



## **DRA**

*Division of Ratepayer Advocates  
California Public Utilities Commission*

**Joseph P. Como  
Acting Director**

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<http://dra.ca.gov>

July 15, 2011

President Peevey  
Commissioner Simon  
Commissioner Florio  
Commissioner Sandoval  
Commissioner Ferron

**Subject:** The Structure Group Investigation and Report on PG&E's SmartMeters

Dear Commissioners,

As you may know, a report was prepared by the Structure Consulting Group, LLC (Structure) and was released by the Commission on September 2, 2010. The stated purpose of the investigation and resulting report was to identify if Pacific Gas and Electric Company's (PG&E) SmartMeter System has been and is accurate, and what caused customer high bill complaints related to SmartMeters in late 2009 and early 2010.

DRA committed to evaluating Structure's investigation and subsequent Report. We have spent approximately \$25,000 on a consultant for this very purpose. Attachment A provides a chronology of DRA's activities regarding its evaluation.

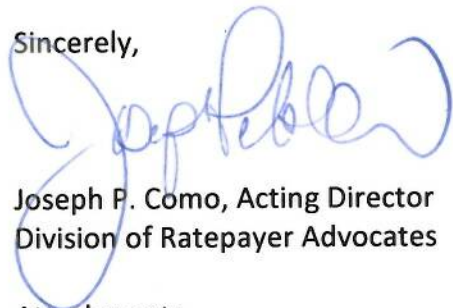
Despite the completion of the CPUC's investigation and Report, DRA cautions that problems may persist. For example, in DRA's October 29, 2010 comments to an Administrative Law Judge Ruling issued in Application 07-12-009, DRA specifically recommended that the Commission establish a process that, "(1) allows interested parties to evaluate and comment on the Structure Group Report, and (2) enables the Commission to determine whether the Report provides satisfactory explanations for the problems consumers have experienced with PG&E's Smart Meters, or whether additional analysis is needed." Other parties made similar requests in their comments. These requests were not granted. Notably, last month, PG&E identified that approximately 1,600 meters malfunction when exposed to high heat. DRA's October 29, 2010 comments had identified a number of questions regarding the Report, including the fact that one in six meters did not meet the manufacturer's or PG&E's high temperature accuracy test.

At this point in time, DRA is unable to complete its evaluation of the Report. DRA's communication with Structure has been limited to DRA providing Structure a list of detailed

questions about the Report. We have not been afforded the opportunity to discuss those questions nor have we been provided answers to those questions. (Attachments B and C) Structure's suggestion that DRA review the 40 gigabytes of raw data stored on a hard drive it gave to Energy Division is not responsive, nor is it reasonable. (Attachment D) Regrettably, key questions raised by DRA will go unanswered, and of greater concern, complaints raised by PG&E's customers and Legislators will go unaddressed. The Report lists factors that *appeared* to contribute to high bill complaints, and it concludes that *Structure was not able to identify* systematic billing errors caused by the SmartMeter system. These cautiously worded statements are not supported in the 253 page body of the report or in the appendices. It is clear that the Report does NOT identify the cause(s) of the high bill complaints, and there are many indications that Structure's methodology was inadequate to determine whether the end-to-end system is accurate.

Unfortunately, barring any further opportunity to have our questions answered by Structure, DRA is forced to cease its evaluation of the Structure investigation and Report. At this point, we believe the Commission should pursue answers to these questions in order to determine the cause(s) of the high bill complaints, and whether PG&E's end-to-end AMI system is accurate.

Sincerely,



Joseph P. Como, Acting Director  
Division of Ratepayer Advocates

Attachments

cc: Paul Clanon, Executive Division  
Julie Fitch, Energy Division  
Pounesh Ghaffarian, Legal Division  
Candace Morey, Legal Division  
Karen Paull, Legal Division  
Service List for PG&E AMI Upgrade Proceeding A.07-12-009

# Attachment A

The following is a sequence of DRA's communications regarding the report, *PG&E Advanced Metering Assessment Report*, prepared by the Structure Consulting Group, LLC (Structure).

