November 10, 2011

Advice Letters 3508-E-A and 3508-E-B

Brian K. Cherry
Vice President, Regulation and Rates
Pacific Gas and Electric Company
77 Beale Street, Mail Code B10C
P.O. Box 770000
San Francisco, CA  94177

Subject: Supplemental Filings – Revisions to Electric Rule 21 – Generating Facility Interconnections, Section D

Dear Mr. Cherry:


Sincerely,

Edward F. Randolph, Director
Energy Division
October 17, 2011

Advice 3508-E-B
(Pacific Gas and Electric Company ID U 39 E)

Public Utilities Commission of the State of California

Subject: Modifications to Electric Rule 21 Pursuant to Resolution E-4411

Purpose

Pursuant to Resolution E-4411 issued September 22, 2011, Pacific Gas and Electric Company (“PG&E”) submits this advice letter and revisions to its electric tariffs to modify Electric Rule 21 - Generating Facility Interconnections. The affected tariff sheets are listed on the enclosed Attachment 1.

Background

On August 18, 2009, PG&E submitted Advice (“AL”) 3508-E proposing two revisions to Electric Rule 21 – Generating Facility Interconnections, Section D. First, PG&E proposed to base the requirement for a dedicated distribution transformer, when interconnecting a 20 kilovolt-ampere (“kVA”) or larger photovoltaic generator, on an engineering evaluation of the existing transformer’s capacity rather than requiring one in all cases. Second, PG&E proposed to clarify voltage requirements consistency with Electric Rule 2 - Description of Service.

After a round of protests and responses, PG&E agreed to work with protesting parties, the other Utilities (Southern California Edison and San Diego Gas and Electric) and the Energy Division to come up with mutually acceptable language. On March 28, 2011, PG&E submitted supplemental AL 3508-E-A.

On September 22, 2011, after additional changes were agreed upon by the parties mentioned above, Resolution E-4411 (“Resolution”) was issued. Because all of the Utilities did not submit a supplemental advice letter in March 2011 and the Resolution dealt broadly with all changes requested since the original 2009 advice letters, some changes the Resolution ordered had already been made by PG&E in its March 28, 2011, AL 3508-E-A. Since the Resolution stated, “These revisions to Tariff Rule 21 are effective as of the effective date of this Resolution,” and some of the pressing customer
issues were addressed in AL 3508-E-A (specifically, the change where section D.3.d is replaced by Sections D.1.e and D.1.f, which deals with transformer change-outs requirements for generating facilities), PG&E assumes this language that was already included in AL 3508-E-A is effective September 22, 2011, the effective date of Resolution E-4411. This Advice Letter addresses the remaining issues ordered as called out in Appendix A of Resolution E-4411.

**Tariff Revisions**

1. In AL 3508-E-A, PG&E already made the first change requested in Appendix A of Resolution E-4411, which orders that Section D.3.d be replaced with new Sections D.1.e and D.1.f to read:

   **D.1.e.** The maximum aggregated Gross Ratings for all the Generating Facilities connected to a secondary distribution transformer shall not exceed the transformer rating modified per established utility practice absent any customer generators. When PG&E’s analysis determines a transformer change is required, PG&E will furnish the customer with an explanation of why the change is needed.

   **D.1.f.** Generating facilities connected to a single-phase transformer with 120/240 volt secondary voltage must be installed such that the aggregated gross output is as balanced as practicable between the two phases of the 240 volt service. When PG&E’s analysis determines a transformer change is required, PG&E will furnish the customer with an explanation of why the change is needed.

2. Section D.2.b title is changed to "Voltage Trip Settings."

3. Section D.2.b.1 is modified to read:

   Generating Facilities (30 kVA or less). Generating Facilities with a Gross Rating of 30 kVA or less shall be capable of operating within the voltage range normally experienced on PG&E’s Distribution System from plus to minus 5% of the nominal voltage (e.g. 114 volts to 126 volts, on a 120 volt base), at the service panel or PCC. The trip settings at the generator terminals may be selected in a manner that minimizes nuisance tripping between 106 volts and 132 volts on a 120-volt base (88%-110% of nominal voltage) to compensate for voltage drop between the generator terminals and the PCC. Voltage may be detected at either the PCC or the Point of Interconnection. However, the voltage range at the PCC, with the generator on-line, shall stay within +/- 5% of nominal.
4. Section D.2.b.2 is modified to read:

