BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Order Instituting Investigation on the Commission's Own Motion into the Operations and Practices of Pacific Gas and Electric Company to Determine Violations of Public Utilities Code Section 451, General Order 112, and Other Applicable Standards, Laws, Rules and Regulations in Connection with the San Bruno Explosion and Fire on September 9, 2010.	I.12-01-007 (Filed January 12, 2012)

REPLY BRIEF OF THE CONSUMER PROTECTION AND SAFETY DIVISION TO PG&E'S OPENING BRIEF

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I. INTRODUCTION

Pursuant to the modified timeline in the Administrative Law Judge Ruling issued on April 12, 2013, the Consumer Protection and Safety Division (CPSD)[1] submits this Reply to Pacific Gas and Electric Company's (PG&E's) Opening Brief.

In its Opening Brief, PG&E says that it is "morally" and "legally" responsible for the tragic explosion on PG&E's Line 132 in San Bruno, California, but then comprehensively denies doing anything wrong. (PG&E Opening Brief, p. 1, hereinafter "PG&E OB".) PG&E admits wrongdoing for only two (relatively minor) things: (1) the clearance form prepared for the work at PG&E's Milpitas Terminal did not meet the requirements of PG&E's Work Procedure, in violation of 49 Code of Federal Regulations (CFR) Part 192.13(c); and (2) PG&E did not test personnel at Milpitas for alcohol within the time required by 49 CFR Part 199.225. (*Ibid.*)

PG&E does not accept moral or legal responsibility for doing things, or failing to do things, that any engineer (and indeed, the public) would find reprehensible, including: using pipe sections that were not completely welded;[2] not visually inspecting the pipe sections before placing them in service;[3] not testing its pipelines;[4] not keeping any records showing the existence of the pups;[5] ignoring its own engineers warnings about aging pipeline that needed to be replaced;[6] ignoring potential weld seam issues known to exist on pipelines of a similar manufacture and age;[7] ignoring overpressurizations that

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[1] On January 1, 2013, CPSD officially changed its name to the Safety and Enforcement Division (SED). However, in light of all of the references to CPSD in the previous rulings by the Commission and the Administrative Law Judges (ALJs), pleadings, exhibits, testimony and cross-examination of witnesses and corresponding transcript references, to avoid confusion we will continue to refer to SED as "CPSD" in this brief and through the remainder of this proceeding.

[2] CPSD-1, p. 20.

[3] CPSD-9, p. 96.

[4] CPSD-1, p. 64.

[5] *Id.*, p. 65.

[6] CPSD-5, pp. 63-64; CPSD-167, Vol. IV, pp. 880 and 884.

[7] CPSD-1, p. 41.

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jeopardized the integrity of the pipelines;[8] not replacing poorly marked and aging equipment until it failed;[9] ignoring leak incidents on Line 132 and similar transmission pipelines;[10] failing to learn from past incidents such as the one at Rancho Cordova;[11] failing to be prepared for a predictable incident;[12] not shutting off the gas promptly after the explosion;[13] and failing to make contact and coordinate with fire or police departments immediately after the incident.[14] Most importantly, PG&E does not accept moral or legal responsibility for maintaining a corporate culture that created an unsafe system by repeatedly and continuously making decisions that compromised safety, in order to make an extra buck. These failures had catastrophic consequences for the 8 people died, and the dozens more who were badly burned or lost their homes.

The evidence of PG&E's failures, recounted in CPSD's Opening Brief, is overwhelming. But not only does PG&E deny that any of these things occurred, it argues that CPSD's evidence proving violations must be "clear and convincing", placing an unreasonably high bar on CPSD that no precedent, statute, or case law says that CPSD must meet. The evidence in the record is so overwhelming that it exceeds any burden of proof PG&E attempts to place on it. However, the proper standard, adopted by every major Commission dealing with violations of health and safety regulations, is that violations must be proven by a "preponderance" of the evidence. There is no reason to change the long-established standard for burden of proof in this proceeding, merely because the number and severity of the offenses is so serious.

PG&E also attempts to deny any duty to comply with safety standards prior to the enactment of the Commission's General Order 112 in 1961. PG&E claims that no laws,

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[8] CPSD-1, p. 49.

[9] CPSD-1, p. 98; CPSD-5, pp. 42 – 49.

[10] CPSD-1, p. 30.

[11] Reporter's Transcript, "RT" 315:23-316:1.

[12] CPSD-1, p. 113.

[13] *Id.*, p. 102.

[14] *Id.*, p.118.

specifically not Public Utilities Code Section 451, obligated PG&E to operate a safe gas transmission system. But, the plain language of Section 451 requires every public utility to "furnish and maintain…equipment and facilities" necessary for the "health and safety" of the public. PG&E ignores prior Commission decisions and a landmark Court of Appeals case that state that Section 451, by itself, does create such a duty. Moreover, CPSD has not interpreted the requirements in a "free-floating" way, or overly vague, as PG&E argues, because CPSD interprets Section 451 to be informed and proscribed by the good industry practices existing at the time of the construction of Segment 180.

PG&E's lack of acceptance indicates that, unfortunately, incidents like the one in San Bruno may occur again unless the Commission intervenes and takes strong actions, which in this instance means holding PG&E liable for all of the violations described in CPSD's Opening Brief.

II. BACKGROUND

A. Factual Summary

CPSD recommends that the Commission base its decision on the facts as described in CPSD's Report, the NTSB Report, the Overland Report, and CPSD's Rebuttal Testimony as summarized in CPSD's Opening Brief (at pages 5 – 27), and disregard the incomplete and incorrect factual summary described in PG&E's Opening Brief, which starts at page 10.

It should be noted that the parties are not in disagreement about the majority of the facts alleged by CPSD; in fact, PG&E determined that cross-examination of most of CPSD's witnesses was unnecessary. However, CPSD finds that certain facts alleged by PG&E are simply wrong, and need to be addressed here. Also, many of the factual statements made by PG&E, while factually correct, omit relevant information. CPSD's "Summary of the Incident" does not.

In some instances, PG&E inserts improper conclusions into its factual summary, which are truly legal arguments and not facts. These issues will be addressed below.

1. The September 9, 2010, Explosion

PG&E provides an incomplete summary of the events at the Milpitas Terminal on the day of the incident.[15] PG&E omits some relevant facts; for example, the fact that the backup power supply (the uninterruptible power supply, or "UPS") at Milpitas had failed earlier in 2010.[16] It had been in service since the 1980s, with a three-phase system that was no longer needed and for which parts were no longer available. (CPSD-1, p. 81.) A work clearance application to install the permanent UPS at the Milpitas Terminal was submitted on August 19, 2010 as Clearance Number MIL-10-09 and approved by PG&E Gas Control on August 27, 2010. (*Id.*, p. 83.) There is no record provided by PG&E showing the specific steps taken and the time, date, and initials of the person completing each step in the system clearance. (*Ibid.*, p. 83.) Due to the lack of detail on the work clearance form for UPS replacement, the SCADA operators could not have been aware of the scope and magnitude of the work being performed at the Milpitas Terminal. (CPSD-9, p. 90.) PG&E's factual summary omits any reference to the flawed and incomplete work clearance application, which, in the Introduction to PG&E's Opening Brief, is one of the few things that PG&E's admits it did wrong. CPSD recommends that the Commission adopt and consider CPSD's factual summary of the events at Milpitas, not PG&E's incomplete timeline.

Also, PG&E's statement on page 12, that its operators on the day of the incident "analyzed the numerous incoming SCADA alarms and related data as efficiently and accurately as possible" is a subjective judgment, not a "fact".

PG&E omits many of the facts that demonstrate the confusion, disorganization, and lack of preparedness exhibit by PG&E on that day. For example, PG&E's SCADA immediately showed the upstream pressure at the Martin Station on Line 132 had decreased from 361.4 psig to 289.9 psig, indicating a rupture. (CPSD-1, p. 108.) PG&E also received continuous and urgent messages that there was an explosion; at 6:31 p.m.,

[15] PG&E OB, p. 10-11.

[16] CPSD-1, p. 81.

Gas Operator 1 called PG&E Dispatch regarding the previous inquiry about the loss of pressure and speculated that PG&E's gas facilities may be involved in the incident. (*Id.*, p. 109.) At 6:32 p.m., Gas Control left a message for San Francisco Transmission and Regulation Supervisor about the low-low alarm at Martin Station, and the possibility of a leak. (*Id.*, p. 109.) Mechanics 1 and 2 arrived at the first valve location at 7:20 p.m. (*Id.*, p. 112.) At 7:22 p.m., the Senior Distribution Specialist contacted PG&E Dispatch and said that while unconfirmed, it looked like gas was involved. (*Ibid.*) Yet it was not until 7:25 p.m., *74 minutes later*, that PG&E confirmed that the incident was a reportable gas fire. (*Ibid.*) PG&E's summary of the facts omits this confusion.

PG&E states that its Dispatch "instructed the mechanics to go to the Colma Yard to retrieve their trucks and equipment to shut the necessary valves on Line 132."[17] However, PG&E omits the fact that Dispatch was contacted at 6:18 p.m. by an off-duty PG&E employee alerting them of a fire; off duty PG&E employees contacted Dispatch at 6:21 and 6:23, and one of the employees informed Dispatch they are headed to the site. (CPSD-1, p. 108.) In response Dispatch said it would notify a supervisor. (*Ibid.*) Thus, but for PG&E employees who acted on their own initiative and outside the corporate chain of command, PG&E's response would have been even worse. PG&E itself admits the amount of time it took to turn off the gas "did not help the first responders." (Reporters Transcript (RT) 336:10-17.) Thus, PG&E's "facts" are misleading in that they portray Dispatch as having recognized the source of the rupture and dispatched crews, while in fact it took over an hour to recognize the source of the rupture and it was the sole initiative of an employee on his own who dispatched himself to the accident.

CPSD recommends that the Commission refer to and adopt CPSD's factual summary of PG&E's response to the explosion on September 9, 2010, not PG&E's.

[17] PG&E OB, p. 12.

2. Construction Of Segment 180

PG&E's factual summary of the construction of Segment 180 is incomplete and omits relevant facts.[18] For example, PG&E neglects to mention that PG&E itself performed the construction and installation, not contractors. (CPSD-1, p. 15.) This is an important omission because PG&E insists that it was unaware of the existence of the pups, which appears highly unlikely if PG&E installed the pups itself.

PG&E also includes the conclusory statement that the existence of the pups was "unknown to PG&E", which is highly subjective.[19] Since the records that could identify the PG&E employees who installed Segment 180 are missing, it is impossible to ask them what they "knew" about the pups they installed, thus PG&E cannot claim with any certainty that the PG&E employees were not aware of what they were doing at time. PG&E goes on to state that "There is no evidence that PG&E ever had actual knowledge of the existence of the pup sections or the missing welds", which is a mischaracterization of the evidence, not a "fact". In fact, there is sufficient evidence to conclude that PG&E's employees who installed Segment 180 were aware of what they doing; for example, Dr. Caliguiri describes the process as follows: "Following receipt of pipe from a mill, a pipeline owner/operator (or contractor hired by them) lays the pipe segments in the ground and welds them with circumferential welds (which are also referred to as "girth welds")." (PGE-1, p. 3-4.) Thus, assuming that the PG&E workers followed normal work procedures, they would have laid the pup sections in the ground and welded them together. The NTSB found that the unwelded seam defects and manual arc welds ran the entire length of each pup and were detectable by the unaided eye and/or by touch. (CPSD-9, p. 96.) Thus, the evidence is sufficient to conclude that the PG&E workers could have easily seen the defects in the sections that they themselves welded and installed and thus were aware of the pup sections.

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[18] PG&E OB, p. 13.

[19] *Id.*, p. 14.

PG&E claims that had PG&E known about the pups it would have removed them immediately[20], but it is fair to question why PG&E workers installed them in the ground in the first place, and it is entirely reasonable to hold PG&E responsible for the misdeeds of its employees.