- On September 2, 2010, at a CPUC business meeting, the CPUC publicly released Structure's Report. Later that afternoon, the Energy Division held a meeting with representatives of DRA and TURN. In this meeting, representatives from Structure provided an overview of the Report and responded to questions. DRA was only able to ask general questions as it had limited time (two hours) between the release of the Report and the meeting to review the 400+ page report.
- Dave Ashuckian, DRA Deputy Director, sent a letter dated September 9, 2010, to Julie Fitch, Energy Division Director, indicating that DRA wanted to pursue detailed questions regarding the Report beyond the general questions asked at the September 2 meeting. DRA requested Energy Division's assistance in establishing communications protocols with the Structure staff that had conducted the evaluation and written the Report. See Attachment B. Although DRA did not receive a written response to the September 9 letter, an Energy Division manager had told Mr. Ashuckian that Structure would be available to respond to DRA's questions.
- Tom Roberts, DRA Senior Engineer, had informal discussions with Energy Division staff in which he emphasized the importance of Structure's responsiveness to DRA questions regarding the Report.
- DRA provided comments and reply comments in 2010 regarding the Structure Report in response to the City and County of San Francisco's Petition to Modify (CCSF Petition) of Application 07-12-009. These included October 15 opening comments and October 29 reply comments on a ruling issued by the Administrative Law Judge, and December 6 comments on the Proposed Decision addressing CCSF's Petition.
- On December 31, 2010, the contract between DRA and its consultant SAIC<sup>1</sup> was approved by DGS. The effort to secure a contractor began with a solicitation in June 2010, but establishing a contract was delayed due to the state budget crisis.
- On March 31, 2011, Mr. Roberts sent a memorandum to Stacey Wood of Structure listing questions that DRA wished to discuss at a meeting with Structure. See Attachment C.
- Subsequently, on April 7, 2011, Ms. Wood sent an email communication to Mr. Roberts stating that, "As Structure is no longer under contract with the CPUC, we are limited

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<sup>1</sup> The consultancy R.W. Beck was acquired by SAIC after the contract was approved by DGS.

both in time and resources to provide detailed response[sic] to each of your questions.” Ms. Wood indicated that Mr. Roberts should review Structure’s supporting materials that were provide to the CPUC on a hard drive in order to obtain answers to DRA’s questions. See Attachment D.

- On May 3, 2011, Mr. Roberts sent a note informing Energy Division staff that Structure had not responded to DRA’s questions and that DRA does not have the resources to review the voluminous raw data supporting the Report. Mr. Roberts indicated that this subject would be discussed at a subsequent meeting with Energy Division on May 9. However, the focus of that meeting did not include the issue of Structure’s lack of response to DRA’s questions.
- On June 7, 2011, Mr. Ashuckian sent a letter to Ms. Fitch notifying her that due to Structure’s non-responsiveness to DRA’s questions, DRA has necessarily ceased its evaluation of Structure’s investigation and Report.

# Attachment B



## DRA

*Division of Ratepayer Advocates  
California Public Utilities Commission*

**Joseph P. Como  
Acting Director**

505 Van Ness Avenue  
San Francisco, CA 94102  
Phone: (415) 703-2381  
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September 9, 2010

Julie Fitch,  
Director, Energy Division  
California Public Utilities Commission  
505 Van Ness Avenue  
San Francisco, CA 94102

**Subject:** The Structure Group Investigation and Report on PG&E's SmartMeters

Dear Ms. Fitch:

The Division of Ratepayer Advocates (DRA) appreciates the meeting that the Energy Division organized last Thursday, September 2, with the Structure Consulting Group, LLC (Structure Group) to discuss questions about its report, "PG&E Advanced Metering Assessment Report," released on September 2. However, we only had a couple of hours to review the over 400 page Report before the meeting. As a result, we were only able to ask very general questions.

As we continue to review the Report, we expect to have more detailed questions about the investigation and the conclusions reached. Since the Structure Group has indicated that its work product was prepared and completed independent of the Commission staff, DRA feels it is appropriate that we address questions directly with the Structure Group staff that performed the evaluation. We request that you provide the name and contact information of a representative at the Structure Group who can address DRA's questions.

Established protocols for communication and transmission of information between the Structure Group, DRA and other interested parties might prove helpful to all in ensuring an efficient and effective process. DRA would like to work with the Energy Division in developing such protocols.

