

Docket: : I.19-06-016  
Exhibit Number : SED-207  
Commissioner : Rechtschaffen  
Admin. Law Judge : Poirier/Hecht  
Date Served: : March 12, 2021  
SED Witness : M. Felts



**SAFETY ENFORCEMENT DIVISION  
CALIFORNIA PUBLIC UTILITIES COMMISSION**

**CHAPTER THREE**  
**PREPARED SUR-REPLY TESTIMONY**  
**OF**  
**MARGARET FELTS IN RESPONSE TO**  
**REPLY TESTIMONY OF L. WILLIAM ABEL**

San Francisco, California  
June 30, 2020

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1 **I. INTRODUCTION**

2 The purpose of the following prepared Sur-Reply testimony, submitted on behalf  
3 of the California Public Utilities Commission’s (“Commission”) Safety Enforcement  
4 Division (“SED”), is to reply to testimony of William Abel regarding violations 79-83  
5 which are failure to successfully execute Well SS-25 kill attempts 2 through 7, due to  
6 lack of proper modeling (79), failure to provide well kill programs for relief well #2, well  
7 SS-25A and well SS-25B (80-82) and prevention of surface plumbing failures on SS-25  
8 from enabling that well to be kept filled (83). Mr. Abel restates these violations  
9 collectively in the introduction of his testimony as “allegations that SoCalGas  
10 mismanaged the SS-25 well control efforts (Violations 79-83),”<sup>1</sup> but does not testify  
11 directly about issues related to violation 83.

12 As observed by Mr. Abel, these violations are based solely on the Blade RCA  
13 Report.<sup>2</sup> In light of Mr. Abel’s statement that there is “little to no independent  
14 verification of Blade’s findings and conclusions,”<sup>3</sup> I provide additional evidence in this  
15 reply.

16 **II. SOCALGAS RESPONSE, INCLUDING ENGAGEMENT OF**  
17 **BOOTS & COOTS**

18 Mr. Abel states that, “. . . SoCalGas displayed the necessary expertise to monitor  
19 and manage its well control experts.”<sup>4</sup>

20 I agree that SoCalGas had the necessary in-house training, experience and  
21 knowledge to oversee their contractor Boots & Coots. This is not an issue that underlies  
22 violations 79-83. Violation 79 only goes to the issue of well kill modeling, which was  
23 lacking during well SS-25 kill attempts 2-6. For reasons discussed here, violation 79  
24 should stand. Well kill modeling can be static (steady-state) or dynamic (transient).<sup>5</sup>

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<sup>1</sup> Abel Testimony, p. 1, line 19.

<sup>2</sup> Abel Testimony, p. 1, lines 23-24.

<sup>3</sup> Abel Testimony, p. 1, lines 24-25.

<sup>4</sup> Abel Testimony, p. 4, lines 27-28.

<sup>5</sup> Abel Testimony, p. 5, lines 17-18

1 Transient modeling is dynamic. A model “run” is a simulation. Each simulation is based  
2 on a set of data and assumptions input to the model. Each simulation run generates a  
3 unique set of results. The dynamic model Mr. Walzel (Boots & Coots) used is called  
4 Drillbench,<sup>6</sup>

5 Evidence we have from the records provided by SoCalGas and the Boots & Coots  
6 daily reports suggest that there was not much difference between the kill attempts 2-6.<sup>7</sup>  
7 For this testimony, my analysis relates to the kill attempts that Blade modeled using  
8 SoCalGas data that was available to Boots & Coots during the event. Although SED  
9 asked SoCalGas for data and communications between SoCalGas and Boots & Coots  
10 regarding information that could be used as inputs to the models as well as results of the  
11 models and authorizations to go ahead with kill attempts, SoCalGas has produced  
12 thousands of documents containing no particularly relevant information other than brief  
13 one page plans for some of the kill attempts.<sup>8</sup> I have not been able to establish the origin  
14 of those summaries, who wrote them, who had them, or whether or not they were the  
15 basis of actual kill attempts.

16 Most concerning is that there were at least 23 days between SoCalGas first and  
17 fourth kill attempts (October 23, 2015 was Kill Attempt 1 and November 18, 2015 was  
18 Kill Attempt 4). Boots & Coots was on site by October 25, 2015.<sup>9</sup> Between SoCalGas  
19 Kill Attempt numbers 1 and 2, a 20 day period of time could have been used to plan Kill  
20 Attempt 2 by running multiple simulations on information that SoCalGas provided about  
21 the well, as well as field data that was collected.<sup>10</sup> Walzel and Haghshenas testimony *say*

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<sup>6</sup> A product created and marketed by Slumberger, Inc, this model applies engineering calculations to simulate changes in pump rates, well pressures and other parameters, during the kill event. As in any model, the key to getting accurate results is to input accurate data and assumptions.

<sup>7</sup> Boots&Coots Daily Reports (reply testimony exhibit FN.30.Boots&Coots.DailyReports.

<sup>8</sup> Well.Kill.Plans.AC\_CPUC.0206050-206058.

<sup>9</sup> The Blade Report at page 13 stated that “A well-control company arrived onsite on October 25, 2019.” SED infers that was Boots & Coots.

<sup>10</sup> Based on the Blade Report, pp. 125-126, Table 15, the first attempt was October 24, 2015 and second attempt was November 13, 2015.

1 that Boots & Coots performed their first transient modeling after November 15, 2015 and  
2 before November 18, 2015.<sup>11</sup> As shown in the Blade RCA November 15, 2015 was the  
3 date of SoCalGas Well Kill Attempt 3, and November 18, 2015 was the date of SoCalGas  
4 Well Kill Attempt 4.<sup>12</sup> SoCalGas concedes no modeling was done until the 4<sup>th</sup> kill  
5 attempt.<sup>13</sup> SoCalGas did not produce any evidence that Boots & Coots actually ran  
6 transient models for kill attempts 4-6, even though Walzel and Haghshenas say they did.