There is simply no support for the proposition that "the pups were delivered to the construction site wrapped" with protective coating and welded together, and thus the pups were not visible. PG&E's testimony unequivocally states that PG&E does not know whether the pups were wrapped or unwrapped.[21] In fact, the normal practice described above indicates that sections were not typically delivered to the job site welded together and already wrapped. Apparently, PG&E introduces the "possibility" that the pups were pre-wrapped, which is simply not supported by the factual record, for the purpose of suggesting that the PG&E employees could not see that they were installing pup sections. This is another instance where PG&E disclaims responsibility, despite its earlier announcement that PG&E does accept responsibility.

The Commission should disregard PG&E's selective and flawed history and construction of Segment 180, especially with regards to the suggestion that PG&E might not have known about the pups because they were delivered to the job site pre-wrapped, and adopt the factual background as described in CPSD's Opening Brief.

3. The Root Cause Of The Rupture Was Not A Post-Installation Hydro-Test, Which Did Not In Fact Occur

With regards to a post-installation pressure test, PG&E confusingly asserts that PG&E witness Dr. Caligiuri concluded that a post-installation hydro-test occurred "based on burst pressure and metallurgical stress analyses, as well as the absence of any other

[20] *Id.*, p. 42.

[21] PGE-1, p. 2-4. "PG&E does not know – and does not today have records to show – whether the six pups were delivered to the construction site in 1956 welded together and double-wrapped with corrosion protection coating or as individual pieces, coated or uncoated."

plausible cause".[22] In fact, that conclusion is not supported by Dr. Caliguiri. What he actually stated was:

> Based on my visual, metallurgical, and fractographic analyses of Pup 1 samples prepared by the NTSB, as well as my calculations using established ASME methodologies, it is my conclusion that the September 9, 2010 rupture of PG&E Line 132, Segment 180 in San Bruno, California, was caused by the combination of a missing interior weld, a ductile tear, and fatigue cracking, all of which were present in the Pup 1 longitudinal seam.[23]

Dr. Caliguiri is stating here that he concludes that Segment 180 failed because of the weakness caused by a missing weld, cyclic fatigue cracking, and a ductile tear (crack). With regards to the initiation of the crack (ductile tear), Dr. Caliguiri stated that "a 500 psig hydro test could have caused the ductile tear in Pup 1."[24] *In other words,* Dr. Caliguiri's conclusion was merely that his "burst pressure and metallurgical stress analyses" did not rule out a hydro-test. *He did not use his burst pressure and metallurgical stress analyses to conclude that there was, in fact, a hydro-test done on Segment 180, or that this was the cause of the rupture.*

In actuality, there is no record whatsoever that such a test occurred.[25] Dr. Caliguiri based his conclusion that a test "most likely" occurred not his metallurgical analyses but on the recollections of "a former PG&E employee [who] has testified that he remembers a hydro-test in the vicinity of the later pipe rupture."[26] His metallurgical testing did not rule out the *possibility* that a hydro-test could have caused the ductile tear, based on the *possibility* that the pups could have survived such a test. PG&E badly misquotes its own witness, Dr. Caliguiri, who did not state his metallurgical testing *alone* revealed that a hydro-test was performed over 50 years ago and caused the rupture. At

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[22] PG&E OB, p. 15.

[23] PGE-1, p. 3-16.

[24] PGE-1, p. 3-14.

[25] CPSD-1, p. 65.

[26] PGE-1, p. 3-16.

best, evidence that Segment 180 *could have* survived a pressure of 500 psig merely suggests such a test *might* have occurred, it does not prove that it *did in fact* occur.

In any event, Dr. Caliguiri's conclusions are highly self-serving. The NTSB found (and CPSD agrees) that Segment 180 would definitely not have survived a hydro-test. (CPSD-9, p. 49, p. 95.)

There are several other reasons to doubt that a post-installation hydro-test actually occurred on Segment 180 in 1956.

- No records exist of a hydro-test on Segment 180. ASME B31.1.8, section 841.417 requires such records be kept for the "useful life of each pipeline".
- Segment 180 "was designed and constructed to meet ASA B31.8 in effect at that time for a Class 3 location". The required test pressure under 841.412(c) for Class 3 locations is 1.40 times MAOP. Thus, the test should have been 560 psig (1.4 x MAOP) not 500 psig as stated by Dr. Caliguiri. At 560 psig, it is highly unlikely that Segment 180 would have survived intact.[27]
- According to the NTSB, the as-fabricated burst pressure for pup 3 would have been 430 psig. (CPSD-9, p. 49; CPSD Report, p. 60.) If a test was performed at 500 psig, that portion of the pipe would have burst.
- Because of differences in elevation, certain points on the pipe that are at a lower elevation will see higher pressures. Based on CPSD staff's field investigation, the pups in Segment 180 were located at a lower elevation than the rest of the segment between the tie-ins. Therefore, the pups would have seen a pressure higher than 500 psig, and would most likely not have survived a hydro-test.[28]
- The PG&E employee's memory is too vague and factually inconsistent to conclude that a hydro-test was performed on Segment 180.
    - He recalls that the test was 1,000 psi (PG&E Testimony, Exhibit 2-7, p. 55), when clearly Segment 180 would not have survived intact to that pressure.

[27] CPSD-5, p. 12.

[28] CPSD-5, p. 12.

- He claims to have seen the job specifications that called for a pressure test to 1,000 psi (*ibid*), which indicates he most likely saw the specs for a different test.
- He also recalls that the pressure testing was done to 2 times the MAOP of the pipeline (*id.*, p. 56), although industry standards required testing to 1.4 times the MAOP.
- He has no documents relating to any hydrostatic testing. (CPSD-156 (Deposition of Robert Jefferies), p. 13.)
- He did not take any notes while he watched the test. (*Id.*, p. 45)
- He acknowledged that his recollection of dates is "real foggy". (*Id.*, at p. 25.)
- A PG&E representative came to the PG&E employee's house with two PG&E attorneys after the San Bruno explosion, and showed this PG&E employee a plat map which he could not recognize as the 1956 relocation project or some other job. (*Id.*, p. 103-104.)

The best we can say about Mr. Jefferies' recollections is that it is not likely that he accurately recalls a hydro-test on Segment 180 in 1956.

In addition, PG&E's own engineers believed that many portions of Line 132 had never been tested, which is why they recommended that PG&E adopt a new plan in the 1980s to begin testing and replacing older gas pipelines, such as Line 132. (CPSD-5, pp. 63-64; CPSD-167, pp. 880, 884, 885, 888.) Segment 180 was listed in GIS as having no pressure test, which shows that PG&E did not believe there was ever a pressure test. (CPSD-1, p. 65.) If sections of Line 132 had been tested, and the records existed to prove that such tests occurred, PG&E's employees would not have been recommending to management that testing should be done.

CPSD believes it is highly unlikely that Segment 180 was actually hydrostatically pressure tested, or that such a test caused the rupture on Segment 180. The Commission should find that the *preponderance of the evidence* indicates that there was no post-installation hydro-test on Segment 180. Dr. Caliguiri's finding that a hydro-test *might* have occurred is insufficient, and in any event is contradicted by the NTSB's own metallurgical analysis that showed that the pup sections would not have survived a properly administered hydro-test. The faulty memory of one single employee is not persuasive. PG&E asserts this claim as a defense, and the existing records show that no such test was ever done, thus it is PG&E's burden to prove that such a test occurred, which it cannot do.

4. Regulatory Background

CPSD has no comment on PG&E's description of the regulatory background of this case.

B. Procedural History

CPSD has no comment on PG&E's description of the procedural history in this proceeding and related ones.

III. LEGAL ISSUES

PG&E's Opening Brief raises two legal issues that need to be addressed. Neither argument has any merit whatsoever. First, PG&E argues that the correct burden of proof is the "clear and convincing" standard.[29] Second, PG&E argues that Public Utilities Code Section 451 is not a safety regulation.[30]

A. The Correct Burden Of Proof Is By A "Preponderance Of The Evidence", Not "Clear And Convincing Evidence"

In this Commission investigation, CPSD has the burden of establishing by a preponderance of the evidence that PG&E has committed the alleged violations. (D.12-02-032, 2010 Cal. PUC LEXIS 240, *51.) This is the usual practice in Commission adjudicatory proceedings, including investigations. (*Ibid.*) In every adjudicatory case before the Commission, it has applied the "preponderance" standard. (See, *e.g.*, D.12-02-032; D.06-11-041; D.05-07-010; D.05-06-033; D.04-12-058; D.03-01-087; D.01-04-035.)

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[29] PG&E OB, p. 24.

[30] *Id.*, p. 28.

PG&E argues the burden of proof should be by "clear and convincing" evidence.[31] In fact, this exact argument was raised and rejected in a previous Commission decision, the *Qwest* case. In *Qwest*, (2003) D.03-01-087; 2003 Cal. PUC LEXIS 67, Qwest attempted to argue that due to the possibility of punitive fines the standard should be "clear and convincing". In rejecting that argument, the Commission stated:

> Qwest argues that the Commission should have required "clear and convincing evidence" of violations, rather than proof by a preponderance of the evidence. Qwest cites no authority for this argument, but contends that the fine imposed on Qwest is like a punitive damages award in a civil case, which must be supported by clear and convincing evidence…
>
> The Commission correctly required that the violations alleged in this investigation be proved by a preponderance of the evidence.
>
> (*In re Qwest*, 2003 Cal. PUC LEXIS 67, *14.)

In one of the earliest enforcement cases at the Commission, in *Investigation on the Commission's own motion into the operations, practices, and conduct of Communication Telesystems International* (1997) D.97-05-089; 1997 Cal. PUC LEXIS 447; 72 CPUC2d 621, the Commission stated:

> It is well settled that the standard of proof in Commission investigation proceedings is by a preponderance of the evidence. (*Investigation On the Commission's Own Motion Into All Facilities-Based Cellular Carriers*, D.94-11-018, mimeo. at 21-22.) Similarly well settled is the standard of proof for criminal sanctions. When the Commission seeks to impose the sanction of imprisonment, the standard of proof becomes beyond a reasonable doubt. (*Id.*)
>
> CTS alleges that to seek large punitive fines or license revocation, S&E must prove its case with clear and convincing evidence. CTS cited no Commission decision for this proposition. Notwithstanding the lack of cited precedent for the clear and convincing standard, we find the proof to be clear and convincing in fact, such that we need not resolve this issue.
>
> (1997 Cal. PUC LEXIS 447, *35.)

[31] *Id.*, p. 24.

The cases cited by PG&E have no application here.[32] *Hughes v. Bd. of Architectural Examiners*, 17 Cal. 4th 763 (1998), dealt with the rights of an architectural license holder vis-à-vis an applicant for an architecture license. The Court held: "A licensee, having obtained such a fundamental vested right, is entitled to certain procedural protections greater than those accorded an applicant." According to this case, a license, once obtained, affords the licensee a "fundamental vested right" to ply his or her trade. However, PG&E has no right to avoid statutory penalties that is fundamentally vested, thus the case is inapposite here. Similarly, *Grubb v. Department of Real Estate*, 194 Cal. App. 4th 1494 (2011) is a professional license case and does not involve administrative fines. In the license cases cited by PG&E, the courts were concerned with taking away a person's livelihood. PG&E, which holds a CPCN, is not being threatened with having its license revoked.

In fact, the Commission has declined to apply the "clear and convincing" standard in cases *where it actually revoked a license*. For example, in D.05-08-033, the Commission revoked Globe Van Lines' license to operate as a household goods carrier, and in doing so applied the "preponderance" standard. (D.05-08-033, 2005 Cal. PUC LEXIS 564, *12.) Also, in a case involving North Shuttle Service, a passenger stage corporation and charter-party carrier, one of the requested remedies (by CPSD) was possible revocation of North Shuttle's operating authority, and the Commission applied the "preponderance of the evidence" standard. (D.98-05-019, 1998 Cal. PUC LEXIS 348, *25.) Even in analogous license revocation proceedings, the Commission has not applied the "clear and convincing" standard of proof.