I am out of the office until Monday, September 20. In my absence, please contact Linda Serizawa at (415) 703-5250 or Chris Danforth at (415) 703-1481.

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*Ratepayer Advocates in the Gas, Electric, Telecommunications and Water Industries*

Sincerely,

A handwritten signature in blue ink, appearing to read "Dave Ashuckian / L. Gungor".

Dave Ashuckian, Deputy Director  
Division of Ratepayer Advocates

cc: Ken Lewis, Energy Division  
Bruce Kaneshiro, Energy Division  
Aloke Gupta, Energy Division  
Pouneh Ghaffarian, Legal Division  
Joe Como, DRA  
Linda Serizawa, DRA  
Chris Danforth, DRA  
Tom Roberts, DRA  
Karen Paull, Legal Division

DAA: je3



# Attachment C

March 31, 2011

**From:** Tom Roberts  
AMI Project Lead  
CPUC Division of Ratepayer Advocates  
[tr@cpuc.ca.gov](mailto:tr@cpuc.ca.gov)  
(415) 203-2781

**To:** Stacey Wood  
Principal  
The Structure Group  
[Stacy.Wood@thestructuregroup.com](mailto:Stacy.Wood@thestructuregroup.com)  
(713) 875-2826

**Subject: The Structure Group Report on PG&E SmartMeter™ System**

In a thorough review of the Structure Group Report (Report), numerous questions arise relating to every aspect of the conclusions of Structure's investigation into PG&E's high bill complaints. In short, the Report does not describe the methodology, data, and analysis in sufficient detail to support the conclusions and key findings. The CPUC's Division of Ratepayer Advocates (DRA) seeks to understand the causes of PG&E's high bill complaints, including those discussed in the Structure Report. To that end we have engaged the services of SAIC Energy Environment & Infrastructure LLC based on our previous relationship with their employees in a previous business incarnation as Plexus Research.

Given that Structure Group is no longer under contract with the CPUC to support this project, DRA has attempted to limit the scope of this request to the highest level questions. High priority areas of inquiry include understanding the nature of the high bill complaints, and the degrees to which any of the following contributed to those complaints:

- The factors that Structure concluded explained the complaints, including rates, weather, and inaccurate electromechanical meters
- Start-up or ongoing problems with PG&E's meters and IT systems

Other lower priority questions are also included where it appears a simple answer can be provided with little effort.

Per your request, we are providing these questions to you in writing in advance of any discussion.. We look forward to discussing your responses with you within a few weeks. Please let us know if there is a date or dates that we can schedule time for this discussion in the third or fourth week of April.

## **Issue 1 - Complaint Account Meters**

**Basis** - 1,360 PG&E customers complained about their "high" electric bills in the time interval studied (Structure Group Report page 72 of 253). Structure Group studied the histories of those accounts and, further, obtained from PG&E "additional information" for 73 of those accounts, chosen for their "propensity to identify system issues within the complaint population" (p. 72 of 253). Of the high-bill complaint Smart Meters, 36 were tested in the field (Scenario 5, p. 121 of 253).

One plausible explanation for high bills is that the Smart Meters for those accounts over-register consumption under some set of (perhaps intermittent) conditions. Because it's difficult to anticipate what those conditions may be, it's impossible to be certain whether any of the tests replicated them or not. Circumstantial evidence that can be a useful guide to investigation includes the meter make, model number, and production lot number and/or date, and firmware revision number of the complaint meters. If

all complaint meters share firmware revision or production lot(s)/date(s), that may indicate a problem that warrants examination.

**Request 1** - Did Structure Group learn the makes, model numbers, and production lot numbers and/or dates, and firmware revisions of the 1,360 (or 73, or 36) Smart Meters serving the high bill complaint accounts? If so, please provide them, associating each customer account number with the corresponding meter information.

## **Issue 2 – Characterization of High Bills**

**Basis** - A quantitative showing of the "high" bills is needed to give context to the rest of the investigation.

**Request 2** - Please provide whatever quantitative results were created showing the following information, and/or identify where in the Report the quantitative information is presented.