### 7 **III. TRANSIENT MODELING**

#### 8 **A. Because Boots & Coots Say They Chose to Do Transient** 9 **Kill Modeling for their Well Kills, Whether or Not It is** 10 **Standard Practice Is Irrelevant**

11 Mr. Abel testifies from his substantial personal experience that, “[w]hile transient  
12 kill modeling may be useful in certain instances, it is not well-accepted industry practice  
13 for all well control efforts by top kill.”<sup>14</sup> He also discusses steady state modeling.<sup>15</sup> There  
14 is no reason to dispute Mr. Abel’s testimony. However, Mr. Walzel said he used transient  
15 modeling to prepare SoCalGas well kill plans 4 through 6 for SS-25, which Mr. Abel  
16 acknowledges.<sup>16</sup> Therefore, whether or not transient modeling is standard in the industry  
17 is a moot point because Mr. Walzel said that he used it after SoCalGas third well kill  
18 attempt.<sup>17</sup>

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<sup>11</sup> Walzel and Haghshenas testimony, p. 3, lines 8-11. My testimony will discuss the lack of evidence to support Walzel and Haghshenas statements later.

<sup>12</sup> See Blade Report, pp. 125-126, Table 15.

<sup>13</sup> The dates showing this are explained in more detail in my response testimony to Walzel and Haghshenas, Sec II.

<sup>14</sup> Abel Testimony, p. 6, lines 8-9.

<sup>15</sup> Abel Testimony, p. 5, line 18 to p. 6 line 4.

<sup>16</sup> Abel Testimony, p. 6, lines 17-18.

<sup>17</sup> See Testimony of Walzel and Haghshenas, p. 3, lines 8-11. Mr. Walzel actually said here that he used modeling before November 18, 2015. As shown in Blade’s RCA, pp. 125-126, Table 15, the attempt on November 18, 2015 was SoCalGas fourth kill attempt.

1           **B.     Mr. Abel Testifies that Boots & Coots Did in Fact**  
2           **Perform Transient Modeling for SoCalGas Well Kill**  
3           **Attempts 4 to 6. But He Relies Solely on Boots & Coots to**  
4           **Make that Statement, and Does Not Provide Any**  
5           **Evidence to Show It to Be True.**

6           Mr. Abel claims that Boots & Coots performed transient modeling for well kill  
7 attempts 4 through 6 multiple times. For example, he states, “[a]t a February 21, 2020  
8 deposition that I attended, Boots & Coots senior well control specialist engineer, Danny  
9 Walzel, clarified that after Boots & Coots’ second well kill attempt (SoCalGas’ fourth  
10 well kill attempt),<sup>18</sup> Boots & Coots performed transient modeling to help inform the SS-  
11 25 well control operations. Based on Mr. Walzel’s testimony, it is my understanding that  
12 the computer containing the transient modeling prepared by Mr. Walzel was later stolen  
13 from Mr. Walzel’s truck, and never recovered.”<sup>19</sup> As another example, Mr. Abel states  
14 that, “Boots & Coots *did* in fact perform transient modeling after its second well kill  
15 attempt (only in time for SoCalGas’ fourth well kill attempt) on SS-25 and before each  
16 subsequent attempt. . .”<sup>20</sup> (Emphasis in original.)

17           Although Mr. Walzel claims he chose to use transient modeling, there is no  
18 evidence of this, no paper trail that it was done with valid data and reasonable  
19 assumptions, and there is no record of the results. A number of points show lack of  
20 evidence of transient modeling, and some suggest that transient modeling actually was  
21 not used in designing kill attempts, as shown by the bullets below.

- 22           • I have found no evidence of transient modeling results  
23           specifically for SoCalGas kill attempts 2-6 despite extensive  
24           review. I have looked through documents provided in response  
25           to data requests for evidence that SoCalGas and Boot & Coots  
26           engaged in some level of planning for well kills 2-6. Since  
27           SoCalGas says they turned over primary operation of the well  
28           kill effort to Boots & Coots after the first well kill attempt

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<sup>18</sup> Again, Walzel says he modeled after Boots & Coots’ second attempt, but this meant he actually modelled only in time for SoCalGas’ fourth attempt.

<sup>19</sup> Abel Testimony p. 6, line 20 to p. 7 line 4.

<sup>20</sup> Abel Testimony, p. 5, lines 10-11; See also Abel Testimony, p. 6, lines 17-18. “Nevertheless, here, Boots & Coots did in fact employ transient kill modeling after it determined modeling was appropriate.”

1 failed,<sup>21</sup> I would expect to see data provided to Boots & Coots by  
2 SoCalGas, such as emails providing inputs to models and  
3 calculations or model simulation results provided to SoCalGas  
4 for review and concurrence by SoCalGas for Boots & Coots to  
5 use the simulation results for the specified well attempt.<sup>22</sup> I  
6 combed through thousands of emails and documents provided by  
7 SoCalGas and found none of this evidence. Instead, we have a  
8 few one page kill plans that were written by someone we do not  
9 know; certainly not Mr. Walzel.<sup>23</sup>

10 • Blade also stated in a data response to SED that, “There was no  
11 evidence provided to Blade that kill modeling or other analytical  
12 approaches were undertaken for kill attempts #1 through #6.”<sup>24</sup>

13 • Blade said it ran its own transient model simulation using the  
14 same data that were available to onsite well control personnel  
15 during the time of well kill operations, but Blade found that all  
16 the SS-25 kill attempts were predicted to be unsuccessful.<sup>25</sup>

17 • Mr. Abel himself admitted that he had not seen Boots & Coots  
18 transient models. SED asked, “Please state how Mr. [Abel]  
19 knows that Boots & Coots’ transient modeling estimated and  
20 modeled gas flow rates range from 15-70 MMscf/d.” SoCalGas  
21 answered, “Mr. Abel based his response on the testimony of  
22 Boots & Coots personnel. Please see SoCalGas’ Reply  
23 Testimony Chapter III (Abel), Ex. III-4 (Danny Walzel Depo. Tr.  
24 134:18-135:7. (Feb. 21, 2020)), and SoCalGas Reply Testimony  
25 Chapter IV (Walzel/Haghshenas) at 6.”<sup>26</sup> SED also asked, “Has  
26 Mr. [Abel] seen Boots & Coots’s transient models that were on  
27 the computer allegedly stolen from Mr. Walzel in late December,  
28 2015?” SoCalGas responded, “No. As described in SoCalGas’  
29 Reply Testimony Chapter IV (Walzel/Haghshenas), Mr. Walzel’s  
30 laptop was stolen from Mr. Walzel’s vehicle in or around  
31 Houston, TX, and never recovered. (See, SoCalGas Reply

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<sup>21</sup> SoCalGas Response to DR33 Q.2.

