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Exhibit Number	:	
Commissioner	:	Cliff Rechtschaffen
Admin. Law Judge	:	Jessica Hecht
	:	Marcelo Poirier
Witness	:	Margaret Felts

SAFETY ENFORCEMENT DIVISION
CALIFORNIA PUBLIC UTILITIES COMMISSION

SUR-REPLY TESTIMONY OF MS. MARGARET FELTS

RELATED TO VIOLATION 331

San Francisco, California
November 24, 2020

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I. INTRODUCTION – REPLY TO TESTIMONIES OF MR. GLENN LA FEVERS AND MR. L. WILLIAM ABEL

After careful review of the supplemental rebuttal testimony and supporting attachments in response to violation 331, both fundamental points regarding the violation remain true. First, on November 13, 2015, SoCalGas purposely extracted and vented oil from well SS-25 during the incident involving that well.[1]

Second, on November 13, 2015, SoCalGas understood internally that it was releasing oil to the air from SS-25. However, at this time, SoCalGas did not precisely communicate what it understood internally about the release with certain government institutions.[2] Also, SoCalGas' messaging to the general public shortly after this time did not reveal that SoCalGas understood it was releasing oil to the air from SS-25, and was even misleading about what it believed it was releasing.[3]

With regards to Mr. La Fevers' Supplemental Rebuttal Testimony (Chapter 1), in several instances SoCalGas either could not or would not answer data requests about it. For example, SoCalGas refused to answer several questions asking whether the report he relies upon in his testimony (Exhibit I-7) was an analysis of the oil that the Message Center Report (MCR) says was extracted and vented into the atmosphere on November 13, 2015.[4] Given this, it remains unclear how SoCalGas knew exactly what it released into the air from well SS-25 on November 13, 2015, not to mention whether the release was non-hazardous. As a second example, SoCalGas said it could not find its recordings and transcripts of Mr. La Fevers' communications with dispatch about the November 13, 2015 MCR that shows oil was extracted and vented into the atmosphere on November 13, 2015.[5]

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[1] See Section II for further discussion and supporting documentation.

[2] See Section III for further discussion and supporting documentation.

[3] See Section IV for further discussion and supporting documentation.

[4] See Section V for further discussion and supporting documentation.

[5] See Section V for further discussion and supporting documentation.

With regards to Mr. Abel's Supplemental Rebuttal Testimony (Chapter 2), in the body of this testimony, I provide further discussion on these points, as well as the evidence I have identified that suggests SoCalGas was well aware of unique conditions in SS-25, but that it apparently failed to understand how these conditions contributed to the difficulties encountered during attempts to kill this well.[6]

In the body of this testimony, I provide further discussion on these points, as well as the evidence I have identified in support of them.

II. SOCALGAS PURPOSELY EXTRACTED AND VENTED OIL INTO THE ATMOSPHERE DURING THE SS-22 INCIDENT ON NOVEMBER 13, 2015, WHICH IS A 451 VIOLATION BECAUSE IT EXPOSED PEOPLE NEAR THE WELL AND THE PUBLIC TO HAZARDOUS SUBSTANCES

Violation 331 is based on a November 13, 2015. 3:00 P.M. text message that showed SoCalGas purposely extracted and vented oil into the atmosphere on November 13, 2015. That text message stated:

> Per Incident commander Glenn La Fevers. During the repair process to mitigate the Leak at the well head in Aliso Canyon, oil was extracted and was vented into the atmosphere. There is an oily mist that may potentially be moving into the Porter Ranch area. Customer Service Field, Distribution and Meter Reading employees who are or may be headed to work in the area have been given instructions to avoid the Porter Ranch area until further notice. The Customer Contact Center has been notified. If an A-1 is issued in the area, CSF employees are to take extreme caution when working the order.[7]

After carefully reviewing the Supplemental Rebuttal Testimony from Mr. La Fevers and Mr. Abel, I recommend that this text message should remain a valid basis for violation 331 because SoCalGas has not provided sufficient evidence to refute the violation that it was the result of a purposeful act.

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[6] See Section VI for further discussion and supporting documentation.

[7] Sur-Reply testimony of Margaret Felts, Chapter 8, pp 4-6. Attachment SED SUR_REPLY_002177.

III. REGARDING SOCALGAS' PURPOSEFUL RELEASE OF OIL FROM SS-25 ON NOVEMBER 13, 2015, SOCALGAS ' INTERNAL CORRESPONDENCE SHOWS DISCREPANCIES COMPARED TO ITS CORRESPONDENCE WITH CERTAIN GOVERNMENT INSTITUTIONS

It is unclear from correspondence between SoCalGas and other government institutions what exactly happened at the well site on November 13, 2015. SoCalGas does not explain, and provides no clear and consistent evidence of what occurred. Based upon the records SoCalGas has provided, the timeline and explanation of events is confusing, as discussed below.

In Exhibit I-9, Mr. La Fevers provides a copy of a call record that shows a call to NRC (EPA National Response Center) at 13:17 (1:17 PM) on Nov 13, 2015 that reports:

> Caller stated that during well kill activities an oily mist was being released into the air as well as oily liquid being released to the ground in the area of the well . . . Release is ongoing at this time. Responding with clean-up efforts and containment at this time. California Div of Oil and Gas is on site."[8]

A report to the NRC is triggered by the release of reportable quantities of hazardous substances.[9] SoCalGas obviously believed a spill of oil had occurred, or it would not have called in the report to the NRC.[10] The EPA does not broadcast these calls to the public.[11] From my review of documents available to me, as discussed below, I believe this call to NRC may have been the initial report of the release mentioned in Mr. La Fevers' Message Center Report (MCR) message underlying Violation 331, which would put the time of the event at, or about, 1:17 P.M. on November 13, 2015. However, since the call to NRC does not contain the same language as the MCR, i.e. "oil was extracted

[8] SoCalGas Supplemental Rebuttal Testimony, Exhibit I-9.

[9] 40 CFR 302.4.

[10] SoCalGas Supplemental Rebuttal Testimony, Exhibit I-9.

[11] Personal knowledge. The public can obtain reports with a Freedom of Information Act request.

and was vented into the atmosphere," I cannot be sure that the NRC report was not associated with another event on the same day.

The MCR that delivered the message underlying Violation 331 states a reported date and time of November 13, 2015 at 2:21 PM, according to an incident report provided by SoCalGas.[12] As shown above, the MCR message itself says 3 PM.[13] I am not able to reconcile the different date and times on various copies of the MCR messages, but the text of the MCR messages appear to be the same, other than identification of who was the source of the message.[14] The MCR message from Mr. La Fevers, and a copy issued by Gillian Wright,[15] are the only dispatch messages that SED received.. There are numerous references to "mud, oil and gas flowing from fissures" on the pad or around the well head.[16] However, none of these reports state that oil was "extracted and vented" into the air. In that respect the Mr. La Fevers' MCR message was unique and appears to be a warning to SoCalGas employees regarding an unsafe and hazardous situation.[17]

In asserting that there was no attempt to "cover up" the release of oil, Mr. LaFevers' testimony states, "Representatives from the Division of Oil, Gas and Geothermal Resources [DOGGR]. . .were present at Aliso Canyon during the well kill attempt on November 13, 2015."[18] However, it is not clear that the "Update" document referenced by Mr. La Fevers provides evidence for this claim.[19]

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[12] **Exhibit 1** SoCalGas_SED_DR_119_0000020, Line 7.

[13] Sur-Reply testimony of Margaret Felts, Chapter 8, pp 4-6. Attachment SED SUR_REPLY_002177.

[14] SED Sur-Reply Chapter 8 Attachment SED SUR_REPLY_002177.

[15] Exhibit 1 SoCalGas_SED_DR_119_0000020.

[16] See Boots & Coots Daily Reports, SoCalGas Daily reports and SS_25 Well History filed with DOGGR. (Already provided in other testimony.)

[17] SED Sur-Reply Chapter 8, pp 4-6 for testimony. Attachment SED SUR_REPLY_002177.

[18] Testimony of Glen La Fevers, p. 3, lines 8-11, including footnote 9, citing to Ex. I-1. This document will be called the DOGGR "Update" for reference.

[19] SoCalGas Supplemental Rebuttal Testimony, Exhibit I-1.

SoCalGas believes the Update was written by DOGGR.[20] However, certain facts in this Update do not precisely match the ones stated in other documents, such as the Standard Sesnon 25 Chronology Summary, a report referenced by Blade,[21] which was written by the same person at DOGGR.[22] For reference, this report will be called the "Chronology Summary".

One difference between the Update and the Chronology Summary is as follows: the Update shows no timeline for events on November 13, 2015. On the other hand, the Chronology Summary does not state the time of the blowout, but does say it occurred 'after this pumping job."[23]

Another difference between the Update and the Chronology Summary is that the Chronology Summary includes the detail that the "blowout vent opened 20 (ft) from the wellbore and began shooting debris 75 (ft) into the air."[24] (Emphasis added.) Unlike the Chronology Summary, the Update states "[a]t about 100 bbls away or so, the well began to blowout to surface despite having the choke at 100% open. A large column of gas, aerated mud, and rock formed a geyser around the well head," (Emphasis added.) and, on p.2 end of first paragraph, "the dust column reached an estimated 60' in height."[25]

The Update is also different than a Boots & Coots daily report.[26] The Update states that the pumping stopped at 1445 hours (2:45 P.M.) on November 13, 2015, and that "[t]he well was blowing a small amount of gas from the well cellar. Most of the gas, however, was blowing from a large fissure about 20' north of the wellhead. This gas was

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[20] **See Exhibit 2**, SoCalGas Response to SED Data Request 119, Question 8(c), pdf p. 8.

[21] The Blade Main Report, pp. 148 and 243, states that "A blowout vent opened 20 (ft) from the wellbore and began shooting debris 75 (ft) into the air (6)." Reference "(6)" from the Blade Main Report is to "Division of Oil, Gas, and Geothermal Resources [DOGGR]."

[22] **Exhibit 3** STANDARD SESNON 25 Chronology Summary, at Nov 13, 2015. (Chronology Summary) File Details show the author was Kris Gustafson; document last saved by Bruce Hesson, both from the Department of Conservation; content created on 12/14/2015.

[23] Exhibit 3, Chronology Summary.

[24] Exhibit 3, Chronology Summary, p. 2.

[25] SoCalGas Supplemental Rebuttal Testimony, Exhibit I-1.

[26] **Exhibit 4** AC_CPUC_SED_DR_16_0000343.

a significant blow and it was decided that it should be left alone for the night."[27] The Update also states that the DOGGR[28] representatives left the site at 1500 hours (3 P.M.).[29] But, according to the Boots & Coots daily report, they continued pumping until 5 P.M on November 13, 2015.[30]

Whereas Mr. La Fevers' MCR message from November 13, 2020 revealed that "[d]uring the repair process to mitigate the leak at the well head in Aliso Canyon, oil was extracted and was vented into the atmosphere," other external communications provided by SoCalGas did not specifically state these facts.

For example, SoCalGas provides another exhibit, which is a Hazardous Material Spill Report to the Governor's Office of Emergency Services.[31] (OES Report) This report is referenced in the Chapter 1 statement: "As further described in SoCalGas' Supplemental Rebuttal Testimony Chapter II (Abel), the release of oil, which was entrained in the resurfaced fluids,[fn8] was an ancillary and unavoidable byproduct of the well kill attempt and to the achievement of SoCalGas' main objective, i.e., to safely control the well."[32] The OES Report was filed electronically on November 13, 2015 at 1334 (1:34 PM).[33] In the OES Report, the substance spilled is identified as crude oil.[34] The Description of the spill is "[d]uring well kill a mist is releasing due to pressure, material is flowing directly into the atmosphere and pooling at the base of the well on soil, mist is traveling Southwest in the air from the well head, no estimate of containment

[27] SoCalGas Supplemental Rebuttal Testimony, Exhibit I-1.

[28] In 2020, DOGGR was renamed as the California Geologic Energy Management Division (CalGEM). For consistency with this and prior testimony, this testimony will use the term "DOGGR" throughout.

[29] SoCalGas Supplemental Rebuttal Testimony, Exhibit I-1.

[30] Exhibit 4 AC_CPUC_SED_DR_16_0000343.

[31] SoCalGas Supplemental Rebuttal Testimony, Exhibit I-3.

[32] SoCalGas Supplemental Rebuttal Testimony, Chapter 1, P. 3, l.5.

[33] SoCalGas Supplemental Rebuttal Testimony Exhibit I-3. P. 1.

[34] SoCalGas Supplemental Rebuttal Testimony Exhibit I-3. P. 1.

at this time, RP[35] is handling the containment and cleanup."[36] SoCalGas does not say in this OES Report that "oil was extracted and was vented into the atmosphere" and it is not clear that this OES Report was filed as a result of the extraction and venting of oil reported by Mr. La Fevers in the MCR message, or if it is related to a different release.[37]

As it turns out, SoCalGas believes there were similar events at SS-25 *after* November 13, 2015. SoCalGas states "[f]rom November 13, 2015 through February 11, 2016, pressure within the SS-25 well caused liquid to become aerosolized during kill events and on a periodic basis between kill attempts. See, e.g., Boots & Coots' daily reports which were previously provided to SED with Bates range AC_CPUC_SED_DR_16_0025631 – AC_CPUC_SED_DR_16_0025808."[38] In this same response, SoCalGas fails to say whether or not additional similar events occurred on November, 13, 2015. To SED's knowledge, no additional MCR notices stating: "oil was extracted and was vented into the atmosphere" were dispatched for any of the events that occurred on or after November 13, 2015.

IV. REGARDING SOCALGAS' PURPOSEFUL OIL RELEASE ON NOVEMBER 13, 2015, SOCALGAS FAILED TO PROVIDE TO THE PUBLIC THE DETAILED WARNING PROVIDED TO ITS OWN EMPLOYEES, THUS TREATING INFORMATION INCONSISTENTLY

While I cannot discern by facts provided by SoCalGas that SoCalGas or Boots & Coots specifically took an action to extract and vent oil to the atmosphere, in response to Mr. La Fevers' testimony, I provide further evidence and reasoning below to support my testimony.

Mr. La Fevers states that he was present at the SS-25 well site on November 13, 2015 and that he notified Dispatch about the release that is subject of the Message Center

[35] Responsible Party.

[36] SoCalGas Supplemental Rebuttal Testimony Exhibit I-3, p. 1.

[37] SED Sur-Reply Chapter 8, pp 4-6 for testimony. Attachment SED SUR_REPLY_002177

[38] Exhibit 2 SoCalGas Response to SED DR 119, Q2.c.

Reporting (MCR) message that is the basis of Violation 331.[39] Among the hundreds of Aliso Canyon visitor passes and visitor lists produced by SoCalGas, I have not found a document that shows Mr. La Fevers was at the site on November 13, 2015. Nevertheless, I rely on his statement that he was there. SoCalGas provides no evidence that Dispatch wrote anything other than exactly what Mr. La Fevers said when he contacted Dispatch.[40] So, I believe the statement issued by MCR was in fact the statement made by Mr. La Fevers.

Mr. La Fevers has significant relevant experience as a Safety Training Supervisor, an Environmental Coordinator, and as a Field Safety Advisor.[41] At the time of the incident, Mr. La Fevers was Storage Operations Manager.[42] With this experience, I do not question that his assessment of the safety conditions at the well site on November 13, 2015 was accurate in that it was based on his observations. Likewise, his determination that an immediate warning should be issued regarding this unusual event resulting in the venting of an oily mist that was "potentially" moving into the Porter Ranch area, in my opinion, is the correct incident response.[43] I say that this was an unusual event because, as discussed in the next section, the physical conditions of the SS-25 well tubing were unusual, leading to unanticipated well kill results, including geysers from ground near the well.

[39] SoCalGas Supplemental Rebuttal Testimony, Chapter 1, P.4, l.16. Mr. La Fevers is identified as the person who contacted Dispatch with a verbal statement. (Response to DR 119 Q.5, 1906016_SoCalGas_SED_DR_119_0000020.).

[40] Exhibit 2 SED DR 119 Q6 asked "Precisely how did dispatch know to state in the Message Center Report that "oil was extracted and vented into the atmosphere."? SoCalGas responded "SoCalGas is not currently able to pose this question to the Dispatcher".

[41] SoCalGas Supplemental Rebuttal Testimony, Witness Qualifications.

[42] Exhibit 2 SoCalGas Response to SED DR 119, Q2.

[43] As noted in my Qualifications, I served as Deputy Director of Site Mitigation at the Department of Toxic Substances Control where I supervised over 200 employees in 4 Divisions, including the Emergency Response Division, which responded to releases of hazardous substances.

According to the Incident Tracking System Record, Mr. La Fevers' first reported the incident to Gillian Wright at 1421 hours (2:21 P.M.).[44] (2:21 message) Gillian Wright, identified as V.P. of Customer Service, apparently sent out a separate message a few minutes later at 1443 hours (2:43 P.M.) that contained the same contents as the 2:21 message.[45] Ms. Wright's message from 2:43 P.M. (2:43 message) is included on the second page of an OES Report:[46]

> ****OPEN MCR*** Per Incident commander Gillian Wright. During the repair process to mitigate the Leak at the well head in Aliso Canyon, oil was extracted and was vented into the atmosphere. There is an oily mist that may potentially be moving into the Porter Ranch area. Customer Service Field, Distribution and Meter Reading employees who are or may be headed to work in the area have been given instructions to avoid the Porter Ranch area until further notice. The Customer Contact Center has been notified. If an A-1 is issued in the area, CSF employees are to take extreme caution when working the order.[47]

In the 2:43 message, Ms. Wright is identified as the Incident Commander.[48] Having just been notified by Mr. La Fevers, she would have had all of the pertinent information about the incident. While it is unclear what Ms. Wright's experience is, there is no reason to believe that Gillian Wright erred in sending this message to employees. Both the 2:21 message and the 2:43 message are shown as occurring on November 13, 2015.[49]

In the message, both Mr. La Fevers and Ms. Wright state that the oily mist was

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[44] Exhibit 1 SoCalGas_SED_DR_119_0000020.

[45] Exhibit 1 SoCalGas_SED_DR_119_0000020.

[46] Exhibit 1 SoCalGas_SED_DR_119_0000020.

[47] Exhibit 1 SoCalGas_SED_DR_119_0000020.

[48] **Exhibit 5** AC_CPUC_0207252. Complicating my analysis is this SoCalGas organizational chart titled SS-25 Incident Command Structure that shows Ms. Wright as Public Information Officer, and not a Vice President or Incident Commander. As of November 22, 2015, Ms. Wright reported to Hal Snyder, who is shown as the Incident Commander. Mr. La Fevers is not on the org chart.

[49] Exhibit 1 SoCalGas_SED_DR_119_0000021.

moving toward, and could fall in, the area of Porter Ranch.[50] They are clearly concerned about the safety of SoCalGas employees as he states in the message that "Customer Service Field, Distribution and Meter Reading employees who are or may be headed to work in the area should avoid the Porter Ranch area until further notice . . . If an A-1 is issued in the area, CSF employees are to take extreme caution when working the order."[51] As shown by the last sentence in this quoted message, this MCR message was an internal SoCalGas message issued as a safety alert for employees -- not a message the public would receive.

Mr. LaFevers' testimony states,

> SoCalGas provided notifications related to the release to the community and the public. On November 13, 2015, SoCalGas issued automated telephone notifications to the community-an 'Outbound Dial Message – Stay Indoor Notification' and 'Outbound Message All Clear Notice' – notifying residents of the release."[52]

The exhibit Mr. La Fevers references for his claim that residents were notified of the release suggests that on November 2015, (someone at) SoCalGas issued an outbound dial message notification to "customer" to "stay indoors."[53] However, unlike the 2:21 message and 2:43 messages, which stated "oil was extracted and was vented into the atmosphere", the exhibit referenced by Mr. La Fevers shows no evidence that these facts were actually mentioned in this notification to the public. Also, it is not clear from this exhibit who issued the message, or who would have received this notification. There is no time stamp on this notification, so it is unknown if this notification was issued as a result of the release of the oily mist, or some other event on the same day.[54]

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[50] **Exhibit 1** SoCalGas_SED_DR_119_0000021.

[51] Sur-Reply testimony of Margaret Felts, Chapter 8, pp 4-6. Attachment SED SUR_REPLY_002177.

[52] SoCalGas Supplemental Rebuttal Testimony, Chapter 1, p. 7, lines 3-6, including footnote 28, referencing Ex. I-4 at 4.

[53] SoCalGas Supplemental Rebuttal Testimony, Exhibit I-4, p. 4.

[54] SoCalGas Supplemental Rebuttal Testimony Chapter 1, Exhibit I-4, p. 4.

Mr. La Fevers' testimony also states that SoCalGas posted an update on its website related to the release on November 14, 2015.[55] According to the testimony, this update stated,

> On Friday [November 13, 2015], some of the brine solution did come back up, and it created a mist in the air over the facility. Out of an abundance of caution, we assumed the mist could contain oily residues (The storage field is a depleted oil field.) and could travel beyond the facility. As a result, we immediately alerted the residents in nearby communities to stay indoors. As soon as we recognized the mist would not travel beyond the facility, we advised residents there was no reason to stay indoors.
>
> We conferred with the Health Department, LA County Department of Health and HazMat and the SCAQMD. Our initial observations later in the day led us to believe the contents of the mist were likely mostly a mixture of mud and the brine solution; however, we have sent samples for analysis to be certain of its contents. When we receive the final report from the laboratory, we will make this information available.[56]

These "website updates" disclose different facts about the contents in the release than some of SoCalGas' other communications.[57] The update says that on November 13, 2015, that SoCalGas' initial observations after conferring with government agencies led them to "believe the contents of the mist were likely mostly a mixture of mud and the brine solution".[58] In contrast, the 2:21 message from Mr. La Fevers and the 2:43 message from Ms. Wright, also on November 13, 2015, state that oil was extracted and vented into

[55] SoCalGas Supplemental Rebuttal Testimony Chapter 1, p. 7, lines 6-7.

[56] SoCalGas Supplemental Rebuttal Testimony Chapter 1, p. 7, lines 8-20.

[57] Specifically, the updates do not say that SoCalGas extracted and vented oil to the atmosphere, as stated in Mr. La Fevers' MCR message.

[58] SoCalGas Supplemental Rebuttal Testimony Chapter 1, p. 7, lines 8-20.

the atmosphere.[59] These two MCR messages did not say mud, water, or brine solution was extracted and vented. Analyses SoCalGas provided show that oil was released.[60]

Mr. La Fevers' testimony went on to say that, "SoCalGas sent samples to an outside laboratory for analysis, and its website update noted the analysis determined the liquid was non-hazardous.[61] Review of the exhibit referenced by SoCalGas to make this statement shows that the website update to which SoCalGas refers stated the following on November 15, 2015:

> We sent samples of the liquid that generated the mist to an outside laboratory for analysis. The laboratory analysis determined that the liquid is non hazardous.[62]

This quote is also inconsistent with certain underlying facts. In an email from Maria Solis (CPUC) dated November 16, 2015, she requests copies of the analyses and quotes from a timeline submitted to her that said "November 14 - Collected samples of the mud and liquid from yesterday's release and having it analyzed and expect results tonight."[63] In fact, the laboratory analyses report from Eurofins shows samples were collected and submitted on November 14th and the report of analyses with results is dated November 16, 2015.[64] Thus, on November 15, 2015, SoCalGas would not have had the Laboratory analysis results as stated in this November 15, 2015 public release. The same quote from the timeline in Solis' email includes the following statement for November 14th: "At 1:05 pm OES and NRC were notified of release containment and minor additional release of

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[59] Sur-Reply testimony of Margaret Felts, Chapter 8, pp 4-6. Attachment SED SUR_REPLY_002177 and Exhibit 1 SoCalGas_SED_DR_119_0000020-21, p. 2.

[60] SoCalGas Supplemental Rebuttal Testimony, Exhibit I-7, page 57, this analysis was for liquid collected from the ground, not the specifically oil that was vented. Therefore, while the analysis shows the liquid was oil, the amount (PPB) of each constituent reported does not represent the amounts that were in the vented oil.

[61] SoCalGas Supplement Rebuttal Testimony Chapter 1, p. 7, lines 21-22, including footnote 31, citing Ex. I-6 and Ex. I-7.

[62] SoCalGas Supplemental Rebuttal Testimony, Exhibit I-6, page 1 Aliso Canyon Updates, Updated November 15, 2015.

[63] SoCalGas Supplemental Rebuttal Testimony, Exhibit I-7, p. 1.

[64] SoCalGas Supplemental Rebuttal Testimony, Exhibit I-7, p. 57.

crude oil at 4:30 am."[65] This statement suggests that OES and NRC were notified a day after the event AND another release of *crude oil* occurred after midnight at 4:30 am on the 14th.[66] SoCalGas provides no information about this release.

V. SOCALGAS DID NOT OR COULD NOT ANSWER CERTAIN DISCOVERY QUESTIONS ABOUT MR. LA FEVERS' TESTIMONY

With regards to the laboratory analysis of the mist mentioned on the SoCalGas website on November 15, 2015, Mr. La Fevers' testimony states that, "SoCalGas produced the laboratory reports to SED on November 17, 2015."[67] As shown here, SED asked SoCalGas several times whether these "laboratory reports" were actually samples collected of the mist that contained the oil identified in the 2:21 and 2:43 messages. SoCalGas did not answer these questions. First, SED asked in Data Request 119, Question 11b, "Please refer to Exhibit I-1, Sample Analyses. Please provide sample chains of custody and analytical results for all samples collected on November 13, 2015 of the mist that contained oil and was subject of the 3:00 pm MCR dispatch. In response to this question, SoCalGas stated, "SoCalGas responds as follows. See Exhibit I-7."[68] Exhibit I-7 analyses are for samples obtained from discharges to the ground.

Following up on this non-answer SED asked in Data Request 124, Question 1, "Is SoCalGas assuming that the analysis it provided in Exhibit I-7 is representative of the mist that was discharged into the atmosphere on November 13, 2015?" SoCalGas' answer stated, "Report 15-11-1098, which was provided in SoCalGas Supplemental Rebuttal Testimony, Chapter 1 (La Fevers), Exhibit I-7, includes a sample of the fluids released during the well kill attempt on November 13, 2015.[69] SED then asked in DR 124, Question 2, "Confirm that SoCalGas did

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[65] SoCalGas Supplemental Rebuttal Testimony, Exhibit I-7, p. 1.

[66] SoCalGas Supplemental Rebuttal Testimony, Exhibit I-7, p. 1.

[67] SoCalGas Supplement Rebuttal Testimony Chapter 1, p. 7, lines 22-23, including footnote 32, citing Ex. I-7.

[68] Exhibit 2 SoCalGas Response to SED Data Request 119, Question 11b.

[69] **Exhibit 8** SoCalGas Response to SED Data Request 124, Question 1, pdf p. 2 of 3.

not take samples of the mist asked about in question 11b." SoCalGas answered, "See Response 1."[70] SoCalGas again did not confirm that the laboratory analyses to which Mr. La Fevers' testimony referred was regarding mist. I am left wondering if SoCalGas did, indeed, take samples of the oily mist but did not submit them for analysis, or did have the samples analyzed but do not want to provide the results to SED.

SED also asked SoCalGas to provide the recordings and transcripts of all communications with Dispatch related to the MCR issued on November 13, 2015 which stated, [d]uring the repair process to mitigate the Leak at the well head in Aliso Canyon, oil was extracted and vented into the atmosphere." SoCalGas responded it could not find recordings or transcripts in answer to these questions.[71]

Sur-Reply to Testimony of L. William Abel, Chapter 2

VI. DESPITE HIS EXTENSIVE REVIEW OF RECORDS AVAILABLE TO SED, MR. ABEL'S TESTIMONY DOES NOT EXPLAIN WHY THE SS-25 WELL EXPERIENCED A GEYSER RELEASE 75 FT HIGH, OR THE EXTRACTION AND VENTING OF OIL THAT OCCURRED ON NOVEMBER 13, 2015

Mr. Abel indicates that he reviewed records available to SED, but does not specify what records he reviewed.[72] SoCalGas has given SED more than 500,000 pages of records in response to data requests. It seems unlikely that Mr. Abel had time to read all of those.

Mr. Abel states that the release occurred as a direct and natural result of the well kill attempt implemented by the well control company.[73] Instead of complicating this issue with confusing and sometimes contradictory facts that seem to indicate a cover-

[70] Exhibit 8 SoCalGas Response to SED Data Request 124, Question 1, pdf p. 3 of 3.

[71] **Exhibit 7** SoCalGas Response to SED Data Request 120, Questions 1 and 2.

[72] SoCalGas Supplemental Rebuttal Testimony, Chapter 2, p.1, l.12-15.

[73] SoCalGas Supplemental Rebuttal Testimony, Chapter 2, p.1, l.15-16, p.2, l.1-3 and p. 2, l-10-17.

up,[74] SoCalGas' expert, Mr. Abel, could have provided a plausible engineering explanation for what Mr. La Fevers saw and reported on November 13, 201, based on facts about the well kill at SS-25.

After further review of data response records[75] and in light of a publicly available technical report that I recently found among Blade documents provided to me, and written by Lawrence Berkley National Labs engineers who were present during SS-25 well kill attempts,[76] I believe the geyser-like release of oil (including mud and gas) from SS-25 during the well kill was a unique event specific to that well, not a direct and natural result of the well kill attempts as stated by Mr. Abel.

Mr. Abel was not present at the well site on November 13, 2015.[77] So, he cannot speak to what exactly happened on that day any more than I can. What we do know is that the DOGGR representative wrote "a blowout vent opened 20 (ft) from the wellbore and began shooting debris 75 (ft) into the air."[78] And we know that Mr. La Fevers described the event by stating "oil was extracted and was vented into the atmosphere. There is an oily mist that may potentially be moving into the Porter Ranch area." [79] He was not describing fluids released to the surface or mud brine flowing around the well head.[80]

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[74] As presented in the sections above in this document.

[75] These records are identified in the text below: DR01.03 SoCalGas memo_SSSVs, which is SoCalGas supplemental responses to DR 1, drafted by SED and DOGGR; SS-25 temperature and noise surveys already in evidence (SED and Public Advocates Office), as well as Page.856.DR30_0000001- 1177 All-8, which is a 1984 Temperature Survey Data Sheet for SS-25; AC_CPUC_SED_DR_17_0046340, a sketch of SS-25 with hand written annotations made as of 11/10/2015; AC_BLD_0076009, Core Labs Report for 11/8/2015; AC_BLD_0075868, Kill Program for 11/12/2015; SED SoCalGas - DR 81; and Hazardous Materials Spill Update2 - 15-6708

[76] **Exhibit 9** Pan_etal_modeling_blowout,_2018.

[77] Mr. Abel was hired as an expert witness after the SS-25 event.

[78] See Blade Main Report, pp. 148 and 243.

[79] Sur-Reply testimony of Margaret Felts, Chapter 8, pp 4-6. Attachment SED SUR_REPLY_002177.

[80] As described in other documents SoCalGas points to, such as Boots & Coots and SoCalGas daily reports.

Even though it appears that Mr. La Fevers was reporting the extraction and release of crude oil as if describing a release of oil from the well itself, further investigation suggests the what he witnessed was likely a sudden ejection from the area around the well of fluids that had just been pumped down SS-25 during a kill attempt and which was coated with oil from the reservoir that contains residual oil.[81] There is another report that was filed with OES on November 13, 2015, which includes multiple updates, the last of which is at 2:33 P.M. that changes the previous description of the release from crude oil to "brine solution with an oily sheen."[82] This reporting seems to be an effort to downplay, or cover up what actually happened, but it could also be a series of corrections to the original report. For unknown reasons, SoCalGas did not provide the 2:33 P.M OES report in its rebuttal.

Since the time SS-25 first failed, I have wondered why SoCalGas could not kill the well, given their years of experience killing wells for maintenance purposes and in the event of well casing failures. The suggestion that a kill attempt was followed by a geyser type discharge of liquids was not explained by any of the documentation SoCalGas generated in response to data requests. The SS-25 well files provided were devoid of the typical interoffice memos that show up in other well files, so there was no analysis of historical issues to consider. Although SoCalGas has produced no reports regarding geyser types of releases from SS-25 associated with well kill attempts, I recently reviewed a technical document in the Journal of Petroleum Science and Engineering, issue 161 (2018) pp.158-164 which was written by engineers from the Lawrence Berkeley National Laboratory.[83] Apparently, some or all of the authors participated in the last SS-25 kill event in December 2015. In this study, failed kill events were modeled utilizing data from those events, resulting in a unique explanation for the failures and,

[81] I say this from my own experiences seeing mud coated with oil, which looks like pure crude oil. Of course, I was not there on November 13, 2015, so, here I am giving Mr. La Fevers the benefit of the doubt.

[82] **Exhibit 10** Hazardous Materials Spill Update2 - 15-6708.

[83] Exhibit 9 Pan_etal_modeling_blowout_2018.

especially, for the geysers, which apparently occurred more than once.[84] In the words of this study,

> The return to blow-out flow conditions occurs like the eruption of a geyser with strong oscillations in liquid flow through the casing failure. . .The liquid in the annulus [between the tubing and 7 inch casing] is quickly carried out of the well with the flowing gas in the form of a geyser like eruption.[85]

This study explains that normal kill procedures could not kill the well, because there were holes in the tubing from a safety valve (SSV) that had been removed years before.[86] Also according to the study, when SoCalGas installed a plug just above those holes and perforated the tubing above the plug, the configuration was such that a column of kill fluid could not be created at reservoir depth.[87] Therefore the flow of high pressure gas could not be overcome.[88] The study also shows how the relief well, which penetrated SS-25 below this configuration of holes and plug, killed the well, as would be expected under normal conditions. Below is wording from the conclusion:

> During early efforts to control SS-25, a plug was installed in the well tubing and the tubing was subsequently perforated above the plug to regain access to the well. These openings along with the open SSV slots in the tubing created a complex flow path for gas and kill fluid between the tubing and A-annulus. Simulations of flowing gas and top-kill and relief well kill processes have been carried out using T2Well, a coupled well reservoir simulator. . . . Using detailed properties of the well and the calibrated and known parameters,

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[84] Exhibit 9 Pan_etal_modeling_blowout_2018.

[85] Exhibit 9 Pan_etal_modeling_blowout_2018, pp. 166 and 167.

[86] **Exhibit 11** DR01.03 SoCalGas memo_SSSVs actually shows that there were a series of SSSVs installed and removed. The authors of this Study refer to the remaining holes in the tubing as "SSV Slots."

[87] Exhibit 11 DR01.03 SoCalGas memo_SSSVs actually shows that there were a series of SSSVs installed and removed. The authors of this Study refer to the remaining holes in the tubing as "SSV Slots."

[88] Exhibit 11 DR01.03 SoCalGas memo_SSSVs actually shows that there were a series of SSSVs installed and removed. The authors of this Study refer to the remaining holes in the tubing as "SSV Slots."

T2Well simulations match observed pressures and provide plausible temperatures for flowing gas.

Our simulation results capture complex two-phase flow and geometry-related aspects of the system and provide a basis for understanding the top-kill failures, behavior of the relief-well kill, and the effectiveness of hypothetical scenarios for the SS-25 well. The SSV resulted in a substantial portion of the top-kill fluid being ejected from the breach in the SS-25 production casing breach as compared to conventional well configurations with no such connection between the tubing and A-annulus. As a result, many times more kill fluid was required than a simple calculation of the well volume would indicate, which is the sufficient volume for conventionally configured well. In the cases of sufficient kill fluid volume and rate to stop the gas flow temporarily, the tubing plug-perforation combination shortened the cessation of gas flow substantially because the resumption of gas flow trapped fluid in the tubing. With no plug in the tubing, the liquid column in the tubing retards the gas flow through the SSV, lengthening the time until this gas has expanded the liquid in the A-annulus up to the production casing breach. Finally, the leakage of kill fluid into the reservoir without a compensatory continued injection of kill fluid caused SS-25 to resume blowing out.

The cumulative effect of these three factors appears not to have been discerned during the blowout as evidenced by the failure of the numerous top kills to stop the gas flow permanently, and the erosion ("cratering") around the casing below the well head resulting from these numerous kills necessitated commencing two relief wells (the second relief well was started as a backup in case the first failed to stop the blowout for some reason). Consequently, the failure to account for the cumulative impact of these factors extended the blowout period and increased the cost of bringing it under control.

This study demonstrates the value of a simulator capable of exploring multiphase fluid flow in complex well configurations coupled to a reservoir as compared to simpler straight pipe simulators. Although we started these simulation studies while the unsuccessful top kills were being carried out and worked extended hours to generate model results, we could not generate results that we were confident in fast enough to keep pace with the needs of the operator. This experience points out that reacting to incidents like the SS-25 blowout is problematic because it is difficult to keep pace

> with the crisis. Instead, it is imperative that operators develop the capacity to carry out simulations, or mine existing databases of pre-computed results, very quickly in response to incidents such as the SS-25 blowout so that decision-making and responses can be made in a timely manner.[89]

This Study seems to pull together loose ends that I had seen in SS-25 data, but could not understand fully.[90] First, there were numerous temperature charts since the 1980s for this well that seemed to show a leak above the shoe.[91] It now seems likely that those leaks may have reflected the holes left in the tubing at about 8400 ft which allowed gas to rush out of the tubing above the shoe.[92] I expect that the well files for SS-25 contained interoffice memos about this issue that were not included in the well files delivered to SED.[93] Second, there is a well view drawing with annotations on it, dated 11/10/2015 that shows a probable path of the gas from the tubing to the annulus via "camco parts".[94] Compare this sketch to a Well View drawing of SS-25 provided to SED in response to DR 64, which does not show holes in the area where the Camco safety valve used to be. In fact, it shows the safety valve installed.[95] Third, there was a survey of the well performed on 11/8/2015 by CoreLabs that showed "gas flow appears to be flowing up the tubing and exiting through a tubing failure at 8435'."[96] SED asked SoCalGas about this tubing leak and they responded "The cross-over flow ports for

[89] Exhibit 9 Pan_etal_modeling_blowout_2018, pp. 171-173.

[90] Considering facts that SoCalGas has provided in response to data requests as discussed below in this document.

[91] These were produced by SED and Public Advocates Office as exhibits in testimonies filed previously.

[92] See temperature and noise surveys. These were produced by SED and Public Advocates Office as exhibits in testimonies filed previously.

[93] Other wells files I reviewed contained one to many interoffice memos that discussed unusual issues.

[94] **Exhibit 12** AC_CPUC_SED_DR_17_0046340.

[95] **Exhibit 13** I1906016_SoCalGas_SED_DR_64_0000594.

[96] **Exhibit 14** AC_BLD_0076009.Core.Labs.Logs, p.AC_BLD_0076014.

SS_25 were at approximately 8451 ft," which is a non-answer.[97] SoCalGas had provided a Kill Procedure dated 11/12/2015, which is the program to install an EZSV into the tubing, and which is the plug referred to in the National Labs study quoted above.[98] The plug was installed the day before the second kill event, November 13, 2015. I have not found in documents produced any explanation as to why this plug was installed.

VII. CONCLUSION

To address Mr. Abel's testimony, there is an alternative theory provided by the National Labs. This theory explains what Mr. La Fevers and DOGGR personnel saw during the well kill event on November 13, 2015, an event that apparently repeated over the course of the subsequent well kills.[99] Whether the release could have been avoided through different actions on the part of Boots & Coots is unclear, leaving the issue of it being a "purposeful extraction and venting of oil" still unresolved by the facts.

Nevertheless, the Supplemental Rebuttal Testimony from Mr. La Fevers and Mr. Abel's fails to adequately show that SED violation 331 is not valid and simply confuses the issue with conflicting data. Below is a chronology of the facts presented in this sur-reply.

[97] **Exhibit 15** SED SoCalGas - DR 81 Response to Q 17.d.

[98] **Exhibit 16** AC_BLD_0075868.

[99] Exhibit 9 Pan_etal_modeling_blowout_2018.

Figure 1 – Chronology based on facts presented in testimony

November 13, 2015		
11-15 to 2:00 P.M.	Boots & Coots	Brine, oil & gas flowing from fissures on pad
1:17 P.M	SoCalGas Call	To NCR re spill
1:34 P.M.	SoCalGas Hz substance Spill Report	To OES/Incident Tracking
2:21 P.M.	Glenn La Fevers to Dispatch	MCR oil extracted and vented to air – warning to employees
2:43 P.M.	Gillian Wright to Dispatch	MCR oil extracted and vented to air - warning
2:45 P.M.	DOGGR	Pumping Stopped
3:00 P.M.	DOGGR	Left site
3:00 P.M. (duplicate, diff. time stamp)	Glenn La Fevers to Dispatch	MCR oil extracted and vented to air
3:00-5:00 P.M.	Boots & Coots	Pumping continued
November 14, 2015		
4:30 AM		Release of crude oil
1:05 P.M.	Notice to OES and NRC	Release of crude oil
	Samples of oil and sludge Collected & sent to Lab	NO SAMPLE OF OIL VENTED TO AIR
November 16, 2016	Lab report issued showing oil sample analysis of sludge	

EXHIBIT 1

Incident Tracking System Record (111315-142435) Details

GENERAL

EIR#:	111315-142435	Entry Date/Time:	11/13/2015 14:24:29	Created By:	Senator Strong	Updated By:	Rachel Gonzales
EIR-Status:	OPEN	MCR-Status:	CLOSED	Review-Status:	DISPATCH	Review-Required:	DOM

01 PRELIMINARY INFORMATION

1. Category:	Gas	2. Company Facility Involvement?	Yes
3. Region:	Storage	4. Emergency Activation?	No
5. Facility Type:	Fields		
6. Facility Name:	Aliso Canyon		
7. First Person Notified:	Gillian Wright	8. Reported Date/Time:	11/13/2015 14:21
9. Reported By:	Glen La Fevers	10. Reporter Phone:	[redacted]
11. Customer Name:	Gas Company	12. Customer Phone:	000-000-0000
13. No street number:			
a. House/Apt Number:	12801 /	b. Street Name:	Tampa
c. Street Type:	Ave		
14. City:	Northridge	15. Zip Code:	91326
16. Cross Street:	Sessnon	17. County:	Los Angeles
18. Responsible Organization:	Storage	19. Incident Classification:	Storage
a. Storage Field:	Aliso Canyon		
20. Estimated Damage Amount:	NA		
21. Gas Leak:	Yes	22. Pipe Material:	N/A
23. Pipe Size:	N/A		
24. Meter:	NA		

02 COMMON INCIDENT INFORMATION

1. Damaged Facility:	Not Applicable Not Applicable
2. Incident Type:	Miscellaneous/Other (MO)
a. If Other, Explain:	Oily mist in the air
3. Cause:	Other Incident Cause Miscellaneous NA (MO)
a. If Other, Explain:	Drilling to repair current leak caused oil to vent into atmosphere
4. Approximate Location:	Company Facility
5. Dig In?	No
6. Display Damage Party Info Tab?	No
7. Claims Investigating Incident?	Yes
a. Claims Representative:	Unknown
8. CPUC Notified?	Yes
9. D.O.T. Notified?	Yes

03 INCIDENT PERSONNEL

Supervisor Notifications:

1. Employee/LAN ID	2. Name	3. Job Title	4. Cell Phone	5. Pager	6. Email	7. Type	8. Date Notified?	9. Time Notified?	10. Will Go?
15743	Gillian Wright	VP - Customer Services	[redacted]	[redacted]	GWright@semprautilities.com	Other	11/13/2015 14:40		

	a. Order Type:	b. Order Number:	c. Arrival Date:	d. Arrival Time:	e. Depart Date:	f. Depart Time:

Additional Supervisor Notification:

11. Employee/LAN ID	12. Name	13. Job Title	14. Notified Date	15. Notified Time	16. First On-Scene?	17. Order Type	18. Order Number	19. Arrival Date	20. Arrival Time	21. Depart Date	22. Depart Time
a.34604	Glenn La Fevers	Storage Ops Mgr - II	11/13/2015	14:23	☒	NA		11/13/2015	14:25	11/13/2015	16:29

Resources Requested:

	22. Requested From:	23. Employee/LAN ID:	24. Rep Contact Name:	25. Dispatcher:	26. Date:	27. Time:
a.				Rachel Gonzales		

04 DIG-IN INFORMATION

NO DIG-IN INFORMATION APPLICABLE

05 ON SCENE INFORMATION

1. Fire Department?	No	2. Police?	No
3. Ambulance?	No	4. News Media?	No
5. Fire?	No	6. Explosion?	No
7. Evacuations?	No		
8. Were there company injuries?	No	9. Were there other injuries?	No
10. Were there company fatalities?	No	11. Were there other fatalities?	No
12. Street Open/Closure Status?	Open		
13. Traffic Re-Routed?	No	14. Area Blocked:	No
15. Outages?	No	16. Shutdown Complete?	No
a. Number of Outages:			
17. Expected Restore Date/Time:	/	18. Gas Under Control Date/Time:	/
19. Repairs Completed Date/Time:	/	20. No of Restores:	
21. Restored Date/Time:	/		

06 DAMAGING PARTY INFORMATION

NO DAMAGING PARTY INFORMATION APPLICABLE

07 MCR INFORMATION

NO MCR CURRENTLY PENDING, REFER TO SECTION 8-2 MCR HISTORY BELOW

08 APPROVAL AND COMMENTS

1. EIR Comments History:

MCR Comment History:	****CLOSE MCR*** Per Incident commander Glenn La Fevers. The Porter Ranch area "Oily Mist" in the air has now dissipated and is safe to enter. Work still in progress EST DMG AMT:NA, Oily mist in the airFrom: Rachel Gonzales,818-701-3394<distribution All,Northern> ---------+---------+---------+---------+---------+---------+---------+ Initiated: 11/13/2015 14:24:29 Subject:MCR: OPEN-Aliso Canyon Fields-Gas MCR No: 111315-142435-1 Declared: 11/13/2015 @ 14:43,Declared By: Gillian Wright,VP - Customer Services,[redacted]Message: CO Fac Inv, Storage, Aliso Canyon, Address:12801, Tampa Ave, cross street Northridge, ****OPEN MCR*** Per Incident commander Gillian Wright. During the repair process to mitigate the Leak at the well head in Aliso Canyon, oil was extracted and was vented into the atmosphere. There is an oily mist that may potentially be moving into the Porter Ranch area. Customer Service Field, Distribution and Meter Reading employees who are or may be headed to work in the area have been given instructions to avoid the Porter Ranch area until further notice. The Customer Contact Center has been notified. If an A-1 is issued in the area, CSF employees are to take extreme caution when working the order. EST DMG AMT:NA, Oily mist in the air,More to Follow...From: Senator Strong,818-701-2505<distribution All,Northern> ---------+---------+---------+---------+---------+---------+---------+

3. Approvals:

LDS:	
FOS:	
DOM:	
FOM:	Approval Not Required
DIR:	Approval Not Required

4. Incident Evaluation:

Contractor Failed to:	
MSA Damaged by Vehicle:	
Investigation Revealed:	
Investigation Follow-Up:	
Response Time:	

5. Approval and Comments:

Approval and Comment History:	

Return Print

EXHIBIT 2

ORDER INSTITUTING INVESTIGATION ON THE COMMISSION'S OWN MOTION INTO THE OPERATIONS AND PRACTICES OF SOUTHERN CALIFORNIA GAS COMPANY WITH RESPECT TO THE ALISO CANYON STORAGE FACILITY AND THE RELEASE OF NATURAL GAS, AND ORDER TO SHOW CAUSE WHY SOUTHERN CALIFORNIA GAS COMPANY SHOULD NOT BE SANCTIONED FOR ALLOWING THE UNCONTROLLED RELEASE OF NATURAL GAS FROM ITS ALISO CANYON STORAGE FACILITY (I.19-06-016)

SOUTHERN CALIFORNIA GAS COMPANY

(DATA REQUEST SED-SCG-119 DATED OCTOBER 30, 2020)

SOCALGAS RESPONSE DATED NOVEMBER 9, 2020

SoCalGas provides the following Responses to the Safety and Enforcement Division (SED) data request dated October 30, 2020 in I.19-06-016. The Responses are based upon the best available, nonprivileged information that SoCalGas was able to locate through a diligent search within the time allotted to respond to this request, and within SoCalGas' possession, custody, or control. SoCalGas' responses do not include information collected or modeled by Blade Energy Partners' during its Root Cause Analysis Investigation. SoCalGas reserves the right to supplement, amend or correct the Responses to the extent that it discovers additional responsive information.