- The quantitative relationships of the "high" bills to bills for the same accounts in similar periods in previous years (Numerically, how high were the bills?)
- The timing of the high bill complaints relative to the timing of the respective customers' Smart Meter installations
- The monthly bills of complaining customers for any period (say, one year or more) before, during, and after the sustained jump in the number of high bill complaints that began in August 2009, shown in Figure 7 on Report page 33 of 253.
- The timing of the high bill complaints relative to the timing of rate increases, the numbers of customers affected, and the effect of the increases on customers' bills
- The timing and magnitudes of the high bills relative to the timing of hot weather
- Changes in customer consumption when the smart meters were installed
- The geographic distribution of the high bill complaints as they occurred over time, including distribution by climate zone
- Bills, from the same time period, of a representative sample of customers who did not complain (Did those bills go up, down, stay the same?) The Report says this was analyzed, but presents no quantitative results.

## **Issue 3 - Utility Historical Meter Accuracy Data**

**Basis** - Investor-owned utilities are commonly required by regulations to monitor the accuracy of in-service meters by annually gathering accuracy data from a statistical sample of customer meters. In the case of PG&E, if PG&E is so required, such data collected before the Smart Meter deployment would show a clear history of the accuracy of electromechanical meters in service.

**Request 3** - Did Structure Group obtain from PG&E any historical sampled meter population performance data quantifying the accuracy of in-service electromechanical meters? If yes, please provide all of such data in full detail.

## **Issue 4 - Statistical Analyses & Correlations**

**Basis** - Structure Group reports on page 71 of 253 that, "For those accounts that do show causation from rate tariff changes or meter exchange errors Structure was to:

- "a. Correlate usage to weather data to identify anomalies in weather adjusted usage patterns including historical analysis of meter data.
- "b. Develop report on results of statistical analysis and correlations.
- "c. Develop customer complaint model correlated to weather and prior energy usage patterns."

**Request 4** - Please identify where such statistical analyses or correlations are presented in the Report, and provide any such analyses or correlations that were not included in the Report. We are asking for quantitative results, not qualitative discussion.

## **Issue 5 – Rates As A Potential Cause Of Higher Bills**



**Basis** - The Report states that "rate increases" and "incorrectly applied rates" "appeared to contribute" to high bill complaints (pages 13 & 14 of 253). The Report does not appear to describe specific rate increases during the period, nor which rates were incorrectly applied and why this error occurred.

- **Request 5A** - Please identify the subject "rate increases."
- **Request 5B** - Please identify the subject "incorrectly applied rates" and what resulted in the incorrect application.

#### **Issue 6 - Weather During The Study Period**

**Basis A** - Weather is a prominent factor influencing energy consumption. Ambient temperature data are commonly presented in units of "degree-days," which quantify by how many degrees and for how long each day's outdoor temperature differs from a comfortable level (usually 65°F), therefore prompting people to incur heating or cooling costs. Numerous agencies gather and publish degree-day data. For the case at hand, it will be helpful to have historical degree-day data for each PG&E climate zone during the study period.

**Request 6A**- If Structure Group obtained the described degree-day data—or any alternate, equivalent, or substitute data—please provide them.

**Basis B** - On page 139 of 253 the Report states, "Structure found when comparing July 2006 and 2009 that only 295 Customer complaint accounts representing 14% of the high bill population reflected 2009 monthly usage greater than 110% of 2006 usage during these peak months. Similar results were identified when evaluating August 2006 and 2009 data."

**Request 6B** - Please clarify: Does this mean that 86% of the high bill complaint customers received July 2009 bills that were less than 10% higher than their July 2006 bills? Please provide the data, particularly also including bills (if any) that declined.

**Basis C** - Page 139 of 253 the Report further states, "The impact to Customer complaint accounts reduced to 110% when evaluating a 20% increase from the same months in 2009 compared to 2006."

**Request 6C** - Please clarify. What does that statement mean? (Perhaps this is a typographical error?) What percent of customer complaint accounts received July 2009 bills that were more than 20% higher than their July 2006 bills? Please provide the data. (These may be the same data that support the previous answer, above.)

#### **Issue 7 - Electromechanical Meter Test Failures**

**Basis A** - The Report states on page 189 of 253 that, "Six of the 47 tested electromechanical meters failed the CPUC Accuracy Standard of  $\pm 2.0\%$ ".

**Request A** - What were the quantitative test results for the meters that passed and that failed? Please provide the numbers for each of the tests.

