

Case No: A.14-02-008

Exhibit No.: A4NR-1

Witness: John Geesman

Application of Pacific Gas and Electric	)	
Company for Compliance Review of Utility	)	
Owned Generation Operations, Electric Energy	)	
Resource Recovery Account Entries, Contract	)	Application 14-02-008
Administration, Economic Dispatch of Electric	)	(Filed February 28, 2014)
Resources, Utility Retained Generation Fuel	)	
Procurement, and Other Activities for the Period	)	
January 1 through December 31, 2013.	)	
(U 39 E)	)	
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**PREPARED TESTIMONY OF**

**JOHN GEESMAN**

**ON BEHALF OF THE**

**ALLIANCE FOR NUCLEAR RESPONSIBILITY**

**BEFORE THE PUBLIC UTILITIES COMMISSION**

**OF THE STATE OF CALIFORNIA**

**JUNE 20, 2014**

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PREPARED TESTIMONY OF JOHN GEESMAN  
ON BEHALF OF THE ALLIANCE FOR NUCLEAR RESPONSIBILITY  
("A4NR")

Q: Please state your name and business address for the record.

A: My name is John Geesman, and my business address is: Dickson Geesman LLP, 1999 Harrison Street, Suite 2000, Oakland, CA 94612.

Q: Are your professional qualifications included in your testimony?

A: Yes, my professional qualifications are contained in the Appendix to my testimony.

Q: Was your testimony prepared by you or under your direction?

A: Yes, it was.

Q: Insofar as your testimony contains material that is factual in nature, do you believe it to be correct?

A: Yes, I do.

Q: Insofar as your testimony contains matters of opinion or judgment, does it represent your best judgment?

A: Yes, it does.

Q: Does this written submittal complete your prepared testimony and professional qualifications?

A: Yes, it does.

Q: What is the purpose of your testimony?

A: The purpose of my testimony is to elaborate upon A4NR's Protest, which I incorporate by reference, using PG&E responses to A4NR data requests as well as other documents in the public domain.

Q: What is your primary conclusion about PG&E's 2013 conduct of the AB 1632 seismic studies?

A: PG&E unilaterally shrank the scope of the studies from what the Commission envisioned, particularly with regard to the high energy offshore component, found the Commission's Independent Peer Review Panel ("IPRP") too intrusive, and after mid-year evaded the IPRP's review entirely.

Q: With regard to the high energy offshore component, what do you mean by "unilaterally shrank the scope"?

A: I mean that PG&E decided on its own, without adequate consultation with the IPRP, that the high energy offshore studies are not necessary to achieve PG&E's objectives.

In describing a January 13, 2013 editorial in the San Luis Obispo *Tribune* which criticized the California Coastal Commission's denial of the high energy offshore permit, PG&E media spokesperson Blair Jones reported to an in-house group by email,

*In advance of the editorial Jearl Strickland, Tom Jones and Tom Cuddy did a good job in addressing questions from the board on the subject of the high-energy study, and set up the fact that in the absence of such data, the models being developed under the NRC's Fukushima response could account for the potential of the faults being connected and the possibility of an earthquake on one fault resulting in the continued rupture of a nearby fault. This point did not make it into the editorial and is an item I will be following up on with the board.<sup>1</sup>*

PG&E State Agency Relations Manager Valerie Winn's February 12, 2013 email reported to her colleagues of a conversation with CPUC staff Eric Greene about the upcoming February 25, 2013 IPRP meeting:

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<sup>1</sup> A4NR-0000128, included in this testimony as Attachment A.

*Eric is looking to us for a 45 minute presentation. Per a discussion with Stu yesterday, I let Eric know that we will be sending the Pt [sic] Bouchon [sic] report to IPRP via letter this week. We'll touch on that and the status of the projects/schedule for the coming year.*

*Eric indicated that Chris wills [sic] wants to talk about the recent SHAQ [sic] meeting and the slip rates on the Hosgri fault.*

*Eric also wants to hear from Mark Johnson re: any insights on denial of permits by the Coastal Commission. Eric indicated that Ed Randolph is prepared to go to the Governor's office but he didn't feel he had a strong enough case from the IPRP/PG&E to move the CCC. [REMAINDER OF PARAGRAPH REDACTED BY PG&E]*

*Eric thinks we could still do Box 4 in the November/December 2013 timeframe, and could do other 3 zones the following year.*

*I'll set up a call this week/next to discuss how we want to approach this. We need to be prepared to finesse this issue at the meeting, given it is not clear to me our outlook.<sup>2</sup>*

Ms. Winn expanded on this "approach" in an email to her PG&E colleagues on February 21,

2013:

*As a reminder of our discussion last week, we are prepared to talk about the Pt. Buchon report (IPRP members should be receiving today) and study results, and provide the calendar of when technical reports will be ready (e.g., the ASLB schedule).*

*On the IPRP question of going back to the CCC for permits, our question is really what insights do the IPRP have that would lead us to believe the Coastal Commission would react differently if we went back. Any other questions on 3D HESS our response is that 'we have not made a decision as a company on whether we are going to pursue 3D HE work. We will let you know when we make that decision.' We are pleased with the results from the surveys currently underway. Want to see more processing of data we have been able to collect, then go through what we have found and decide if we have enough information.<sup>3</sup>*

A day after the IPRP meeting, PG&E Senior Seismologist/Geophysicist Stuart Nishenko emailed his colleagues:

*The meeting went well yesterday, no major surprises. The IPRP avoided making any demands we do high energy, instead they characterized it as the 'last tool' in the box to be used when we*

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<sup>2</sup> A4NR-0000282, included in this testimony as Attachment B.

<sup>3</sup> A4NR-0000122, included in this testimony as Attachment C.

*have exhausted all other options. So I think we'll be able to avoid the issue as we'll consider linking the Hosgri and Shoreline as a 'worst case scenario' in the SSHAC.<sup>4</sup>*

Ms. Winn summarized the IPRP meeting's discussion of the high energy surveys in a February 26, 2013 email to her colleagues as follows:

*- Chris Wills noted that since the last IPRP meeting, the Coastal Commission had denied PG&E's application for 3D high energy seismic surveys (HESS). CCC indicated that PG&E had not shown that HESS was worth the impact and that 3D HESS was completely out of the question unless we have an extremely clear purpose and know how it impact [sic] the seismic hazard. He wanted to verify that others were on the same page and indicated that we should table any discussion on 3D HESS until it was the last tool in the tool kit.*

*- Eric Greene noted that he had hoped we'd get some guidance from the CCC on the topic, and he would like to discuss off-line. Still an issue that needs to be pursued among IPRP. Eric noted that HESS could only be done in winter months. If permits granted, wouldn't be able to do until Nov/Dec 2013.*

*- Bruce Gibson agreed with Chris that last thing in the tool box. He did not hear what was intended to be resolved that other studies could not address.*

*- Chris recognized the logistical challenges noted by Eric and that it would take a while to arrange any future surveys. However that discussion about whether the surveys would be done would be well into the future, if they were ever needed.*

*- Ed Randolph asked what IPRP views were on value of the marginal data they would get from the 3 HESS versus harm to marine mammals. Are there other approaches?*

*- Chris indicated that it would have been helpful to inform the range of parameters for the seismic hazard analysis and that the Hosgri slip rate was an important parameter. If the low energy surveys were not conclusive, HESS would have some value, but we don't know if you would get to the point where information from the HESS would put you close to the design basis of the plant. Will be better able to evaluate once we see other survey results.*

*- Chris noted other studies need to be done on ground motion calculations.*

*- Bruce asked about conclusions of Hosgri dying out – energy has to go somewhere – where is it going?*

*- Ed Randolph reiterated that CPUC will be seeking feedback of IPRP – no decision one way or another on what CPUC will want PG&E to do going forward.<sup>5</sup>*

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<sup>4</sup> A4NR-0000170, included in this testimony as Attachment D.

<sup>5</sup> A4NR-0000169, included in this testimony as Attachment E.

## Redacted by A4NR Pursuant to NDA with PG&E

Ms. Winn’s emailed account of the IPRP meeting also included an interaction with a reporter – “JA Savage (CA Currents) asked about whether we would not be pursuing ‘sonic blast’ – Chris Wills indicated that it was pretty clear CCC doesn’t want to hear back from us unless it is the last tool in the kit.”— and concluded with “Next Steps: - IPRP likely to set up quarterly public meetings. No word on the dates though.”<sup>6</sup>

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]<sup>7</sup>

[REDACTED]

[REDACTED]

[REDACTED]<sup>8</sup>

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]<sup>9</sup>

[REDACTED]

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<sup>6</sup> *Id.*

<sup>7</sup> A4NR-0000228, three pages of which are included in this testimony as Attachment F, [REDACTED]

<sup>8</sup> *Id.*, [REDACTED]

<sup>9</sup> *Id.*, [REDACTED]

# Redacted by A4NR Pursuant to NDA with PG&E

[REDACTED] <sup>10</sup>

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] <sup>11</sup>

[REDACTED] <sup>12</sup>

On April 1, 2013 PG&E Senior Seismologist/Geophysicist Stuart Nishenko emailed to his PG&E colleagues the following description of a private session with the IPRP:

*The 4 hour meeting went well, and we are coming to consensus about a] the results of the Pt. Buchon study and 2] the value of low energy 3D vs. high energy 3D mapping – with the IPRP leaning towards low energy providing a greater reduction in overall uncertainty w/r hazard – by addressing fault slip rates.*

*The IPRP posed 17 questions to us about the Pt. Buchon report – and Fridays [sic] informational meeting gave us the opportunity to discuss both background and responses in more detail[.] There is still a need to resolve the HESS questions once and for all – though it looks like any final agreement will have to wait until the Technical Reports from both the onshore and offshore studies are released and evaluated.<sup>13</sup>*

An undated draft of PG&E’s May 19, 2013 response to the California Energy Commission (“CEC”) nuclear data requests for the 2013 Independent Energy Policy Report contained the following two references to the IPRP:

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<sup>10</sup> *Id.*

<sup>11</sup> *Id.*

<sup>12</sup> *Id.*

<sup>13</sup> A4NR-0000193, included in this testimony as Attachment G.



## Redacted by A4NR Pursuant to NDA with PG&E

- *Technical reports describing the 2011 and 2012 surveys of the southern segment of the Shoreline fault zone and Hosgri fault zone will be issued in the 4<sup>th</sup> quarter of 2013. This information will also be transmitted to the PUC IPRP as well as the PG&E SSHAC study to support ongoing seismic hazard assessment activities at DCPP.*  
\* \* \*
- *In 2012, PG&E applied for the necessary state and federal permits to conduct high-energy 3D seismic studies offshore DCPP. PG&E received a Geophysical Survey Permit from the CA State Lands Commission in August 2012, but was denied a Coastal Development Permit by the CA Coastal Commission in November, 2012. As a result, no high-energy marine seismic surveys have been conducted. Final decision whether PG&E ~~needs to, in fact, conduct~~ high-energy 3D marine seismic surveys is pending review of existing data, ~~and consultation with the IPRP.~~<sup>14</sup>*

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]<sup>15</sup>

Q: What else causes A4NR to believe that PG&E unilaterally shrank the scope of the studies from what the Commission envisioned?

A: I will defer to Dr. Douglas Hamilton's testimony on A4NR's concerns about PG&E's treatment of the Diablo Cove, Inferred Offshore, and San Luis Range faults, and instead focus on the open contradiction between what PG&E said on May 5, 2014 in this proceeding and what it said on March 19, 2014 to the U.S. Nuclear Regulatory Commission ("NRC").

A4NR's first discovery question: *"Has PG&E decided that it will not perform high-energy seismic surveys offshore Diablo Canyon?"* PG&E's May 5, 2014 response: *"No. PG&E is still finalizing the results of the seismic studies that were performed and has not made a determination whether additional*

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<sup>14</sup> A4NR-0000136, included in this testimony as Attachment H.

<sup>15</sup> A4NR-0000235, one page of which is included in this testimony as Attachment I.

*advanced seismic studies are necessary.*<sup>16</sup> Six weeks earlier, in a prehearing teleconference for Diablo Canyon's suspended relicensing proceeding at the NRC, PG&E legal counsel Jennifer Post (identified as a copied recipient of the emails included in A4NR-0000282, A4NR-0000122, A4NR-0000170, A4NR-0000169, A4NR-0000193, A4NR-0000286, and A4NR-0000104) offered an opposite description:

*JUDGE ABRAMSON: This is Judge Abramson. Did either of these California agencies that are saying they'd like you guys to do this study have anything to say about the Coastal Commission saying now we can't do it?*

*MS. POST: Well, the Coastal Commission rejected the permit for just one piece of the seismic study. They actually -- we actually were able to undertake a bunch of studies that we did get permitted. The Coastal Commission declined our permit to do offshore three-dimensional seismic studies, but the recommendation from the California Energy Commission was that we perform studies using advanced technologies, including three-dimensional seismic mapping. And we actually did do onshore three dimensional seismic studies, and we also did two dimensional seismic studies, so they have not weighed in on the Coastal Commission's denial of our permit for the offshore 3D studies. They also have not yet weighed in on whether or not they might suggest additional studies be done.*

*JUDGE ABRAMSON: So, you were only partially foiled by one California agency.*

*MS. POST: Yes, only partially foiled, but not really. Actually, we weren't ultimately foiled because the data we were able to collect is sufficient, at least under our preliminary analysis it looks like we were -- the data we were able to collect using the studies that we were able to get permitted is sufficient.*

*JUDGE KARLIN: I suspect that will be an issue that might be, you know -- there might be an issue on that, but certainly we understand that that's the position of PG&E.<sup>17</sup>*

Q: What causes you to believe that PG&E, over the course of 2013, found the IPRP too intrusive?

A: PG&E abandoned its plans to allow IPRP review of seismic study results before the Final Report on relicensing is rendered a fait accompli. In the aftermath of publication of IPRP Report No. 6, PG&E Regulatory Relations Director Erik Jacobson reported his efforts:

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<sup>16</sup> ERR-2013-PGE-Compliance\_DR\_A4NR\_001-Q01, included in this testimony as Attachment J.

<sup>17</sup> March 19, 2014 Pre-Hearing Conference Transcript, NRC Docket Number: 50-275-LR and 50-323-LR; ALSBP Number: 10-900-01-LR-BD01; pp. 658 – 659, included in this testimony as Attachment K.