SoCalGas objects to the instructions submitted by SED and to the continuing and indefinite nature of this request on the grounds that they are overbroad and unduly burdensome. Special interrogatory instructions of this nature and continuing interrogatories are expressly prohibited by California Code of Civil Procedure Section 2030.060(d) and 030.060(g), respectively. SoCalGas will provide responsive documents in existence at the time of its response. Should SED seek to update its request, SoCalGas will respond to such a request as a new data request in the future.

SoCalGas submits these Responses, while generally objecting to any Request that fails to provide a defined time period to which SoCalGas may tailor its Response, and to the extent that any Request is overly broad, vague, ambiguous, unduly burdensome, assumes facts, or otherwise fails to describe with reasonable particularity the information sought. SoCalGas further submits these Responses without conceding the relevance of the subject matter of any Request or Response. SoCalGas reserves the right to object to use of these Responses, or information contained therein, in any dispute, matter or legal proceeding. Finally, at the time of this Response, there are no pending oral data requests from SED to SoCalGas.

Please refer to Chapter 1 of SoCalGas' Supplemental Rebuttal Testimony, entitled, "Prepared Supplemental Rebuttal Testimony of Glenn La Fevers on Behalf of Southern California Gas Company" for this set of questions.

QUESTION 1:

Please provide a resume for Mr. LaFevers that shows his education, all of his career positions and experience with SoCalGas, and any additional specialty training that is relevant to his experience with underground gas storage.

ORDER INSTITUTING INVESTIGATION ON THE COMMISSION'S OWN MOTION INTO THE OPERATIONS AND PRACTICES OF SOUTHERN CALIFORNIA GAS COMPANY WITH RESPECT TO THE ALISO CANYON STORAGE FACILITY AND THE RELEASE OF NATURAL GAS, AND ORDER TO SHOW CAUSE WHY SOUTHERN CALIFORNIA GAS COMPANY SHOULD NOT BE SANCTIONED FOR ALLOWING THE UNCONTROLLED RELEASE OF NATURAL GAS FROM ITS ALISO CANYON STORAGE FACILITY (I.19-06-016)

SOUTHERN CALIFORNIA GAS COMPANY

(DATA REQUEST SED-SCG-119 DATED OCTOBER 30, 2020)

SOCALGAS RESPONSE DATED NOVEMBER 9, 2020

RESPONSE 1:

SoCalGas objects to this request as vague and ambiguous, particularly with respect to the phrases "career positions and experience" and "specialty training." Subject to and without waiving the foregoing objection, SoCalGas responds as follows. For Mr. La Fevers' SoCalGas work history and education information, please refer to the Witness Qualifications appended to his testimony.

QUESTION 2:

What was Mr. LaFever's job title on November 13, 2015?

RESPONSE 2:

Storage Operations Manager.

QUESTION 3:

Referring to page 2:14-15, which states, "The Release Was an Unavoidable Byproduct of the Well Kill Attempt on November 13, 2015". Also referring to 3:1-2, which states, "Because Aliso Canyon is a depleted oil field there is some residual oil within the field." Also, referring to page 3:3-4, ". . .the release of oil, which was entrained in the resurfaced fluids, [footnote omitted], was an ancillary and unavoidable byproduct of the well kill attempt. . ." With these passages in mind, please answer the following:

a. In this sentence, define the location(s) of the depleted oil field by reservoir, such as Aliso, Porter, Sesnon, etc.
b. Identify by Bates number the geologic cross section of SS-25 that shows the reservoirs intersected by SS-25.
c. How many times from October 23, 2015 through February 28, 2016 was there a release event at SS-25 similar to the one that occurred on November 13, 2015?
    i. If the answer is more than 1, please list the dates of the additional release events and identify by name or bates numbers all documents that described those releases.
d. Did "the release of oil, which was entrained in the resurfaced fluids" contain water?
    i. If yes, provide an estimate of how much water.

ii. If yes, what was the source of the water?

e. Has SoCalGas experienced release of oil as a byproduct of a well kill attempt before the occurrence at SS-25 on November 13, 2015?

f. If the answer to question 1a is yes, please list:
   i. For which wells?
   ii. On which dates?
   iii. For each such experience, were mitigation measures recommended relating to the release of oil?
   iv. If so, which measures?
   v. Provide documentation to support the answer to questions 1bi through 1biv.

g. As the release of oil was allegedly unavoidable, did SoCalGas contemplate ways to mitigate its release?
   i. Provide documents supporting your answer.

RESPONSE 3:

a. SoCalGas objects to this request as vague and ambiguous, particularly with respect to the phrases "this sentence" and "define the locations(s) of the depleted oil field by reservoir." SoCalGas also objects to this request on the ground it is outside the scope of this proceeding as determined in the Assigned Commissioner's Scoping Memo and Ruling dated September 26, 2019. Subject to and without waiving the foregoing objections, SoCalGas responds as follows. SoCalGas interprets this request to ask the title of the gas storage reservoir at Aliso Canyon, where SS-25 is completed, which was converted from oil operation to gas storage. The Sesnon Frew Gas Storage Zone.

b. SoCalGas objects to this request on the ground it is unduly burdensome to the extent it seeks information that has already been provided to, and thus is equally available to, SED. SoCalGas further objects to this request on the ground it seeks information outside the scope of this proceeding as determined by the Assigned Commissioner's Scoping Memo and Ruling dated September 26, 2019. Subject to and without waiving the foregoing objections, SoCalGas responds as follows. Please see previously provided electronic document with Bates range I1906016_SCG_SED_DR_115_0000001.

c. SoCalGas objects to this request as overly broad and unduly burdensome, particularly with respect to the request to "identify by name or bates number all documents that described those releases." SoCalGas further objects to this

request as vague and ambiguous, particularly with respect to the terms "release event" and "similar." SoCalGas also objects to this request to the extent it is compound and seeks information that is equally available to SED. Subject to and without waving the foregoing objections, SoCalGas responds as follows. From November 13, 2015 through February 11, 2016, pressure within the SS-25 well caused liquid to become aerosolized during kill events and on a periodic basis between kill attempts. See, e.g., Boots & Coots' daily reports which were previously provided to SED with Bates range AC_CPUC_SED_DR_16_0025631 – AC_CPUC_SED_DR_16_0025808.

d. SoCalGas objects to this request as vague and ambiguous and outside the scope of this proceeding as determined by the Assigned Commissioner's Scoping Memo and Ruling dated September 26, 2019. SoCalGas further objects to this request on the grounds that it calls for speculation. Subject to and without waiving the foregoing objections, SoCalGas responds as follows. The resurfaced fluids were not tested for water composition. It is expected that the resurfaced fluids would have a high water content because of the constituents of the well kill fluids.
e. SoCalGas objects to this request as vague and ambiguous, particularly with respect to the phrase "experienced release of oil as a byproduct of a well kill attempt." SoCalGas additionally objects to this request as overly broad and unduly burdensome, including because it fails to specify a period of time to which a response may be tailored. Subject to and without waiving the foregoing objections, SoCalGas responds as follows. SoCalGas is not aware of a similar release of oil as a byproduct of a well kill attempt at SS-25 prior to November 13, 2015.
f. N/A.
g. SoCalGas objects to this request to the extent it mischaracterizes or misconstrues SoCalGas' testimony. SoCalGas further objects to this request as it fails to specify a period of time to which a response may be tailored. Subject to and without waving the foregoing objections, SoCalGas responds as follows. Although the incidental release of oil in conjunction with the November 13, 2015 well kill attempt was unavoidable, it was not expected. As noted in SoCalGas' Supplemental Rebuttal Testimony, Chapter II (Abel), such an event does not always occur in conjunction with a top kill.

ORDER INSTITUTING INVESTIGATION ON THE COMMISSION'S OWN MOTION INTO THE OPERATIONS AND PRACTICES OF SOUTHERN CALIFORNIA GAS COMPANY WITH RESPECT TO THE ALISO CANYON STORAGE FACILITY AND THE RELEASE OF NATURAL GAS, AND ORDER TO SHOW CAUSE WHY SOUTHERN CALIFORNIA GAS COMPANY SHOULD NOT BE SANCTIONED FOR ALLOWING THE UNCONTROLLED RELEASE OF NATURAL GAS FROM ITS ALISO CANYON STORAGE FACILITY (I.19-06-016)

SOUTHERN CALIFORNIA GAS COMPANY

(DATA REQUEST SED-SCG-119 DATED OCTOBER 30, 2020)

SOCALGAS RESPONSE DATED NOVEMBER 9, 2020

QUESTION 4:

Did SoCalGas and Boots & Coots know the release would occur before "the release of oil, which was entrained in the resurfaced fluids"?
a. If yes, state what field or well data informed SoCalGas and Boots & Coots that the release would occur?
b. If yes, how much time occurred between when the data was received and when the release occurred?
c. If yes, did SoCalGas and Boots & Coots have to make a decision to take some action to cause the release?
i. If yes, what steps were taken to cause the release?
ii. If yes, what steps did SoCalGas and Boots & Coots take to make sure everyone on site would be safe during the event?

RESPONSE 4:

SoCalGas objects to this request on the ground it is compound. SoCalGas further objects to this request to the extent it seeks information that is not within SoCalGas' knowledge or control. Subject to and without waiving the foregoing objections, SoCalGas responds as follows. SoCalGas did not know the release on November 13, 2015 would occur prior to the release. See Response 3.g.

a. N/A.
b. N/A.
c. N/A
    i. N/A
    ii. N/A

QUESTION 5:

Referring to page 4:16, which states, "On November 13, 2015, I reported the release to Dispatch." With this passage in mind:

a. Please provide the communication that constituted the reporting of the release to Dispatch.

ORDER INSTITUTING INVESTIGATION ON THE COMMISSION'S OWN MOTION INTO THE OPERATIONS AND PRACTICES OF SOUTHERN CALIFORNIA GAS COMPANY WITH RESPECT TO THE ALISO CANYON STORAGE FACILITY AND THE RELEASE OF NATURAL GAS, AND ORDER TO SHOW CAUSE WHY SOUTHERN CALIFORNIA GAS COMPANY SHOULD NOT BE SANCTIONED FOR ALLOWING THE UNCONTROLLED RELEASE OF NATURAL GAS FROM ITS ALISO CANYON STORAGE FACILITY (I.19-06-016)

SOUTHERN CALIFORNIA GAS COMPANY

(DATA REQUEST SED-SCG-119 DATED OCTOBER 30, 2020)

SOCALGAS RESPONSE DATED NOVEMBER 9, 2020

RESPONSE 5:

SoCalGas objects to this request on the ground it assumes the report was in writing. Subject to and without waiving the foregoing objection, SoCalGas responds as follows. The communication was verbal. Please see enclosed electronic document with Bates number I1906016_SCG_SED_DR_119_0000020.

QUESTION 6:

Referring to page 4:16-18, which states, "Dispatch took the information provided and developed the MCR. Note that dispatch does not have technical expertise, and certainly not with respect to well control operations." Also referring to page 4:8-10, which states, "The text message to which Ms. Felts refers is a Message Center Report (MCR) issued on November 13, 2015 at 3:00 p.m. which states, "[d]uring the repair process to mitigate the Leak at the well head in Aliso Canyon, oil was extracted and vented into the atmosphere." With these passages in mind, please answer:

a. Precisely how did dispatch know to state in the Message Center Report that "oil was extracted and vented into the atmosphere."?

RESPONSE 6:

SoCalGas objects to this request as vague and ambiguous, particularly with respect to the phrase "how did dispatch know to state." SoCalGas further objects to this request on the ground it calls for speculation. Subject to and without waiving the foregoing objections, SoCalGas responds as follows. SoCalGas is not currently able to pose this question to the Dispatcher.

QUESTION 7:

Referring to pages 5:19 to 6:1-2, which states, "At 3:14 PM, SoCalGas provided its final status update to CalOES, reporting that, "[t]he mist flow has reduced and no off site impact has occurred." [Footnote omitted].

Please refer to the following quote, "On January 11, 2016 Mitchell Englander, the Los Angeles City Councilman representing Porter Ranch, criticized SoCal Gas "operating a

facility of this magnitude, [...] feeding 20 million addresses" for not having a backup plan, the delay in bringing necessary equipment on site "from the Gulf states like they did in this particular situation" and the delay in catching the brine, oil and chemical mist "landing on people's homes and turning their cars black".

a. Does SoCalGas dispute that "brine, oil and chemical mist landed on people's homes and turned their cars black?
b. If so, provide the documentation in support of each point that SoCalGas disputes.

RESPONSE 7:

SoCalGas objects to this request on the ground that it is compound, vague and ambiguous, and unintelligible to the extent quotes are offered out of context and it appears to conflate different occurrences. Subject to and without waiving the foregoing objections, SoCalGas responds as follows. SoCalGas understands this request to ask SoCalGas to reconcile its quoted testimony with Mitchell Englander's January 11, 2016 statement that "[t]hey're just learning now that some of the brine and oil and chemicals that are coming up from the ground and are landing on people's homes and turning their cars black - they've now put in a screening system to capture that." Violation 331 and SoCalGas' responsive testimony relate to the November 13, 2015 event. Former Councilman Englander's reference appears to be to reports from certain residents who lived immediately adjacent to the facility that they had found dark brown spots on their properties, which occurred after and is unrelated to the November 13, 2015 event.

QUESTION 8:

Please refer to: Exhibit 1-1, the email from Ben Turner to Lauren, Wolman@mail.house .gov
a. Who is lauren, Wolman@mail.house.gov?
b. How did SoCalGas obtain this forwarded message?
c. Who was the field engineer who wrote the content of the Aliso Update?
d. Please identify the sentence or section in this update that describes the event that was subject of the MCR dispatch that was sent out on November 13, 2015 at 3:00 pm.

ORDER INSTITUTING INVESTIGATION ON THE COMMISSION'S OWN MOTION INTO THE OPERATIONS AND PRACTICES OF SOUTHERN CALIFORNIA GAS COMPANY WITH RESPECT TO THE ALISO CANYON STORAGE FACILITY AND THE RELEASE OF NATURAL GAS, AND ORDER TO SHOW CAUSE WHY SOUTHERN CALIFORNIA GAS COMPANY SHOULD NOT BE SANCTIONED FOR ALLOWING THE UNCONTROLLED RELEASE OF NATURAL GAS FROM ITS ALISO CANYON STORAGE FACILITY (I.19-06-016)

SOUTHERN CALIFORNIA GAS COMPANY

(DATA REQUEST SED-SCG-119 DATED OCTOBER 30, 2020)

SOCALGAS RESPONSE DATED NOVEMBER 9, 2020

RESPONSE 8:

a. SoCalGas objects to this request to the extent it seeks information that is equally available to SED. Subject to and without waiving the foregoing objection, SoCalGas responds as follows. SoCalGas understands that, as of the date of the email, Ms. Wolman was Legislative Director for the Office of Congressman Brad Sherman.
b. SoCalGas obtained this document through a California Public Records Act request.
c. SoCalGas understands the field engineer was Kris Gustafson.
d. SoCalGas objects to this request on the ground it is unduly burdensome because it seeks information contained in the two-page document referenced by SED in the question and thus is equally available to SED.

QUESTION 9:

Please refer to the documents provided as Exhibit 1-3. If any of these documents were previously provided in response to SED data requests, please provide the bates numbers.

RESPONSE 9:

SoCalGas objects to this request to the extent it assumes the documents provided as Exhibit 1-3 were responsive to an SED data request. SoCalGas further objects to this request as outside the scope of this proceeding as determined in the Assigned Commissioner's Scoping Memo and Ruling dated September 26, 2019. Subject to and without waiving the foregoing objections, SoCalGas responds as follows. N/A.

QUESTION 10:

Please refer to Exhibit 1-7, page 1.

a. Refer specifically to the last line of the quoted bulleted paragraph beginning "November 14 --. The last sentence reads "At 1:05 pm OES and NRC were notified of release containment and minor additional release of crude oil at 4:30 am." With regards to this quoted last sentence, what does the "4:30 am" time refer to: "release containment," "minor additional release of crude oil," or both?
b. Provide, or identify by Bates number, the timeline this "November 14" – bullet came from.

ORDER INSTITUTING INVESTIGATION ON THE COMMISSION'S OWN MOTION INTO THE OPERATIONS AND PRACTICES OF SOUTHERN CALIFORNIA GAS COMPANY WITH RESPECT TO THE ALISO CANYON STORAGE FACILITY AND THE RELEASE OF NATURAL GAS, AND ORDER TO SHOW CAUSE WHY SOUTHERN CALIFORNIA GAS COMPANY SHOULD NOT BE SANCTIONED FOR ALLOWING THE UNCONTROLLED RELEASE OF NATURAL GAS FROM ITS ALISO CANYON STORAGE FACILITY (I.19-06-016)

SOUTHERN CALIFORNIA GAS COMPANY

(DATA REQUEST SED-SCG-119 DATED OCTOBER 30, 2020)

SOCALGAS RESPONSE DATED NOVEMBER 9, 2020

RESPONSE 10:

a. SoCalGas further objects to this request as outside the scope of this proceeding as determined in the Assigned Commissioner's Scoping Memo and Ruling dated September 26, 2019. SoCalGas further objects to this request to the extent it seeks information that is equally available to SED. Subject to and without waiving the foregoing objections, SoCalGas responds as follows. Minor additional release of crude oil.
b. SoCalGas objects to this request as unduly burdensome to the extent it seeks information that is equally available to SED. Subject to and without waiving the foregoing objection, SoCalGas responds as follows. The referenced timeline was provided to SED in response to a data request on November 15, 2015. SED referenced and included this language in a request to SoCalGas (SED Data Request 33), which is included as an attachment in support of SED's testimony alleging Violation 331 (see SED SUR_REPLY_002198).

QUESTION 11:

Please refer to Exhibit 1-7, Sample Analyses.

a. Please confirm that all of these analyses are of mud and liquid, not air emissions.
b. Please provide sample chains of custody and analytical results for all samples collected on November 13, 2015 of the mist that contained oil and was subject of the 3:00 pm MCR dispatch.
c. Please provide sample chains of custody and analytical results for all gas emission and air quality samples collected on November 13, 2015 on, or about 3 PM, but not more than 30 minutes after the release that was subject of the 3:00 pm MCR dispatch.

RESPONSE 11:

a. Eurofins reports 15-11-1098 and 15-11-1099 provided in Exhibit I-7 are well fluid samples to determine material properties. These are not samples for ambient air monitoring.
b. SoCalGas objects to this request on the ground it is unduly burdensome in that it seeks information equally available to SED. Subject to and without waiving the

foregoing objection, SoCalGas responds as follows. See Exhibit I-7.

c. SoCalGas objects to this request on the ground it assumes the referenced samples were collected as described. Subject to and without waiving the foregoing objection, SoCalGas responds as follows. N/A.

QUESTION 12:

Provide all communications related to Chapter I.

RESPONSE 12:

SoCalGas objects to this request as overly broad and unduly burdensome pursuant to Rule 10.1 of the Commission's Rules of Practice and Procedure. SoCalGas further objects to this request on the grounds it seeks information that is protected from disclosure by the attorney-client communication privilege and/or the attorney work product doctrine.

QUESTION 13:

Provide all communications between SoCalGas and Mr. La Fevers related to Chapter I.

RESPONSE 13:

SoCalGas objects to this request on the ground it is unintelligible in that it fails to recognize that Mr. La Fevers is an employee of SoCalGas. SoCalGas further objects to this request on the grounds it seeks information that is protected from disclosure by the attorney-client communication privilege and/or the attorney work product doctrine. Subject to and without waiving the foregoing, SoCalGas responds as follows. Please see enclosed electronic documents with Bates number I1906016_SCG_SED_DR_119_0000018 - 0000019.

QUESTION 14:

Provide all workpapers related to Chapter I.

ORDER INSTITUTING INVESTIGATION ON THE COMMISSION'S OWN MOTION INTO THE OPERATIONS AND PRACTICES OF SOUTHERN CALIFORNIA GAS COMPANY WITH RESPECT TO THE ALISO CANYON STORAGE FACILITY AND THE RELEASE OF NATURAL GAS, AND ORDER TO SHOW CAUSE WHY SOUTHERN CALIFORNIA GAS COMPANY SHOULD NOT BE SANCTIONED FOR ALLOWING THE UNCONTROLLED RELEASE OF NATURAL GAS FROM ITS ALISO CANYON STORAGE FACILITY (I.19-06-016)

SOUTHERN CALIFORNIA GAS COMPANY

(DATA REQUEST SED-SCG-119 DATED OCTOBER 30, 2020)

SOCALGAS RESPONSE DATED NOVEMBER 9, 2020

RESPONSE 14:

See SoCalGas' Supplemental Rebuttal Testimony Chapter I (La Fevers) Exhibits and enclosed electronic documents with Bates number I1906016_SCG_SED_DR_119_0000020 - 0000021.

QUESTION 15:

Provide all documents related to Chapter I.

c. Please refer to Chapter 2 of SoCalGas' Supplemental Rebuttal Testimony, entitled, "Prepared Supplemental Rebuttal Testimony of L. William Abel on Behalf of Southern California Gas Company" (Chapter II) for this set of questions.

RESPONSE 15:

SoCalGas objects to this request as overly broad and unduly burdensome pursuant to Rule 10.1 of the Commission's Rules of Practice and Procedure. SoCalGas further objects to this request on the grounds that it is vague, ambiguous, and unintelligible.

QUESTION 16:

Provide all communications related to Chapter II.

RESPONSE 16:

SoCalGas objects to this request as overly broad and unduly burdensome pursuant to Rule 10.1 of the Commission's Rules of Practice and Procedure.

QUESTION 17:

Provide all communications between SoCalGas and Mr. Abel related to Chapter II.

RESPONSE 17:

Please see enclosed electronic documents with Bates number I1906016_SCG_SED_DR_119_0000001 – 0000003;

ORDER INSTITUTING INVESTIGATION ON THE COMMISSION'S OWN MOTION INTO THE OPERATIONS AND PRACTICES OF SOUTHERN CALIFORNIA GAS COMPANY WITH RESPECT TO THE ALISO CANYON STORAGE FACILITY AND THE RELEASE OF NATURAL GAS, AND ORDER TO SHOW CAUSE WHY SOUTHERN CALIFORNIA GAS COMPANY SHOULD NOT BE SANCTIONED FOR ALLOWING THE UNCONTROLLED RELEASE OF NATURAL GAS FROM ITS ALISO CANYON STORAGE FACILITY (I.19-06-016)

SOUTHERN CALIFORNIA GAS COMPANY

(DATA REQUEST SED-SCG-119 DATED OCTOBER 30, 2020)

SOCALGAS RESPONSE DATED NOVEMBER 9, 2020

I1906016_SCG_SED_DR_119_00000010.

QUESTION 18:

Provide all workpapers related to Chapter II.

RESPONSE 18:

Please see enclosed electronic documents with Bates number
I1906016_SCG_SED_DR_119_0000004 - 0000009;
I1906016_SCG_SED_DR_119_0000011 – 0000017.

QUESTION 19:

Provide all documents related to Chapter II.

RESPONSE 19:

SoCalGas objects to this request as overly broad and unduly burdensome pursuant to Rule 10.1 of the Commission's Rules of Practice and Procedure.

EXHIBIT 3

“Standard Sesnon” 25 Chronology - Summary

- On **October 23, 2015** at ±1600 a representative called the Ventura office (formally District 2). The caller stated that the Standard Sesnon 25 well API 037-00776 had suffered a well head leak. The caller stated that mitigation procedures would begin the next day. The well gave no indication of a serious problem.
- **October 24, 2015:** Todd Van De Putte, Senior Storage Engineer, with SoCalGas called the Ventura 24 hour number at around 1200 and updated the on-call engineer about the status of the leaking well head. The engineer did not feel that a visit was warranted at the time and that SoCalGas’s kill procedures were sufficient.
- **October 26, 2015:** Todd Van De Putte with SoCalGas called me with an update on the SS 25 well. I personally took the phone call. He informed me that Boots and Coots had been called out to the scene. Normal kill operations were not being effective and SoCalGas believed that the well had formed methane hydrates in the kill string. Boots and Coots was performing an assessment of the situation at that time. Kris Gustafson scheduled a field meeting with Todd for 1000 the next morning.
- **October 27, 2015:** Kris Gustafson arrived at Todd Van De Putte’s office at 1000 and got a situation report from him. At around 1015 we ascended to the SS 25 site and I did a field inspection. There were several cracks around the well head that were several feet long and about as wide as a pencil. These cracks were leaking noticeable quantities of gas. There was a smell of methyl mercaptan coming from the well head. Gas was also escaping out the west side of the hill below the well pad. It was discovered previously by the operator but not reported until my site visit. Locations were marked with red spray paint. Gas was coming out of the hillside and through cracks in the cement drainage ditch. I took pictures of both well site and hill sites with my iPhone camera. I went back down to Todd’s office and called my supervisor. I informed my supervisor that the situation was more complicated and serious than was previously reported. I recommended daily visits and updates from the operator until the situation was resolved. I left the field at 1100.
- **October 28, 2015:** No major activity on this day. Kris Gustafson received an email update from Todd Van De Putte at 0840. No major work was being done as the well head was being resealed. The well was being blown down to try and mitigate the gas at surface. A lubricator for wireline operations was being assembled. The goal was to see where ice was plugging the tubing and perhaps causing a leak. I did not feel that a field visit was necessary at that time as no significant operations were planned.
- **October 29, 2015**: Kris Gustafson received my update from Todd Van De Putte at 0831. He informed me that a sinker bar was run in the tubing and tagged an obstruction at 467’. SCG tried to pump down the tubing but it pressured up to 2300 psi almost immediately. Todd reported that the situation was unchanged otherwise. I scheduled a field visit for 1000 that morning. I got onsite at 1000 and received a verbal update from Todd. He informed me that a lubricator was being assembled and that another attempt to get wireline down the tubing. Also a temperature tool was going to be run in the well. This would confirm the presence of hydrates in the tubing. I took photos of the site and left around 1130. I observed a slower rate of gas release during this visit. The gas rate appeared to be about 15-20% less from my previous visit. The well gave no

indication that a more serious issue had developed. I wrote a summary email to Bruce Hesson and David Ortiz. Bruce wanted to schedule another field visit for October 30th and it was scheduled again for 1000. Bruce updated HQ on the situation via email.

- **October 30, 2015**: Bruce Hesson and Kris Gustafson made a field visit to the SS 25 well site. We arrived at the field at 1000. Todd Van De Putte was again present at site and accompanied the both of us. The site was unchanged from the previous day. The gas volume appeared again to be reduced by about 20% from the previous day. The smell of mercaptan was still present but not as strong. The well gave no indication that a more serious issue was present. The operator was making plans for an offshore style CT rig that could operate in an explosive environment should it be warranted.
- **October 31-November 1, 2015:** Operator prepared well site for killing operations and began moving in equipment. The operator also gathered a low temperature mud for a kill attempt. This mud would counter act the hydrates in the well. Kris Gustafson received the daily update from Todd Van De Putte at 0843 on November 1st. Offset well SS-25A was killed with mud to ensure site stability and the site was generally being made ready for a kill job. The site was reported to be stable and no changes were reported. A field visit was not warranted until Monday during regular hours.
- **November 2, 2015:** Kris Gustafson made a field visit to the site. I met Todd Van De Putte at 1030 in the morning. I stayed at the site until 1200. The site was being prepared for the kill operations and a super choke was being installed. The first set of coil tubing equipment began to arrive that morning. The CT reel arrived at SS 25 at 1133 that morning. I took pictures of all the equipment and set it to HQ. John Geroch, Chief Deputy, asked for a description of the equipment and I set that up as well. The gas leakage appeared to be about 25% less than the previous field visit on October 30th. Most of the cracks and the hillside were no longer leaking gas to surface. Gas leakage was primarily confined to the well cellar and was reduced from before. There was some leakage still on the hillside, but this was barely noticeable. The well gave no indication that a more serious problem was present.
- **November 3 - 4, 2015, 2015:** During these two days the operator was rigging up the CT rig and preparing the BOPE for a kill attempt. Kris Gustafson was onsite for the morning of the 3rd and the entire day on the 4th. An NOI for the kill operations for the SS 25 well was sent in on the 4th and a permit was issued.
- **November 5, 2015:** Kris Gustafson was out on site the entire day on November 5th. BOPE test and repairs took the entire day. At the end of the day a good test was achieved. The rig was approved to begin operations for the next day. The site remained unchanged from the previous day.
- **November 6, 2015:** The first kill operation with the coil tubing was performed in the morning. Kris Gustafson wrote a detailed description at the end of the day and sent it to Bruce who sent it to other management. I have uploaded this email to the public drive in the EMAIL Updates folder. The email is called Aliso Update 11 6 2015. It contains all of my field notes for the operation. The operation was successful in that the tubing string in the well was cleared and the tubing could be used as a kill string. The CT rig did not have enough pumping capacity to kill the well. The pumping operation re-agitated the gas leak. Gas was once again leaking at the well head and on the surrounding hillsides after a period of quiescence. This was likely caused by the removal of ice from the pumping attempt.

- **November 7 - 12, 2015:** The following days were spent running wireline logs and getting additional information. A gauge ring was run in the 2 7/8" tubing on November 7th and was able to reach 8412' without incident. Additional logs were run on subsequent days. These logs are available on the HQ share drive. Kris Gustafson placed a summary from November 7th in the share drive. Please see that summary for a more detailed explanation of the situation. Kris Gustafson was not present on November 8th as the operator was running wireline and reconfiguring the well head. November 9th through the 12th proceeded similarly. No major operations were undertaken at the SS-25 site. Summaries were written by Bruce Hesson. Field wide withdrawal began on 11/11/2015
- **November 13, 2015:** The kill attempt of November 13th the largest to that point. The well continued to leak gas around the well head and out to the hillside. Unlike previous visits, the gas did not self-extinguish and leaked constantly at comparable rates. Rather than try and summarize the events of that day, I will direct the reader to the share drive and my email summary of the operations. The email is called "Standard Sesnon 25 Daily 11 13 2015". This email has all of my pertinent observations. - Overall, this was the day that the well actually blew out in the conventional sense. Previously, it was not clear that the well was in a blowout situation. But after this pumping job, a blowout vent opened 20' from the wellbore and began shooting debris 75' into the air. This day's events also ended the gas leakage on the surrounding hillsides. It is likely that the hillside leakage was caused by ice buildup in the well annuli. Once this ice was broken, the well could flow unobstructed through the casing damage that was present. It should be noted that one of the pumps was snuffed out by escaping gas at around 350 bbls away. It took around 15 minutes for the pump to be restored. This is an important fact that guided the subsequent operations. The operator and Boots and Coots was not sure whether the kill was truly unsuccessful or whether the pump failure prematurely interrupted the operation. Serious thoughts on a relief well started after this operation, but the operator was hesitant to begin this process because of the pump failure during this attempt. No accurate determination of success could be made given the pump failure.
- **November 14 – 17, 2015:** This time period was much the same as the others. Logs were run and information was gathered. The wellsite was reorganized and a new pumping schedule was prepared. The NOI for the Porter 39A relief well was prepared during this time period. A second barite pill was designed. I have added a copy of this pumping job, and the two others, to share drive. Scott Walker and Scott McGurk began their daily visits and field presence. Their daily updates and reports should be referenced.
- **November 18, 2015:** A second large kill attempt was made on this day and it was not successful. Kris Gustafson witnessed this operations from the SS 25 site. The well never fully laid down. Barite likely came to surface after this attempt. The attempt caused one of the pressure gauges to fail and for 24 hours it did not read correctly.
- **November 19 – 23, 2015:** Much of the next 4 days was spend demobilizing the CT rig and other equipment. Also wireline logs were attempted but cancelled due to false readings on the electronic tubing gauge. Several days of work were lost due to weather conditions. Winds coming out of the north prevented the equipment from being used as gas was being blown directly into the engines. A third major kill attempt was prepared during this time. Boots and Coots relief well specialists were also being picked and mobilized. Operations began shifting

toward the relief well on Monday November 23rd. The conductor was drilled and installed and the rig began to move in. The permit for the relief well was approved on the 23rd as well.

- **November 24, 2015:** The third large kill was attempted. The pumping location was moved from the SS-25 pad to the SS 1 pad directly above the site. This was for safety reasons and to give the equipment a more stable site to pump from. The job mostly consisted of lease water in addition to some polymer. The pumping rate was greatly increased and the volume was 1000 bbls total. It was during this operation that the north side of the well pad cratered. The enlarged vent measured 10' wide by 30' long. It was created by fluids that returned to surface from the pumping job.
- **November 25, 2015:** A fourth large kill job similar to the previous day's operations was performed. The kill job was not successful. The electronic monitoring devices were knocked off the well head and have not been available since. Also, the cratering around the well head increased and damage several casing valves. This was the final pumping job to date. - The Ensign 587E drilling rig began to rig up on the Porter 39A well site.
- **November 26 - December 11, 2015:** The Standard Sesnon 25 site was mostly monitored and repaired. Much of the focus has shifted to the Porter 39A site. A fresh noise and temperature log was run on December 1st. The operator put the tubing on production starting December 7th. The tubing has consistently had 1350-1450 psi on it since it was put on production.
- **December 11, 2015 Update**: At the SS25 site, SCG was attempting to run a directional survey today with a gyro in order to have the well location. This will help them avoid a collision between the existing pipe and drill bit of the relief well until the intercept is desired. AECom and Flour both made on site visits to continue with the proposals for design, fabrication, and installation of systems designed to capture fugitive gas while the relief wells are being drilled and completed. The attempt to install the 13-3/8 inch casing segment was not successful, due to the debris in the well and safety issues.
- **December 12, 2015:** Due to concerns from visiting CalOSHA personnel yesterday afternoon, SCG shutdown all production and operations at the SS25 site temporarily overnight. SCG met with CalOSHA again this morning to resolve the issues. SCG plans to start air sampling at the SS25 site, in a day or two, to record gas emission variations over time. The SS25 site will restart production and operations this afternoon. Long-term resolution of the CalOSHA concerns are critical to efficient B&C activities. SCG met with CPUC yesterday to discuss general production and drilling activities related to the SS25 gas leak. AECOm and Fluor are investigating shallow drilling near the SS25 well, to intercept and capture the shallow 7 inch casing leak. This could be an important approach to reducing gas leak emissions and oil misting.
- **December 13, 2015:** Scott Walker attended a meeting between SCG and Boots and Coots experts on planning the next leak control pumping plan. This plan is intended to seal off the production zone by creating a filter cake on the reservoir. The operation would consist of pumping a 200 bbl pill of 15.0 ppg WBM followed by a plugging shot (junk shot) followed by 100 bbls of 15 ppg Diaseal M (diatomaceous earth) followed by another 300 bbls of 15.0 ppg WBM. There is significant staging of equipment in preparation for this job. Anticipated completion of this work and start date for the pumping is approximately one week. In order to prepare for this next pumping operation it will require the shutting in of SS-25 due to safety concerns. As they are under Division order to produce SS-25 Scott walker gave SCG verbal approval to shut in SS-25. Scott walker directed them to wait as long as possible before shutting down the well without jeopardizing safety. CalOSHA was on site today working with SCG on setting up monitoring stations around the SS-25 site. Detectors will be looking for oil mist and

possibly benzene. Scott walker spoke with CalOSHA and they indicated they are still assessing the situation. Based on data collected CalOSHA may require additional PPE. Scott walker did not notice any appreciable difference in the flow or characteristics of the vent after my morning inspection.

- **December 14, 2015:** Due to the dangerous wind conditions, Site 25 has been shut down this morning. Conditions are expected to improve later in the day. Flow from SS 25 was shut down last night because of the dangerous weather conditions. SCG did not want to risk having Boots and Coots personnel monitor the well overnight. The venting appears unchanged from prior inspections. Prior to shut in the well was producing between two to three MMSCF at 1375 psi. Shut in pressure was 1486 psi at this morning's site assessment. Today's morning pumping plan meeting at 6:30 am discussed logistics for the staging of equipment and site preparation. Scott walker expressed the Divisions concern with possible continued erosion of the vent. They will mitigate this concern by lining the vent with large diameter river rock (6"-10"). A second pump line will be run from Site 1 down to Site 25 for redundancy. This is at least a two day operation with good weather. A mud plant will be built up on Site 1. This involved bringing in four 430 bbl tanks which will store the 15 ppg mud. Site 1 is also the staging area for the pump trucks. The configuration of the wellhead pumping will also be modified to accommodate the next pumping job. In preparation for the next pumping job a wireline unit will make at least two jet cuts on the tubing with the thought this will increase the flow area. Scott Walker asked about possibly shooting the tubing across the 10 ft section with a high density grouping before the jet cutting. This is being considered. This wireline work is wind dependent as the crane needs to hang tools over the wellhead. AECom is working with B&C to build a bridge over to the SS-25 wellhead. This will increase work efficiency by not having to position a man lift each time work is performed on the SS-25 wellhead. Scott Walker visited the onsite fabrication shop to inspect the progress. The frame has been completed and installation is expected in approximately two days. This bridge will also help stabilize the wellhead. This work is also weather dependent as a crane must lift the bridge into place. SCG is rebuilding and strengthening the catch basins and culverts surrounding the Site 25 location in anticipation of heavier El Nino rains. Security has been added to the backside access roads.
- **December 15, 2105:** The venting appears unchanged from prior inspections. The shut in pressure of SS 25 was 1430 psi at this morning's inspection. The pressure is slowing falling off likely due to the continued field withdrawals of gas. The river rock for lining the vent will be delivered this morning. This work can be done as the equipment is located on the north side of the Site 25 pad. The backup pump line from Site 1 down to Site 25 will be finished today. This is a backup line for the next pumping event. Scott Walker discussed the tubing jet cutting approach and SCG decided to conduct a pumping test to verify the cut has been made. This is satisfactory to the Division. There will not be any crane related work today as the winds are not favorable. Scott Walker estimated the pumping job would likely be Tuesday due to unfavorable wind forecasts today and tomorrow. AECom is working with B&C to build a bridge over to the SS-25 wellhead. The fabrication will be completed today. The installation may be delayed as a

crane must lift the bridge into place. SCG is rebuilding and strengthening the catch basins and culverts surrounding the Site 25 location in anticipation of heavier El Nino rains. AECom and Fluor are scheduled to update SCG tomorrow on their concepts for capturing fugitive methane emissions at SS 25.

- **December 16, 2015:** Continue to cleanup the SS25 site for the wellhead bridge installation, which could be in a day or two. The bridge will be 100 feet long, with a safety cage in the middle. It will permit safe, close wellhead activities in most wind conditions, and eliminate the need for a manlift. The next well control attempt, with heavier mud and a larger junk shot, is expected to be on Sunday at the earliest. At SS1, the new piping to the SS25 site is in place and tested. All tanks are set. The bulk silos will be finished today. Mud delivery is being delayed due to traffic conditions on the 5 fwy, but should arrive in time. SCG had a half-day meeting with Conservation/DOGGR personnel, and with representatives of three national labs. The meeting focused on SS25 conditions, reservoir pressure reduction, the next well control action, and relief well activities.
- **December 17, 2015:** SCG is finishing the bridge that will be installed across and over the SS25 wellhead and vent opening. The 100 foot long, 40,000 pound bridge is about 10 feet wide, with a center cage 10 feet long and 10 feet high. SS25 wellhead pipes are being removed today (winds permitting), for the bridge placement. The bridge will likely be installed on Saturday , with a NW to SE orientation. This bridge is critical for future well control attempts, repairing the 11-3/4" broken nipple, and possible vent gas capture. The first relief well ranging run should be on Sunday when drilling reaches 3850'. A spinning magnet device on a bottom hole assembly in the relief well will be detected by a receiver in the SS25B well next to SS25. This is a critical event to stay on the drilling schedule. Drilling is presently at 2439 MD, with 20-30 feet/hour rate. At the SS1 well control site, the blender hoses are being connected today, and the mud should be on location. The DE material is on route from Texas and should create no delay. Large river rocks are on site and will be placed in the SS25 vent today and tomorrow. B&C considers the chance of ignition to be low, since the vent has almost no oxygen. The rocks will reduce further vent hole erosion if liquids surface during the next well control attempt. The next well control attempt would be Monday or Tuesday at the earliest.
- **December 18, 2015:** The weather is good, but with medium winds from the north, which limits crane use at the SS25 site. The winds should shift tomorrow from the south, with increasing rain chance late Saturday into Sunday. Scott McGurk is on site today, with Scott Walker on site Saturday, and John Iverson on site Sunday through Tuesday. The well access bridge construction should be completed today. With favorable winds, the bridge could start transport to the SS25 site tomorrow. The SS1 site is ready for the next well control attempt, except for minor hookups. The SS25 site is ready for the next well control attempt, except for minor cleanup. The wellhead pipes were removed yesterday. B&C fabricated a special wellhead clamp and pipe that will be placed around the 11-3/4" casing, to seal the broken nipple leak, once the well is controlled.
- **December 19, 2015:** The weather is good with a favorable slight wind to the south/southwest. The winds are not expected to be favorable Sunday and potential rain is on the way. Scott Walker is on site today, with Jon Iverson on site Sunday through Tuesday. The well access bridge construction was completed and installed this afternoon the SS 25 well. This will allow for safe access to the wellhead. The SS1 site is ready for the next well control attempt. Pump lines have been hooked up and pressure tested to 5000 psi.

