Demand load justifies a 75 kVA transformer	1,000 kVA	(T) |
240	10 hp, 3-phase connected	300 kVA	|
240/120	10 hp, 3-phase connected	300 kVA	|
480Y/277	Demand load justifies a 75 kVA transformer	3,000 kVA	| (T)
c. Secondary service from underground network systems (only in portions of downtown San Francisco and Oakland):			
208Y/120	None	2,000 kVA	(T)
480Y/277	1,200 kVA demand load	As required	(T)

* Limited availability, consult PG&E.

(Continued)

ELECTRIC RULE NO. 2 Sheet 10
DESCRIPTION OF SERVICE

D. GENERAL LOAD LIMITATIONS (Cont'd.)

2. THREE-PHASE SERVICE (2,000 VOLTS OR LESS) (Cont'd.)

d. Where three-phase service is supplied, PG&E reserves the right to use banks of single-phase transformers or three-phase transformers.

e. Three-phase service will be supplied on request for installations aggregating less than the minimums listed above but not less than 3 hp, three-phase, where existing transformer capacity is available. If three-phase service is not readily available, or for service to loads less than 3 hp, service shall be provided in accordance with either Section H or I of this rule regarding Connected Load Ratings and Special Facilities, respectively. (T)

f. Three-phase metering for one service voltage supplied to installations on one premise at one delivery location normally is limited to a maximum of a 4,000 ampere service rating. Metering for larger installations, or installations having two or more service switches with a combined rating in excess of 4,000 amperes, or service for loads in excess of the maximum demand load permitted, may be installed provided approval of PG&E has been first obtained as to the number, size, and location of switches, circuits, transformers and related facilities. Service supplied to such approved installations in excess of one 4,000 ampere switch or breaker at one service delivery point may be totalized for billing purposes.

(Continued)

ELECTRIC RULE NO. 2 Sheet 11
DESCRIPTION OF SERVICE

D. GENERAL LOAD LIMITATIONS (Cont'd.)

3. THREE-PHASE SERVICE (OVER 2,000 VOLTS)

a. Following are three-phase voltages that are transformed from higher existing primary distribution voltages and provided only as isolated services for a single Applicant where the Applicant's demand load justifies, as determined by PG&E, the installation of the minimum size transformer bank used by PG&E: (T)

Nominal Voltage	Minimum Size Bank Installed	Maximum Demand Load Permitted	
2,400 (See Note 1)	500 kVA	5,000 kVA	(T)
4,160 (See Note 1)	500 kVA	5,000 kVA	|
12,000 (See Notes 1 and 2)	1,000 kVA	10,000 kVA	(T)

b. Following are the standard primary voltages, one of which may be available without transformation from existing primary distribution lines in the area:

4,160	100 kVA	4,000 kVA	(T)
12,000 (See Note 1)	500 kVA	12,000 kVA	|
17,200	500 kVA	15,000 kVA	|
20,780	500 kVA	20,000 kVA	(T)

Note 1: Not available in the network areas in portions of downtown San Francisco and Oakland.

Note 2: Not available where existing primary is 17,200 volts.

(Continued)

ELECTRIC RULE NO. 2 Sheet 12
DESCRIPTION OF SERVICE

D. GENERAL LOAD LIMITATIONS (Cont'd.)

3. THREE-PHASE SERVICE (OVER 2,000 VOLTS) (Cont'd.)

c. Applicants with minimum demand loads of 4,000 kVA may elect to take delivery at the available transmission voltage and provide their own substation facilities. The availability of transmission voltages shall be determined by PG&E. Where a substation on an Applicant's property is supplied from a transmission voltage source, the metering may be installed, at PG&E's option, on the secondary side of the transformers and may be subject to a transformer loss adjustment in accordance with Section B.4., of this Rule. (T)

d. For its operating convenience and necessity, PG&E may elect to supply an Applicant whose demand load is in excess of 2,000 kVA from a substation on the Applicant's premises supplied from a transmission source. Refer to Rule 16 for additional information regarding transformers located on the Applicant's premises. (T)

e. Three-phase service outside the limits of Section D.3., may be available but only if feasible and approved by PG&E. (T)

f. PG&E reserves the right to change its distribution or transmission voltage to another standard service voltage when, in its judgment, it is necessary or advisable for economic reasons or for proper service to its customers. Where a customer is receiving service at the voltage being changed, the customer then has the option to: (1) accept service at the new voltage, (2) accept service at the secondary side of an additional stage of transformation to be supplied by PG&E at a location on the customer's premises in accordance with PG&E's requirements, or (3) contract with PG&E for an additional stage of transformation to be installed as special facilities (including continuing ownership costs and any applicable Income Tax Component of Contribution) under the provisions of Section I, below, whereby the customer will be considered as accepting service at the primary side of the additional stage of transformation. Metering not relocated to the primary side of the additional stage of transformation will be subject to a transformer loss adjustment in accordance with Section B.4., of this Rule. The option to contract with PG&E for an additional stage of transformation (option 3, above) is available only once in conjunction with a change in standard voltage by PG&E. (T)

(Continued)

ELECTRIC RULE NO. 2 Sheet 13
DESCRIPTION OF SERVICE

D. GENERAL LOAD LIMITATIONS (Cont'd.)

4. LOAD BALANCE

The Applicant must balance its demand load as nearly as practicable between the two sides of a three-wire single-phase service and between all phases of a three-phase service. The difference in amperes between any two phases at the Customer's peak load should not be greater than 10 percent or 50 amperes (at the service delivery voltage), whichever is greater; except that the difference between the load on the lighting phase of a four-wire delta service and the load on the power phase may be more than these limits. It will be the responsibility of the Customer to keep its demand load balanced within these limits. (T)

E. PROTECTIVE DEVICES

1. It shall be the Applicant's responsibility to furnish, install, inspect and keep in good and safe condition at its risk and expense, all appropriate protective devices of any kind or character, which may be required to properly protect the Applicant's facilities. PG&E shall not be responsible for any loss or damage occasioned or caused by the negligence, or wrongful act of the Applicant or of any of its agents, employees or licensees in omitting, installing, maintaining, using, operating or interfering with any such protective devices. (T)

2. It shall be the Applicant's responsibility to select and install such protective devices as may be necessary, to coordinate properly with PG&E's protective devices to avoid exposing other Customers to unnecessary service interruptions. (T)

Customers planning the installation of electric equipment such as power electronics, communication equipment, electronic control devices, etc., the performance of which may be adversely affected by waveform harmonic distortion, are responsible for providing and installing the necessary corrective measures or facilities, including suitable protective devices, to limit these adverse effects. (N)

3. It shall be the Applicant's responsibility to equip its three-phase motor installations with appropriate protective devices, or use motors with inherent features, to completely disconnect each such motor from its power supply, giving particular consideration to the following: (T)

a. Protection in each set of phase conductors to prevent damage due to overheating in the event of overload.

(Continued)

ELECTRIC RULE NO. 2 Sheet 14
DESCRIPTION OF SERVICE

E. PROTECTIVE DEVICES (Cont'd.)

3. (Cont'd.)

b. Protection to prevent automatic restarting of motors or motor driven machinery which has been subjected to a service interruption and, because of the nature of the machinery itself or the product it handles, cannot safely resume operation automatically.

c. Open-phase protection to prevent damage due to overheating in the event of loss of voltage on one phase.

d. Reverse-phase protection where appropriate to prevent uncontrolled reversal of motor rotation in the event of accidental phase reversal. (Appropriate installations would include, but are not limited to, motors driving elevators, hoists, tramways, cranes, pumps, conveyors, etc.). (T)

4. The available short-circuit current varies from one location to another, and also depends on the ultimate design characteristics of PG&E's supply and service facilities. Consult PG&E for the ultimate maximum short-circuit current at each service termination point.