In addition, PG&E cites to *Qwest* for the odd proposition that *only* if there are a large <u>number</u> of violations can a large fine be supported.[33] PG&E infers that the possibility of a large fine <u>without</u> a large number of violations somehow "requires" the

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[32] PG&E OB, p. 25.

[33] PG&E OB, p. 27.

clear and convincing standard.[34] This argument is odd because nowhere does *Qwest* make any such statement, and clearly another factor besides the number of offenses is the *severity* of the offense.[35] If the violations are *both* numerous and severe, either supports a large fine. *Qwest* does not stand for the proposition, as suggested by PG&E, that *only* a large number of violations (but not severe ones) justifies a large fine.

PG&E argues that, because the potential fines are "far beyond the statutory range that would apply to a single violation that occurred on a single day", the Commission should apply the "clear and convincing" standard.[36] Section 2108 authorizes the Commission to penalize each day a violation continues as a separate violation. However, the reason the fines are potentially large here is because the violations continued for decades unremediated by PG&E. PG&E itself is solely to blame for allowing the dangerously unsafe of Segment 180 to exist and continue unabated. PG&E could have tested Line 132; it could have rectified its records retention issues; it could have identified the errors in its records when it transferred them to GIS; it could have heeded the warnings of engineers who warned about missing records; it could have addressed the known leak issues on Line 132 and on similar pipelines, etc. PG&E is solely responsible for the length of time these violations continued. It would not be logical or fair to make it more difficult to prove violations against PG&E for the sole reason that PG&E allowed the violations to continue for decades.

Regardless of the burden of proof one applies, the evidence conclusively demonstrates that PG&E committed multiple serious violations. The evidence is so overwhelming PG&E chose to forego cross-examination of CPSD's witnesses, apparently conceding that the bulk of CPSD's allegations are true.[37] PG&E's logic

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[34] PG&E quotes *Qwest*, stating "*See* 2003 Cal. PUC LEXIS 67 at *15 ("The main reason the fine is so large is because the number of violations established is large.").

[35] D.98-12-075. The factors that go into setting the amount of the fine will be thoroughly discussed in a separate brief, by ALJ Ruling.

[36] PG&E OB, p. 27.

[37] PG&E cross-examined only CPSD's Overland Consulting witnesses, relating to financial matters.

behind adopting a new standard is not compelling, and has been raised before in prior proceedings and rejected.[38] CPSD recommends that the Commission act consistently with all of its past enforcement precedents and reject PG&E's attempt to change the burden of proof.

B. Section 451 Creates A Duty To Furnish And Maintain A Safe Gas Transmission System

PG&E next argues that Section 451 does not create pipeline safety requirements.[39] PG&E makes this argument on a textual interpretation of Section 451, but on little else. PG&E also argues that application of Section 451 as a safety regulation violates its due process, which is discussed below.

1. The Commission And The Court Of Appeals Have Established That Section 451 By Itself Imposes A Legal Duty To Provide A Safe System

PG&E argues that Section 451 is merely a ratemaking provision, having nothing to do with safety.[40] PG&E's argument is based solely on a textual interpretation of Section 451, without any supporting case law. Not only is PG&E's textual reading completely wrong, but the Commission and the California Court of Appeals have decided otherwise.

It is well settled that to interpret statutory language, the courts must ascertain the intent of the legislature so as to effectuate the purpose of the law. (*California Teachers Assn. v. Governing Bd. of Rialto United School Dist.* (1997) 14 Cal.4th 627, 632.) In determining the Legislature's intent, the first step "is to scrutinize the actual words of the statute, giving them a plain and commonsense meaning." (*Ibid.*; *Lungren v. Deukmejian* (1988) 45 Cal. 3d 727, 735.) In construing a statute, a court may consider the

[38] Specifically, in the *Qwest* proceeding the Commission considered the argument that the standard should be "clear and convincing", and rejected it. Not surprisingly, Qwest's lead counsel in that case was PG&E's attorney Mr. Malkin.

[39] PG&E OB, p. 28.

[40] PG&E OB, p. 28.

consequences that would follow from a particular construction and will not readily imply an unreasonable legislative purpose. Therefore, a practical construction is preferred. (*California Correctional Peace Officers Assn. v. State Personnel Bd.* (1995) 10 Cal.4th 1133, 1147.) In analyzing statutory language, courts should seek to give meaning to every word and phrase in the statute to accomplish a result consistent with the legislative purpose…" (*Harris v. Capital Growth Investors XIV* (1991) 52 Cal.3d 1142, 1159.) Finally, if the statutory language is clear and unambiguous, there is no need for judicial construction. (*California School Employees Assn. v. Governing Board* (1994) 8 Cal. 4th 333, 340; *Ladd v. County of San Mateo* (1996) 12 Cal. 4th 913, 921; *California Fed. Savings & Loan Assn. v. City of Los Angeles* (1995) 11 Cal. 4th 342, 349.)

Here, there is no need for judicial interpretation of Section 451. The text of Section 451 is unambiguous, because Section 451 requires all public utilities to provide and maintain "adequate, efficient, just, and reasonable" service and facilities as are necessary for the "safety, health, comfort, and convenience" of its customers and the public. PG&E's tortured reading that "'safety' is buried in one dependent clause within a multi-paragraph provision"[41] and therefore Section 451 is merely a ratemaking provision is unsupportable.

On its face, the plain and commonsense wording of Section 451 is that it requires every public utility to furnish and maintain equipment and facilities necessary to promote the health and safety of the public. The words are unambiguous, and the Commission has always so held.

PG&E's convenient redaction of the word "safety" from its reading of Section 451, which PG&E does to change the plain meaning of the text, can only be accomplished by placing an impractical and unreasonable construction on Section 451's plain words, an attempt which has been rejected by the Court of Appeals.

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[41] PG&E OB, p. 28.

Not only is PG&E's tortured interpretation preposterous, but it flies in the face of two important cases that say that Section 451 can be used as the basis for a statutory violation. In *Cingular*, the Court of Appeals stated:

> While in most of the cases which the parties have cited on appeal, there was another violation of law, we do not infer from this that there must be another statute or rule or order of the Commission that has been violated for the Commission to determine there has been a punishable violation of section 451.

(*PacBell Wireless v. PUC* (2006) 140 Cal.App. 4th 718, 751.)

PG&E also argues that the *Carey v. PG&E* case is somehow inapplicable.[42] However, the issues raised by PG&E in that case are identical:

> PG&E contends that the language in Section 451 is too general to support the imposition of the fine under Section 2107. PG&E argues that Section 451's mandate that a utility provide "reasonable service" to promote public safety is vague. More specifically, PG&E argues that Section 451 fails to identify what utility action or inaction is "reasonable." For the same reasons, PG&E contends that Section 451 is unconstitutionally vague.

(*Carey v. Pacific Gas & Electric Company,* D.99-04-029 (1999) 85 Cal. P.U.C.2d 682.) The Commission went on to find that "Section 451's mandate that a utility provide 'reasonable service, instrumentalities, equipment and facilities' as necessary to promote the public safety is constitutional and not violative of due process." (*Ibid.*)

After these two cases, there is no question that Section 451 by itself imposes a duty to furnish and maintain a safe system. In *Carey v. PG&E*, Section 451 was the only law upon which the violations were based. In both cases, Section 451 stood alone as an alleged violation, because its requirement to provide utility service that promotes public safety was <u>not</u> "too general" or "unconstitutionally vague".

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[42] PG&E OB, p. 32.

PG&E makes the spurious claim that somehow these two cases are "unique" and that no other Section 451 cases exist.[43] PG&E apparently failed to read the *Cingular* case, which reprints the many other Section 451 cases cited by CPSD in that proceeding.[44] Below are other Commission decisions cited by CPSD as violations of Section 451, in *Cingular*.

> See, e.g., *Higginbotham v. Pacific Bell Telephone Company* (2002) Cal.P.U.C. Dec. No. 02-08-069 [substituting less accurate and less convenient means of obtaining local toll pricing information without a compelling reason is unreasonable and violates *section 451*; case originally filed while Cingular provided misleading information regarding service, and provided no grace period for ETF]; *Office of Ratepayer Advocates v. Pacific Bell Telephone Company* (2001) Cal.P.U.C. Dec. No. 01-12-021 [two violations of *section 451*--significant increase in average time to restore dial tone service, and failure to notify customers of the availability of a four-hour appointment window when calling 611 repair service; case filed in 2000]; *Utility Consumers' Action Network v. Pacific Bell* (2001) Cal.P.U.C. Dec. No. 01-09-058 [misleading or potentially misleading marketing tactics violate *section 451*, particularly sales tactics regarding caller ID plans, inside wire maintenance plans, and marketing service plans by offering them in descending price order without fully disclosing all available options in the plans; case filed in 1998]; *First Financial Network v. Pacific Bell* (1998) 80 Cal.P.U.C.2d 407, 416 [public utility violates *section 451* by providing customer with far more than necessary in equipment and service]; *Corona City Council v. Southern California Gas Company* (1992) 45 Cal.P.U.C.2d 301, 313 [public utility violated *section 451* by closing branch offices with inadequate notice and without reasonable alternative services available]; Cal.P.U.C. Proposed Decision of *ALJ Meaney* (Apr. 5, 1984) Dec. No. 84-04-041 [employee discount that is part of public utility's tariffs may nevertheless violate *section 451* if it is excessive]; *National Communications Center Corp. v. PT&T Co.* (1980) 3 Cal.P.U.C.2d 672 *[section 451* requires telephone utility to "provide all available and accurate information as those customers may require to make an intelligent choice between similar services where such a choice exists"]; *Hidden Valley West v. SDG&E Co.* (1977) 81 Cal.P.U.C. 627, 636 [failure to return money paid for estimated projects in excess of actual cost violates *section 451*].) [Italics in original.]

Thus, there are many other cases that cite to Section 451 as a safety regulation. Having realized that its argument regarding "void for vagueness" has previously been

[43] PG&E OB, p. 32.

[44] At that time, CPSD was referred to as the Consumer Services Division (CSD).

rejected by the Commission, PG&E now gives its old argument a new twist – that Section 451 is solely a ratemaking provision. Again, this argument is directly contradicted by the plain and commonsense wording of Section 451, which in its title includes "just and reasonable charges, *service*, and rules" [emphasis added]. The word "service" is in the title and described in the text of Section 451, proving that PG&E is wrong that Section 451 only applies to "reasonable charges". PG&E must dance around the entire second paragraph of Section 451, which is dedicated to defining what the Legislature meant with regards to safe and reliable service, stating that PG&E must "furnish and maintain" safe service, including equipment and facilities, that are necessary to promote the "safety, health, comfort, and convenience of its patrons, employees, and the public."

To bolster its argument, PG&E cites several cases that deal with the ratemaking provisions of Section 451.[45] There is no question that Section 451 has both a ratemaking aspect and a safety aspect. CPSD does not disagree that Section 451 has been used in ratemaking proceedings. But to suggest that Section 451 applies to rates *and nothing else* is unsupportable. PG&E attempts to eliminate the second paragraph of Section 451 by only focusing on the Commission cases that cite to the ratemaking provisions of Section 451. However, as discussed above, there are many cases that also deal with the safety requirements of Section 451, which PG&E neglects to mention.

PG&E also argues that CPSD's use of the term "good engineering practices" is somehow overly vague.[46] However, CPSD has not used its own judgment as the measuring stick, but has formed its judgment using the guidance provided by the industry standards in existence at the time of the incident, including ASME B31.1.8-1955, API 5LX, and API Standard 1104. Those guidelines are clear and unambiguous. Thus there is no "vagueness" problem in the way in which CPSD applies Section 451.