The SS25 site is ready for the next well control attempt. The junk shot manifold has been staged. There are two 120 bbl vac trucks staged at the new catch basins ready for the next pump job and rain. The vent volume appears unchanged.

- **December 20, 2015:** Sunny clear weather today with winds out of the North, Northwest gusting up to 20-30 mph. Wind could hamper wireline work on SS 25. Jon Iverson is on site today through Tuesday. The well access bridge at SS 25 is in place and in use. The pressure gauge for the tubing has been reconnected and the initial pressure reading was 1,319 psi.
  The wireline unit is currently being set into place on the SS 25 site. The plan is to set in a location that will not need to be changed because of well activity or wind. Gusts out of the North are expected to limit the wireline work on the SS 25 site, but they are hopeful to begin this afternoon with a gauge run. The wind should shift to the South or Southwest tomorrow and will allow for increased work. Tubing may be cut as soon as tomorrow at SS 25.
  ½" piping is being set to allow for the start of the Nitrous tracer study to potentially start this afternoon. The vent volume appears unchanged. The SS 25 wellhead is currently anchored to two guy line anchors and the plan is to add to more anchors from the wellhead to the bridge to minimize movement of the wellhead.
- **December 21, 2015:** Sunny and clear weather today with light winds from the south, southwest. Jon Iverson is on site today. Wireline operations have begun on the SS 25 site. The initial gauge run on the tubing stopped at 100'. To maximize the time SCG has with good weather, they got off SS 25 and have begun to run the interference receiver in SS 25B to get more data for the ranging runs. They will return to SS 25 and investigate the reason for the stop at 100'. There have been three WellSpot ranging runs over night. The first run showed a much stronger response than was anticipated. The confidence in the data was also high, but a second run with a similar tool was performed. The second run had communication issues with the tool so a third run was conducted. The results of the data of all the tests puts the current bottom hole location of the relief well about 13' away with a 10'± safety factor from the SS 25 wellbore. The wireline operation in SS 25B will validate the location of that well for avoidance purposes. SCG is working with B&C, Ensign, and DOGGR to create a plan forward for the plugback, casing program, and re-drill work with the new directional data. The vent volume appears unchanged. The shut-in tubing pressure at 0700 was 1,285'. Down 34 pounds from the same time yesterday.
- **December 22, 2015:** Light rain this morning and light winds from the south, southwest. Jon Iverson and Scott Walker are on site today. A dynamic kill attempt was performed this morning. A total of 300 bbl of 15 ppg mud was pumped at 5 bbl/min. The middle 100 bbl of mud had LCM. After the 300 bbl of mud, SCG followed with a constant mud rate of 1/2 bbl/min to keep a dynamic kill on the well. Sfc returns occurred throughout and after the pumping. B&C shut down all pumping because the wellhead was moving too much and did not want to lose the wellhead. 25 bbl of mud was pumped at 1/2 bbl/min. Pumping stopped at 11:35.
  The final ranging run with the spinning magnet in P39A and a receiver in SS 25B was completed. The results places the SS 25B well 87' away and it did not interfere with the earlier ranging runs. This testing confirms the P 39A well is 13' away at TD.
- **December 23, 2015:** Hazy skies today, but no rain. Strong winds from the North. Winds are expected from the south tomorrow. Extreme winds (up to 80 MPH gusts) are expected for Friday, and may lead to shut-down of some operations, including drilling. Scott McGurk is on site today through Saturday.

At SS25, the well control attempt yesterday was pumped as planned, but failed. The vent leak appears to be unchanged to SCG. The wellhead was moving +/- 1 foot during the attempt (as seen in a video), and SCG is not sure why the steel cables were not more effective. The wellhead lubricator connection came loose due to the movement. B&C is doing site cleanup and assessment today. The wellhead will be re-secured and the well control piping will be removed today if possible. Initial B&C inspection this morning of the site shows a significant increase of the vent cavity. A full surface assessment will be done today, before visitors are allowed tomorrow. If the winds are favorable, B&C will run a wireline caliper, noise, and temperature log tomorrow, if the tools can get below a tubing restriction at roughly 100 feet. The static tubing head pressure was 750 psi at 9:30am. B&C said they will need a couple days of evaluation to decide if they will recommend further well control attempts.
B&C brought Arash Haghshenas on site today. He is responsible for past and future modeling of the SS25 flow dynamics and well control programs. The division talked with him this morning and he provided documentation of the input parameters he used in his modeling (files to be sent separately). B&C is using a publicly available software OLGA ABC for the modeling. The modeling is relatively simple and does not account for complex gas jet flow in the well.
SCG continues to investigate vent capture options with AECom and Fluor. The bridge gratings have reduced the oil mist escaping from the vent. SCG is looking into ways you remove the liquid oil buildup in the vent.

- **December 24, 2015:** Morning weather was good, but with winds from the north. By 11am, the winds were shifting and coming from the SW. 40% chance of rain in the evening. Friday winds should be from the N-NW, leading to extreme winds going into Saturday (gusts up to 80 MPH). Scott McGurk is on site today through Saturday.
  At the SS25 site, a lot of mud was ejected during the Tuesday well control attempt. As observed during the morning site inspection, there is 1-2 feet of mud all around the wellhead area. There is much mud on the access bridge (up to 3 feet thick), and the bridge has a slight bow. The mud on the bridge will be removed by hand slowly. The vent cave to the south is much larger, perhaps 5-8 feet wide and 15-20 feet long. The access bridge appears to be supported by 15-20 feet of stable surface on each end. The whole SS25 site will need a couple days of mud cleanup and surface evaluation. The wellhead piping was not removed yesterday due to the mud, but an attempt will be made today. AECom will evaluate the access bridge structural integrity, once some of the mud has been removed. SCG plans to remove wireline equipment from the site today. No tubing pressure measurements are available. The vent behavior appears unchanged.
  AECom has a preliminary design for a second bridge structure that would be used for oil mist capture, gas leak re-direction, and gas leak capture. The preliminary design will now be re-visited to account for the recent surface erosion. The division asked SCG for construction diagrams of the new bridge. SCG is looking at possible incineration of captured leaking gas.
  A second tracer based gas leak measurement is in the planning stages, using a new tracer gas, under better wind conditions.
- **December 25, 2015:** The morning weather was clear, but with strong winds from the north, which caused the SS25 site to shut-down at 10:30am. There was no rain overnight. Extreme winds are expected going into Saturday (gusts up to 80 MPH) and continuing Sunday, which may shut-down some or all operations. Scott McGurk is on site today through Saturday.
  At the SS25 site, mud cleanup from the last well control attempt continues. Most of the access bridge has been cleaned up and the structural bow is almost gone. The wellhead is tilting to the north, due to slack in some of the restraint cables. The vent cave to the south is confirmed to be much larger, perhaps 5-8 feet wide and 15-20 feet long. The whole SS25 site will need further

mud cleanup and surface evaluation. The wellhead piping was not removed completely yet. AECom plans to evaluate the access bridge structural integrity tomorrow, if winds permit. SCG removed wireline equipment from the site yesterday. Some electrically-grounded, stainless steel meshes were installed over the vent today, to reduce oil misting. No tubing pressure measurements are available. The vent behavior appears unchanged.
SCG and AECom are looking at possible incineration of captured leaking gas, using six incinerators at the SS29 site. The system should handle up to 20 MMCFPD of captured gas. This is an important step to reduce methane emissions without flaring.
AECom is re-working a preliminary design for a second bridge structure that would be used for oil mist capture, gas leak re-direction, and gas leak capture. The re-work accounts for new surface erosion and crane-based weight limitations.
A second tracer based gas leak measurement is in the planning stages, using a new tracer gas, under better wind conditions.

- **December 26, 2015:** The morning weather was clear, but with very strong winds from the north, which prevented safe operations at the SS25. Extreme winds are expected to continue into Sunday, which may shut-down some or all operations. Scott McGurk is on site today. Scott Walker is on site for the next four days. The SS25 site was closed this morning due to unsafe wind conditions. Some electrically-grounded, stainless steel meshes were installed over the vent yesterday, to reduce oil misting, and they appear to be working. AECom did a preliminary inspection of the bridge yesterday and saw no concerns. They will perform a full inspection as soon as possible. No tubing pressure measurements are available. AECom is re-working a preliminary design for a second bridge structure that would be used for oil mist capture, gas leak re-direction, and gas leak capture.
  A second tracer based gas leak measurement is in the planning stages, using a new tracer gas, under better wind conditions.
  SCG and AECom are looking at possible incineration of captured leaking gas, using six incinerators at the SS29 site.
  The division granted SCG a verbal extension for Section V, Item D, for Order 1106, till Monday December 28 at 1700 hours. The extension is for clarification of previously submitted materials and to fully address Item D.
  The division requested to receive daily SCG relief well 39A mud log reports.
- **December 27, 2015:** The morning weather was clear, but with very strong winds from the north, which prevented safe operations at the SS25. Winds are expected to die down later in the day. Scott Walker is on site for the next four days. The SS25 site was closed this morning due to unsafe wind conditions. Some electrically-grounded, stainless steel meshes were installed over the vent to reduce oil misting, and they appear to be working. AECom is hoping to do a full inspection as soon as possible in order to update their gas venting capture concepts. No SS-25 tubing pressure measurements are available. The wellhead is currently tilted approximately 3 ft to the north. This is due to one of the guy wires breaking during the last pumping operation.
  AECom is re-working a preliminary design for a second structure that would be used for oil mist capture, gas leak re-direction, and gas leak capture. A second tracer based gas leak measurement is in the planning stages, using a new tracer gas, under better wind conditions.
  SCG and AECom are looking at possible incineration of captured leaking gas, using six incinerators at the SS29 site.
  The CPUC will be visiting the SS-25 site tomorrow.

- **December 28, 2015:** The morning weather was clear and calm. Unfortunately, the weather is predicted to deteriorate with northerly winds of 30-50 mph on Tuesday and 50-70 mph on Wednesday. In addition, a large sustained rain event is predicted for most of next week. Scott Walker is on site Monday, Tuesday, and Wednesday. AECom was on site yesterday afternoon assessing the site for gas venting capture concepts modifications. Boots & Coots and SCG are concerned with pad preparation for the coming rain event next week. SS-25 pad maintenance is taking place today which involves moving dirt and mud around the bridge and vent. Sandbags and a backhoe are also being prepositioned. No SS-25 tubing pressure measurements are available. The flexible temporary piping was also confirmed to be damaged and will need to be replaced before SS-25 can be placed back on production. The wellhead is currently tilted approximately 3 ft to the north. This is due to one of the guy wires loosening during the last pumping operation. An attempt will be made to re-position the wellhead in the future after pad and bridge cleanup is completed. There will not be any direct kill attempts for the next couple weeks at least.
  AECom is making a presentation on Thursday in Chatsworth on their fugitive methane capture concepts. There is a call in and web option.
  Reviewed the preliminary plug and abandonment program with Brett Lane, Todd Van De Putte, Don Blankenship. Modifications were noted and a revised copy is attached. This represents the minimum that will be done to the well to meet Division requirements. It is anticipated additional cementing will take place based on data gathered during the procedure.
  The CPUC president will be visiting the SS-25 site today. I met with Randy Holter (CPUC) lead investigator for the CPUC and went over basic well construction and drilling and the records on file with the Division for SS-25.
- **December 29, 2015:** The weather was clear but windy from the north. Unfortunately, the weather is predicted to deteriorate with increased northerly winds on Wednesday. In addition, a large sustained rain event is predicted for most of next week. Scott Walker is on site Tuesday, and Wednesday. AECom was on site again today assessing the vent for oil mist abatement. This will be accomplished by installing a metal mesh over a grating structure and then placing over sections of the vent. The current mesh covering portions of the existing bridge appear to be working. Oil misting is noticeably reduced. Also, the audible volume of the venting gas appears less. This could be due to the falling reservoir pressure (optimistic) or due to a larger orifice from which the gas is escaping (pessimistic). SS-25 pad maintenance is restricted today to the north end of the pad due to wind direction. No SS-25 tubing pressure measurements are available. The valves on the tree are being assessed and a gauge will be installed to read tubing pressure in the near future. The wellhead was successfully repositioned to the center of the bridge cage and secured.
  There was a meeting between Boots and Coots and SCG on the planned 7" casing point. Contingencies were discussed depending on whether or not hydraulic communication will be seen as the relief well approaches SS-25. Contingencies were also discussed concerning the planned milling operation at intercept. AECom is making a presentation on Thursday in Chatsworth on their fugitive methane capture concepts. There is a call in and web option.
- **December 30, 2015:** The weather is good today with very little wind. Winds are expected to pick up to 50-70 mph on Friday and Saturday. Heavy rains are expected on Sunday and Monday. This will delay the second relief well pad preparation. Scott Walker is on site today. Bruce Hesson will be on site Thursday thru Sunday. No SS-25 tubing pressure measurements are available. Pump lines have been removed from the location and dirt is being moved on the north end of the pad in preparation of the rain event. One thousand sandbags are being brought on location. Construction continues on the mist abatement structures. The

plan is for two 100 ft expanses on the east side of the well and one 60 ft segment on the west side of the well. Existing mist abatement mesh on the bridge appears to be working.
Work was shut down twice yesterday for site visits by OSHA. This is done as a safety precaution anytime visitors must see the SS-25 location.
AECom issued a letter indicating the bridge structure is structurally sound.
AECom is making a presentation on Thursday in Chatsworth on their fugitive methane capture concepts. There is a call in and web option.

- **December 31, 2015:** The weather is not favorable today with winds gusting to 50-70 mph today. Heavy rains are expected on Sunday through Tuesday. This will delay the second relief well pad preparation. Bruce Hesson is on site today and will be through Sunday. No SS-25 tubing pressure measurements are available. Pump lines have been removed from the location and dirt is being moved on the north end of the pad in preparation of the rain event. One thousand sandbags are on location. Construction continues on the mist abatement structures. The plan is for two 100 ft expanses on the east side of the well and one 60 ft segment on the west side of the well. Existing mist abatement mesh on the bridge appears to be working.
- **January 1, 2016:** The weather is not favorable today with winds gusting to 50-70 mph today. Winds are forecasted to decrease to 20-30 mph by mid-day Saturday, January 2nd. Light rain is forecasted for Sunday evening, January 3rd, increasing to heavy rains Monday through Tuesday. Bruce Hesson is on site today and will be through Sunday. No SS-25 tubing pressure measurements are available. Pump lines have been removed from the location and dirt has been moved on the north end of the pad in preparation of the rain event. Construction continues on the 100 foot mist abatement structures with the 60 foot structure now complete. The plan is for two 100 ft expanses to be placed on the east side of the well and the 60 foot segment on the west side of the well. When wind speeds subside as expected mid-day Saturday, the 60 foot section will be installed with cranes. The existing mist abatement mesh on the bridge appears to be working as witnessed today. One thousand sandbags are on location. The sand bags will be placed around the vent Saturday and Sunday to prevent run-off from entering the opening and to direct run-off into a culvert that has been installed at the upper east side of the wellsite. The culvert will direct run-off to a concrete lined drainage channel along the edge of the access road below the wellsite where a berm has been constructed. Vacuum trucks will recover run-off from this collection point.
- **January 2, 2016:** SS-25 tubing pressure measurements are now available with a flowing tubing pressure this morning of 978 psi. The pressure gauge is located in the Boots & Coots observation room on location. Pump lines have been removed from the location and dirt has been moved on the north end of the pad in preparation of the rain event. One row of sandbags were placed yesterday afternoon at the north end of the site (an inverted V- shape) to prevent run-off from entering the vent and to direct run-off towards the installed culvert on the east-side of the wellsite in a slightly lower graded area. Once entering the culvert the run-off will flow downhill to a concrete lined drainage channel along the edge of the access road where a berm has been constructed for fluid recovery by vacuum trucks. A second row of sandbags will be placed today and a third row added to the north end of this barrier. The upper SS-1 location has been prepared to direct rain run-off to either side of the ridgeline so that it will not flow downhill to the lower SS-25 location. The 60 foot section with mist abatement coalescing mesh was moved from the fabrication site to the SS 25 wellsite yesterday afternoon. Once wind conditions subside this afternoon, as forecasted, it will be lifted into place with a crane and installed on the west side of the wellhead over the vent. Construction continues on the 2- 100 foot mist abatement structures. These are being modified to be wider to provide broader

coverage over the vent for placement on the east side. The existing mist abatement mesh on the bridge appears to be working as witnessed today.

- **January 3, 2016:** SS-25 flowing tubing pressure measurement this morning was 982 psi. The pressure gauge is located in the Boots & Coots observation room on location. All of the sandbags were placed yesterday afternoon three rows high at the north end of the site (an inverted V- shape) to prevent run-off from entering the vent and to direct run-off towards the installed culvert on the east-side of the wellsite in a slightly lower graded area. (see attached photos) Once entering the culvert the run-off will flow downhill to a concrete lined drainage channel along the edge of the access road where a collection vault has been constructed and in combination with sandbag placement will be used for fluid recovery by vacuum trucks. The upper SS-1 location has been prepared using sandbags to direct rain run-off to either side of the ridgeline so that it will not flow downhill to the lower SS-25 location. This morning the 60 foot section with mist abatement coalescing mesh was lifted into place using a crane and tag lines on the west side of the wellhead over the vent. Construction continues on the 2- 100 foot mist abatement structures. These are being modified to be wider to provide broader coverage over the vent for placement on the east side.
- **January 4, 2016:** The weather this morning was light rain and a slight breeze 10-20 mph from the north. Light-to-moderate rain is forecasted for this evening increasing to heavy rains through Wednesday. Scott Walker will be on-site beginning Monday morning, January 4th through Wednesday, January 6th. SS-25 flowing tubing pressure measurement this morning was 968 psi. The pressure gauge is located in the Boots & Coots observation room on location. The 60 foot section with mist abatement coalescing mesh that was lifted into place yesterday appears to be working. I could not detect any oil mist exiting the vent on the west side. Construction continues on two additional mist abatement structures. These are being modified to be wider to provide broader coverage over the vent for placement on the east side. The second structure may be completed by the end of today with installation dependent on weather conditions Tuesday and Wednesday. AECom structural engineer was on SS-25 location yesterday taking measurements on SS-25A and SS-25B for heat shields.
- **January 5, 2016:** The weather this morning is heavy rain and dense fog. Visibility is severely limited. There is also a slight possibility of lightning. Weather conditions are dangerous for operations on SS-25 well site. Rain is forecasted to continue throughout the rest of the week. Scott Walker is on-site Tuesday and Wednesday. Scott McGurk will be on-site Thursday thru Saturday. SS-25 “flowing” tubing pressure measurement this morning was 907 psi. The 2-7/8” tubing is actually shut in and disconnected from the gathering system but the well is flowing out of the leak. The pressure gauge is located in the Boots & Coots observation room on location. The shorter 60 ft oil mist abatement structure has been completed and is awaiting better weather condition for installation. The final 100 ft abatement structure may be completed and installed by the end of this week depending on weather conditions.
  The vent is misting the rain which falls directly into the vent. I inspected the site during the heaviest rainfall and rain water on the ground was flowing away from the vent and towards the drains. Vacuum trucks are located at each catch basin collecting the runoff. There was no oil sheen on water running down the culverts towards the catch basins.

- **January 6, 2015:** The weather this morning is heavy rain and fog. Visibility is limited. There is also a possibility of lightning. Weather conditions are dangerous for operations on SS-25 well site. Rain is forecasted to continue throughout the rest of the week. Scott Walker is on-site today. Scott McGurk will be on-site Thursday thru Saturday. SS-25 "flowing" tubing pressure measurement this morning was 914 psi. The 2-7/8" tubing is actually shut in and disconnected from the gathering system but the well is flowing out of the leak. The pressure gauge is located in the Boots & Coots observation room on location. The shorter 60 ft oil mist abatement structure has been completed and is awaiting better weather conditions for installation. The final 100 ft abatement structure is still under construction. The vent is misting the rain which falls directly into the vent. Rain water on the ground was flowing away from the vent and towards the drains. Vacuum trucks are located at each catch basin collecting the runoff. There was no oil sheen on water running down the culverts towards the catch basins.

1. **January 7, 2016:** The weather this morning was rainy, but mostly cleared by 8:00am. The winds are very light. Rain is forecasted to return Saturday. Scott McGurk is on-site today through Saturday. SS-25 "flowing" tubing pressure measurement this morning was 908 psi. The 2-7/8" tubing is actually shut in but the well is flowing out of the leak. The present west side static reservoir pressure is 1400 to 1500 psi. The shorter 60 ft oil mist abatement tray has been completed and was installed west of the well. The final 100 ft tray for the east side of the well is still under construction. The sand bag barriers at the SS25 site performed as designed during the recent heavy rain and there were no major issues. SCG performed another NO2 tracer study, to better gage gas leak flow for future capture. The results will be available in a couple days. SCG will provide a digital copy of the Fluor preliminary gas/oil mist capture and incineration system today. SCG is concerned that the system may be ready before AQMD can issue permits to use it. SCG said they are planning to provide the division with daily photos of the SS25 site from SS1.

- **January 8, 2016:** The weather is expected to be clear all day, but with medium winds from the North. Rain is forecasted to return tomorrow. Scott McGurk is on-site today through Saturday. SS-25 "flowing" tubing pressure measurement this morning was 884 psi. The 2-7/8" tubing is actually shut in but the well is flowing out of the leak. The present west side static reservoir pressure is 1400 to 1500 psi. The shorter 60 ft oil mist abatement tray has been installed west of the well. The final 100 ft tray for the east side of the well should be completed today and installed tomorrow, if weather permits.

  SCG is performing more NO2 tracer studies over the next couple days, to better gage gas leak flow for future capture. The results will be available in a couple days. SCG provided a digital copy of the Fluor preliminary gas/oil mist capture and incineration system today. SCG is working with state agencies to ensure permitting will not delay its implementation.

  CalOSHA visited this morning to take air samples at the SS25 site. State Senator Fran Pavley visited this morning, and SCG said the meeting was cordial. US Congressman Brad Sherman plans to visit the site January 19. The onsite division rep will be meeting with SCG management this afternoon, to discuss contingency plans in the event the two relief wells are not successful, as per the Governor's recent proclamation.

- **January 9, 2016:** The weather is cloudy, with light winds, and light rain expected this afternoon. Scott McGurk is on-site today, and Scott Walker will be on-site Sunday through Tuesday. SS-25 "flowing" tubing pressure measurement this morning was 870 psi. The 2-7/8" tubing is actually shut in but the well is flowing out of the leak. The present west side static reservoir pressure is 1400 to 1500 psi. The final 100 ft tray for the east side of the well should be completed today. A large crane is being moved in today for installation tomorrow, if weather permits. A "hat" for the access bridge starts construction tomorrow, to capture oil misting over

the central cage areaSCG held a 9am pre-construction meeting for the gas capture/incineration project. The meeting, by Fluor/AECom/ARB was mostly an overview of construction logistics and related EHS issues. It covered no design details. Some pipes and other small equipment for the project arrive Monday. SCG indicated they will need equipment and foundation permits from the AQMD soon. At the 6:30am staff meeting, B&C expressed serious concerns regarding the safety of the proposed gas capture/incineration proposal. They said they would do a full risk assessment and provide SCG with a written document Monday. The division on-site rep will have a 1pm meeting with SCG, AECom, and Fluor to discuss safety issues related to the gas capture/incineration project.

- **January 10, 2016:** The weather is cloudy, with no wind. Scott Walker is on-site today Monday and Tuesday. SS-25 "flowing" tubing pressure measurement this morning was 819 psi. The 2-7/8" tubing is actually shut in but the well is flowing out of the leak. The present west side static reservoir pressure is 1400 to 1500 psi. The final 100 ft tray for the east side of the well should be completed today. A large crane is being moved in today for installation tomorrow, if weather permits. A "hat" for the access bridge starts construction tomorrow, to capture oil misting over the central cage area. SCG held a pre-construction meeting for the gas capture/incineration project. The meeting, by Fluor/AECom/ARB was mostly an overview of construction logistics and related EHS issues. It covered no design details. Some pipes and other small equipment for the project arrive Monday. SCG indicated they will need equipment and foundation permits from the AQMD soon.
- **January 11, 2016:** The weather is clear but there are strong North/North winds up to 40 mph. Possible light showers are expected Wednesday and another set of El Nino rains are possible Saturday and Sunday. Scott Walker is on-site today and Tuesday. SS-25 "flowing" tubing pressure measurement this morning was 797 psi. The 2-7/8" tubing is actually shut in but the well is flowing out of the leak. The present west side static reservoir pressure is 1400 to 1500 psi. A downhole pressure survey will be conducted today or tomorrow on nearby well SS-5 which will update this figure. The vent size and shape has not changed. The loudness of the escaping gas is less intense and there was very little misting this morning. The 100 ft mist abatement tray is being extended to 120 ft for the west side of the well and should be completed today. A large crane is being moved in for installation, if weather/wind permits. Heat shields are being manufactured for wells SS-25A and SS-25B. Surveyors are onsite today to survey the monuments installed as part of the slope stability monitoring.
  The onsite Division rep met with SCG management, Boots and Coots, and consultants to discuss contingency plans in the event the two relief wells are not successful. This was submitted to the Division as part of the Governors Emergency proclamation.
- **January 12, 2016:** The weather is clear but there are strong North winds up to 50 mph. Possible light showers are expected late Wednesday and another set of El Nino rains are possible Saturday and Sunday. Scott Walker is on-site today. Scott McGurk will be onsite Wednesday and Thursday. SS-25 "flowing" tubing pressure measurement this morning was 755 psi. The 2-7/8" tubing is actually shut in but the well is flowing out of the leak. The present west side static reservoir pressure is 1400 to 1500 psi. A downhole pressure survey will be conducted on nearby well SS-5 which will update this figure. The vent size and shape has not changed overnight. There was no noticeable misting during this morning's inspection. The 100 ft mist abatement tray is being extended to 120 ft for the west side of the well and should be completed today. A large crane is being moved in for installation, if weather/wind permits. There may be a weather window on this afternoon or Wednesday morning. Heat shields should be completed today for wells SS-25A and SS-25B. Installation will be dependent

on weather conditions. Surveyors completed their survey of monuments installed as part of the slope stability monitoring. Results should be available later this week.

- **January 13, 2016:** The weather is partly clear with light to medium winds. Possible light showers are expected later today. No other rain expected till Monday. Scott McGurk will be onsite today and Thursday. SS-25 "flowing" tubing pressure measurement this morning was 743 psi. The 2-7/8" tubing is actually shut in but the well is flowing out of the leak. The present west side static reservoir pressure is 1400 to 1500 psi. A downhole pressure survey will be conducted on nearby well SS-5 which will update this figure. The vent size and shape has not changed overnight. There was no noticeable misting during this morning's inspection.
  The 100 ft mist abatement tray is being extended to 120 ft for the west side of the well and should be completed in a couple days. It is delayed due to design changes. A large crane has arrived, but is not yet at the SS25 site. B&C has completed their risk assessment for the Gas Capture/Incineration Project. Although, they will not release a written document, they verbally told SCG that they will not be involved, and they consider the risks to out-weight the benefits.
  The heat shields are completed for wells SS-25A and SS-25B. Installation will be completed today. Surveyors completed their survey of monuments installed as part of the slope stability monitoring. Results should be available later this week.

- **January 14, 2016:** The weather is partly clear with strong winds from the north this morning, changing to medium winds and possible drizzle. No other rain expected till Monday. Scott McGurk is onsite today and Kris Gustafson onsite Friday. SS-25 "flowing" tubing pressure measurement this morning was 720 psi. The 2-7/8" tubing is actually shut in but the well is flowing out of the leak. During this morning's inspection, the SS25 well site appeared stable and unchanged. The 120 ft mist abatement tray should be completed in a couple days (photo attached). It is delayed due to design changes that will break it into 4 sections for installation. A large crane has arrived, but is not yet at the SS25 site.
  B&C has completed their risk assessment for the Gas Capture/Incineration Project. Although, they will not release a written document, they verbally told SCG that they will not be involved, and they consider the risks to out-weight the benefits.
  Yesterday, there was a SCG meeting from 2:30pm to 5:30pm, for preliminary discussions on the relief well control of SS25. Don Shackelford presented his analysis of the previous well control attempts, and how he believes that sand production over the last 62 years at SS25 has created a roughly 600 BBL reservoir void. If correct, it would mean that any well control should prepare for larger mud loss and should plan for extra mud/water reserves. The division will have a meeting with SCG, B&C, and the national labs on Friday to further discuss these issues.
  SCG will attempt a new gyro survey on SS25 tomorrow, weather permitting. They will also attempt to measure the gas temperature in the vent.
  The heat shields are installed for wells SS-25A and SS-25B.
  Surveyors completed their survey of monuments installed as part of the slope stability monitoring. Results should be available later this week.
- **January 15, 2016:** Today's email is being sent early due to meetings that will be on going for most of the day. A supplemental email may be sent later this afternoon/evening if significant developments occur. The weather is foggy with minimal winds this morning from WNW direction. Drizzle is possible. No other rain is expected until Monday. The weather should remain stable through the weekend into Monday. Kristopher Gustafson is onsite today, Scott Walker will be onsite Saturday and Sunday. SS-25 "flowing" tubing pressure measurement this morning was 718 psi and is essentially unchanged from yesterday. The 2-7/8" tubing is actually shut in but the well is flowing out of the leak. During this morning's inspection, the SS25 well

site appeared stable and unchanged. There was moderate fog over the SS-25 site, which may complicate work.
SCG is going to attempt to run a gyro survey in the SS-25 well today as weather conditions permit. This survey is necessary to establish an accurate bottom hole location for the SS-25 well. An accurate gyro survey increases the chances of a successful intercept of the SS-25 well.
The 120 ft mist abatement tray is completed. (No photo due to fog). The installation will be delayed so that the gyro can be run in SS-25. The earliest that the tray can be installed is by tomorrow, but Sunday is also a possibility. A large crane is available and can be spotted on the SS-25 site as needed.
The division will attend a meeting this afternoon with members of the National Labs, SCG, and B&C to discuss kill options for the SS-25 well. Currently, the drill rig has 3000 bbls of mud reserves available on site in the event a large void should be encountered in the SS-25 well.
SCG will attempt a new gyro survey on SS25 today, weather permitting. They will also attempt to measure the gas temperature in the vent.

- **January 16, 2016: No submittal**
- **January 17, 2016:** The weather is good with a slight breeze from the North/Northwest. Scott Walker is on site today. Kris Gustafson will be onsite Monday thru Wednesday. SS-25 "flowing" tubing pressure measurement this morning was 662 psi. The 2-7/8" tubing is actually shut in but the well is flowing out of the leak. During this morning's inspection, the SS25 well site appeared stable and unchanged. I did not see any misting take place during my morning site visit. There does not appear to be much gas or mist escaping out of the uncovered part of the vent.
- **January 18, 2016:** The weather is very foggy with a chance of rain later today. Drizzle was observed at the SS-25 site during the morning inspection. Kris Gustafson is onsite today until Wednesday. SS-25 "flowing" tubing pressure measurement this morning was 669 psi. The 2-7/8" tubing is actually shut in but the well is flowing out of the leak. During this morning's inspection, the SS25 well site appeared stable and unchanged. I did not see any misting take place during my morning site visit. There does not appear to be much gas or mist escaping out of the uncovered part of the vent. The gyro survey was successfully run in the SS-25 well. The survey showed 7 ft of additional drift that will be corrected in the next drilling interval. The gyro will greatly improve drilling accuracy for the relief well interception. Results for BTEX (benzene) monitoring were made available to the Division today.
- **January 19, 2016:** The weather is cloudy with patches of fog at higher elevations, winds are calm. Rain began in the early afternoon. North winds are expected to return by the end of the week. Weather at the SS-25 was calm this morning. Kris Gustafson is onsite today until Wednesday. Scott McGurk will be onsite Thursday. SS-25 "flowing" tubing pressure measurement this morning was 640 psi. The 2-7/8" tubing is actually shut in but the well is flowing out of the leak. During this morning's inspection, the SS25 well site appeared stable and unchanged. I did not see any misting take place during my morning site visit. There does not appear to be much gas or mist escaping out of the uncovered part of the vent. Please find attached photo. SCG sent a letter to the Governor's office last evening confirming that SCG does not plan on installing the gas capture and incineration equipment on SS-25. SCG confirmed that the third mist abatement tray is not going to be installed on the remaining open portion of the vent. SCG plans on removing the trays from the site once the relief well has been cased and the intercept phase begins. The SS-25 site is mostly closed down for monitoring. SCG plans to continue monitoring the site but at this time there are no further downhole operations planned until the well is killed. Except for Boots and Coots personnel, visitors are going to be restricted at SS-25. Division personnel are exempted from this restriction and daily inspections are going to

continue as normal. A Legislative hearing is scheduled for Thursday with regard to the SS-25 incident.

- **January 20, 2016:** The weather is mostly cloudy with patches of fog, with clearing expected by this afternoon. Winds could return late today or early tomorrow. Weather at the SS-25 was calm this morning. Kris Gustafson is onsite today. Scott McGurk will be onsite Thursday. SS-25 "flowing" tubing pressure measurement this morning was 618 psi. The 2-7/8" tubing is actually shut in but the well is flowing out of the leak. Some light misting was observed on the west side of the vent. This misting did not reach the end of the bridge, but there is visible oil on the SS-25A heat shield. A crack was reported by Boots and Coots in the asphalt on the NW side of the bridge. This is due to a lack of supporting material beneath the asphalt. The presence of this crack would seem to limit the amount of equipment that can be staged on that side of the pad. The bridge is not affected by the crack. The site is stable and unchanged otherwise.
  SCG confirmed that the third mist abatement tray is not going to be installed on the remaining open portion of the vent. This tray was going to go on the west side of the vent and potentially over the unstable area. SCG plans on removing the mist trays from the site once the relief well has been cased and the intercept phase begins. The SS-25 site is mostly closed down for monitoring. SCG plans to continue monitoring the site but at this time there are no further downhole operations planned until the well is killed. Except for Boots and Coots personnel, visitors are going to be restricted at SS-25. Division personnel are exempted from this restriction and daily inspections are going to continue as normal. LA County Fire and the FAA modified the flight restrictions over the site last Friday. Aircraft must now stay 2600' away from the SS-25 site and both relief well locations. A Legislative hearing of the Utilities Committee in Granada Hills is scheduled for Thursday covering the SS-25 incident.
- **January 21, 2016:** The weather is partly cloudy this morning with extreme winds from the north up to 50 MPH. Winds are expected to be medium for the rest of the day with no rain. Scott McGurk is onsite today. Scott Walker will be onsite Friday through Sunday. SS-25 "flowing" tubing pressure measurement this morning was 595 psi. The 2-7/8" tubing is actually shut in but the well is flowing out of the leak. Some light misting was observed on the west side of the vent. Two 500 BBL portable tanks are on the SS25 site. The tanks will collect any wellhead fluids that surface during the relief well control attempt. The site is stable and unchanged otherwise.
- **January 22, 2016:** The weather is partly cloudy this morning with light winds from the north. Scott Walker is onsite today through Sunday. SS-25 "flowing" tubing pressure measurement this morning was 618 psi. The 2-7/8" tubing is actually shut in but the well is flowing out of the leak. No misting was observed on the west side of the vent. The volume (loudness) of the leak is less compared to my last visit five days ago. The site is stable and unchanged otherwise. SCG is planning on running another temperature and noise log in SS 25 as well as a caliper survey. The caliper survey is to help refine the kill modelling.
  Work was temporarily suspended on the SS-25 site for a CalOSHA visit.
- **January 23, 2016:** The weather is partly cloudy this morning with light winds from the north. Possible rain showers later in the afternoon. Scott Walker is onsite today through Sunday. SS-25 "flowing" tubing pressure measurement this morning was 595 psi. The 2-7/8" tubing is actually shut in but the well is flowing out of the leak. No misting was observed on the west side of the vent. There was no evidence of overnight misting as visqueen plastic covered equipment was still clean. The site is stable and unchanged otherwise. SS-25 had a temperature and pressure survey completed today.
- **January 24, 2016:** The weather is clear today with strong winds from the north in the morning shifting to light winds from the south/southeast in the afternoon. The wind forecast for Monday is 45-55 mph from the north and 55-70 mph from the north on Tuesday. Scott Walker is onsite

today. Scott McGurk will be on site Monday and Tuesday. SS-25 “flowing” tubing pressure measurement this morning was 589 psi. The 2-7/8” tubing is actually shut in but the well is flowing out of the leak. No misting was observed on the west side of the vent. There was no evidence of overnight misting as visqueen plastic covered equipment was still clean. A small one foot square chunk fell off the northern part of the vent near the bridge. There is no impact to the vent or bridge. The site is stable and unchanged otherwise. The wellhead is being secured further with additional metal cables connected to rig anchors.
A decision tree has been created by Don Schackelford which outlines the intercept and kill procedure. Please see attachment. There is a planned JPL overflight on Monday or Tuesday.

- **January 25, 2016:** The weather is clear this morning with extreme winds from the north up to 55 MPH. Winds are expected to be medium for the rest of the day with no rain. Scott McGurk is onsite today and tomorrow. SS-25 “flowing” tubing pressure measurement this morning was 575 psi. The 2-7/8” tubing is actually shut in but the well is flowing out of the leak. The wellhead is now secured with 8 cables. Lines are being connected between the wellhead tubing and the tanks onsite, in case the tubing needs to flow during the pending well control. The site is stable and unchanged otherwise.
  SCG has Western Wireline at the facility performing well kills. SCG has targeted 18 wells of similar characteristics to SS25. They will kill the wells with saline and place tubing plugs. The process is expected to take 3-4 weeks for all wells.
  SCG is holding a 1:30pm meeting today to discuss all relief well activities during the pending well control attempt. Two division reps will attend. SCG has been recording the gas leak from the SS1 site with FLIR since December 23.

- **January 26, 2016:** The weather is clear this morning with extreme winds from the north up to 65MPH. Scott McGurk is onsite today. Kris Gustafson is onsite tomorrow. Scott Walker is onsite Thursday through Saturday. SS-25 “flowing” tubing pressure measurement this morning was 574 psi. The 2-7/8” tubing is actually shut in but the well is flowing out of the leak. Lines have been connected between the wellhead tubing and the tanks onsite, in case the tubing needs to flow during the pending well control. The site is stable and unchanged otherwise.
  SCG has Western Wireline at the facility performing well kills. SCG has targeted 18 wells of similar characteristics to SS25. They will kill the wells with saline and place tubing plugs. The process is expected to take 3-4 weeks for all wells.
  Starting Friday January 29, all non-essential visits to the facility are prohibited, due to increased road traffic and the pending well control attempt. SCG said that a group of investigators are expected on Friday to start the root cause analysis phase. SCG thought the visit was premature, ill-timed, and could cause dangerous delays as intercept drilling commences.
- **January 27, 2016:** The weather was partly cloudy with wind gusts from the north at 40 MPH. Wind gusts dropped to 20 MPH by early afternoon. Tomorrow should have similar conditions. Kris Gustafson is onsite today. Scott Walker will be onsite Thursday through Saturday. SS-25 “flowing” tubing pressure measurement this morning was 558 psi. The 2-7/8” tubing is actually shut in but the well is flowing out of the leak. Lines have been connected between the wellhead tubing and the tanks onsite, in case the tubing needs to flow during the pending well control. Mist tray removal will begin on Thursday or Friday, wind conditions permitting, and should be completed by Sunday. The site is stable and unchanged otherwise.

SCG has Western Wireline at the facility plugging injection tubings. These are not abandonments and no casing changings are being made. SCG has targeted 18 wells with similar characteristics to SS-25. These are the same wells that have SIMP priority. SCG will place tubing plugs in the targeted wells and then kill them with brine later. The process is expected to take 3-4 weeks for all wells. Well control drills and walk-throughs will continue. All future drilling will be during daylight hours only. Starting Friday January 29, all non-essential visits to the facility are prohibited, due to increased road traffic and the pending well control attempt. SCG said that a group of investigators are expected on Friday to start the root cause analysis phase.

- **January 28, 2016:** The weather was clear with wind gusts from the north at 35 MPH. Tomorrow should have similar conditions. Sunday heavy rain is expected with up to 2 inches along with winds from the South/Southwest from 40-60 mph. Scott Walker will be onsite Thursday through Saturday. SS-25 "flowing" tubing pressure measurement this morning was 580 psi. The 2-7/8" tubing is actually shut in but the well is flowing out of the leak. Lines have been connected between the wellhead tubing and the tanks onsite, in case the tubing needs to flow during the pending well control. Mist tray removal will begin on Friday, wind conditions permitting, and should be completed by Sunday. The site is stable and unchanged otherwise. There was no apparent misting during the morning inspection.
- **January 29, 2016:** The weather was clear with wind gusts from the north at 20-30 MPH. The wind is expected to calm this afternoon. Sunday heavy rain is expected with up to 2 inches along with winds from the South/Southwest from 40-60 mph. Scott Walker will be onsite Friday and Saturday. SS-25 "flowing" tubing pressure measurement this morning was 573 psi. The 2-7/8" tubing is actually shut in but the well is flowing out of the leak. Lines have been connected between the wellhead tubing and the tanks onsite, in case the tubing needs to flow during the pending well control. Mist tray removal will begin this afternoon, wind conditions permitting, and should be completed by Sunday. The site is stable and unchanged otherwise. There was no apparent misting during the morning inspection. Western Wireline is staging an antennae and equipment on site for continuous pressure reading transmission during the kill attempt.
  At the Porter 39A relief well, the rig ran a gyro on drill pipe. The drill pipe and gyro were pulled and a CBL and USIT were also run on wireline. The next planned interval of drilling and gyro and ranging is 37 ft. An early kill of SS-25 is possible at any point after the relief well drills below the cap rock. Drilling operations will be restricted to daylight hours so that Boots and Coots can monitor SS-25. The earliest planned well control attempt is tentatively scheduled for February 8th. The relief well is on schedule.
  The division attended the twice weekly Coordinators Agency meeting at SCG offices in Chatsworth. I gave all attending agencies a report on activities at SS-25, relief well 1 and relief well 2. Agencies were most interested in the possible future misting of mud during the kill attempt. Starting Friday January 29, all non-essential visits to the facility are prohibited, due to increased road traffic and the pending well control attempt.
- **January 30, 2016:** The weather was partly cloudy and relatively calm with slight winds from the South/Southwest. Sunday heavy rain is expected with up to 2 inches along with winds from the South/Southwest from 40-60 mph. Scott Walker is onsite today. Scott McGurk will be onsite Sunday thru Tuesday. SS-25 "flowing" tubing pressure measurement this morning was 578 psi. The 2-7/8" tubing is actually shut in but the well is flowing out of the leak. The two mist trays over the west side of the vent were removed. A tray will be installed perpendicular to the bridge on the north side. The north side of the bridge will actually rest on top of the tray. This is to redistribute the weight of the bridge over a larger area. The site is stable and unchanged otherwise. There was no apparent misting during the morning inspection.