**From:** Jacobson, Erik B (RegRel)  
**Sent:** Monday, September 16, 2013 11:26 AM  
**To:** Winn, Valerie J  
**Cc:** Nishenko, Stuart; Klimczak, Richard; Abrahamson, Norman; Post, Jennifer (Law); Krausse, Mark; Strickland, L Jearl  
**Subject:** RE: Act by 9/9, COB: PG&E response to IPRP Report 6

*I talked to Gurbux Kahlon, Don LaFrenz and Eric Green today about the IPRP process. They agreed that the IPRP should not do their own studies and that the scope of IPRP's role is to review and comment on PG&E's studies. In light of this conversation, I don't think we should risk rocking the boat by sending a letter or pressing this issue further at this time. If the IPRP starts to go too far in expanding its scope of work, we can try to rein them in at that point [REMAINDER OF SENTENCE REDACTED BY PG&E] I recommend that we continue with our current strategy of cooperating with the IPRP, monitor their activities and follow up with the CPUC if we see some major conflicts on the horizon.<sup>18</sup>*

To which Mr. Krausse responded:

**From:** Krausse, Mark  
**Sent:** Monday, September 16, 2013 11:40 AM  
**To:** Jacobson, Erik B (RegRel); Winn, Valerie J  
**Cc:** Nishenko, Stuart; Klimczak, Richard; Abrahamson, Norman; Post, Jennifer (Law); Strickland, L Jearl  
**Subject:** RE: Act by 9/9, COB: PG&E response to IPRP Report 6

Erik—

*When PG&E submits its final findings on its enhanced imaging (by May of 2014), do you believe we could get the IPRP "decommissioned?"<sup>19</sup>*

And Mr. Klimczak clarified:

**From:** Klimczak, Richard  
**Sent:** Monday, September 16, 2013 11:48 AM  
**To:** Krausse, Mark; Jacobson, Erik B (RegRel); Winn, Valerie J  
**Cc:** Nishenko, Stuart; Abrahamson, Norman; Post, Jennifer (Law); Strickland, L Jearl  
**Subject:** RE: Act by 9/9 COB: PG&E response to IPRP Report 6

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<sup>18</sup> A4NR-0000286, included in this testimony as Attachment L, p. 3.

<sup>19</sup> *Id.*

Mark,

The final report is scheduled for June 2014

Rich<sup>20</sup>

Scrutiny of PG&E's ground motion characterizations provoked controversy earlier in 2013 when A4NR representatives were ejected from the March 19, 2013 SSHAC workshop on the subject, prompting the personal intervention of CPUC President Michael Peevey. As Dr. Norman Abrahamson, PG&E's lead scientist for the SSHAC process, emailed Mr. Klimczak:

*I continue to think that we are doing the wrong thing by excluding the public from listening to the workshop discussions. The reasoning that the technical discussion may be inhibited by the presence of the public is not a real concern. I have been working for years building trust with the public by being straightforward with them and directly answering their questions. Having to ask them to leave the workshop is not helping. It looks like we are hiding something.<sup>21</sup>*

PG&E's ground motion assumptions also attracted the attention of the IPRP, as its chair, Chris Wills, Supervising Engineering Geologist at the California Geological Survey, explained in a May 16, 2013 email to IPRP members (with Mr. Klimczak and CPUC staff Eric Greene copied in):

*As mentioned at previous meetings, CGS has been looking at parameters that are important to ground motion calculations at Diablo Canyon and has focused on site conditions as a very important parameter that was not well documented in the Shoreline fault report. We've asked PG&E to provide additional documentation and have received that, but even with the additional data we believe that PG&E is not considering the range of possible site conditions in their analysis, and that their analysis is only one of several possible methods to consider site conditions in seismic hazard analysis. As a result, it appears that PG&E's seismic hazard analysis gives a relatively narrow range of potential ground motions, within the lower part of the much broader range that we think would capture the uncertainty in site conditions.*

*Please read over the attached draft report that describes all this. Since this is the first report in which we report significant differences with PG&E and are not describing any studies by PG&E to reduce the uncertainty in seismic hazard, I think it would be appropriate to meet with PG&E to discuss this report and see if they object to our conclusions and if they are proposing any*

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<sup>20</sup> *Id.*

<sup>21</sup> A4NR-0000210, included in this testimony as Attachment M.

*additional studies to resolve some of the uncertainties before having a public IPRP meeting to discuss this. How do you all feel about that?*<sup>22</sup>

CPUC staff Eric Greene responded by email (with Mr. Klimczak copied in):

*I concur. We should try to meet with PG&E to [sic] soonest possible to get PG&E's initial feedback and any PG&E input prior to our next IPRP public meeting. To me, it would be better to have a solid meaningful draft report that we could then discuss at a public IPRP meeting. Thank you.*<sup>23</sup>

The IPRP privately met with PG&E on June 6, 2013 and Mr. Wills summarized the following day:

*I think we had a really productive meeting with PG&E yesterday. We went over the draft IPRP report #6, some additional data on site conditions at Diablo Canyon and the various methods for considering site conditions in seismic hazard analysis. Most importantly, we got a much more complete and clear understanding of the method that Norm Abrahamson has devised for considering site conditions in calculating seismic shaking.*

*One of the outcomes of the meeting is that I think we have a good enough understanding of this issue to move forward with a public meeting of the IPRP...*

*At a public meeting, CGS could make a presentation on how site conditions have typically been considered in estimating seismic hazards, and the range of resulting seismic shaking estimates, to show the importance of this topic. PG&E could then present their approach to considering site conditions in seismic hazard analysis and the types of data that could be gathered/ has been gathered to help constrain the uncertainty in seismic hazard analysis due to variability and/or uncertainty in site conditions at Diablo Canyon.*<sup>24</sup>

After the July 11, 2013 public meeting of the IPRP, PG&E Senior Seismologist/Geophysicist

Stuart Nishenko emailed his assessment to Messrs. Summy and Klimczak:

*Jeff –*

*Norm, Valerie and I just got out of the PUC IPRP meeting – which went very well this afternoon.*

*The two IPRP meetings we've had so far on site response (one in March [sic] (panel members only) and today (public) have resulted in a better understanding of our approach and our plans*

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<sup>22</sup> A4NR-0000154, included in this testimony as Attachment N.

<sup>23</sup> *Id.*

<sup>24</sup> A4NR-0000134, included in this testimony as Attachment O.

*to continue to address site response issues at DCP. While the California Geological Survey (CGS, one of the IPRP members) has gotten more comfortable with our approach – the proof as they say ‘is in the pudding’ and they are looking forward to seeing the data we will be using and the results we get before they make any final decisions.*

*Chris Wills (CGS) is still skeptical about the high shear wave speeds (Vs30) we are using based on his experience – but recognizes that we are being proactive and have a plan in place to get more data – both from recorded earthquakes and from the seismic survey work we did at the plant in 2012.*

*The IPRP plans to issue a revised draft report in ~ 1 month on this topic, which we should get the opportunity to review.*

*The next IPRP meeting is tentatively scheduled for this fall (~October), where the topic will be the marine low energy seismic survey results.*

*Stu*<sup>25</sup>

Notwithstanding this “*better understanding*” the August 12, 2013 IPRP Report No. 6 was not favorably received by PG&E, as made clear by the September 16, 2013 emails discussed at pp. 8 – 10 above, and the IPRP has not convened a public meeting since July 11, 2013 despite prior plans to do so quarterly. Notwithstanding the September 16, 2013 emails, PG&E did not actually submit its written response to IPRP Report No. 6 until October 10, 2013. On October 9, 2013 Mr. Klimczak expressed concern with the “*short letter*”<sup>26</sup> drafted by Ms. Winn:

*Privileged and Confidential*

*Stu and Norm,*

*I have edited Valerie’s response letter to the subject IPRP report. I am concerned with the ‘general agreement with respect to the scientific findings and recommendations’ statement. I believe we agreed to the further studies and I am assuming they will address their recommendations, am I correct? If I am correct, do you agree with my edits to the response letter?*<sup>27</sup>

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<sup>25</sup> A4NR-0000104, included in this testimony as Attachment P.

<sup>26</sup> A4NR-0000286, included in this testimony as Attachment L, p. 3.

<sup>27</sup> *Id.*, p. 1.

Mr. Klimczak went on to highlight four recommendations from the paragraphs on pages 20 – 21 of IPRP Report No. 6:

*PG&E should demonstrate that the low site amplification seen at the DCPD site is due to site effects, not specific to the azimuths and distances traveled by the recorded ground motions at the site from the two earthquakes used.*

*PG&E should also justify the adequacy of using only two earthquakes to characterize site amplification, particularly because these two earthquakes cover only a small range of the azimuths that seismic waves can travel toward the DCPD site.*

*Near surface  $V_s$  data at the DCPD site indicate significant variability/uncertainty ( $V_{s30}$  ranging from 696 m/s to 1,646m/s). PG&E should evaluate whether and how this site-specific variability/uncertainty is captured adequately by its approach that quantifies uncertainty in site amplification based on site-to-site uncertainty (not a site specific parameter) in the single station sigma method.*

*PG&E's approach in  $\kappa$  estimation is different from approaches that are commonly applied. Usually,  $\kappa$  is estimated from the Fourier spectra of recorded ground motions or from subsurface material properties. We would appreciate justifications/explanations to the PG&E's approach.<sup>28</sup> [UNDERLINING IN ORIGINAL]*

PG&E's October 10, 2013 written response to IPRP Report No. 6, a letter addressed to CPUC staff Eric Greene, stated "PG&E understands the scientific findings and will conduct the further studies noted on Page 21 of the Report. PG&E would like to clarify the scope of Studies 2 and 3 as follows ..."<sup>29</sup> IPRP Report No. 6 had introduced its description of three studies with the preamble, "In a public meeting held on July 11, 2013, PG&E indicated that they plan to conduct further studies to improve the quantification of site amplification:" and A4NR has used boldfaced type, strikeouts and underlines to show the adjustments PG&E's clarification made to the italicized IPRP language:

**Study 2. PG&E will analyze broad band ground motion data from the region to evaluate the method previously used by PG&E to rule out remove path effects from the two earthquakes used for in the current site-specific amplification terms. Additionally, the ground motions from small earthquakes recorded at the Diablo Canyon Power Plant (e.g., the Deer Canyon earthquake) will also be used to evaluate the site effects. Since data from two earthquakes are not sufficient to demonstrate that the amplification factors include only modifications of the**

<sup>28</sup> *Id.*, p. 2.

<sup>29</sup> A4NR-0000131, included in this testimony as Attachment Q.

~~shaking due to site effects, recorded motion from other earthquakes, particularly~~ **In particular, earthquakes from the south and west, may help rule out would provide different path effects and lead to reduced uncertainty in the resulting average site amplification terms.**

**Study 3. PG&E will evaluate site amplification using analytical approaches, such as those used by the Nuclear Regulatory Commission (NRC) in its independent evaluation, in which seismic waves are propagated through a velocity model. This approach is commonly used at facilities that do not have site-specific recordings from earthquakes. The results from this modeling – based approach will be compared to the site-specific approach data for evaluating the average value and uncertainty in more typical of state-of-the-practice for critical facilities and will provide a comparison to the ground shaking evaluation using the site-specific amplification factors.**

One month earlier, on September 9, 2013, Dr. Abrahamson had reported to Mr. Klimczak a greater affinity with the IPRP-recommended studies: *“The recommended tasks described in the conclusion are reasonable and we plan to address them as part of our own updated site response evaluation.”*<sup>30</sup>

Q: Have the IPRP and PG&E diverged this much in the past?

A: Yes, one need only look to IPRP Report No. 2, issued September 7, 2011, to see a fundamental difference between IPRP and PG&E perspectives on the proper scope of review:

#### ***IPRP Authority and Review Process***

*In 2006, AB 1632 (Blakeslee) was enacted requiring the California Energy Commission (CEC) to conduct a comprehensive study of the seismic vulnerability of Diablo Canyon and directed the CEC to perform subsequent updates in the IEPR as new data or new understanding of potential seismic hazards emerge. In 2008, the CEC published its AB 1632 Report, which recommended that PG&E complete several seismic studies including that PG&E should use three-dimensional geophysical reflection mapping and other advanced techniques to explore fault zones near Diablo Canyon. The California Public Utilities Commission in 2009 and 2010 directed PG&E to complete the advanced seismic studies recommended in the CEC's AB 1632 Report and have an Independent Peer Review Panel review these seismic studies (CPUC letter to PG&E on June 25, 2009 and CPUC Decision 10-08-003).*

*The IPRP expects that:*

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<sup>30</sup> A4NR-0000151, included in this testimony as Attachment R.



- *PG&E will provide its study plans and draft completed study findings to the IPRP for review. These include studies summarized in CPUC Decision 10-08-003 including off-shore, on-shore, and ocean bottom studies, and seismic studies recommended in the AB 1632 Report.*
- *The IPRP, coordinated by the California Geological Survey (CGS), will review and provide comments on PG&E's study plans. The goal will be, if possible, to provide comments within 30 days of receipt.*
- *The IPRP, coordinated by the CGS, will review and provide comments on PG&E's draft completed study findings to the CPUC. The goal will be to provide comments as promptly as possible.*
- *PG&E will review and, if possible, within 30 days incorporate the IPRP's recommendations and comments in PG&E's revised study plans and revised completed study findings and prepare for the IPRP a "Response to Comments" for the IPRP to document scientifically why PG&E accepted or rejected the IPRP's comments.*
- *PG&E and the IPRP will participate in quarterly meetings/briefings to review the status of PG&E's seismic studies, any changes in the study plans, and any preliminary study findings.*
- *PG&E and the IPRP will prepare a master schedule incorporating the major milestones for the IPRP's review process and will include these milestones in PG&E's monthly progress reports and schedule to the NRC and the Atomic Safety and Licensing Board.*
- *The CPUC and CEC will address any major scientific or technical issues that have not been resolved informally between the IPRP and PG&E. CPUC Decision 10-08-003 states that, "Should a dispute arise it should be resolved informally but if that is not attainable the Commission has authority to halt the associated rate recovery." In addition, the CEC may report on any seismic issues and updates through its IEPR process. However, we anticipate that any major scientific or technical issue that may arise can be addressed and resolved informally.*

*The quarterly briefings/meetings mentioned above will allow PG&E to report on its progress and help facilitate a productive informal exchange of scientific viewpoints. The IPRP would like to schedule another briefing in October.<sup>31</sup>*

PG&E did not address these "IPRP Authority and Review Process" comments in its November 22, 2011 written response to IPRP Report No. 2. When IPRP Report No. 3, issued April 6, 2012, included an identical section (replacing the final sentence's reference to "another briefing in October" with "the next briefing in the near future"), PG&E responded as follows:

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<sup>31</sup> IPRP Report No. 2, September 7, 2011, pp. 8 – 9, included in this testimony as Attachment S.