[45] PG&E OB, p. 29.

[46] PG&E OB, p. 35.

2. Use Of Section 451 As A Pipeline Safety Law Does Not Violate Due Process/Fair Notice Principles

PG&E further argues that CPSD's interpretation violates due process because it allows Section 451 to be "free-floating" and to be interpreted however CPSD wants.[47] PG&E is plainly wrong. Without stating so, PG&E is essentially arguing that CPSD has interpreted Section 451 in an arbitrary or capricious manner.

It is important to note that CPSD's engineers are in fact qualified, licensed, expert engineers, who are qualified to form expert opinions about pipeline safety. CPSD also hired professional, independent consulting engineers to assist in the preparation of its testimony.[48] Providing expert opinions is one aspect of their jobs. It is not inappropriate, as implied by PG&E, for CPSD's engineers to have opinions about what constitutes a safe practice. Indeed, many of the opinions held by CPSD are non-controversial and PG&E agrees with them – for example, PG&E does not disagree that the lack of an interior weld on the pups was unsafe. Apparently, PG&E has little respect for the opinion of CPSD's engineers (or the NTSB's, for that matter) as to what constitutes as safe practice. However, it is not inappropriate or impermissible for CPSD's engineers to apply their expert knowledge to utility practices.

That being said, CPSD's opinions with regards to safety are not "free-floating"; that is, they are not unbounded or arbitrary. In fact, CPSD's expert opinions are carefully grounded in the standards of safe gas pipeline construction that *were in effect in the 1950s*. As explained in CPSD's testimony:

> Section 451, which has been in effect since 1909 (half a century prior to the installation of Segment 180), is a broad and general requirement for utilities to create and follow safe operating practices. Section 451 is not prescriptive in the specific manner in which its obligations must be met. Without such specifics and because no set of regulations can cover every single possible unsafe condition, one

[47] PG&E OB, p. 30.

[48] CPSD provided to PG&E a list of all of the individuals who assisted in the investigation and contributed to CPSD-1 and CPSD-5. PG&E decided not to cross-examine any of those individuals, with the exception of the financial experts.

looks to the industry standards and guidelines for guidance. (CPSD-5, p. 1.)

A review of CPSD's allegations shows CPSD grounds each violation of Section 451 in an industry standard. For each of the violations of Section 451 cited in the Opening Brief, CPSD has cited the industry standard that was applicable to the particular unsafe issue. For example, PG&E's failure to weld the pups all the way through violates industry standards set forth by the American Society of Mechanical Engineers (ASME), Gas Transmission and Distribution Piping Systems, B-31.1.18-1955, Section 811.27E, and the American Petroleum Institute's Standard for Field Welding of Pipe Lines, Std. 1104, 4th Ed., 1956, Section 1.7. In other words, CPSD does not impose an arbitrary standard on PG&E. Its engineers' opinions are not "free-floating", but are grounded in the industry standards. The existence of these standards is not controversial – PG&E informed the Commission in 1960 that it was *already following these standards*.[49] Perhaps there is a conceivable situation where the application of Section 451 is overly vague – but that is not the case here. PG&E cannot argue that it was not aware of the industry standards from the 1950s, which CPSD uses as the basis for determining that certain practices were unsafe, and therefore none of the CPSD's findings with regards to the unsafe practices during the construction and installation of Section 451 prior to 1961 can be said to be arbitrary or "free-floating".

3. Section 451 Does Not "Incorporate" ASME B31.1.8-1955

PG&E asserts, incorrectly, that CPSD is arguing that Section 451 incorporates B31.1.8-1955.[50] This is simply wrong – CPSD never made such an argument. In fact, the citation provided by PG&E belies this falsehood – CPSD stated "one looks to the industry standards and guidelines for guidance" to determine what constituted the

[49] CPUC Decision No.61269 (1960), p. 12.

[50] PG&E OB, p. 39, Footnote 193.

obligations for utility safe practices prior to federal law. CPSD did not state that one must look to B31.1.8-1955 because it was incorporated into the law in 1955.

PG&E's second citation in Footnote 193, at page 39, is equally misleading. PG&E quotes CPSD as saying "PG&E is incorrect in claiming that industry safety rules in existence in 1956 were merely 'guidelines' that created no duty for PG&E to follow them. In fact, Section 451 placed (and continues to place) an affirmative duty on the utility to act in a safe manner." This sentence also does not say that B31.1.8-1955 is incorporated into Section 451. It merely reaffirms that Section 451 created a duty to maintain a safe system in the 1950s.

The quotations speak for themselves. CPSD has consistently stated throughout this proceeding that engineers look for guidance to the standards and guidelines that have been promulgated by the experts in the field. For the time when Segment 180 was built, the standards were ASME B31.1.8-1955, API 5LX, and API Standard 1104.

PG&E's characterization of CPSD's position is mistaken. As discussed above, CPSD believes Section 451 may stand alone as a violation, without reference to any other law or regulation. Although it does not contain specific prescriptions, one may look to the industry standards and guidelines for guidance to determine what constitutes a safe practice. This is entirely consistent with the interpretation of Section 451 in both the *Cingular* and the *Carey v. PG&E* case. At no time did CPSD ever give Section 451 the interpretation as described by PG&E, that Section 451 incorporates B31.1.8-1955.

PG&E goes on to incorrectly claim that in 1961, when the Commission adopted General Order (GO) 112, which mandated compliance with the ASME (also referred to as the ASA) standards, there were no safety requirements in effect at that time.[51] In effect, PG&E claims that prior to 1961, PG&E was not legally bound to maintain a safe system. CPSD believes strongly that this cannot be the case, based on the plain language of Section 451 and the cases that have since interpreted Section 451 to create a safety obligation separate and distinct from any other statute.

[51] PG&E OB, p. 39.

Moreover, in 1961, when the Commission adopted GO 112, it recognized that utilities had a pre-existing responsibility to the public to provide safe service that goes beyond GO 112 because no code of safety rules can cover every conceivable situation. The Commission stated:

> Public utilities serving or transmitting gas bear a great responsibility to the public respecting the safety of their facilities and operating practices.
>
> It is recognized that no code of safety rules, no matter how carefully and well prepared can be relied upon to guarantee complete freedom from accidents. Moreover, the promulgation of precautionary safety rules does not remove or minimize the primary obligation and responsibility of respondents to provide safe service and facilities in their gas operations. Officers and employees of the respondents must continue to be ever conscious of the importance of safe operating practices and facilities and of their obligation to the public in that respect. (Emphasis added. CPUC Decision No.61269 (1960), p.12.)

In effect, PG&E argues that there were no enforceable safety rules prior to 1961.[52] In the section quoted above, the Commission clearly did not intend to absolve utilities from safety violations that were not specifically covered under the new GO 112. Nor is CPSD attempting to apply GO 112 retroactively, because CPSD alleges that unsafe conditions prior to 1961 violate Section 451 not GO 112.

In this OII, the Commission noted that Section 451 requires all public utilities to provide safe service. (I.12-01-007, p. 7.) The Commission further noted that "the California Court of Appeals has upheld the Commission's authority to find Section 451 violations that are separate and distinct from any other rule or regulation. *PacBell Wireless v. PUC* (2006) 140 Cal.App. 4th 718." PG&E cannot claim that Section 451 does not create a duty separate from GO 112 for PG&E to provide safe service.

CPSD alleges that PG&E violated Section 451 by installing and operating its system in an unsafe manner.[53] This is true even though industry safety practices were not

[52] PG&E OB, p. 39.

[53] CPSD-1, p. 15.

codified on the state level until 1961 and the federal level until 1968. PG&E is incorrect in claiming that industry safety rules in existence in 1956 were merely "guidelines" that created no duty for PG&E to follow them. In fact, Section 451 placed (and continues to place) an affirmative duty on the utility to act in a safe manner. That duty would apply even if there were no specific guidelines, even if there were no General Order, and even if there were no federal law. PG&E's attempt to confuse Section 451's legal obligations with "voluntary" industry standards should be rejected.

Proof of this is demonstrated by the fact that CPSD links violations of Section 451 with the applicable industry guidelines to demonstrate that a particular practice is unsafe. For example, CPSD alleges that failing to conduct pressure testing on Segment 180 was an unsafe practice in violation of Section 451. Post-installation pressure testing was a common practice in the industry in 1956 – and how do we know this? Because ASME B31.1.8-1955, Section 841.412(c), required[54] operators to hydrostatically test pipelines in Class 3 locations to a pressure not less than 1.4 times the maximum operating pressure. Not only is ASME the "Standard Code for Pressure Piping" but when GO 112 was adopted in 1961, PG&E argued that GO 112 was unnecessary *because PG&E was already following it*.[55] We can thus be certain that in 1956 the American Society of Mechanical Engineers believed that post-installation hydro-tests were a common and good industry practice, and that PG&E thought so as well.

[54] To be precise, B31.1.8 was a guideline in 1956, not a requirement. But if an operator chose to follow B31.1.8's requirements (which PG&E did), doing so would require operators to comply with the requirements; for example, to hydrostatically test their pipelines.

[55] D.61269, p. 415. In that proceeding, PG&E stated that adoption of GO 112 was "unnecessary" because it was already following the American Standards Association (ASA) code for gas transmission and distribution piping systems (B31.8 - 1958).

IV. OTHER ISSUES

A. The Evidence Shows That, In Hindsight, PG&E Lacked Any Foresight

In its Opening Brief, PG&E repeatedly takes issue with CPSD's "hindsight", but never compellingly explains why looking to the past is invalid.[56] This proceeding is a backwards-looking one, by definition. CPSD's Report focuses on what PG&E did in the past, not what it is doing in the future. There is a separate proceeding for looking forward to the future, R.11-02-019. Nevertheless, many of CPSD's proposed remedies do look to the future, in an attempt to change specific inadvisable behaviors. It should be noted that PG&E does not agree with all of CPSD's recommendations, which will be discussed in CPSD's brief on fines and remedies. But CPSD's focus on violations necessarily looks at PG&E's failures and lack of awareness from 1956 to 2010.

Presumably, the reason PG&E does not to want to look backwards is that PG&E would prefer we all remain in the dark about its transgressions. PG&E apparently believes that because the violations have been found in "hindsight", they were unknowable to PG&E. CPSD does not accept that the violations were unknowable to PG&E, for two reasons; first, that CPSD does not have to prove that PG&E knew about the violations; second, that in many instances PG&E should have known, based on the warning from its employees or the warning signs present in the missing and inaccurate data. The law requires that PG&E know what it has in its system. Furnishing and maintaining safe natural gas transmission equipment and facilities requires that a natural gas transmission system operator know the location and essential features of all such installed equipment and facilities. (D.12-12-030, p. 91.) There are numerous specific legal requirements regarding an operator's knowledge and awareness of its system, described in CPSD's Opening Brief and herein.

[56] PG&E OB, p. 40.

1. "Unknown" Pups?

With regards to the pups in Segment 180, PG&E claims that to be held liable for failing use conservative yield strength values an operator must be aware that it has pipe with unknown specifications.[57]

However, it is well-established that public welfare offenses are strict liability offenses unless they specifically state a different mental state requirement. (D.97-10-063, 76 CPUC 2d 214, *9.) A strict liability offense is an unlawful act which does not require proof of mental state. (Black's Law Dictionary, 6th Ed.) Thus, CPSD is not required to prove PG&E's mental state with regard to the alleged violations. Specifically, CPSD does not have to prove whether or not PG&E was aware that the pups were flawed. The violation occurred when PG&E placed the flawed pups into service.

PG&E's knowledge is irrelevant to the question of whether the applicable laws were violated. Much like a driver who speeds, the reasons why are irrelevant to the police. Ignorance (if true) of the pups is no defense. But ignorance is inexcusable, because there are many requirements for visual examination, post-installation testing, threat identification, leak/rupture data gathering, etc., that should have led to the discovery of the missing records, or the pups themselves.