An early kill of SS-25 is possible at any point after the relief well drills below the cap rock. At this point drilling operations will be restricted to daylight hours so that Boots and Coots can monitor SS-25. The earliest planned well control attempt is tentatively scheduled for February 8th. The relief well is on schedule.

- **January 31, 2016:** The weather is heavy fog with rain and medium winds from the South/Southwest this morning. The rain is expected to increase into the afternoon with strong winds up to 40-50 mph. Scott McGurk is onsite today through Tuesday. SS-25 "flowing" tubing pressure measurement this morning was 584 psi. The 2-7/8" tubing is actually shut in but the well is flowing out of the leak. The two mist trays over the west side of the vent were removed, but one tray was re-installed perpendicular to and under the access bridge on the north side. Misting was not visible, due to the heavy fog during the morning inspection. The north side pad sandbags were adjusted to prepare for heavy rain and run-off. The site is stable and unchanged otherwise. At the Porter 39A relief well, Ranging Run 22 was completed. The relief well is now 3 feet away from leaking well SS25. Drilling is now at 8500 feet MD. Ranging Run 23 and a gyro run will be made today and tonight. There is 15 feet of cap rock left to drill, before entering the S1 gas storage formation. Since drilling operations are restricted to daylight hours, the next drilling will possibly take place Monday morning, but likely Tuesday morning. When drilling resumes, within two hours of drilling, communication may be made with the leaking well and an unplanned well control may occur, but SCG is prepared for such an event. The earliest planned well control attempt is tentatively scheduled for February 8th. The relief well is on schedule.
- **February 1, 2016:** The weather is clear with strong winds from the North this morning up to 60 mph. Scott McGurk is onsite today through Tuesday. SS-25 "flowing" tubing pressure measurement this morning was 594 psi. The 2-7/8" tubing is actually shut in but the well is flowing out of the leak. The rains yesterday had no impact on the site. The site is stable and unchanged otherwise. At the Porter 39A relief well, Ranging Run 23 was completed. The relief well is now 3 feet away from leaking well SS25. The hole is now at 8500 feet MD. There is 15 feet of cap rock left to drill, before entering the S1 gas storage formation, and the next drilling segment is planned to be 30 feet. Drilling started at 10:40am and should take 1.5 hours to go the 30 feet. Communication may be made with the leaking well and an unplanned well control may occur, but SCG is prepared for such an event. The earliest planned well control attempt is tentatively scheduled for February 8th. The relief well is on schedule. The latest drilling intercept diagram with markers is attached (note that the diagram is not to scale).
- **February 2, 2016:** The weather is partly cloudy with medium winds from the North. Scott McGurk and Scott Walker are onsite every day until further notice. SS-25 "flowing" tubing pressure measurement this morning was 594 psi. The 2-7/8" tubing is actually shut in but the well is flowing out of the leak. The site is stable and unchanged otherwise.
  At the Porter 39A relief well, Ranging Run 24 and a gyro run were completed. The relief well is now 2 feet away from leaking well SS25. The hole is now at 8530 feet MD, just above the base of the S1 sand. A gamma ray and Resistivity log is being run today. The next drilling segment is planned to be 30 feet to the lower part of the S2 sand. Drilling should start at around 7AM tomorrow. Communication may be made with the leaking well and an unplanned well control may occur, but SCG is prepared for such an event. The earliest planned well control attempt is tentatively scheduled for February 8th. The relief well is stable and on schedule.
  The division met with members of the Blade Energy investigative team and the CPUC rep yesterday, to discuss immediate sampling of SS25 wellhead gas today. Blade Energy informed SCG overnight that the equipment to test the gas would not be on site until tonight, forcing a delay in relief well drilling on Wednesday. After several hours of discussion, Blade Energy

concluded that alternatives to the immediate SS25 gas sampling would be acceptable, and drilling on Wednesday could continue. The division and the CPUC will be issuing a written document to SCG confirming the wait to take SS25 gas samples.

- **February 3, 2016:** The weather is partly cloudy with medium winds from the North up to 45 mph. Scott McGurk and Scott Walker are onsite every day until further notice. SS-25 "flowing" tubing pressure measurement this morning was 589 psi. The 2-7/8" tubing is actually shut in but the well is flowing out of the leak. The site is stable and unchanged otherwise.
  At the Porter 39A relief well, the rig drilled another 30 ft interval without any fluid losses. The relief well is now 2.5 +/- 0.5 feet away from leaking well SS25 in a horizontal plane. The bottom of the well is now in a shale at 8,560 feet MD just above the top of the S2 sand. The rig will condition the hole and trip out for ranging run #25 and gyro. There is a small chance drilling could resume tomorrow morning. That decision will be made between 10 am and 12 pm. Communication may be made with the leaking well and an unplanned well control may occur, but SCG is prepared for such an event. The earliest planned well control attempt is tentatively scheduled for February 8th. The relief well is stable and on schedule.
- **February 4, 2016:** The weather is partly cloudy with high winds from the North up to 60 mph. Tomorrow, winds are expected to increase with gusts up to 70 mph. This could limit any crane work needed for assembly of the second relief well rig at PS-20A. Scott McGurk and Scott Walker are onsite today. SS-25 "flowing" tubing pressure measurement this morning was 579 psi. The 2-7/8" tubing is actually shut in but the well is flowing out of the leak. The vent was intermittently expelling what appeared to be tiny clay or oil spheroids periodically in the afternoon. This activity had ceased overnight. The site is stable and unchanged otherwise.
  At the Porter 39A relief well, the rig conditioned the hole at 8,560 ft and made a trip for a gyro survey. The rig is currently performing ranging run (#25). The next drilling will likely take place tomorrow (Friday) after the ranging data is processed. The next drilling segment will take the wellbore through the S2 sand. The well is currently 54 ft from intersecting SS-25. Hydraulic communication may be made with the leaking well and an unplanned well control may occur, but SCG is prepared for such an event. The earliest planned well control attempt is tentatively scheduled for February 8th. The relief well is stable and on schedule.
  Blade Energy is onsite and acquiring gas samples from SS-25, SS-9, and SS-29. They are testing for gas composition as part of the Root Cause Analysis (RCA).
- **February 5, 2016:** The weather is clear with high winds from the North up to 65 mph. Tomorrow, winds are expected to about the same. This could limit any crane work needed for assembly of the second relief well rig at PS-20A. Scott McGurk is onsite today. SS-25 "flowing" tubing pressure measurement this morning was 591 psi. The 2-7/8" tubing is actually shut in but the well is flowing out of the leak. No inspection of the SS25 site is possible due to extreme wind conditions and the CPUC/DOGGR RCA Directive limiting site disturbance. The site is stable and unchanged otherwise. At the Porter 39A relief well, activities are on hold due the CPUC/DOGGR RCA Directive, but there is a chance drilling might take place by 1pm if there is a resolution. The hole is at 8,560 ft. The gyro and Ranging Run #25 are complete. The next drilling segment of 25 feet will take the wellbore to the bottom of the S2 sand. Hydraulic communication may be made with the leaking well and an unplanned well control may occur, but SCG is prepared for such an event. The earliest planned well control attempt is tentatively scheduled for February 8th. The relief well is stable and on schedule.
  Blade Energy is onsite and acquiring gas samples from well offset to SS25. They are testing for gas composition as part of the Root Cause Analysis (RCA).

- **February 6, 2016:** The weather is clear with high winds from the North up to 50 mph. Tomorrow, winds are expected to increase to 55-65 mph. This could limit any crane work and welding needed for assembly of the second relief well rig at PS-20A. Scott McGurk and Scott McGurk is onsite today. SS-25 "flowing" tubing pressure measurement this morning was 607 psi. The 2-7/8" tubing is actually shut in but the well is flowing out of the leak. There did not appear to be any change in the vent characteristics. The site is stable and unchanged otherwise. At the Porter 39A relief well, the hole total depth (TD) is currently 8,585 ft . The gyro run on drill pipe was completed and ranging run #26 is under way. After this data is evaluated the next drilling interval will be determined. The next drilling interval is expected to start Sunday morning 2/7. This interval will take the relief well past the Water Shutoff Perfs depth (WSO holes) in SS-25. The planned interception point is now 8,619 ft which is 5 ft deeper than previous estimates. See attached diagram. Hydraulic communication may be made with the leaking well and an unplanned well control may occur, but SCG is prepared for such an event. The earliest planned well control attempt is tentatively scheduled for February 8th. The relief well is stable and on schedule. Blade Energy is onsite and acquiring gas samples from well offset to SS25. They are testing for gas composition as part of the Root Cause Analysis (RCA).
  February 7, 2016: The weather is clear with extreme winds from the North up to 65 mph. Tomorrow, winds are expected to be the same. This could limit any crane work and welding needed for assembly of the second relief well rig at PS-20A. Scott McGurk is onsite today. SS-25 "flowing" tubing pressure measurement this morning was 606 psi. The 2-7/8" tubing is actually shut in but the well is flowing out of the leak. There was no inspection of the well site this morning due to relief well drilling and wind conditions. The site is stable and unchanged otherwise. At the Porter 39A relief well, the hole total depth (TD) is currently 8,600 ft, just at the top of the WSO perfs, and no communication to the leaking well has occurred yet. The gyro run and Ranging Run #26 were completed yesterday. Fifteen feet were drilled this morning, and the wells are 8 inches apart edge-to-edge. The next drilling interval is expected to start Tuesday morning 2/9, and will take the relief well past the Water Shutoff Perfs depth (WSO holes) in SS-25. Two more short drilling segments are expected before a soft touch. The planned interception point is now 8,619 ft. Hydraulic communication may be made with the leaking well at any time and an unplanned well control may occur, but SCG is prepared for such an event. The relief well is stable and on schedule.
  The Unified Command has issued a directive that only "mission critical" personnel shall visit the SS25 site, unless the personnel has mission specific reasons and are approved by UC and SCG. This does not affect onsite DOGGR personnel.
- **February 8, 2016:** The weather is clear with extreme winds from the North from 40-50 mph. Wednesday winds are expected to be slightly less in strength. This will limit any crane work and welding needed for assembly of the second relief well rig at PS-20A. Scott Walker and Scott McGurk are onsite today. SS-25 "flowing" tubing pressure measurement this morning was 597 psi. The 2-7/8" tubing is actually shut in but the well is flowing out of the leak. The site is stable and unchanged otherwise. Boots and Coots continue to monitor the well and site.
  At the Porter 39A relief well, the hole total depth (TD) is currently 8,610 ft after drilling 10 ft this morning, no communication to the leaking well has yet occurred. The wells are 2.5 inches apart edge-to-edge. The next drilling interval is expected to start tomorrow morning 2/10, and will take the relief well to the interception point on target well SS-25. The planned interception point is revised back to 8,615 ft. This adjustment was made after examining the geologic

correlation and ranging run data. Hydraulic communication may be made with the leaking well at any time and an unplanned well control may occur, but SCG is prepared for such an event. The relief well is stable and on schedule.
The schedule this week is tentatively planned as follows:
Wednesday 2/10, drill approximately 5 ft and soft touch SS-25 at 8,615 ft. No gyro or ranging run necessary at this point.
Thursday 2/11, mill into SS-25 7" casing from 8,615 ft down to 8,630 ft.
Note – Gyro runs are not required for the last two drilling intervals which shortens the time between drilling intervals.
The Unified Command has issued a directive that only "mission critical" personnel shall visit the SS25 site, unless the personnel has mission specific reasons and are approved by UC and SCG. This does not affect onsite DOGGR personnel.

- **February 9, 2016:** The weather is clear with extreme winds from the North from 40-50 mph. Wednesday winds are expected to be slightly less in strength. This will limit any crane work and welding needed for assembly of the second relief well rig at PS-20A. Scott Walker and Scott McGurk are onsite today. SS-25 "flowing" tubing pressure measurement this morning was 597 psi. The 2-7/8" tubing is actually shut in but the well is flowing out of the leak. The site is stable and unchanged otherwise. Boots and Coots continue to monitor the well and site.
  At the Porter 39A relief well, the hole total depth (TD) is currently 8,610 ft after drilling 10 ft this morning, no communication to the leaking well has yet occurred. The wells are 2.5 inches apart edge-to-edge. The next drilling interval is expected to start tomorrow morning 2/10, and will take the relief well to the interception point on target well SS-25. The planned interception point is revised back to 8,615 ft. This adjustment was made after examining the geologic correlation and ranging run data. Hydraulic communication may be made with the leaking well at any time and an unplanned well control may occur, but SCG is prepared for such an event. The relief well is stable and on schedule.
  The schedule this week is tentatively planned as follows:
  Wednesday 2/10, drill approximately 5 ft and soft touch SS-25 at 8,615 ft. No gyro or ranging run necessary at this point.
  Thursday 2/11, mill into SS-25 7" casing from 8,615 ft down to 8,630 ft.
  Note – Gyro runs are not required for the last two drilling intervals which shortens the time between drilling intervals.
  The Unified Command has issued a directive that only "mission critical" personnel shall visit the SS25 site, unless the personnel has mission specific reasons and are approved by UC and SCG. This does not affect onsite DOGGR personnel.
- **February 10, 2016:** The weather is clear with medium winds from the North from 20-30 mph. Scott Walker and Scott McGurk are onsite today. SS-25 "flowing" tubing pressure measurement this morning was 605 psi. The 2-7/8" tubing is actually shut in but the well is flowing out of the leak. The site is stable and unchanged otherwise. Boots and Coots continue to monitor the well and site. At the Porter 39A relief well, the hole is currently at 8,615 ft, after drilling this morning. Soft touch between the relief well and the leaking well was confirmed twice. There are no fluid losses and no communication to the leaking well yet. A last ranging run will be made this afternoon to confirm intercept location and orientation. Tomorrow at 7AM, the relief well will mill into the SS25 leaking well and well control will occur. Hydraulic communication may be made with the leaking well at any time and an unplanned well control may occur, but SCG is prepared for such an event. The relief well is stable and on schedule.

The Unified Command has issued a directive that only "mission critical" personnel shall visit the SS25 site, unless the personnel has mission specific reasons and are approved by UC and SCG. This does not affect onsite DOGGR personnel.

- **February 11, 2016:** The weather is clear with light winds from the North from 15-20 mph. Scott Walker, Scott McGurk, Kris Gustafson and Jay Huff are onsite today. SS-25 "flowing" tubing pressure measurement this morning was 607 psi before the interception. The 2-7/8" tubing is actually shut in but the well is flowing out of the leak. The site is stable and unchanged otherwise. Boots and Coots continue to monitor the well and site.
  At the Porter 39A relief well, the hole is currently at 8,615 ft, and the mill is positioned on top of the 7" casing and tagged the casing at 8,615.3 ft. The morning developed as follows:
  0710 Started milling operations.
  0742 Relief well PS-39A started on losses.
  0745 Reported well SS-25 tubing pressure increased to 675 psi.
  0749 Boots and Coots observing SS-25 reported gas flow has stopped surfacing at SS-25. Mud loss rate increased to approximately 9 bpm and the centrifugal pump was engaged to keep the hole full in PS-39A.
  0752 The milling assembly was pulled back up into the 7" casing shoe at 8,402 ft. The SS-25 tubing pressure climbed to 911 psi indicating the well is building a stable fluid column in the annulus.
  0802 SS-25 tubing pressure had climbed to 1,102 psi. There was no activity in the vent and no gas flow or fluids surfacing.
  0811 The pump rate was dropped to 2 bpm and the pumping pressure had built up to 100 psi.
  0812 SS-25 tubing pressure had climbed to 1,240 psi indicating further building of fluid column in the SS-25 tubing-casing annulus.
  0814 The well had taken 280 bbls of mud and the SS-25 tubing pressure had built up to 1,259 psi.
  0817 There is no activity in the SS-25 vent. The pumping rate of mud from the relief well to SS-25 was 3 bpm at 60 psi. The SS-25 tubing pressure was 1,300 psi which is the equivalent of a tubing annulus fluid level of 500 ft below surface. The equivalent frac gradient is 8.5 ppg.
  0833 The SS-25 tubing pressure was 1,370 psi and the pumping rate was 2 bpm at 100 psi.
  0837 370 bbl of pump have been pumped into the well.
  0936 The pump rate was 1.7 bpm at 158 psi with the SS-25 tubing pressure at 1,418 psi. The equivalent frac gradient is 9 ppg indicating there is likely no substantive void.
  0953 Pumping was stopped and both wells are being monitored. The wells appears stable with almost no losses of mud to the formation.
  1100 Visited the SS-25 well pad and verified there is no venting or liquids surfacing into the bottom of the vent.
  1115 Kris Gustafson DOGGR noticed a small leak on the pumping iron laying across the bridge. Boots and Coots will make repairs when safe and not in conflict with the CPUC/DOGGR order in place.
  1330 The milling assembly was lowered back down to the SS-25 7" casing and a 7 ft window will be cut into SS-25. This will take approximately 4 hrs.

  Going forward the cementing operation will likely be handled with tubing run down the well into the milled window of SS-25. This will increase the certainty that cement will be placed where

desired. The Unified Command has issued a directive that only "mission critical" personnel shall visit the SS25 site, unless the personnel has mission specific reasons and are approved by UC and SCG. This does not affect onsite DOGGR personnel.
The Secretary of Energy will visit along with the National Labs on Tuesday.

- **February 12, 2016:** The weather is clear with light winds from the North from 15-20 mph. Scott McGurk, Scott Walker, and Kris Gustafson are onsite today. At SS-25, the tubing pressure this morning was 1351 psi, a drop of roughly 20 PSI overnight. The pressure drop is likely due to minor mud loss and a very small pipe leak at the surface. The well is still under control. CalOSHA is requiring the installation of hand railing on the west side of the access bridge today. The site is stable and unchanged otherwise. Boots and Coots continue to monitor the well and site. The SS25 bottom production liner is planned to be cement plugged this afternoon, through the milled casing window, from 39A, with standard P&A Class G cement. The SS25 liner fill was tagged twice this morning from 39A at 8809 MD (39A), so that the correct cement volume for the first plug can be determined. The tag was witnessed by Kris Gustafson and Scott Walker. Once placed, the first cement plug will cure for about 24 hours, then it will be tagged from 39A to confirm placement.
  At the Porter 39A relief well, the SS25 7" casing was milled to create an 8 foot window yesterday afternoon, after the well control. This morning, a 2-7/8" tubing string on the bottom of the tapered drill string, entered SS25 through the milled casing window, to tag the bottom of the SS25 production liner.
  The Secretary of the DOE and the Administrator for PHMSA will visit along with the National Labs on Tuesday. A tour and roundtable discussion is planned.
  A CARB flyover is scheduled for tomorrow.
- **February 13, 2016:** The weather is clear with light winds from the North from 15-20 mph. Scott McGurk and Scott Walker are onsite today. At SS-25, the tubing pressure this morning was 1,373 psi. The well is under control. CalOSHA is requiring the installation of hand railing on the west side of the access bridge today. The vent and site are stable and unchanged otherwise. Boots and Coots continue to monitor the well and site.
  At the Porter 39A relief well, with open ended 2-7/8" tubing set at 8,808 ft MD pumped 20 bbls of 14.8 ppg cement into the 5-1/2" liner in SS-25. CIP 1845 hrs. Picked up pipe to 8,627 ft MD and attempted to circulate but only got partial returns. Picked up pipe to 8,000 ft MD and attempted to circulate with similar results, partial returns. Pulled up to 7,043 ft MD and established full returns. Circulated bottoms up and got a small amount of soft cement at surface. Picked up a tricone bit to cleanout any cement stringers in the P-39A hole. Tricone bit went down to 8,618 ft MD which is 3 ft inside the window of the SS-25 7" casing without any issues. Will trip out the bit and run in with open ended 2-7/8" tubing for a tag later tonight.
  The Secretary of the DOE and the Administrator for PHMSA will visit along with the National Labs on Tuesday. A tour and roundtable discussion is planned.
  A CARB flyover is scheduled for today.
- **February 14, 2016:** The weather is clear with medium winds from the North from 20-30 mph. Winds are expected to increase through the day with 60-70 MPH tonight and into tomorrow morning. The higher winds will likely prevent crane use at SS25, and delay diagnostic logging for confirmation. Scott McGurk and Scott Walker are onsite today. At SS-25, the tubing pressure this morning was 1,268 psi. The well is under control. The CalOSHA mandated access bridge hand railing has been installed. The vent and site are stable and unchanged otherwise. During relief well cementing today, the SS25 tubing gas was purged a small amount, to help bring cement into the bottom of the tubing. If wind conditions permit, SCG will move in

a crane and wireline unit this afternoon, to run a temperature log for top-of-cement detection tonight. Boots and Coots continue to monitor the well and site.
At the Porter 39A relief well, the first cement plug in the liner of SS25 was tagged twice (witnessed) last night at 8657 feet MD (39A), about 30 feet lower than expected, and not covering the top SS25 perfs. A second cement plug was placed this morning, as per the attached program. Forty-two barrels of cement were injected from 39A, through the SS25 casing window, to fill up the SS25 liner and the bottom of the SS25 well to roughly 7500 feet MD (SS25). If placed properly, this would seal the entire bottom of SS25, including the packer, tubing, and all tubing ports/perfs. This second cement plug will also seal the bottom of 39A, ending it's relief well mission. SCG indicated that 39A will be a future observation well.
The Secretary of the DOE and the Administrator for PHMSA will visit along with the National Labs on Tuesday. A tour and roundtable discussion is planned.

- **February 15, 2016:** The weather is clear with extreme winds from the North from 60-70 mph. Winds are expected to decrease through the day. The same wind pattern is expected tomorrow. The higher winds will likely prevent crane use at SS25, and delay diagnostic logging for confirmation. Scott McGurk and Alan Walker are onsite today. At SS-25, the tubing pressure is 1,226 psi this afternoon. The well is under control. The vent and site are stable and unchanged otherwise. This morning, SCG performed three fluid level measurements on the SS25 tubing over an hour of time. All three fluid levels were the same (2443 ft MD), indicating no fluid communication in or out of the tubing in the well. This is a good indication that the second cement plug worked, the tubing has cement at the bottom, and the tubing is not communicating with the casing. If wind conditions permit (unlikely), SCG will run a temperature log for top-of-cement detection this afternoon. Boots and Coots continue to monitor the well and site.
  At the Porter 39A relief well, this morning, a third cement plug of 150 feet was placed on top of the cement retainer from the second cement job. This means there is cement in 39A from the intersection with SS25 (8615 md) to about 8150 md. The division will tag and confirm the cement tomorrow. SCG indicated that 39A will be a future observation well.
  The Secretary of the DOE and the Administrator for PHMSA will visit along with the National Labs tomorrow. A tour and roundtable discussion is planned.

  February 16, 2016: The weather is clear with low winds from the North. The same wind pattern is expected tomorrow. Scott McGurk, Alan Walker, Scott Walker, and Jay Huff are onsite today. At SS-25, the tubing pressure is 1,145 psi this afternoon, due to some loss during logging. The well is under control. The vent and site are stable and unchanged otherwise. This morning, SCG ran a temperature log followed by a noise log. Tomorrow, SCG will run a cement bond log and will do the tubing perf pressure test against the casing annulus cement. Boots and Coots continue to monitor the well and site. At the Porter 39A relief well, in the early morning, the cement plug was polished off and the division witnessed the cement tag. SCG indicated that 39A will be a future observation well. At the PS-20A second relief well site, the rig is ready to spud, but all operations have been suspended (DOGGR approved), pending SS25 final kill announcement. Ori Sartono with the DOGGR RCA team is onsite.
  The Secretary of the DOE and the Administrator for PHMSA visited today.

  February 17, 2016: No update provided.

- **February 18, 2016:** **<u>Final Update</u>** Thursday, February 18, 2016. At approximately 8:30 pm yesterday DOGGR completed evaluation of the final positive pressure test and recommended to the Supervisor that the Confirmation of the leak was complete. Confirmation was announced today, February 18th at 10:00 am in Chatsworth. Relief well 1 plugged back and began demobilizing. Relief well 2 was released today after the announcement.

EXHIBIT 4

7047 W. Greens Rd.
Houston, TX. 77066
281-931-8884

This is an estimate only for the date listed on this sheet. This is not an invoice.

Date:	13-Nov-2015	**Well Name and Number:**	Standard Senson 25	**Report #**	20
Customer Name:	Southern California Gas Company	**County:**	Los Angeles		
Customer Billing Address:	12801 Tampa Ave., SC 9328	**State:**	California		
	Northridge, CA, 91326	**Country:**	USA		
AFE #:		**Well Location:**	Aliso Canyon Storage Facility		
Customer Representative:		**Well Type:**	Gas		
Report Generated By:	Danny Walzel	**Job Type:**	Well Control		
Lease - Well #:	Standard Senson 25	**Rig No:**	N/A		

Description of Charges:	Level	Comments	Units	Unit Charge	Total
Sr. Well Control Specialist	4	Danny Clayton	1	[redacted]	[redacted]
Well Control Specialist	4	James Kopecky	1		
Sr. Well Control Engineer	4	Danny Walzel	1		
HSE Specialist	4	Mike Baggett	1		
General Daily Expense		D.C./ D.W. / J.K. / M.B.	4		
Hotel		D.C./ D.W. / J.K. / M.B.	4		
Rental Car			1		
Rental Car			1		
Estimated Daily Total					

Well Summary

Standard Senson 25 has broached to surface with several fissures on pad site.
11-3/4" casing to 990 ft. 7" casing to 8,585 ft. 5-1/2" slotted liner to 8,745 ft. 2-7/8" tubing to 8,510 ft. Packer depth 8,468 ft.

Hour	Hour	Activity on Site
5:45	6:00	Traveled from hotel to location.
6:00	6:30	Performed site assessment. Took LEL readings. Cleared location to begin work. 2-7/8" - 1,202 psi. 7" - 229 psi.
		11-3/4" - 89 psi.
6:30	7:00	Attended morning safety/operations meeting. Discussed perforating tubing and pumping kill.
7:00	9:00	Installed targeted 90 on wellhead flowline. Stabbed lubricator. Tested to 300/4,000 psi. Test good. Equalized swab valve with
		1,200 psi. Opened swab valve. Tubing pressure 1,201 psi. Pumped 6 bbls of 10.8 ppg CaCl2. 2-7/8" - 908 psi. 7" - 229 psi.
		11-3/4" - 90 psi.
9:00	11:15	RIH with tubing punch. Tagged EZSV at 8,402 ft. Perforated tubing 8,387 ft to 8,391 ft. Pulled out of hole. Laid down lubricator.
11:15	14:00	2-7/8" - 1,526 psi. 7" - 253 psi. 11-3/4" - 89 psi. Held PJSM. Pumped 10 9.4 ppg polymer pill. Began displacing with 9.4 ppg
		CaCl2. After displacing tubing volume opened choke on 7" casing. Pump rate 6 bpm. PP - 166 psi. After 80 bbls displaced
		observed increased gas flow and liquid from fissures. Pump rate 8.0 bpm. PP - 1,500 psi. Continued pumping at 8.0
		bpm. After 185 bbls pumped. Pump pressure - 1,400 psi. Pony motor went down. 7" - 45 psi. 11-3/4" - 45 psi. Pumps offline.
		Brought pumps online at 7 bpm. Pump pressure 0 psi. After 210 bbs pumped. Pump pressure 203 psi. After 320 bbls pumped
		PP - 634 psi. Brine, oil, and gas flowing from fissures on pad. After 693 bbls pumped 10 bbls 9.4 ppg polymer pill.
		Displaced into tubing with 3 bbls. Shut down. Tubing pressure 0 psi. 7" - 192 psi. 11-3/4" - 92 psi.
14:00	17:00	Lined up to pump down 2-7/8" x 7" annulus. Pumped junk shot. After 5 bbls pumped observed brine from fissures. Continued
		pumping junk shots. Shut down. 2-7/8" - 278 psi. 7" - 293 psi. 11-3/4" - 42 psi.
17:00	17:45	Attended end of the day meeting. Discussed pumping junk shot to plug hole in 7" casing and pumping barite pill
		out of perfs in tubing.
17:45	18:00	Traveled to hotel.

Projected Operations

Pump barite pill.

Approvals

Signature Customer Representative	Print Name	Date

Signature Boots and Coots Representative	Print Name	Date
	Danny Walzel	

Employee Name	Hours on Location	Travel Hours	Employee Name	Hours on Location	Travel Hours
Danny Clayton	11.75	0.5			
Danny Walzel	11.75	0.5			
James Kopecky	11.75	0.5			
Mike Baggett	11.75	0.5			

EXHIBIT 5

SS – 25 Incident Command Structure

Updated
For Nov

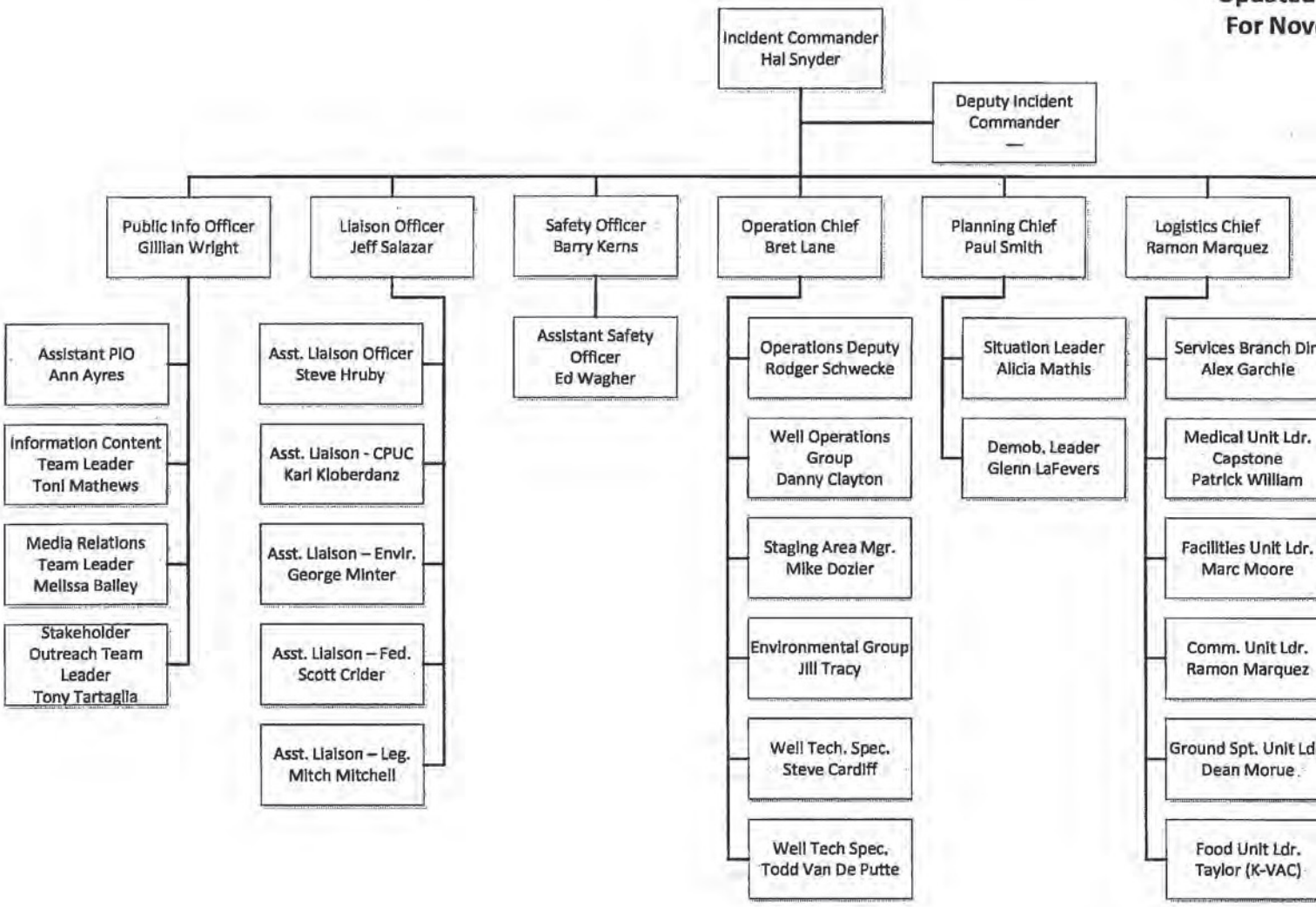

EXHIBIT 6

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EXHIBIT 7

ORDER INSTITUTING INVESTIGATION ON THE COMMISSION'S OWN MOTION INTO THE OPERATIONS AND PRACTICES OF SOUTHERN CALIFORNIA GAS COMPANY WITH RESPECT TO THE ALISO CANYON STORAGE FACILITY AND THE RELEASE OF NATURAL GAS, AND ORDER TO SHOW CAUSE WHY SOUTHERN CALIFORNIA GAS COMPANY SHOULD NOT BE SANCTIONED FOR ALLOWING THE UNCONTROLLED RELEASE OF NATURAL GAS FROM ITS ALISO CANYON STORAGE FACILITY (I.19-06-016)

SOUTHERN CALIFORNIA GAS COMPANY

(DATA REQUEST SED-SCG-120 DATED NOVEMBER 16, 2020)

SOCALGAS RESPONSE DATED NOVEMBER 19, 2020

SoCalGas provides the following Responses to the Safety and Enforcement Division (SED) data request dated November 16, 2020 in I.19-06-016. The Responses are based upon the best available, nonprivileged information that SoCalGas was able to locate through a diligent search within the time allotted to respond to this request, and within SoCalGas' possession, custody, or control. SoCalGas' responses do not include information collected or modeled by Blade Energy Partners' during its Root Cause Analysis Investigation. SoCalGas reserves the right to supplement, amend or correct the Responses to the extent that it discovers additional responsive information.

SoCalGas objects to the instructions submitted by SED and to the continuing and indefinite nature of this request on the grounds that they are overbroad and unduly burdensome. Special interrogatory instructions of this nature and continuing interrogatories are expressly prohibited by California Code of Civil Procedure Section 2030.060(d) and 030.060(g), respectively. SoCalGas will provide responsive documents in existence at the time of its response. Should SED seek to update its request, SoCalGas will respond to such a request as a new data request in the future.

SoCalGas submits these Responses, while generally objecting to any Request that fails to provide a defined time period to which SoCalGas may tailor its Response, and to the extent that any Request is overly broad, vague, ambiguous, unduly burdensome, assumes facts, or otherwise fails to describe with reasonable particularity the information sought. SoCalGas further submits these Responses without conceding the relevance of the subject matter of any Request or Response. SoCalGas reserves the right to object to use of these Responses, or information contained therein, in any dispute, matter or legal proceeding. Finally, at the time of this Response, there are no pending oral data requests from SED to SoCalGas.

For this question, please refer to the following, which is a quote of SED Data Request 119, Question 6 and the response to that question.

QUESTION 6:
Referring to page 4:16-18, which states, "Dispatch took the information provided and developed the MCR. Note that dispatch does not have technical expertise, and certainly not with respect to well control operations." Also referring to page 4:8-10, which states, "The text message to which Ms. Felts refers is a Message Center Report (MCR) issued on November 13, 2015 at 3:00 p.m. which states, "[d]uring the repair process to mitigate the Leak at the well head in Aliso Canyon,

oil was extracted and vented into the atmosphere." With these passages in mind, please answer:

a. **Precisely how did dispatch know to state in the Message Center Report that "oil was extracted and vented into the atmosphere."?**

RESPONSE 6:
SoCalGas objects to this request as vague and ambiguous, particularly with respect to the phrase "how did dispatch know to state." SoCalGas further objects to this request on the ground it calls for speculation. Subject to and without waiving the foregoing objections, SoCalGas responds as follows. SoCalGas is not currently able to pose this question to the Dispatcher.
[End of Response]

With SED Data Request 119, Question 6 and SoCalGas' response to that question in mind, please answer the following:

QUESTION 1:

Provide all recordings of communications with dispatch, including radio and phone recordings, related to the "Message Center Report (MCR) issued on November 13, 2015 at 3:00 p.m. which states, "[d]uring the repair process to mitigate the Leak at the well head in Aliso Canyon, oil was extracted and vented into the atmosphere."

RESPONSE 1:

SoCalGas objects to this request as unduly burdensome under Rule 10.1 of the Commission's Rules of Practice and Procedure, particularly because a response has been requested within 3 calendar days of issuance of the request. SoCalGas further objects to this request as vague and ambiguous, particularly with respect to the phrase "related to." Subject to and without waiving the foregoing objections, SoCalGas responds as follows. SoCalGas searched through recordings for the relevant dispatchers, for the period November 13, 2015 between 1:00-5:00 PM, and was not able to locate the recording.

ORDER INSTITUTING INVESTIGATION ON THE COMMISSION'S OWN MOTION INTO THE OPERATIONS AND PRACTICES OF SOUTHERN CALIFORNIA GAS COMPANY WITH RESPECT TO THE ALISO CANYON STORAGE FACILITY AND THE RELEASE OF NATURAL GAS, AND ORDER TO SHOW CAUSE WHY SOUTHERN CALIFORNIA GAS COMPANY SHOULD NOT BE SANCTIONED FOR ALLOWING THE UNCONTROLLED RELEASE OF NATURAL GAS FROM ITS ALISO CANYON STORAGE FACILITY (I.19-06-016)

SOUTHERN CALIFORNIA GAS COMPANY

(DATA REQUEST SED-SCG-120 DATED NOVEMBER 16, 2020)

SOCALGAS RESPONSE DATED NOVEMBER 19, 2020

QUESTION 2:

If SoCalGas possesses transcripts of the recordings requested in question 1 as of the time it received this data request, please provide them.

RESPONSE 2:

SoCalGas objects to this request as unduly burdensome under Rule 10.1 of the Commission's Rules of Practice and Procedure, particularly because a response has been requested within 3 calendar days of issuance of the request. Subject to and without waiving the foregoing objection, SoCalGas responds as follows. SoCalGas was not able to locate a transcript.

QUESTION 3:

For question 3, please refer to the following passages in the "Prepared Supplemental Rebuttal Testimony of Glenn La Fevers on Behalf of Southern California Gas Company, dated October 26, 2020. Page 3, lines 8 through 11 of Mr. LaFever's testimony states:

"Representatives from the Division of Oil, Gas and Geothermal Resources (DOGGR, presently known as the California Geologic Energy Management or CalGEM) were present at Aliso Canyon during the well kill attempt on November 13, 2015." [Footnote omitted.]

Page 4 of Mr. LaFever's testimony, lines 8 through 10 states,
"The text message to which Ms. Felts refers is a Message Center Report (MCR) issued on November 13, 2015 at 3:00 p.m. which states: "[d]uring the repair process to mitigate the Leak at the well head in Aliso Canyon, oil was extracted and vented into the atmosphere. [Footnote omitted}

With these passages in mind, please answer the following question.

Provide the names of the people who were present at Aliso Canyon during the well kill attempt on November 13, 2015, and who witnessed the extracting and venting of oil into the atmosphere stated in the Message Center Report issued in November 13, 2015 at 3:00 p.m., which is the text message to which Ms. Felts refers.

ORDER INSTITUTING INVESTIGATION ON THE COMMISSION'S OWN MOTION INTO THE OPERATIONS AND PRACTICES OF SOUTHERN CALIFORNIA GAS COMPANY WITH RESPECT TO THE ALISO CANYON STORAGE FACILITY AND THE RELEASE OF NATURAL GAS, AND ORDER TO SHOW CAUSE WHY SOUTHERN CALIFORNIA GAS COMPANY SHOULD NOT BE SANCTIONED FOR ALLOWING THE UNCONTROLLED RELEASE OF NATURAL GAS FROM ITS ALISO CANYON STORAGE FACILITY (I.19-06-016)

SOUTHERN CALIFORNIA GAS COMPANY

(DATA REQUEST SED-SCG-120 DATED NOVEMBER 16, 2020)

SOCALGAS RESPONSE DATED NOVEMBER 19, 2020

RESPONSE 3:

SoCalGas objects to this request as unduly burdensome under Rule 10.1 of the Commission's Rules of Practice and Procedure, particularly because a response has been requested within 3 calendar days of issuance of the request. SoCalGas also objects to this request as unduly burdensome on the ground the information sought is equally available to SED, as referenced within the question. Subject to and without waiving the foregoing objection, SoCalGas responds as follows. The following DOGGR personnel were present at Aliso Canyon during the well kill attempt on November 13, 2015.: Kris Gustafson, Bruce Hesson, Scott McGurk, and Scott Walker.

EXHIBIT 8

ORDER INSTITUTING INVESTIGATION ON THE COMMISSION'S OWN MOTION INTO THE OPERATIONS AND PRACTICES OF SOUTHERN CALIFORNIA GAS COMPANY WITH RESPECT TO THE ALISO CANYON STORAGE FACILITY AND THE RELEASE OF NATURAL GAS, AND ORDER TO SHOW CAUSE WHY SOUTHERN CALIFORNIA GAS COMPANY SHOULD NOT BE SANCTIONED FOR ALLOWING THE UNCONTROLLED RELEASE OF NATURAL GAS FROM ITS ALISO CANYON STORAGE FACILITY (I.19-06-016)

SOUTHERN CALIFORNIA GAS COMPANY

(DATA REQUEST SED-SCG-124 DATED NOVEMBER 17, 2020)

SOCALGAS RESPONSE DATED NOVEMBER 20, 2020

SoCalGas provides the following Responses to the Safety and Enforcement Division (SED) data request dated November 17, 2020 in I.19-06-016. The Responses are based upon the best available, nonprivileged information that SoCalGas was able to locate through a diligent search within the time allotted to respond to this request, and within SoCalGas' possession, custody, or control. SoCalGas' responses do not include information collected or modeled by Blade Energy Partners' during its Root Cause Analysis Investigation. SoCalGas reserves the right to supplement, amend or correct the Responses to the extent that it discovers additional responsive information.

SoCalGas objects to the instructions submitted by SED and to the continuing and indefinite nature of this request on the grounds that they are overbroad and unduly burdensome. Special interrogatory instructions of this nature and continuing interrogatories are expressly prohibited by California Code of Civil Procedure Section 2030.060(d) and 030.060(g), respectively. SoCalGas will provide responsive documents in existence at the time of its response. Should SED seek to update its request, SoCalGas will respond to such a request as a new data request in the future.

SoCalGas submits these Responses, while generally objecting to any Request that fails to provide a defined time period to which SoCalGas may tailor its Response, and to the extent that any Request is overly broad, vague, ambiguous, unduly burdensome, assumes facts, or otherwise fails to describe with reasonable particularity the information sought. SoCalGas further submits these Responses without conceding the relevance of the subject matter of any Request or Response. SoCalGas reserves the right to object to use of these Responses, or information contained therein, in any dispute, matter or legal proceeding. Finally, at the time of this Response, there are no pending oral data requests from SED to SoCalGas.

For this set of questions, please refer to SED Data Request 119, Question 11b, and SoCalGas' answer thereto. For reference, that question and answer are quoted here.

SED Question 11b.

Please refer to Exhibit 1-7, Sample Analyses. b. Please provide sample chains of custody and analytical results for all samples collected on November 13, 2015 of the mist that contained oil and was subject of the 3:00 pm MCR dispatch.

ORDER INSTITUTING INVESTIGATION ON THE COMMISSION'S OWN MOTION INTO THE OPERATIONS AND PRACTICES OF SOUTHERN CALIFORNIA GAS COMPANY WITH RESPECT TO THE ALISO CANYON STORAGE FACILITY AND THE RELEASE OF NATURAL GAS, AND ORDER TO SHOW CAUSE WHY SOUTHERN CALIFORNIA GAS COMPANY SHOULD NOT BE SANCTIONED FOR ALLOWING THE UNCONTROLLED RELEASE OF NATURAL GAS FROM ITS ALISO CANYON STORAGE FACILITY (I.19-06-016)

SOUTHERN CALIFORNIA GAS COMPANY

(DATA REQUEST SED-SCG-124 DATED NOVEMBER 17, 2020)

SOCALGAS RESPONSE DATED NOVEMBER 20, 2020

SoCalGas Response to Question 11b.

SoCalGas objects to this request on the ground it is unduly burdensome in that it seeks information equally available to SED. Subject to and without waiving the foregoing objection, SoCalGas responds as follows. See Exhibit I-7.

