

**BEFORE THE PUBLIC UTILITIES COMMISSION  
OF THE STATE OF CALIFORNIA**

Application of Pacific Gas and Electric Company for Approval of Modifications to its SmartMeter™ Program and Increased Revenue Requirements to Recover the Costs of the Modifications (U39M).	Application 11-03-014 (Filed March 24, 2011)  <b>(NOT CONSOLIDATED)</b>
Application of Utility Consumers' Action Network for Modification of Decision 07-04-043 so as to Not Force Residential Customers to Use Smart Meters.	Application 11-03-015 (Filed March 24, 2011) <b>(NOT CONSOLIDATED)</b>
Application of Consumers Power Alliance, Public Citizen, Coalition of Energy Users, Eagle Forum of California, Neighborhood Defense League of California, Santa Barbara Tea Party, Concerned Citizens of La Quinta, Citizens Review Association, Palm Springs Patriots Coalition Desert Valley Tea Party, Menifee Tea Party - Hemet Tea Party – Temecula Tea Party, Rove Enterprises, Inc., Schooner Enterprises, Inc., Eagle Forum of San Diego, Southern Californians For Wired Solutions To Smart Meters, and Burbank Action For Modification of D.08-09-039 and A Commission Order Requiring Southern California Edison Company (U338E) To File An Application For Approval of A Smart Meter Opt- Out Plan.	Application 11-07-020 (Filed July 26, 2011) <b>(NOT CONSOLIDATED)</b>

**RESPONSE OF THE SOUTHERN CALIFORNIA GAS COMPANY (U 904G) TO  
ADMINISTRATIVE LAW JUDGE'S RULING SEEKING CLARIFICATION**

STEVEN D. PATRICK

*Attorney for*

**SOUTHERN CALIFORNIA GAS COMPANY**

555 West Fifth Street, Suite 1400

Los Angeles, CA 90013-1011

Phone: (213) 244-2954

Fax: (213) 629-9620

E-Mail: [sdpatrick@semprautilities.com](mailto:sdpatrick@semprautilities.com)

November 1, 2011

**BEFORE THE PUBLIC UTILITIES COMMISSION  
OF THE STATE OF CALIFORNIA**

<p>Application of Pacific Gas and Electric Company for Approval of Modifications to its SmartMeter™ Program and Increased Revenue Requirements to Recover the Costs of the Modifications (U39M).</p>	<p>Application 11-03-014 (Filed March 24, 2011)  <b>(NOT CONSOLIDATED)</b></p>
<p>Application of Utility Consumers' Action Network for Modification of Decision 07-04-043 so as to Not Force Residential Customers to Use Smart Meters.</p>	<p>Application 11-03-015 (Filed March 24, 2011) <b>(NOT CONSOLIDATED)</b></p>
<p>Application of Consumers Power Alliance, Public Citizen, Coalition of Energy Users, Eagle Forum of California, Neighborhood Defense League of California, Santa Barbara Tea Party, Concerned Citizens of La Quinta, Citizens Review Association, Palm Springs Patriots Coalition Desert Valley Tea Party, Meniffee Tea Party - Hemet Tea Party – Temecula Tea Party, Rove Enterprises, Inc., Schooner Enterprises, Inc., Eagle Forum of San Diego, Southern Californians For Wired Solutions To Smart Meters, and Burbank Action For Modification of D.08-09-039 and A Commission Order Requiring Southern California Edison Company (U338E) To File An Application For Approval of A Smart Meter Opt- Out Plan.</p>	<p>Application 11-07-020 (Filed July 26, 2011) <b>(NOT CONSOLIDATED)</b></p>

**RESPONSE OF THE SOUTHERN CALIFORNIA GAS COMPANY (U 904G) TO  
ADMINISTRATIVE LAW JUDGE’S RULING SEEKING CLARIFICATION**

**I. INTRODUCTION**

Pursuant to Rule 6.3 of the Rules of Practice and Procedure of the California Public Utilities Commission (the “Commission”), Southern California Gas Company (“SoCalGas”) provides the following response to Administrative Law Judge Yip-Kikugawa’s October 18, 2011 ruling seeking clarification.