5. Where an Applicant proposes to use a ground-fault sensing protective system which would require special PG&E-owned equipment, such a system may be installed only where feasible and with written approval of PG&E. (T)

6. Any non-PG&E-owned emergency standby or other generation equipment that can be operated to supply power to facilities that are also designed to be supplied from PG&E's system shall be controlled with suitable protective devices by the Applicant to prevent parallel operation with PG&E's system in a fail-safe manner, such as the use of a double-throw switch to disconnect all conductors, except where there is a written agreement or service contract with PG&E permitting such parallel operation. (T)

(Continued)

ELECTRIC RULE NO. 2 Sheet 15
DESCRIPTION OF SERVICE

F. INTERFERENCE WITH SERVICE

1. GENERAL

PG&E reserves the right to refuse to serve new loads or to continue to supply existing loads of a size or character that may be detrimental to PG&E's operations or to the service of its Customers. Any Customer who operates or plans to operate any equipment such as, but not limited to, pumps, welders, saw mill apparatus, furnaces, compressors or other equipment where the use of electricity is intermittent, causes intolerable voltage fluctuations, generates waveform harmonic distortion, or otherwise causes intolerable service interference, must reasonably limit such interference or restrict the use of such equipment upon request by PG&E. The Customer is required either to provide and pay for whatever corrective measures are necessary to limit the interference to a level established by PG&E as reasonable, or avoid the use of such equipment, whether or not the equipment has previously caused interference. (T)

2. HARMFUL WAVE FORM AND HARMONICS (T)

Customers shall not operate equipment that superimposes a current of any frequency or wave form upon PG&E's system, or draws current from PG&E's system of a harmful wave form, which causes interference with PG&E's operations, or the service to other Customers, or inductive interference to communication facilities. (T)

Harmonics shall be defined per the Institute of Electrical and Electronics Engineers (IEEE) 519 Standard for Harmonic Control in Electric Power Systems and PG&E may require that the harmonic current drawn by Customer's equipment of any kind be in conformity with the current IEEE 519 standard. (N)

3. CUSTOMER'S RESPONSIBILITY

Any Customer causing service interference to others must diligently pursue and take timely corrective action after being given notice and a reasonable time to do so by PG&E. If the Customer does not take timely corrective action, or continues to operate the equipment causing the interference without restriction or limit, PG&E may, without liability, after giving five (5) calendar days written notice to Customer, either install and activate control devices on its facilities that will temporarily prevent the detrimental operation, or discontinue electric service until a suitable permanent solution is provided by the Customer and it is operational. (T)

(Continued)

ELECTRIC RULE NO. 2 Sheet 16
DESCRIPTION OF SERVICE

F. INTERFERENCE WITH SERVICE (Cont'd.)

4. MOTOR STARTING CURRENT LIMITATIONS

a. The starting of motors shall be controlled by the Customer as necessary to avoid causing voltage fluctuations that will be detrimental to the operation of PG&E's distribution or transmission system, or to the service of any of PG&E's Customers. (T) (T)

b. If the starting current for a single motor installation exceeds the value listed in Table 1, and the resulting voltage disturbance causes or is expected to cause detrimental service to others, reduced voltage starters or other suitable means must be employed, at the Customer's expense, to limit the voltage fluctuations to a tolerable level, except as otherwise provided under subsections 4.d., 4.e., 4.f., and 4.g. (T)

c. The starting current shall be considered to be the current defined in Note 2 of Table 1. At its option, PG&E may determine the starting current of a motor by test, using a stop ammeter with not more than 15 percent overswing, or an oscillograph, disregarding the value shown for the first ten (10) cycles after energizing the motor. (T)

d. Where service conditions permit, subject to PG&E's approval, motor starters may be deferred in the original installation. PG&E may later order the installation of a suitable starter or other devices when it has been determined that the operation of the Customer's motors interfere with service to others. (T) Also, PG&E may require starting current values lower than those set forth herein where conditions at any point on its system require such reduction to avoid interference with service to other Customers. (T)

(Continued)

ELECTRIC RULE NO. 2 Sheet 17
DESCRIPTION OF SERVICE

F. INTERFERENCE WITH SERVICE (Cont'd.)

4. MOTOR STARTING CURRENT LIMITATIONS (Cont'd.)

e. In the case of room and unitary air conditioners, heat pumps or other complete unit equipment on which the nameplate rating is expressed in kVA input and not in hp output, the nameplate kVA input rating shall be used to determine the hp rating for use in Table 1 within Section F.4. If the nameplate does not show kVA input, then it may be determined for single-phase motors by taking the product of the running input line current in amperes times the input voltage rating divided by 1,000. For three-phase motors, multiply this product by the square root of three (1.73). (T) | | (T)

f. The starting current values in Table 1 apply only to the installation of a single motor. Starters may be omitted on the smaller motors of a group installation when their omission will not result in a starting current in excess of the allowable starting current of the largest motor of the group. Where motors start simultaneously, they will be treated as a single unit equal to the sum of their individual starting currents.

g. PG&E may limit the maximum size and type of any motor that may be operated at any specific location on its system to that which will not be detrimental to PG&E's system operations or to the service of its Customers, as determined by PG&E. (T)

h. Where the design or operation of the Customer's motor is such that unequal starting currents flow in PG&E's service conductors, the largest starting current in any one set of phase conductors shall be considered the motor starting current. (T)

(Continued)

ELECTRIC RULE NO. 2 Sheet 18
DESCRIPTION OF SERVICE

F. INTERFERENCE WITH SERVICE (Cont'd.)

4. MOTOR STARTING CURRENT LIMITATIONS (Cont'd.)

i. For installations of motors where the equipment is started automatically by means of float, pressure, or thermostat devices, such as with pumps or wind machines for frost protection, irrigation pumps or other similar installations, PG&E may require the Customer to install, at its expense and in accordance with PG&E's operating requirements, suitable preset time-delay devices to stagger the automatic connection of load to the supply system and to prevent simultaneous start-up for any reason. (T)

(Continued)

ELECTRIC RULE NO. 2 Sheet 19
DESCRIPTION OF SERVICE

F. INTERFERENCE WITH SERVICE (Cont'd.)

4. MOTOR STARTING CURRENT LIMITATIONS (Cont'd.)

TABLE 1
NORMAL MAXIMUM ALLOWABLE MOTOR STARTING CURRENTS
ALTERNATING-CURRENT MOTORS

Rated HP Output	Single-Phase Voltage Motor Rating (Service Voltage)	Three-Phase Voltage Motor Rating (Service Voltage)		
	230v (240v)	200v (208v)	230v (240v)	460v (480v)
2	60 amps	–	–	–
3	80	74 amps	64 amps	32 amps
5	120	106	92	46
7.5	170	146	127	63
10	–	186	162	81
15	–	267	232	116
20	–	347	302	151
25	–	428	372	186
30	–	508	442	221
40	–	669	582	291
50	–	830	722	361
60	–	–	–	431
75	–	–	–	536
100	–	–	–	711
Over 100—See Note 3				

Table 1 Notes:

1. See Section F.4. for details on the use of this table.

2. Motor starting current is defined as the steady state current taken from the supply line with the 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.

3. The Applicant shall consult PG&E for design criteria information for selecting suitable starting equipment for three-phase AC motors not shown on Table 1, for DC motors supplied directly from existing DC systems, and for motors that operate at higher voltage ratings. (T) | (T)

(Continued)

ELECTRIC RULE NO. 2 Sheet 20
DESCRIPTION OF SERVICE

G. POWER FACTOR

When lighting devices, such as neon, fluorescent, luminous gaseous, mercury vapor, and other lighting equipment having low power factors are served on street lighting or area lighting schedules, the Customer shall provide, at its expense, power factor corrective equipment to increase the power factor of each complete lighting device to not less than 90 percent. (T)

H. CONNECTED LOAD RATINGS

1. The connected load is the sum of the rated capacities of all of the Customer's electric utilization equipment that is served through one metering point and that may be operated at the same time, computed to the nearest one-tenth of a horsepower, kilowatt or kilovolt-ampere. Motors will be counted at their nameplate ratings in horsepower output and other devices at their nameplate input ratings in kW or kVA, except that resistance welders will be rated in accordance with Section J., of this rule regarding "Welder Service." Unless otherwise stated in the rate schedule, conversions between horsepower, kW and/or kVA ratings will be made on a one-to-one basis. (T) (T) (T)

2. The normal operating capacity rating of any motor or other device may be determined from the nameplate rating. Where the original nameplate has been removed or altered, the manufacturer's published rating may be used or the rating determined by test at the expense of the Customer. (T)

3. Motor-generator sets shall be rated at the nameplate rating of the alternating-current drive motor of the set.

4. a. X-ray equipment shall be rated at the maximum nameplate kVA input operating at the highest rated output amperes. If the kVA input rating is not shown, it will be determined for single-phase loads by taking the product of the amperes input rating times the input voltage rating divided by 1,000. For three-phase equipment, multiply this product times the square root of three (1.73). (T) (T)

(Continued)

ELECTRIC RULE NO. 2 Sheet 21
DESCRIPTION OF SERVICE

H. CONNECTED LOAD RATINGS (Cont'd.)

4. (Cont'd.)

b. Where X-ray equipment is separately metered and supplied from a separate transformer installed by PG&E to serve the X-ray installation only, the kVA rating of PG&E's transformer or the total X-ray equipment input capacity, whichever is smaller, will be considered the load for billing purposes. (T)

5. Where a Customer operates a complete unit of equipment connected for three-phase service but consisting of single-phase components which cannot be readily reconnected for single-phase service, PG&E shall consider the connected load of such a unit as three-phase load. (T)

6. Where a Customer has, or expects to have, permanently-connected, three-phase load that is used infrequently or for short durations, such as, but not limited to, equipment for fire pumps, frost protection, flood control, emergency sirens or other similar installations which make it impractical to record proper demands on a monthly basis for billing purposes, the Customer may, for its reasons and with PG&E's approval, guarantee an appropriate billing demand or connected three-phase load for billing purposes in order to reserve suitable capacity in PG&E's facilities. (T) (T)