<sup>22</sup> AC\_CPUC\_0206050-206056.

<sup>23</sup> The documents provided as Well Kill plans are all authored on the dates of the well kills by Erle P. Halliburton (under details of each document). Erle Palmer Halliburton, 1892-1957, founded Halliburton.

<sup>24</sup> Blade Response to SED Data Request 63, Response 2.1.1, p. 6, May 5, 2020.

<sup>25</sup> Blade Response to SED Data Request 63, Response 2.1.1, p. 6, May 5, 2020.

<sup>26</sup> SoCalGas Response to SED Data Request 61, Question 7a, pdf p. 11.

1 Testimony Chapter III (Abel) Ex. III-4 (Danny Walzel Depo. Tr.  
2 77:1-78:14)”<sup>27</sup>

- 3 • SED requested documents showing all kill modeling that  
4 SoCalGas and Boots & Coots performed, including inputs,  
5 outputs, the name of the models, etc.<sup>28</sup> To date, we have 5 one  
6 page “plans” that do not indicate how they were generated or  
7 who wrote them.<sup>29</sup> These are the same plans that Mr. Abel  
8 reviewed to arrive at his opinions.<sup>30</sup>
- 9 • SoCalGas admitted that it never reviewed the transient modeling  
10 that Boots & Coots allegedly did, and does not know whether the  
11 model actually informed the kill plans.<sup>31</sup>
- 12 • Mr. Walzel never mentioned transient modeling to SED during  
13 an Examination Under Oath before the opening of the OII,  
14 despite extensive questioning about the method for calculating  
15 mud weight, the name of that calculation, and the method for  
16 calculating kill rate.<sup>32</sup>

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<sup>27</sup> SoCalGas Response to SED Data Request 61, Question 7b, pdf p. 11, also See, SoCalGas Reply Testimony Chapter III (Abel) Ex. III-4 (Danny Walzel Depo. Tr. 77:1-78:14.

<sup>28</sup> DR 61 Q.7 Abel could not come up with any data that Walzel used in his models.

<sup>29</sup> AC\_CPUC\_0206050-206056.

<sup>30</sup> Abel Testimony, pp. 7-8.

<sup>31</sup> SoCalGas Response to SED Data Request 61, Question 3d and 3e.

- Question 3d: “Were Boots & Coots’s recommended well kill plans based upon Boots & Coots’s transient modeling?

Answer: Based on information and belief, SoCalGas *understands* that the kill plan summaries prepared by Boots & Coots were informed, in part, by the transient kill modeling that Boots & Coots conducted, beginning after Boots & Coots’ second well kill attempt. (Emphasis added.)

- Question 3e: If yes, did SoCalGas see the transient model prepared by Boots & Coots’s that corresponded to each well kill plan?

Answer: In the course of Boots & Coots’ well control efforts, SoCalGas understood that Boots & Coots conducted modeling in connection with the SS-25 top kill operations. SoCalGas reviewed and discussed the kill plans with Boots & Coots, but *SoCalGas did not review the model that may have informed the plans.* (Emphasis added.)

<sup>32</sup> Transcript Walzel and Kopecky, p. 49, line 22 to p. 52, line 28.

(continued on next page)



- 1           • In the Walzel and Haghshenas reply testimony, it was disclosed  
2 for the first time that Mr. Walzel’s transient modeling was done  
3 on his laptop, which was stolen from him.<sup>33</sup> The testimony says  
4 Mr. Walzel reported the theft to the police.<sup>34</sup> SED asked  
5 SoCalGas, “Provide the police report of the theft that Mr. Walzel  
6 reported to the police.”<sup>35</sup> In response, SoCalGas stated, “The  
7 Houston Police Department provided Mr. Walzel with a  
8 document regarding the reported theft of Mr. Walzel’s laptop and  
9 other belongings, provided here bearing the following bates  
10 number: AC\_CPUC\_SED\_DR\_57\_0000001.”<sup>36</sup> However, the  
11 document provided by SoCalGas is the size of a post-it note, and  
12 says, “Burglary Motor Vehicle”, with the date December 26,  
13 2015, not a report. The document does not corroborate that any  
14 laptop was stolen, and says nothing about a model that was on a  
15 laptop.<sup>37</sup> Mr. Walzel testifies that his transient modeling was not  
16 saved anywhere else, and was not sent to anyone else.<sup>38</sup>
- 17           • SED asked SoCalGas, “Did SoCalGas review Mr. Walzel’s  
18 transient models?” SoCalGas responded in part, “. . .SoCalGas  
19 did not review the transient modeling that resided only on Mr.  
20 Walzel’s laptop and required licensed software to review.”<sup>39</sup>

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Rather than paying attention to the actual dialogue of the EUO transcripts cited here, and Mr. Walzel’s failure to tell SED about the transient model that Mr. Walzel now claims was stolen, Mr. Abel instead suggests his surprise at SED for not asking Mr. Walzel about transient modeling, stating:

I find it unusual SED asserts violations against SoCalGas for not employing transient kill modeling without first having verified this fact during SED’s August 8, 2018 examination of Mr. Walzel. While SED asked Mr. Walzel about the formulae and calculations used in Boots & Coots’ dynamic kill of SS-25, none of SED’s five questioners asked Mr. Walzel whether the dynamic kill of SS-25 involved transient modeling. (See Abel Testimony, p. 7, fn 16, citing SED’s Opening Testimony, SED 000635-000786 (D.Walzel and J. Kopecky EUO Examination Under Oath (EUO) Tr.(Walzel and Kopecky) p. 49 line 52 to p 52 line 28 (Aug. 8, 2018)).)