Generating Facilities (greater than 30 kVA). PG&E may have specific operating voltage ranges for Generating Facilities with Gross Ratings greater than 30 kVA, and may require adjustable operating voltage settings. In the absence of such requirements, the Generating Facility shall be capable of operating at a range between 88% and 110% of the applicable interconnection voltage. Voltage shall be detected at either the PCC or the Point of Interconnection, with settings compensated to account for the voltage at the PCC. However, the voltage range at the PCC, with the generator on-line, shall stay within +/-5% of nominal.

5. The title for Table D.1 is changed to “Voltage Trip Settings for Generating Facilities" and the heading of the voltage range columns is changed to “Voltage at Point of Common Coupling (the Ranges Below Are Used to Trip the Generating Facility During Abnormal Distribution System Conditions).”

6. In Table D.1, delete the row starting with “Greater than or equal to 106 Volts but less than or equal to 132 Volts.” This change was already made in AL 3508-E-A.

7. In Table D.1, move the last sentence of Footnote 1 and make it a separate footnote (Footnote 2) to the title of Table D.1 to read:

For Generating Facilities with a rating greater than 30 kVA, set points shall be field adjustable and different voltage set points and trip times from those in Table D.1 may be negotiated with PG&E.

8. Section D.2.i is modified to read:

Power Factor: The Producer shall provide adequate reactive power compensation on site to maintain the generating facility power factor near unity at rated output or a PG&E specified power factor within a power factor range from 0.9 leading to 0.9 lagging, based on local system conditions. While not required, for generators that do not have inherent reactive power control capability, PG&E may offer reactive power support in the form of power factor correction capacitors on its distribution system, under a Special Facilities agreement, as described in section E.3.a or Rule as applicable.

9. Throughout Rule 21 replace the term, “Gross Nameplate Rating” with “Gross Rating” and replace the term “Net Nameplate Rating” with “Net Rating” and correct other minor formatting and terminology errors.
Protests

Anyone wishing to protest this filing may do so by letter sent via U.S. mail, by facsimile or electronically, any of which must be received no later than November 7, 2011, which is 21 days after the date of this filing. Protests should be mailed to:

CPUC Energy Division  
Tariff Files, Room 4005  
DMS Branch  
505 Van Ness Avenue  
San Francisco, California 94102

Facsimile: (415) 703-2200  
E-mail: jnj@cpuc.ca.gov and mas@cpuc.ca.gov

Copies of protests also should be mailed to the attention of the Director, Energy Division, Room 4004, at the address shown above.

The protest also should be sent via U.S. mail (and by facsimile and electronically, if possible) to PG&E at the address shown below on the same date it is mailed or delivered to the Commission:

Brian K. Cherry  
Vice President, Regulation and Rates  
Pacific Gas and Electric Company  
77 Beale Street, Mail Code B10C  
P.O. Box 770000  
San Francisco, California 94177

Facsimile: (415) 973-6520  
E-mail: PGETariffs@pge.com

Effective Date

PG&E requests that this Tier 1 advice filing become effective on September 22, 2011, which is the effective date for Resolution E-4411.

Notice

In accordance with General Order 96-B, Section IV, a copy of this advice letter is being sent electronically and via U.S. mail to parties shown on the attached list and the parties on the service lists for R.10-05-004 and A.10-03-001. Address changes to the General

* Since the protest period ends on a weekend, PG&E is moving the end of the protest period to the following business day.
Order 96-B service list should be directed to PG&E at e-mail address PGETariffs@pge.com. For changes to any other service list, please contact the California Public Utilities 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 filings can also be accessed electronically at: http://www.pge.com/tariffs