With SED DR 119 Question 11b, and SoCalGas' response to DR 119, Question 11b in mind, please answer:

QUESTION 1:

Is SoCalGas assuming that the analysis it provided in Exhibit I-7 is representative of the mist that was discharged into the atmosphere on November 13, 2015?

RESPONSE 1:

SoCalGas objects to this request on the ground it is vague and ambiguous, particularly with respect to the terms and phrases "assuming," and "representative of the mist that was discharged." Moreover, SoCalGas objects to this request on the ground it poses an incomplete hypothetical: the question does not identify the purpose of the assumption inquired about. As a result, SoCalGas additionally objects to this request on the basis it is unintelligible. Subject to and without waiving the foregoing objections, SoCalGas responds as follows. SoCalGas notes a distinction between this question and SED's testimony regarding Violation 331, which alleges "SoCalGas Purposely Extracted and Vented Oil into the Atmosphere…." The characterization in the testimony, of a purposeful extraction, is incorrect. This question asks about a "mist that was discharged into the atmosphere," and this characterization better describes the occurrence. Report 15-11-1098, which was provided in SoCalGas Supplemental Rebuttal Testimony, Chapter I (La Fevers), Exhibit I-7, includes a sample of the fluids released during the well kill attempt on November 13, 2015.

ORDER INSTITUTING INVESTIGATION ON THE COMMISSION'S OWN MOTION INTO THE OPERATIONS AND PRACTICES OF SOUTHERN CALIFORNIA GAS COMPANY WITH RESPECT TO THE ALISO CANYON STORAGE FACILITY AND THE RELEASE OF NATURAL GAS, AND ORDER TO SHOW CAUSE WHY SOUTHERN CALIFORNIA GAS COMPANY SHOULD NOT BE SANCTIONED FOR ALLOWING THE UNCONTROLLED RELEASE OF NATURAL GAS FROM ITS ALISO CANYON STORAGE FACILITY (I.19-06-016)

SOUTHERN CALIFORNIA GAS COMPANY

(DATA REQUEST SED-SCG-124 DATED NOVEMBER 17, 2020)

SOCALGAS RESPONSE DATED NOVEMBER 20, 2020

QUESTION 2:

Confirm that SoCalGas did not take samples of the mist asked about in question 11b.

RESPONSE 2:

SoCalGas objects to this request to the extent it assumes SoCalGas did not take samples of the mist on November 13, 2015. Subject to and without waiving the foregoing objection, SoCalGas responds as follows. See Response 1.

EXHIBIT 9

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Modeling the Aliso Canyon underground gas storage well blowout and kill operations using the coupled well-reservoir simulator T2Well

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ABSTRACT

A blowout of the Sesnon Standard-25 well (SS-25; API 03700776) at the Aliso Canyon Underground Gas Storage Facility, first observed on October 23, 2015, eventually resulted in emission of nearly 100,000 tonnes of natural gas (mostly methane) to the atmosphere. Several thousand people were displaced from their homes as the blowout spanned 111 days. Seven attempts to gain pressure control and stop the gas flow by injection of heavy kill fluids through the wellhead failed, a process referred to as a "top kill." Introduction of drilling mud when a relief well milled through the casing of SS-25 at a depth of ~8 400 ft ("bottom kill") succeeded in halting the gas flow on February 11, 2016. We carried out coupled well-reservoir numerical modeling using T2Well to assess why the top kills failed to control the blowout. T2Well couples a reservoir simulation in which porous media flow is described using Darcy's law with a discretized wellbore in which the Navier-Stokes momentum equation implemented via a drift-flux model (Shi et al., 2005) is used to describe multi-phase fluid transport to allow detailed process modeling of well blowouts and kill attempts. Modeling reveals the critical importance of well geometry in controlling flow dynamics and the corresponding success or failure of the kill attempts. Geometry plays a role in controlling where fluids can flow, e.g., when gas flow prevents liquid flow from entering the tubing from the annulus, but geometry also provides the opportunity for dead end regions to accumulate stagnant gas and liquid that can also affect kill attempts. Simulations show that follow-up fluid injections after the main kill attempts likely would have been effective to ensure that gas leakage remains stopped. T2Well is capable of simulating well kills and understanding the mechanisms behind well control failures and successes.

1. Introduction

A subsurface blowout of the Sesnon Standard-25 (SS-25; API 03700776) well at the Aliso Canyon underground gas storage (UGS) facility, first observed to have ruptured to the ground surface on 23 October 2015, resulted in about 100,000 tonnes of methane and several thousand tonnes of ethane emitted to the atmosphere (Conley et al., 2016; California Air Resources Board, 2016). Several thousand people were displaced from their homes as emitted gases and fumes (e.g., mercaptan odorant) went on for 111 days. Seven attempts failed to stop the flow by gaining pressure control through the injection of dense fluids through the wellhead, so-called top-kill attempts. Introduction of drilling mud when a relief well milled through the SS-25 casing at reservoir depth (~8 400 ft) finally killed the gas leak on February 11, 2016, a method known as a bottom kill. .

Starting in late 2015, our team began numerical modeling of the SS-25 well and the ongoing kill attempts with the goal of understanding why the attempts were failing and to recommend how the kill attempts could be designed to be effective. Although our team did not have direct experience with UGS well modeling prior to October 2015, we were able to utilize existing simulation capabilities developed over many years and build on long experience in numerical reservoir simulation of two-phase fluid flow. Specifically, we developed coupled well-reservoir simulation capabilities several years ago for application in the area of geologic carbon sequestration where there is a need for modeling carbon dioxide well injection and blowout scenarios for risk assessment (Pan et al., 2011b). Our approach to simulating two-phase coupled well-reservoir systems was to add a well-flow (pipe-flow) modeling capability based on implementing the Navier-Stokes momentum equation via a drift-flux model (DFM, Shi et al., 2005) to LBNL's reservoir simulator TOUGH2 (Pruess et al., 1999, 2011) to create T2Well (Pan et al., 2011c; Pan and Oldenburg, 2014). The integral finite difference method grids used in the TOUGH codes allow modeling of complicated geometries, which were needed to capture flow-path complexities in the SS-25 well

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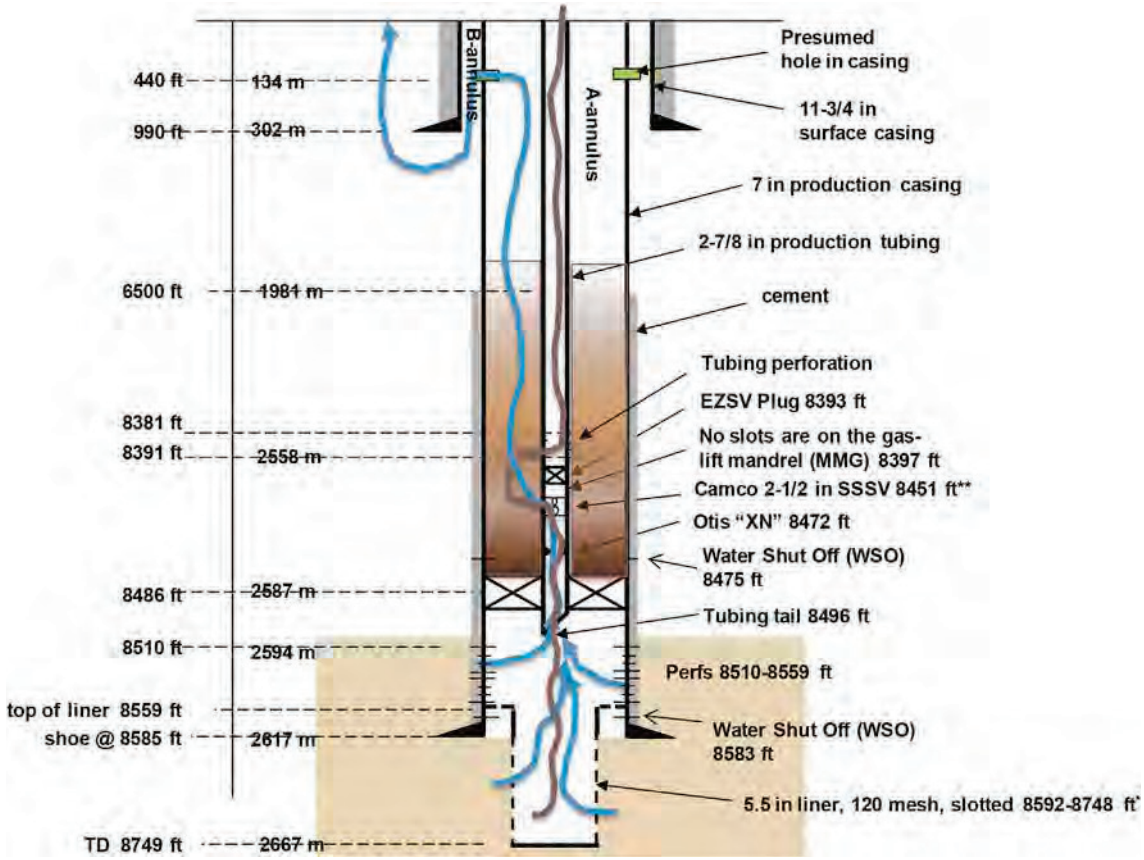

Fig. 1. A sketch of the SS-25 well (not to scale) and possible flow paths of gas leakage (blue) and kill fluid (brown). * This is believed to be actually 120 Gauge (0.120 inch). ** This is actually the remnants of an SSSV (subsurface safety valve). All that remains are slots between tubing and annulus. Although the exact origin of these slots is uncertain, it is possible they are part of an SSV (sliding sleeve valve) that has been removed and therefore these slots will be called SSV slots in this paper. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

Table 1
Governing equations solved in T2Well (see Nomenclature for definition of symbols).

Description		Equation
Conservation of mass and energy		$\frac{d}{dt}\int_{V_n} M^k dV_n = \int_{\Gamma_n} \mathbf{F}^K \cdot n d\Gamma_n + \int_{V_n} q^K dV_n$
Mass accumulation		$M^\kappa = \phi \sum_\beta S_\beta \rho_\beta X_\beta^\kappa$, for each mass component
Mass flux		$\mathbf{F}^\kappa = \sum_\beta X_\beta^\kappa \rho_\beta \mathbf{u}_\beta$, for each mass component
Porous media	Energy flux	$\mathbf{F}^\kappa = -\lambda \nabla T + \sum_\beta h_\beta \rho_\beta \mathbf{u}_\beta$
	Energy accumulation	$M^\kappa = (1-\varphi)\rho_R C_R T + \varphi \sum_\beta \rho_\beta S_\beta U_\beta$
	Phase velocity	$\mathbf{u}_\beta = -k \frac{^*r_\beta}{\mu_\beta}(\nabla P_\beta - \rho_\beta \mathbf{g})$ Darcy's Law
Wellbore	Energy flux	$F^\kappa = -\lambda \frac{\partial T}{\partial z} - \frac{1}{A}\sum_\beta \left[A \rho_\beta S_\beta u_\beta \left(h_\beta + \frac{u_\beta^2}{2} + gz\cos\theta \right) \right] + q'$
	Energy accumulation	$M^\kappa = \sum_\beta \rho_\beta S_\beta \left(U_\beta \frac{u_\beta^2}{2} + gz\cos\theta \right)$
	Phase velocity	$u_G = C_0 \frac{\rho_m}{\rho_m^*} u_m + \frac{\rho_L}{\rho_m^*} u_d$
		$u_L = \frac{(1-S_G C_0)\rho_m}{(1-S_G)\rho_m^*} u_m - \frac{S_G \rho_G}{(1-S_G)\rho_m^*} u_d$ Drift − Flux − Model

described below.

Despite the original target application being geologic carbon sequestration, T2Well is a general coupled well-reservoir simulator that can be used for a variety of applications. For example, we modified the code slightly in 2010 to simulate the Macondo well oil and gas blowout in the Gulf of Mexico in response to the urgent need for flow-rate estimation (Oldenburg et al., 2012). T2Well is also used in geothermal reservoir modeling studies (e.g., Pan et al., 2015; Vasini, 2016) and aquifer-based compressed air energy storage studies (Oldenburg and Pan, 2013a; b; Guo et al., 2016). Applications of T2Well in various areas have confirmed

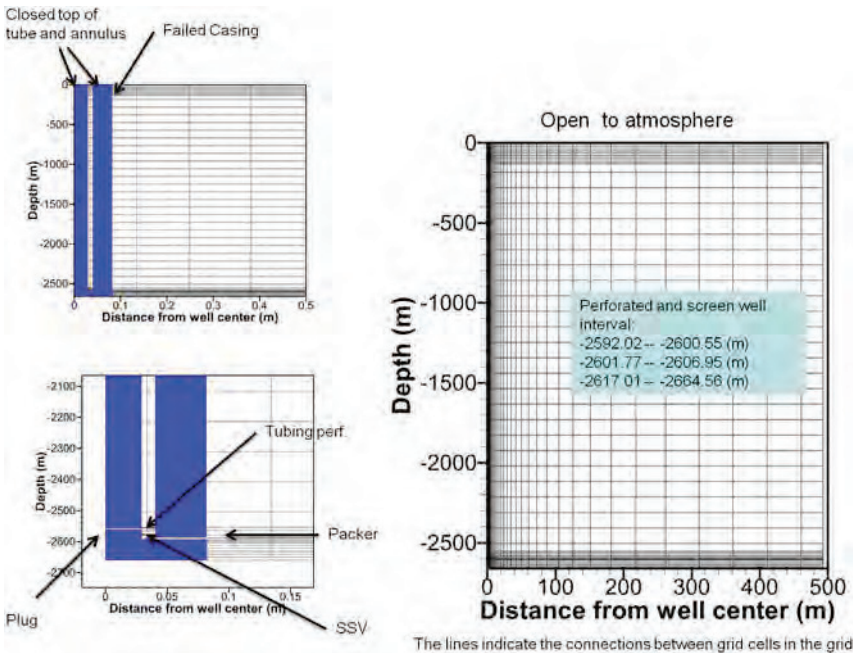

Fig. 2. Radially symmetric grid for modeling blowout and top kills of the SS-25 well system showing the large range in length scales needed to model integrated well-reservoir systems. The left-hand side, upper figure shows the refined mesh for the well (tubing, tubing wall, and annulus) and surrounding formation. The left-hand side, lower figure shows details of the tubing plug (white gap), tubing perforations (red line), the packer (white gap), and the SSV slots (red line) in the mesh. Void space inside the well (tubing or annulus) is marked by the blue color. The right-hand side figure shows the entire mesh showing the large radius of the full system. The lateral resolution of the grid starts at 5 cm near well and then grows at a rate of 1.2 × per block until the domain size reaches 50 m. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

Table 2
Formations properties.

Formation	Depth (m)	Porosity	Horizontal permeability (10^{-15} m^2)	Vertical permeability (10^{-15} m^2)	Notes
1	0.0–129.2	0.169	8600	3000	Shallow formations
2	129.2–135.3	0.254	10000	10000	
3	135.3–2252.7	0.288	230	95	
4	2252.7–2256.4	0.139	2.4	0.083	Cap rocks
5	2256.4–2574.0	0.315	350	0.01	
6	2574.0–2584.7	0.283	230	0.81	
7	2584.8–2592.0	0.083	0.003	0.00001	
8	2592.0–2600.6	0.315	80	2.0	1st feed zone
9	2600.6–2601.7	0.139	2.4	0.08	Shale in reservoir
10	2601.7–2607.0	0.315	80	2.0	2nd feed zone
11	2607.0–2617.0	0.315	2.0	0.08	Shale in reservoir
12	2617.0–2655.1	0.315	80	2.0	3rd feed zone

Table 3
Wellbore properties.

Section	Depth (m)	Internal Diameter (m)	External diameter of tube (m)	Wall roughness (10^{-6} m)
Tubing	0–2592	0.062	–	30
Casing (below packer)	2592–2607	0.1595	–	45
Casing (above packer, annulus)	0–2592	0.1595	0.073	67.5
Screen	2607–2655	0.1236	–	45

the importance of modeling the coupling between the well and the reservoir, which can limit the supply of fluid to the well. T2Well simulations have also shown the importance of modeling two-phase flow and associated depressurization effects associated with upward flow in the well, which can lead to gas exsolution and gas volume expansion that can interfere with (limit) liquid-phase flow (Oldenburg et al., 2012).

The purpose of this paper is to describe the methods used in T2Well and their applicability to modeling well blowouts, and to present detailed modeling analyses of flow, kill attempts, and kill designs related to the Aliso Canyon SS-25 well blowout. The SS-25 well presented some particular challenges that demanded novel gridding approaches to capture the complex flow interconnections between the tubing and casing. As we will show, the well configuration prevented standard top-kill approaches from working as planned. Simulations suggest that the main feature that prevented effective top kills was the interconnection between the tubing and the A-annulus (the annulus outside of the tubing and inside of the production casing, Fig. 1) that was utilized for natural gas injection and production. Through our modeling work we demonstrate the profound importance of well geometry on flow blocking, liquid entrainment and expulsion by gas, and creation of stagnant zones in the

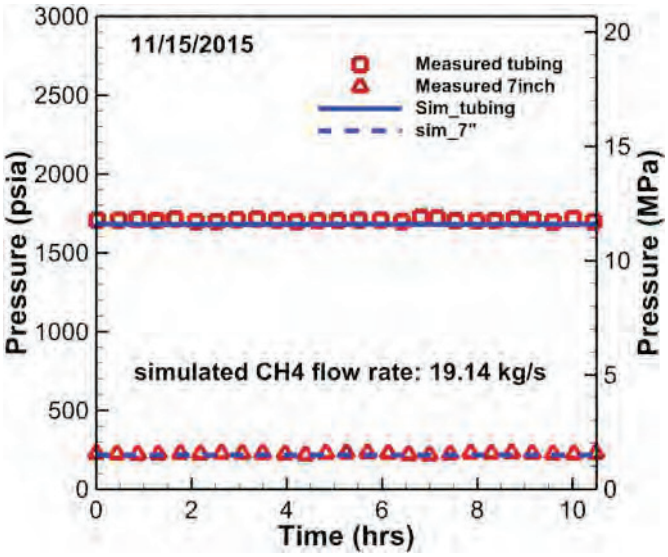

Fig. 3. Simulated and measured tubing and production (7″ or 7-in) casing pressure under blowout conditions before the 11/15/2015 top-kill operation with manual calibration of the production casing hole diameter and shallow formation permeability.

Table 4
Fluid velocity at various locations along the leakage pathway (as marked on Fig. 4).

Point	Location	Velocity (m/s)
1	Top of 5.5″ liner	9.64
2	7″ perforated zone	6.87
3	Tubing below SSV	70.24
4	Through SSV slots	49.83
5	7″ casing after SSV	13.90
6	7″ casing below tubing perf.	13.68
7	7″ casing below leaking point	120.37

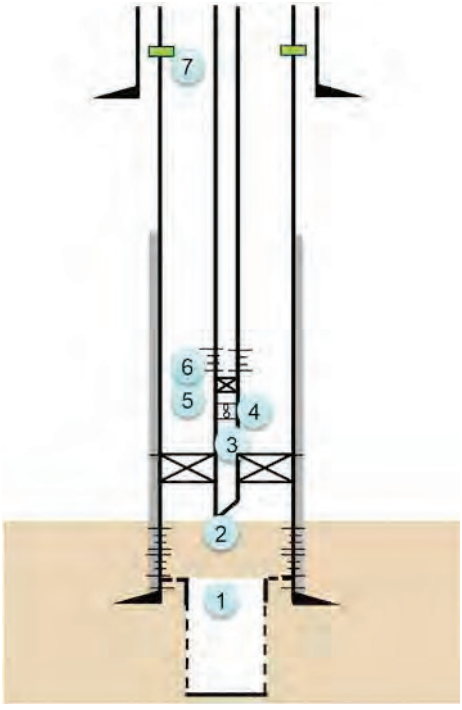

Fig. 4. Sketch enumerates the various locations along the leakage pathway of the well under blowout conditions at which fluid velocities are reported in Table 4.

Table 5
Kill-fluid properties and injection schedules used in the simulations.

	242 bbl kill		1100 bbl kill	
Relative viscosity[a]	2.4540		1.3886	
Relative density[a]	1.1834		1.0107	
Schedule	Time (s)	Rate (kg/s)	Time (s)	Rate (kg/s)
	0–600	12.83	0–600	16.29
	600–2247	23.61	600–5822	32.75
	2247	0.00	5822 -	0.0

[a] Relative values are calculated as the ratio to pure water properties at 1 atm and 15.6 °C.

well. The simulations show that consideration of well geometry is critical to the planning and execution of successful well kills during blowout events.

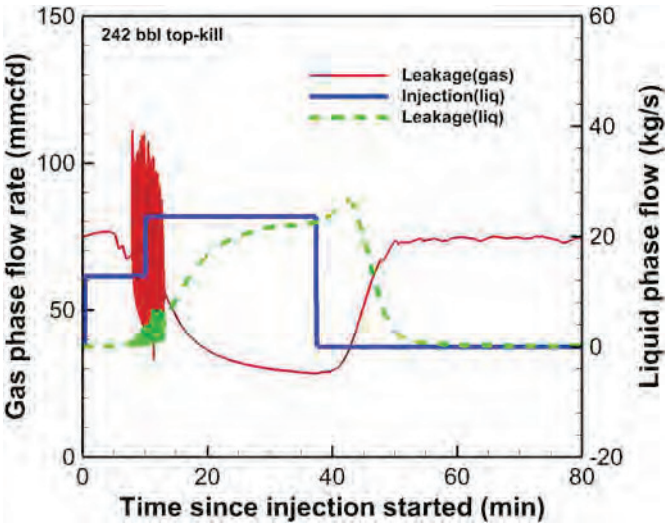

Fig. 5. Simulated gas (red line) and liquid (green dashed line) flow through the casing failure plotted along with the injection rate of kill fluid (blue line) during the 242 bbl kill. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

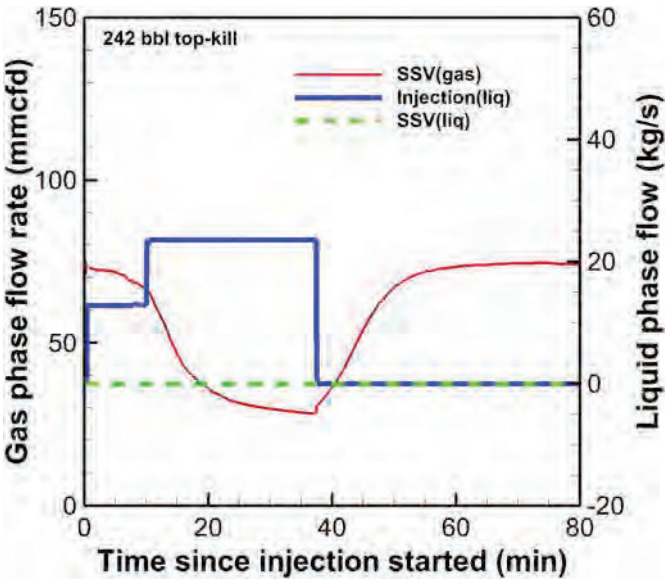

Fig. 6. Simulated gas (red line) and liquid (green dashed line) flow rates through the SSV slots from the tubing side to the A-annulus side plotted along with the injection rate of kill fluid (blue line) during the 242 bbl kill. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

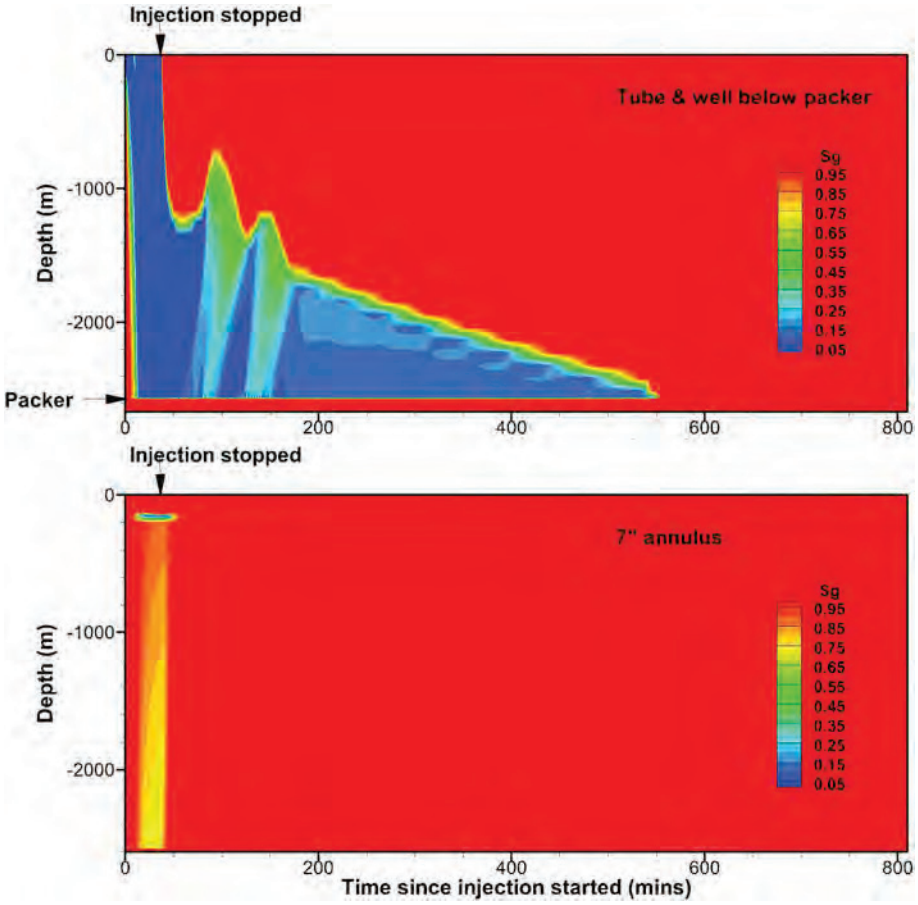

Fig. 7. Simulated gas saturation profiles in the tubing and in the well below the packer (upper panel) and 7" (7-in) annulus (lower panel) as a function of time during the 242 bbl kill.

2. Methods

2.1. Standard well flow simulation

The state-of-the-art simulation codes used by industry for analysis of multiphase well flow, including design of well kills, are based on OLGA, a transient pipe-flow model originally developed for modeling two-phase flow in pipelines (e.g., Bendiksen et al., 1991). OLGA solves two momentum equations, one for the liquid and one for the combination of gas and liquid droplets contained in the gas. Friction factors on the pipe wall are adjusted in OLGA as a function of flow regime. With gravitational terms controlling liquid-gas separation, OLGA can handle stratified flows in horizontal pipes, along with flow in inclined and vertical pipes, which serves to model vertical wells. As such, OLGA has become an industry standard for modeling well kills including dynamic well kills, which are kills based on introducing fluids that increase friction to flow rather than control pressure by building up a dense, static fluid column (e.g., Rygg and Smestad, 1992; Dhulesia and Lopez, 1996; Ravndal, 2011). Although OLGA models flow in the pipe or well with proven accuracy as demonstrated by over 30 years of development and use, OLGA-based models are not fully coupled to the reservoir that supplies the fluid, or in the case of SS-25, the flow is not coupled to the shallow formation into which the blowout was flowing from the well. By fully coupling well flow with flows in the porous media formations connected to the well, T2Well captures the essential interactions between fluid supply and loss related to the well-blowout process as described below. In addition, the flexibility of the integral finite difference grid used in the TOUGH codes upon which T2Well is based allows modeling of complex flow paths and well geometry.

2.2. T2Well coupled well-reservoir simulation

T2Well is a numerical simulator for modeling non-isothermal, multiphase, and multicomponent fluid and energy flow in integrated well-reservoir systems (Pan et al., 2011a, 2011c; Pan and Oldenburg, 2014). In T2Well, the flow in the well is described by the two-phase momentum equations whereas the flow in the reservoir is described by multiphase Darcy law (Table 1). By applying the DFM, the two-phase momentum equations are lumped into a momentum equation of the mixture (Eq. (1)), which can be solved for the mixture velocity u_m (Pan et al., 2011a):

$$\frac{\partial}{\partial t}(\rho_m u_m) + \frac{1}{A}\frac{\partial}{\partial z}\left[A\left(\rho_m u_m^2 + \gamma\right)\right] = -\frac{\partial p}{\partial z} - \frac{\Gamma f \rho_m |u_m| u_m}{2A} - \rho_m g \cos\theta \quad (1)$$

In Eq. (1), t is time, z is distance, A is cross sectional area of the flow path, γ is a phase-slip term (a complex function of local two-phase flow regime described by DFM), p is pressure, Γ is the perimeter of the cross sectional area, f is the friction coefficient (a function of Reynolds number and other geometric parameters), ρ_m is the mixture density, g is gravitational acceleration, and θ is the inclination angle (symbols are also defined in Nomenclature). The complete methods implemented in T2Well have been fully described elsewhere (Pan et al., 2011c; Pan and Oldenburg, 2014) and will not be duplicated here.

In order to model the flow in a well with complicated geometry such as that in SS-25 (to be described in the next section), we modified the calculation of the effective diameter, which is used to calculate the friction coefficient f in Eq. (1), by introducing a shape factor, f_{nc}, to account for the additional pressure loss caused by the non-circular and/or non-straight flow paths. For example, the present simulation study involved modeling two-phase flow in the annulus and through tubing

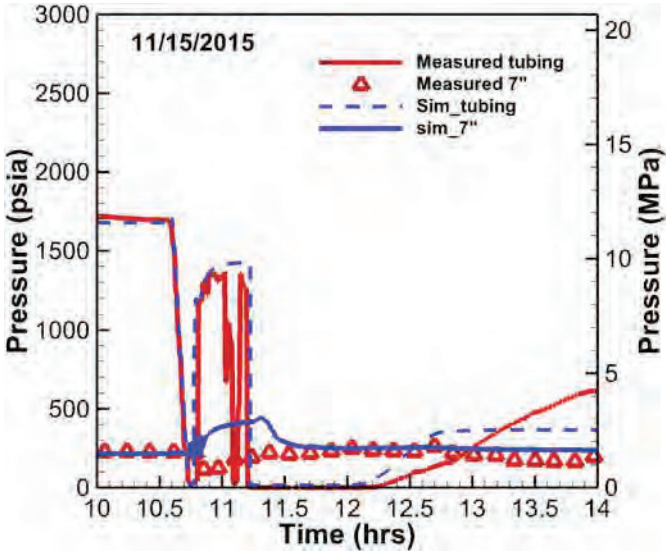

Fig. 8. Comparison of simulated tubing (blue dashed line) and casing (blue solid line) pressures against measured values during the 242 bbl kill. The sudden large drop in the measured tubing pressure in the middle of injection reflects the effects of the heavier (18 ppg) barite pill injection which we do not expect to see in the numerical model because we modeled only a single fluid with properties representative of a mixture of the kill-fluid compositions. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

perforations and open sliding-sleeve valve ports (i.e., SSV slots) connecting the tubing with the A-annulus, and along flow paths that change direction from vertical to horizontal and vice versa. The shape factor is the square of the ratio between the diameter of a circular pipe, D_c, and the equivalent diameter, D_{eq}:

$$f_{nc} = \left(\frac{D_c}{D_{eq}}\right)^2 = \left(\frac{4A/\Gamma}{2\sqrt{A/\pi}}\right)^2 \quad (2)$$

For circular pipe(s), the shape factor will reduce to unity (i.e., value of 1) because $\Gamma = 2\pi\sqrt{A/\pi}$. For the annulus, the shape factor will be proportional to the difference between the inner radius of the casing and outer radius of the tubing wall.

The thermophysical properties and phase diagnostics are calculated using the equation of state model for real gases and brine implemented in EOS7Cma (Oldenburg and Pan, 2013b) which is a modification of EOS7C (Oldenburg et al., 2004). EOS7Cma has capability to simulate non-condensable gas components such as methane (CH_4) and air in addition to the brine. The kill fluid is simulated as brine with appropriately increased density and viscosity relative to pure water, whose density and viscosity are functions of pressure and temperature. All fluids are assumed to be Newtonian.

3. Model setup

3.1. Conceptual model

Fig. 1 shows a sketch of the SS-25 well derived from its record available from DOGGR (https://secure.conservation.ca.gov/WellRecord/037/03700776/03700776%20Data_03-19-08.pdf accessed July 20, 2017). The failure of the well is believed to have occurred because of a production casing integrity failure at a depth of ~134 m (440 ft) below the wellhead as evidenced by temperature logs which showed maximum cooling at this depth. Based on the magnitude of the flow, the casing failure was conjectured to be a gap or hole in the casing several cm (~1 inch) or more in size. Gas flows into the well from the

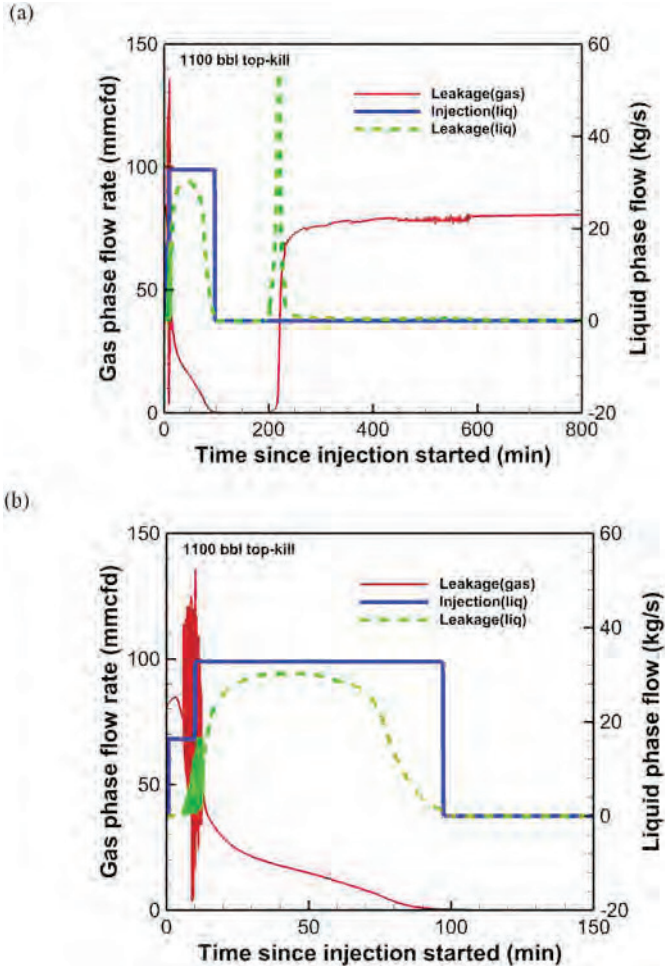

Fig. 9. Simulated gas (red thin line) and liquid (green dash line) leakage rate through the casing failure plotted along with the injection rate of kill fluid (blue solid line) for the 1100 bbl kill, (a) entire period, and (b) early time. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

reservoir through the liner screen installed below 2617 m (8586 ft) and the production casing through perforations between 2594 and 2609 m (8510-8559 ft) (notional gas flow paths are shown as blue lines in Fig. 1). The gas then moves up into the tubing to the location where there was reportedly once an SSSV (subsurface safety valve). For unknown reasons, there are slots (open pathways) between the inner tubing and A-Annulus at this location, possibly indicative of later installation of a sliding sleeve valve (SSV). Regardless of how the tubing came to possess slots at this location, at the time of the SS-25 blowout in 2015 these slots provided a connection between the tubing and the A-annulus.

In the blowout scenario, gas flows up the A-annulus and then leaks through the casing failure at ~134 m (440 ft) below the wellhead and flows into the B-annulus. Although the B-annulus is cemented, a kink in the temperature logs suggests the gas flowed to the bottom, or nearly so, of the surface casing after exiting the production casing. The gas entered the geologic material around the well at this depth either through a breach near the base of the surface casing or through the opening at the bottom of the surface casing. Based on gas emanating from fractures in the ground surface down the slope to the west of the wellhead at the start of the blowout, it appears that due to its high pressure the gas fractured through the geologic material from where it exited the surface casing to the ground surface.

Because the tubing was plugged at a depth of 2559 m (8393 ft) (above the SSV slots) and perforated above the plug, the kill fluid injected down

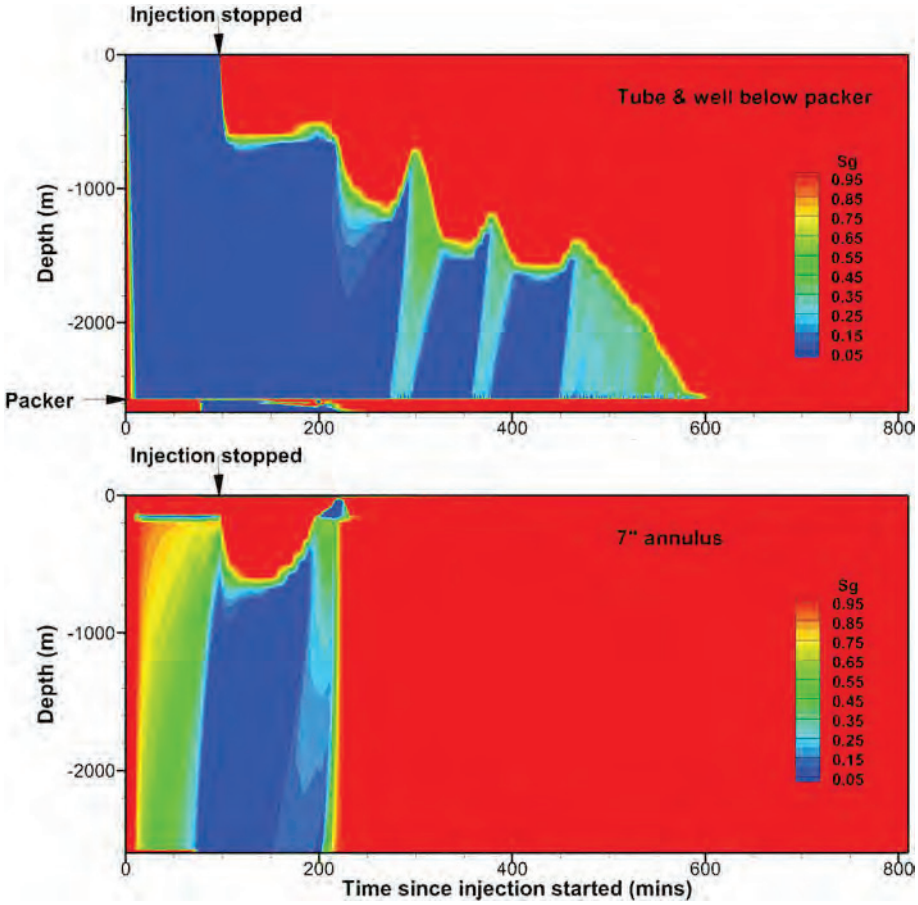

Fig. 10. Simulated gas saturation in the tubing and well below the packer (upper panel) and 7" (7-in) annulus (lower panel) during the 1100 bbl kill.

the tubing from the wellhead must flow through the perforations above the plug and then into the gas-filled and flowing A-annulus. In order to have a successful kill by this approach, kill fluid needs to build up in the A-annulus to create a high enough pressure to overcome the gas flow exiting the open SSV slots, or the combination of pressure and flow resistance (dynamic kill) needs to overcome the gas pressure at the SSV slots. Either way, kill fluid needs to accumulate significantly in the A-annulus and avoid being entrained by upward-flowing gas.

3.2. Radial grid

We developed a radially symmetric grid for T2Well to simulate the complex configuration in the well and its coupling to the surrounding reservoir, cap rock, and shallow formations (Fig. 2). The tubing wall is explicitly described in the grid as special grid cells from the top of the well down to the packer which separates the A-annulus from the tubing. Tubing walls are impermeable to the fluid (i.e., only conductive to heat flow) except at the tubing perforations and the open SSV slots. At the perforations, the tubing grid blocks and annulus grid blocks are directly connected with a total cross-sectional area corresponding to the area of 16 perforation holes. The total perimeter of the perforation holes is also assigned to that connection to accurately account in the T2Well flow calculations for the multi-hole geometry and its effects on flow resistance caused by the perforations. Similar approaches are used for the SSV slot connections; actual cross-sectional areas and perimeters of six SSV slots are summed to assign the correct area and perimeter for the connection. The production casing wall is modeled as impermeable with connections between the A-annulus cells and the surrounding formation cells allowing only for conductive heat flow. For the location where the production casing failed, an effective open area of 3.054×10^{-3} m^2 (equivalent to a 2.46 in diameter hole) is used for that connection based on a calibration described below. The effective open area of the screen installed below 2617 m (8586 ft) is assumed to be 3% of the bulk surface area of the liner. The same ratio is used for the perforated zone between 2594 and 2609 m (8510-8559 ft).

The land surface temperature is set to 15 °C with geothermal gradient of 20 °C/km. The upper boundary is open to the atmosphere except for the tubing and annulus which are closed. The lower boundary is closed while the far-field radial boundary (at 500 m away from the well center) is assumed to have constant pressure and temperature.

The major properties of formations and wellbore sections used in the modeling are shown in Table 2 and Table 3, respectively.

With this grid and properties of the system, we modeled non-isothermal flow from the reservoir zone into and up the production casing as well as injection of kill fluid through the tubing.

4. Results

4.1. Modeling calibrations and system status during gas leakage

Because of limited availability of information and parameter values for both the well and the formations, we did a preliminary manual calibration of the model against the measured tubing and 7" (7-in) casing pressure data before the November 15, 2015 top kill operation, when the reservoir pressure is assumed to be 19.31 MPa (2800 psi). The poorly constrained parameters that we calibrated are (1) the area of the casing failure (hole), and (2) permeability of the shallow formation (formation 1 through 3). Fig. 3 shows the comparison of the simulated and the measured pressure data following manual calibration. The gas leakage rate predicted by the calibrated model is about 19 kg/s, which is within

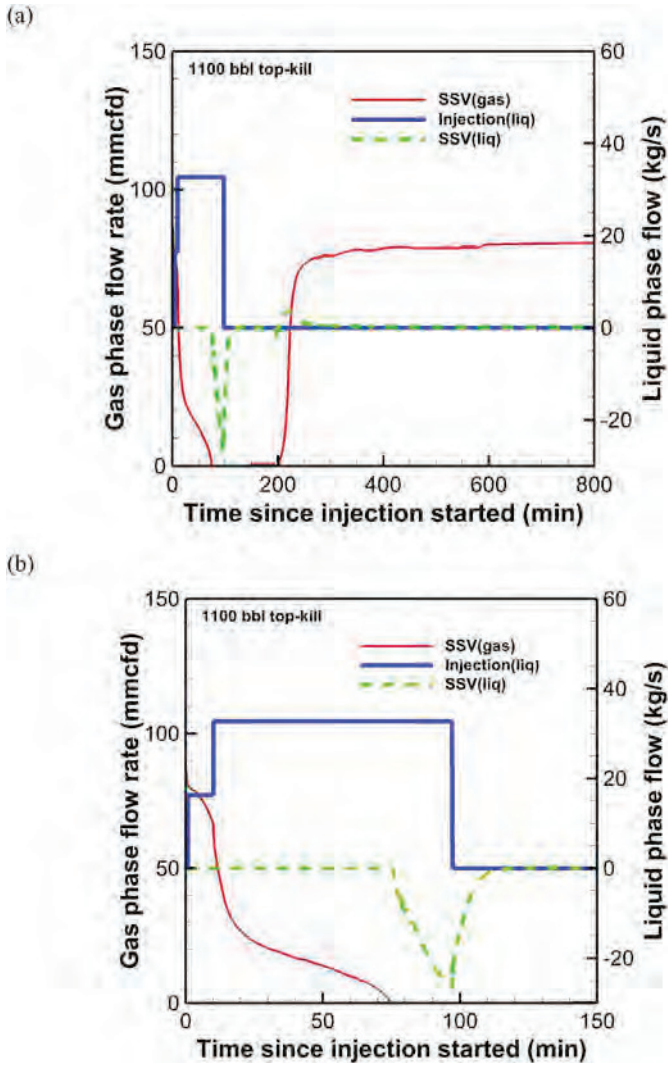

Fig. 11. Simulated gas (red line) and liquid (green dashed line) flow rates through the SSV slots from the tubing side to the annulus side as a response to the injection of kill fluid (blue line) during the 1 100 bbl kill. Negative values indicate flow from the annulus side to the tubing side through the SSV slots. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

the range of the peak leakage rate measured by Scientific Aviation (Conley et al., 2016).