<sup>33</sup> Walzel and Haghshenas Testimony, p. 3, lines 30-31.

<sup>34</sup> Walzel and Haghshenas Testimony, p. 3, line 32.

<sup>35</sup> SoCalGas Response to SED Data Request 57, Question 3, p. 4 of 27, May 7, 2020.

<sup>36</sup> SoCalGas Response to SED Data Request 57, Question 3, p. 4 of 27, May 7, 2020.

<sup>37</sup> I1906016\_SCG\_SED\_DR\_57\_0000001.

<sup>38</sup> Testimony of Walzel and Haghshenas, p. 3, lines 32-33.

<sup>39</sup> SoCalGas Supplemental Response to SED Data Request 57, Question 25, dated, May 19, 2020.

- 1           • In a follow up data response, SoCalGas stated that the transient  
2 model used was Drillbench,<sup>40</sup> which can be purchased from  
3 Schlumberger.<sup>41</sup> This is a product that performs dynamic well  
4 kill simulations, which would be the same as transient modeling  
5 as opposed to static modeling. The model used by Mr. Walzel  
6 was apparently purchased software licensed for use on his  
7 computer.<sup>42</sup>
- 8           • On December 14, 2015, Boots & Coots prepared a document that  
9 states on its title page that it was prepared for SoCalGas, and is  
10 entitled “Dynamic Kill Analysis SoCalGas Porter 39A”.<sup>43</sup> This  
11 report states that it “covers dynamic kill analysis for Southern  
12 California Gas Company, Porter 39A”.<sup>44</sup> The listed contact  
13 information is Mr. Arash Haghshenas, with a Boots & Coots  
14 email.<sup>45</sup> The report states, “This report presents the key results  
15 from a blowout and dynamic kill analysis performed for  
16 SoCalGas, Porter 39A well as part of relief well planning.<sup>46</sup>  
17 (Emphasis added, and in original.) I have not observed any  
18 document like this one showing transient kill modeling related to  
19 the top kill attempts that Boots & Coots allegedly performed for  
20 SoCalGas.
- 21

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<sup>40</sup> During my review of data responses, I saw images among emails provided by SoCalGas that appear to be from Drillbench simulations, but are not represented as such by SoCalGas or Boots & Coots in response to data requests link to simulation video: [HYPERLINK https://www.software.slb.com/products/drillbench](https://www.software.slb.com/products/drillbench)

<sup>41</sup> 2015. June. Drillbench\_Blowout\_Control\_Web.

<sup>42</sup> SoCalGas Response to DR 57

<sup>43</sup> AC\_CPUC\_SED\_DR\_16\_0019665. The entire document spans from AC\_CPUC\_SED\_DR\_16\_0019665 to 19680.

<sup>44</sup> AC\_CPUC\_SED\_DR\_16\_0019666.

<sup>45</sup> AC\_CPUC\_SED\_DR\_16\_0019666.

<sup>46</sup> AC\_CPUC\_SED\_DR\_16\_0019668.

1           **C.     Mr. Abel’s Statement that “SoCalGas’ Operating**  
2           **Standards for Well Kill Operations Were Reasonable and**  
3           **Consistent with Industry Standard Practice” Is Not**  
4           **Applicable to the SS-25 Failure Event.**

5           In section C of his testimony, Mr. Abel states that, “SoCalGas’ Operating  
6 Standards for Well Kill Operations Were Reasonable and Consistent with Industry  
7 Standard Practice.”<sup>47</sup>

8           I do not disagree with Mr. Abel. However, the standards SoCalGas has for well  
9 kill operations do not apply to the SS-25 emergency situation, other than to provide a  
10 roadmap regarding who to contact and a process for responding in general to a well  
11 emergency.<sup>48</sup> Another standard for well kills provides a procedure for routine well kills  
12 for well maintenance when the well is not out of control and there is no emergency.<sup>49</sup>  
13 This standard is not applicable to the SS-25 well failure event because it only applies to  
14 routine well kills, not emergencies when the well is out of control.<sup>50</sup>

15           **IV.    BLADE’S WELL KILL MODELING WAS DONE USING**  
16           **THE SAME INFORMATION THAT WAS AVAILABLE AT**  
17           **THE TIME OF THE WELL KILLS**

18           Mr. Abel claims that “SED’s well kill modeling derives from perfect hindsight  
19 fails to consider safety, and is entirely speculative.”<sup>51</sup> He specifically alleges that I have  
20 made “speculative assertions, particularly in support of SED’s allegation that transient  
21 kill modeling would have resulted in an earlier well kill. . .”<sup>52</sup> In support of this  
22 allegation, he cites several conclusions in my opening testimony.<sup>53</sup> Each of the statements  
23 Mr. Abel cites were made by Blade in their RCA Report. It is true that Blade’s analysis

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<sup>47</sup> Abel Testimony, p. 8, lines 6-7, Subheading C.

<sup>48</sup> DR 35 Emergency.Plan.2008.

<sup>49</sup> Well Standards DR 17.Well.Kills.

<sup>50</sup> Walzel and Haghshenas Opening Testimony, p. 3, lines 9-11.

<sup>51</sup> Abel Testimony, p. 10, lines 20-21, Heading IV.

<sup>52</sup> Abel Testimony, p. 10, lines 22-23.

<sup>53</sup> Pp.10-11 bullet points.

1 occurred after the SS-25 well kill attempts failed. However, Mr. Abel fails to consider  
2 that Blade accounted for what he calls the “perfect hindsight” problem. In response to an  
3 SED data request, Blade explained that it used the same information that was available at  
4 the time of the kills, but that Blade’s modeling still predicted unsuccessful kill attempts.  
5 In Blade’s own words:

6 Blade conducted a transient kill simulation study to evaluate the  
7 likelihood of success of the actual kill attempts. Blade intentionally  
8 used the same field data that were available to the onsite well control  
9 personnel during the time of well kill operations for this evaluation.  
10 According to Blade’s modelling, all the SS-25 kill attempts were  
11 predicted to be unsuccessful.