Moreover, the plain language of the law applies to unknown specifications; it does not state that the operator be aware that it is installing pipe with unknown specifications into service. For example, Part 192.107(b)(2) states that 24,000 psi for yield strength must be used on pipe "whose specification or tensile properties are <u>unknown</u>". Similarly, Section 811.27(G) of ASME B31.1.8 applies when "yield strength, tensile strength or elongation for the pipe is <u>unknown</u>." The NTSB found, and PG&E did not dispute, that the pups were not built to any known specifications. (CPSD-9, p. 95.) Thus, the pups were built to "no known specification", which means that the pups' specifications were <u>actually unknown</u> by PG&E. (*Ibid.*) It is not relevant whether PG&E knew or did not

[57] PG&E OB, p. 41.

know that the pups' specifications were unknown. In any event, *they are required to know*.

It is completely unacceptable (if true) that PG&E did not know about the dangerous flaws in Segment 180. To maintain ignorance, PG&E had to ignore all the guidelines that required it to know what it was installing in the ground. PG&E claims it somehow unknowingly *obtained* and *installed* pups that were not welded all the way through, even though PG&E was required to obtain and use pipe that met the minimum yield strength prescribed by the specification under which the pipe was purchased,[58] and even though typical construction procedures call for the workers to install the pipe sections in the ground and weld them in place, when the pups would have been clearly visible to the workers welding them.[59] In addition, PG&E failed to conduct a visual examination of the pipe and its welds, which would have revealed the missing and defective welds.[60] PG&E did not test its pipelines, which would have caused the pups to fail.[61] PG&E did not keep any records showing the existence of the pups, even though good engineering practice and common sense would require keeping the records.[62] These failures, together, had to occur for PG&E to maintain ignorance. Doing any of these things would have broken the chain of negligent ignorance that led to the explosion. It is highly implausible that PG&E maintained actual ignorance from 1956 to 2010; but if so, it is legally and morally reprehensible.

Moreover, PG&E makes the unsupported claim that Part 192 "only applies…when the operator is aware that it has pipe with unknown specifications." Apparently, PG&E believes that CPSD must prove that PG&E was aware that it did not know the true

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[58] Section 805.54, ASME B31.1.8-1955.

[59] PGE-1, p. 3-4.

[60] Visual inspection of new pipe for defects is required by Section 811.27(A) of B31.1.8-1955, and of welds specifically by Section 1.523 of API 1104.

[61] Post-installation hydro-testing is required by Section 841.412(c) of B31.1.8 – 1955.

[62] CPSD-1, p. 62; B31.1.8-1955, Section 824 described record keeping requirements of welding procedures and welder qualifications; Sections 840 and 841 required as-built drawings and related design and construction documents and test records be maintained as long as the pipe remained in service.

specifications for Segment 180. PG&E cannot, and does not, cite to any law or case that supports this. In fact, it is not correct. The law does not say anything like that, for good reason, because how can CPSD prove that PG&E was unaware of having pipe with unknown specifications, unless CPSD knew the specifications of the unknown pipeline? It is a logical impossibility. Yet PG&E suggests that because it did not know that Segment 180 contained pipe of unknown specifications, it cannot be held accountable.[63] However, the law applies if the specifications were not known, not if PG&E knew it did not know. Requiring CPSD to prove that PG&E knew that the specifications of Segment 180 were unknown would mean that the law would *never* apply, because if PG&E knew the specifications were unknown they would then be required to use conservative assumed values or to conduct an inquiry.

The specific proof demanded by PG&E, that it knew it did not know, would be difficult to obtain, because proving knowledge of a negative is difficult. In light of this, neither the Legislature nor the Courts have ever placed such a requirement on the Commission. However, this is not an acknowledgement by CPSD that there is no evidence whatsoever relating to PG&E's knowledge of potential issues on Line 132.

PG&E could have, and should have, discovered it was missing data. For example, Segment 180 specifications in PG&E's GIS came from Pipeline Survey Sheet (PLSS) map 385121, which contained the incorrect information that Segment 180 was 30 inch seamless pipe.[64] The data in PLSS map 385121, in turn, came from journal voucher 174143.[65] After the explosion, PG&E discovered engineering documents related to Segment 180, filed under job number 136471, which showed that the Segment 180 was DSAW and not seamless.[66] PG&E's quality control failed to cross check the PLSS data against available engineering documents and correct the seamless designation at the time

[63] PG&E OB, p. 41.

[64] CPSD-1, p. 65.

[65] *Ibid.*

[66] *Id.*, p. 66.

the PLSS was created and again at the time the data was transferred to GIS.[67] In this case, it is reasonable to conclude that PG&E *should* have known that its records were deficient and *should* have used the value of 24,000 psi for the yield strength (see Section 811.27(G) of ASME B31.1.8-1955), because PG&E had multiple chances to realize that its data for Segment 180 was erroneous.

Moreover, in a general sense there is ample evidence that PG&E could have been aware that it was missing records, and should have been aware that certain values in its GIS were suspect. Yet, just as PG&E claims to be ignorant of the installation of the pups, it also claims to be ignorant of the failure to properly transfer the PLSS data correctly into GIS, even though 30 inch seamless pipe does not exist.[68]

This GIS data example illustrates the difficulty with imposing on CPSD the burden of proving that PG&E specifically knew that the specifications were unknown. There were many opportunities for PG&E to learn about the missing records for Segment 180, when it received warnings from its own engineers and contractors that there were missing records, or when it transferred the information to GIS. Yet the employees who constructed Segment 180 have passed away, or cannot be located because PG&E has lost the records. PG&E's purchase records for the pups cannot be found. (CPSD-1, p. 65.) PG&E's testing records for Segment 180 cannot be found. (*Ibid.*)

If PG&E is allowed to use ignorance as a defense, we can be assured that no utility will ever save records showing that its system contains flaws, such as leak survey records. PG&E lost the evidence of its own mental state at the time Segment 180 was installed. It should not be rewarded for that.

In any event, no Commission precedent imposes the obligation on CPSD to prove that PG&E knew that it was violating the law when it committed the violations. Strict liability means that the sole inquiry is whether the violation occurred, not whether PG&E

[67] *Ibid.*

[68] *Ibid.*

knew that it was violating the law when it did so. For those violations that involve unknown specifications of pipeline, such as Part 192.107(b)(2), the sole inquiry is whether the specifications were known or unknown to the utility, not whether the utility knew that it did not know.

2. DSAW

PG&E claims that "all [operators] considered DSAW pipe to be reliable and safe pipe not subject to a long seam threat."[69] This is an over-simplification of what was known by PG&E and other operators for the past 50 years. In fact, the evidence demonstrates that not all DSAW pipe was considered safe and reliable, and further that PG&E had warnings that the DSAW pipe on Line 132 had potential issues.

In its Opening Brief, PG&E frames the issue as one of "hindsight"; in other words, PG&E claims that it could not have known about the problems with DSAW pipe.[70] PG&E claims that CPSD has not produced evidence that operators knew of potential seam issues in DSAW pipe. In any event, PG&E claims that it "did not know the pups were there, let alone that three of them were missing internal welds."[71]

However, PG&E mischaracterizes CPSD's position. CPSD's Report did not state that <u>all</u> DSAW pipe made at <u>any</u> time has seam issues. Instead, PG&E's records show that the 1948 DSAW pipe from Consolidated Western had seam quality issues based on the rejection of some seam welds noted in the limited girth weld x-rays taken during installation and seam leaks and cracks found since the installation date.[72]

PG&E stated its belief that the pipe was most likely produced by Consolidated Western in 1948, 1949 or 1953. (NTSB Report, p. 28.) PG&E had in its possession a report that demonstrates that DSAW pipe from *this* company, in *this* time frame, was suspect. The "Integrity Characteristics of Vintage Pipelines" report, a report referenced

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[69] PG&E OB, p. 43.

[70] PG&E OB, p. 44.

[71] *Ibid.*

[72] CPSD-1, p. 41.

by PG&E in its first revision of RMP-06, identifies DSAW as having manufacturing defects, including seam and pipe body defects. Table E-6 of that report identifies incidents associated with certain manufacturers during certain years related to pipe body and seam weld defects for DSAW pipe, including seam issues on Consolidated Western pipe pre-1960.[73]

The NTSB requested a complete leak/repair history for Line 132, and discovered that Line 132 has suffered several DSAW seam leak incidents.[74] PG&E's failure to analyze the data on these weld defects resulted in an incomplete understanding of the manufacturing threats to Line 132, in violation of Part 192.917(a) and ASME-B31.8S Section 2.2. ASME-B31.8S Section 2.2 states that "The first step in managing integrity is identifying potential threats to integrity. All threats to pipeline integrity shall be considered." PG&E knew, or should have known, that DSAW from Consolidated Western in the 1940s had potential problems.

Another document in PG&E's possession at the time was the Moody Engineering report, which noted that Kaiser provided an unspecified percentage of pipe plate to Consolidated Western for the manufacture of pipe.[75] The "Integrity Characteristics of Vintage Pipelines" report identified Kaiser as having a large number of incidents in the pipe body attributable to Kaiser pipe for the years 1949-1956.

Thus, CPSD does not merely "revise history", using "hindsight". In fact, the existing documentation, which PG&E *had in its possession*, proves that DSAW manufactured during some years by some manufacturers constituted a threat, which PG&E should have accounted for. The pups in Segment 180 were, inarguably, very poorly made. Based on the reports of known seam issues on this particular vintage of pipe, and the leak incidents on Line 132, PG&E *should* have been aware that some of the

[73] CPSD-1, p. 41.

[74] CPSD-9, pp. 38-39.

[75] CPSD-1, p. 47.

DSAW pipe in Line 132 had known seam issues; if it had, it would likely have handled Segment 180 differently.[76]

3. ASVs

PG&E has committed to install more automated valves throughout its gas transmission system.[77] Although PG&E does not agree with the some of the statements made by CPSD, those criticisms are not relevant here, in light of the fact that CPSD did not allege violations of Part 192.935(c). CPSD's Report recommended that PG&E continue to study the issue of whether it should provide its Gas Control with a means of determining and isolating the location of a rupture remotely by installing ASVs, remote control valves (RCVs), and appropriately spaced pressure and flow transmitters on critical transmission line infrastructure.[78] In its testimony in Chapter 13, page 13A-8, PG&E stated "We are implementing this recommendation as discussed in the testimony in Chapter 8, section F.2." CPSD will discuss this recommendation in its separate brief on fines and remedies.

B. Post Accident Improvements

PG&E mischaracterizes CPSD's position with regards to post accident improvements. CPSD does not, as claimed by PG&E, assert that "PG&E's improvement actions do not provide a greater level of safety or exceed applicable standards."[79] Rather, CPSD's point is that PG&E should not take credit for initiating the post accident improvements on its own. PG&E has been forced into a new paradigm by the Commission. PG&E is doing nothing beyond the new standards of safety being

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[76] For example, if PG&E had identified that Line 132 had design and manufacturing threats, it should have considered such possible threats to have become unstable as a result of the overpressurization events. (CPSD-9, p. 111.) Once unstable, an operator must select the method best suited to address the threats identified. Assessment technologies proven to detect seam issues include In Line Inspection (ILI) and hydrostatic pressure testing, but not ECDA. (CPSD-1, p. 47.)

[77] PG&E OB, p. 44.

[78] CPSD-1, p. 167.