Vice President - Regulation and Rates

cc: Service Lists R.10-05-004 and A.10-03-001

Attachments
### CALIFORNIA PUBLIC UTILITIES COMMISSION

#### ADVICE LETTER FILING SUMMARY

**ENERGY UTILITY**

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

<table>
<thead>
<tr>
<th>Company name/CPUC Utility No.</th>
<th>Pacific Gas and Electric Company (ID U39 M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utility type:</td>
<td>Contact Person: Linda Tom-Martinez</td>
</tr>
<tr>
<td>☑ ELC ☑ GAS</td>
<td>Phone #: (415) 973-4612</td>
</tr>
<tr>
<td>☐ PLC ☐ HEAT ☐ WATER</td>
<td>E-mail: <a href="mailto:lmt1@pge.com">lmt1@pge.com</a></td>
</tr>
</tbody>
</table>

### EXPLANATION OF UTILITY TYPE

ELC = Electric  
GAS = Gas  
PLC = Pipeline  
HEAT = Heat  
WATER = Water

**Advice Letter (AL) #: 3508-E-B**  
**Tier: 1**

**Subject of AL:** Modifications to Electric Rule 21 Pursuant to Resolution E-4411

**Keywords (choose from CPUC listing): Compliance, Text Changes**

**AL filing type:** ☑ Monthly  ☐ Quarterly  ☐ Annual  ☐ One-Time  ☐ Other _____________________________

If AL filed in compliance with a Commission order, indicate relevant Decision/Resolution #: Resolution E-4411

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: ____________________

Is AL requesting confidential treatment?  If so, what information is the utility seeking confidential treatment for: Confidential  
information will be made available to those who have executed a nondisclosure agreement: ☐ Yes  ☐ No  
Name(s) and contact information of the person(s) who will provide the nondisclosure agreement and access to the confidential  
information: __________________________________________________________________________________________________

Resolution Required?  Yes ☐ No

Requested effective date: **September 22, 2011**  
No. of tariff sheets: 6

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: Electric Rule 21

Service affected and changes proposed: N/A  
Pending advice letters that revise the same tariff sheets: N/A

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

**CPUC, Energy Division**  
**Tariff Files, Room 4005**  
**DMS Branch**  
505 Van Ness Ave.,  
San Francisco, CA 94102

**jnj@cpuc.ca.gov and mas@cpuc.ca.gov**

**Pacific Gas and Electric Company**  
**Attn: Brian Cherry**  
**Vice President, Regulation and Rates**  
**77 Beale Street, Mail Code B10C**  
**P.O. Box 770000**  
San Francisco, CA 94177

**E-mail: PGETariffs@pge.com**
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<td>ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 14</td>
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<td>30191-E</td>
<td>ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 15</td>
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<td>ELECTRIC RULE NO. 21 GENERATING FACILITY INTERCONNECTIONS Sheet 17</td>
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<td>30197-E</td>
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</table>
D. GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (Cont’d.)

1. GENERAL INTERCONNECTION AND PROTECTIVE FUNCTION REQUIREMENTS (CONT’D.)

   e. The maximum aggregated Gross Ratings for all the Generating Facilities connected to a secondary distribution transformer shall not exceed the transformer rating modified per established utility practice absent any customer generators. When PG&E’s analysis determines a transformer change is required, PG&E will furnish the customer with an explanation of why the change is needed.

   f. Generating facilities connected to a single-phase transformer with 120/240 volt secondary voltage must be installed such that the aggregated gross output is as balanced as practicable between the two phases of the 240 volt service, consistent with Electric Rule 2.D.4. When PG&E’s analysis determines a transformer change is required, PG&E will furnish the customer with an explanation of why the change is needed.

   g. Drawings Required. Prior to Parallel Operation or Momentary Parallel Operation of the Generating Facility, PG&E shall approve the Producer’s Protective Function and control diagrams. Generating Facilities equipped with a Protective Function and control scheme previously approved by PG&E for system-wide application or only Certified Equipment may satisfy this requirement by reference to previously approved drawings and diagrams.

   h. Generating Facility Conditions Not Identified. In the event this Rule does not address the Interconnection conditions for a particular Generating Facility, PG&E and Producer may agree upon other arrangements.
ELECTRIC RULE NO. 21
GENERATING FACILITY INTERCONNECTIONS

D. GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (Cont’d.) (N)

2. PREVENTION OF INTERFERENCE (L)

The Producer shall not operate Generating or Interconnection Facilities that superimpose a voltage or current upon PG&E’s Distribution System that interferes with PG&E operations, service to PG&E customers, or communication facilities. If such interference occurs, the Producer must diligently pursue and take corrective action at its own expense after being given notice and reasonable time to do so by PG&E. If the Producer does not take corrective action in a timely manner, or continues to operate the facilities causing interference without restriction or limit, PG&E may, without liability, disconnect the Producer’s facilities from PG&E’s Distribution System, in accordance with Section B.9 of this Rule. To eliminate undesirable interference caused by its operation, each Generating Facility shall meet the following criteria:

a. Voltage Regulation. The Generating Facility shall not actively regulate the voltage at the PCC while in parallel with PG&E’s Distribution System. The Generating Facility shall not cause the service voltage at other customers to go outside the requirements of ANSI C84.1-1995, Range A (IEEE 1547-4.1.1).

b. Voltage Trip Settings. The voltage ranges in Table D.1 define protective trip limits for the Protective Function and are not intended to define or imply a voltage regulation Function. Generating Facilities shall cease to energize PG&E’s Distribution System within the prescribed trip time whenever the voltage at the PCC deviates from the allowable voltage operating range. The Protective Function shall detect and respond to voltage on all phases to which the Generating Facility is connected.

(Continued)
ELECTRIC RULE NO. 21
GENERATING FACILITY INTERCONNECTIONS

D. GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (Cont’d.)

2. PREVENTION OF INTERFERENCE (Cont’d.)

b. Voltage Trip Settings (Cont’d.)

1) Generating Facilities (30 kVA or less). Generating Facilities with a Gross Rating of 30 kVA or less shall be capable of operating within the voltage range normally experienced on PG&E’s Distribution System from plus to minus 5% of the nominal voltage (e.g., 114 volts to 126 volts, on a 120 volt base), at the service panel or PCC. The trip settings at the generator terminals may be selected in a manner that minimizes nuisance tripping between 106 volts and 132 volts on a 120 volt base (88%-110% of nominal voltage) to compensate for voltage drop between the generator terminals and the PCC. Voltage may be detected at either the PCC or the Point of Interconnection. However, the voltage range at the PCC, with the generator on-line, shall stay within +/-5% of nominal.

2) Generating Facilities (greater than 30 kVA). PG&E may have specific operating voltage ranges for Generating Facilities with Gross Ratings greater than 30 kVA, and may require adjustable operating voltage settings. In the absence of such requirements, the Generating Facility shall be capable of operating at a range between 88% and 110% of the applicable interconnection voltage. Voltage shall be detected at either the PCC or the Point of Interconnection, with settings compensated to account for the voltage at the PCC. However, the voltage range at the PCC, with the generator on-line, shall stay within +/-5% of nominal.

3) Voltage Disturbances. Whenever PG&E’s Distribution System voltage at the PCC varies from and remains outside normal (nominally 120 volts) by the predetermined amounts set forth in Table D-1, the Generating Facility’s Protective Functions shall cause the Generator(s) to become isolated from PG&E’s Distribution System:
ELECTRIC RULE NO. 21  
GENERATING FACILITY INTERCONNECTIONS

D. GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (CONT’D.)  

2. PREVENTION OF INTERFERENCE (Cont’d.)
   b. Voltage Trip Settings (Cont’d.)

<table>
<thead>
<tr>
<th>Voltage at Point of Common Coupling</th>
<th>% of Nominal Voltage</th>
<th># of Cycles (Assuming 60 Hz Nominal)</th>
<th>Maximum Trip Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assuming 120 V Base</td>
<td>Less than 50%</td>
<td>10 Cycles</td>
<td>0.16 Seconds</td>
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<tr>
<td>Less than 60 Volts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Greater than or equal to 60 Volts</td>
<td>Greater than or equal to 50% but less than 88%</td>
<td>120 Cycles</td>
<td>2 Seconds</td>
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<tr>
<td>but less than 106 Volts</td>
<td></td>
<td></td>
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<tr>
<td>Greater than 132 Volts</td>
<td>Greater than 110% but less than or equal to 120%</td>
<td>60 Cycles</td>
<td>1 Second</td>
</tr>
<tr>
<td>but less than or equal to 144 Volts</td>
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<tr>
<td>Greater than 144 Volts</td>
<td>Greater than 120%</td>
<td>10 Cycles</td>
<td>0.16 Seconds</td>
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</table>