12 It is not clear to Blade how Boots and Coots selected the pump rates  
13 and kill fluid densities for each kill attempt. The kill fluid densities  
14 did not change materially until kill attempt #7.<sup>54</sup>

15  
16 However, a Root Cause Analysis (RCA) always occurs after an event occurs and  
17 looks back at the events as they unfolded as part of the RCA process. Especially  
18 considering the lack of data provided by SoCalGas and Boots & Coots regarding data and  
19 assumptions they used in their simulations, Blade developed reasonably designed models  
20 with the data they could find or develop and used reasonable assumptions. As Blade  
21 explained to SoCalGas in response to SoCalGas’ data request “[a]n outcome of the RCA  
22 process was that the lack of understanding of the well deliverability was a root cause and  
23 affected the well-control planning as discussed in the Blade Report on pages 132 – 133—  
24 Section 3.2.1. Well gas flow rate is a key parameter used in dynamic kill modeling and in  
25 estimating the total gas leak volume.”<sup>55</sup> In my Opening Testimony, I adopted Blade’s  
26 well kill modeling, findings and conclusions, and I continue to find them valid.

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<sup>54</sup> Blade Response to SED Data Request 63, Response 2.1.1, p. 5, May 5, 2020.

<sup>55</sup> 2020-02-14 Blade Response to SoCalGas Data Request Jan 23, 2020 Rev 1-Feb 14, 2020.

1 **V. I AM WITHDRAWING VIOLATIONS 80-82**

2 Mr. Abel’s testimony responds to violations 80-82,<sup>56</sup> which are “failure to provide  
3 well kill programs for relief well #2, well SS-25A and well SS-25B.”<sup>57</sup> I agree with Mr.  
4 Abel’s testimony regarding violations 80-82. Blade included in its RCA Report a  
5 suggestion that well kill programs for Aliso wells might be useful in the event of well  
6 failure incidents. SoCalGas has a standard for Emergency Well Kills.<sup>58</sup> This standard is  
7 not specific to any well, but provides response guidelines. Because every incident is  
8 different even on the same well, it would be difficult to develop a useful well kill plan for  
9 each well that would go beyond the general emergency well kill standard already in  
10 place. With this, I am withdrawing violations 80-82.

11 **VI. MR. ABEL FAILS TO ARGUE AGAINST SED’S VIOLATION**  
12 **83**

13 Mr. Abel mentions violation 83 only in his introduction in a way that is grouped  
14 with violations 79 through 82.<sup>59</sup> Other than making general allegations in his  
15 introduction about that violation, Mr. Abel provides no specific discussion in his  
16 testimony or evidence against violation 83. Violation 83 is for failure to prevent surface  
17 plumbing failures on SS-25 from enabling that well to be kept filled.<sup>60</sup> As Blade  
18 discusses, SoCalGas facilities at the surface of the well system failed, pumps went down  
19 and well kill efforts that might have been successful were discontinued because fluids  
20 could not be pumped.<sup>61</sup> ~~This problem on kill attempt 6 could have been averted by having~~  
21 ~~back-up capacity.~~<sup>62</sup> Violation 83 should stand.

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<sup>56</sup> Abel Testimony, p. 15.

<sup>57</sup> See my Opening Testimony, p. 3.

<sup>58</sup> DR 35 Emergency.Plan.2008.

<sup>59</sup> Abel Testimony, p. 1, lines 18-20.

<sup>60</sup> See my Opening Testimony, p. 4.

<sup>61</sup> Blade Main Report at p. 151.

~~<sup>62</sup> Blade Main Report at p. 151.~~

1 **VII. BLADE RESPONSES TO ALLEGATIONS FROM MR.**  
2 **ABEL’S TESTIMONY**

3 Mr. Abel makes a number of assertions in his testimony. To clarify the merits of  
4 six of these assertions, SED asked Blade for its views regarding them, and the fact-based  
5 reasons for those views. Six of Mr. Abel’s assertions and Blade’s responses are shown in  
6 this section.

7 **Abel Assertion 1 and Blade Response:** Mr. Abel stated that “Blade’s modeling  
8 simply represents an academic exercise to calculate the kill fluid density and pump rate  
9 that theoretically could have killed SS-25, and fails to account for several important  
10 safety considerations that impacted Boots & Coots’ well kill efforts. First, as Boots &  
11 Coots explained to SED during SED’s August 2018 examination, the first step upon  
12 arriving at a well control event is to secure the area and ensure the safety of personnel.  
13 [Footnote omitted.]. Indeed, as discussed in SoCalGas’ opening testimony, safety is a  
14 paramount consideration in any well control operation, and the response to the SS-25 leak  
15 was no different—extensive measures were implemented to mitigate the risk of ignition.  
16 [Footnote omitted]. Second, in designing a well kill plan, a well control company must  
17 take extreme caution not to implement a well kill operation that may worsen the leak, and  
18 thereby increase the risk of ignition, or jeopardize the success of subsequent kill attempts.  
19 Boots & Coots appropriately considered these factors, and made adjustments to its kill  
20 operations accordingly.”<sup>63</sup>

21 When SED asked whether Blade agreed that, “Blade’s modelling simply  
22 represents an academic exercise to calculate the kill fluid density and pump rate that  
23 theoretically could have killed SS-25.” Blade said no. Blade explained that its efforts to  
24 model kill operations were: [S]pecifically to ascertain why the top kill well-control  
25 efforts were unsuccessful and why it took 111 days to stop the gas from the Aliso Canyon  
26 gas storage reservoir from escaping to the atmosphere. As discussed in the Blade Report  
27 [1] (page 229), Blade conducted a transient kill simulation study to evaluate the

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<sup>63</sup> Abel Testimony, p. 12.

1 likelihood of success of the actual kill attempts. Blade intentionally used the same field  
2 data that were available to the onsite well control personnel during the time of well kill  
3 operations for this evaluation. According to Blade’s modelling, all of the SS-25 kill  
4 attempts were predicted to be unsuccessful.