[79] PG&E OB, p. 47.

developed and mandated by regulators.[80] The instances cited by PG&E as examples of its new attitude towards safety do not appear in its opening testimony (PGE-1).[81]

For example, PG&E touts its Pipeline Safety Enhancement Plan (PSEP), but in fact the PSEP is mandated by R.11-02-019. Further, PG&E states that it has developed a plan that is consistent with best practices in the gas industry and with federal pipeline safety statutes. Both the R.11-02-019 and SB 705 (Leno, Ch522/2011) require PG&E to develop the plan.[82]

V. CPSD'S ALLEGATIONS

A. Construction of Segment 180[83]

In its Opening Brief, PG&E demonstrates that it continues to believe that no law was violated by the recklessly negligent construction of Segment 180.[84] In some places in its Opening Brief, PG&E appears to show a shocking lack of awareness that PG&E created an unreasonably dangerous condition. For example, PG&E continues to argue that Segment 180 was safe. This will be discussed in more detail below.[85]

It should be noted that Section 451 is not the only provision that generally mandates safety for gas transmission pipelines. The predominant industry guidelines in effect at the time Segment 180 was constructed state:

> It is intended that all materials and equipment that will become a permanent part of any piping system constructed under this code shall be suitable and safe for the conditions under which they are used.[86]

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[80] CPSD-5, p. 63.

[81] PG&E OB, p. 47.

[82] CPSD-5, p. 63.

[83] For organizational purposes, this reply brief follows exactly the structure of PG&E's opening brief, although the structure is somewhat incongruous.

[84] PG&E OB, p. 48.

[85] For example, PG&E makes the shocking claim that it correctly set the MAOP despite the missing interior seam weld. (PG&E OB, p. 56.) This claim is contradicted by every engineer that considered whether the pups were safe, including PG&E's own engineers, who said that Segment 180 should have been immediately removed. (Joint RT, pp. 337-38.)

[86] ASME B31.1.8-1955, Section 810.1.

The pipe used to construct Segment 180 was not suitable nor safe; nor can PG&E claim it maintained Segment 180 in safe manner. PG&E's arguments are addressed below.

1. The Overwhelming Evidence Proves That PG&E Violated Industry Standards For Safe Construction

a) Yield Strength

PG&E argues that "reliance on the voluntary guideline ASA B31.1.8-1955, Section 805.54, is misplaced" with regards to the yield strength requirements.[87] PG&E goes on to state that Section 805.54 "does no more than define specified minimum yield strength". However, as discussed above, and also in CPSD's Report and its Opening Brief, CPSD has grounded its violations for the construction of Segment 180 in Section 451. CPSD does not rely solely on Section 805.54 to establish a violation.

Testing revealed the ruptured pups on Segment 180 had yield strengths below 42,000 psi. (CPSD-1, p. 20.) Pup 1, the failed pup on which the facture initiated, was found to have yield strength of only 36,600 psi, and Pup 2 had the lowest yield strength of 32,000 psi. (CPSD-1, p. 20.) PG&E acknowledges that the pups installed in Segment 180 did not meet the specified yield strength.[88]

What PG&E fails to acknowledge is that by using pups that did not meet the required yield strengths, it created an extremely unsafe condition. Based on the characteristics of the pups revealed by subsequent testing, it is clear that, if a strength test that conformed to industry standards had been performed, it would have failed. (CPSD-1, p. 22.) Section 805.54 of ASME B31.1.8-1955 provides guidance to operators to only use pipe with the "minimum yield strength prescribed by the specification under which pipe is purchased from the manufacturer." (CPSD-1, p. 20.) The violation is based, not solely on poorly made pipe that did not meet the yield strength called for in the

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[87] PG&E OB, p. 48.

[88] *Ibid.*

purchase order, but on the unsafe condition that was created when PG&E workers ignored the guidelines and installed the sub-standard pipe in the ground, in violation of Section 451.

b) Wall Thickness

PG&E essentially redefines "wall thickness" as "a metric applied to the pipe body" but not the seam.[89] PG&E offers no support for this in the record, or from any industry guidelines, or from any engineers.

PG&E does not dispute that there was a missing interior seam weld. Instead, PG&E asserts that the calculation of wall thickness does not include the seams.[90]

However, CPSD's engineers testified that "the seam weld is considered part of the pipe."[91] CPSD's expert opinion as to the engineering rationale is as follows:

> The missing seam welds on pups 1, 2 and 3 resulted in reduced wall thickness. The intent of the minimum wall thickness requirement is to ensure its ability to withstand pressure. The ability of the pipe to withstand pressure is impacted regardless of whether the wall thickness reduction was on the plate or the seam weld. (CPSD-1, p. 20.)

With regards to wall thickness, the NTSB stated:

> The size of the unwelded region, combined with the grinding of the weld reinforcements (and the pipe body for pup 1), resulted in net intact seam thicknesses of 0.162, 0.195, and 0.162 inch for pups 1, 2, and 3, respectively. (CPSD-9, p. 41.)

The violation of the wall thickness requirement is not merely a semantic exercise. Section 811.27(C) of ASME B31.1.8-1955 requires proper measurement of the wall thickness of the pipe, because wall thickness is a key component of the design pressure formula in Section 841.1 of ASME B31.1.8-1955, which calculates the safe operating

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[89] PG&E OB, p. 49.

[90] *Ibid.*

[91] CPSD-5, p. 6.

pressure for a given pipeline. Therefore, if wall thickness is measured incorrectly, this can greatly impact the pressure at which the pipe will operate.

The intent of the minimum wall thickness requirement is to ensure its ability to withstand pressure. (CPSD-5, p. 7.) The ability of the pipe to withstand pressure is impacted regardless of whether the wall thickness reduction was on the plate or the seam weld. (*Ibid.*) While PG&E focuses on the technical aspect of the allegations, it is important to note that the reduced wall thickness due to the missing seam weld of the pups greatly reduced the strength of those sections, contributing to the likelihood of a rupture. The violation occurred not when PG&E failed to properly measure the wall thickness, but when it ignored the guidance of the industry standards for wall thickness and set an unreasonably high MAOP on Segment 180 that did not account for the reduced wall thickness, creating an unsafe condition in violation of Section 451.[92]

c) Weldability

With regards to the shoddy welds on the pup sections, PG&E does not claim that the welds were well-made. Instead, PG&E claims that CPSD "did not identify a standard" or "any legal requirement" that applies to welding.[93] PG&E is wrong.

CPSD stated in its Report that Section 811.27(E) of ASA B31.1.8-1955 required welds be done by a qualified welder and tested in accordance with requirements of API Standard 1104, which is the Standard for Field Welding of Pipelines. (CPSD-1, p. 21.) Section 1.7 of API 1104 (4th Ed., 1956) has a section entitled "Standards of Acceptability" for welds, which prohibits particular kinds of weld defects. It states:

> The standards of acceptability are applicable primarily to determination of size and type of defects located by radiography or other nondestructive test methods.

In other words, the purpose of API 1104, Section 1.7, is to ensure that weld defects are located and repaired/removed. Section 1.7 of API 1104 requires examination

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[92] See proposed Conclusions of Law #11 and #12, CPSD Opening Brief, Appendix B.

[93] PG&E OB, p. 50.

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for specific defects, such as: “incomplete penetration and incomplete fusion”; “burn-through areas”; “slag inclusions”; “porosity”; “cracks”; and “undercutting”. The NTSB’s metallurgical examination found the following defects in the girth welds on the pups: “lack of penetration, incomplete fusion, burn through, slag inclusion, crack, porosity, undercutting, and excess reinforcement.” (CPSD-16, p. 6.) The existence of so many of the defects prohibited by API 1104 strongly suggests that PG&E did not follow either the welding quality requirements or the weld inspection requirements of those guidelines.

But more importantly, one of the root causes of the San Bruno explosion is the missing interior seam weld. PG&E acknowledges that the pups were dangerously unsafe due to that defect.[94] But PG&E apparently cannot think of any rules that apply to pipe sections with a missing interior seam weld.[95] However, Section 1.721 of API 1104 specifically prohibits “inadequate penetration” of welds, which is defined as “incomplete filling of the bottom of the weld groove with weld metal.”

Again, it is inexcusable that PG&E did not discover these defects (or so it claims). Section 1.523 of API 1104, which is entitled “Visual Examination”, states “The weld must be free of cracks, inadequate penetration, burn-through, and other obvious defects, and it must present a neat workman-like appearance.” PG&E workers should have detected the obviously missing interior weld, and should have repaired the many defects in the welds before allowing the pups to go into service. It is reprehensible that PG&E used such poorly made pipe sections, and even more reprehensible that PG&E allowed the sections to go into service without conducting a visual inspection.

Despite PG&E’s claims that the welds violated no laws, the shoddy and unsafe quality of the welds on the pups indicates the lack of a qualified welder, lack of proper

[94] PG&E OB, p. 1.

[95] PG&E OB, p. 50. PG&E claims: “CPSD did not identify a standard by which “defective” girth welds were to be determined, did not offer any evidence that the girth welds between the pups fell below any such standard, and did not identify any legal requirement or regulation that could support an alleged violation of law related to these girth welds.”

welding techniques, and lack of any visual examination, in violation of API 1104, creating a dangerously unsafe condition that violated Section 451.

d) Minimum Length

PG&E claims that API 5LX, Specification for High-Test Line Pipe, is a standard for manufacturers, not purchasers.[96] However, page 3 of API 5LX (4th Ed., 1954) contains "suggestions for ordering high-test line pipe", and contains recommendations to purchasers regarding what to request when ordering pipeline, thus the standards clearly apply to both purchasers and manufacturers. Therefore, as a purchaser of vast quantities of pipe, PG&E should have known that the pipe standards called for sections not shorter than 5 feet in length.[97] Not only did the API guidelines state that pups should be no shorter than 5 feet, its purchase order to Consolidated Western *included the same specification*.[98] This demonstrates that PG&E was fully aware of the requirement when it ordered the pipe from Consolidated Western, whether the requirement came from API 1104 or its own purchase order specifications.

In any event, CPSD cites to API 5LX for the purpose of showing that the use of pipe sections less than 5 feet in length was considered an unsafe practice according to industry standards in effect at the time Segment 180 was constructed. By using pups that were less than 5 feet in violation of API 5LX, PG&E created an unsafe condition in violation of Section 451. Again, as stated in CPSD's Report, "one looks to the industry standards and guidelines for guidance" to determine whether an unsafe condition exists in violation of Section 451. Here, the industry's and PG&E's own guidelines in 1956 called for the use of pups no shorter than 5 feet.

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[96] PG&E OB, p. 49.

[97] CPSD-1, p. 22.

[98] PGE-1, p. 2-6.

e) Post-Installation Pressure Test

With regards to a post-installation pressure test, PG&E claims 1) that no legal requirement to hydro-test existed in 1956, and 2) Segment 180 was hydrotested in 1956.[99] However, ASME B31.1.8-1955 unequivocally calls for a post-installation hydro-test, and the preponderance of the evidence demonstrates that no such test was ever conducted on Segment 180.

(1) ASME Standards Called For Post-Installation Pressure Testing

Section 841.3 of ASME B31.1.8-1955 has a section entitled "Testing Requirements"; Section 841.31 states: "All pipelines, mains and services shall be tested *after construction*." [Emphasis added.] Section 841.412(c) requires operators to hydrostatically test pipelines in Class 3 locations to a pressure not less than 1.4 times the maximum operating pressure. Thus, to comply with the safety requirements of the ASME standards PG&E should have conducted a post-installation hydro-test. Again, CPSD does not allege that PG&E should be held liable for violating the ASME standards, which were not mandatory in 1956; CPSD alleges that by failing to conduct a hydro-test on Segment 180, PG&E created an unsafe system in violation of Section 451. Failing to hydro-test is a serious safety violation, because hydro-tests reveal flawed pipe sections. Segment 180 would not have survived such a test had it been done, and the flawed pups would have been discovered. (CPSD-5, p. 11.)