(1) “Maximum Trip time” refers to the time between the onset of the abnormal condition and the Generating Facility ceasing to energize PG&E’s Distribution System. Protective Function equipment and circuits may remain connected to PG&E’s Distribution System to allow sensing of electrical conditions for use by the “reconnect” feature. The purpose of the allowed time delay is to allow for a Generating Facility to minimize tripping during short-term system disturbances. Set points shall not be user adjustable for generating facilities less than 30 kW.

(2) For Generating Facilities with a rating greater than 30 kVA, set points shall be field adjustable and different voltage set points and trip times from those in Table D.1 may be negotiated with PG&E.
D. GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (Cont’d.)

2. PREVENTION OF INTERFERENCE (Cont’d.)

f. Frequency. (Cont’d.)

<table>
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<th>Generating Facility Rating</th>
<th>Frequency Range (Assuming 60 Hz Nominal)</th>
<th>Maximum Trip Time$^{(1)}$ (Assuming 60 Cycles per Second)</th>
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<tr>
<td>Less or equal to 30 kW</td>
<td>Less than 59.3 Hz</td>
<td>10 Cycles</td>
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<td>Greater than 60.5 Hz</td>
<td>10 Cycles</td>
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<tr>
<td>Greater than 30 kW</td>
<td>Less than 57 Hz</td>
<td>10 Cycles</td>
</tr>
<tr>
<td></td>
<td>Less than an adjustable value between 59.8 Hz and 57 Hz but greater than 57 Hz$^2$</td>
<td>Adjustable between 10 and 18,000 Cycles$^{2,3}$</td>
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<tr>
<td></td>
<td>Greater than 60.5 Hz</td>
<td>10 Cycles</td>
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$^{(1)}$ “Maximum Trip time” refers to the time between the onset of the abnormal condition and the Generating Facility ceasing to energize PG&E’s Distribution System. Protective Function sensing equipment and circuits may remain connected to PG&E’s Distribution System to allow sensing of electrical conditions for use by the “reconnect” feature. The purpose of the allowed time delay is to allow a Generating Facility to “ride through” short-term disturbances to avoid nuisance tripping. Set points shall not be user adjustable (though they may be field adjustable by qualified personnel). For Generating Facilities with a Gross Rating greater than 30 kVA, set points shall be field adjustable and different voltage set points and trip times from those in Table D.2 may be negotiated with PG&E.

$^{(2)}$ Unless otherwise required by PG&E, a trip frequency of 59.3 Hz and a maximum trip time of 10 cycles shall be used.

$^{(3)}$ When a 10-cycle maximum trip time is used, a second under frequency trip setting is not required.
ELECTRIC RULE NO. 21
GENERATING FACILITY INTERCONNECTIONS

D. GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS (Cont’d.) (N)

2. PREVENTION OF INTERFERENCE (Cont’d.) (N)

h. Direct Current Injection. Generating Facilities should not inject direct current greater than 0.5% of rated output current into PG&E’s Distribution System.

i. Power Factor. The Producer shall provide adequate reactive power compensation on site to maintain the generating facility power factor near unity at rated output or a PG&E specified power factor within a power factor range from 0.9 leading to 0.9 lagging, based on local system conditions. While not required, for generators that do not have inherent reactive power control capability, PG&E may offer reactive power support in the form of power factor correction capacitors on its distribution system under a Special Facilities agreement as described in Section E.3.a or Rule 2.I as applicable. (N) (L)
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<th>Contact Information</th>
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<td>Ameresco</td>
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<td>Braun Blaising McLaughlin, P.C.</td>
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<td>San Francisco Public Utilities Commission</td>
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<td>Brookfield Renewable Power</td>
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<td>Western Manufactured Housing</td>
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<td>Day Carter Murphy</td>
<td>North America Power Partners</td>
<td>Communities Association (WMA)</td>
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<td>eMeter Corporation</td>
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