**PG&E Response to Authority and Review Process**

*Decision 10-08-003 explicitly defines the scope and authority of the IPRP. The Commission found:*

*It is reasonable to provide for independent peer review of the study plans and of the findings/results of the seismic studies approved and funded through this decision.*

*Therefore, the Commission will convene its own IPRP to conduct a review and provide written comments on the study plans prior to implementation and to conduct a review and provide written comments on the findings and/or results of the studies.*

*The scope and authority of the IPRP is limited to review and comment on the study plans for the seismic studies approved and funded through this decision prior to implementation of those studies and to review and comment on the findings and/or results of the seismic studies approved and funded through this decision.*

*The Commission ordered:*

*Pacific Gas and Electric Company shall provide the [IPRP] with its seismic study plans prior to implementation of the seismic studies. The [IPRP] shall review and provide Pacific Gas and Electric Company written comments on the study plans within 30 days of receipt.*

*Pacific Gas and Electric Company shall provide the [IPRP] the findings and/or results associated with the seismic studies upon finalizing those findings and/or results. The [IPRP] shall review and provide Pacific Gas and Electric Company written comments on the findings and/or results within 30 days of receipt.*

*The Commission also stated in the decision that PG&E and the IPRP should resolve disputes informally, but if that is not attainable, the Commission has authority to halt the associated rate recovery.*

*PG&E will meet the IPRP requests and expectations that are consistent with the explicit language contained in the Commission's findings, orders and statements establishing the IPRP.<sup>32</sup>*

Q: What is A4NR's ratemaking recommendation in this proceeding?

A: Because of PG&E's refusal to conduct its AB 1632 seismic studies in a manner consistent with D.12-09-008 and D.10-08-003, one-half of the 2013 costs recorded in the Diablo Canyon Seismic Studies Balancing Account should be determined unreasonable and recovery disallowed.

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<sup>32</sup> PG&E Response to IPRP Report No. 3, June 19, 2012, p. 5, included in this testimony as Attachment T.

## APPENDIX: PROFESSIONAL QUALIFICATIONS OF JOHN GEESMAN

John Geesman is an attorney with the Oakland law firm, Dickson Geesman LLP. He was a member of the California Energy Commission from 2002 to 2008, and its Executive Director from 1979 to 1983. Between his two tours at the Commission, Mr. Geesman spent 19 years as an investment banker focused on the US bond markets.

He has previously served as

- Co-Chair of the American Council on Renewable Energy,
- Chairman of the California Power Exchange,
- President of the Board of Directors of TURN,
- a Board Member of the California ISO,
- and Chairman of the California Managed Risk Medical Insurance Board.

He is a graduate of Yale College and the UC Berkeley School of Law.

# **ATTACHMENT A**

**From:** Klimczak, Richard </O=PG&E/OU=CORPORATE/CN=RECIPIENTS/CN=RLK1>  
**Sent:** Monday, January 14, 2013 9:15 AM  
**To:** Nishenko, Stuart <SPN3@pge.com>; Ferre, Kent S <KSF1@pge.com>; McLaren, Marcia K <MKM2@pge.com>; Abrahamson, Norman <NAA2@pge.com>  
**Cc:** thompson@lettisci.com; lettis@lettisci.com  
**Subject:** Fw: SLO Tribune Article/Editorial on Seismic Studies

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FYI. Rich

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Sent using BlackBerry

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**From:** Cuddy, Thomas  
**Sent:** Sunday, January 13, 2013 09:37 AM  
**To:** Halpin, Ed; Allen, Barry; DCPD SLT; DCPD Directors  
**Subject:** RE: SLO Tribune Article/Editorial on Seismic Studies

All;

Please see the note below. Thank you.

**Tom Cuddy**  
**Internal Nuclear Communications**  
**Pacific Gas & Electric Company**  
**O: 805-545-4068**  
**C: 805-440-4655**  
**F: 805-545-3834**

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**From:** Jones, Blair  
**Sent:** Sunday, January 13, 2013 9:34 AM  
**To:** DCPD External Update  
**Subject:** SLO Tribune Article/Editorial on Seismic Studies

All,

As expected, the SLO Tribune this morning ran an article and editorial on the proposed high-energy seismic study.

**Article**

The article ran front page and features a picture of PG&E's Jim Welsch conducting part of a recent tour of the plant for members of the Coastal Commission and the public. The focus of the piece is on how we are evaluating next steps and how to proceed following the Commission's denial of the permit to perform the high-energy survey. Several third parties provide their opinions on the subject, including Supervisor Bruce Gibson, a Seismic Safety Commission member, and a member of the Independent Peer Review Panel. Ed Halpin provides our position, stating how we are continuing to study data from the recently completed advanced studies, and reviewing other existing seismic data, to determine how to move forward and that we are being very thorough in this process. It's a balanced article – here are some noteworthy passages:

- "Gibson and other seismologists familiar with Diablo Canyon agree that mining the existing geologic data is the best course of action in the short term for PG&E. That work could show that the high-energy seismic surveys are not necessary, or reduce their size and duration."
- "The Coastal Commission also investigated using a variety of alternate, less damaging technologies...and found

them lacking.”

- Supporting our point that we have extensively studied the region over the years and that we have a significant amount of seismic data, the article states: “Since the 1970s, 19 seismic surveys have been undertaken around Diablo Canyon,” and that PG&E recently completed onshore and offshore advanced studies, of which “the high-energy surveys were to be one part.”
- Supporting our point on the value of the advanced studies we have completed, the article states, “PG&E has done extensive low-energy offshore seismic surveys that are intended to measure how active the faults offshore the plant have been. It has also done onshore geologic mapping of the Irish Hills around the plant. “There are lots of tools PG&E can use,” said Chris Wills of the IPRP. “Analyzing the slip rate of the offshore faults and the structure of the Irish Hills are the two most important.”
- Demonstrating our commitment to being thorough in our analysis of the data in determining how to proceed, the article quotes Ed Halpin saying, “I haven’t given our seismologists a deadline...I want them to take the time and do the job right.”

The piece also reiterates the NRC’s position that high-energy study is not required for license renewal. The text of the article is below.

### **Editorial**

The editorial is directed at the Coastal Commission and states that the Commission took a narrow view in denying the permit and that aiding sea life should not take priority over seismic safety. The opinion also states that the Commission’s “dismissive, even scornful attitude toward the idea that seismic tests could ever play a role in ensuring the safety of all residents and visitors in San Luis Obispo County (not just marine mammals) is disappointing and discouraging.”

The opinion goes on to reiterate some of the arguments made by the Commission in November when they denied the permit, including the Commissioner’s views that 1) Earthquakes are impossible to predict, 2) the testing isn’t likely to turn up anything new or definitive, and 3) even if testing were to indicate an increased seismic risk, PG&E has already indicated that it wouldn’t do anything different anyway. The editorial states we have denied that we would take no action in the event it was needed.

The opinion adds that the study would help show if the Hosgri and Shoreline faults are connected, that that is useful information, but that given the mindset of the Commission, “That’s data we likely won’t have any time soon.” It concludes with the hope that a future Commission will take a broader view.

Of note, the opinion also includes some of the comments made by Commissioner Martha McClure at the November hearing where she stated that it’s time to close the plant and that the \$64 million for the studies should be spent on solar power development instead.

The editorial has not posted online so a scanned version is attached.

### **Next Steps**

The article and the editorial have been shared with the core team for review to determine any needed follow-ups and/or corrections. In advance of the editorial Jearl Strickland, Tom Jones and Tom Cuddy did a good job in addressing questions from the board on the subject of the high-energy study, and set up the fact that in the absence of such data, the models being developed under the NRC’s Fukushima response could account for the potential of the faults being connected and the possibility of an earthquake on one fault resulting in the continued rupture of a nearby fault. This point did not make it into the editorial and is an item I will be following up on with the board. Looking ahead, as we move forward with evaluating the seismic data we have and finalizing our plan on how to proceed, I will be scheduling as part of our outreach strategy another session(s) with the board for our subject matter experts and leaders to present in detail our path forward.

### **PG&E Still Pondering Next Move on Seismic Surveys**

***Utility will continue studying its existing data while deciding whether to keep pursuing powerful sonic surveys that may be the only way to explore deep faults hidden beneath the ocean floor***

By David Sneed

San Luis Obispo Tribune

January 12, 2013

When the California Coastal Commission denied PG&E's request to do high-energy seismic surveys off of Diablo Canyon nuclear power plant, it left the utility and seismic regulators in a quandary.

It denied seismologists the only effective tool available to explore earthquake faults six to nine miles into the Earth's crust where the quakes occur. The commission ruled that PG&E had not demonstrated that the sonic blasting done in the high-energy surveying was the least environmentally damaging option to assess the earthquake danger facing the nuclear plant.

"It's a conundrum," said county Supervisor Bruce Gibson, who sits on a state panel that oversees the seismic testing. "We want the best science, but the damage to the environment has to be minimized."

Even groups such as the San Luis Obispo Mothers for Peace, which have called for more information about the seismic danger facing the plant, are leery of high-energy surveys.

"Mothers for Peace urges extreme caution in the method used to obtain data about the faults in the 530 square nautical miles of the proposed testing area," the group said in a position statement.

Opposition to the surveys centered on concern that the extremely loud blasts of sound would damage ocean resources, particularly marine mammals. Local fishing and diving activities would also be disrupted.

PG&E officials have not decided whether they will reapply to do high-energy surveys at the end of this year. In the meantime, the utility is busy analyzing a wealth of data it already has about the network of earthquake faults surrounding the plant.

"We are going to have to step back and re-evaluate," said Ed Halpin, PG&E's chief nuclear officer.

"There's a lot of work we can still do evaluating the information we already have."

**Studying data already gathered**

Gibson and other seismologists familiar with Diablo Canyon agree that mining the existing geologic data is the best course of action in the short term for PG&E. That work could show that the high-energy seismic surveys are not necessary, or reduce their size and duration.

"They need to work up everything that is available and decide what they know and what they don't know," Gibson said.

One of the challenges facing PG&E is the fact that high-energy surveys are the only tool available to explore deep beneath the seafloor, experts say. The technology consists of using air guns to send 250-decibel blasts of sound into the seafloor and deploying long streamers of hydrophones to record and analyze the sound that bounces back.

"There isn't anything that can replace the high-energy seismic surveys in the short term," said Peggy Hellweg, a UC Berkeley seismologist who sits on the California Seismic Safety Commission. "PG&E could put additional seismographs on the seafloor, but you have to wait for an earthquake to happen, and then the data they produce is of a lower resolution than you get with high-energy seismic surveys."

The Coastal Commission also investigated using a variety of alternate, less-damaging technologies, such as passive seismic monitoring, electromagnetic surveys and deep-towed acoustic systems, and found them lacking.

“The commission has carried out an additional review of these technologies and also finds that none of them would be feasible alternatives to the proposed use of air guns,” the commission’s official findings concluded.

The Independent Peer Review Panel on which Gibson sits is also reviewing a suggestion by Gibson that an oil industry vessel towing a larger array of hydrophone streamers would be more effective than PG&E’s proposal. PG&E contends that larger streamers are not suitable for the study area, and the panel’s independent review has not been completed.

This leaves seismic experts to mine the seismic data already at hand. Since the 1970s, 19 seismic surveys have been undertaken around Diablo Canyon.

Most recently, PG&E has been spending \$64 million conducting seismic investigations both onshore and offshore of the plant, of which the high-energy surveys were to be one part.

For example, PG&E has done extensive low-energy offshore seismic surveys that are intended to measure how active the faults offshore of the plant have been. It has also done onshore geologic mapping of the Irish Hills around the plant.

“There are lots of tools PG&E can use,” said Chris Wills, a geologist with the California Geologic Survey who sits on the Diablo Canyon Independent Peer Review Panel with Gibson. “Analyzing the slip rate of the offshore faults and the structure of the Irish Hills are the two most important.”

A team of PG&E seismologists is expected to complete that work later this year. Their findings will be a key component in whether PG&E decides to go before the Coastal Commission again later this year.

“I haven’t given our seismologists a deadline,” Halpin said. “I want them to take the time and do the job right.”

### **Key information at a critical time**

The issue of high-energy seismic surveys comes at a crucial time for PG&E. The utility has applied to renew Diablo Canyon’s two reactor operating licenses, which expire in 2024 and 2025, for an additional 20 years.

Because the Central Coast is so seismically active, PG&E is the only nuclear utility in the nation that has a full-time seismic staff. The issue of seismic safety at the plant will be relevant for the foreseeable future because highly radioactive spent fuel will be stored onsite for decades to come, at least, because of the lack of a national nuclear waste storage repository.

The March 2011 Fukushima Dai-ichi nuclear disaster in Japan further focused the nation’s attention on the potential earthquake danger a plant such as Diablo Canyon faces. Although high-energy surveys are not required by the Nuclear Regulatory Commission to renew the licenses, PG&E agreed to put its renewal application on hold while it completes its \$64 million earthquake mapping effort.

The main goal of the high-energy surveys is to determine whether the Hosgri fault and the recently discovered Shoreline fault are connected and could deliver an unexpectedly large earthquake to Diablo Canyon. In August, the three-person Diablo Canyon Independent Safety Committee sent a strongly worded letter to state and local officials describing the need for the high-energy work as urgent.

“If there is a surprise out there, we all want to know about it urgently; and if not — if in fact the new measurements confirm the interim conclusion that the Shoreline fault zone does not pose a seismic safety threat to the DCP plant above that for which DCP has already been designed — then knowing that is very important too,” stated the letter signed by Peter Lam, the safety committee’s chairman.



# **ATTACHMENT B**

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**From:** Summy, Jeff  
**Sent:** Wednesday, February 20, 2013 8:30 PM  
**To:** Klimczak, Richard  
**Subject:** FW: 2/25 IPRP: Info from Eric Green--3D Seismic studies this fall?

Rich,

Are we making a presentation at 2/25 IPRP? If so we will need to preview it and I need to get a copy of what we expect to present to Ed. In general when we are presenting to outside PG&E I need to know that so I can make sure Ed is not surprised.

Please let me know.