PG&E is incorrect that such testing "had not been widely adopted in the industry."[100] PG&E presents no evidence that other operators did not conduct post-installation hydrotesting. In 1955, hydrotesting was mandated by the ASME guidelines, which were the definitive industry guidelines. The fact that the ASME guidelines were the definitive standards is demonstrated by: 1) PG&E informed the Commission in 1960 that it was already following the ASME standards; 2) when it adopted GO 112, the

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[99] PG&E OB, p. 51.

[100] PG&E OB, p. 52.

Commission imposed the ASME standards; and 3) when the federal government adopted the Natural Gas Pipeline Safety Act (NGPSA) in 1968, it adopted the ASME standards. PG&E can point to no guideline or subsequent law that *did not* mandate hydrotesting; nor can PG&E point to a different standard other than B31.1.8 that it followed in the 1950s.

(2) Was a hydro-test performed in 1956?

PG&E next argues that a hydro-test was performed in 1956, although PG&E acknowledges that it kept no records of it.[101] Failure to maintain records of a hydro-test violates Section 841.417, which states "The operating company shall maintain in its file for the useful life of each pipeline and main, records showing the type of fluid used for test and the test pressure." Thus, even if PG&E did in fact conduct a hydro-test on Segment 180, it violated Section 841.417.

However, CPSD does not concede that a hydro-test was performed on Segment 180, and thus CPSD believes that Section 841.412(c) is the correct violation. However, if the Commission finds the evidence persuasive that such a test occurred, CPSD requests that PG&E be held liable for a violation of Section 841.417, which requires such records to be kept for the life of the pipeline, thereby violating Section 451.

CPSD addressed the factual dispute over whether a hydro-test was performed by PG&E above, at pages 7 – 11. It is worth repeating here that the weight of the evidence proves that no such test occurred:

- No records exist of a hydro-test on Segment 180.
- The hydro-test should have been to 560 psig (1.4 x MAOP). At 560 psig, it is highly unlikely that Segment 180 would have survived intact.[102]
- According to the NTSB, the as-fabricated burst pressure for pup 3 would have been 430 psig. (CPSD-9, p. 49; CPSD-1, p. 60.) If a test was performed at 500 psig, that portion of the pipe would have burst.

[101] PG&E OB, p. 53. PG&E's witness Harrison, while on the stand, added additional opinions that were not in his written prepared testimony, stating that part of the job file (Joint-10) for Segment 180 included 2 end caps, but conceded that this is "not great evidence" that a hydro-test was performed. (Joint RT, 413:6.) End caps have multiple purposes.

[102] CPSD-5, p. 12.

- Because of differences in elevation, certain points on the pipe that are at a lower elevation will see higher pressures. Based on CPSD staff's field investigation, the pups in Segment 180 were located at a lower elevation than the rest of the segment between the tie-ins. Therefore, the pups would have seen a pressure higher than 500 psig, and would most likely not have survived a hydro test.[103]
- Only one person recalls a hydro-test, but it is not likely that his memory is accurate:
    - He recalls that the test was 1,000 psi (PG&E Testimony, Exhibit 2-7, p. 55), when clearly Segment 180 would not have survived intact to that pressure.
    - He claims to have seen the job specifications that called for a pressure test to 1,000 psi (*ibid*), which indicates he most likely saw the specs for a different test.
    - He also recalls that the pressure testing was done to 2 times the MAOP of the pipeline (*id.*, p.56), although industry standards required testing to 1.4 times the MAOP.
    - He has no documents relating to any hydrostatic testing. (CPSD-156 (Deposition of Robert Jefferies), p. 13)
    - He didn't take any notes while he watched the test. (*Id.*, p. 45)
    - He acknowledged that his recollection of dates is "real foggy". (*Id.*, at p. 25.)
    - A PG&E representative came to the PG&E employee's house with two PG&E attorneys after the San Bruno explosion, and showed this PG&E employee a plat map which he could not recognize as the 1956 relocation project or some other job. (*Id.*, p. 103-104.)

The Commission should find that the preponderance of the evidence indicates that there was no post-installation hydro-test on Segment 180 as required by Section 841.412(c), which created an unreasonably unsafe condition in violation of Section 451.

f) MAOP

Section 845.22 of ASME B31.1.8-1955 requires that the MAOP be established based on the lesser of either: 1) the design pressure; or 2) the test pressure. However,

[103] *Ibid.*

PG&E could not have relied on a test pressure value because it has no records showing that there was a pressure test on Segment 180, and it is unlikely that a hydro-test was performed.

Without a test pressure, PG&E should have calculated the design pressure for Segment 180 at the time it was installed and established the MAOP based on that calculation. According to Section 845.22, the design pressure is the pressure of the "weakest element of the pipeline or main". PG&E clearly did not incorporate the pups, which were the weakest element of Segment 180, when it calculated the design pressure at 400 psi.

PG&E argues that CPSD's line of reasoning is "based on hindsight knowledge no one had in 1956."[104] As discussed above, CPSD is not required to prove PG&E's mental state at time the violation occurred. Therefore, CPSD does not have to prove that PG&E *actually* knew about the flawed pup sections when it calculated MAOP.

In any event, CPSD does not agree that there is no proof that PG&E had, or could have had, any knowledge regarding the pup sections. (*See* Section IV(A)(1) above.) There is ample evidence that PG&E's workers who installed the pup sections knew, or should have known, about the defective condition of the pipe they were installing, and that PG&E had many opportunities later to discover the defective pipe. A visual examination of the pipe would have detected the anomalous and defective welds. (CPSD-9, p. 96.) The unwelded seam defects and manual arc welds ran the entire length of each pup and were detectable by the unaided eye and/or by touch. (*Ibid*.) After installation, PG&E was on notice that DSAW pipe from Consolidated Western had known seam issues. (CPSD-1, p. 41.) During the transfer of records from PLSS sheets to GIS, PG&E should have taken notice of the missing and clearly inaccurate data, such as 30 inch seamless pipe, or that the pressure test was listed as "NA". (CPSD-1, p. 65.)

Next, PG&E argues that the MAOP of 400 psi was correct based on the theory that "Applying the design formula to that tensile strength, the 1956 MAOP would have been

[104] PG&E OB, p. 56.

480 psig in a Class 2 location and 400 psig in a class 3 location."[105] PG&E does not document how it arrived at these calculations. Apparently, by maintaining that the MAOP was set correctly, PG&E *still believes* Segment 180 was not dangerous.

However, the NTSB found that the MAOP was incorrect:

> Based on the yield strength test data, the MAOP for a class 3 location would have been 284 psig and the MAOP for a class 2 location (as the location of Segment 180 was in 1956) would have been 341 psig. (CPSD-9, p. 106.)

CPSD's own expert witness calculations for MAOP similarly found the MAOP was incorrect:

> If PG&E had used the 24,000 value for the yield strength on the pipe, it would have had an MAOP of 300 psi if the type of longitudinal seam was known. If they did not have records on the type of seam, it should have used a joint seam factor of 0.8 which would have lowered the MAOP to 240 psi, well below the actual pressure at which Segment 180 failed. (CPSD-5, p. 18.)

Without knowing how PG&E arrived at its numbers, it is difficult to analyze its calculations, other than to point out that PG&E's calculations are self-serving and conflict with both the NTSB's engineers' and CPSD's engineers' calculations. The design pressure methodology is described in Section 841.1, where the design pressure (P) is equal to two times the yield strength (S) times the nominal wall thickness (t), divided by the outside diameter (D), times the design factor (F), times the joint factor (E), times the temperature rating (T). An illustration of this calculation is contained in exhibit number Joint-14.[106] For PG&E to calculate a higher MAOP than either the NTSB or CPSD, it must have not only assumed 32,000 psi for (S) instead of 24,000, but also 0.375" for (t), even though this ignores the missing seam. In the Section 841.1 formula (P=2(S)(t)/D x E x F x T) illustrated in Exhibit Joint-14, one can see the these assumptions make to the design calculation, demonstrating the danger in failing to

[105] *Ibid.*

[106] The formula in Section 845.22 is: P=2(S)(t)/D x E x F x T.

account for the missing interior weld or the missing specified minimum yield strength (SMYS) data.

Regardless, the evidence shows that the pups were not constructed to survive pressures as high as 400 psi. And in fact, the pups did not survive – they ruptured, at only 386 psi. Moreover, the design calculation for MAOP builds in a safety factor; that is, if the pipe as constructed will fail at 386 psi, the MAOP (if calculated correctly) will be substantially lower to ensure the failure threshold is not approached. Thus, by failing to properly account for the missing seam welds in the pups when it calculated MAOP, PG&E created an unsafe condition in violation of Section 451.

PG&E further argues that it properly set the MAOP under the grandfathering clause in Part 192.619(c).[107] While it is technically accurate that this clause specified that the MAOP for existing lines may not exceed the highest actual operating pressure to which the segment was subjected during the 5 years preceding 1970, this does not change the fact that a dangerous condition existed because the MAOP had been set too high for Segment 180. CPSD's allegation of a violation is not merely a technical argument over whether PG&E correctly calculated the MAOP; the allegation is that the MAOP was dangerously high for the condition of the pipe in Segment 180, creating an unsafe condition in violation of Section 451.

B. PG&E's Integrity Management Program

PG&E argues that it is only with "hindsight" that one can find violations with PG&E's Integrity Management (IM) program.[108] However, CPSD's investigation into PG&E's IM program is backwards-looking *by definition*. The Commission's stated purpose here is to determine if PG&E's IM program violated Section 451 and other applicable standards, laws, rules and regulations in connection with the San Bruno explosion. Since the events occurred in the past, we must look to the past to determine

[107] PG&E OB, p. 56.

[108] PG&E OB, p. 57. "In no area is it more apparent that CPSD is using a different lens after San Bruno than before than in its charges concerning PG&E's Integrity Management program."

what happened. The criticism that CPSD uses only "hindsight" is not convincing proof that PG&E has not violated any laws.[109]

As proof that "hindsight" is necessary to find violations, PG&E points out that CPSD audited PG&E's IM program prior to the San Bruno explosion and found no violations.[110] However, CPSD's audit is irrelevant. CPSD was, of course, unaware of the dangerous pup sections – which is understandable, since it was PG&E that installed the pups, not CPSD, and it was PG&E that lost the records showing the existence of the pups, not CPSD. PG&E cannot reasonably expect CPSD to conduct an accurate audit if PG&E lost important records. It is not reasonable to claim that CPSD is in a similar position as PG&E to prevent and detect mistakes. CPSD has no duty to construct pipelines in a safe manner – the duty is on the utility. CPSD has no obligation to keep PG&E's records for them, or ensure their accuracy. Perhaps CPSD's audits missed things[111] – but that is a separate issue, and not relevant to whether PG&E's IM program violated the law.

This is merely an attempt to shift the blame to others. No audit can ever detect every violation.[112] Ultimately, the responsibility for operating a safe system is on the utility, and the utility is accountable for violations existing on its system.

PG&E faults CPSD for using "knowledge only available after the accident".[113] This is preposterous. The information about the missing records was "only available

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[109] Again, as argued previously, CPSD is not required to prove that PG&E was aware of the violations in order to prove that the violations occurred; and in any event there is a substantial amount of evidence regarding what PG&E knew, or should have known, about the existence of dangerous flaws in its gas transmission system.

[110] *Ibid.*

[111] *Ibid.* "A CPSD audit generally includes a high level look at a utility's operations and records along with a detailed physical review of a sample of utility facilities and/or records. These audits are not intended to examine every detailed aspect of a utility's system and find every possible violation." The CPSD audits primarily review an operator's records; and CPSD's audit can only be as accurate as the records which it is reviewing.

[112] CPSD-5, p. 5.

[113] PG&E OB, p. 57.

after the accident" *to CPSD*; however, it was certainly available *to PG&E* before the accident, had PG&E checked its records. CPSD strongly disagrees that PG&E was somehow unable to discover the flaws in its system or its IM program prior to the San Bruno accident. In addition, the evidence is overwhelming that PG&E could have discovered the existence of the pups and missing pipeline records, because there were many opportunities to catch those mistakes. Yet PG&E disavows that there were any opportunities to catch the mistakes; CPSD discusses those missed opportunities, below.