**Basis B**- Of 148 electromechanical meters tested, "One electromechanical meter was not found to be functional, registering zero on all tests; and was therefore excluded from testing" (p. 189 of 253). Sampling 148 meters and finding one that registers zero might be considered very significant. One meter is 0.68% of 148 meters. Depending on how it is calculated, the percentage of PG&E bills that generated complaints is far smaller than 0.68%, presenting the possibility that electromechanical meter degradation alone explains all or most of the "high" bills. That is, a customer whose electromechanical meter is grossly under-registering is sure to see a large increase in the electric bill when an accurate new electronic meter is installed. This possibility does not appear to be addressed in the Report.

**Request 7B** - If the possibility that electromechanical meter degradation was a prominent cause of the "high" bills is addressed in the Report, please identify where it is addressed. If it is not, please explain what evidence, circumstance, or reasoning prompted Structure Group to set aside this possibility.

**Basis C** - It is well-known that electromechanical meters may "slow down"—that is, under-register consumption—as they age. This is noted in the Report on page 59 of 253, where "meter age" is included on a list of "factors with the potential to affect ... unusually high bill generation."

**Request 7C** - What "correlation of Smart Meter high bills based upon age of electromechanical meter" (p. 59 of 253) did Structure Group find in assessing the impact of meter age on customer bills? Please identify where this is discussed or presented in the Report.

#### **Issue 8 – IT Related Issues**

**Basis** - PG&E installed one of the largest AMI systems to date in the world. This system relies on a new meter data management systems (MDMS) and data warehouse, major modifications to the customer care and billing IT system, and extensive links between them. It is reasonable that a ground-breaking and complicated IT project such as this could have start-up glitches, growing pains as data flows increase as mass deployment progresses, and completely unforeseen problems that required modifications to the IT systems. Some of the customers interviewed, for example customers 5X and 14X, appear to have had electric bill spikes in the winter, which could be caused by start-up or transition glitches in the IT systems.

- **Request 8A** – The Report notes that many of PG&E's data validation practices, billing practices, and MDMS interfaces were not consistent with industry best practices (pages 231-240.) From the Report, it appears that the only tests addressing these IT elements of the AMI system were the end-to-end tests performed on nine (9) meters. Please describe any other tests of PG&E's IT systems that relate to Smart meters. Please explain how Structure's investigation was able to eliminate the possibility that transient errors in PG&E's evolving IT systems caused high bills.
- **Request 8B** – The Report states that "stress tests" were performed as part of the laboratory end to end tests. Please describe these stress tests, how they were performed, and how they are representative of the *in situ* IT system stresses.

#### **Issue 9 - Data Storage Issue Role in High Bill Complaints**

**Basis** - On page 187 of 253 the Report states, "These data storage issues had been identified by PG&E in 12,735 meters as of May 2010, potentially resulting in a subset of Customers receiving zero usage or lower estimated bills. Data storage issues are one type of exception disclosed by PG&E, and may include: ... large intervals ... ."

**Request 9** - What is a "large interval"? Did 100% of "data storage issues" result in under-registration of consumption by the affected Smart Meters? Did Structure Group gather any numerical data about the behavior of the 12,735 Smart Meters (or any subset of those meters) with "data storage issues"? If yes, please provide those data.

#### **Issue 10 - Acceptance Tests**

**Basis** - It is common for utilities (and other entities of all kinds) purchasing a large, complex, and/or expensive system to conduct formal Acceptance Tests to verify the efficacy of the system before making final payment for it. Such tests often are—at least, are intended to be—rigorous enough to detect significant errors or deficiencies in system performance.

**Request 10** - Did Structure Group inquire whether PG&E performed Acceptance Tests on the AMI system and on its own billing system, and did Structure Group receive detailed data from PG&E describing the Tests and test results? Were Acceptance tests performed on the three iterations of PG&E's electric SmartMeter systems: DCSI, Aclara, and SSN? If yes, please provide the information you received on this subject.

#### **Issue 11 – Temperature Or Humidity Extremes As Potential Causes Of Higher Bills**

**Basis** - The Structure investigation tested new meters to high temperatures of +50 degrees Celsius (page 52 of 253). Meters located in direct sunlight, or in confined spaces can be subjected to much higher temperature temperatures, particularly in summer. Other locations could subject meters to high humidity levels and moisture could condense inside the meter if the housing had manufacturing flaws. Extreme environmental conditions such as these can result in transient meter errors.