Thanks

Jeff S

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**From:** Strickland, L Jearl  
**Sent:** Tuesday, February 12, 2013 3:56 PM  
**To:** Summy, Jeff  
**Subject:** FW: 2/25 IPRP: Info from Eric Green--3D Seismic studies this fall?

Fyi...

We will need to be careful in the 2/25 IPRP meeting. I will talk too Rich about dry-running the presentation prior to the meeting.

---

**From:** Winn, Valerie J  
**Sent:** Tuesday, February 12, 2013 2:29 PM  
**To:** Post, Jennifer (Law)  
**Cc:** Strickland, L Jearl; Nishenko, Stuart; Klimczak, Richard; Krausse, Mark; Vardas, Kris  
**Subject:** RE: 2/25 IPRP: Info from Eric Green--3D Seismic studies this fall?

PRIVILEGED AND CONFIDENTIAL

[REDACTED]

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**From:** Post, Jennifer (Law)  
**Sent:** Tuesday, February 12, 2013 2:27 PM  
**To:** Winn, Valerie J  
**Cc:** Strickland, L Jearl; Nishenko, Stuart; Klimczak, Richard; Krausse, Mark; Vardas, Kris  
**Subject:** Re: 2/25 IPRP: Info from Eric Green--3D Seismic studies this fall?

PRIVILEGED AND CONFIDENTIAL

[REDACTED]

Sent from my iPhone

On Feb 12, 2013, at 2:09 PM, "Winn, Valerie J" <[VJW3@pge.com](mailto:VJW3@pge.com)> wrote:

Talked to Eric Greene this am. Schedule for 2/25 IPRP meeting is:

10am – noon: PG&E  
1pm-3pm: SCE

Eric is looking to us for a 45 minute presentation. Per a discussion with Stu yesterday, I let Eric know that we will be sending the Pt Bouchon report to IPRP via letter this week. We'll touch on that and the status of projects/schedule for the coming year.

Eric indicated that Chris will want to talk about the recent SHAQ meeting and slip rates on the Hosgri fault.

Eric also wants to hear from Mark Johnson re: any insights on denial of permits by the Coastal Commission. Eric indicated that Ed Randolph is prepared to go to the Governor's office but he didn't feel like he had a strong enough case from the IPRP/PG&E to move the CCC. [REDACTED]

[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

Eric thinks we could still do Box 4 in the November/December 2013 timeframe, and could do other 3 zones the following year.

I'll set up a call later this week/next to discuss how we want to approach this. We need to be prepared to finesse this issue at the meeting, given it is not clear to me our outlook.

Thanks.

Valerie Winn  
415.730.7179 (m)  
415.973.3839 (o)

# **ATTACHMENT C**

**From:** Winn, Valerie J </O=PG&E/OU=CORPORATE/CN=RECIPIENTS/CN=VJW3>  
**Sent:** Thursday, February 21, 2013 1:22 PM  
**To:** Strickland, L Jearl <LJS2@pge.com>; Klimczak, Richard <RLK1@pge.com>; Nishenko, Stuart <SPN3@pge.com>; Post, Jennifer (Law) <JLKM@pge.com>; Vardas, Kris <KAV6@pge.com>; Krausse, Mark <MCKd@pge.com>; Plummer, Matthew <M3Pu@pge.com>  
**Subject:** DCP/PRP: February 25 Meetings of the IPRP and IPRG, background reading  
**Attach:** Hosgri Fault Slip Rate Review DRAFT.docx

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FYI. Sorry for duplication.

Stu, Rich, please advise on how you feel about this "would like our discussion to lead up to discussions with PG&E about what they are currently doing to better constrain this important parameter in the seismic hazard calculations, and discussions of what further investigations could achieve."

As a reminder of our discussion last week, we are prepared to talk about the Pt Buchon report (IPRP members should be receiving today) and study results, and provide the calendar of when technical reports will be ready (e.g., the ASLB schedule).

On the IPRP question of going back to the CCC for permits, our question is really what insights do the IPRP have that would lead us to believe the Coastal Commission would react differently if we went back. Any other questions on 3D HESS, our response is that "we have not made a decision as a company on whether we are going to pursue 3D HE work. We will let you know when we make that decision." We are pleased with the results from the surveys currently underway. Want to see more processing of data we have been able to collect, then go through what we have found and decide if we have enough information.

Thanks! Let me know if you have any questions.

Valerie  
415.973.3839

---

**From:** Wills, Chris@DOC [mailto:Chris.Wills@conservation.ca.gov]  
**Sent:** Thursday, February 21, 2013 7:37 AM  
**To:** Greene, Eric; Walter, Joan@Energy; Weaver, Casey@Energy; Seitz, Gordon@DOC; Fenton, Johanna@CalEMA; Johnsson, Mark@Coastal; 'Dick McCarthy'; 'Bob Anderson'; bgibson@co.slo.ca.us  
**Cc:** Winn, Valerie J; Nishenko, Stuart; 'Caroline.Mcandrews@sce.com'; Strickland, L Jearl; Krausse, Mark  
**Subject:** RE: February 25 Meetings of the IPRP and IPRG, background reading

Hi all

I'd like a significant part of our discussion next Monday to be on the Hosgri fault, and how well we know the slip rate on that fault. I've asked Gordon Seitz of CGS to put together a summary of what we know about that from previous investigations, and would like our discussion to lead up to discussions with PG&E about what they are currently doing to better constrain this important parameter in the seismic hazard calculations, and discussions of what further investigations could achieve.

I think it would be helpful if members of the IPRP read the attached summary before Monday's meeting, so that our discussions can move along efficiently and focus on recommendations to PG&E on the types of investigations that the IPRP recommends to constrain the range of possible values of slip rate on the Hosgri fault.

Chris

Chris Wills  
Supervising Engineering Geologist  
California Geological Survey  
801 K St. MS 12-32  
Sacramento, CA 95814-3531

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**From:** Greene, Eric [<mailto:eric.greene@cpuc.ca.gov>]  
**Sent:** Thursday, February 14, 2013 2:48 PM  
**To:** Walter, Joan@Energy; Weaver, Casey@Energy; Wills, Chris@DOC; Seitz, Gordon@DOC; Fenton, Johanna@CalEMA; Johnson, Mark@Coastal; 'Dick McCarthy'; 'Bob Anderson'; [bgibson@co.slo.ca.us](mailto:bgibson@co.slo.ca.us)  
**Cc:** 'Winn, Valerie J'; Nishenko, Stuart; 'Caroline.Mcandrews@sce.com'; Strickland, L Jearl; 'Krausse, Mark'  
**Subject:** February 25 Meetings of the IPRP and IPRG

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**From:** Lafrenz, Donald J.  
**Sent:** Thursday, February 14, 2013 1:39 PM  
**To:** [matthew@turn.org](mailto:matthew@turn.org); [walker.matthews@sce.com](mailto:walker.matthews@sce.com); [APak@SempraUtilities.com](mailto:APak@SempraUtilities.com); [rochelle@a4nr.org](mailto:rochelle@a4nr.org); [tmcnulty@co.slo.ca.us](mailto:tmcnulty@co.slo.ca.us); Rashid, Rashid A.; [jilm@pge.com](mailto:jilm@pge.com); [John@DicksonGeesman.com](mailto:John@DicksonGeesman.com); [ReqRelCPUCcases@pge.com](mailto:ReqRelCPUCcases@pge.com); [mrw@mrwassoc.com](mailto:mrw@mrwassoc.com); [angelica.morales@sce.com](mailto:angelica.morales@sce.com); [case.admin@sce.com](mailto:case.admin@sce.com); [douglas.porter@sce.com](mailto:douglas.porter@sce.com); [CentralFiles@SempraUtilities.com](mailto:CentralFiles@SempraUtilities.com); [WKeilani@SempraUtilities.com](mailto:WKeilani@SempraUtilities.com); [LWrazen@SempraUtilities.com](mailto:LWrazen@SempraUtilities.com); [JCDt@pge.com](mailto:JCDt@pge.com); [BWT4@pge.com](mailto:BWT4@pge.com); [ReqRelCpucCases@pge.com](mailto:ReqRelCpucCases@pge.com); [WAG9@pge.com](mailto:WAG9@pge.com); [jsqueri@goodinmacbride.com](mailto:jsqueri@goodinmacbride.com); [cem@newsdata.com](mailto:cem@newsdata.com); Greene, Eric; Reiger, J. Jason; Peleo, Marion; Barnett, Robert A.; Logan, Scott; Khosrowjah, Sepideh; Burns, Truman L.; [gloria.ing@sce.com](mailto:gloria.ing@sce.com); [APak@SempraUtilities.com](mailto:APak@SempraUtilities.com); [rochelle@a4nr.org](mailto:rochelle@a4nr.org); Rashid, Rashid A.; [mrw@mrwassoc.com](mailto:mrw@mrwassoc.com); [case.admin@sce.com](mailto:case.admin@sce.com); [walker.matthews@sce.com](mailto:walker.matthews@sce.com); [patricia.borchmann@yahoo.com](mailto:patricia.borchmann@yahoo.com); [CentralFiles@SempraUtilities.com](mailto:CentralFiles@SempraUtilities.com); [WKeilani@SempraUtilities.com](mailto:WKeilani@SempraUtilities.com); [LWrazen@SempraUtilities.com](mailto:LWrazen@SempraUtilities.com); [Sxpg@pge.com](mailto:Sxpg@pge.com); [cem@newsdata.com](mailto:cem@newsdata.com); [ssmyers@att.net](mailto:ssmyers@att.net); [regrelcpucases@pge.com](mailto:regrelcpucases@pge.com); Greene, Eric; Barnett, Robert A.; Pocta, Robert M.; Logan, Scott; Khosrowjah, Sepideh; Burns, Truman L.  
**Cc:** Greene, Eric; Randolph, Edward F.; Kahlon, Gurbux; Walker, Cynthia  
**Subject:** February 25 Meetings of the IPRP and IPRG

Parties in A.10-01-014 and A.11-04-006:

For your information, on Monday February 25 the Independent Peer Review Panel on seismic studies at Diablo Canyon, and the Independent Peer Review Group on seismic studies at San Onofre will hold public meetings at the Commission. Below are the meeting notices that appear in the Commission's Daily Calendar.

-Don Lafrenz, CPUC, Energy Division, 415-703-1063

***Public Meeting Notice: Independent Peer Review Panel for Seismic Studies at the Diablo Canyon Power Plant***

February 25, 2013  
10 am – 12 pm

California Public Utilities Commission  
505 Van Ness Avenue, Commission Auditorium  
San Francisco

**Call in number:** 1-866-812-8481, **Code:** 9058288#

The Independent Peer Review Panel (IPRP) reviews the plans and findings of seismic studies that Pacific Gas and Electric

Company will conduct at the Diablo Canyon Power Plant pursuant to Commission Decisions D.10-08-003 and D.12-09-008. The purpose of this meeting is to discuss the status of PG&E's seismic research projects, the plan for future projects, and the timing of future public meetings of the IPRP.

Information on PG&E's proposed seismic research projects can be found at:

<http://www.cpuc.ca.gov/PUC/energy/nuclear.htm>

For information please contact Eric Greene (415-703-5560; [eg1@cpuc.ca.gov](mailto:eg1@cpuc.ca.gov)).

***Public Meeting Notice: Independent Peer Review Group for Seismic Studies at the San Onofre Nuclear Generating Station***

*February 25, 2013*

*1 pm – 3 pm*

*California Public Utilities Commission*

*505 Van Ness Avenue, Commission Auditorium*

***San Francisco***

***Call in number: 1-866-812-8481, Code: 9058288#***

The Independent Peer Review Group (IPRG) reviews the plans and findings of seismic studies that Southern California Edison Company will conduct at the San Onofre Nuclear Generating Station (SONGS) pursuant to Commission Decision 12-05-004. The purpose of this meeting is to discuss the status of SCE's seismic research projects, the plan for future projects, and the timing of future public meetings of the IPRG.

Information on SCE's proposed seismic research projects, and the IPRG's report can be found at:

<http://www.cpuc.ca.gov/PUC/energy/nuclear.htm>

For information please contact Eric Greene ([eg1@cpuc.ca.gov](mailto:eg1@cpuc.ca.gov); 415-703-5560).

# **ATTACHMENT D**



**From:** Nishenko, Stuart </O=PG&E/OU=CORPORATE/CN=RECIPIENTS/CN=SPN3>  
**Sent:** Tuesday, February 26, 2013 10:46 AM  
**To:** Summy, Jeff <J51D@pge.com>  
**Cc:** Klimczak, Richard <RLK1@pge.com>  
**Subject:** Re: IPRP presentation

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Hi Jeff

The meeting went well yesterday, no major surprises. The IPRP avoided making any demands we do high energy, instead they characterized it as the "last tool" in the box to be used when we have exhausted all other options. So I think we'll be able to avoid the issue as we'll consider linking the Hosgri and Shoreline as a "worst case scenario" in the SSHAC.

Meanwhile time shares was the theme in Mexico - everyone was trying to sell us one. Did you get one on your trip? Other than that we had a relaxing time, saw a lot of whales and enjoyed the warm weather.

Stu

Sent from my iPhone

On Feb 24, 2013, at 9:46 AM, "Summy, Jeff" <[J51D@pge.com](mailto:J51D@pge.com)> wrote:

Stu,

Thanks! It looks like this is just a status update on our seismic study work. Is that true? I'll be interested to hear if there is any feedback on your presentation. I appreciate your support in this effort.

Jeff S

PS How was Puerto Vallarta?

---

**From:** Nishenko, Stuart  
**Sent:** Friday, February 22, 2013 2:47 PM  
**To:** Klimczak, Richard; Post, Jennifer (Law); Winn, Valerie J; Strickland, L Jearl; Summy, Jeff  
**Subject:** IPRP presentation

All –

Attached is the PowerPoint presentation for the PUC IPRP meeting on Monday Feb 25. This has benefitted from a thorough review by Rich, Jennifer and Valerie this afternoon. If you have any questions, feel free to contact Rich or myself.