I. SPECIAL FACILITIES

1. PG&E normally installs only those standard facilities which it deems are necessary to provide regular service in accordance with the tariff schedules. Where the Applicant requests PG&E to install special facilities and PG&E agrees to make such an installation, the additional costs thereof shall be borne by the Applicant, including the Income Tax Component of Contribution and such continuing ownership costs as may be applicable. (T) (T) (T)

(Continued)

ELECTRIC RULE NO. 2 Sheet 22
DESCRIPTION OF SERVICE

I. SPECIAL FACILITIES (Cont'd.)

2. Special facilities are (a) facilities requested by an Applicant which are in addition to or in substitution for standard facilities which PG&E would normally provide for delivery of service at one point, through one meter, at one voltage class under its tariff schedules, or (b) a pro rata portion of the facilities requested by an Applicant, allocated for the sole use of such Applicant, which would not normally be allocated for such sole use. Unless otherwise provided by PG&E's filed tariff schedules, special facilities will be installed, owned and maintained or allocated by PG&E as an accommodation to the Applicant only if acceptable for operation by PG&E and the reliability of service to PG&E's other Customers is not impaired. (T) (T) (T) (T)

3. Special facilities will be installed under the terms and conditions of a contract in the form on file with the Commission. Such contract will include, but is not limited to, the following terms and conditions:

   a. Where new facilities are to be installed for Applicant's use as special facilities, the Applicant shall advance to PG&E the estimated additional installed cost of the special facilities over the estimated cost of standard facilities. At PG&E's option, PG&E may finance the new facilities. (T) (T)

   b. A monthly cost-of-ownership charge shall be paid by Applicant for the special facilities: (T)

(Continued)

ELECTRIC RULE NO. 2 Sheet 23
DESCRIPTION OF SERVICE

I. SPECIAL FACILITIES (Cont'd.)

3. (Cont'd.)

b. (Cont'd.)

TYPE OF FACILITY	FINANCING	MONTHLY CHARGE
Transmission (60kv and over)*	Customer PG&E	0.31% of the amount advanced 1.14% of the additional cost
Distribution	Customer PG&E	0.49% of the amount advanced 1.23% of the additional cost

c. Where existing facilities are allocated for Applicant's use as special facilities, the Applicant shall pay a monthly Cost of Ownership charge. This monthly Cost of Ownership charge shall be based on the estimated installed cost of that portion of the existing facilities which is allocated to the Customer. (T)

d. Where PG&E determines the collection of continuing monthly Cost of Ownership charges is not practicable, the Applicant will be required to make an equivalent one-time payment in lieu of the monthly Cost of Ownership charges. (T)

e. All monthly Cost of Ownership charges shall be reviewed and re-filed with the Commission when changes occur in PG&E's cost of providing such service.

* For the purpose of applying the special transmission facilities charge, special transmission facilities are those facilities in the "100 series" of the standard PG&E system of accounts (FERC Account Nos. 352-359). (T)

(Continued)

ELECTRIC RULE NO. 2 Sheet 24
DESCRIPTION OF SERVICE

I. SPECIAL FACILITIES (Cont'd.)

4. Beginning January 1, 2021, PG&E will no longer accept requests under the Special Facilities provision of Rule 2, Section I, for underground distribution systems that call for specified pieces of electrical equipment to be installed in below-ground structures in circumstances where it is technically feasible to install the equipment above ground. Such requests will no longer be accepted for situations indicated in Sections I.4.a, I.4.b, and with certain exceptions I.4.c, below. However, all requests which call for below ground installations that are received by PG&E prior to January 1, 2021 will have "legacy" status" and not subject to the provisions of this Rule section. These legacy requests must be approved by PG&E for construction by April 1, 2021 and installed by April 1, 2022.

   a. New construction on any property except public property and public rights-of-way;

   b. Circumstances in which capacity upgrades, conversions, and relocations are required due to Customer-driven renovations of existing structures or other building activities on any property except public property and public rights of way resulting in a change of use or occupancy as defined in state or local law; (T)

   c. Except for situations on a case-by-case basis in which the local authority and PG&E agree to locate Equipment above ground because the above-ground location is technically feasible for the installation.

   For purposes of this provision, specified pieces of equipment include all primary voltage from 4 kV to 35 kV electrical distribution system equipment (Equipment), including, but not limited to, transformers, switches and fuses, capacitors, and junction bars.

   "Technically feasible" means that enough space is, or can be made, available above ground for the electrical distribution Equipment needed for PG&E to serve Customers and that other requirements, such as obtaining the required permits, are met. The required space is defined by existing design standards within the operation and maintenance requirements that are in compliance with applicable safety codes and regulations such as CPUC General Order 128. (T)

(Continued)

ELECTRIC RULE NO. 2 Sheet 25
DESCRIPTION OF SERVICE

I. SPECIAL FACILITIES (Cont'd.)

Where PG&E has existing primary voltage distribution equipment installed in below ground structures, the equipment will continue to be operated and maintained below ground. However, in accordance with Section I.4.c., above, where existing below-ground Equipment must be modified by PG&E, above-ground retrofits shall only occur in circumstances in which capacity upgrades, conversions, and relocations are required due to Customer-driven renovations of existing structures or other building activities resulting in a change of use or occupancy as defined in state or local law; or when agreed to by the local authority and PG&E on a case-by-case basis. (T)

Design and installation of any above-ground Equipment shall comply with the typical installations depicted in PG&E's Electric Design Manual, as well as land use laws, including local ordinances respecting matters of public health, safety and convenience, that are of general applicability to above-ground utility structures regardless of ownership, to the extent the same would not directly or effectively require the Equipment to be located underground.

When modifying existing Equipment installed in the above-ground public rights-of-way, PG&E shall comply with local ordinances respecting matters of public health, safety and convenience, that are of general applicability to other utility and public works structures or equipment, regardless of ownership, installed in the public rights-of-way do not directly or effectively require the Equipment to be located underground, or otherwise conflict with the then current design standards contained in PG&E's Electric Design Manual and similar documents. (T) (T)

(Continued)

ELECTRIC RULE NO. 2 Sheet 26
DESCRIPTION OF SERVICE

J. WELDER SERVICE

1. RATING OF WELDERS

Electric welders will be rated for billing purposes as follows:

a. MOTOR-GENERATOR ARC WELDERS – The horsepower rating of the motor driving a motor-generating type arc welder will be taken as the horsepower rating of the welder.

b. TRANSFORMER ARC WELDERS – Nameplate maximum kVA input (at rated output amperes) will be taken as the rating of transformer type arc welders. (T)

c. RESISTANCE WELDERS – Resistance welder ratings will be determined by multiplying the welder transformer nameplate rating (at 50 percent duty cycle) by the appropriate factor listed below:

(Continued)

ELECTRIC RULE NO. 2 Sheet 27
DESCRIPTION OF SERVICE

J. WELDER SERVICE (Cont'd.)

1. RATING OF WELDERS (Cont'd.)

TYPE OF WELDER	TRANSFORMER NAMEPLATE RATING @ 50% Duty Cycle**	FACTOR PG&E-Owned Distrib. Transf.	FACTOR Customer Owned Distrib. Transf.	
1. Rocker Arm, Press or Projection Spot	20 kVA or less	0.60	0.50	(T)
2. Rocker Arm, Press Spot Project Spot Flash or Butt Seam or Portable Gun	Over 20 kVA 21 to 75 kVA, inclusive 100 kVA or over All sizes	0.80	0.60	(T) | (T)
3. Flash or Butt	67 to 100 kVA, inclusive	***	***	(T)
4. Projection Spot Flash or Butt	Over 75 kVA 66 kVA or less	1.20	0.90	(T) (T)

** The kVA rating of all resistance welders to which these rating procedures are applied must be at or equivalent to 50 percent duty cycle operation. Duty cycle is the percentage of the time welding current flows during a given operating cycle. If the operating kVA nameplate rating is for some other operating duty cycle, then the thermally equivalent kVA rating at 50 percent duty cycle must be calculated. (T)

*** Each flash or butt welder in this group will be rated at 80 kVA where distribution voltage transformer is owned by PG&E or 60 kVA where distribution voltage service transformer is owned by the Customer. (T)

(Continued)

ELECTRIC RULE NO. 2 Sheet 28
DESCRIPTION OF SERVICE

J. WELDER SERVICE (Cont'd.)

1. RATING OF WELDERS (Cont'd.)

d. Ratings prescribed by a., b., and c., above, normally will be determined from nameplate data or from data supplied by the manufacturer. If such data are not available or are believed by either PG&E or Customer to be unreliable, the rating will be determined by test at the expense of the Customer. (T) (T) (T)

e. If established by seals approved by PG&E, the welder rating may be limited by the sealing of taps which provide capacity greater than the selected tap and/or by the interlocking lockout of one or more welders with other welders.

f. When conversion of units is required for tariff application, one welder kVA will be taken as one horsepower for tariffs stated on a horsepower basis and one welder kVA will be taken as one kilowatt for tariffs stated on a kilowatt basis. (T) (T)

2. BILLING OF WELDERS

Welders will be billed at the regular rates and conditions of the tariffs on which they are served, subject to the following provisions:

a. CONNECTED LOAD TYPE OF SCHEDULE

Welder load will be included as part of the connected load with ratings as determined under Section 1, above, based on the maximum load that can be connected at any one time, and no allowance will be made for diversity between welders.