As shown on Table 4, the gas velocity varies greatly along the complex gas-flow pathway. The velocity increases significantly as the flowing gas enters the tubing (a narrow pathway). At the tubing below the open SSV slots (Point 3 in Fig. 4), the gas velocity is 70.24 m/s (~150 mph). This implies that the flowing gas carries large upward momentum at this location. An on-site engineer stated that a survey instrument lowered into the well behaved as if it hit a wall at that depth and the instrument broke immediately. After entering the annulus, the gas velocity decreases because of its relatively larger cross-sectional area compared to the tubing. By the point the gas reaches the hole in the production casing at shallow depth, the gas has become much less dense because of the lower pressure and velocities again become very large. Based on the gas velocity distribution pattern revealed here, it can be anticipated that the probability and flow rate of the kill fluid entering the A-annulus through the tubing perforations (Point 6), is larger than the probability and rate of the kill fluid entering the tubing through the open SSV slots (Point 4) against the more rapidly outflowing gas.

4.2. Two top-kill attempts

We simulated two of the seven top-kill attempts mainly because more information was available for these two than for the others. In the first kill attempt we simulated, 220 bbl of 9.4 ppg $CaCl_2$ solution and 22 bbl of 18 ppg barite pill were used in a 242 bbl kill attempt on Nov. 15, 2015. In the second kill attempt we simulated, 100 bbl of 9.4 ppg $CaCl_2$ solution and 1000 bbl of water was used in the 1 100 bbl kill attempt on Nov. 25, 2015. Because T2Well cannot simulate two types of kill (liquid) fluid simultaneously, we used one kill fluid with properties representative of the mixed fluid properties. The volume-weighted average density was assumed for the fluid. We estimated the viscosity of the kill fluid according to the concentration of $CaCl_2$ based on published viscosity data of $CaCl_2$ solution (OxyChem, Calcium Chloride: A Guide to Physical Properties, http://www.oxycalciumchloride.com/(accessed July 20, 2017)) and pure water at 15.6 °C (NIST Chemistry webbook, http://webbook.nist.gov/chemistry/fluid/(accessed July 20, 2017)). An estimated factor is used to multiply the viscosity data for a given $CaCl_2$ solution to account for the effects of the barite pill on the mixture. Table 5 summarizes the properties of the kill fluid and the injection schedules used in the simulations. The mass injection rates were estimated based on average density of kill fluids from the reported (or planned) volumetric injection rate data.

Results of T2Well simulations can be represented as time plots of gas flow (million standard cubic feet per day; mmcfd) and liquid flow (kg/s), the latter of two kinds: (i) into the well as kill fluid, and (ii) out of the well as kill-fluid return flow (kill fluid that returns to ground surface). Fluid or gas flows out of the ground surface are referred to as leakage.

As shown in Fig. 5, the gas leakage rate increases slightly immediately after the injection of kill fluid because the residual gas in the tubing is driven into the annulus and contributes to the gas leakage volume. Gas leakage then decreases, although not smoothly, as the kill fluid enters the annulus. Oscillations in fluid and gas flow become severe after the leaking gas starts to lift the injected kill fluid (green line) out of the A-annulus and into the overburden. The strong oscillations in both gas and liquid leakage rates are indicative of complicated phase interferences between the fast upward-flowing gas and the injected kill fluid in the annulus. This type of slugging behavior was likely the cause of observed oscillations of the well casing within the eroded cavities around the wellhead. Notably, when the kill-fluid injection rate increases, the amplitude of the oscillations in gas leakage rate gradually decreases and finally ceases so that the flows become smoothly varying and the gas leakage rate gradually decreases while the liquid leakage rate gradually increases.

Although the gas leakage rate decreases, it never reaches zero (the well is not killed). The simulation shows that a few minutes after the kill-fluid injection stops, the gas leakage rate recovers to its pre-kill level after having blown the kill fluid out of the A-annulus into the overburden and from there out of the subsurface entirely. The simulated kill failed because the liquid fraction of the two-phase mixture in the A-annulus was never high enough to create a column of fluid that imposed a back pressure at the SSV sufficient to stop the gas flow. Instead, the injected kill fluid was effectively carried out of the well with the gas under this limited injection intensity (up to 23.61 kg/s) and never entered the well below the packer through the open SSV slots (Fig. 6). As a result, the kill fluid never reached the well below the packer (Fig. 7, upper panel). The A-annulus becomes two-phase during the kill, but the liquid is swept out after the injection stops and it returns to being single-phase gas (Fig. 7, lower panel).

Measured and simulated tubing pressure responses roughly match, giving confidence in the model (Fig. 8). Because the kill fluid was modeled using “average” properties, the big pressure drop due to injection of the denser barite pill is not expected to be observed in the model results. In addition, because the perforations in the tubing are spread over a length of 3 m (9.8 ft) along the tubing (i.e., 16 holes at eight depths) whereas we simulated the perforations as a single effective hole,

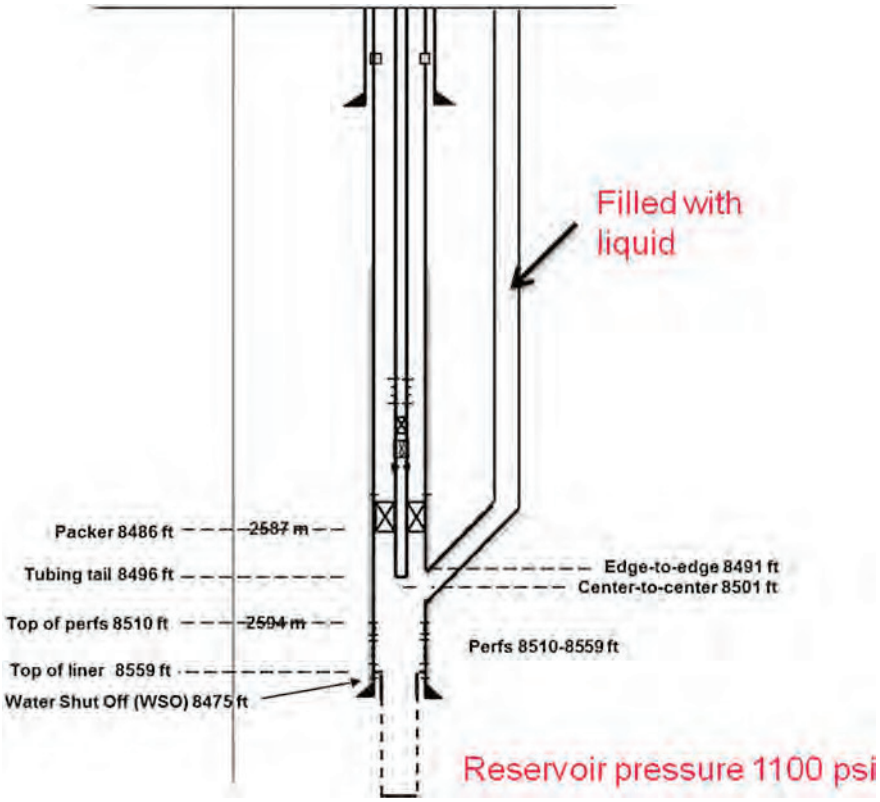

Fig. 12. Sketch of the SS-25 well intersected by the relief well (not to scale). The fluid in the relief well drains into the SS-25 well reservoir region below the packer immediately after the casing is milled through.

the gradual recovery trend of the tubing pressure due to sequential exposure of perforations to gas flow (gas flows into tubing through the top holes while water flows into the annulus through the bottom holes) cannot be reproduced by the model either. Poor match of the 7" (7-in) casing pressure during the injection period is because the leakage pathway through the shallow formations (including casing hole, the crater, and larger fractures in between) was approximated as porous media in the model. Although the permeabilities were calibrated against the measured tubing and 7" (7-in) casing pressure data before the November 15, 2015 top kill operation, the parameters of the relative permeability functions were not calibrated. As a result, the model overestimated the resistance to two-phase flow in that pathway.

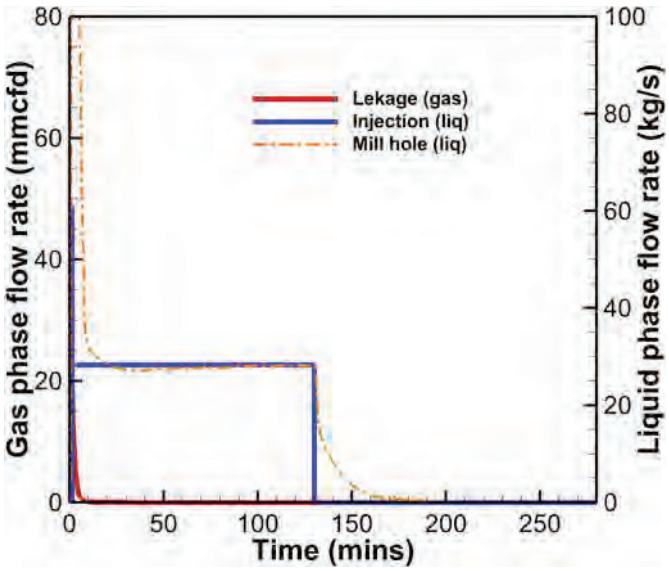

Fig. 13. Simulated gas leakage rate (red solid line), relief-well fluid injection rate (blue solid line), and liquid flow rate through the mill hole (red dash-dot line) from the relief well to the SS-25 well during the relief-well kill attempt. The injected liquid (blue line) is 9.0 ppg $CaCl_2$ solution. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

The early response of the gas leakage rate to kill-fluid injection in the 1 100 bbl kill attempt is similar to the case of the 242 bbl kill (Fig. 9b), i.e., gas leakage increases slightly in the first 5 min because of the increased pressure of the kill-fluid injection. With higher injection rate (39% higher) and longer injection period (160% longer), however, the 1 100 bbl kill was able to reduce the gas leakage rate to zero after about 90 min, which was about 10 min before the end of the injection. The associated liquid leakage rate also becomes zero and the well "lays down" for about 100 min before gas leakage resumes and quickly recovers to its pre-kill level (Fig. 9a). The return to blow-out flow conditions occurs like the eruption of a geyser with strong oscillations in liquid flow through the casing failure.

The reason that the blowout flow "lays down" is because the liquid column in the annulus becomes high enough (Fig. 10, lower panel) after about 75 min of injection to stop the gas flow through the SSV slots and the resulting pressure causes liquid to flow into the tubing below the plug. (Fig. 10, upper panel, and Fig. 11). As a result, kill fluid fills the well below the packer (Fig. 10, upper panel). However, when injection of the kill fluid ceases, the buildup of liquid in the annulus ceases. The pressure in the annulus at the SSV slots is still high enough to cause liquid to flow through the slots into the tubing (Fig. 11B) to replenish fluid below the packer that is entering the reservoir, but this decreases average liquid saturation in the annulus as kill fluid is depleted from the tubing (Fig. 10, upper panel). This causes the pressure in the annulus at the SSV slots to decrease until it is no longer large enough to cause liquid to flow into the tubing through the slots at about 13 min after the cessation of kill fluid injection (Fig. 11B). However, the liquid below the packer is still draining into the reservoir, allowing a gas "bubble to form below the packer

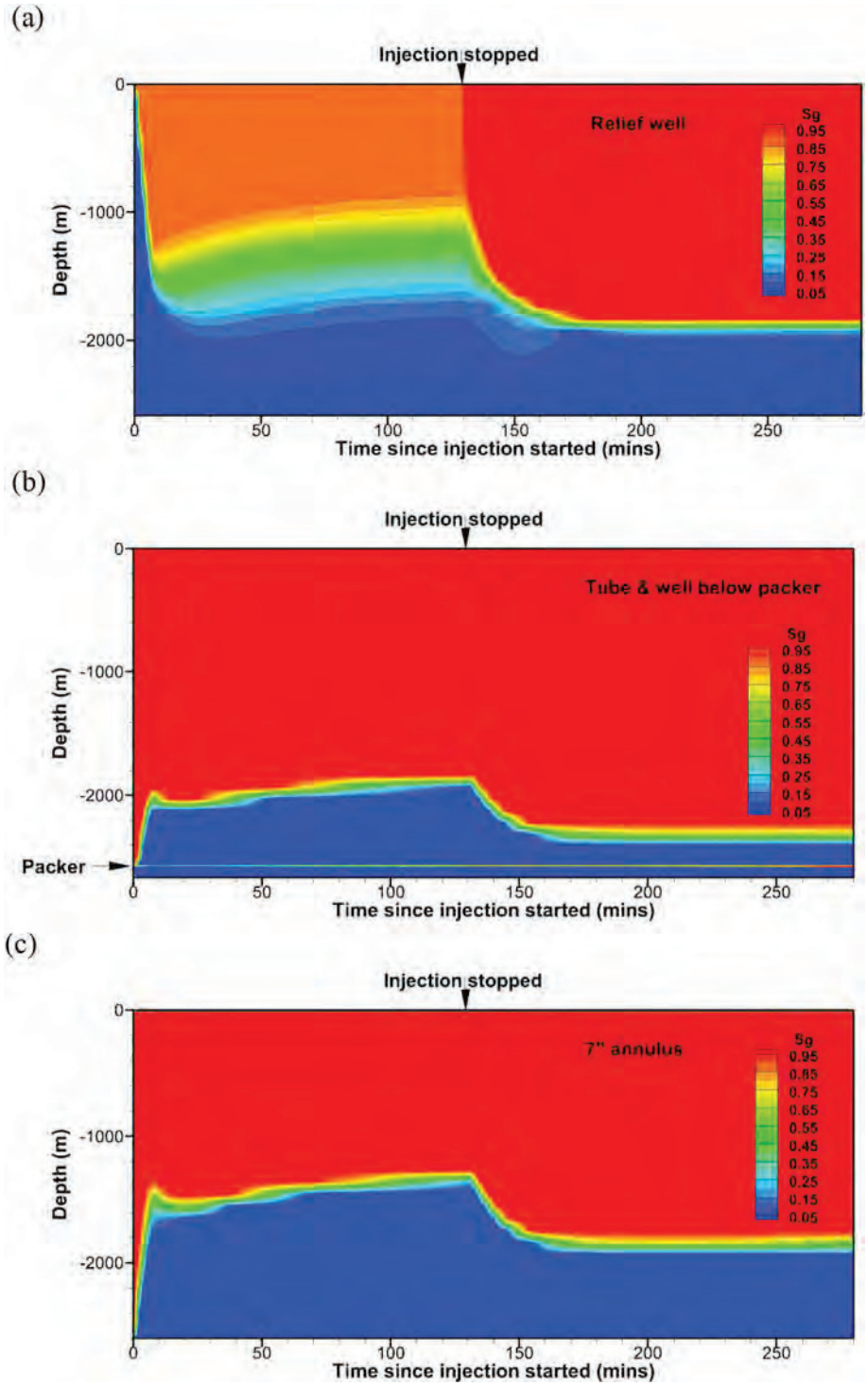

Fig. 14. Simulated gas saturation during relief-well kill in (a) the relief well over time, (b), tubing and well below the packer, and (c), 7" (7-in) annulus.

(Fig. 10, upper panel). About 50 min after the cessation of injection (150 min after the start), the gas "bubble" becomes tall enough to develop more pressure in the tubing at the SSV slots than the liquid in the annulus is imposing, and gas starts to enter the annulus again (Fig. 10 lower panel, and 11A). The depth to the top of the liquid column decreases as it expands due to the gas inflow (Fig. 10, lower panel). About 100 min after the end of injection and 200 min after the start of injection, the top of the liquid column reaches the production casing breach and liquid starts to exit the production casing (Fig. 10, lower panel, and 9A). The liquid in the annulus is quickly carried out of the well with the flowing gas in the form of a geyser like eruption (Fig. 9A). The resulting decrease of pressure in the well below the packer causes some of the kill fluid that has entered the reservoir to flow back into the well and also be ejected through the SSV slots (Fig. 10, upper panel, and 11A).

4.3. *Kill with relief well*

In this simulation, we added the relief well to the coupled wellbore-reservoir model described above as an additional one-dimensional domain connected to the SS-25 domain in the reservoir (Fig. 12). As in

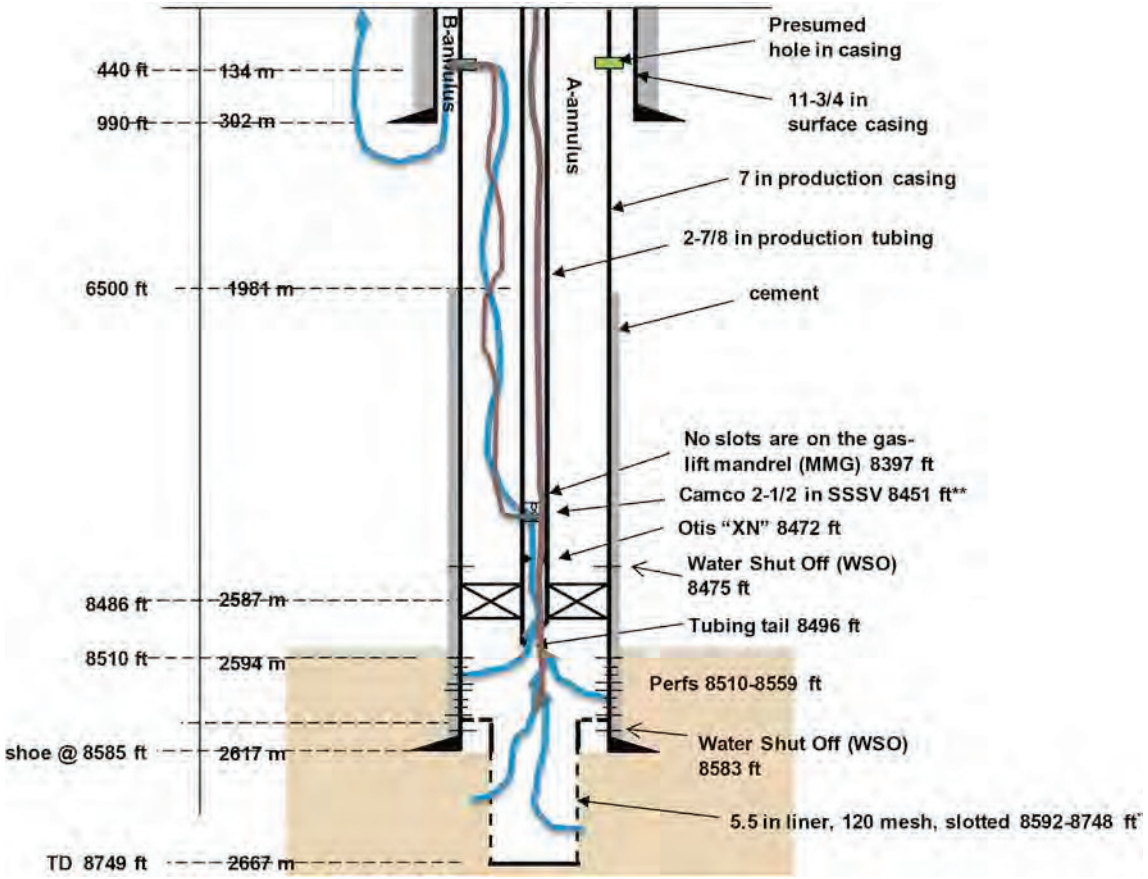

Fig. 15. A sketch of the SS-25 well without the tubing plug and perforations (not to scale) and possible flow upward flow path of gas leakage (blue) and downward flow of kill fluid (brown). In this hypothetical configuration, the kill fluid (brown) can flow down directly to the well below the packer although a fraction may be carried away by the leaking gas through the SSSV slots. See Fig. 1 for explanation of components.

the actual system just prior to successful killing of the SS-25 blowout, the relief well is connected to the SS-25 well through a hole that was created by milling through the casing of the SS-25 well. All other model parameters and boundary conditions are the same as presented in Section 4.2 except that the initial conditions in the SS-25 well and the formations were calculated assuming the reservoir pressure had decreased to 1 100 psi. We make this assumption because approximately 100 days of leakage and gas drawdown by production (through other wells) was carried out before the relief-well kill in February 2016. The relief well is initially filled with drilling fluid (9.0 ppg $CaCl_2$ solution) at hydrostatic pressure and is under continuous injection with the same fluid (1 100 bbl). The mass flow rate in the T2Well model through the mill hole is limited to 100 kg/s for numerical stability.

As shown in Fig. 13, gas leakage at the surface stops within 10 min after milling into SS-25, which is consistent with the field observations. The effectiveness of the relief-well kill is due to the large liquid inflow through the mill hole below the packer (Fig. 12). The large amount of the liquid in the relief well almost immediately fills the critical portion of SS-25 (i.e., the well below the packer) exerting pressure on the reservoir and stopping gas flow into the well (Fig. 14). The liquid then "U-tubes" up the SS-25 well tubing, out the SSV slots and into the lower portion of the annulus. The liquid even flows back into the tubing through the tubing perforations above the plug as the liquid level further increases in the annulus. After the injection stops, the liquid levels in the relief well and the annulus tend to approach the same height as they form a U-tube configuration (Fig. 14a and c). The lower liquid level in the tubing is caused by the pressurization of the gas bubble trapped in the top portion of the tubing (Fig. 14b). There are two other compressed gas bubbles, one in the dead end of the tubing above the SSV and below the plug in the tubing and the other in the dead end of the production casing around the tubing below the packer (Fig. 14b), but these gas bubbles have little effect on stopping gas leakage from the reservoir because of the large pressure exerted by the liquid filling the wells in the U-tube configuration. We note these compressed gas features of our simulations did not play a critical role in the success of the relief-well kill, but they could inhibit fluid entry and are potentially important aspects of the flow system which our T2Well model faithfully simulated.

Presumably the well blowout would eventually restart some time after cessation of injection via the relief-well kill due to fluid loss to the reservoir, just as it did after the two top kills simulated. However in practice SS-25 was plugged with cement via the relief well within a day of the kill.

5. Discussion

5.1. Effects of the configuration of tubing plug and perforations

To investigate the possible effects of the tubing plug and perforations on the top kill, we simulated a hypothetical scenario of 1100 bbl kill attempt on the well assuming there was no tubing plug nor associated perforations (Fig. 15). Based on the few details available regarding the top kill attempts prior to setting the plug in and perforating the tubing, this hypothetical "no plug" case was designed to use more kill fluid in order to provide a limiting case.

With no plug in the tubing, the injected kill fluid does not need to enter the annulus through tubing perforation holes before re-entering the tubing by overcoming the pressure of the gas flowing from the SSV slots into the annulus. Instead, the kill fluid can flow down directly to the well below the packer through the tubing, although a fraction may be carried away by the leaking gas through the SSV slots. All other parameters are

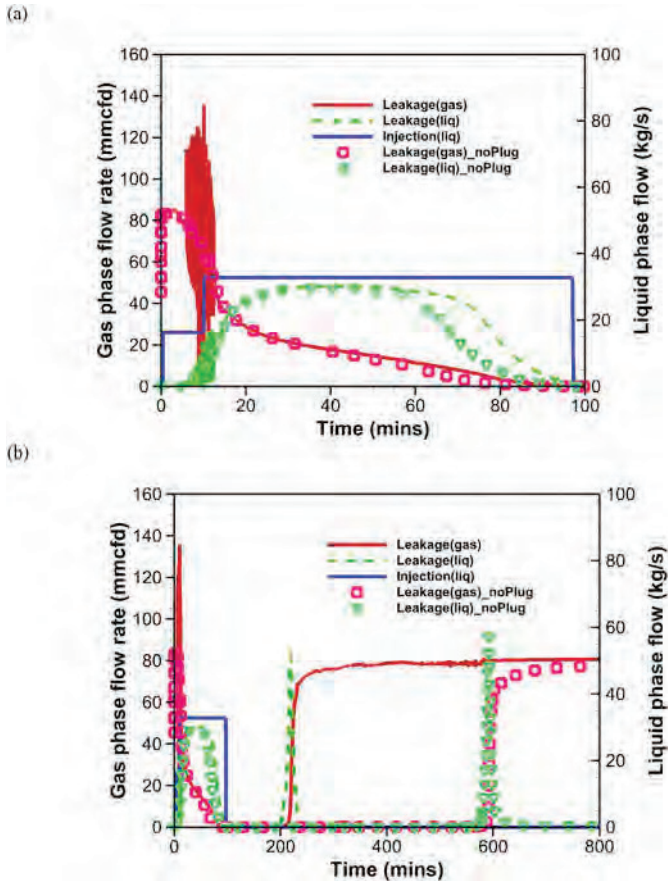

Fig. 16. Comparison of simulated flow rates in response to the same 1100 bbl kill attempt for the base case (tubing plug and perforations) and the hypothetical no-plug case (no tubing plug and perforations) for (a) the first 100 min, (b) the entire simulated period.

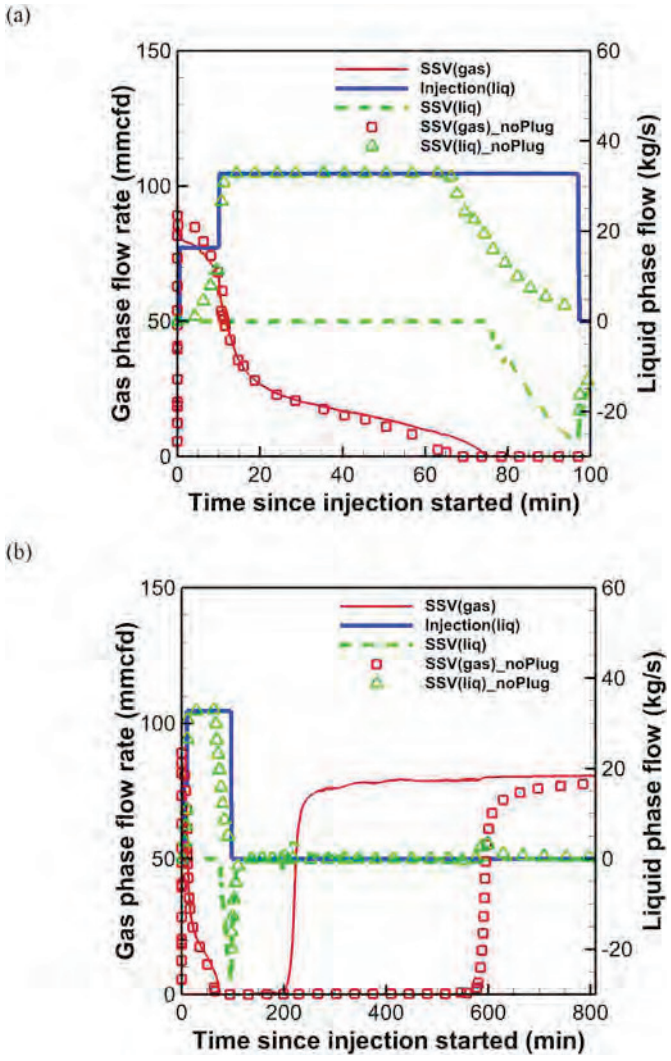

Fig. 17. Comparison of simulated flow rates through the SSV slots in response to the same 1100 bbl kill attempt for (a) the first 100 min, and (b) the entire simulated period. The "noPlug" case contains no tubing plug nor perforations. Flow from the tubing side to the annulus side through the SSV is positive. We plot the injection of kill liquid (blue) for reference. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

the same as those of the 1100 bbl kill attempt described in Section 4.2.

The simulated gas leakage in response to the injection of kill fluid for the base-case (tubing plug and perforations) and no plug case are shown for comparison in Fig. 16. The gas leakage response is almost the same at early time (Fig. 16A) for both cases except that the strong oscillations in gas and liquid leakage rates do not occur in the no plug case. When the gas leakage rate decreases to a certain rate, the liquid leakage rate starts to decrease because of the diminishing gas lift. However, this phenomenon takes place slightly earlier in the no plug case. On the other hand, in both cases, the gas leakage ultimately recovers to its pre-kill level following an eruption of liquid after the well is temporarily "dead" (Fig. 16B). However, without the tubing plug and perforations structure the length of the "lay-down" period increases from about 100 min to 500 min (Fig. 16B). In other words, the tubing plug and perforations increase the difficulty of controlling pressure in the SS-25, thereby preventing effective top kills of the well. But we emphasize that in both cases, the gas leakage resumes eventually if the injection of kill fluid is stopped due to loss of this fluid to the reservoir. These simulations are consistent with the experience that fluid levels need to be maintained in wells to maintain pressure control once the high flow-rate gas release has been stopped, for instance during workovers.

Looking the simulated flows through the SSV slots in the no plug case, we see that at early time almost all of the injected liquid is carried away by the leaking gas flow through the SSV slots into the annulus (green triangles, Fig. 17A) while no liquid could enter the tubing side of the SSV slots from the annulus in the base case. When the gas leakage rate drops significantly and approaches zero, the liquid starts to flow down into the well below the packer so that the trend of liquid flow rate through the SSV starts to deviate from the injection curve in the no plug case (Fig. 17A). In the base case, about 10 min later, liquid starts to enter the tubing side of the SSV from the annulus (green dashed line, Fig. 17A). After liquid breaks through the gas-flow barrier, the rate of liquid flow into the bottom of the well increases with time in both cases until the end of the injection. Only a small amount of liquid flow from the tubing out to the annulus is associated with the resumption of gas leakage in both cases (Fig. 17B). This implies that the liquid forming the eruption at the start of resumption of gas leakage is primarily derived from the liquid sitting in the annulus.

Fig. 18 shows the gas-saturation profiles in the tubing (including in the well below the packer) and annulus over time. Unlike in the default case, where there still is a large amount of liquid trapped in the tubing when the gas leakage resumes (Fig. 10), removing the tubing plug effectively eliminates the occurrence of liquid that was trapped in the tubing and unable to enter the leakage flow path (i.e., A-annulus) through the perforations (Fig. 18). The process of decreasing liquid saturation in the annulus (i.e., the preparation of resumption of gas leakage) is much longer in the no plug case (Fig. 18) than the default case

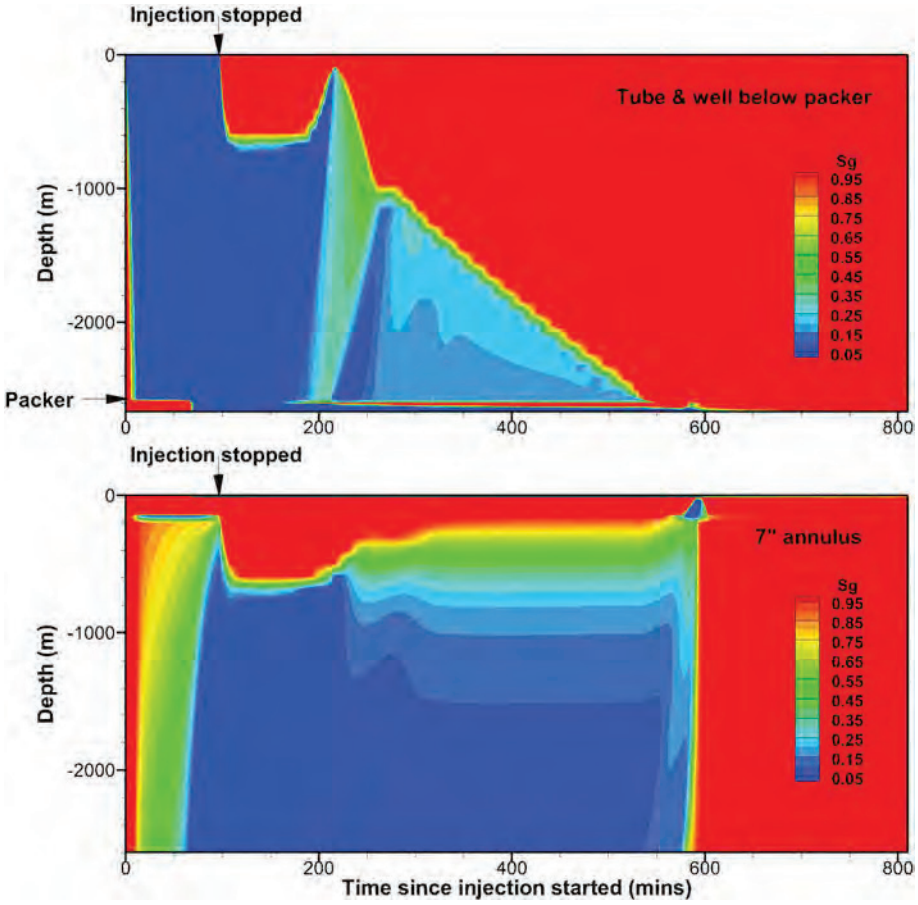

Fig. 18. Simulated gas saturation in tubing and in well below the packer (upper panel) and 7″ annulus (lower panel) during the 1100 bbl kill without the tubing plug or perforations.

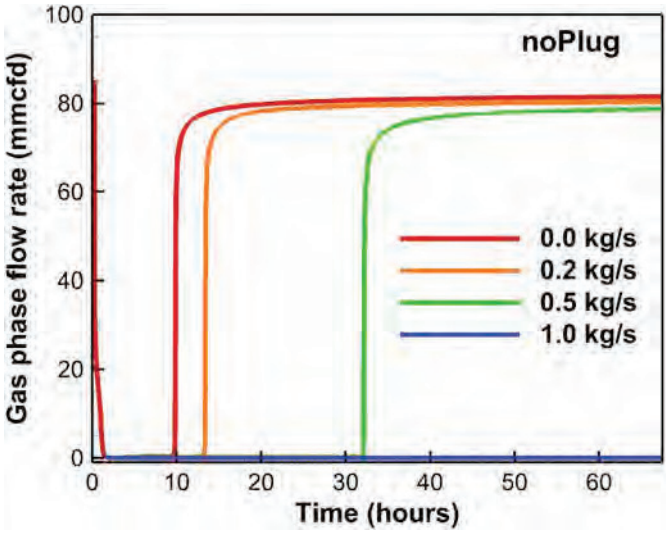

Fig. 19. Simulated gas leakage rate in response to different follow-up injection rates after the 1 100 bbl kill attempt for no-plug case. The default (red line) is the case where no follow-up liquid injection occurs after the main 1 100 bbl injection. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

(Fig. 10) because all of the liquid in the tubing has to be drained first in the no plug case. In other words, we have more liquid built up to halt gas leakage in the no plug case than in the base case for the same amount of injection. This is the reason that the leaking well "lays down" for a much longer time in the no plug case than in the base case.

5.2. *Test of alternate approach for top kill of SS-25*

As suggested by the simulation results of the no plug case, it appears that one could "lay down" the leaking well longer if the well below the packer and the annulus remained fluid-filled for a longer time. The idea here is that the SS-25 well with its complex geometry, and any other well with simpler conditions (e.g., analogous to our no plug case), could perhaps be killed successfully by continuous fluid injection rather than having to resort to the slow and costly drilling of a relief well. In order to test alternate kill approaches, we carried out a set of numerical simulations with various follow-up injection rates that could be prescribed after the initial 1 100 bbl are injected for the top kill.

The model set up and parameters are the same as the no plug case, chosen because it is potentially more representative of typical wells rather than the SS-25, which ended up with a plug and perforations following initial mitigation efforts. Fig. 19 shows the gas leakage rates in response to the different follow-up injection rates. As expected, the larger the injection rate, the longer the "lay down" condition will last. If the follow-up injection is at a rate of 1 kg/s, the well is practically "dead." This is directly related to the duration of fluid-filled annulus (Fig. 20). For injection rates larger than 1 kg/s, the liquid column in the annulus quickly reaches a stable condition which blocks the leakage of gas. For other cases, the liquid saturation will gradually decrease for a relatively short period before sudden expulsion of liquid by the resumed gas flow. These gradually decreasing periods often start when the liquid column in the tubing almost disappears (Fig. 21). Therefore, keeping a certain height of the liquid column in the tubing is critical to keeping the well "dead." The minimum follow-up injection rate should be between 0.5 kg/

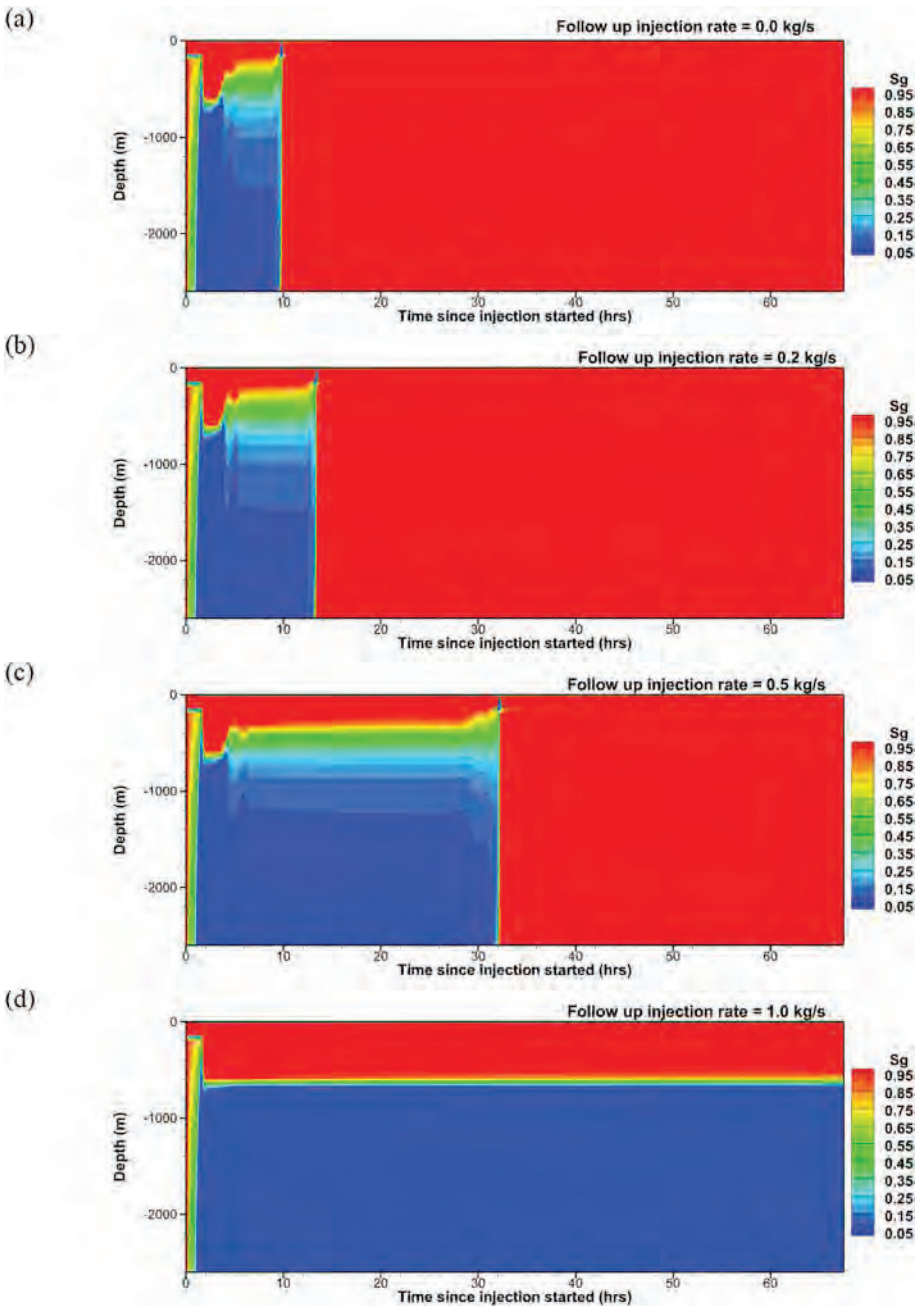

Fig. 20. Simulated evolution of gas saturation in the 7″ annulus in response to different follow-up injection rates after the main 1100 bbl kill attempt for the system without the tubing plug).

s and 1.0 kg/s for the modeled system. Interestingly, a gas bubble develops first in the well below the packer about 2 h after the sudden drop in injection rate in all cases (Fig. 21). However, this gas bubble is kept in check in the 1 kg/s followup injection case because maintenance of the liquid column height sustains the necessary backpressure on the bubble.

6. Conclusions

During early efforts to control SS-25, a plug was installed in the well tubing and the tubing was subsequently perforated above the plug to regain access to the well. These openings along with the open SSV slots in the tubing created a complex flow path for gas and kill fluid between the tubing and A-annulus. Simulations of flowing gas and top-kill and relief-well kill processes have been carried out using T2Well, a coupled well-reservoir simulator based on the TOUGH codes. T2Well uses compressible Navier-Stocks momentum equation (with the drift-flux model) to simulate flow in the well and couples the well region with porous media regions in which flow is governed by Darcy's law. Using detailed properties of the well and the calibrated and known parameters, T2Well simulations match observed pressures and provide plausible temperatures for flowing gas.

Our simulation results capture complex two-phase flow and geometry-related aspects of the system and provide a basis for understanding the top-kill failures, behavior of the relief-well kill, and the effectiveness of hypothetical scenarios for the SS-25 well. The SSV resulted in a substantial portion of the top-kill fluid being ejected from the breach in the SS-25 production casing breach as compared to conventional well configurations with no such connection between the tubing and A-annulus. As a result, many times more kill fluid was required than a simple calculation of the well volume would indicate,

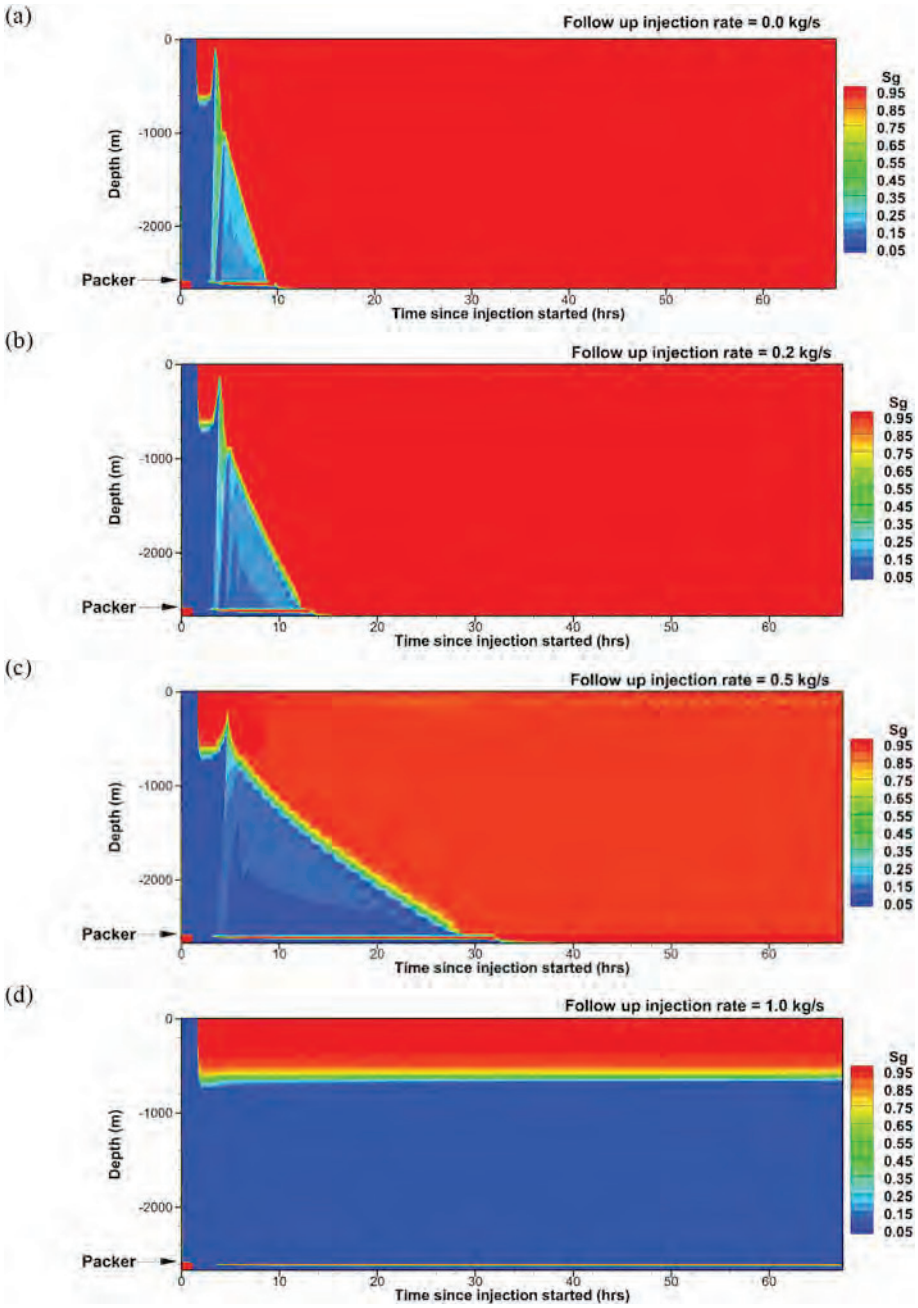

Fig. 21. Simulated evolution of gas saturation in the tubing and well below the packer in response to different follow-up injection rates after the main 1100 bbl kill attempt for the system without the tubing plug.

which is the sufficient volume for conventionally configured well. In the cases of sufficient kill fluid volume and rate to stop the gas flow temporarily, the tubing plug-perforation combination shortened the cessation of gas flow substantially because the resumption of gas flow trapped fluid in the tubing. With no plug in the tubing, the liquid column in the tubing retards the gas flow through the SSV, lengthening the time until this gas has expanded the liquid in the A-annulus up to the production casing breach. Finally, the leakage of kill fluid into the reservoir without a compensatory continued injection of kill fluid caused SS-25 to resume blowing out.