Structure Group's laboratory testing included thermal environmental tests, and the Report states that these tests were performed "in accordance with ANSI Standard C12.20" (page 52 of 253).

- **Request 15A-** Are other meter test protocols routinely used by PG&E or other utilities which include more stringent environmental tests, including humidity tests?
- **Request 15B** – Did the analysis of high bill complaints consider if the meter was installed where it would be subjected to extreme temperature or moisture levels?

#### **Issue 12 – Tampering And Damage As A Potential Cause Of Higher Bills**

**Basis** - Customers who had previously tampered with their meters to reduce electricity bills, or whose meters had been tampered with by a previous occupant, would incur higher bills once an accurate meter was installed. Replacement of faulty meter sockets or electric panels, as part of Smart meter installation, could also result in higher bills. Available industry data indicate that meter tampering varies widely but occurs at approximately 0.25% of residential meters. This percentage is larger than the percentage of customers complaining of high bills.

- **Request 12A-** Did the smart meter installation protocol include documentation of evidence (or absence of evidence) of tampering with the old meter? If so, were the high bill complaints compared to evidence of tampering? If this comparison was made, what were the findings?
- **Request 12B** - Did the smart meter installation protocol include documentation of issues with the electric panel or meter socket? If so, were the high bill complaints compared to evidence of these issues? If this comparison was made, what were the findings?

## Attachment D

**From:** Stacey Wood [stacey.wood@thestructuregroup.com]  
**Sent:** Thursday, April 07, 2011 7:43 AM (Central time)  
**To:** Roberts, Thomas  
**Subject:** RE: DRA request for information on PG&E report

Thomas,

That is correct. The questions that you have should be answered by the appendix and the documentation included in the files. Sorry to have to make you dig through the details but since the project is officially closed on our side, this is the approach that will need to be taken.

Cheers,

Stacey Wood  
713-875-2826

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**From:** Roberts, Thomas [mailto:thomas.roberts@cpuc.ca.gov]  
**Sent:** Thursday, April 07, 2011 9:36 AM (Pacific time)  
**To:** Stacey Wood  
**Subject:** RE: DRA request for information on PG&E report

Stacey,

So to be clear, I understand that you are recommending that not call you next week as we discussed yesterday. Instead, I should start digging through the 40 GB hard drive to find the answers. I should assume you are not available to answer questions.

Do I have this right?

Tom

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-----Original Message-----

**From:** Stacey Wood [mailto:stacey.wood@thestructuregroup.com]  
**Sent:** Thu 4/7/2011 7:23 AM (Central time)  
**To:** Roberts, Thomas  
**Subject:** RE: DRA request for information on PG&E report

Thomas,

As Structure is no longer under contract with the CPUC, we are limited both in time and resources to provide detailed response to each of your questions. I did perform a cursory review of your questions and respectfully will need to reference the availability of our support materials that were provided to the CPUC on a hard drive to provide answers to the questions that are included in your document. I do believe that the answers to your questions are provided in the referenced supporting documentation and appendixes, and the documentation will support the conclusions that we stated in our report.

Regards,

Stacey Wood  
713-875-2826

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**From:** Roberts, Thomas [mailto:thomas.roberts@cpuc.ca.gov]  
**Sent:** Friday, April 01, 2011 11:50 AM  
**To:** Roberts, Thomas; Stacey Wood  
**Cc:** Danforth, Christopher; Paull, Karen P.; Hadden, Stephen C.  
**Subject:** DRA request for information on PG&E report

Hello Stacey,

You probably recall our discussion over a month ago about DRA's questions about your report on PG&E's SmartMeter system. I'm sorry it's taken so long to come up with a detailed list of questions, but they are now attached. We'd like to set a meeting for the third or fourth week in April to discuss your responses. Please send a quick reply letting me know the attachment came though OK and is legible.

Thanks,  
Tom

Tom Roberts  
Senior Engineer  
CPUC Division of Ratepayer Advocates

tcr@cpuc.ca.gov<<mailto:tcr@cpuc.ca.gov>>  
(415) 203-2781