(Continued)

ELECTRIC RULE NO. 2 Sheet 29
DESCRIPTION OF SERVICE

J. WELDER SERVICE (Cont'd.)

2. BILLING OF WELDERS (Cont'd.)

b. DEMAND METERED TYPE OF SCHEDULE

Where resistance welders are served on these schedules, the computation of diversified resistance welder load shall be made as follows:

Multiply the individual resistance welder ratings, as prescribed in Sections 1.c. to 1.f. inclusive, above, by the following factors and adding the results thus obtained:

1.0 times the rating of the largest welder

0.8 times the rating of the next largest welder

0.6 times the rating of the next largest welder

0.4 times the rating of the next largest welder

0.2 times the ratings of all additional welders

If this computed, diversified, resistance welder load is greater than the metered demand, the diversified resistance welder load will be used in lieu of the metered demand for rate computation purposes.

3. USE OF WELDERS THROUGH RESIDENTIAL SERVICE

Any welder exceeding three kVA capacity at 50 percent duty cycle supplied through a residential service requires advance approval by PG&E. (T)

ELECTRIC TABLE OF CONTENTS Sheet 1

TABLE OF CONTENTS

(Continued)

ELECTRIC TABLE OF CONTENTS Sheet 18

(Continued)

Attachment 2

Redline Tariff Revisions

ELECTRIC RULE NO. 2 Sheet 1
DESCRIPTION OF SERVICE

A. GENERAL

1. The type of service available at any particular location should be determined by inquiry at PG&E's local office~~.~~ or by using available online resources at PGE.com.

2. Alternating-current (AC) service will be regularly supplied at a frequency of approximately 60 Hertz (cycles per second).

3. In areas where a certain standard secondary voltage is presently being served to one or more customers, an ~~applicant~~ Applicant applying for new service in such areas may be required by PG&E to receive the same standard voltage supplied to existing customers.

4. All electric service~~s~~ described in this rule ~~is~~ are subject to the conditions in the applicable rate schedule and other pertinent rules.

5. It is the responsibility of the ~~applicant~~ Applicant to ascertain and comply with the requirements of governmental authorities having jurisdiction.

6. Service to an ~~applicant~~ Applicant is normally established at one delivery point, through one meter, and at one voltage class. Other arrangements for service at multiple service delivery points, or for services ~~at more than one voltage class~~under different voltage classes, are permitted only where feasible and with the approval of PG&E. For purposes of this rule, distribution service voltage classes, delta or wye connected, are described as:

   a. 0-300 volt source, single- or three-phase.

   b. 301-600 volt source, three-phase.

   c. 601-3,000 volt source, three-phase.

   d. 3,001-5,000 volt source, three-phase.

   e. 5,001-15,000 volt source, three-phase.

   f. 15,001-25,000 volt source, three-phase.

(Continued)

ELECTRIC RULE NO. 2 Sheet 2
DESCRIPTION OF SERVICE

A. GENERAL (Cont'd.)

7. New direct-current (~~d-c~~DC) or two-phase service is not available. Direct-current service and two-phase service is supplied only to existing customers who continue to operate existing ~~d-c~~DC or two-phase equipment. Such service is being gradually replaced by standard alternating-current service.

B. SERVICE DELIVERY VOLTAGES

1. Following are the standard service voltages normally available, although not all of them are or can be made available at each service delivery point:

Distribution Voltages			Transmission Voltages
Single-phase Secondary	Three-phase Secondary	Three-phase Primary	Three-phase
120/240, 3-wire	240/120, 4-wire	4,160, 3-wire*~~2,400, 3-wire*~~	60,000, 3-wire
120/208, 3-wire	240, 3-wire*	4,160Y/2,400, 4-wire*~~4,160, 3-wire*~~	70,000, 3-wire
	208Y/120, 4-wire	12,000, 3-wire~~4,160Y/2,400, 4-wire*~~	115,000, 3-wire
	480/3-wire**	12,000Y/6,930, 4-wire*~~12,000, 3-wire~~	230,000, 3-wire
	480/277, 4-wire	17,200, 3-wire~~12,000Y/6,930, 4-wire*~~	
	480Y/277, 4-wire	20,780, 3-wire~~17,200, 3-wire~~ 20,780Y/12,000, 4-wire~~20,780, 3-wire~~ ~~20,780Y/12,000, 4-wire~~	

* Limited availability, consult PG&E.
** This service is no longer available for new or rebuilt installations.

(Continued)

ELECTRIC RULE NO. 2 Sheet 4
DESCRIPTION OF SERVICE

C. VOLTAGE AND FREQUENCY CONTROL (Cont'd.)

1. CUSTOMER SERVICE VOLTAGES (Cont'd.)

a. (Cont'd.)

~~Nominal Two-Wire And Multi-Wire Service Voltage~~	~~Minimum Voltage To All Services~~	~~Maximum Service Voltage On Residential And Commercial Distribution Circuits~~		~~Maximum Service Voltage On Agricultural And Industrial Distribution Circuits~~
		~~Class A~~	~~Class B~~	
~~120~~	~~114~~	~~120~~	~~126~~	~~126~~
~~208~~	~~197~~	~~208~~	~~218~~	~~218~~
~~240~~	~~228~~	~~240~~	~~252~~	~~252~~
~~277~~	~~263~~	~~277~~	~~291~~	~~291~~
~~480~~	~~456~~	~~480~~	~~504~~	~~504~~

~~1) For purposes of energy conservation, PG&E's distribution voltage will be regulated to the extent practicable to maintain service voltage on residential and commercial distribution circuits within the minimum and maximum voltages specified above for Class A circuits.~~

~~2) The residential and commercial distribution circuits that cannot be operated within the minimum and maximum voltages for Class A circuits shall be regulated to the extent practicable to maintain service voltage within the minimum and maximum voltages for Class B circuits and, whenever possible, within the minimum and maximum voltages for Class A circuits.~~

Nominal Two-Wire and Multi-Wire Service Voltage	Minimum Service Voltage to All Services (Distribution Circuits)	Maximum Service Voltage to All Services (Distribution Circuits)
120	114	126
208	197	218
240	228	252
277	263	291
480	456	504

1) For the purposes of energy conservation, PG&E's distribution voltages will be regulated to the extent practicable to maintain the lowest service

(Continued)

voltages to all customers served on the distribution circuits while being within the noted minimum and maximum voltage ranges.

(Continued)

ELECTRIC RULE NO. 2 Sheet 5
DESCRIPTION OF SERVICE

C. VOLTAGE AND FREQUENCY CONTROL (Cont'd.)

1. CUSTOMER SERVICE VOLTAGES (Cont'd.)

b. Exceptions to Voltage Limits

Voltage may be outside the limits specified when the variations:

1) Arise from the temporary action of the elements.

2) Are infrequent momentary fluctuations of a short duration.

3) Arise from service interruptions.

4) Arise from temporary separation of parts of the system from the main system.

5) Are from causes beyond the control of PG&E.

c. It must be recognized that, because of conditions beyond the control of PG&E or customer, or both, there will be infrequent and limited periods when sustained voltages outside of the service voltage ranges will occur. Utilization equipment may not operate satisfactorily under these conditions, and protective devices may operate to protect the equipment.

d. The sustained service delivery voltages are subject to minor momentary and transient voltage excursions which may occur in the normal operation of PG&E's system. Subject to the limitations of C.1.a., above, the voltage balance between phases will be maintained by PG&E as close as practicable to 2½ percent maximum deviation from the average voltage between the three phases.

(Continued)

C. VOLTAGE AND FREQUENCY CONTROL (Cont'd.)

1. CUSTOMER SERVICE VOLTAGES (Cont'd.)

e. Where the operation of the ~~applicant's~~ Applicant's equipment requires unusually stable voltage regulation or other stringent voltage control beyond that supplied by PG&E in the normal operation of its system, the ~~applicant~~Applicant, at ~~his~~its ~~own~~ expense, is responsible for installing, owning, operating, and maintaining any special or auxiliary equipment on the load side of the service delivery point as deemed necessary by the ~~applicant~~Applicant.

f. The ~~applicant~~ Applicant shall be responsible for designing and operating ~~his~~its service facilities between the service delivery point and the utilization equipment to maintain proper utilization voltage at the line terminals of the utilization equipment.