**Stu Nishenko**  
Senior Seismologist / Geophysicist  
Pacific Gas and Electric  
245 Market Street  
San Francisco, CA 94105  
office: 415.973.1213  
cell: 415.816.0005  
[spn3@pge.com](mailto:spn3@pge.com)

# **ATTACHMENT E**

**From:** Winn, Valerie J </O=PG&E/OU=CORPORATE/CN=RECIPIENTS/CN=VJW3>  
**Sent:** Tuesday, February 26, 2013 9:03 PM  
**To:** Strickland, L Jearl <LJS2@pge.com>; Nishenko, Stuart <SPN3@pge.com>; Klimczak, Richard <RLK1@pge.com>; Krausse, Mark <MCKd@pge.com>; Vardas, Kris <KAV6@pge.com>; Post, Jennifer (Law) <JLKm@pge.com>; Plummer, Matthew <M3Pu@pge.com>  
**Subject:** DCP/PRP: Takeaways from 2/25 IPRP Meeting

---

All,

Here are my key notes from yesterday's IPRP meeting. If you have any additions/follow-up items, please reply to all so we can stay on the same page.

**IPRP attendees:** Chris Wills, Bruce Gibson, Joan Walter, Casey Weaver, Eric Greene, Ed Randolph (CPUC Energy Div Director), Richard McCarthy. Mark Johnsson from Coastal Commission was absent.

**Other parties represented:**

PG&E; Alliance for Nuclear Responsibility (John Geesman); Ecological Options Network (videotaped both PG&E's and SCE's IPR meetings); Californians Opposing Acoustic Seismic Testing (COAST); Lettis Consultants; Fugro; KGO Radio

**Topic:**

**3D High Energy Surveys:**

- Chris Wills noted that since the last IPRP meeting, the Coastal Commission had denied PG&E's application for 3D high energy seismic studies (HESS). CCC indicated that PG&E had not shown that HESS was worth the impact and that 3D HESS was completely out of the question unless we have an extremely clear purpose and know how it impact the seismic hazard. He wanted to verify that others were on the same page and indicated that we should table any discussion on 3D HESS until it was the last tool in the tool kit.
- Eric Greene noted that he had hoped we'd get some guidance from the CCC on the topic, and he would like to discuss off-line. Still an issue that needs to be pursued among IPRP. Eric noted that HESS could only be done in winter months. If permits granted, wouldn't be able to do until Nov/Dec 2013.
- Bruce Gibson agreed with Chris that last thing in the tool box. He did not hear what was intended to be resolved that other studies could not address
- Chris recognized the logistical challenges noted by Eric and that it would take a while to arrange any future surveys. However that discussion about whether the surveys would be done would be well into the future, if they were ever needed.
- Ed Randolph asked what IPRP views were on value of the marginal data they would get from the 3D HESS versus harm to marine mammals. Are there other approaches?
- Chris indicated that it would have been helpful to inform the range of parameters for the seismic hazard analysis and that the Hosgri slip rate was an important parameter. If the low energy surveys were not conclusive, HESS would have some value, but we don't know if you would get to the point where information from the HESS would put you close to the design basis of the plant. Will be better able to evaluate once we see other survey results.
- Chris noted other studies need to be done on ground motion calculations.
- Bruce asked about conclusions of Hosgri dying out – energy has to go somewhere – where is it going?
- Ed Randolph reiterated that CPUC will be seeking feedback of IPRP – no decision one way or another on what CPUC will want PG&E to do going forward.

**Data:**

- Bruce Gibson asked about Stu's first slide and whether some parts of the chart were suppressed. Stu noted we were trying to differentiate the areas with better data interpretability. Stu indicated we can have a conversation with him on interpretations when data are available.
- John Geesman asked when the data set would be made publicly available – he indicated PG&E had stated previously

that they would make the raw data available for the scientific community. Rich indicated that PG&E is working on it and expected to have it posted within a month – we are working to debug this now.

**Other:**

- IPRP members did a good job reminding the public of IPRP’s role in advising on technical issues. They are not the ones balancing multiple interests like marine mammal impact and public safety.
- Mandy Davis (COAST) asked about 2D LE impacts on marine life – what was source noise level. While rebuffed by IPRP as outside of their area, she added that State Lands Commission is revamping its permitting process because of biological impacts.
- JA Savage (CA Currents) asked about whether it was clear we would not be pursuing “sonic blast” – Chris Wills indicated that it was pretty clear CCC doesn’t want to hear back from us unless it is the last tool in the kit.
- SCE IPRP – SCE provided updates on multiple surveys/projects they have underway. They noted their 2D deep marine survey was not completed in 2012 – application was withdrawn and they are working to align survey resources and to address potential permitting technical questions. They noted the Coastal consistency review will not be this year. 3D studies would follow 2D studies, if warranted. They noted their paleo seismic trenching report was issued in January 2013; 2d and 3D shallow marine seismic reflection surveys will be issued in August 2013 and October 2013 respectively. SCE was also asked why they didn’t have the same public SHHAC process as PG&E – SCE noted that they are following the NRC process, which allows for a series of technical experts to have a dialogue outside of the public. Want that environment for them to discuss openly without things being taken out of context.

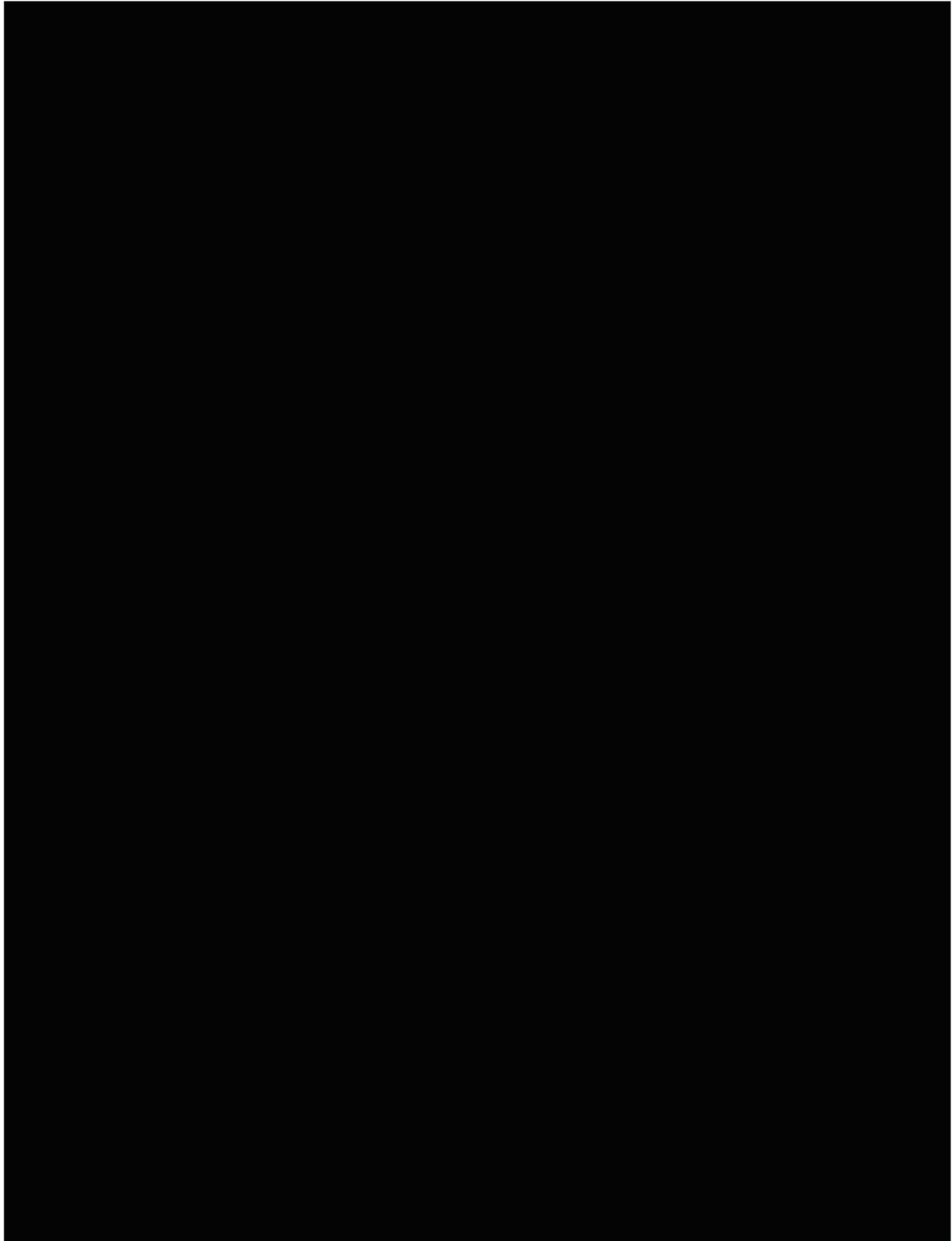
**Next Steps:**

- IPRP likely to set up quarterly public meetings. No word yet on the dates though.

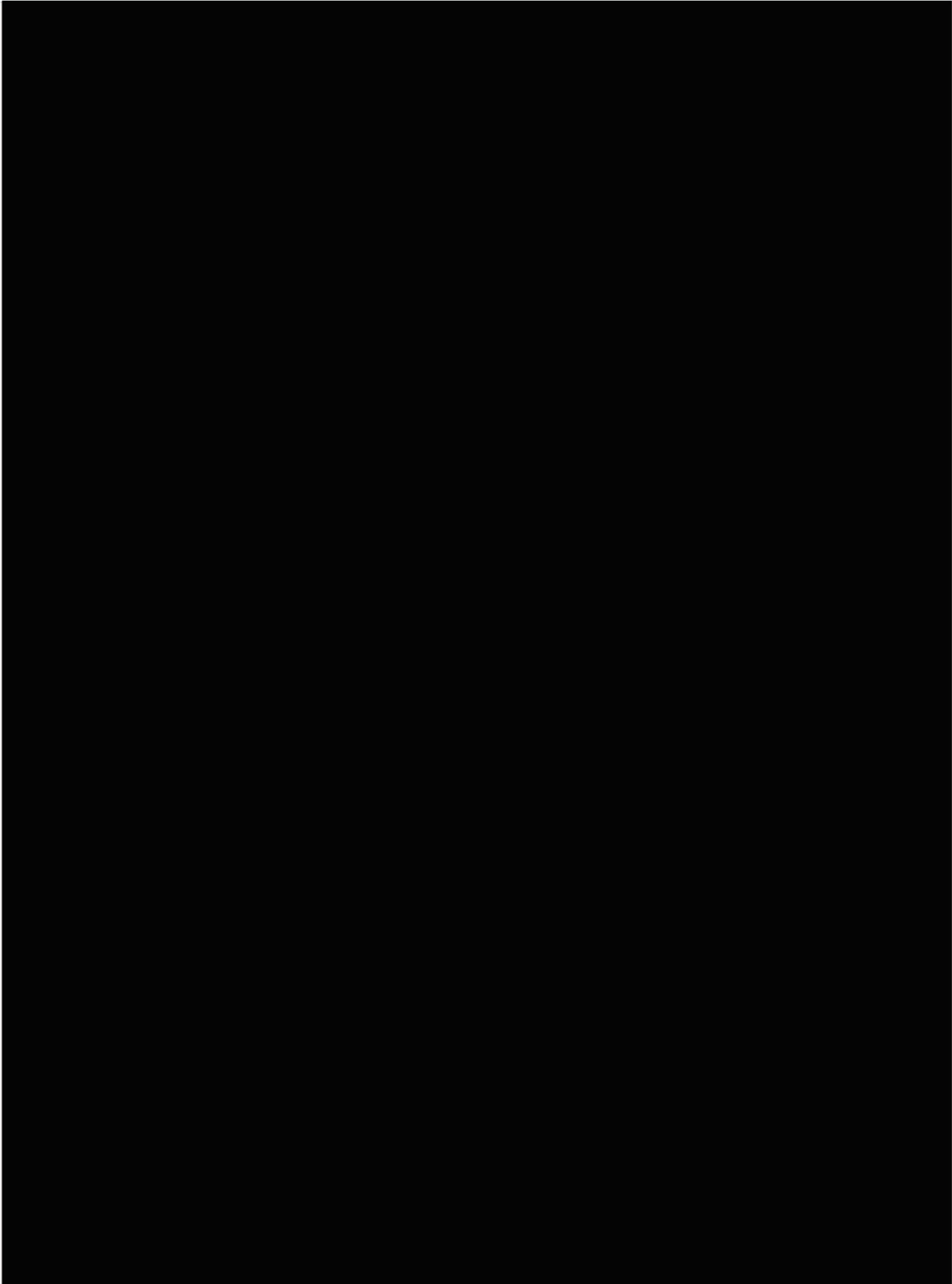
Valerie Winn  
Manager, State Agency Relations  
Pacific Gas and Electric Company  
415.973.3839 (o)  
415.730.7179 (m)

# **ATTACHMENT F**

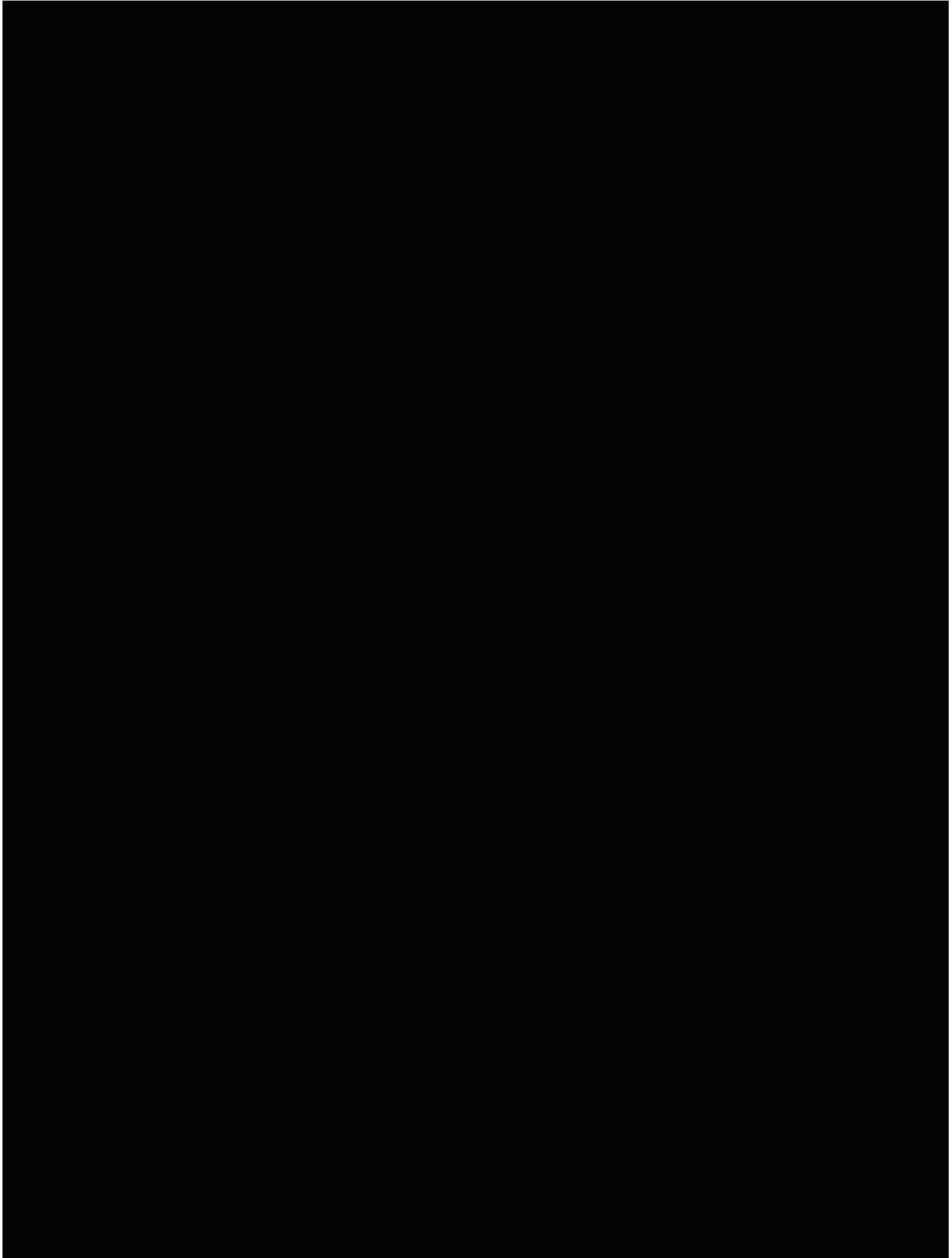
Redacted by A4NR Pursuant to NDA with PG&E