The cumulative effect of these three factors appears not to have been discerned during the blowout as evidenced by the failure of the numerous top kills to stop the gas flow permanently, and the erosion ("cratering") around the casing below the well head resulting from these numerous kills necessitated commencing two relief wells (the second relief well was started as a backup in case the first failed to stop the blowout for some reason). Consequently the failure to account for the cumulative impact of these factors extended the blowout period and increased the cost of bringing it under control.

This study demonstrates the value of a simulator capable of exploring multiphase fluid flow in complex well configurations coupled to a reservoir as compared to simpler straight pipe simulators. Although we started these simulation studies while the unsuccessful top kills were being carried out and worked extended hours to generate model results, we could not generate results that we were confident in fast enough to keep pace with the needs of the operator. This experience points out that reacting to incidents like the SS-25 blowout is problematic because it is difficult to keep pace with the crisis. Instead, it is imperative that operators develop the capacity to carry out simulations, or mine existing databases of pre-computed results, very quickly in response to incidents

such as the SS-25 blowout so that decision-making and responses can be made in a timely manner.

Acknowledgements

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Nomenclature

A	wellbore cross-sectional area m^2
b	formation thickness m
C_0	shape factor
$\mathbf{g}$	acceleration of gravity vector m s^{-2}
E	Energy J
$\mathbf{F}$	Darcy flux vector kg m^2 s^{-1}
H	enthalpy J
h	specific enthalpy J kg^{-1}
k	permeability m^2
k	relative permeability
m	mass kg
$\mathbf{n}$	outward unit normal vector
p	total pressure Pa
Q	heat J
q_v	volumetric source term kg m^{-3} s^{-1}
R	radial coordinate, gas constant m, J kg^{-1} mol^{-1}
S	saturation, storativity -, m^{-1}
t	time s
T	temperature, transmissivity ^oC, m s^{-1}
u	*Darcy* velocity of phase β m s^{-1}
uG, uL	*phase velocity of gas and liquid in the well* m s^{-1}
U	internal energy J kg^{-1}
v	velocity m s^{-1}
V	volume m^3
W	work J
X	mass fraction w/phase subscript and component superscript
z	Z-coordinate (positive upward) m
Z	compressibility factor

Greek symbols

α	fluid compressibility Pa^{-1}
β	phase index
β_f	formation compressibility Pa^{-1}
Γ	surface area m^2
θ	angle between wellbore and the vertical $^\circ$
κ	mass components (superscript)
λ	thermal conductivity of fluid-rock composite J m^{-1} s^{-1} K^{-1}
μ	dynamic viscosity kg m^{-1} s^{-1}
ρ	density kg m^{-3}
τ	tortuosity
ϕ	porosity

Subscripts and superscripts

β	phase index
cap	capillary
d	drift
G	gas
κ	component index
l	liquid
lr	liquid residual
L	liquid
m	mixture
NK1	energy component
0	reference value

r	relative
res	bulk reservoir

References

Bendiksen, K.H., Maines, D., Moe, R., Nuland, S., 1991. The dynamic two-fluid model OLGA: theory and application. SPE Prod. Eng. 6 (02), 171–180.

California Air Resources Board, 2016. Determination of Total Methane Emissions from the Aliso Canyon Natural Gas Leak Incident. Available at. https://www.arb.ca.gov/research/aliso_canyon/aliso_canyon_methane_emissions-arb_final.pdf.

Conley, S., Franco, G., Faloona, I., Blake, D.R., Peischl, J., Ryerson, T.B., 2016. Methane emissions from the 2015 Aliso Canyon blowout in los angeles, ca. Science 351 (6279), 1317–1320.

Dhulesia, H., Lopez, D., 1996. January. Critical evaluation of mechanistic two-phase flow pipeline and well simulation models. In: SPE Annual Technical Conference and Exhibition. Society of Petroleum Engineers.

Guo, C., Pan, L., Zhang, K., Oldenburg, C.M., Li, C., Li, Y., 2016. Comparison of compressed air energy storage process in aquifers and caverns based on the Huntorf CAES plant. Appl. ENERGY 181, 342–356.

Oldenburg, C.M., Moridis, G.J., Spycher, N., Pruess, K., March 2004. EOS7C Version 1.0: TOUGH2 Module for Carbon Dioxide or Nitrogen in Natural Gas (Methane) Reservoirs. Lawrence Berkeley National Laboratory Report LBNL-56589.

Oldenburg, C.M., Freifeld, B.M., Pruess, K., Pan, L., Finsterle, S., Moridis, G.J., 2012. Numerical simulations of the Macondo well blowout reveal strong control of oil flow by reservoir permeability and exsolution of gas. Proc. Natl. Acad. Sci. 109 50, 20254–20259.

Oldenburg, Curtis M., Pan, Lehua, 2013a. Utilization of CO2 as cushion gas for porous media compressed air energy storage. Greenh. Gas. Sci. Technol. 3, 1–12.

Oldenburg, C.M., Pan, L., 2013b. Porous media compressed-air energy storage (PM-CAES): theory and simulation of the coupled wellbore–reservoir system. Transp. Porous Media 97 (2), 201–221.

Pan, L., Freifeld, B., Doughty, C., Zakem, S., Sheu, M., Cutright, B., Terrall, T., 2015. Fully coupled wellbore-reservoir modeling of geothermal heat extraction using CO2 as the working fluid. Geothermics 53, 100–113.

Pan, L., Oldenburg, C.M., 2014. T2Well—an integrated wellbore–reservoir simulator. Comput. Geosciences 65, 46–55.

Pan, L., Webb, S.W., Oldenburg, C.M., 2011a. Analytical solution for two-phase flow in a wellbore using the drift-flux model. Adv. Water Resour. 34, 1656–1665.

Pan, L., Oldenburg, C.M., Wu, Y.-S., Pruess, K., 2011b. Transient CO2 leakage and injection in wellbore-reservoir systems for geologic carbon sequestration. Greenh. Gases Sci. Tech. 1 (4), 335–350.

Pan, L., Wu, Y.-S., Oldenburg, C.M., Pruess, K., 2011c. T2Well/ECO2N Version 1.0: Multiphase and Non-isothermal Model for Coupled Wellbore-reservoir Flow of Carbon Dioxide and Variable Salinity Water. LBNL-4291E.

Pruess, K., Oldenburg, C.M., Moridis, G.J., 1999. TOUGH2 User's Guide Version 2. E. O. Lawrence Berkeley National Laboratory Report LBNL-43134. LBNL-43134 (revised), 2012.

Ravndal, M., 2011. Models for Dynamic Kill of Blowouts. Master's thesis. University of Stavanger, Norway.

Rygg, O.B., Smestad, P., Wright, J.W., 1992. Dynamic two-phase flow simulator: a powerful tool for blowout and relief well kill analysis. January. In: SPE Annual Technical Conference and Exhibition. Society of Petroleum Engineers.

Shi, H., Holmes, J.A., Durlofsky, L.J., Aziz, K., Diaz, L.R., Alkaya, B., Oddie, G., 2005. Drift-flux modeling of two-phase flow in wellbores. Soc. Pet. Eng. J. 10 (1), 24–33.

Vasini, E.M., 2016. Numerical Modelling and Simulation Optimization of Geothermal Reservoirs Using the Tough2 Family of Codes (Doctoral dissertation, alma).

EXHIBIT 10

PrevDoc | NextDoc

Governor's Office of Emergency Services

Hazardous Material Spill Update

CONTROL#: 15-6708 NRC# 1133496

NOTIFY DATE/TIME: 11/13/2015 / 1334	**RECEIVED BY:** **OCCURENCE DATE/TIME:** 11/13/2015/1317	**CITY/OP. AREA:** Northridge/Los Angeles County SOUTH COAST AQMD

1.a. PERSON NOTIFYING Cal OES:

AGENCY: S CA Gas	

1.b. PERSON REPORTING SPILL (If different from above):

AGENCY:	

SUBSTANCE TYPE:

	a. SUBSTANCE:	b. QTY: *Amount*	*Measure*	c. TYPE:	d. OTHER:	e. PIPELINE	f. VESSEL >= 300 Tons
1.	Oil - Crude Type	Unk	Gal(s)	PETROLEUM		No	No
2.						No	No
3.						No	No

Orignal Description:During well kill a mist is releasing due to pressure, material is flowing directly into the atmosphere and pooling at the base of the well on soil, mist is traveling Southwest in the air from the well head, no estimate of containment at this time, RP is handling the containment and clean up.

Update(s): 11/13/2015 01:56:55 PM - NRC report received: Wind speed is 20 MPH, No additional information.

; 11/13/2015 03:14:36 PM - Called to update status: The mist flow has reduced and no off site impact has occurred. No waterways have been impacted.

; 11/14/2015 01:02:55 PM - Called to update status, material involved and Agencies on scene: Release is contained, a minor additional release of crude oil flowed onto soil near the well at 0430 hrs today, the material that released on the 13th consisted mostly of mud and brine, no totals are available at this time, LA Co Hazmat and DOG are on scene.

; 11/15/2015 02:10:47 PM - RP is updating to state that well kill operations continues. Caller states that there was a release of brine solution to ground with an oily sheen. Release started at 0400 hours and then again at 1038 hours and contained at 1123 hours. Release is contained and cleanup is underway. Approx 110bbls of brine solution has been recovered. Response and cleanup crews are on site with 24 hour monitoring of this incident. Caller states that there have been no off-site impacts. No waterways have been impacted.

; 11/15/2015 02:33:24 PM - Per NRC: "The caller is reporting a discharge of brine solution with an oily sheen during "well kill operations". The impact is soil containment. Caller stated the amount of oil product in the brine solution is unknown, however it is believed to be a "small amount". Remedial Actions: material spilled into second containment, clean up crew on-site, clean up underway. Division of Oil and Gas are also on site. Additional Information: Weather: light rain earlier in the day.""

PERSON NOTIFYING Cal OES OF SPILL UPDATE:

NAME:	AGENCY:	PHONE#:	Ext:	PAG/CELL:
	So Cal Gas			

UPDATE QUANTITY

Amount	*Measure*
1.	Gal(s)
2.	
3.	
4.	

UPDATE KNOWN IMPACT:	
UPDATE CAUSE	

SITUATION UPDATE:
Per NRC: "The caller is reporting a discharge of brine solution with an oily sheen during "well kill operations". The impact is soil
containment. Caller stated the amount of oil product in the brine solution is unknown, however it is believed to be a "small amount". Remedial Actions: material spilled into second containment, clean up crew on-site, clean up underway. Division of Oil and Gas are also on site. Additional Information: Weather: light rain earlier in the day.""

FAX NOTIFICATION LIST:

AA/CUPA, DFG-OSPR, DTSC, RWQCB, US EPA, USFWS, AIR RESOURCES BD, CDPH-D.O., DOG, BSEE, Co/WP, Co/Hlth, Co/E-Hlth **DOG**

ADMINISTERING AGENCY: Los Angeles City Fire Department
SECONDARY AGENCY: LACoFD Health Haz-Mat
ADDITIONAL COUNTIES:
ADDITIONAL ADMIN. AGENCY:
DOG Unit:
OTHER NOTIFIED:
RWQCB Unit: 4
CONFIRMATION REQUEST:

FAX NOTIFICATION LIST:
ADMINISTERING AGENCY:
ADDITIONAL ADMIN. AGENCY:
SECONDARY AGENCY:
ADDITIONAL COUNTIES:
Cal GEM:
RWQCB Unit:

Created by: Warning Center on: 11/15/2015 02:33:24 PM Last Modified by: Warning Center on: 11/15/2015 02:40:37 PM

* * * * * * * * * * * * * * End of Form * * * * * * * * * * * * * *

EXHIBIT 11

SOUTHERN CALIFORNIA GAS COMPANY

CPUC-SAFETY AND ENFORCEMENT DIVISION AND DEPARTMENT OF CONSERVATION- DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES DATED JANUARY 26, 2016

Updated Response Dated October 27, 2017

General Response:

The information provided herein and in the enclosed electronic document production is provided in response to the January 26, 2016 data requests of the CPUC-SED and DOGGR. The information provided is based upon the best available non-privileged information known at this time, and is subject to change as investigation continues and new information becomes available. SoCalGas reserves the right to amend or supplement this information as its investigation continues. Please note that this revised response, supplements and amends prior productions provided on February 5, 2016, February 16, 2016, and March 18, 2016. SoCalGas reserves the right to request confidential treatment for any document inadvertently produced herein that should be treated as confidential under applicable CPUC rules.

A. Detailed Well Data – "Standard Sesnon" 25 (SS-25) (API 037-00776)

Question 2:

Complete history of well SS-25 from drilling to the date of the well failure; including, but not limited to, all permanent and non-permanent alteration of casing, all tubing, packer, subsurface safety valves, plugs, sliding sleeve, perforations, cementing and remedial operations, logs.

Response 2:

See below. In addition, please see response to A1.

- October 1953 to March 1954: Drilled and completed SS-25 as an oil producer. 11-3/4" surface casing installed and cemented at 990'. 7" production casing cemented at 8585'. 5-1/2" slotted liner installed from 8559' to 8748'. Completed with 2-7/8" tubing. Please see enclosed electronic documents Bates range AC_CPUC_0000040 through AC_CPUC_0000041; AC_CPUC_0000151 through AC_CPUC_0000157.
- March 1954 to May 1973: Operation as an oil producer. Please see enclosed electronic documents Bates range AC_CPUC_0000034 through AC_CPUC_0000039.
- May to June, 1973: Converted SS-25 to gas storage well. Pulled tubing and packer. Cleaned-out well to 8748'. Ran cement bond log, neutron life log, acoustilog, and densilog. Pressure tested casing at 6 different intervals from 1000' at 3400 psi to 8525' at 1500 psi. Added perforations from 8542'-8538'. Set bridge plug at 8550'. Set packer at 8487' and flow tested new perfs. Retrieved bridge plug from 8500' and set at 4975'. Replaced 11-3/4" wellhead, re-landed 7" casing in new wellhead. Retrieved bridge plug. Added perforations from 8559'-8542', 8538'-8510'. Ran wire brush over new perfs. Ran 2-7/8" tubing, Baker FH hydrostatic packer (8453'), nipple, sliding sleeve (8387') and 5 gas lift mandrels with bottom of tubing (8492'). Please see enclosed electronic documents Bates range AC_CPUC_0000093; and AC_CPUC_0000139 through AC CPUC 0000141.
- June 1973 to June 1976: Operation as gas storage well. An Otis 'J' Type wireline retrievable deep-set SSSV was installed on SS25 on or about November 27, 1973. This first SSSV on SS25

was removed on or about March 7, 1975. Please see previously provided electronic documents with Bates Range AC_CPUC_0000664 and AC_CPUC_0000666.

- June to July, 1976: Installed a deep-set Camco SC-1 Annular Flow Safety System. Cleaned-out well to 8748'. Replaced hydrostatic packer with Baker Retrieva-D packer and annular flow safety system (seal assembly stabbed into 7" Baker Retrieva-D packer (8480'), Otis XN nipple, Camco SC-1 safety system and Camco MMG gas lift mandrel). Please see enclosed electronic documents Bates range AC_CPUC_0000024; AC_CPUC_0000029 through AC_CPUC_0000030; AC_CPUC_0000044; AC_CPUC_0000085 through AC_CPUC_0000087; AC_CPUC_0000120.
- July 1976 to February 1979: Operation as gas storage well. Installed a wireline retrievable deep-set Camco SSSV on June 28, 1977 and removed on June 30, 1977. Installed wireline retrievable deep-set Camco SSSV on June 30, 1977 and removed on February 2, 1978. Installed a wireline retrievable deep-set Camco SSSV on February 3, 1978 and removed on August 11, 1978. Installed a wireline retrievable deep-set Camco SSSV on November 9, 1978 and removed on December 13, 1978. Installed wireline retrievable deep-set Camco SSSV on December 14, 1978 and removed on December 21, 1978. Please see previously provided electronic documents with Bates Range AC_CPUC_0000625, AC_CPUC_0000628, AC_CPUC_0000631 - AC_CPUC_0000633, AC_CPUC_0000635, AC_CPUC_0000639, AC_CPUC_0000642- AC_CPUC_0000647, AC_CPUC_0000650- AC_CPUC_0000652. Please see enclosed electronic documents Bates number AC CPUC 0000070.
- February 1979: Replaced deep-set Camco SC-1 Annular Flow Safety System. (new seal assembly stabbed into 7" Baker Retrieva-D packer (8480'), Otis XN nipple, Camco SC-1 safety system and Camco MMG gas lift mandrel). Please see enclosed electronic documents Bates range AC_CPUC_0000031 through AC_CPUC_0000033; AC_CPUC_0000121 through AC_CPUC_0000122; AC_CPUC_0000083; and AC_CPUC_0000132.
- February 1979 to October 2015: Operation as gas storage well. Installed a wireline retrievable deep-set Camco SSSV on January 8, 1980 and removed on January 23, 1980. Installed a wireline retrievable deep-set Camco SSSV on January 23, 1980 and removed on January 24, 1980. Installed a wireline retrievable deep-set Camco SSSV on January 24, 1980 and removed on January 25, 1980. Installed and removed wireline retrievable deep-set Camco SSSV on January 28, 1980. Please see previously provided electronic documents with Bates Range AC_CPUC_0000603 through AC_CPUC_0000611. From 1989 until 2014 the well was temperature logged and pressure tested annually. All logs and pressure tests confirmed no leaks. Please see responses to D.1, D.2., A.4 – A.6, and enclosed electronic documents with Bates range AC_CPUC_0000060; AC_CPUC_0000603 through AC_CPUC_0000607.

Question 4:

Information on the current subsurface safety valve (SSSV) installed in the well.

a. Depth and date the current SSSV was installed. If the SSSV was installed in 1979, provide history. If a SSSV was required, please provide documentation.

b. A recorded description of the purpose and function of the current SSSV. Document description of the current SSSV.
c. Manufacturers specification/design sheet of all SSSVs assemblies used historically on SS-25.
d. The narrative reason for installation of a SSSV in SS-25.
e. Manufacturer's specification of the SSSV currently in the well.

Response 4:

As described below, a deep-set wireline retrievable SSSV was installed on SS-25 on or about November 27, 1973. The first SSSV in SS-25 was removed on or about March 7, 1975, only fifteen months after it was installed. A replacement deep-set SSSV was installed on or about June 28, 1977, but it required removal, repair and reinstallation or replacement on at least four occasions before its final removal on or about December 21, 1978. In February, 1979, SoCalGas brought in a workover to pull the tubing and SSSV system from SS-25 so that a new replacement deep-set SSSV system could be installed. Records reflect that a valve was successfully reinstalled around January 8, 1980, but this success was temporary; the device came unlatched and smashed into the packoff a few days later. After three attempts to re-set the device, the last deep-set SSSV installed in well SS-25 was pulled in January 28, 1980, and was not replaced.

Response 4 below explains that there is no SSSV in SS-25 today. Response 5 below provides a history of the attempts made to operate, repair and replace SSSVs in SS-25 between 1973 and 1980.

a. There is no SSSV currently installed on SS-25. The SSSV was removed from 8,455 ft. on January 28, 1980. The history of Oil or Gas Well (Form OG103), dated February 21, 1979, is attached. Due to continued operability issues, the SSSV in SS-25 was removed on January 28, 1980 and was not replaced. The housing within which the SSSV was located remains in SS-25 today and is depicted on some diagrams transmitted to DOGGR and the CPUC as part of this Data Request.

   In 1977, DOGGR promulgated new regulations that required subsurface safety devices at "critical wells", defined as wells within 300 feet of a building intended for human occupancy or an airport runway, or within 100 feet of a public street, a navigable body of water, a public recreational facility or an officially recognized wildlife reserve. *See* 14 CCR §§ 1720, 1724.3. SS-25 does not meet these conditions and, accordingly, is not a "critical well" as defined in the California Code of Regulations and does not require a SSSV pursuant to these DOGGR regulations.

   To date, SoCalGas is not aware of requirements mandating the installation of such deep-set SSSVs in any well. For example, current DOGGR regulations only require installation of SSSVs "at a depth of 50 feet or more below the ground level" in critical wells. *See* 14 CCR § 1724.3.

b. Not applicable because there is no SSV currently installed on SS-25. Due to continued operability issues, the SSSV in SS-25 was removed on January 28, 1980 and was not replaced.

c. This information is not available. SoCalGas has not yet been able to locate manufacturer's specification documents or design sheets relating to SSSVs for SS-25. SoCalGas' document review is ongoing.

d. Unknown. SoCalGas has reviewed its records and has not identified documentation stating the reasons for the installation of subsurface safety valves in SS-25 in the late 1970s.

e. Not applicable because there is no SSV currently installed on SS-25. Due continued operability issues, the SSSV in SS-25 was removed on January 28, 1980 and was not replaced.

Question 5:

Historical operational narrative overview of ALL SSSVs.

a. Include original SSSVs installed or removed, decommissioned in place, replaced, and repaired.
b. Why are SSSVs installed in SS-25?
c. Manufacture specifications All SSSVs installed or removed, decommissioned in place, replaced, and repaired.
d. Maintenance history and issues.
e. Functionality or improvements needed.

Response 5:

SoCalGas interprets Question 5 as a request for SoCalGas to provide historical operational narrative overview of subsurface safety valves installed, removed, decommissioned, replaced or repaired in SS-25.

a. There was no SSSV installed on SS-25 when it was initially completed as an oil producer in March 1954. There was no SSSV installed on SS-25 when it was converted to a gas storage well in June 1973. A deep-set wireline retrievable SSSV was installed on SS-25 on or about November 27, 1973. The first SSSV in SS-25 was removed on or about March 7, 1975, only fifteen months after it was installed. A replacement deep-set SSSV was installed on or about June 28, 1977, but it required removal, repair and reinstallation or replacement on at least four occasions before its final removal on or about December 21, 1978. In February, 1979, SoCalGas brought in a workover to pull the tubing and SSSV system from SS-25 so that a new replacement deep-set SSSV system could be installed. Records reflect that a valve was successfully reinstalled around January 8, 1980, but this success was temporary; the device came unlatched and smashed into the packoff a few days later. After three attempts to re-set the device, the last deep-set SSSV installed in well SS-25 was pulled in January 28, 1980, and was not replaced.

   The subsurface safety devices installed in SS-25 were "deep-set" and were located more than 8,000 feet below the surface. The documents reflect that SoCalGas experienced operability issues with subsurface safety valves, including in SS-25. SoCalGas made numerous attempts to install, replace or repair subsurface safety devices in SS-25. Available documents indicate that no further subsurface safety valves were installed in SS-25 after SoCalGas attempted to install a

Camco 2 $^{1}/_{2}$ PC-4 subsurface safety valve on January 28, 1980. Please see enclosed electronic documents with Bates range AC_CPUC_0000058 through AC_CPUC_0000061, and AC_CPUC_0000603 through AC_CPUC_0000607. That valve did not test successfully and was removed the same day. As indicated above, the housing of the prior subsurface safety device is still located at the bottom of the well. Certain diagrams which have been provided to regulatory agencies contain a reference to a "SSSV."

The documents provided to DOGGR in connection with the Data Request reflect the following information:

- On November 27, 1973, SoCalGas installed an Otis 'J' Type SSSV in SS25 and removed on March 7, 1975. Please see previously provided electronic documents with Bates Range AC_CPUC_0000664 and AC_CPUC_0000666.

- Between June 25 and July 9, 1976, SoCalGas performed a workover on SS-25. On or about July 7, 1976, the 2 7/8" tubing was installed with a deep-set Camco SC-1 Annular Flow Safety System. Please see enclosed electronic documents with Bates range AC_CPUC_0000024 and AC_CPUC_0000029 through AC_CPUC_0000033.

- Installed a wireline retrievable deep-set Camco SSSV on June 28, 1977 and removed on June 30, 1977. Please see previously provided electronic documents with Bates Range AC_CPUC_0000650 – AC_CPUC_0000652.

- Installed wireline retrievable deep-set Camco SSSV on June 30, 1977 and removed on February 2, 1978. Please see previously provided electronic documents with Bates Range AC_CPUC_0000650 and AC_CPUC_0000642- AC_CPUC_0000647.

- Installed a wireline retrievable deep-set Camco SSSV on February 3, 1978 and removed on August 11, 1978. Please see previously provided electronic documents with Bates Range AC_CPUC_0000642 and AC_CPUC_0000639. Please see enclosed electronic documents with Bates range AC_CPUC_0000642 through AC CPUC 0000644.

- On or about September 13, 1978, Camco repaired a 2 $^{1}/_{2}$" Camco PC-4 in SS-25. Please see enclosed electronic documents with Bates range AC_CPUC_0000636 through AC_CPUC_0000637.

- Installed a wireline retrievable deep-set Camco SSSV on November 9, 1978 and removed on December 13, 1978. Please see previously provided electronic documents with Bates Range AC_CPUC_0000632, Bates Range AC_CPUC_0000633 and AC_CPUC_0000635.

- Installed wireline retrievable deep-set Camco SSSV on December 14, 1978 and removed on December 21, 1978. Please see previously provided electronic documents with Bates Range AC_CPUC_0000625, AC_CPUC_0000628 and AC_CPUC_0000631.

- Between December 12 and December 21, 1978, SoCalGas made several attempts to repair the 2 $^{1}/_{2}$" Camco SSSV because the SSSV had come "unlatched" and "smashed into the packoff" above. The repairs and attempts to set a new SSSV were unsuccessful, the SSSV was removed and a valve body was installed across the control line ports. Please see enclosed electronic documents with Bates range AC_CPUC_0000070, AC_CPUC_0000072 through AC_CPUC_0000073 and AC_CPUC_0000624 through AC_CPUC_0000633.

- Between February 16 and February 20, 1979, the completion tubing string was removed and reinstalled with a 2 7/8" tubing that included a Camco 2 7/8" SC-1 annular flow safety system at approximately 8,455 feet. Please see enclosed electronic documents with Bates range AC_CPUC_0000043, AC_CPUC_0000058 through AC_CPUC_0000061, AC_CPUC_0000116 through AC_CPUC_0000122, and AC_CPUC_0000132.

- On or about January 4, 1980, there was an unsuccessful attempt to run and set a Camco 2 $^{1}/_{2}$" PC-4 safety valve in SS-25 and the safety valve was pulled. Please see enclosed electronic documents with Bates range AC_CPUC_0000058 through AC_CPUC_0000061 and AC CPUC 0000613.

- Between January 7 and January 10, 1980, additional attempts were made to install a safety valve. After an unsuccessful attempt to set a SSSV on January 7, Camco installed a 2 $^{1}/_{2}$" Camco PC-4 SSSV at approximately 8443 feet on January 8. SoCalGas successfully tested the SSSV on January 10, 1980. Please see enclosed electronic documents with Bates range AC_CPUC_0000058 through AC_CPUC_0000061 and AC_CPUC_0000609 through AC_CPUC_0000612.

- Between January 21 and January 28, 1980, there were several attempts made to replace a safety valve that had come out of the nipple and hit the packoff. SoCalGas made three attempts to set SSSVs, but none tested successfully. Due to the foregoing reasons, the last SSSV was pulled on January 28. Please see enclosed electronic documents with Bates range AC_CPUC_0000058 through AC_CPUC_0000061, and AC_CPUC_0000603 through AC_CPUC_0000607.

SoCalGas' responses in 5a above are based on documents referred to in each bullet and which are submitted to DOGGR and the CPUC in connection with this Data Request. For the file containing work done on SS-25, please see enclosed electronic documents with Bates range AC_CPUC_0000023 through AC-CPUC_0000759. SoCalGas notes that certain documents refer to a "safety valve" or a "SSSV" without specifying whether the valve is an annular gas flow safety system or a tubing flow safety valve. SoCalGas has described all subsurface safety systems in these bullets above as they are referenced in the underlying documents.

b. Unknown. SoCalGas has reviewed its records and has not identified documentation stating the reasons for the installation of SSSV in SS-25 in the late 1970s.

c. This information is not available. SoCalGas has not been able to locate manufacturer's specification documents or design sheets relating to SSSVs for SS-25. As stated above, SoCalGas' document review is ongoing.

d. Below is a description of the maintenance history and issues of SSSVs on SS-25:

- June 28, 1977 – December 21, 1978: Wireline Activity. Please see enclosed electronic documents with Bates range AC_CPUC_0000631 - AC_CPUC_0000633. Please see previously provided electronic documents with Bates Range AC_CPUC_0000625-AC_CPUC_0000652.
  - June 28, 1977 - June 30, 1977: For a description of maintenance issues, please see previously provided electronic documents with Bates Range AC_CPUC_0000650- AC_CPUC_0000652.
  - June 30, 1977 – February 2, 1978: Please see previously provided electronic documents with Bates Range AC_CPUC_0000642- AC_CPUC_0000650.
  - February 3, 1978 – August 11, 1978: For a description of maintenance issues, please see previously provided electronic documents with Bates Range AC_CPUC_0000639 - AC_CPUC_0000642.
  - November 9, 1978 – December 13, 1978: For a description of maintenance issues, please see previously provided electronic documents with Bates Range AC_CPUC_0000632- AC_CPUC_0000635.
  - December 14, 1978 – December 21, 1978: For a description of maintenance issues, please see previously provided electronic documents with Bates Range AC_CPUC_0000625 - AC_CPUC_0000631.
- February 16-20, 1979: Workover Rig Activity. Please see enclosed electronic documents with Bates range AC_CPUC_0000031 through AC_CPUC_0000033; AC_CPUC_0000121 through AC_CPUC_0000122; AC_CPUC_0000083; and AC_CPUC_0000132.
  - Removed completion string containing Camco SC-1 safety system.
  - Installed replacement completion string containing Camco SC-1 safety system.
- January 8-28, 1980: Wireline Activity. Please see enclosed electronic documents with Bates range AC_CPUC_0000603 through AC_CPUC_0000611. Please see previously provided electronic documents with Bates Range AC_CPUC_0000603-611.
  - January 8, 1980 – January 23, 1980: For a description of maintenance issues, please see previously provided electronic documents with Bates Range AC_CPUC_0000606 - AC_CPUC_0000611.
  - January 24, 1980 – January 25, 1980: For a description of maintenance issues, please see previously provided electronic documents with Bates Range AC_CPUC_0000604 - AC_CPUC_0000606.

- January 28, 1980: For a description of maintenance issues, please see previously provided electronic documents with Bates Range AC_CPUC_0000603.

As set forth above in response to Question 5.a., SoCalGas experienced operability issues with the SSSVs in SS-25.

e. Not applicable. Please see enclosed electronic documents with Bates numbers AC CPUC 0000073 and AC CPUC 0000134.

B. Abnormal Conditions Data – "Standard Sesnon" 25 (SS-25) (API 037-00776)

Question 1:
A narrative identifying, describing and analyzing any problems encountered during operational history of the well.

Response 1:
SoCalGas interprets Question 1 as a request to identify, describe and analyze problems occurring below the wellhead of SS-25. The operational history of SS-25 below the wellhead is reflected in the Response to A1, including the enclosed electronic documents with Bates range AC_CPUC_0000056 - AC_CPUC_0000061; AC_CPUC_0000102.
SoCalGas has identified problems with the SSSV systems from 1975-1980, which are discussed in the Response A.4 and A.5

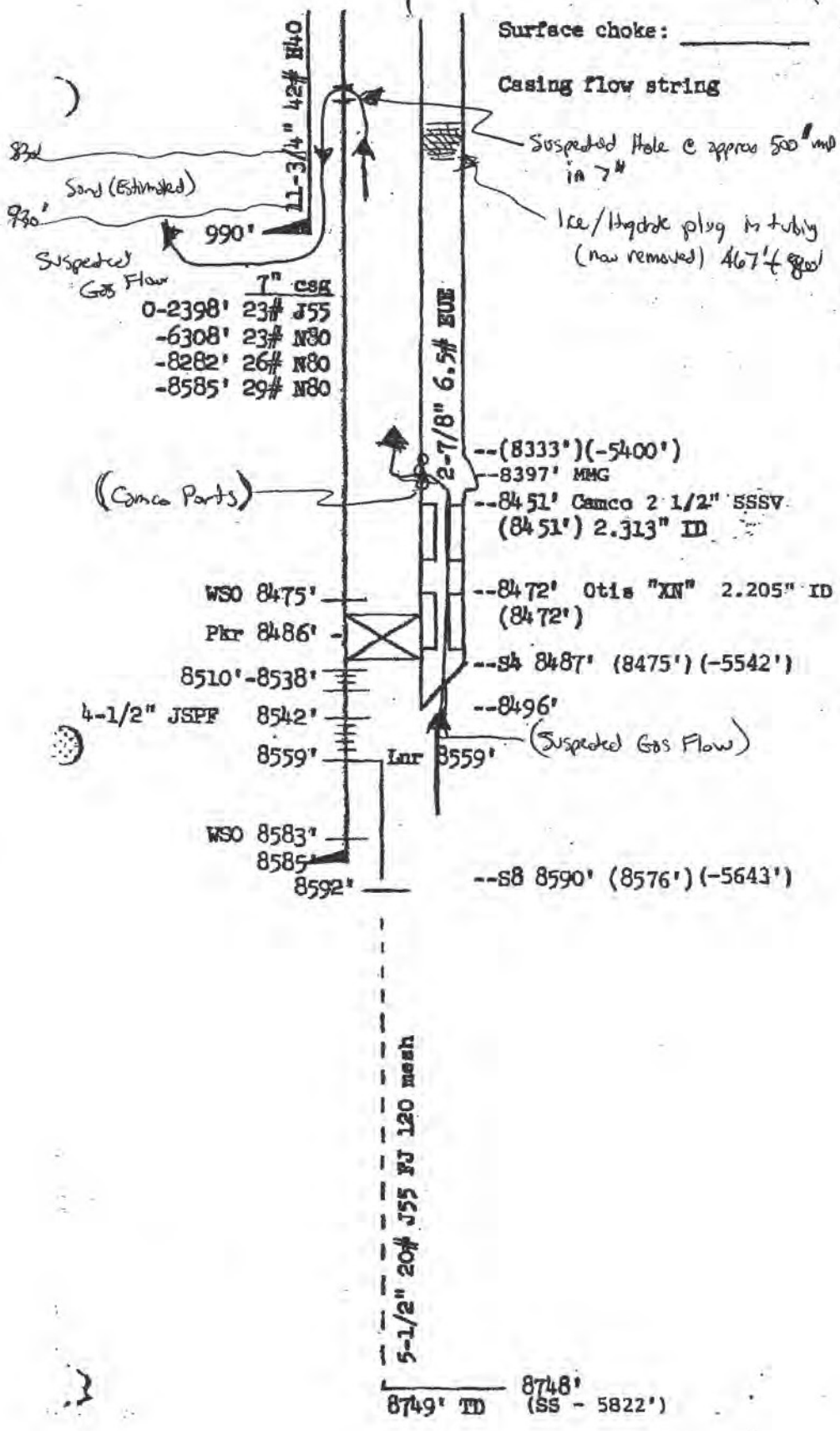
SS-25 has performed testing during the operational history of SS-25 to identify problems, including: (1) annual temperature to identify anomalies which could indicate the presence of a leak; (2) weekly pressure measurements of tubing, casing, and surface casing annuli; (3) periodic sand tests to test for erosion in the surface lateral piping and (4) periodic noise logs to further investigate anomalies from temperature surveys. These test results are provided in Responses to question D and electronic documents with Bates range AC_CPUC_0006726; AC_CPUC_0006735; ; AC_CPUC_0006746; and AC_CPUC_0006753.

EXHIBIT 12

ESTIMATED WELL CONDITIONS (As of 11-10-15)

Elevation: 2927" G.L.
DF: 6'

Standard Sesnon 25



10/1/53 - Well spud
2/25/54 - Well completed 893' of 4-1/2" drill pipe + Johnston tester side tracked - old TD 4948' plugged back 3860'
5/24/73 - 6/6/73 Cleaned out to 8748', pressure tested csg, perforated for conversion to gas storage, ran tbg with gas lift valves.
6/25/76 - 7/9/76 Cleaned out to 8748', ran tbg with SSSV
2/16/79-2/20/79 Replaced safety system

NOTE: Unable to use lower nipple - use M-lock for SSSV nipple. See wire-line tickets.

WELL VOLUME

	Cu.Ft.	Bbl.
Tubing	276	49
Csg/Lnr.	37	7
Annulus	1469	262

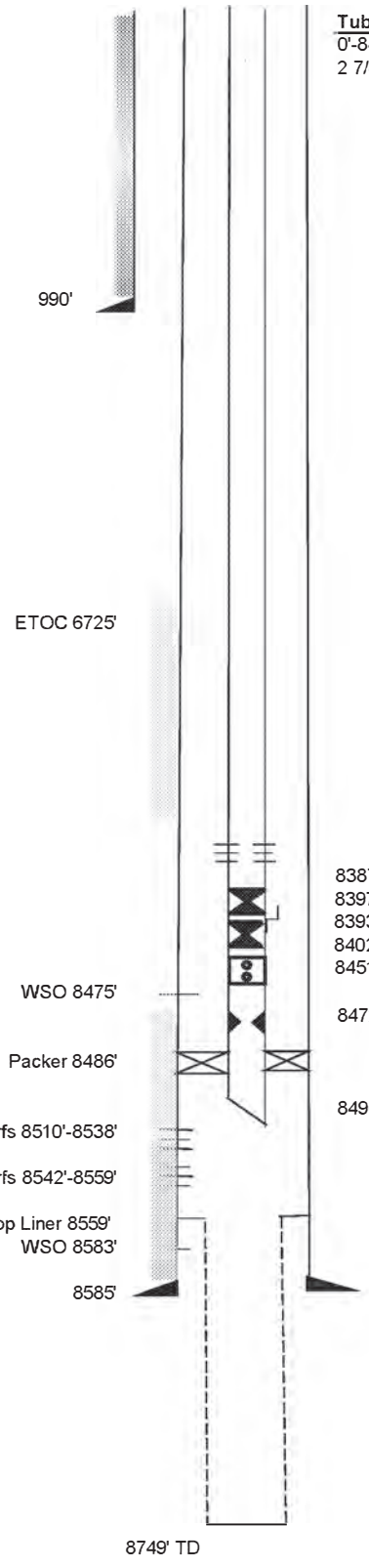
6-16-86

EXHIBIT 13

Surface Casing:
0'-990', 11 3/4"
42#, H40

Casing:
0'-8585'
7" OD
0-2398' 23# J55
2398'-6308' 23# N80
6308'-8282' 26# N80
8282'-8585' 29#N80

Liner:
8559'-8749'
5-1/2"
20#, J55, 120 Mesh



Tubing:
0'-8496'
2 7/8" OD 6.5# EUE

8387'-8391' Tubing Perfs
8397' GLM MMG
8393' EZSV Plug
8402' EZSV Plug
8451' Camco 2 1/2" SSSV 2.313" ID

8472' Otis "XN" 2.205" ID

8496' Tbg tail

Operator: Southern California Gas Company
Field: Aliso Canyon
Well: Standard Sesnon 25
KB: 6'
Elevation 2927' GL

EXHIBIT 14

Southern California Gas Company
Standard Sesnon 25

Completion Profiler

Completion Profile Analysis

Company	*Southern California Gas Company*
Well Name	*Standard Sesnon 25*
Field	*Aliso Canyon*
Location	*Los Angeles County, California*
Customer Name	*Hilary Petrizzo*
Date of Survey	*November 8, 2015*
Date of Analysis	*November 12, 2015*
Logging Engineer	*Rick Kent*
Analyst	*Derrick George*

Table of Contents

Survey Objectives

- Identify casing and tubing breaches

Logging Procedures

Date	Time	Comment
11/08	N/A	Arrive on location
11/08	N/A	Gauge run start
11/08	N/A	Gauge run stop
11/08	10:44	Program Completion Profile String
11/08	11:31	Start GIH pass
11/08	11:31	Stop GIH pass
11/08	11:31	Start logging passes
11/08	15:37	Stop logging passes
11/08	14:22	Start out of well pass
11/08	15:37	Stop out of well pass
11/08	15:50	Start download
11/08	16:22	Stop download
11/08	17:00	Rig down

Interval Logged: [From Surface to 8,436 ft.]
50 ft/min
100 ft/min

Well Information

Surf Casing:	11.750"	42.0 lb/ft	surface to 990 ft
Casing:	7.000"	23.0 lb/ft	surface to 2,398 ft
Casing:	7.000"	23.0 lb/ft	2,398 ft to 6,308 ft
Casing:	7.000"	26.0 lb/ft	6,308 ft to 8,282 ft
Casing:	7.000"	29.0 lb/ft	8,282 ft to 8,585 ft
Liner:	5.500"	20.0 lb/ft	8,559 ft to 8,749 ft PBTD: 8,749 ft
Tubing:	2.875"	6.5 lb/ft	surface to 8,496 ft

** Camco SSSV at 8451' (2.313" ID), Otis "XN" nipple at 8472' (2.205"), EOT at ~8496' (Packer depth). Tubing string installed 7/9/76. 6/673 – well was converted to gas storage well.

Perforations: 8,475 ft (S2 Sand)

8,510 ft - 8,538 ft; 8,538 ft - 8,542 ft; 8,542 ft - 8,559 ft (S6 Sand)

8,583 ft (S6 Sand)

Tool String

The 1 11/16" Completion Profiler string comprised the following sensors:

Battery housing; RS-232/CCL; Memory/CPU; Gamma Ray; Pressure/Temperature Combo; Induction Collar Locator; Fluid Density; Fluid Dielectric; Spinner Flowmeter.