2. CUSTOMER UTILIZATION VOLTAGES

a. All customer-owned utilization equipment must be designed and rated in accordance with the following utilization voltages specified by the American National Standard C84.1, if customer equipment is to give fully satisfactory performance:

Nominal Utilization Voltage	Minimum Utilization Voltage	Maximum Utilization Voltage
120	110	125
208	191	216
240	220	250
277	254	289
480	440	500

(Continued)

ELECTRIC RULE NO. 2 Sheet 7
DESCRIPTION OF SERVICE

C. VOLTAGE AND FREQUENCY CONTROL (Cont'd.)

2. CUSTOMER UTILIZATION VOLTAGES (Cont'd.)

b. The differences between service and utilization voltages are allowances for voltage drop in customer wiring. The maximum allowance is 4 volts (120 volt base) for secondary service.

c. Minimum utilization voltages from American National Standard C84.1 are shown for customer information only as PG&E has no control over voltage drop in customer's wiring.

d. The minimum utilization voltages shown in a., above, apply ~~for~~ to circuits supplying lighting loads. The minimum secondary utilization voltages specified by American National Standard C84.1 for circuits not supplying lighting loads are 90 percent of nominal voltages (108 volts on 120 volt base) for normal service.

e. Motors used on 208 volt systems should be rated 200 volts or (for small single-phase motors) 115 volts. Motors rated 230 volts will not perform satisfactorily on these systems and should not be used. Motors rated 220 volts are no longer standard, but many of them were installed on existing 208 volt systems on the assumption that the utilization voltage would not be less than 187 volts (90 percent of 208 volts).

3. FREQUENCY

PG&E will exercise reasonable diligence and care to regulate and maintain its frequency within reasonable limits but does not guarantee same.

(Continued)

ELECTRIC RULE NO. 2 Sheet 8
DESCRIPTION OF SERVICE

D. GENERAL LOAD LIMITATIONS

1. SINGLE-PHASE SERVICE

a. Single-phase service normally will be three-wire, 120/240 volts (or three-wire 120/208 volts at certain locations as now or hereafter established by PG&E) where the size of any single motor does not exceed 7.5 horsepower (larger motors may be permitted at the option of PG&E). For any single-phase service, the maximum demand as determined by PG&E is limited to the capability of a 100 ~~kVa~~ kVA transformer unless otherwise approved by PG&E. If the load requires a transformer installation in excess of 100 ~~kVa~~kVA, the service normally will be three-phase.

b. In locations where PG&E maintains a 120/208 volt secondary system, 3-wire single-phase service normally shall be limited to that which can be supplied by a main switch or service entrance rating of 200 amperes. Single-phase loads in these locations in excess of that which can be supplied by a 200 ampere main switch or service entrance rating normally will be supplied with a 208Y/120-volt, three-phase, 4-wire service.

(Continued)

ELECTRIC RULE NO. 2 Sheet 9
DESCRIPTION OF SERVICE

D. GENERAL LOAD LIMITATIONS (Cont'd.)

2. THREE-PHASE SERVICE (2,000 VOLTS OR LESS)

Nominal Voltage	Minimum Load Requirements	Maximum Demand Load Permitted
a. Secondary service normally available from overhead primary distribution systems (this may require the installation of underground primary to supply a transformer at ground level.):		
208Y/120	Demand load justifies a 75 ~~kVa~~ kVA transformer	1,000 ~~kVa~~kVA
240*	5 hp, 3-phase connected	300 kVA~~a~~
240/120	5 hp, 3-phase connected	300 ~~kVa~~kVA
480	30 ~~kVa~~kVA, 3-phase demand	3,000 ~~kVa~~kVA
480Y/277	30 ~~kVa~~kVA, 3-phase demand	3,000 ~~kVa~~kVA
b. Secondary service from underground primary distribution systems (where PG&E maintains existing 3-phase primary circuits):		
208Y/120	Demand load justifies a 75 ~~kVa~~ kVA transformer	1,000 ~~kVa~~kVA
240	10 hp, 3-phase connected	300 ~~kVa~~kVA
240/120	10 hp, 3-phase connected	300 ~~kVa~~kVA
480Y/277	Demand load justifies a 75 ~~kVa~~ kVA transformer	3,000 ~~kVa~~kVA
c. Secondary service from underground network systems (only in portions of downtown San Francisco and Oakland):		
208Y/120	None	2,000 ~~kVa~~kVA
480Y/277	1,200 ~~kVa~~ kVA demand load	As required

* Limited availability, consult PG&E.

(Continued)

ELECTRIC RULE NO. 2 Sheet 10
DESCRIPTION OF SERVICE

D. GENERAL LOAD LIMITATIONS (Cont'd.)

2. THREE-PHASE SERVICE (2,000 VOLTS OR LESS) (Cont'd.)

d. Where three-phase service is supplied, PG&E reserves the right to use banks of single-phase transformers or three-phase transformers.

e. Three-phase service will be supplied on request for installations aggregating less than the minimums listed above but not less than 3 hp, three-phase, where existing transformer capacity is available. If three-phase service is not readily available, or for service to loads less than 3 hp, service shall be provided in accordance with either Section H or I of this rule regarding Connected Load Ratings and Special Facilities, respectively.

f. Three-phase metering for one service voltage supplied to installations on one premise at one delivery location normally is limited to a maximum of a 4,000 ampere service rating. Metering for larger installations, or installations having two or more service switches with a combined rating in excess of 4,000 amperes, or service for loads in excess of the maximum demand load permitted, may be installed provided approval of PG&E has been first obtained as to the number, size, and location of switches, circuits, transformers and related facilities. Service supplied to such approved installations in excess of one 4,000 ampere switch or breaker at one service delivery point may be totalized for billing purposes.

(Continued)

ELECTRIC RULE NO. 2 Sheet 11
DESCRIPTION OF SERVICE

D. GENERAL LOAD LIMITATIONS (Cont'd.)

3. THREE-PHASE SERVICE (OVER 2,000 VOLTS)

a. Following are three-phase voltages that are transformed from higher existing primary distribution voltages and provided only as isolated services for a single ~~applicant~~ Applicant where the ~~applicant's~~ Applicant's demand load justifies, as determined by PG&E, the installation of the minimum size transformer bank used by PG&E:

Nominal Voltage	Minimum Size Bank Installed	Maximum Demand Load Permitted
2,400 (See Note 1)	500 ~~kVa~~kVA	5,000 ~~kVa~~kVA
4,160 (See Note 1)	500 ~~kVa~~kVA	5,000 ~~kVa~~kVA
12,000 (See Notes 1 and 2)	1,000 ~~kVa~~kVA	10,000 ~~kVa~~kVA

b. Following are the standard primary voltages, one of which ~~-~~may be available without transformation from existing primary distribution lines in the area:

4,160	100 ~~kVa~~kVA	4,000 ~~kVa~~kVA
12,000 (See Note 1)	500 ~~kVa~~kVA	12,000 ~~kVa~~kVA
17,200	500 ~~kVa~~kVA	15,000 ~~kVa~~kVA
20,780	500 ~~kVa~~kVA	20,000 ~~kVa~~kVA

Note 1: Not available in the network areas in portions of downtown San Francisco and Oakland.

Note 2: Not available where existing primary is 17,200 volts.

(Continued)

ELECTRIC RULE NO. 2 Sheet 12
DESCRIPTION OF SERVICE

D. GENERAL LOAD LIMITATIONS (Cont'd.)

3. THREE-PHASE SERVICE (OVER 2,000 VOLTS) (Cont'd.)

c. Applicants with minimum demand loads of 4,000 ~~kVa~~ kVA may elect to take delivery at the available transmission voltage and provide their own substation facilities. The availability of transmission voltages shall be determined by PG&E. Where a substation on an ~~applicant's~~ Applicant's property is supplied from a transmission voltage source, the metering may be installed, at PG&E's option, on the secondary side of the transformers and may be subject to a transformer loss adjustment in accordance with Section B.4.. of this Rule.

d. For its operating convenience and necessity, PG&E may elect to supply an ~~applicant~~ Applicant whose demand load is in excess of 2,000 ~~kVa~~ kVA from a substation on the ~~applicant's~~ Applicant's premises supplied from a transmission source. Refer to Rule 16 for additional information regarding transformers located on the ~~applicant's~~ Applicant's premises.

e. Three-phase service outside the limits of Section D.3.. may be available but only if feasible and approved by PG&E.

f. PG&E reserves the right to change its distribution or transmission voltage to another standard service voltage when, in its judgment, it is necessary or advisable for economic reasons or for proper service to its customers. Where a customer is receiving service at the voltage being changed, the customer then has the option to: (1) accept service at the new voltage, (2) accept service at the secondary side of an additional stage of transformation to be supplied by PG&E at a location on the customer's premises in accordance with PG&E's requirements, or (3) contract with PG&E for an additional stage of transformation to be installed as special facilities (including continuing ownership costs and any applicable ~~Contributions in Aid of Construction taxes~~Income Tax Component of Contribution) under the provisions of Section I, below, whereby the customer will be considered as accepting service at the primary side of the additional stage of transformation. Metering not relocated to the primary side of the additional stage of transformation will be subject to a transformer loss adjustment in accordance with Section B.4.. of this Rule. The option to contract with PG&E for an additional stage of transformation (option 3, above) is available only once in conjunction with a change in standard voltage by PG&E.