Redacted by A4NR Pursuant to NDA with PG&E



Redacted by A4NR Pursuant to NDA with PG&E





# **ATTACHMENT G**

**From:** Nishenko, Stuart </O=PG&E/OU=CORPORATE/CN=RECIPIENTS/CN=SPN3>  
**Sent:** Monday, April 1, 2013 1:59 PM  
**To:** Post, Jennifer (Law) <JLKm@pge.com>; Strickland, L Jearl <LJS2@pge.com>;  
Summy, Jeff <J51D@pge.com>; Winn, Valerie J <VJW3@pge.com>  
**Cc:** Klimczak, Richard <RLK1@pge.com>; abrahamson@berkeley.edu; Abrahamson,  
Norman <NAA2@pge.com>  
**Subject:** 3\_29 IPRP Presentation FOR YOUR REVIEW  
**Attach:** IPRP\_3\_29\_2013(a).ppt

---

All –

Attached for your review is the revised PowerPoint presentation from last Fridays meeting with the IPRP. The 4 hour meeting went well, and we are coming to consensus about a] the results of the Pt. Buchon study and 2] the value of low energy 3D vs. high energy 3D mapping – with the IPRP leaning towards low energy providing a greater reduction in overall uncertainty w/r hazard – by addressing fault slip rates.

The IPRP posed 17 questions to us about the Pt. Buchon report – and Fridays informational meeting gave us the opportunity to discuss both background and responses in more detail  
There is still a need to resolve the HESS questions once and for all – though it looks like any final agreement will have to wait until the Technical Reports from both the onshore and offshore studies are released and evaluated.

Eric Green is anxious to post this presentation on the PUC website – so I encourage a rapid turnaround on your reviews.

With regards to IPRP Report #5, the two major comments were 1] the use of *robust* (page 11 para 2) *Further analysis based on a new (2012) focused USGS-multibeam bathymetric survey and age estimates based on paleo sea level should lead to a robust slip rate estimate* and  
2] the need to reference the 3D studies PG&E has conducted on the Hosgri fault in 2012 (in addition to the 2D studies described on page 12).

**Stu Nishenko**  
Senior Seismologist / Geophysicist  
Pacific Gas and Electric  
245 Market Street  
San Francisco, CA 94105  
office: 415.973.1213  
cell: 415.816.0005  
spn3@pge.com

# **ATTACHMENT H**

## Request for Data related to California's Nuclear Power Plants

### Progress in Completing 2011 IEPR Recommendations

#### A- Seismic Issues

1. *Please provide an update on the progress in completing the AB1632 report recommended studies, including technical details and any significant updates of seismic hazard study plans completed, in progress or proposed since 2011 (as recommended in the 2008 IEPR Update) and associated findings as applicable.*

The CEC AB1632 Report – *An Assessment of California's Nuclear Power Plants*, recommended that PG&E 1] Continue ongoing efforts to understand seismic hazards affecting the Diablo Canyon site through its Long Term Seismic Program

- PG&E's continuing DCPD Long Term Seismic Program efforts are described in the response to Question 2A- Seismic Hazards at Diablo Canyon.
- 2] Use three-dimensional geophysical seismic reflection mapping and other advanced techniques to explore fault zones near Diablo Canyon.
- On January 5, 2010 PG&E filed A.10-01-014 with the CPUC for cost recovery of \$16.73 million associated with the enhanced seismic studies recommended by the CEC AB1632 Report. The CPUC adopted Decision D.10-08-003 to perform these additional seismic studies on August 12, 2010.
  - On September 23, 2011, PG&E filed a Motion to re-open A.10-01-014 to request additional funding for increased costs of the enhanced seismic studies at DCPD. On September 13, 2012 the CPUC issued Decision D.12-09-008 authorizing PG&E to recover in rates an additional \$47.5 million above the \$16.73 million already approved in D.10-08-003 for a total of \$64.25 million.
  - Plans to conduct these studies were presented to, and reviewed by, the IPRP in 2010, 2011, and 2012 (see IPRP Reports provided in response to Seismic Issues, Question 2.)

These studies included

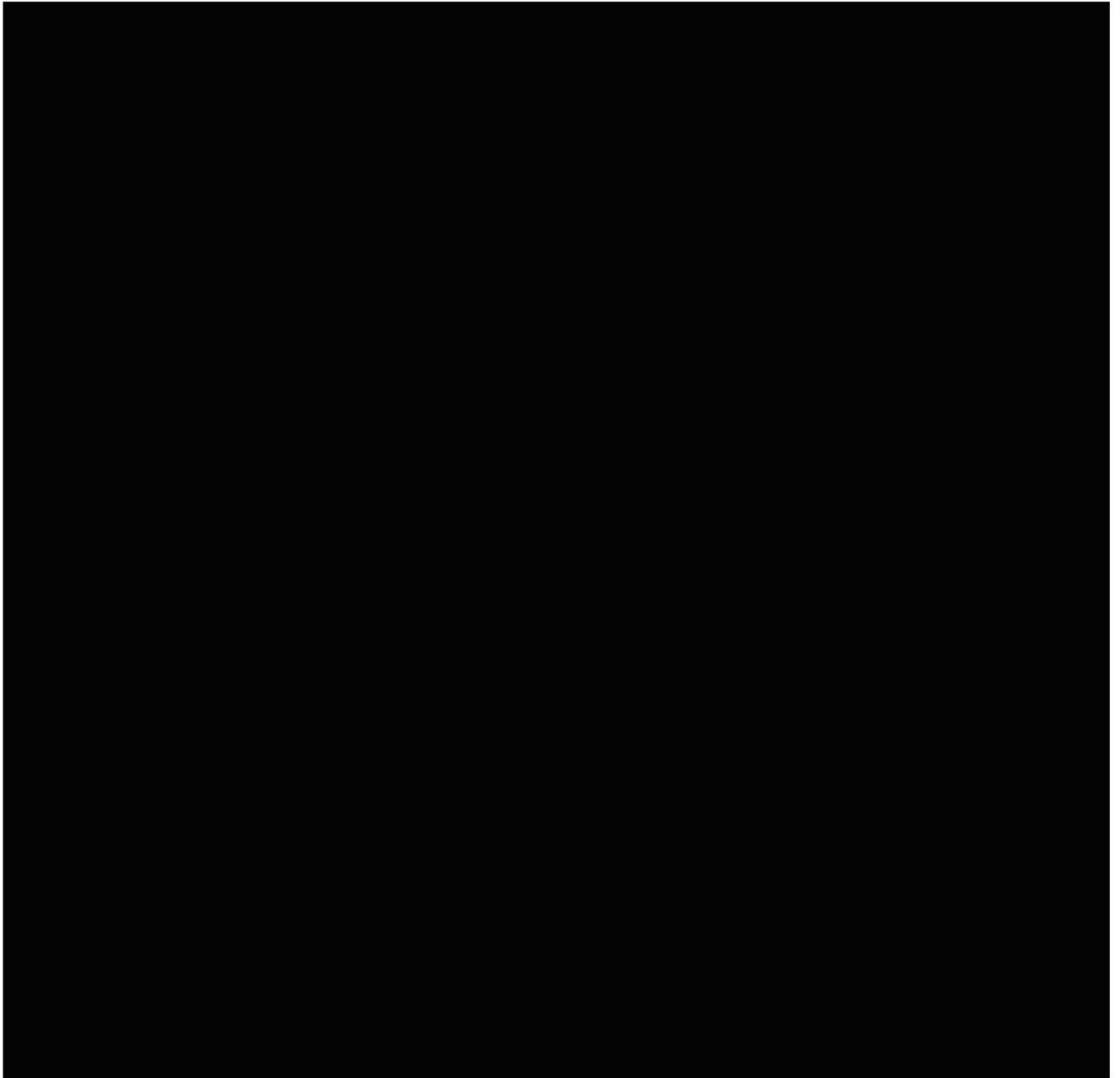
- High-resolution low energy 2D and 3D marine seismic reflection surveys of the northern and southern ends of the Shoreline fault zone (conducted in 2010, 2011 and 2011, 2012, respectively) and the Hosgri Fault Zone in 2012. Objectives of these surveys were to
  - determine the nature of the structural linkage between the Shoreline and Hosgri faults offshore Point Buchon,
  - determine the southern extent of the Shoreline fault zone in San Luis Bay, and

- investigate possible piercing points (intersections of paleo-stream channels with fault zones) along the Shoreline and Hosgri faults in order to document slip rates (i.e., rates of fault displacement) for use in seismic hazard studies.
- A Technical Report describing the 2010/2011 2D/3D Survey of the northern segment of the Shoreline Fault was released in 2012 (*DCPP 3D/2D Seismic-Reflection Investigation of Structures Associated with the Northern Shoreline Seismicity Sublineament of the Point Buchon Region*, PG&E GEO.DCPP.TR.12.01 R0 -see [Appendix XX](#)) and was transmitted to the PUC IPRP as well as the PG&E SSHAC study to support ongoing seismic hazard assessment activities at DCPP.
- Technical reports describing the 2011 and 2012 surveys of the southern segment of the Shoreline fault zone and Hosgri fault zone will be issued in the 4<sup>th</sup> quarter of 2013. This information will also be transmitted to the PUC IPRP as well as the PG&E SSHAC study to support ongoing seismic hazard assessment activities at DCPP.
- High-resolution shallow- and deep-penetrating 2D and 3D land seismic surveys were conducted in and around the Irish Hills and DCPP plant area in 2011 and 2012. Objectives of these surveys were to
  - Determine the geometry of onshore faults recognized in the 2011 NRC *Report on the Analysis of the Shoreline Fault Zone, Central Coastal California* (PG&E, 2011- NRC Docket No. 50-275 and 50-323; DCL-11-005 - see [Appendix YY](#)) as having the most importance to the DCPP – the Los Osos and San Luis Bay Fault Zones.
  - Conduct high resolution seismic studies in and around the DCPP site
  - Data from these land surveys are currently being processed and interpreted and are scheduled to be issued as a Technical report during the 2<sup>nd</sup> quarter of 2014. This information will also be transmitted to the PG&E SSHAC study to support ongoing seismic hazard assessment activities at DCPP.
- In 2012, PG&E applied for the necessary state and federal permits to conduct high-energy 3D seismic studies offshore DCPP. PG&E received a Geophysical Survey Permit from the CA State Lands Commission in August 2012, but was denied a Coastal Development Permit by the CA Coastal Commission in November, 2012. As a result, no high-energy marine seismic surveys have been conducted. Final decision whether PG&E ~~needs to, in fact, conduct~~ high-energy 3D marine seismic surveys is pending review of existing data, ~~and consultation with the IPRP.~~
- PG&E has applied for and received the necessary state and federal permits to deploy and operate a network of four (4) Ocean Bottom Seismometers offshore Point Buchon, near the proposed northern Shoreline/ Hosgri fault intersection. The objective of the OBS network is to improve the detection capability and location accuracy of earthquakes in this region.

- OBS instruments are schedule to be deployed during the 3<sup>rd</sup> quarter of 2013.

# **ATTACHMENT I**

Redacted by A4NR Pursuant to NDA with PG&E





# **ATTACHMENT J**

PG&E Data Request No.:	A4NR_001-01		
PG&E File Name:	ERRA-2013-PGE-Compliance_DR_A4NR_001-Q01		
Request Date:	April 21, 2014	Requester DR No.:	001
Date Sent:	May 5, 2014	Requesting Party:	Alliance for Nuclear Responsibility
PG&E Witness:	Stu Nishenko	Requester:	John Geesman

**QUESTION 1**

Has PG&E decided that it will not perform high-energy seismic surveys offshore Diablo Canyon?

**ANSWER 1**

No. PG&E is still finalizing the results of the seismic studies that were performed and has not made a determination whether additional advanced seismic studies are necessary.

# **ATTACHMENT K**

**Official Transcript of Proceedings**  
**NUCLEAR REGULATORY COMMISSION**

Title: Diablo Canyon Nuclear Power Plant  
Units 1 and 2: Pre-Hearing Conference

Docket Number: 50-275-LR and 50-323-LR

ALSBP Number: 10-900-01-LR-BD01

Location: teleconference

Date: Wednesday, March 19, 2014

Work Order No.: NRC-664

Pages 630-659

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1 JUDGE KARLIN: Okay.

2 JUDGE ABRAMSON: This is Judge Abramson.  
3 Did either of these California agencies that are  
4 saying they'd like you guys to do this study have  
5 anything to say about the Coastal Commission saying  
6 now we can't do it?