**Question 1:** What is an average duration (in seconds) that a residential smart meter transmits in a 24 hour period?

a. How is this average computed or measured?

**Response 1:**

As background, SoCalGas' Advanced Meter project will install an Aclara module on every meter in its service territory. Each module contains an embedded antenna for communicating over a 450-470 MHz licensed-spectrum network. The module is powered by two AA batteries, which have a 20 year expected life.

The Aclara modules communicate with Data Collector Units (DCU). The DCUs aggregate data from approximately 1,500 modules, and then transmit the data to SoCalGas' computer systems. SoCalGas will deploy about 4,000 DCUs. The DCUs will likely be located on streetlights, power poles, and buildings, typically 25 feet or more above ground level.

Approximately 95 percent of the modules will be installed on above ground meters and transmit at 229 milliwatts (mW) of total output power per transmission. Approximately 5% of the modules will be installed in enclosed areas such as basements, garages, or underground meter vaults and transmit at 600 mW of power (to help ensure receipt of transmissions) while transmitting with the same frequency.

All modules will transmit a module identification code and a meter read for each of the 12 previous hours four times per day for 70 milliseconds (0.07 seconds). Over the course of an entire year, each module will transmit gas consumption data for a total of about 1.7 minutes. This protocol is designed to minimize transmission time to preserve the battery life.

**Question 2:** How many times in total (average and maximum) is a smart meter scheduled to transmit during a 24-hour period?

a. How many of those times (average and maximum) are to transmit electric usage information?

b. How many of those times (average and maximum) are for other purposes? What are those other purposes?

Please specify number of times (average and maximum) by type/category of transmission.

**Response 2:**

a) As stated in response 1, above, all modules will transmit a module identification code and a meter read for each of the 12 previous hours four times per day for 70 milliseconds (0.07 seconds). Over the course of an entire year, each module will transmit gas consumption data for a total of about 1.7 minutes. This protocol is designed to minimize transmission time to preserve the battery life.

b) The only other time the module will transmit is to send an alarm. The following unusual and infrequent conditions caused by tampering with the meter or module would generate an alarm:

- Cut wire
- Tilt
- Magnetic tamper
- Cover off tamper
- Reverse flow
- Programming (activation/deactivation)

When an alarm is triggered, the module makes six transmissions. The first three transmissions send the alarm to the DCU. The last three transmissions inform the DCU that the alarm has been remedied. SoCalGas has no history with these alarms and has no historic data upon which to base a forecast of how frequently alarms will be transmitted. For the purposes of calculating total radio transmission time, SoCalGas assumes one alarm per customer per month. Assuming the 12 transmissions, each module will transmit alarm information for a total of about 0.05 minutes over the course of a year. SoCalGas does not expect this level of alarms to take place, so we believe it sets an outside boundary for the average condition.

Based on the assumptions outlined above about the consumption data and alarm transmissions, the typical module will transmit for less than 2 minutes per year.

Because the modules communicate with the DCUs, the only transmissions emanating from the module will be to send consumption data or an alarm to a DCU. (for example, the modules do not form a mesh network to transmit data or firmware upgrades among themselves; they do not communicate with each other.

The above description covers the vast majority of SoCalGas' approximately 5.8 million meter customer base. SoCalGas will be installing modules for large commercial and industrial customer meters, likely less than 10,000, spread over the entire service territory. The modules used on these meters may have additional alarms, may transmit more frequently (such as hourly) and may transmit additional information (such as pressure and temperature). Because these modules are still in the engineering design phase it is not possible to provide precise information at this time.