(Continued)

ELECTRIC RULE NO. 2 Sheet 13
DESCRIPTION OF SERVICE

D. GENERAL LOAD LIMITATIONS (Cont'd.)

4. LOAD BALANCE

The ~~applicant~~ Applicant must balance ~~his~~its demand load as nearly as practicable between the two sides of a three-wire single-phase service and between all phases of a three-phase service. The difference in amperes between any two phases at the ~~customer's~~ Customer's peak load should not be greater than 10 percent or 50 amperes (at the service delivery voltage), whichever is greater; except that the difference between the load on the lighting phase of a four-wire delta service and the load on the power phase may be more than these limits. It will be the responsibility of the ~~customer~~ Customer to keep ~~his~~its demand load balanced within these limits.

E. PROTECTIVE DEVICES

1. It shall be the ~~applicant's~~ Applicant's responsibility to furnish, install, inspect and keep in good and safe condition at ~~his~~its ~~own~~ risk and expense, all appropriate protective devices of any kind or character, which may be required to properly protect the ~~applicant's~~ Applicant's facilities. PG&E shall not be responsible for any loss or damage occasioned or caused by the negligence, or wrongful act of the ~~applicant~~ Applicant or of any of ~~his~~its agents, employees or licensees in omitting, installing, maintaining, using, operating or interfering with any such protective devices.

2. It shall be the ~~applicant's~~ Applicant's responsibility to select and install such protective devices, as may be necessary, to coordinate properly with PG&E's protective devices to avoid exposing other ~~customers~~ Customers to unnecessary service interruptions.

Customers planning the installation of electric equipment such as power electronics, communication equipment, electronic control devices, etc., the performance of which may be adversely affected by waveform harmonic distortion, are responsible for providing and installing the necessary corrective measures or facilities, including suitable protective devices, to limit these adverse effects.

3. It shall be the ~~applicant's~~ Applicant's responsibility to equip ~~his~~its three-phase motor installations with appropriate protective devices, or use motors with inherent features, to completely disconnect each such motor from its power supply, giving particular consideration to the following:

a. Protection in each set of phase conductors to prevent damage due to overheating in the event of overload.

(Continued)

ELECTRIC RULE NO. 2 Sheet 14
DESCRIPTION OF SERVICE

E. PROTECTIVE DEVICES (Cont'd.)

3. (Cont'd.)

b. Protection to prevent automatic restarting of motors or motor driven machinery which has been subjected to a service interruption and, because of the nature of the machinery itself or the product it handles, cannot safely resume operation automatically.

c. Open-phase protection to prevent damage due to overheating in the event of loss of voltage on one phase.

d. Reverse-phase protection where appropriate to prevent uncontrolled reversal of motor rotation in the event of accidental phase reversal. (Appropriate installations would include, but are not limited to, motors driving elevators, hoists, tramways, cranes, pumps, conveyors, etc.).

4. The available short-circuit current varies from one location to another, and also depends on the ultimate design characteristics of PG&E's supply and service facilities. Consult PG&E for the ultimate maximum short-circuit current at each service termination point.

5. Where an ~~applicant~~ Applicant proposes to use a ground-fault sensing protective system which would require special PG&E-owned equipment, such a system may be installed only where feasible and with written approval of PG&E.

6. Any non-PG&E-owned emergency standby or other generation equipment that can be operated to supply power to facilities that are also designed to be supplied from PG&E's system shall be controlled with suitable protective devices by the ~~applicant~~ Applicant to prevent parallel operation with PG&E's system in a fail-safe manner, such as the use of a double-throw switch to disconnect all conductors, except where there is a written agreement or service contract with PG&E permitting such parallel operation.

(Continued)

ELECTRIC RULE NO. 2 Sheet 15
DESCRIPTION OF SERVICE

F. INTERFERENCE WITH SERVICE

1. GENERAL

PG&E reserves the right to refuse to serve new loads or to continue to supply existing loads of a size or character that may be detrimental to PG&E's operations or to the service of its ~~customers~~Customers. Any ~~customer~~ Customer who operates or plans to operate any equipment such as, but not limited to, pumps, welders, saw mill apparatus, furnaces, compressors or other equipment where the use of electricity is intermittent, causes intolerable voltage fluctuations, generates waveform harmonic distortion, or otherwise causes intolerable service interference, must reasonably limit such interference or restrict the use of such equipment upon request by PG&E. The ~~customer~~ Customer is required either to provide and pay for whatever corrective measures are necessary to limit the interference to a level established by PG&E as reasonable, or avoid the use of such equipment, whether or not the equipment has previously caused interference.

2. HARMFUL WAVE FORM AND HARMONICS

Customers shall not operate equipment that superimposes a current of any frequency or wave form upon PG&E's system, or draws current from PG&E's system of a harmful wave form, which causes interference with PG&E's operations, or the service to other ~~customers~~Customers, or inductive interference to communication facilities.

Harmonics shall be defined per the Institute of Electrical and Electronics Engineers (IEEE) 519 Standard for Harmonic Control in Electric Power Systems and PG&E may require that the harmonic current drawn by Customer's equipment of any kind be in conformity with the current IEEE 519 standard.

3. CUSTOMER'S RESPONSIBILITY

Any ~~customer~~ Customer causing service interference to others must diligently pursue and take timely corrective action after being given notice and a reasonable time to do so by PG&E. If the ~~customer~~ Customer does not take timely corrective action, or continues to operate the equipment causing the interference without restriction or limit, PG&E may, without liability, after giving five (5) calendar days written notice to ~~customer~~Customer, either install and activate control devices on its facilities that will temporarily prevent the detrimental operation, or discontinue electric service until a suitable permanent solution is provided by the ~~customer~~ Customer and it is operational.

(Continued)

ELECTRIC RULE NO. 2 Sheet 16
DESCRIPTION OF SERVICE

F. INTERFERENCE WITH SERVICE (Cont'd.)

4. MOTOR STARTING CURRENT LIMITATIONS

a. The starting of motors shall be controlled by the ~~customer~~ Customer as necessary to avoid causing voltage fluctuations that will be detrimental to the operation of PG&E's distribution or transmission system, or to the service of any of PG&E's ~~customers~~Customers.

b. If the starting current for a single motor installation exceeds the value listed in Table 1, and the resulting voltage disturbance causes or is expected to cause detrimental service to others, reduced voltage starters or other suitable means must be employed, at the ~~customer's~~ Customer's expense, to limit the voltage fluctuations to a tolerable level, except as otherwise provided under subsections 4.d., 4.e., 4.f., and 4.g.

c. The starting current shall be considered to be the current defined in Note 2 of Table 1. At its option, PG&E may determine the starting current of a motor by test, using a stop ammeter with not more than 15 percent overswing, or an oscillograph, disregarding the value shown for the first ten (10) cycles after energizing the motor.

d. Where service conditions permit, subject to PG&E's approval, motor starters may be deferred in the original installation. PG&E may later order the installation of a suitable starter or other devices when it has been determined that the operation of the ~~customer's~~ Customer's motors interfere with service to others. Also, PG&E may require starting current values~~-~~ lower than those set forth herein where conditions at any point on its system require such reduction to avoid interference with service to other ~~customers~~Customers.

(Continued)

F. INTERFERENCE WITH SERVICE (Cont'd.)

4. MOTOR STARTING CURRENT LIMITATIONS (Cont'd.)

e. In the case of room and unitary air conditioners, heat pumps or other complete unit equipment on which the nameplate rating is expressed in ~~kVa~~ kVA input and not in hp output, the nameplate ~~kVa~~ kVA input rating shall be ~~considered to be~~used to determine the hp rating for use ~~of~~ in Table 1 within Section F.4. If the nameplate does not show ~~kVa~~ kVA input, then it may be determined for single-phase motors by taking the product of the running input line current in amperes times the input voltage rating divided by 1,000. For three-phase motors, multiply this product by the square root of three (1.73).

f. The starting current values in Table 1 apply only to the installation of a single motor. Starters may be omitted on the smaller motors of a group installation when their omission will not result in a starting current in excess of the allowable starting current of the largest motor of the group. Where motors start simultaneously, they will be treated as a single unit equal to the sum of their individual starting currents.

g. PG&E may limit the maximum size and type of any motor that may be operated at any specific location on its system to that which will not be detrimental to PG&E's system operations or to the service of its ~~customers~~Customers, as determined by PG&E.

h. Where the design or operation of the ~~customer's~~ Customer's motor is such that unequal starting currents flow in PG&E's service conductors, the largest starting current in any one set of phase conductors shall be considered the motor starting current.

(Continued)

ELECTRIC RULE NO. 2 Sheet 18
DESCRIPTION OF SERVICE

F. INTERFERENCE WITH SERVICE (Cont'd.)

4. MOTOR STARTING CURRENT LIMITATIONS (Cont'd.)

i. For installations of motors where the equipment is started automatically by means of float, pressure, or thermostat devices, such as with pumps or wind machines for frost protection, irrigation pumps or other similar installations, PG&E may require the ~~customer~~Customer to install, at ~~his own~~its expense and in accordance with PG&E's operating requirements, suitable preset time-delay devices to stagger the automatic connection of load to the supply system and to prevent simultaneous start-up for any reason.