5 Blade explained it was not clear to Blade how Boots and Coots selected the pump  
6 rates and kill fluid densities for each kill attempt. The kill fluid densities did not change  
7 materially until kill attempt #7.<sup>64</sup>

8 **Abel Assertion 2 and Blade Response:**

9 Mr. Abel stated, “Mr. Walzel testified that while the SS-25 wellhead equipment  
10 was rated to 5,000 PSI, given the unknown condition of the leak, Boots & Coots set a  
11 “safety limit” or “safety factor” well below the working pressure of the equipment.  
12 [Footnote omitted]. I believe that it was prudent for Boots & Coots to have set a safety  
13 factor so as not to risk damaging the wellhead.”<sup>65</sup>

14 SED requested Blade to weigh in about the merits of this statement. In response to  
15 SED’s questions, Blade answered: 1) Blade’s modeling considered the wellhead rated  
16 working pressure of 5,000 psi and all simulations stayed below that. Blade’s highest kill  
17 simulation in kill attempt #2 had a maximum predicted pump pressure of 3,644 psi, with  
18 decreasing maximum pump pressure for subsequent kill attempts;<sup>66</sup> 2) Blade agreed with  
19 using a wellhead safety factor, and Blade’s model results honored that wellhead safety  
20 factor;<sup>67</sup> and 3) using data available at the time of the kill attempts, well kill modeling  
21 would have demonstrated that the pump rate and fluid density were inadequate to kill  
22 well SS-25.<sup>68</sup>

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<sup>64</sup> Blade Response to SED Data Request 63, Response 2.1.1, p. 5, May 5, 2020.

<sup>65</sup> Abel Testimony, p. 12.

<sup>66</sup> Blade Response to SED Data Request 63, Response 2.2.1, p. 10, May 5, 2020.

<sup>67</sup> Blade Response to SED Data Request 63, Response 2.2.1, p. 10, May 5, 2020.

<sup>68</sup> Blade Response to SED Data Request 63, Response 2.2.1, p. 10, May 5, 2020.

1           **Abel Assertion 3 and Blade Response:**

2           Mr. Abel stated, “[f]urther, Boots & Coots’ pumping operations were  
3 implemented not only in consideration of the pressure rating of the surface equipment,  
4 but also based on observation of the wellhead’s physical response to pumping operations.  
5 Mr. Walzel described that during certain pumping operations, the SS-25 wellhead was  
6 ‘moving around a lot,’ which at times caused Boots & Coots to slow or stop pumping  
7 operations an [sic], in one case, broke the flow lines on the 7 inch tubing and casing, and  
8 the nipple on the wellhead. [Footnote omitted] While it does not appear that Blade’s  
9 modeling accounted for these safety considerations, Boots & Coots appropriately tailored  
10 its kill operations—in real-time—to limit the potential risk of further damaging the well  
11 and compromising safety.”<sup>69</sup>

12           SED asked Blade to respond to Mr. Abel’s assertion that “it does not appear that  
13 Blade’s modeling accounted for these safety considerations” that Abel identified in this  
14 passage. Blade provided a detailed response, including the following statements:

- 15           • “Although requested, Blade did not have direct access to the  
16 Boots & Coots personnel to determine what Boots & Coots had  
17 considered and the rationale for kill operations.”;<sup>70</sup>
- 18           • Information that Boots & Coots appropriately tailored to its kill  
19 operations-in real-time-to limit the potential risk of further  
20 damaging the well and compromising safety was not provided to  
21 Blade. . .Blade requested data regarding kill planning, modeling,  
22 and operations many times, but such data were not provided.”;<sup>71</sup>
- 23           • “Blade made multiple data requests for data related to kill  
24 operations and kill modeling in addition to a request for a face-  
25 to-face meeting with the Boots & Coots personnel with firsthand  
26 knowledge of the SS-25 kill operations. A meeting with Blade  
27 and Boots & Coots could not be arranged.”<sup>72</sup>

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<sup>69</sup> Abel Testimony, p. 13.

<sup>70</sup> Blade Response to SED Data Request 63, Response 2.3.1, p. 12, May 5, 2020.

<sup>71</sup> Blade Response to SED Data Request 63, Response 2.3.1, pp. 12-13, May 5, 2020.

<sup>72</sup> Blade Response to SED Data Request 63, Response 2.3.1, p. 13, May 5, 2020.



- 1           • Blade data requests to SoCalGas related to killing the SS-25 well  
2 includes the following:
- 3           ○ Data Request February 11, 2016 [11]
  - 4           ○ Data Request May 4, 2016[12]
  - 5           ○ Data Request June 29, 2018[13]
  - 6           ○ Data Request August 29, 2018[14]
  - 7           ○ Data Request October 26, 2018[15]
  - 8           ○ Data Request December 19, 2018[9]
  - 9           ○ Data Request January 2, 2019[16]<sup>73</sup>
- 10          • “Safety considerations always take precedence when carrying out  
11 the field operations.”<sup>74</sup>

12  
13           **Abel Assertion 4 and Blade Response:**

14           Mr. Abel stated, “[s]econd, Blade had the benefit of gathering more precise data  
15 points that were not available to Boots & Coots while planning, modeling, and executing  
16 its well kill attempts: 1) the precise depth and severity of damage to the production  
17 casing, and 2) the flow path of the gas from the 7” casing leak to the surface. Indeed,  
18 computer modeling is sensitive to the well geometry (i.e., leak depth, severity, and flow  
19 path), which means that more precise information will produce more accurate modeling  
20 outputs. However, precise flow path geometry is typically unavailable during an active  
21 leak response. . . While Blade was able to determine that the production casing had  
22 completely parted 892 feet after extracting and examining the 7” casing, Boots & Coots  
23 could only estimate the flow path geometry based on real-time observation and analysis  
24 of pumping operations. Second, after extracting the 7” casing, Blade had the advantage of  
25 using a video camera to analyze the 11-3/4” casing and observe holes—which Blade  
26 determined were the “likely consequence of the axial rupture” of the 7” casing. [Footnote  
27 omitted.]. The existence of holes in the surface casing is significant because it impacts the  
28 flow path of the leak and, in turn, the accuracy of the transient modeling. Accordingly,

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<sup>73</sup> Blade Response to SED Data Request 63, Response 2.3.1, p. 13, May 5, 2020.