7 MS. POST: Well, the Coastal Commission  
8 rejected the permit for just one piece of the seismic  
9 study. They actually -- we actually were able to  
10 undertake a bunch of studies that we did get  
11 permitted. The Coastal Commission declined our permit  
12 to do offshore three-dimensional seismic studies, but  
13 the recommendation from the California Energy  
14 Commission was that we perform studies using advanced  
15 technologies, including three-dimensional seismic  
16 mapping. And we actually did do onshore three-  
17 dimensional seismic studies, and we also did two-  
18 dimensional seismic studies, so they have not weighed  
19 in on the Coastal Commission's denial of our permit  
20 for the offshore 3D studies. They also have not yet  
21 weighed in on whether or not they might suggest  
22 additional studies be done.

23 JUDGE ABRAMSON: So, you were only  
24 partially foiled by one California agency.

25 MS. POST: Yes, only partially foiled, but

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1 not really. Actually, we weren't ultimately foiled  
2 because the data we were able to collect is  
3 sufficient, at least under our preliminary analysis it  
4 looks like we were -- the data we were able to collect  
5 using the studies that we were able to get permitted  
6 is sufficient.

7 JUDGE KARLIN: I suspect that will be an  
8 issue that might be, you know -- there might be an  
9 issue on that, but certainly we understand that that's  
10 the position of PG&E.

11 JUDGE ABRAMSON: This reminds me of a  
12 situation we all face where there was a law passed  
13 that said you have to have a permanent geologic  
14 repository for spent fuel. And the site chosen was  
15 neither permanent nor geologic.

16 (Laughter.)

17 JUDGE KARLIN: Yes, exactly. Thank you.

18 I think on that note, we will adjourn, and  
19 I'll look forward -- we will be issuing an order, and  
20 we'll probably have another pre-hearing conference  
21 call sometimes after the DEIS is issued. So, I  
22 appreciate your attention and participation, and we  
23 will adjourn the meeting at this point. Thank you.

24 (Whereupon, the proceedings went off the  
25 record at 2:16 p.m.)

# **ATTACHMENT L**

---

**From:** norman abrahamson <abrahamson@berkeley.edu>  
**Sent:** Thursday, October 10, 2013 6:45 AM  
**To:** Klimczak, Richard  
**Subject:** Re: Act by 10/10, noon: PG&E response to IRPR Report 6

Rich:

There is one additional key issue here. We have not just taken the average from the two elk and assumed that the site amplification is fully constrained. We are including the effects of the uncertainty in the site amplification. The new studies are intended to check that the uncertainty in the site response is captured.

Overall, I agree with your revisions.

Here are my edits to our tasks:

2. PG&E will analyze broad band ground motion data from the region to evaluate the method previously used by PG&E to remove path effects from the two earthquakes used for site amplification. Additionally, the ground motions from small earthquake recorded at DCPD (such as the Deer Canyon earthquake) will also be used to evaluate the site effects. In particular, earthquakes from the south and west would provide different paths effects and lead to reduced uncertainty in the resulting average site amplification terms.

3. PG&E will evaluate site amplification using analytical approaches, such as used by the NRC in their independent evaluation, in which seismic waves are propagated through a velocity model. This approach is commonly used at facilities that do not have site-specific recordings from earthquakes. The results from this modeling based approach will be compared to the site-specific approach data approach for evaluating the average value and uncertainty in the amplification factors.

Norm

On Oct 9, 2013, at 11:15 AM, Klimczak, Richard wrote:

Privileged and Confidential

Stu and Norm,

I have edited Valerie's response letter to the subject IPRP report. I am concerned with the "general agreement with respect to the scientific findings and recommendations" statement. I believe we agreed to the further studies and I am assuming they will address their recommendations, am I correct? If I am correct, do you agree with my edits to the response letter?

The recommendations I see from the report are:



PG&E should demonstrate that the low site amplification seen at the DCPD site is due to site effects, not specific to the azimuths and distances traveled by the recorded ground motions at the site from the two earthquakes used.

PG&E should also justify the adequacy of using only two earthquakes to characterize site amplification, particularly because these two earthquakes cover only a small range of the azimuths that seismic waves can travel toward the DCPD site.

Near surface  $V_s$  data at the DCPD site indicate significant variability/uncertainty ( $V_{s30}$  ranging from 696 m/s to 1,646 m/s). PG&E should evaluate whether and how this site specific variability/uncertainty is captured adequately by its approach that quantifies uncertainty in site amplification based on site-to-site uncertainty (not a site specific parameter) in the single station sigma method.

PG&E's approach in  $\kappa$  estimation is different from approaches that are commonly applied. Usually,  $\kappa$  is estimated from the Fourier spectra of recorded ground motions or from subsurface material properties. We would appreciate justifications/explanations to the PG&E's approach.

The studies we agreed to are items 1-3 below:

In a public meeting held on July 11, 2013, PG&E indicated that they plan to conduct further studies to improve the quantification of site amplification:

1. PG&E will use new data from recently completed on-land exploration geophysics surveys to develop a new model of  $V_s$  beneath the plant site. Initial results of surveys presented by PG&E from one profile suggest that this analysis will result in a well-constrained 3-D model of shear-wave velocity beneath the plant.
2. PG&E will analyze broad band ground motion data to rule out path effects in the current site-specific amplification terms. Since data from two earthquakes are not sufficient to demonstrate that the amplification factors include only modifications of the shaking due to site effects, recorded motion from other earthquakes, particularly earthquakes from the south and west, may help rule out path effects in the amplification terms.
3. PG&E will evaluate site amplification using analytical approaches in which seismic waves are propagated through a velocity model. This approach is more typical of state-of-the-practice for critical facilities and will provide a comparison to the ground shaking evaluation using the site-specific amplification factors.

The additional studies by PG&E appear to be well conceived to address the uncertainty in site conditions at DCPD. Considering the large effects on seismic hazard results from different estimates of site conditions and different methods in considering site conditions in seismic hazard analysis, the IPRP will be interested in additional briefings by PG&E on the results of their surveys and analyses.

Rich

---

**From:** Winn, Valerie J  
**Sent:** Wednesday, October 09, 2013 9:22 AM  
**To:** Klimczak, Richard; Krausse, Mark; Jacobson, Erik B (RegRel)

**Cc:** Nishenko, Stuart; Abrahamson, Norman; Post, Jennifer (Law); Strickland, L Jearl  
**Subject:** Act by 10/10, noon: PG&E response to IRPR Report 6

All,

Here's the short letter we'll be sending to the IPRP on Report #6, reflecting Norm's two corrections. Any additions, please let me know by noon tomorrow. Thanks. Valerie

---

**From:** Klimczak, Richard  
**Sent:** Monday, September 16, 2013 11:48 AM  
**To:** Krausse, Mark; Jacobson, Erik B (RegRel); Winn, Valerie J  
**Cc:** Nishenko, Stuart; Abrahamson, Norman; Post, Jennifer (Law); Strickland, L Jearl  
**Subject:** RE: Act by 9/9, COB: PG&E response to IRPR Report 6

Mark,

The final report is scheduled for June 2014.

Rich

---

**From:** Krausse, Mark  
**Sent:** Monday, September 16, 2013 11:40 AM  
**To:** Jacobson, Erik B (RegRel); Winn, Valerie J  
**Cc:** Nishenko, Stuart; Klimczak, Richard; Abrahamson, Norman; Post, Jennifer (Law); Strickland, L Jearl  
**Subject:** RE: Act by 9/9, COB: PG&E response to IRPR Report 6

Erik—

When PG&E submits its final findings on its enhanced imaging (by May of 2014), do you believe we could get the IPRP "decommissioned?"

---

**From:** Jacobson, Erik B (RegRel)  
**Sent:** Monday, September 16, 2013 11:26 AM  
**To:** Winn, Valerie J  
**Cc:** Nishenko, Stuart; Klimczak, Richard; Abrahamson, Norman; Post, Jennifer (Law); Krausse, Mark; Strickland, L Jearl  
**Subject:** Re: Act by 9/9, COB: PG&E response to IRPR Report 6

I talked with Gurbux Kahlon, Don LaFrenz and Eric Green today about the IPRP process. They agreed that the IPRP should not do their own studies and that the scope of IPRP's role is to review and comment on PG&E's studies. In light of this conversation, I don't think we should risk rocking the boat by sending a letter or pressing this issue further at this time. If the IPRP starts to go too far in expanding its scope of work, we can try to rein them in at that point [REDACTED]

[REDACTED] I recommend that we continue with our current strategy of cooperating with the IPRP, monitor their activities and follow up with the CPUC if we see some major conflicts on the horizon.

On Sep 5, 2013, at 1:15 PM, "Winn, Valerie J" <[VJW3@pge.com](mailto:VJW3@pge.com)> wrote:

All,

Per my earlier email today (and a conversation with Jennifer last week), please find attached my proposed response to the IPRP in response to its Report No. 6 on ground motions studies.

**Please let me know by the end of the day on Monday if you have any questions or concerns about sending this letter. Any edits in redline would be appreciated by COB Monday.**

Thanks very much!

Valerie Winn  
415.973.3839 (o)  
415.730.7179 (m)

<IRPR Report 6 response.docx>

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<IRPR Report 6 response\_100913.docx>

# **ATTACHMENT M**

**From:** norman abrahamson <abrahamson@berkeley.edu>  
**Sent:** Wednesday, March 20, 2013 9:58 AM  
**To:** Klimczak, Richard <RLK1@pge.com>  
**Subject:** public at Workshop

---

Rich:

As you know, yesterday I had to ask the A4NR people to leave the workshop. From what I understand, they had asked to talk to me before they would leave. I told them that this project involved 3 utilities and that to work together with the other two utilities on this, the workshops had to be non-public. I also told them that I would provide a summary of the workshop to the public in SLO at some later date.

Separately, I also let them know that we can include their technical experts as observers in the workshop. So if Doug Hamilton wanted to attend, we could allow it.

I continue to think that we are doing the wrong thing by excluding the public from listening to the workshop discussions. The reasoning that the technical discussion may be inhibited by the presence of the public is not a real concern. I have been working for years building trust with the public by being straightforward with them and directly answering their questions. Having to ask them to leave the workshop is not helping. It looks like we are hiding something.

If you have a few minutes before the meeting this morning, I would like to talk about this. I would not be surprised with the A4NR folks are back today.

Norm

# **ATTACHMENT N**

**From:** Greene, Eric <eric.greene@cpuc.ca.gov>  
**Sent:** Monday, May 20, 2013 2:51 PM  
**To:** Wills, Chris@DOC <Chris.Wills@conservation.ca.gov>; Weaver, Casey@Energy <Casey.Weaver@energy.ca.gov>; Walter, Joan@Energy <Joan.Walter@energy.ca.gov>; Johnsson, Mark@Coastal <Mark.Johnsson@coastal.ca.gov>; Fenton, Johanna@CalEMA <johanna.fenton@calema.ca.gov>; Bob Anderson <anderson@stateseismic.com>; Dick McCarthy <McCarthy@stateseismic.com>; bgibson@co.slo.ca.us; Chen, Rui@DOC <Rui.Chen@conservation.ca.gov>  
**Cc:** Klimczak, Richard <RLK1@pge.com>; Seitz, Gordon@DOC <Gordon.Seitz@conservation.ca.gov>; Dawson, Timothy@DOC <Timothy.Dawson@conservation.ca.gov>  
**Subject:** RE: IPRP report #6

---

I concur. We should try to meet with PG&E to soonest possible to get PG&E's initial feedback and any PG&E input prior to our next IPRP public meeting. To me, it would be better to have a solid meaningful draft report that we could then discuss at a public IPRP meeting. Thanks.

Eric

---

**From:** Wills, Chris@DOC [mailto:Chris.Wills@conservation.ca.gov]  
**Sent:** Thursday, May 16, 2013 10:28 AM  
**To:** Greene, Eric; Weaver, Casey@Energy; Walter, Joan@Energy; Johnsson, Mark@Coastal; Fenton, Johanna@CalEMA; Bob Anderson; Dick McCarthy; bgibson@co.slo.ca.us; Chen, Rui@DOC  
**Cc:** Klimczak, Richard; Seitz, Gordon@DOC; Dawson, Timothy@DOC  
**Subject:** IPRP report #6

Hi all

As mentioned at previous meetings, CGS has been looking at parameters that are important to ground motion calculations at Diablo Canyon and has focused on site conditions as a very important parameter that was not well documented in the Shoreline fault report. We've asked PG&E to provide additional documentation and have received that, but even with the additional data we believe that PG&E is not considering the range of possible site conditions in their analysis, and that their analysis is only one of several possible methods to consider site conditions in seismic hazard analysis. As a result, it appears that PG&E's seismic hazard analysis gives a relatively narrow range of potential ground motions, within the lower part of the much broader range of ground motions that we think would capture the uncertainty in site conditions.

Please read over the attached draft report that describes all this. Since this is the first report in which we report significant differences with PG&E and are not describing any studies by PG&E to reduce the uncertainty in seismic hazard, I think it would be appropriate to meet with PG&E to discuss this report and see if they object to our conclusions and if they are proposing any additional studies to resolve some of the uncertainties before having a public IPRP meeting to discuss this. How do you all feel about that?

Chris

Chris Wills  
Supervising Engineering Geologist  
California Geological Survey  
801 K St. MS 12-32  
Sacramento, CA 95814-3531

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# **ATTACHMENT O**



**From:** Wills, Chris@DOC <Chris.Wills@conservation.ca.gov>  
**Sent:** Friday, June 7, 2013 6:27 PM  
**To:** Greene, Eric <eric.greene@cpuc.ca.gov>; Weaver, Casey@Energy <Casey.Weaver@energy.ca.gov>; Walter, Joan@Energy <Joan.Walter@energy.ca.gov>; Johnsson, Mark@Coastal <Mark.Johnsson@coastal.ca.gov>; Fenton, Johanna@CalEMA <johanna.fenton@calema.ca.gov>; Bob Anderson <anderson@stateseismic.com>; Dick McCarthy <McCarthy@stateseismic.com>; bgibson@co.slo.ca.us; Chen, Rui@DOC <Rui.Chen@conservation.ca.gov>  
**Cc:** Klimczak, Richard <RLK1@pge.com>; Abrahamson, Norman <NAA2@pge.com>; Nishenko, Stuart <SPN3@pge.com>  
**Subject:** RE: IPRP report #6

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Hi all

I think we had a really productive meeting with PG&E yesterday. We went over the draft IPRP report #6, some additional data on site conditions at Diablo Canyon and the various methods for considering site conditions in seismic hazard analysis. Most importantly, we got a much more complete and clear understanding of the method that Norm Abrahamson has devised for considering site conditions in calculating seismic shaking.