(Continued)

F. INTERFERENCE WITH SERVICE (Cont'd.)

4. MOTOR STARTING CURRENT LIMITATIONS (Cont'd.)

TABLE 1
NORMAL MAXIMUM ALLOWABLE MOTOR STARTING CURRENTS
ALTERNATING-CURRENT MOTORS

Rated HP Output	Single-Phase Voltage Motor Rating (Service Voltage)	Three-Phase Voltage Motor Rating (Service Voltage)		
	230v (240v)	200v (208v)	230v (240v)	460v (480v)
2	60 amps	–	–	–
3	80	74 amps	64 amps	32 amps
5	120	106	92	46
7.5	170	146	127	63
10	–	186	162	81
15	–	267	232	116
20	–	347	302	151
25	–	428	372	186
30	–	508	442	221
40	–	669	582	291
50	–	830	722	361
60	–	–	–	431
75	–	–	–	536
100	–	–	–	711
Over 100—See Note 3				

Table 1 Notes:

1. See Section F.4.~~.~~ for details on the use of this table.
2. Motor starting current is defined as the steady state current taken from the supply line with the 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.
3. The ~~applicant~~ Applicant shall consult PG&E for design criteria information for selecting suitable starting equipment for three-phase ~~a-c~~AC motors not shown on Table 1, for ~~d-c~~DC motors supplied directly from existing ~~d-c~~DC systems, and for motors that operate at higher voltage ratings.

(Continued)

G. POWER FACTOR

When lighting devices, such as neon, fluorescent, luminous gaseous, mercury vapor, and other lighting equipment having low power factors are served on street lighting or area lighting schedules, the ~~customer~~ Customer shall provide, at ~~his own~~its expense, power factor corrective equipment to increase the power factor of each complete lighting device to not less than 90 percent.

H. CONNECTED LOAD RATINGS

1. The connected load is the sum of the rated capacities of all of the ~~customer's~~ Customer's electric utilization equipment that is served through one metering point and that may be operated at the same time, computed to the nearest one-tenth of a horsepower, kilowatt or kilovolt-ampere. Motors will be counted at their nameplate ratings in horsepower output and other devices at their nameplate input ratings in ~~kw~~ kW or ~~kVa~~kVA, except that resistance welders will be rated in accordance with ~~the section~~ Section J., of this rule regarding "Welder Service." Unless otherwise stated in the rate schedule, conversions between horsepower, ~~kw~~ kW and/or ~~kVa~~ kVA ratings will be made on a one-to-one basis.

2. The normal operating capacity rating of any motor or other device may be determined from the nameplate rating. Where the original nameplate has been removed or altered, the manufacturer's published rating may be used or the rating determined by test at the expense of the ~~customer~~Customer.

3. Motor-generator sets shall be rated at the nameplate rating of the alternating-current drive motor of the set.

4. a. X-ray equipment shall be rated at the maximum nameplate ~~kVa~~ kVA input operating at the highest rated output amperes. If the ~~kVa~~ kVA input rating is not shown, it will be determined for single-phase loads by taking the product of the amperes input rating times the input voltage rating divided by 1,000. For three-phase equipment, multiply this product times the square root of three (1.73).

(Continued)

H. CONNECTED LOAD RATINGS (Cont'd.)

4. (Cont'd.)

b. Where X-ray equipment is separately metered and supplied from a separate transformer installed by PG&E to serve the X-ray installation only, the ~~kVa~~ kVA rating of PG&E's transformer or the total X-ray equipment input capacity, whichever is smaller, will be considered the load for billing purposes.

5. Where a ~~customer~~ Customer operates a complete unit of equipment connected for three-phase service but consisting of single-phase components which cannot be readily reconnected for single-phase service, PG&E shall consider the connected load of such a unit as three-phase load.

6. Where a ~~customer~~ Customer has, or expects to have, permanently-connected, three-phase load that is used infrequently or for short durations, such as, but not limited to, equipment for fire pumps, frost protection, flood control, emergency sirens or other similar installations which make it impractical to record proper demands on a monthly basis for billing purposes, the ~~customer~~ Customer may, for ~~his~~its own reasons and with PG&E's approval, guarantee an appropriate billing demand or connected three-phase load for billing purposes in order to reserve suitable capacity in PG&E's facilities.

I. SPECIAL FACILITIES

1. PG&E normally installs only those standard facilities which it deems are necessary to provide regular service in accordance with the tariff schedules. Where the ~~applicant~~ Applicant requests PG&E to install special facilities and PG&E agrees to make such an installation, the additional costs thereof shall be borne by the ~~applicant~~Applicant, including the Income Tax Component of Contribution and such continuing ownership costs as may be applicable.

(Continued)

ELECTRIC RULE NO. 2 Sheet 22
DESCRIPTION OF SERVICE

I. SPECIAL FACILITIES (Cont'd.)

2. Special facilities are (a) facilities requested by an ~~applicant~~ Applicant which are in addition to or in substitution for standard facilities which PG&E would normally provide for delivery of service at one point, through one meter, at one voltage class under its tariff schedules, or (b) a pro rata portion of the facilities requested by an ~~applicant~~Applicant, allocated for the sole use of such ~~applicant~~Applicant, which would not normally be allocated for such sole use. Unless otherwise provided by PG&E's filed tariff schedules, special facilities will be installed, owned and maintained or allocated by PG&E as an accommodation to the ~~applicant~~ Applicant only if acceptable for operation by PG&E and the reliability of service to PG&E's other ~~customers~~ Customers is not impaired.

3. Special facilities will be installed under the terms and conditions of a contract in the form on file with the Commission. Such contract will include, but is not limited to, the following terms and conditions:

a. Where new facilities are to be installed for ~~applicant's~~ Applicant's use as special facilities, the ~~applicant~~ Applicant shall advance to PG&E the estimated additional installed cost of the special facilities over the estimated cost of standard facilities. At PG&E's option, PG&E may finance the new facilities.

b. A monthly cost-of-ownership charge shall be paid by ~~applicant~~ Applicant for the special facilities:

(Continued)

ELECTRIC RULE NO. 2 Sheet 23
DESCRIPTION OF SERVICE

I. SPECIAL FACILITIES (Cont'd.)

3. (Cont'd.)

b. (Cont'd.)

TYPE OF FACILITY	FINANCING	MONTHLY CHARGE
Transmission (60kv and over)*	Customer PG&E	0.31% of the amount advanced 1.14% of the additional cost
Distribution	Customer PG&E	0.49% of the amount advanced 1.23% of the additional cost

c. Where existing facilities are allocated for ~~applicant's~~ Applicant's use as special facilities, the ~~applicant~~ Applicant shall pay a monthly Cost of Ownership charge. This monthly Cost of Ownership charge shall be based on the estimated installed cost of that portion of the existing facilities which is allocated to the ~~customer~~Customer.

d. Where PG&E determines the collection of continuing monthly Cost of Ownership charges is not practicable, the ~~applicant~~ Applicant will be required to make an equivalent one-time payment in lieu of the monthly Cost of Ownership charges.

e. All monthly Cost of Ownership charges shall be reviewed and re-filed with the Commission when changes occur in PG&E's cost of providing such service.

* For the purpose~~s~~ of applying the special transmission facilities charge, special transmission facilities are those facilities in the "100 series" of the standard PG&E system of accounts (FERC Account Nos. 352-359).

(Continued)

ELECTRIC RULE NO. 2 Sheet 24
DESCRIPTION OF SERVICE

I. SPECIAL FACILITIES (Cont'd.)

4. Beginning January 1, 2021, PG&E will no longer accept requests under the Special Facilities provision of Rule 2, Section I, for underground distribution systems that call for specified pieces of electrical equipment to be installed in below-ground structures in circumstances where it is technically feasible to install the equipment above ground. Such requests will no longer be accepted for situations indicated in Sections I.4.a., I.4.b., and with certain exceptions I.4.c., below. However, all requests which call for below ground installations that are received by PG&E prior to January 1, 2021, will have "legacy" status" and not subject to the provisions of this Rule section. These legacy requests must be approved by PG&E for construction by April 1, 2021, and installed by April 1, 2022.

   a. New construction on any property except public property and public rights-of-way;

   b. Circumstances in which capacity upgrades, conversions, and relocations are required due to ~~customer~~Customer-driven renovations of existing structures or other building activities on any property except public property and public rights of way resulting in a change of use or occupancy as defined in state or local law;

   c. Except for situations on a case-by-case basis in which the local authority and PG&E agree to locate Equipment above ground because the above-ground location is technically feasible for the installation.

   For purposes of this provision, specified pieces of equipment include all primary voltage from 4 kV to 35 kV electrical distribution system equipment (Equipment), including, but not limited to, transformers, switches and fuses, capacitors, and junction bars.