**Question 3:** Under what scenarios does a meter transmit outside of the daily schedule, i.e., unscheduled transmission such as on-demand read, tamper/theft alert, last gasp, firmware upgrade etc.?

**Response 3:**

See response to Question 2.

**Question 4:** Typically, how much of the communication between the customer's meter and the utility is unscheduled vs. scheduled?

**Response 4:**

See response to Question 2. SoCalGas expects most of the communication between the customer's module and the utility to be scheduled.

**Question 5:** Are there any other factors that go into determining duration and/or frequency of meter transmissions (e.g., if a meter can't access the network when it's trying to send data, type of a meter etc.)? If yes, please identify these factors.

**Response 5:**

See response to Question 2. No other factors affect the duration or frequency of transmissions for the vast majority of the modules SoCalGas will install. Less than 10,000 modules will be installed for large commercial and industrial customers and the duration and frequency of transmissions for those customers will be different.

**Question 6:** What is the amount of RF emission at the source when a meter is transmitting data (instantaneous maximum peak level, averaged over 30 minutes)?

**Response 6:**

Table 1 contains the detailed calculation of the RF emissions generated by the Aclara modules being installed by SoCalGas and compares them to the Federal Communications Commission (FCC) standard. The Aclara modules SoCalGas plans to install do or will fully comply with FCC guidelines for human exposure to RF energy. The Aclara modules which have not yet gone through the FCC process are similar in RF output to Aclara modules previously approved by the FCC in which RF emissions were found to be far below FCC limits.

**Table 1**  
**Details of RF Exposure Calculations for Typical Residential Modules**

	<b>Typical Residential Advanced Meter Module (Series 3000)<sup>1</sup></b>	<b>Extended Range Residential (Series 3000)<sup>2</sup></b>
	<b>Consumption Data + Alarm</b>	<b>Consumption Data + Alarm</b>
Expected Installations	5.5 million	0.3 million
Transmission Path	Module to DCU	Module to DCU
RF Band (MHz)	450-470 UHF	450-470 UHF
Power Output (mW)	229	600
# Of Transmissions Per Day	4 data	4 data*
Transmission Duration (seconds/transmission)*	0.07 (data), 0.035 (alarm)	0.07 (data), 0.035 (alarm)
Transmission (seconds) in 30 min. period*	0.07 (data), 0.21 (alarm)	0.07 (data), 0.21 (alarm)
Maximum Duty Cycle (30 min)	0.02%	0.02%
FCC Limit for MPE, 8 inches from source (microWatts/sq. cm)	300	300
Average Exposure Level (microWatts/sq. cm)	0.007	0.019
Ratio of Avg. Exposure Level to FCC allowable limit (%)	0.002%	0.006%

\*Analysis accounts for one 6-transmission alarm occurring once per month.

As Table 1 shows, the RF exposure caused by the Aclara/SoCalGas modules is well below the FCC maximum permissible exposure.

**Question 7:** Does the amount of RF emission vary depending on duration of transmission/volume of data being sent? For example, are RF emissions higher when there is a larger volume of data to be transmitted?

**Response 7:**

The amount of RF emissions does not vary for the gas modules because the duration of each transmission and the volume of data transmitted do not change.

<sup>1</sup> The FCC ID for Aclara's typical Series 3000 module is LLB10001. The emission designator is 9K66F1D.

<sup>2</sup> The extended range Series 3000 module is currently being tested for FCC compliance.

**Question 8:** Are there any other factors that impact the amount of RF emissions? If so, please identify the factor(s) and its impact on RF emissions.

**Response 8:**

One other factor impacts the amount of RF emissions generated by the SoCalGas system—the DCUs referenced in Response #2.

Each DCU<sup>3</sup> has three antennas:

- one operating at 450-470 MHz to receive data from the modules;
- one operating at 450-470 MHz to send data to the modules; and,
- one operating at 902-928 MHz to relay data from DCU to DCU.