<sup>74</sup> Blade Response to SED Data Request 63, Response 2.3.1, p. 13, May 5, 2020.

1 while Blade was able to extract the 7” casing to gather additional data to incorporate into  
2 its modeling, Boots & Coots could not have done the same. The practical impact of this  
3 disparity in information is that Blade’s modeling was refined by additional data points  
4 that were not available to Boots & Coots.”<sup>75</sup>

5 SED’s asked Blade whether Blade agreed that Boots & Coots could not have  
6 gathered the information that Abel listed in this passage at the time it was attempting the  
7 well kills of SS-25. In response, Blade stated it did not agree.<sup>76</sup> When asked about which  
8 of the data points Boots & Coots could have attained at the time of its well kill attempts,  
9 Blade provided an extensive list of data points available at the time of the well kills,  
10 stating,

11 Assumptions regarding the leak path and leak depth were made within a few days  
12 of the leak event on October 23, 2015, and likely within hours because a wellbore  
13 schematic (WBS) with well details information was needed for kill planning. Examples  
14 of the evolution of wellbore schematics prepared post October 23, 2015, include wellbore  
15 schematics from SoCalGas, a Boots & Coots WBS from a December 16, 2015,  
16 presentation, a WBS from an Add Energy Report released in February, 2016 (work done  
17 prior to February), and a Blade WBS with final data. Log surveys run on November 8,  
18 2015, were also available that indicated possible leak depths. A review of these  
19 documents shows there were no material changes to the leak path and there would be no  
20 impact on modeling results. . .<sup>77</sup>

21 Precise data of the leak location and leak path were not needed for transient kill  
22 modeling.”<sup>78</sup>

23 Per SED’s request, Blade also explained why Boots & Coots could have attained  
24 these data points at the time of the well kill.<sup>79</sup>

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<sup>75</sup> Abel Testimony, p. 13.

<sup>76</sup> Blade Response to SED Data Request 63, Response 2.4.1, p. 14, May 5, 2020.

<sup>77</sup> Blade Response to SED Data Request 63, Response 2.4.1, p. 14, May 5, 2020.

<sup>78</sup> Blade Response to SED Data Request 63, Response 2.4.1, p. 14, May 5, 2020.

<sup>79</sup> Blade Response to SED Data Request 63, Response 2.4.1, p. 21, May 5, 2020.

1 SED also asked, with the data that Boots & Coots had at the time it was attempting  
2 to kill well SS-25, could Boots & Coots successfully have killed well SS-25?

3 Blade answered, “Yes, assuming that available data and reasonable assumptions  
4 had been used for the kill modeling (and assuming that the pumping was carried out  
5 according to plan developed through modeling), Boots & Coots could likely have killed  
6 SS-25. By ‘reasonable’ we mean that assumptions were made based on engineering  
7 analysis, experience, and judgment. In addition, uncertainties in the input data should  
8 have been evaluated using the modeling to determine the sensitivities to a given  
9 parameter. Conservative assumptions are normally made in designing kill plans to  
10 improve the chances for a successful outcome.”<sup>80</sup>

11 SED also asked Blade, on which attempt Boots & Coots could have successfully  
12 killed well SS-25. Blade answered in part:

13 Kill attempt #2 (the first Boots & Coots attempt) or kill attempt #3 were possible  
14 to achieve a successful kill assuming proper modeling was done with valid input data and  
15 a successful pumping operation according to the modeling results. This is discussed in  
16 the Blade Report [1] (page 4).<sup>81</sup>

17 **Abel Assertion 5 and Blade Response:**

18 Lastly, Mr. Abel asserts that “Blade’s model disregarded other key variables in  
19 pertinent well control operations. Blade’s primary design variables were fluid density and  
20 pump rate. Other parameters such as viscosity, fluid stability, availability, and toxicity  
21 must also be considered. Further, not only must a kill operation stop the gas flow, the  
22 well must be stable when the kill fluid column is in a static state (i.e., after pumping  
23 stops). The pressure profile and corresponding tubular and wellbore integrity (which  
24 changes with depth) must also be considered and not exceeded. Because the Blade Report

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<sup>80</sup> Blade Response to SED Data Request 63, Response 2.4.1, pp. 21-22, May 5, 2020.

<sup>81</sup> Blade Response to SED Data Request 63, Response 2.4.1, p. 22, May 5, 2020.

1 did not analyze these additional parameters, it is unknown if the fluid characteristics  
2 proposed by Blade (and alleged by SED) would have killed the well.”<sup>82</sup>

3 SED asked Blade if it agreed that its model disregarded other key variables in  
4 pertinent well control operations. Blade answered, “No.”,<sup>83</sup> explaining in part, “[t]he  
5 parameters, fluid stability, availability, and toxicity are not input data to a kill model.  
6 Blade used fluid viscosity in the modeling analysis. Fluid viscosity is an important  
7 parameter used to estimate the friction pressure calculations which affect the pressure  
8 profile in the fluid flow path in the wellbore and the surface pump pressure.”<sup>84</sup>

9 **Abel Assertion 6 and Blade Response:**

10 Mr Abel states “[i]n sum, Blade’s post-hoc transient modeling was an academic  
11 exercise that cannot fairly be compared to Boots & Coots’ task of working on site under  
12 real-time constraints, and dealing with practical, field-level concerns (e.g., severe  
13 weather, wellhead condition, and safety of personnel). Even assuming Blade’s transient  
14 modeling generated reasonable outputs, there is no basis for SED to claim that Boots &  
15 Coots should have killed SS-25 sooner—particularly as early as the second attempt (on  
16 November 13, approximately 3 weeks after the leak commenced)—when Blade needed  
17 5-6 weeks to model a well kill, [Footnote omitted] not including time spent on the  
18 investigation and casing removal. Boots & Coots’ approach of increasing pump rate and  
19 fluid density over well kill attempts 2 through 7 reflects a measured and logical process  
20 that did not compromise the safety in the process of bringing the well under control.”<sup>85</sup>

21 SED asked Blade to identify the portions of Mr. Abel’s statement with which it  
22 disagrees, and why. In response, Blade stated it disagreed with the following statements,

- 23 • “In sum, Blade’s post-hoc transient modeling was an academic  
24 exercise that cannot fairly be compared to Boots & Coots’ task of  
25 working on site under real-time constraints, and dealing with

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<sup>82</sup> Abel Testimony, p. 14.