   "Technically feasible" means that enough space is, or can be made, available above ground for the electrical distribution Equipment needed for PG&E to serve ~~customers~~ Customers and that other requirements, such as obtaining the required permits, are met. The required space is defined by existing design standards within the operation and maintenance requirements that are in compliance with applicable safety codes and regulations such as CPUC General Order 128.

(Continued)

ELECTRIC RULE NO. 2 Sheet 25
DESCRIPTION OF SERVICE

I. SPECIAL FACILITIES (Cont'd.)

Where PG&E has existing primary voltage distribution equipment installed in below ground structures, the equipment will continue to be operated and maintained below ground. However, in accordance with Section I.4.c., above, where existing below-ground Equipment must be modified by PG&E, above-ground retrofits shall only occur in circumstances in which capacity upgrades, conversions, and relocations are required due to ~~customer~~Customer-driven renovations of existing structures or other building activities resulting in a change of use or occupancy as defined in state or local law; or when agreed to by the local authority and PG&E on a case-by-case basis.

Design and installation of any above-ground Equipment shall comply with the typical installations depicted in PG&E's Electric Design Manual, as well as land use laws, including local ordinances respecting matters of public health, safety and convenience, that are of general applicability to above-ground utility structures regardless of ownership, to the extent the same would not directly or effectively require the Equipment to be located underground.

When modifying existing Equipment installed in the above-ground public rights-of-way, PG&E shall comply with local ordinances respecting matters of public health, ~~and~~ safety and convenience, ~~to the extent~~ that ~~the same~~ are of general applicability to other utility and public works structures or equipment, regardless of ownership, installed in the public rights-of-way do not directly or effectively require the Equipment to be located underground, or otherwise conflict with the then current design standards contained in PG&E's Electric Design Manual and similar documents.

(Continued)

J. WELDER SERVICE

1. RATING OF WELDERS

Electric welders will be rated for billing purposes as follows:

a. MOTOR-GENERATOR ARC WELDERS – The horsepower rating of the motor driving a motor-generating type arc welder will be taken as the horsepower rating of the welder.

b. TRANSFORMER ARC WELDERS – Nameplate maximum ~~kVa~~ kVA input (at rated output amperes) will be taken as the rating of transformer type arc welders.

c. RESISTANCE WELDERS – Resistance welder ratings will be determined by multiplying the welder transformer nameplate rating (at 50 percent duty cycle) by the appropriate factor listed below:

(Continued)

ELECTRIC RULE NO. 2 Sheet 27
DESCRIPTION OF SERVICE

J. WELDER SERVICE (Cont'd.)

1. RATING OF WELDERS (Cont'd.)

TYPE OF WELDER	TRANSFORMER NAMEPLATE RATING @ 50% Duty Cycle**	FACTOR PG&E-Owned Distrib. Transf.	FACTOR Customer Owned Distrib. Transf.
1. Rocker Arm, Press or Projection Spot	20 ~~kVa~~ kVA or less	0.60	0.50
2. Rocker Arm, Press Spot Project Spot Flash or Butt Seam or Portable Gun	Over 20 ~~kVa~~kVA 21 to 75 ~~kVa~~kVA, inclusive 100 ~~kVa~~ kVA or over All sizes	0.80	0.60
3. Flash or Butt	67 to 100 ~~kVa~~kVA, inclusive	***	***
4. Projection Spot Flash or Butt	Over 75 ~~kVa~~kVA 66 ~~kiva~~ kVA or less	1.20	0.90

** The ~~kVa~~ kVA rating of all resistance welders to which these rating procedures are applied must be at or equivalent to 50 percent duty cycle operation. Duty cycle is the percentage of the time welding current flows during a given operating cycle. If the operating ~~kVa~~ kVA nameplate rating is for some other operating duty cycle, then the thermally equivalent ~~kVa~~ kVA rating at 50 percent duty cycle must be calculated.

*** Each flash or butt welder in this group will be rated at 80 ~~kVa~~ kVA where distribution voltage transformer is owned by PG&E or 60 ~~kVa~~ kVA where distribution voltage service transformer is owned by the ~~customer~~Customer.

(Continued)

ELECTRIC RULE NO. 2 Sheet 28
DESCRIPTION OF SERVICE

J. WELDER SERVICE (Cont'd.)

1. RATING OF WELDERS (Cont'd.)

d. Ratings prescribed by a., b., and c., above, normally will be determined from nameplate data or from data supplied by the manufacturer. If such data are not available or are believed by either PG&E or ~~customer~~ Customer to be unreliable, the rating will be determined by test at the expense of the ~~customer~~Customer.

e. If established by seals approved by PG&E, the welder rating may be limited by the sealing of taps which provide capacity greater than the selected tap and/or by the interlocking lockout of one or more welders with other welders.

f. When conversion of units is required for tariff application, one welder ~~kVa~~ kVA will be taken as one horsepower for tariffs stated on a horsepower basis and one welder ~~kVa~~ kVA will be taken as one kilowatt for tariffs stated on a kilowatt basis.

2. BILLING OF WELDERS

Welders will be billed at the regular rates and conditions of the tariffs on which they are served, subject to the following provisions:

a. CONNECTED LOAD TYPE OF SCHEDULE

Welder load will be included as part of the connected load with ratings as determined under Section 1, above, based on the maximum load that can be connected at any one time, and no allowance will be made for diversity between welders.

(Continued)

ELECTRIC RULE NO. 2 Sheet 29
DESCRIPTION OF SERVICE

J. WELDER SERVICE (Cont'd.)

2. BILLING OF WELDERS (Cont'd.)

b. DEMAND METERED TYPE OF SCHEDULE

Where resistance welders are served on these schedules, the computation of diversified resistance welder load shall be made as follows:

Multiply the individual resistance welder ratings, as prescribed in Sections 1.c. to 1.f. inclusive, above, by the following factors and adding the results thus obtained:

1.0 times the rating of the largest welder

0.8 times the rating of the next largest welder

0.6 times the rating of the next largest welder

0.4 times the rating of the next largest welder

0.2 times the ratings of all additional welders

If this computed, diversified, resistance welder load is greater than the metered demand, the diversified resistance welder load will be used in lieu of the metered demand for rate computation purposes.

3. USE OF WELDERS THROUGH RESIDENTIAL SERVICE

Any welder exceeding three ~~kVa~~ kVA capacity at 50 percent duty cycle supplied through a residential service requires advance approval by PG&E.

PG&E Gas and Electric
Advice Submittal List
General Order 96-B, Section IV

AT&T
Albion Power Company

Alta Power Group, LLC
Anderson & Poole

Atlas ReFuel
BART
Buchalter
Barkovich & Yap, Inc.
Braun Blaising Smith Wynne, P.C.
California Community Choice Association
California Cotton Ginners & Growers Assn California Energy Commission

California Hub for Energy Efficiency Financing

California Alternative Energy and Advanced Transportation Financing Authority
California Public Utilities Commission
Calpine

Cameron-Daniel, P.C.
Casner, Steve
Center for Biological Diversity

Chevron Pipeline and Power
City of Palo Alto

City of San Jose
Clean Power Research
Coast Economic Consulting
Commercial Energy
Crossborder Energy
Crown Road Energy, LLC
Davis Wright Tremaine LLP
Day Carter Murphy

Dept of General Services
Don Pickett & Associates, Inc.
Douglass & Liddell
Downey Brand LLP
Dish Wireless L.L.C.

East Bay Community Energy Ellison Schneider & Harris LLP

Electrical Power Systems, Inc.
Fresno
Engineers and Scientists of California

GenOn Energy, Inc.
Green Power Institute
Hanna & Morton
ICF
iCommLaw
International Power Technology
Intertie

Intestate Gas Services, Inc.

Johnston, Kevin
Kelly Group
Ken Bohn Consulting
Keyes & Fox LLP
Leviton Manufacturing Co., Inc.

Los Angeles County Integrated Waste Management Task Force
MRW & Associates
Manatt Phelps Phillips
Marin Energy Authority
McClintock IP
McKenzie & Associates

Modesto Irrigation District
NRG Solar

OnGrid Solar
Pacific Gas and Electric Company
Peninsula Clean Energy

Pioneer Community Energy

Public Advocates Office

Redwood Coast Energy Authority
Regulatory & Cogeneration Service, Inc.

Resource Innovations

SCD Energy Solutions
San Diego Gas & Electric Company

SPURR
San Francisco Water Power and Sewer
Sempra Utilities

Sierra Telephone Company, Inc.
Southern California Edison Company
Southern California Gas Company
Spark Energy
Sun Light & Power
Sunshine Design
Stoel Rives LLP

Tecogen, Inc.
TerraVerde Renewable Partners
Tiger Natural Gas, Inc.

TransCanada
Utility Cost Management
Utility Power Solutions
Water and Energy Consulting Wellhead Electric Company
Western Manufactured Housing Communities Association (WMA)
Yep Energy