One of the outcomes of the meeting is that I think we have a good enough understanding of this issue to move forward with a public meeting of the IPRP. We talked briefly about schedule and agreed that it would be difficult to schedule a meeting in June. I suspect that it would be best to wait until after July 4.

At a public meeting, CGS could make a presentation on how site conditions have typically been considered in estimating seismic hazards, and the range of resulting seismic shaking estimates, to show the importance of this topic. PG&E could then present their approach to considering site conditions in seismic hazard analysis and the types of data that could be gathered/ has been gathered to help constrain the uncertainty in seismic hazard analysis due to variability and/or uncertainty in site conditions at Diablo Canyon.

At this point, I think we can start by looking at our schedules to see if there are any times in July that will work for an IPRP meeting. I've created a doodle poll for us all to input our available days. Please go to <http://www.doodle.com/pkqnn6ypmukmfhzk> and indicate the days that you would be available to meet.

Thanks

Chris

Chris Wills  
Supervising Engineering Geologist  
California Geological Survey  
801 K St. MS 12-32  
Sacramento, CA 95814-3531

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**From:** Wills, Chris@DOC [<mailto:Chris.Wills@conservation.ca.gov>]  
**Sent:** Wednesday, May 29, 2013 1:48 PM

**To:** Greene, Eric; Weaver, Casey@Energy; Walter, Joan@Energy; Johnsson, Mark@Coastal; Fenton, Johanna@CalEMA; Bob Anderson; Dick McCarthy; [bjgibson@co.slo.ca.us](mailto:bjgibson@co.slo.ca.us); Chen, Rui@DOC  
**Cc:** Klimczak, Richard  
**Subject:** RE: IPRP report #6

Hi all

We're set to meet with PG&E about our draft report on Thursday, June 6. We'll start at 10:00 am and meet until 2:00 pm or so. PG&E has reserved the same conference room we met in last time (room 435 in their offices at 245 Market Street, San Francisco) Presumably, they will want a complete list of who will be attending. Please reply to me and cc Rich Klimczak to let us know whether or not you can make it.

Thanks

Chris

Chris Wills  
Supervising Engineering Geologist  
California Geological Survey  
801 K St. MS 12-32  
Sacramento, CA 95814-3531

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**From:** Wills, Chris@DOC  
**Sent:** Thursday, May 16, 2013 10:28 AM  
**To:** 'Greene, Eric'; Weaver, Casey@Energy; Walter, Joan@Energy; Johnsson, Mark@Coastal; Fenton, Johanna@CalEMA; Bob Anderson; Dick McCarthy; [bjgibson@co.slo.ca.us](mailto:bjgibson@co.slo.ca.us); Chen, Rui@DOC  
**Cc:** Klimczak, Richard; Seitz, Gordon@DOC; Dawson, Timothy@DOC  
**Subject:** IPRP report #6

Hi all

As mentioned at previous meetings, CGS has been looking at parameters that are important to ground motion calculations at Diablo Canyon and has focused on site conditions as a very important parameter that was not well documented in the Shoreline fault report. We've asked PG&E to provide additional documentation and have received that, but even with the additional data we believe that PG&E is not considering the range of possible site conditions in their analysis, and that their analysis is only one of several possible methods to consider site conditions in seismic hazard analysis. As a result, it appears that PG&E's seismic hazard analysis gives a relatively narrow range of potential ground motions, within the lower part of the much broader range of ground motions that we think would capture the uncertainty in site conditions.

Please read over the attached draft report that describes all this. Since this is the first report in which we report significant differences with PG&E and are not describing any studies by PG&E to reduce the uncertainty in seismic hazard, I think it would be appropriate to meet with PG&E to discuss this report and see if they object to our conclusions and if they are proposing any additional studies to resolve some of the uncertainties before having a public IPRP meeting to discuss this. How do you all feel about that?

Chris

Chris Wills

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# **ATTACHMENT P**

**From:** Klimczak, Richard </O=PG&E/OU=CORPORATE/CN=RECIPIENTS/CN=RLK1>  
**Sent:** Friday, July 12, 2013 10:12 AM  
**To:** Post, Jennifer (Law) <JLKm@pge.com>  
**Subject:** FW: IPRP Meeting Summary

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fyi

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**From:** Nishenko, Stuart  
**Sent:** Thursday, July 11, 2013 4:52 PM  
**To:** Summy, Jeff; Klimczak, Richard  
**Cc:** Winn, Valerie J; Abrahamson, Norman; norman abrahamson  
**Subject:** IPRP Meeting Summary

Jeff –

Norm , Valerie and I just got out of the PUC IPRP meeting - which went very well this afternoon.

The two IPRP meetings we've had so far on site response (one in March (panel members only) and today (public) ) have resulted in a better understanding of our approach and our plans to continue to address site response issues at DCP.

While the California Geological Survey (CGS, one of the IPRP members) has gotten more comfortable with our approach – the proof as they say 'is in the pudding' and they are looking forward to seeing the data we will be using and the results we get before they make any final decisions.

Chris Wills (CGS) is still skeptical about the high shear wave speeds (Vs30) we are using based on his experience – but recognizes that we are being proactive and have a plan in place to get more data – both from recorded earthquakes and from the seismic survey work we did at the plant in 2012.

The IPRP plans to issue a revised draft report in ~ 1 month on this topic, which we should get the opportunity to review.

The next IPRP meeting is tentatively scheduled for this fall (~October), where the topic will be the marine low energy seismic survey results.

Stu

**Stu Nishenko**  
Senior Seismologist / Geophysicist  
Pacific Gas and Electric  
245 Market Street  
San Francisco, CA 94105  
office: 415.973.1213  
cell: 415.816.0005  
[spn3@pge.com](mailto:spn3@pge.com)

# **ATTACHMENT Q**



Valerie J. Winn  
Manager  
State Agency Relations

77 Beale Street, B10C  
San Francisco, CA 94105

(415) 973-3839  
(415) 973-7226 Fax  
vjw3@pge.com

October 10, 2013

VIA E-MAIL

Mr. Eric Greene  
California Public Utilities Commission  
Energy Division  
505 Van Ness Avenue  
San Francisco, CA 94102-3214

RE: PG&E Response to IPRP Report No.6 *Site shear wave velocity at Diablo Canyon: summary of available data and comments on analysis by PG&E for Diablo Canyon Power Plant seismic hazard studies*

Dear Mr. Greene:

I am writing to provide Pacific Gas and Electric Company's (PG&E) limited technical feedback on the Independent Peer Review Panel (IPRP) Report No.6 entitled "*Site shear wave velocity at Diablo Canyon: summary of available data and comments on analysis by PG&E for Diablo Canyon Power Plant seismic hazard studies*" (Report).

PG&E understands the scientific findings and will conduct the further studies noted on Page 21 of the Report. PG&E would like to clarify the scope of Studies 2 and 3 as follows:

Study 2: PG&E will analyze broad band ground motion data from the region to evaluate the method previously used by PG&E to remove path effects from the two earthquakes used for site amplification. Additionally, the ground motions from small earthquakes recorded at the Diablo Canyon Power Plant (e.g., the Deer Canyon earthquake) will also be used to evaluate the site effects. In particular, earthquakes from the south and west would provide different path effects and lead to reduced uncertainty in the resulting average site amplification terms.

Study 3: PG&E will evaluate site amplification using analytical approaches, such as those used by the Nuclear Regulatory Commission (NRC) in its independent evaluation, in which seismic waves are propagated through a velocity model. This approach is commonly used at facilities that do not have site-specific recordings from earthquakes. The results from this modeling-based approach will be compared to the site-specific approach data for evaluating the average value and uncertainty in the amplification factors.

Also, PG&E offers two comments on the following statements in IPRP Report No. 6. At Page 2, paragraph 3, the Report indicates: "The NEHRP scaling approach is simple, conservative, and often used only for an approximate estimation ...?" PG&E notes that while the NEHRP scaling is simple, it is not a conservative approach. It is just simplified and may underestimate or overestimate the

PG&E Comments on *IPRP Report No. 6*  
October 10, 2013  
Page 2

site-specific site factors. Additionally, at Page 3, paragraph 1, the Report notes "... the PGE method resulted in lower ground motion hazard estimates." It should be clarified that the PG&E method resulted in lower ground motions at high frequencies ( $> 3$  Hz) and higher ground motion at moderate and low frequencies ( $< 3$  Hz).

Should you have any questions about these comments, please don't hesitate to call me.

Sincerely,

/s/

Valerie J. Winn



# **ATTACHMENT R**

**From:** Norman A Abrahamson <abrahamson@berkeley.edu>  
**Sent:** Monday, September 9, 2013 12:45 PM  
**To:** Klimczak, Richard <RLK1@pge.com>  
**Subject:** Comments on IPRP Report #6

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Rich:

Here are my comments on OPRP report #6

Norm

The main message in IPRP report #6 is that if DCPD was an typical rock site in California, then the ground motions would be higher than estimated by PGE. That is correct, but we have data that demonstrate the the DCPD site is not a typical rock site, There is a large range about a typical rock site, so it not a surprise that a specific site is different from the average.

The recommended tasks described in the conclusion are reasonable and we plan to address them as part of our own updated site response evaluation.

The IPRP report has many statements about the PG&E method and data being unconservative or not well constrained. These are presented as facts but they are really the judgments of Chris Wills based on the assumption that DCPD is a average rock site. We should expect the public to focus on these statements in future public meetings.

There are a two incorrect statements:in the report listed below:

Page 2, paragraph 3: "The NEHRP scaling approach is simple, conservative, and often used only for an approximate estimation ...?"

The NEHRP scaling is simple, but it is not a conservative approach. It is just simplified and may underestimate or overestimate the site-specific site factors.

Page 3, paragraph 1: "... the PGE method resulted in lower ground motion hazard estimates"

The PGE method resulted in lower ground motions at high frequencies (> 3 Hz) and higher ground motion at moderate and low frequencies (< 3 Hz).

# **ATTACHMENT S**

locations and slip rates on all faults beneath the hills that can be checked against rates of uplift and surface deformation.

### **IPRP Authority and Review Process**

In 2006, AB 1632 (Blakeslee) was enacted requiring the California Energy Commission (CEC) to conduct a comprehensive study of the seismic vulnerability of Diablo Canyon and directed the CEC to perform subsequent updates in the IEPR as new data or new understanding of potential seismic hazards emerge. In 2008, the CEC published its AB 1632 Report, which recommended that PG&E complete several seismic studies including that PG&E should use three-dimensional geophysical reflection mapping and other advanced techniques to explore fault zones near Diablo Canyon. The California Public Utilities Commission in 2009 and 2010 directed PG&E to complete the advanced seismic studies recommended in the CEC's AB 1632 Report and have an Independent Peer Review Panel review these seismic studies (CPUC letter to PG&E on June 25, 2009 and CPUC Decision 10-08-003).

The IPRP expects that:

- PG&E will provide its study plans and draft completed study findings to the IPRP for review. These include studies summarized in CPUC Decision 10-08-003 including off-shore, on-shore, and ocean bottom studies, and seismic studies recommended in the AB 1632 Report.
- The IPRP, coordinated by the California Geological Survey (CGS), will review and provide comments on PG&E's study plans. The goal will be, if possible, to provide comments within 30 days of receipt.
- The IPRP, coordinated by the CGS, will review and provide comments on PG&E's draft completed study findings to the CPUC. The goal will be to provide comments as promptly as possible.
- PG&E will review and, if possible, within 30 days incorporate the IPRP's recommendations and comments in PG&E's revised study plans and revised completed study findings and prepare for the IPRP a "Response to Comments" for the IPRP to document scientifically why PG&E accepted or rejected the IPRP's comments.
- PG&E and the IPRP will participate in quarterly meetings/briefings to review the status of PG&E's seismic studies, any changes in the study plans, and any preliminary study findings.
- PG&E and the IPRP will prepare a master schedule incorporating the major milestones for the IPRP's review process and will include these milestones in

PG&E's monthly progress reports and schedule to the NRC and the Atomic Safety and Licensing Board.

- The CPUC and CEC will address any major scientific or technical issues that have not been resolved informally between the IPRP and PG&E. CPUC Decision 10-08-003 states that, "Should a dispute arise it should be resolved informally but if that is not attainable the Commission has authority to halt the associated rate recovery." In addition, the CEC may report on any seismic issues and updates through its IEPR process. However, we anticipate that any major scientific or technical issue that may arise can be addressed and resolved informally.

The quarterly briefings/meetings mentioned above will allow PG&E to report on its progress and help facilitate a productive informal exchange of scientific viewpoints. The IPRP would like to schedule another briefing in October.

**IPRP membership:**

California Geological Survey

California Coastal Commission

California Emergency Management Agency

California Energy Commission

California Seismic Safety Commission

California Public Utilities Commission

# ATTACHMENT T

*major scientific or technical issue that may arise can be addressed and resolved informally.*

### PG&E Response to Authority and Review Process

Decision 10-08-003 explicitly defines the scope and authority of the IPRP. The Commission found:

*It is reasonable to provide for independent peer review of the study plans and of the findings/results of the seismic studies approved and funded through this decision. Therefore, the Commission will convene its own IPRP to conduct a review and provide written comments on the study plans prior to implementation and to conduct a review and provide written comments on the findings and/or results of the studies.*

*The scope and authority of the IPRP is limited to review and comment on the study plans for the seismic studies approved and funded through this decision prior to implementation of those studies and to review and comment on the findings and/or results of the seismic studies approved and funded through this decision.*

*The Commission ordered:*

*Pacific Gas and Electric Company shall provide the [IPRP] with its seismic study plans prior to implementation of the seismic studies. The [IPRP] shall review and provide Pacific Gas and Electric Company written comments on the study plans within 30 days of receipt.*

*Pacific Gas and Electric Company shall provide the [IPRP] the findings and/or results associated with the seismic studies upon finalizing those findings and/or results. The [IPRP] shall review and provide Pacific Gas and Electric Company written comments on the findings and/or results within 30 days of receipt.*

*The Commission also stated in the decision that PG&E and the IPRP should resolve disputes informally, but if that is not attainable, the Commission has authority to halt the associated rate recovery.*

PG&E will meet the IPRP requests and expectations that are consistent with the explicit language contained in the Commission's findings, orders and statements establishing the IPRP.