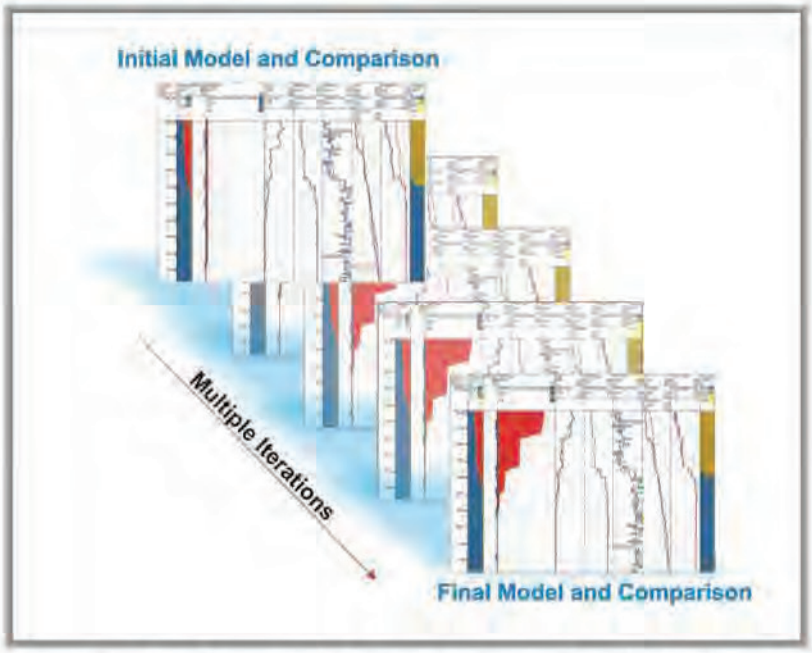
Observations:

1. The log data indicates the following observations and gas flow path evaluation:
   - There is no gas flow inside the tubing down to ~8435'
   - Temperature profile appears to be a normal flowing response with the source below log depth and assumed to be from the gas storage zone.
   - At ~8435' the spinner appears to indicate flow up through the tubing and exiting to the annulus (tubing x prod casing).
   - A cooling anomaly appears to detect a leak through the surface casing at ~890' (depth confirmed with both down and up log pass temperatures). The reported bottom of the surface casing is at 990'. The temperature is ~26.9 degF (down pass) at this depth and continues to cool up to a warming anomaly that changes from ~365' during the down pass and ~65' during the up pass. This change in depth may indicate the gas flow path has changed between the passes. The warming interval would likely indicate that the gas flow has moved away from the near-wellbore zone and beyond the ability for the temperature sensor inside the tubing to detect cooling caused by the gas flow.
   - Summary: gas flow appears to be flowing up the tubing and exiting through a tubing failure at ~8435'. Gas flows up the tubing x production casing annulus until it exits through the surface casing at ~890'. Gas flow up the surface casing annulus and moves away for the near-wellbore region at changing depths based on the temperature warm-back response. Note: An ice plug was drilled out with coiled tubing just prior to this log run. The ice plug was reported around ~450', which is in the maximum cooling zone.

2. Other secondary observations:
   - The log run covered from surface to ~8440'.
   - The log was depth correlated to a supplied gamma ray which only cover a short interval of the bottom of the log. The depth correlation up around the surface leak area could be off depth but should be relatively close. If a complete pipe record was available additional depth correlation checks could be conducted.
   - The spinner kicks to a very high rps level as the tool sat down during the down logging pass. The target depth was a little deeper (just short of a previous coiled tubing cleanout run). Upon retrieving the spinner at surface the impeller was observed to have been exposed to an extreme flow rate or velocity that was above the design limits of the spinner. It is very likely that the logging string reached the gas flow inside the tubing at the tubing failure location at ~8435'. The up log pass indicated no spinner activity. The damage could not have been caused by just hitting something in the tubing because the tool was moving at only 60 ft/min line speed. A subsequent tubing plug run set a plug just above the top pup joint above the Camco SSSV. A setting depth was not reported but is estimated to be around 8380'. The plug run confirms no gas flow inside the tubing down to the plug setting depth and of course the plug did not shut off the gas flow to surface.
   - The differential pressure curve averaged ~0.01 bar/m. This calculates to ~0.044 psi/ft pressure gradient. This, in turn calculates to ~0.1g/cc fluid density.
   - The BHP recorded ranged from ~1600 psi to 2050 psi.

Brief Description of Process

The analysis is performed using a global stochastic optimization technique.
In this technique an initial flow model is estimated. Then from this model the theoretical log responses are derived. The theoretical responses are compared to all available data and the model is adjusted until the best possible match of the theoretical and actual data is obtained.



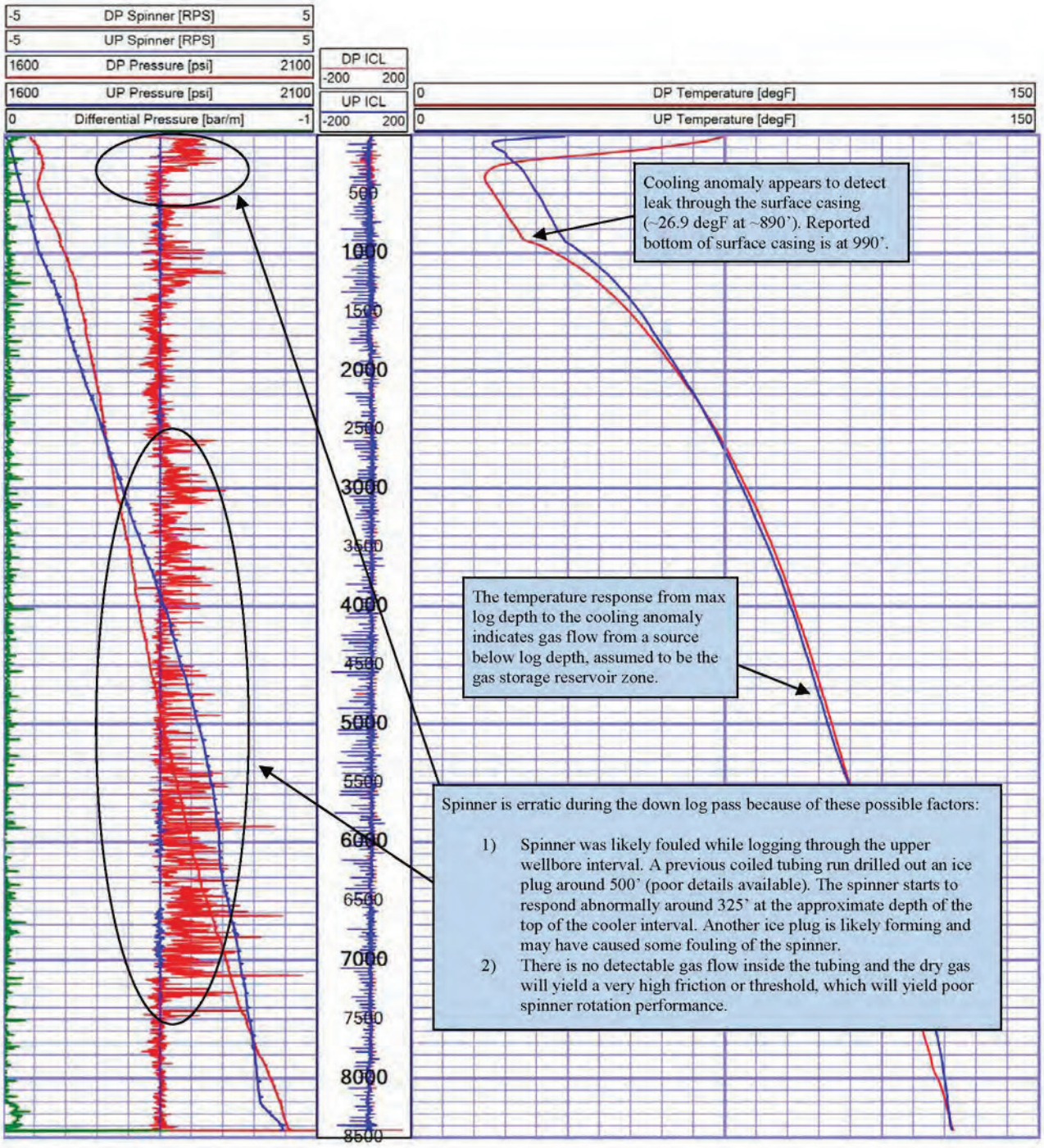
A comparison between the model responses and the recorded data is shown in this report. Good correlation between the theoretical and log data curves indicates that the flow model is in agreement with the log data and the actual well production profile. Discrepancies between the theoretical and raw data curves can be due to tool deficiencies, conflicts between the parameters or conditions that make the underlying empirical models (such as flow regimes) less applicable.

- The flow regimes were determined, directly from the flow rates and holdups, according to the Dukler-Taitel analytic model.
- The profile factors, to calculate the average effective fluid velocity from the apparent velocity, were based on the Reynolds number, calculated from the phase velocities and phase properties.
- Where gas was present the density, heat capacity and Joule-Thompson coefficients were derived from the Lee Kesler Pitzer equation of states.
- Solution gas in oil was derived from the Vasquez and Beggs or Ostein Glas0 correlation.

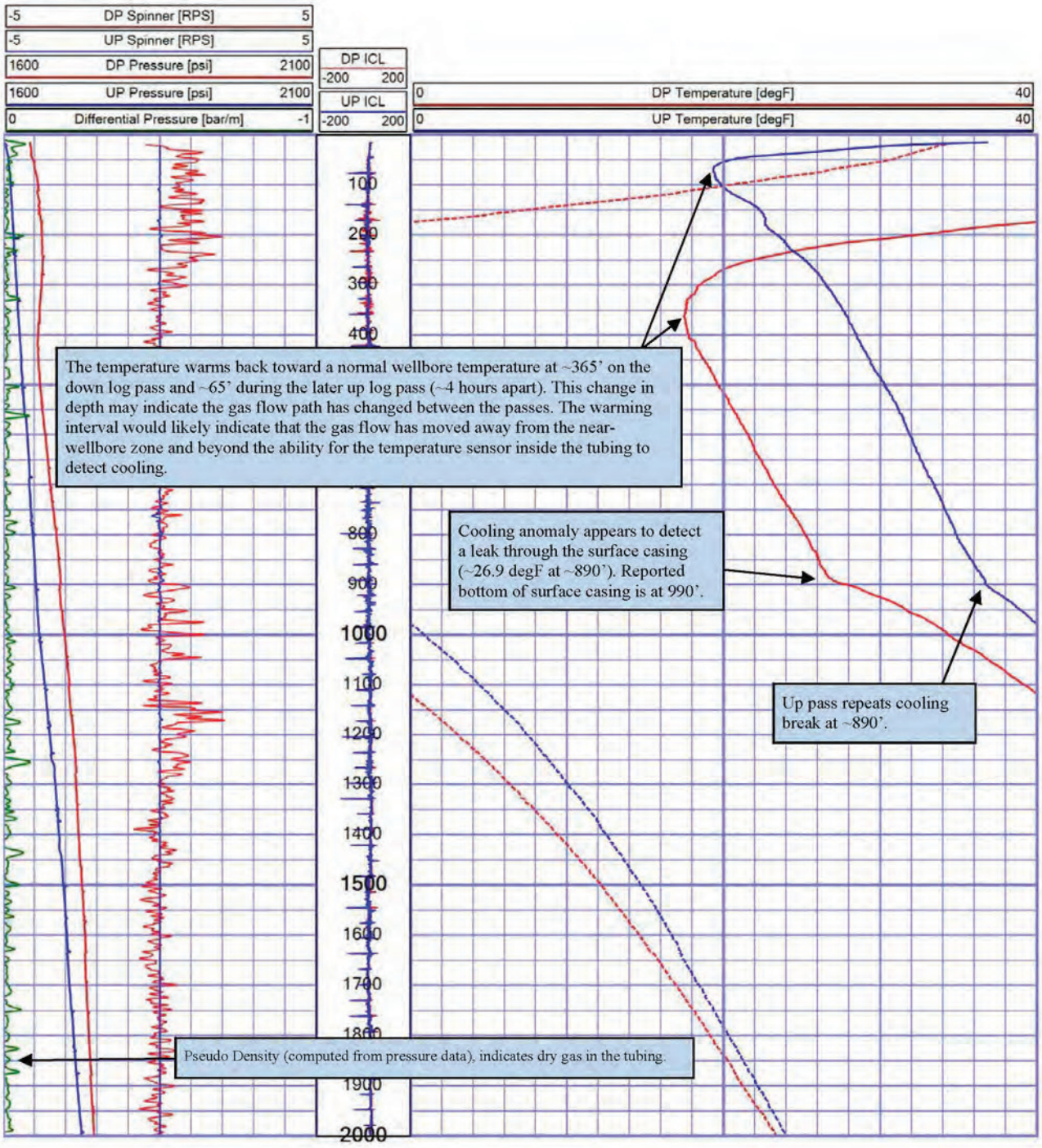
The analysis was performed in five steps:

- The data preparation to filter the data, compute gradients and error estimates.
- The flow meter analysis to compute the apparent velocity.
- The profile determination to identify the potential producing and/or injecting zones.
- The computation of the flow rates (model) by global optimization.
- The computation of surface production rates and reporting

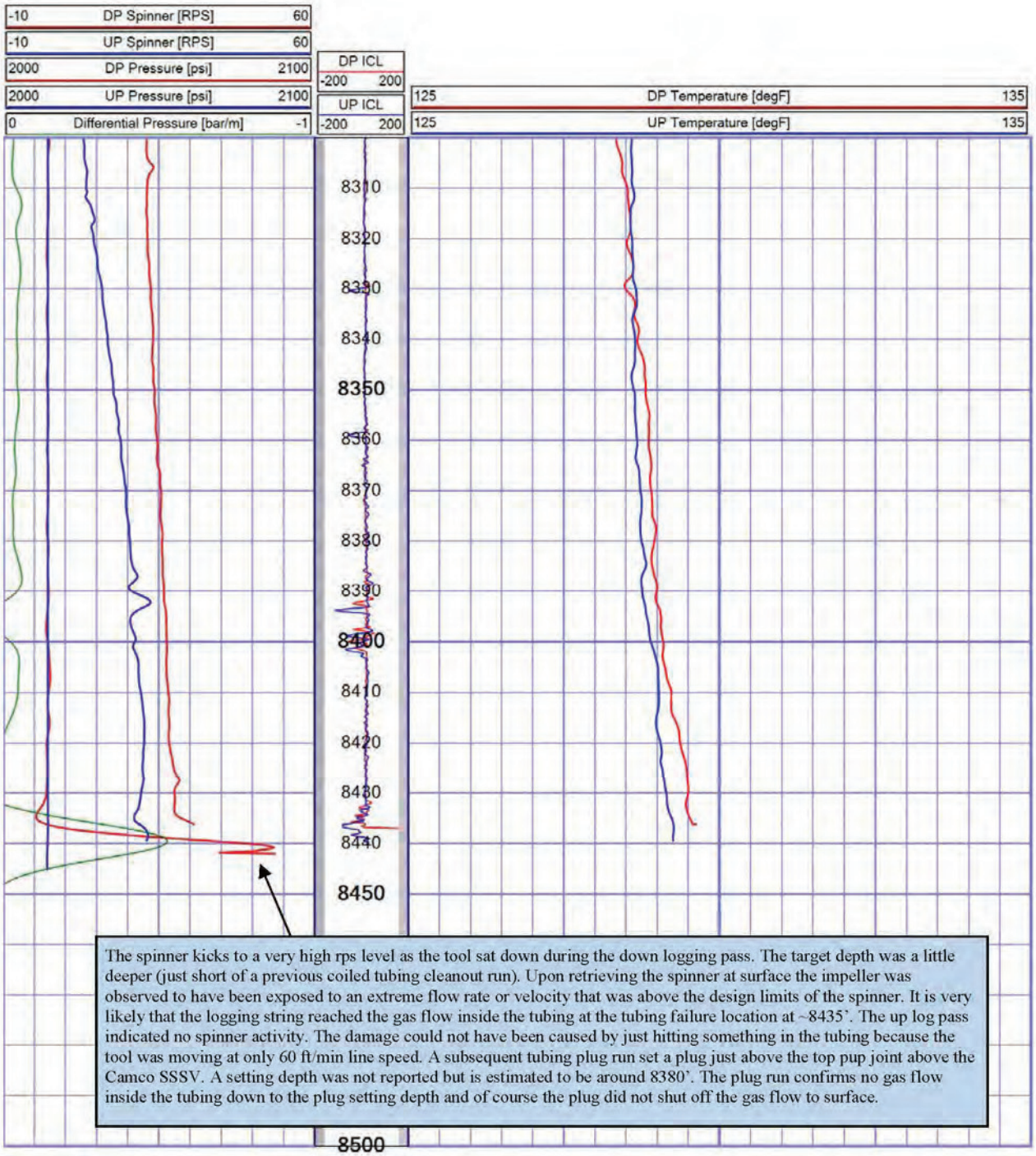
Temperature Profile
0' - 8436'



Temperature Profile
0' - 2000'



Temperature Profile
8,300' - 8,500'



The spinner kicks to a very high rps level as the tool sat down during the down logging pass. The target depth was a little deeper (just short of a previous coiled tubing cleanout run). Upon retrieving the spinner at surface the impeller was observed to have been exposed to an extreme flow rate or velocity that was above the design limits of the spinner. It is very likely that the logging string reached the gas flow inside the tubing at the tubing failure location at ~8435'. The up log pass indicated no spinner activity. The damage could not have been caused by just hitting something in the tubing because the tool was moving at only 60 ft/min line speed. A subsequent tubing plug run set a plug just above the top pup joint above the Camco SSSV. A setting depth was not reported but is estimated to be around 8380'. The plug run confirms no gas flow inside the tubing down to the plug setting depth and of course the plug did not shut off the gas flow to surface.

Definitions

Curve Name	Description
Holdup	Holdups
PerfCount	Perforations
QGas	Total Gas Production at surface conditions
QpGas	Incremental Gas Production at surface conditions
QOil	Total Oil Production (if present downhole) at surface conditions
QpOil	Incremental Oil Production (if present downhole) at surface conditions
QWater	Total Water Production at surface conditions
QpWater	Incremental Water Production at surface conditions
GR	Gamma Ray/SpectraScan
Twf	Average Temperature
Vap	Apparent Velocity
Vap-Theo	Theoretical Apparent Velocity
Tgeotherm	Geothermal Gradient
RhoFluid	Average Fluid Density
Pwf	Average Pressure
HydroFrq	Average Fluid Dielectric
Flowrate	Total Flowrate at downhole conditions
Vap	Apparent Velocity
Vap-Theo	Theoretical Apparent Velocity
RhoFluid	Average Fluid Density
RhoFluid-Theo	Theoretical Average Fluid Density
DPwfDz	Differential Pressure
DPwfDz-Theo	Theoretical Differential Pressure
Twf	Average Temperature
Twf-Theo	Theoretical Average Temperature
Tgeotherm	Geothermal Gradient
DTwfDz	Differential Temperature
DTwfDz-Theo	Theoretical Differential Temperature
Regime	Flow Regimes
Temperature	Temperature Passes
Density	Fluid Density Passes
Spinner	Spinner Passes
Pressure	Pressure Passes
Linespeed	Linespeed Passes
Slope	Spinner Slope
Vthr	Spinner Threshold
SpinnerFlt	Spinner
DPipe	Inside diameter of the casing/tubing across logged interval
PipeAngle	Average pipe angle across logged interval
APIOil	Degree API of the oil
SPGG	Specific Gravity of the gas
TgeoRef	Reference Temperature for Geothermal Gradient calculations
DgeoRef	Reference Depth for Geothermal Gradient calculations
Goetherm	Geothermal Gradient across logged interval

Completion Profile Analysis

Tool Specifications

O.D.	1-11/16 in. (42.86 mm)
Length	11.9 ft.(3.63 m) in combination 23.28 ft. (7.1 m) stand alone
Pressure Rating	15,000 psi (103421.4 Kpa)
Temperature Rating	350°F (177°C)

Flow Measurement

Measurement of fluid velocity is made using the *Spinner Flowmeter*. This is calibrated by making logging passes at different line speeds to establish the relationship between instrument velocity in feet/minute and the spinner response in revolutions/second (RPS). With this relationship the measured RPS can be converted to fluid velocity in ft/minute. With a known pipe I. D. this can be used to calculate the flow rate in BPD.

$Q_{BPD} = ft/min \times 1.4 \times I.D.^2$

Mass flow rate can be computed using the *Temperature* data. This is based on an enthalpy model, taking into consideration; kinetic energy, frictional and Joule-Thompson heating as well as conduction and convection into the formation.

In gas wells the volumetric fraction of liquids (water) can be very small. Therefore water production may not be quantifiable by velocity measurement alone. Because of water's high mass relative to gas, mass flowrate computed from the *Temperature* data can be better at quantifying the water production.

Holdup Measurement

Holdup (γ) - The fraction of each phase in the wellbore (Water, Oil, Gas fraction) This should not be confused with Cut. i.e. 100% water holdup exists in the static rathole but does not flow.

The *Fluid Density* instrument uses a small gamma ray source and a gamma ray detector to measure the density of the wellbore fluid mixture. The mixture density is used to calculate the holdup fraction.

$\gamma water = (\rho mixture - \rho gas) / (\rho water - \rho gas)$

[For two-phase gas-water production]

ρ: density (gm/cc)

The *Fluid Dielectric* instrument works like an electric capacitor. The capacitor plates are exposed to the wellbore fluids and are a fixed size and distance apart. The value of the capacitance will change as the dielectric of the fluids between the plates change. The instrument response is then used to calculate the hydrocarbon and water fractions. This is possible because of the unique dielectric constant of water, oil and gas.
Water = 78, Oil = 4 and Gas = 1

The *Pressure* data can also be used to corroborate the fluid holdup measurements. This is done by measuring the pressure gradient or the derivative of the pressure curve with respect to depth. The resulting curve in psi/ft can be used to determine the water and gas fractions.

Note:
In three phase flow both fluid density and dielectric measurements are necessary. The dielectric is used to determine the water holdup then the density is used to calculate the remaining gas and oil holdups.

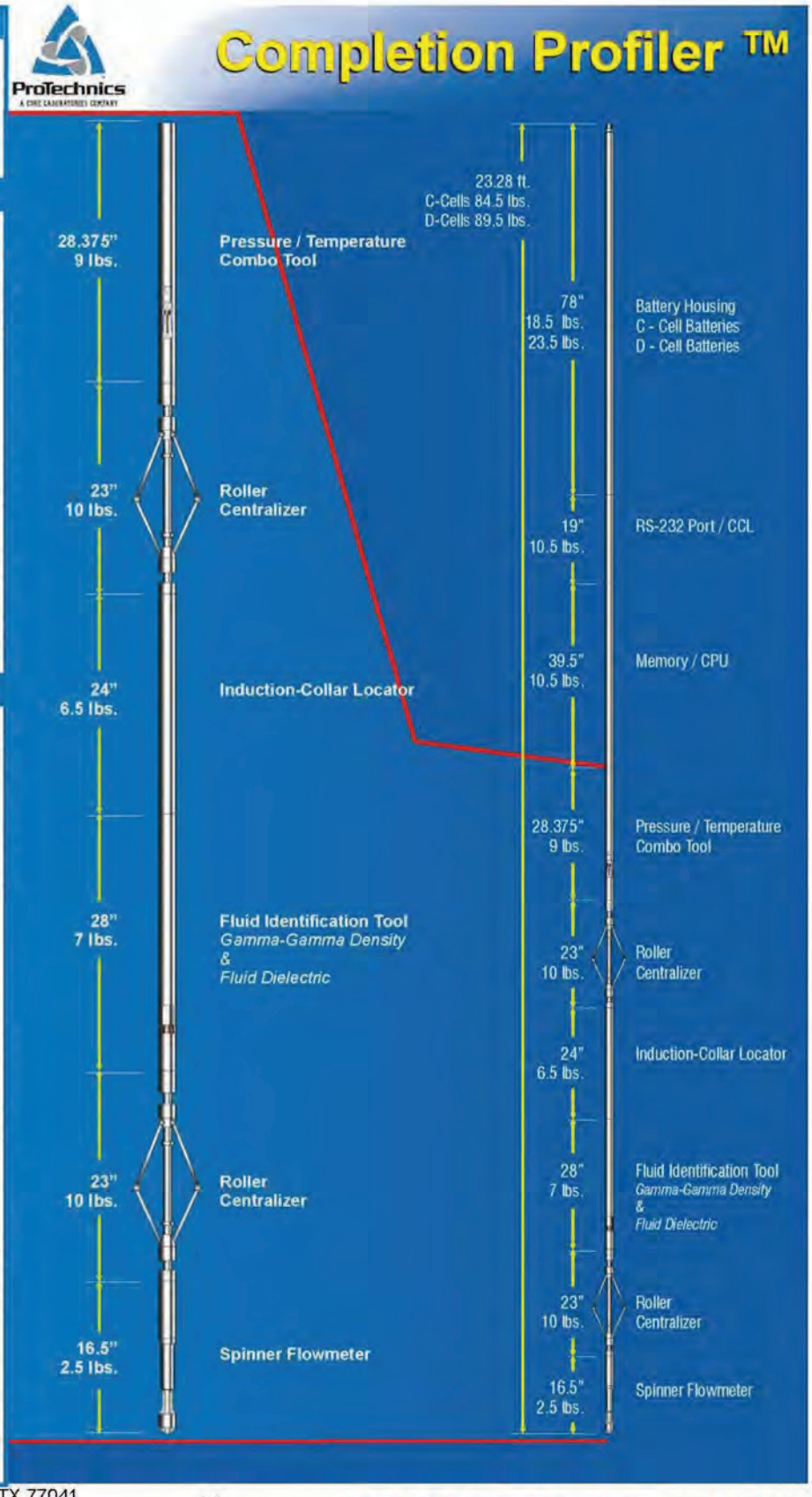


EXHIBIT 15

ORDER INSTITUTING INVESTIGATION ON THE COMMISSION'S OWN MOTION INTO THE OPERATIONS AND PRACTICES OF SOUTHERN CALIFORNIA GAS COMPANY WITH RESPECT TO THE ALISO CANYON STORAGE FACILITY AND THE RELEASE OF NATURAL GAS, AND ORDER TO SHOW CAUSE WHY SOUTHERN CALIFORNIA GAS COMPANY SHOULD NOT BE SANCTIONED FOR ALLOWING THE UNCONTROLLED RELEASE OF NATURAL GAS FROM ITS ALISO CANYON STORAGE FACILITY (I.19-06-016)

SOUTHERN CALIFORNIA GAS COMPANY

DATA REQUEST SED-SCG-81 DATED APRIL 17, 2020

SOCALGAS RESPONSE DATED MAY 8, 2020

SoCalGas provides the following Responses to the Safety and Enforcement Division (SED) data request dated April 17, 2020 in I.19-06-016. The Responses are based upon the best available, nonprivileged information that SoCalGas was able to locate through a diligent search within the time allotted to respond to this request, and within SoCalGas' possession, custody, or control. SoCalGas' responses do not include information collected or modeled by Blade Energy Partners' during its Root Cause Analysis Investigation. SoCalGas reserves the right to supplement, amend or correct the Responses to the extent that it discovers additional responsive information.

SoCalGas objects to the instructions submitted by SED and to the continuing and indefinite nature of this request on the grounds that they are overbroad and unduly burdensome. Special interrogatory instructions of this nature and continuing interrogatories are expressly prohibited by California Code of Civil Procedure Section 2030.060(d) and 030.060(g), respectively. SoCalGas will provide responsive documents in existence at the time of its response. Should SED seek to update its request, SoCalGas will respond to such a request as a new data request in the future.

SoCalGas submits these Responses, while generally objecting to any Request that fails to provide a defined time period to which SoCalGas may tailor its Response, and to the extent that any Request is overly broad, vague, ambiguous, unduly burdensome, assumes facts, or otherwise fails to describe with reasonable particularity the information sought. SoCalGas further submits these Responses without conceding the relevance of the subject matter of any Request or Response. SoCalGas reserves the right to object to use of these Responses, or information contained therein, in any dispute, matter or legal proceeding. Finally, at the time of this Response, there are no pending oral data requests from SED to SoCalGas.

Please refer to the attached document when answering the questions in this data request. For identification in this data request, the first page of the document has the words "Southern California Gas Company Standard Sesnon 25 Completion Profiler", and the Bates numbers on the document range from AC_BLD_0076009 to AC_BLD_0076020. The file name of the document is "AC_BLD_0076009.Core.Labs.Logs". With this document in mind, please answer the following:

ORDER INSTITUTING INVESTIGATION ON THE COMMISSION'S OWN MOTION INTO THE OPERATIONS AND PRACTICES OF SOUTHERN CALIFORNIA GAS COMPANY WITH RESPECT TO THE ALISO CANYON STORAGE FACILITY AND THE RELEASE OF NATURAL GAS, AND ORDER TO SHOW CAUSE WHY SOUTHERN CALIFORNIA GAS COMPANY SHOULD NOT BE SANCTIONED FOR ALLOWING THE UNCONTROLLED RELEASE OF NATURAL GAS FROM ITS ALISO CANYON STORAGE FACILITY (I.19-06-016)

SOUTHERN CALIFORNIA GAS COMPANY

DATA REQUEST SED-SCG-81 DATED APRIL 17, 2020

SOCALGAS RESPONSE DATED MAY 8, 2020

QUESTION 1:

Name all entities, including but not limited to Core Labs, who were responsible for the preparation of this document.

RESPONSE 1:

SoCalGas objects to this request to the extent it seeks information that is beyond the scope of this proceeding as determined by the Assigned Commissioner's Scoping Memo and Ruling dated September 26, 2019. SoCalGas further objects to this request as vague and ambiguous, particularly with respect to the phrase "responsible for the preparation of this document." Subject to and without waiving the foregoing objections, SoCalGas responds as follows. The "Southern California Gas Company Standard Sesnon 25 Completion Profiler" document with Bates range AC_BLD_0076009 to AC_BLD_0076020, was issued by ProTechnics, a division of Core Laboratories.

QUESTION 2:

Name all individuals responsible for preparing this document.

RESPONSE 2:

SoCalGas objects to this request to the extent it seeks information that is beyond the scope of this proceeding as determined by the Assigned Commissioner's Scoping Memo and Ruling dated September 26, 2019. SoCalGas further objects to this request as vague and ambiguous, particularly with respect to the phrase "responsible for preparing this document." Subject to and without waiving the foregoing objections, SoCalGas responds as follows. The "Southern California Gas Company Standard Sesnon 25 Completion Profiler" document with Bates range AC_BLD_0076009 to AC_BLD_0076020, was issued by ProTechnics, a division of Core Laboratories. Based on a review of SoCalGas' records, the following individuals from ProTechnics were identified in connection with this effort: Derek Key, Rick Kent, and Derrick George.

QUESTION 3:

Provide the titles of each individual named in response to question 2.

ORDER INSTITUTING INVESTIGATION ON THE COMMISSION'S OWN MOTION INTO THE OPERATIONS AND PRACTICES OF SOUTHERN CALIFORNIA GAS COMPANY WITH RESPECT TO THE ALISO CANYON STORAGE FACILITY AND THE RELEASE OF NATURAL GAS, AND ORDER TO SHOW CAUSE WHY SOUTHERN CALIFORNIA GAS COMPANY SHOULD NOT BE SANCTIONED FOR ALLOWING THE UNCONTROLLED RELEASE OF NATURAL GAS FROM ITS ALISO CANYON STORAGE FACILITY (I.19-06-016)

SOUTHERN CALIFORNIA GAS COMPANY

DATA REQUEST SED-SCG-81 DATED APRIL 17, 2020

SOCALGAS RESPONSE DATED MAY 8, 2020

RESPONSE 3:

SoCalGas objects to this request to the extent it seeks information that is beyond the scope of this proceeding as determined by the Assigned Commissioner's Scoping Memo and Ruling dated September 26, 2019. SoCalGas further objects to this request as overly broad and unduly burdensome to the extent it does not specify a timeframe to which SoCalGas may tailor its response. Subject to and without waiving the foregoing objections, SoCalGas responds as follows. SoCalGas interprets this request to ask the titles of the individuals listed in Response 2, in November 2015, with respect to their work related to the "Southern California Gas Company Standard Sesnon 25 Completion Profiler" document with Bates range AC_BLD_0076009 to AC_BLD_0076020. Rick Kent – Logging Engineer; Derrick George – Analyst; Derek Key – Account Manager.

QUESTION 4:

Articulate the responsibilities of each individual named in response to question 2.

RESPONSE 4:

SoCalGas objects to this request to the extent it seeks information that is beyond the scope of this proceeding as determined by the Assigned Commissioner's Scoping Memo and Ruling dated September 26, 2019. SoCalGas further objects to this request as overly broad and unduly burdensome to the extent it does not specify a timeframe to which SoCalGas may tailor its response. Moreover, SoCalGas objects to this request as vague and ambiguous, particularly with respect to the term "responsibilities." Subject to and without waiving the foregoing objections, SoCalGas responds as follows. See Response 3.

QUESTION 5:

Provide all contracts between SoCalGas and each entity that are related to the preparation of this document, including but not limited to all contracts with "Core Labs".

a. If the contract with Core Labs was identified in response to Safety and Enforcement Division Data Request 3, please identify the contract in that response.

b. If the contract with Core Labs was not identified in response to DR3, please explain why SoCalGas excluded it.

RESPONSE 5:

SoCalGas objects to this request to the extent it seeks information that is beyond the scope of this proceeding as determined by the Assigned Commissioner's Scoping Memo and Ruling dated September 26, 2019. SoCalGas further objects to this request as vague and ambiguous, particularly with respect to the phrases "responsible for the preparation of this document" and "Safety and Enforcement Division Data Request 3." Subject to and without waiving the foregoing objections, SoCalGas responds as follows. SoCalGas interprets the Safety and Enforcement Division Data Request 3 to mean Mr. Bruno's request to SoCalGas dated December 3, 2015, which SoCalGas responded to on December 4, 2015. The "Southern California Gas Company Standard Sesnon 25 Completion Profiler" document with Bates range AC_BLD_0076009 to AC_BLD_0076020, was issued by ProTechnics, a division of Core Laboratories. Based on a review of SoCalGas' records, ProTechnics was subcontracted through Western Wireline. SoCalGas produced a Western Wireline contract, in response to Ken Bruno's request on behalf of SED, on December 4, 2015.

QUESTION 6:

On page 2, the customer name is Hilary Petrizzo, the Logging Engineer is Rick Kent, and the Analyst is Derrick George. Please provide the role of each of these individuals in relation to this document.

RESPONSE 6:

SoCalGas objects to this request to the extent it seeks information that is beyond the scope of this proceeding as determined by the Assigned Commissioner's Scoping Memo and Ruling dated September 26, 2019. SoCalGas further objects to this request as overly broad and unduly burdensome to the extent it does not specify a timeframe to which SoCalGas may tailor its response. Moreover, SoCalGas objects to this request as vague and ambiguous, particularly with respect to the term "role." Subject to and without waiving the foregoing objections, SoCalGas responds as follows. See Response 3. Ms. Petrizzo acted as a liaison with ProTechnics, which included

providing information and receiving and distributing the report to SoCalGas personnel. Ms. Petrizzo was not involved in the logging work or in drafting the report.

QUESTION 7:

Was this work done in response to requests or needs from Boots & Coots related to the well kill attempts of SS-25?

RESPONSE 7:

SoCalGas objects to this request as vague and ambiguous, particularly with respect to the phrase "this work," and the term "needs." Subject to and without waiving the foregoing objections, SoCalGas responds as follows. Yes.

QUESTION 8:

If so, explain.

RESPONSE 8:

The work was requested as part of running diagnostics in support of well kill operations.

QUESTION 9:

Provide all documents related to the answers to questions 7 and 8.

RESPONSE 9:

a. SoCalGas objects to this request as unduly burdensome pursuant to Rule 10.1 of the Commission's Rules of Practice and Procedure, as the "burden, expense, or intrusiveness of this request clearly outweighs the likelihood that the information sought will lead to the discovery of admissible evidence." Subject to and without waiving the foregoing objection, SoCalGas responds as follows. N/A. See Response 7. Please see previously provided documents with Bates range AC_CPUC_SED_DR_16_0025631 – AC_CPUC_SED_DR_16_0025808.

ORDER INSTITUTING INVESTIGATION ON THE COMMISSION'S OWN MOTION INTO THE OPERATIONS AND PRACTICES OF SOUTHERN CALIFORNIA GAS COMPANY WITH RESPECT TO THE ALISO CANYON STORAGE FACILITY AND THE RELEASE OF NATURAL GAS, AND ORDER TO SHOW CAUSE WHY SOUTHERN CALIFORNIA GAS COMPANY SHOULD NOT BE SANCTIONED FOR ALLOWING THE UNCONTROLLED RELEASE OF NATURAL GAS FROM ITS ALISO CANYON STORAGE FACILITY (I.19-06-016)

SOUTHERN CALIFORNIA GAS COMPANY

DATA REQUEST SED-SCG-81 DATED APRIL 17, 2020

SOCALGAS RESPONSE DATED MAY 8, 2020

QUESTION 10:

Was this work done in response to requests or needs from SoCalGas related to the well kill attempts of SS-25?

RESPONSE 10:

See Response 7.

QUESTION 11:

If so, explain.

RESPONSE 11:

N/A. See Response 7.

QUESTION 12:

Provide all documents related to the answers to questions 10 and 11.

RESPONSE 12:

N/A. See Response 7.

QUESTION 13:

On page 4, the survey objectives are shown as "Identify casing and tubing breaches". On page 2, the date of survey is November 8, 2015, and the date of analysis is November 12, 2015. With these things in mind, please answer:

a. Why did SoCalGas have reason to request this document with a survey objective to "Identify casing and tubing breaches" as of the dates shown on page 2?
b. Provide all documents related to the answer to question 13a.

ORDER INSTITUTING INVESTIGATION ON THE COMMISSION'S OWN MOTION INTO THE OPERATIONS AND PRACTICES OF SOUTHERN CALIFORNIA GAS COMPANY WITH RESPECT TO THE ALISO CANYON STORAGE FACILITY AND THE RELEASE OF NATURAL GAS, AND ORDER TO SHOW CAUSE WHY SOUTHERN CALIFORNIA GAS COMPANY SHOULD NOT BE SANCTIONED FOR ALLOWING THE UNCONTROLLED RELEASE OF NATURAL GAS FROM ITS ALISO CANYON STORAGE FACILITY (I.19-06-016)

SOUTHERN CALIFORNIA GAS COMPANY

DATA REQUEST SED-SCG-81 DATED APRIL 17, 2020

SOCALGAS RESPONSE DATED MAY 8, 2020

RESPONSE 13:

b. SoCalGas objects to this request as vague and ambiguous, particularly with respect to the phrase "reason to request." SoCalGas further objects to this request to the extent it assumes SoCalGas' objective was to identify casing and tubing breaches or SoCalGas drafted the referenced language. Subject and without waiving the foregoing objections, SoCalGas responds as follows. The purpose of the "Southern California Gas Company Standard Sesnon 25 Completion Profiler" document with Bates range AC_BLD_0076009 to AC_BLD_0076020 was to run diagnostics of SS-25 for the objective of killing the well.
c. SoCalGas objects to this request as overly broad and unduly burdensome pursuant to Rule 10.1 of the Commission's Rules of Practice and Procedure, as the "burden, expense, or intrusiveness of this request clearly outweighs the likelihood that the information sought will lead to the discovery of admissible evidence." Subject and without waiving the foregoing objections, SoCalGas responds as follows. The Boots & Coots Daily Reports reference the diagnostic work on SS-25. Please see previously provided documents with Bates range AC_CPUC_SED_DR_16_0025631 – AC_CPUC_SED_DR_16_0025808.

QUESTION 14:

On or around the dates identified in question 13, did SoCalGas request any other analysis or study related to the objective shown on page 2 of this document?

RESPONSE 14:

SoCalGas objects to this request as vague and ambiguous, particularly with respect to the phrase "any other analysis or study." Subject to and without waiving the foregoing objections, SoCalGas responds as follows. See Response 13.

QUESTION 15:

If so, why?

ORDER INSTITUTING INVESTIGATION ON THE COMMISSION'S OWN MOTION INTO THE OPERATIONS AND PRACTICES OF SOUTHERN CALIFORNIA GAS COMPANY WITH RESPECT TO THE ALISO CANYON STORAGE FACILITY AND THE RELEASE OF NATURAL GAS, AND ORDER TO SHOW CAUSE WHY SOUTHERN CALIFORNIA GAS COMPANY SHOULD NOT BE SANCTIONED FOR ALLOWING THE UNCONTROLLED RELEASE OF NATURAL GAS FROM ITS ALISO CANYON STORAGE FACILITY (I.19-06-016)

SOUTHERN CALIFORNIA GAS COMPANY

DATA REQUEST SED-SCG-81 DATED APRIL 17, 2020

SOCALGAS RESPONSE DATED MAY 8, 2020

RESPONSE 15:

See Response 13.

QUESTION 16:

Provide all documents related to the answer to questions 14 and 15.

RESPONSE 16:

See Response 13.

QUESTION 17:

Please review the passages on page 6 of this document that states under the "Observations" section:

"A cooling anomaly appears to detect a leak through the surface casing at ~890 (depth conformed with both down and up log pass temperatures). The reported bottom of the surface casing is 990'. . .
Summary: gas flow appears to be flowing up the tubing and exiting through a tubing failure at ~8435'. Gas flows up the tubing x production casing annulus until it exists through the surface casing at ~890'. . ."
With these passages in mind, please answer the following:

a. When did SoCalGas first suspect a leak through the surface casing of well SS-25?
b. What information did SoCalGas base this suspicion on?
c. Provide documentation in support of the response to 17b.
d. When was SoCalGas first aware of a tubing failure at ~8435'?
e. If the answer to 17d is anything other than the Core Labs report dated November 12. 2015, provide documentation in support of the response to questions 17d.
f. What specific problem(s) relative to killing SS-25 did the tubing failure at ~8435' present?
g. What steps did SoCalGas or its contractors take to overcome the problem(s) identified in answer 17f.?

h. Provide documentation in support of the answer to question 17g

RESPONSE 17:

a. SoCalGas objects to this request as vague and ambiguous, particularly with respect to the phrase, "suspect a leak through the surface casing of well SS-25." SoCalGas also objects to this request to the extent it assumes SoCalGas suspected a leak through the surface casing of well SS-25. SoCalGas further objects to this request to the extent it assumes that the purpose of the surface casing is to contain gas. SoCalGas further objects to this request to the degree that it assumes that the cooling anomaly at 890' was indicative of a leak in the surface casing. Subject to and without waiving the foregoing objection, SoCalGas responds as follows. SoCalGas interprets this request to ask when SoCalGas first became aware of a leak through the surface casing of well SS-25 at ~890 feet. SoCalGas is not aware of a leak through the surface casing at this depth.
b. See Response 17.a. N/A.
c. See Response 17.a. N/A.
d. SoCalGas objects to this request to the extent it assumes SoCalGas suspected a tubing failure at ~8435'. SoCalGas further objects to this request to the extent it assumes that there was a tubing failure at 8435'. Subject to and without waiving the foregoing objection, SoCalGas responds as follows. The cross-over flow ports for SS-25 were at approximately 8451ft.
e. N/A. See Response 17.d.
f. SoCalGas objects to this request as vague and ambiguous with regards to the phrase "specific problems related to killing SS-25." SoCalGas further objects to this request to the extent it assumes a tubing failure existed at ~8435' which posed "a problem relative to killing SS-25." Subject to and without waiving the forgoing objection, SoCalGas responds as follows. N/A. See Response 17.d.
g. SoCalGas objects to this request to the extent it assumes a tubing failure existed at ~8435' which posed "a problem relative to killing SS-25." Subject to and without waiving the forgoing objection, SoCalGas responds as follows. N/A. See Response 17.d.
h. N/A. See Response 17.d.

EXHIBIT 16

Kill Procedure

SS-25

Nov. 12, 2015

1. Ensure a minimum of 600 bbls of 9.4 ppg $CaCl_2$ is available to pump before perforating the tubing.
2. Make up 2-7/8" EZSV on e-line.
3. Stab lubricator. Test to 300/4,000 psi.
4. RIH with 2-7/8" EZSV.
5. Set EZSV at ± 8,390 ft.
6. Pull out of hole.
7. Perform positive test on EZSV to 500 psi above tubing pressure.
8. Observe 30 minutes.
9. Perform negative test on EZSV to 500 psi below tubing pressure.
10. Observe for 30 minutes.
11. RIH with tubing punch.
12. Pressure tubing to 2,000 psi.
13. Perforate tubing ± 8,391 – 8,385 ft. (16 Shots, 0.3" x 3/8" Charge, 4 shots/foot)
14. Pull out of hole into lubricator.
15. Close swab valve and upper maseter.
16. Pump 10 bbls 9.4 ppg Polymer Plug.
17. Start pumping 9.4 ppg $CaCl_2$ at 4 bpm. Observe pressures
18. Increase pump rate according to pump pressure. MAX PUMP PRESSURE – 4,000 psi.
    - Observe pump pressure when KWM leaves the perforations. Attempt to maintain constant pump pressure.
    - If unable to maintain constant pump pressure a decision will be made to open choke to allow KWM to flow up the 2-7/8" x 7" annulus.
19. Pump 303 bbls. Observe well.