<sup>83</sup> Blade Response to SED Data Request 63, Response 2.5.1, p. 23, May 5, 2020.

<sup>84</sup> Blade Response to SED Data Request 63, Response 2.5.1, p. 23, May 5, 2020.

<sup>85</sup> Abel Testimony, pp. 14-15.

1 practical, field-level concerns (e.g., severe weather, wellhead  
2 condition, and safety of personnel).”<sup>86</sup>

- 3 • “Even assuming Blade’s transient modeling generated reasonable  
4 outputs, there is no basis for SED to claim that Boots & Coots  
5 should have killed SS-25 sooner—particularly as early as the  
6 second attempt (on November 13, approximately 3 weeks after  
7 the leak commenced)—when Blade needed 5-6 weeks to model a  
8 well kill, [Footnote omitted] not including time spent on the  
9 investigation and casing removal.”<sup>87</sup>
- 10 • “Boots & Coots’ approach of increasing pump rate and fluid  
11 density over well kill attempts 2 through 7 reflects a measured  
12 and logical process that did not compromise the safety in the  
13 process of bringing the well under control.”<sup>88</sup>

14 SED also asked Blade why it disagreed with these points. Blade answered as  
15 follows:

16 Regarding bullet 1, Blade said: “Blade’s efforts to model the kill  
17 operations were not an academic exercise—it was specifically to  
18 ascertain why the top kill well-control efforts were unsuccessful and  
19 why it took 111 days to stop the gas from the Aliso Canyon gas  
20 storage reservoir from escaping to the atmosphere. As discussed in  
21 the Blade Report, Blade conducted a transient kill simulation study  
22 to evaluate the likelihood of success of the actual kill attempts.  
23 Blade intentionally used the same field data that were available to  
24 the onsite well control personnel during the time of well kill  
25 operations for this evaluation. According to Blade’s modeling, all  
26 the SS-25 kill attempts were predicted to be unsuccessful.”<sup>89</sup>

27 Regarding bullet 2, Blade said: “[t]he statement that Blade needed 5  
28 to 6 weeks to model a well kill was taken out of context. The  
29 accurate statement is “So for us [Blade] it took much longer; four,  
30 five, six weeks to analyze all of the seven kills” [21] (page 1058:14-  
31 16). Blade modeling included a detailed assessment of gas flowrates

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<sup>86</sup> Blade Response to SED Data Request 63, Response 2.6.1, pp. 25-26, May 5, 2020.

<sup>87</sup> Blade Response to SED Data Request 63, Response 2.6.1, p. 26, May 5, 2020.

<sup>88</sup> Blade Response to SED Data Request 63, Response 2.6.1, p. 26, May 5, 2020.

<sup>89</sup> Blade Response to SED Data Request 63, Response 2.6.1, p. 26, May 5, 2020.

1 and history matching. This level of accuracy was not required for  
2 kill modeling prior to kill attempts.

3 “Blade believes that more accurate kill modeling, using data  
4 available as early as the second kill attempt, would have led to a  
5 better well kill plan. Such modeling would have taken less than a  
6 week to complete. Drillbench software is intended to be used prior  
7 to well kill operations. A properly designed well kill plan, if  
8 implemented correctly, would have increased the chances of success.  
9 However, operational uncertainties are not reflected in the  
10 modeling.”<sup>20</sup>

11 Regarding bullet 3, Blade said: “[b]ased on kill attempt data and  
12 reports provided to Blade, the fluid density did not increase during  
13 kill attempts #2 through 6. The majority of the kill fluid pumped was  
14 9.4 ppg brine and 8.34 ppg fresh water with some 18 ppg barite pills.  
15 This assertion is supported by Mr. Walzel with Boots & Coots. He  
16 stated “. . . I think the fluid weights stayed the same.” in the SED  
17 CPUC Opening Testimony Supporting Attachments document [8]  
18 (page SED 00717:18 – 19). The fluid density did increase to 15 ppg  
19 for kill attempt #7. The data does show the pump rate increased from  
20 8 to 9 bpm for kill attempts #2, 3, and 4 to 13 bpm for kill attempts  
21 #5 and 6. The pump rate for kill attempt #7 was 5.8 bpm.

22 ‘As discussed in the Blade Report [1] (page 4), Based on the data  
23 reviewed by Blade, the well control company appeared to have  
24 designed the kill attempts solely by calculating a kill fluid density  
25 that was higher than the static bottom hole pressure. The result was  
26 that the well was not killed and the surface conditions continued to  
27 deteriorate. The well was brought under control in February 2016  
28 from the relief well, not from top kill attempts in November and  
29 December of 2015.’<sup>21</sup>

30 SED also asked Blade, “Does Blade view that its transient modeling generated  
31 reasonable outputs?” Blade answered, “Yes.” When asked why, Blade explained that,  
32 “Blade used available data (as described in response to Question 2.c.) to construct its  
33 model. This model demonstrated that the well could be killed using 12 ppg or 15 ppg  
34 fluids pumped at reasonable rates.”<sup>22</sup>

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<sup>20</sup> Blade Response to SED Data Request 63, Response 2.6.1, pp. 24-25, May 5, 2020.

<sup>21</sup> Blade Response to SED Data Request 63, Response 2.6.1, pp. 24-25, May 5, 2020.

<sup>22</sup> Blade Response to SED Data Request 63, Response 2.6.1, p. 24, May 5, 2020.