When receiving data from modules, DCUs do not produce RF emissions. When transmitting data to modules, DCUs send only a time synchronization signal. Time synchronizations occur once daily for 70 milliseconds (0.07 seconds) at up to 2 W of total output power per transmission.

The third DCU antenna (known as the Ascendent radio) is for transmitting information from one DCU to another. These antennas transmit on a 902-928 MHz, unlicensed industrial, scientific, and medical (ISM) band for use in most areas. When transmitting to another DCU, each DCU will transmit up to 96 times per day for 20 seconds at a maximum of 1 W of total output power per transmission.

In some special cases, up to 100 DCUs will transmit on an 860- or 1900-MHz cellular network (Verizon or AT&T), mainly in areas distant from SoCalGas facilities.

Certain DCUs will be ‘take-out points,’ aggregating data from other DCUs and transmitting it to the SoCalGas computer systems. These take-out points will be placed on SoCalGas facilities, where possible, so the data is transmitted through the existing SoCalGas landline system.

Given these operating characteristics, Table 2 summarizes the key operating characteristics and RF emissions for the DCUs.

---

<sup>3</sup> Although still under development, the DCU described is similar to another Aclara product which has an FCC ID of LLB9975 and emission designator of 7K20F1D.

**Table 2  
Details of RF Exposure Calculations for Typical Data Collector Units (DCUs)**

	<b>Data Collector Unit</b>		
	<b>Module Radio</b>	<b>Acendant Radio</b>	<b>Cellular</b>
Expected Installations	4000		~100
Transmission Path	DCU to module	DCU to DCU or DCU to head-end	DCU to head-end
RF Band (MHz)	450-470 UHF	902-928 UHF	860 or 1900
Power Output (W)	2	1	1
# Of Transmissions Per Day	1 time sync	96 data	96 data
Transmission Duration (seconds/transmission)	0.07	20	20
Transmission (seconds) in 30 min. period	0.07	40	40
Maximum Duty Cycle (30 min)	0.004%	2.2%	2.2%
FCC Limit for MPE, 8 inches from source (microWatts/sq. cm)*	300	601	573
Average Exposure Level (microWatts/sq. cm)**	0.05	27.9	4.4
Ratio of Avg. Exposure Level to FCC allowable limit (%)	0.016%	4.6%	0.77%

\*Federal Communications Commission (FCC) Maximum Permissible Exposure (MPE) limit.

\*\*Exposure at 20 cm (8 inches) from source; DCUs actually mount 25 feet above ground.

As Table 2 shows, the exposure from the DCUs falls well below the FCC maximum permissible exposure, even when conservatively calculated at 8 inches (20 cm) from the DCU. Since DCUs will be installed at heights typically at or above 25 feet, exposure is likely to be significantly less.

**Question 9:** Is there RF emission when the meter is not transmitting? If yes, what is the amount of RF emission?

**Response 9:**

There are no RF emissions when the module is not transmitting.



**Question 10:** Is there a difference in the amount of RF emissions for a wireless smart meter with the radio off and a smart meter with the radio out? If yes, what is that difference and how is it calculated?

**Response 10:**

Not applicable.

**Question 11:** Is there a difference in the amount of RF emissions for a wireless smart meter with the radio off and an analog meter? If yes, what is that difference and how is it calculated?

**Response 11:**

Not applicable.

All responses prepared by Pat Petersilia, AMI Director, Southern California Gas Company.

Dated: November 1, 2011

Respectfully submitted

By           /s/ Steven D. Patrick            
STEVEN D. PATRICK

*Attorney for:*

**SOUTHERN CALIFORNIA GAS COMPANY**  
555 W. Fifth Street, Suite 1400  
Los Angeles, CA 90013-1011  
Telephone: (213) 244-2954  
Facsimile: (213) 629-9620  
E-mail: [SDPatrick@semprautilities.com](mailto:SDPatrick@semprautilities.com)