1. PG&E's Data Gathering And Integration

One of the ways in which PG&E could have caught the flaws in Segment 180 prior to the explosion was by having an IM program that detected potential threats to the integrity of its pipeline segments through a detailed and thorough knowledge of each covered segment. (CPSD-1, p.27.) Yet PG&E argues that its IM program procedures "provided for appropriate gathering and integration of all data elements necessary".[114] Specifically, PG&E claims that it did not fail to 1) consider all relevant leak data; and 2) ensure the quality and accuracy of its GIS data. However, CPSD's Report documented numerous leak reports on Line 132 and similar pipelines that PG&E ignored. (CPSD-1, pp. 33-35; CPSD-9, p. 39.) CPSD's Report also pointed out a number of examples where data from PG&E's GIS were in error. (CPSD-1, p. 32; CPSD-9, p. 61.) These are not merely examples of "hindsight" being 20/20 – in fact, these are examples where PG&E could have and should have caught the errors in its system.

a) PG&E Did Not Gather And Integrate Data Relating To Leak Data

(i) PG&E Did Not Always Incorporate Known Data Elements As Required By ASME B31.8S, Section 4

The requirements for data gathering and integration are stated in Part 192.917(b) and ASME B31.8S, Section 4, which is incorporated by reference in 49 CFR Part 192.

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[114] PG&E OB, p. 61.

Operators are required to gather basic information about the pipeline as described in Appendix A of ASME B31.8S, as well as past incident history, leak history, maintenance history, etc. Appendix A sets forth the data sets required, including pipe material, year of installation, pipe manufacturing process, seam type, joint factor, and operating pressure history.

PG&E argues that its IM program calls for such data to be gathered, but fails to explain the numerous lapses discovered by CPSD.[115] PG&E states that "taken together the components of PG&E's data gathering process incorporated the elements required by ASME B31.8S Appendix A." PG&E fails to offer much support for that premise, other than to point to Mr. Zurcher's testimony, which states "PG&E's [IM program] lines up with all these [other] programs."

The investigation uncovered numerous instances where PG&E failed to gather relevant data in its GIS:

- the pipe wall thickness was an assumed value for 21.5 miles (41.75 percent) of Line 132;
- the manufacturer of the pipe was unknown ("NA") for 40.6 miles (78.81 percent) of Line 132;
- the pipeline depth of ground cover was also unknown for 42.7 miles (82.79 percent) of Line 132;
- in GIS, three values were used for the SMYS of grade B pipe: 35,000 psi, 40,000 psi, and 45,000 psi;
- two segments of Line 132 with unknown SMYS were assigned values of 33,000 psi and 52,000 psi, not 24,000 psi;
- six consecutive segments, totaling 3,649 feet, specified an erroneous minimum depth of cover of 40 feet;
- several segments, including Segment 180, specified 30-inch diameter seamless pipe, although there was no API-qualified domestic manufacturer of such pipe when the line was constructed;
- the GIS did not reflect the presence of the six pups in Segment 180; and

[115] PG&E OB, p. 64.

- PG&E has no records of pressure tests for Segment 180.

(CPSD-1, p. 32; CPSD-9, p. 61.)

PG&E's GIS was implemented in the 1990s and was populated with data from preexisting pipeline survey sheets. (CPSD-9, p. 60.) If information was missing, assumed values were entered, preceded by a negative sign to indicate they were assumed values. (*Ibid.*) The high number of missing data sets indicates that PG&E often inserted data that could be obtained in a "timely" manner, rather than accurate data. For example, PG&E's RMP-06 states:

> For the risk analysis process, the Company has chosen pipeline attributes based upon available, verifiable information or information that can be obtained in a timely manner.

As a result of limiting its data gathering to that which could be obtained in a timely manner, an in-depth understanding of the threats on Line 132 and Segment 180 was not achieved. (CPSD-1, p. 30.)

PG&E argues that its procedures called for verification of the accuracy of its records.[116] PG&E states its IM data gathering called for "analyzing job files, interviewing employees responsible for maintenance on the pipe segment, and conducting a review of records in local Division and District offices"; however, PG&E presents no evidence that these procedures were actually followed. The evidence indicates that the procedures were often not followed.

Part 192.917(b) does not only call for PG&E to merely *develop* the proper procedures.[117] The plain language calls for PG&E to *actually* "gather and integrate existing data and information on the entire pipeline that could be relevant to the covered segment." It is not sufficient that PG&E had procedures – in this instance, PG&E must *actually gather and integrate existing data*. The evidence of missing data for Line 132,

[116] PG&E OB, p. 63.

[117] This is in contrast to, for example, Part 192.615(a), which calls for operators to establish written procedures for emergency plans.

such as wall thickness, depth of ground cover, manufacturer, seam type, pressure testing, yield strength value, and of course most importantly, the flawed pups, indicates that that PG&E failed to gather and integrate *existing* data.

In addition, the existing data must be checked for accuracy. ASME B31.8S (Section 5.7, p. 14) states: "Any data applied in a risk assessment process shall be verified and checked for accuracy." The large amount of assumed or missing data proves that PG&E was unaware that it was missing data, and failed to check.

(ii) PG&E's Failure To Consider Leak Reports Are Numerous And Long-Standing

Another opportunity for PG&E to catch its mistakes was in the numerous leak reports. PG&E's initial analysis of the condition of Line 132 for its 2004 Baseline Assessment Plan (BAP) failed to incorporate a number of defects including leak reports. These defects, which were not integrated and evaluated, are described in CPSD's and the NTSB's Reports. (CPSD-1, pp. 33-35; CPSD-9, p. 39.)[118]

PG&E argues that its GIS was not the main repository of leak information, but that leak records were kept in hardcopy form in local PG&E field offices.[119] PG&E claims that the NTSB and CPSD based its conclusions on missing GIS data, which was not where PG&E kept its leak records.[120] There was no mention of this in PG&E's direct testimony.[121] The reason that CPSD's testimony "failed to consider PG&E's incorporation of hardcopy data"[122] is that there is no reference to it in any of PG&E's direct testimony.

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[118] The defects are summarized in CPSD's Opening Brief, p. 44.

[119] PG&E OB, p. 65.

[120] *Ibid.*

[121] The sole reference occurred during the cross-examination of PG&E witness Keas. See PG&E OB, p. 65.

[122] *Ibid.*

However, the fact that leak records existed in field offices is not evidence that the records were integrated into PG&E's evaluation of potential threats. On the contrary, if the records were kept in hardcopy only, in local field offices, and not in GIS, this is strong evidence that the records were not integrated and considered. ASME B31.8S, Section 4.2.1, which is incorporated by reference in 49 CFR Part 192, requires operators to gather information about the pipeline such as past incident history, leak history, maintenance history, etc. The essence of the violation of Part 192.917(b) is that PG&E failed to integrate the leak history data into its identification and evaluation of threats to its pipelines. The fact that it remained hidden in hardcopy form in a field office does not mean that it was considered; in fact, Ms. Keas testified that it was only *after San Bruno* that PG&E collected "all leak records from local offices and create[d] a central data set of transmission leaks to assist Integrity Management personnel during data gathering."[123]

b) PG&E's GIS Errors Were Numerous

PG&E argues that its use of assumed values was appropriate and legal, and that its data was sufficiently accurate.[124] PG&E's used of assumed values was neither legal nor appropriate, and had catastrophic consequences, as discussed below.

(i) PG&E Illegally Used Assumed Values For Yield Strength When The Data Was Unknown

Another opportunity for PG&E to catch its mistakes was with the use of assumed values for yield strength. This was another instance of PG&E failing to follow the law that could have led to detection of potential threats.

Inarguably, where there is missing data, conservative assumptions must be used. (CPSD-1, p. 28.) However, with regards to yield strength, Part 192.107(b)(2) requires operators to use 24,000 psi if the data is missing. Thus, operators are not allowed to subjectively determine what they believe is a "conservative" value for SMYS when the

[123] See PG&E OB, p. 65, Footnote 334.

[124] PG&E OB, p. 65.

data is missing. However, two segments of Line 132 whose yield strength was unknown were assigned values of 33,000 psi and 52,000 psi, not 24,000 psi. (CPSD-9, p. 61.) PG&E claims that it does this because using values above 24,000 psi for yield strength is "consistent with the regulations and common across the pipeline industry."[125] This points to a policy of failing to comply with Part 192.107(b)(2). In addition, the yield strength of the pups in Segment 180 was unknown, yet PG&E assigned a value of 52,000 psi based on a similar purchase order from Consolidated Western. (CPSD-1, p. 20.)

PG&E does not dispute that it assigned values higher than 24,000 psi; instead, PG&E argues that it was legal for it to do so. PG&E argues that its "measured use of conservative assumed values [is] in accordance with ASME B31.8S." PG&E does not define what it means by "measured use", which appears to be a subjective opinion.

Also, it is important to note that PG&E defines "conservative" in relation to pipeline of a similar vintage and make.[126] Noticeably, however, PG&E does not define "conservative" as the lowest value in effect at the time. Thus, if the lowest yield strength value for similar Grade B pipe was 35,000 psi, PG&E might have used 40,000 psi or 45,000 psi. (CPSD-9, p. 61.) PG&E points out that Grade B pipe commonly has a SMYS value of 35,000 psig and was also available at intermediate grades above this value, as a justification for using values above 35,000 psi.[127] However, this demonstrates that PG&E did not use truly use *conservative* values, but instead it used *comparable* values.

In any event, with regards to yield strength the operator is not permitted to use values above 24,000 psi, pursuant to Part 192.107(b)(2). PG&E may use conservative values for other specifications, but not that one.[128] PG&E's argument that its use of

[125] PG&E OB, p. 67.

[126] PG&E OB, p. 66.

[127] *Id.*, at p. 68.

[128] No evidence was presented regarding for which categories it might be appropriate to use assumed values. For example, it is not clear why PG&E designated portions of Line 132 (including Segment 180) as "30 inch seamless". It would not be "conservative" for PG&E to use an assumed value of 30 inch

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"conservative" values for yield strength is consistent with industry norms is inapplicable, because Appendix A1.2 of B31.8S-2004 does not supercede Part 192.107(b)(2).

Appendix A1.2 of B31.8S-2004 does not explicitly state for which categories operators may use assumed values. It should be noted that there are some categories where it would not be appropriate to use assumed values, despite what Appendix A1.2 says. For example, Appendix A1.2 requires data for the year of installation, leak history, and past hydrostatic test information. Those are examples of data that cannot be assumed, because that data is specific to that segment only.

With regards to the data entry for year of installation, PG&E's records did not show that Segment 180 was first constructed in 1948 and later moved in 1956, which means that Segment 180 was in fact older than PG&E thought.[129] Did PG&E insert an assumed value for the date of installation, when it populated the GIS database in 1998, based on a journal voucher that contained incorrect information? If so, this mistake resulted in PG&E's failure to designate Segment 180 as containing a manufacturing defect based on its policy of considering pipeline over 50 years as containing manufacturing defects.

Appendix A1.2 also requires data for the leak history and past hydrostatic test information. Did PG&E assume that Segment 180 had no threat of leaks, because it had not recorded any of the leak history of Line 132 in GIS? Did PG&E assume that hydrostatic pressure tests had been done on Segment 180 because they had been performed on other pipelines? If so, these mistaken assumptions had catastrophic consequences, and illustrate why it is not always appropriate to use assumed values.

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seamless for the seam type, when no such pipe ever existed. In fact, Part 192.113 states "If the type of longitudinal joint cannot be determined, the joint factor to be used must not exceed that designated for 'Other.'" This is another example of PG&E failing to use conservative values, because the rule in Part 192.113 for "other" (i.e., unknown seam type) is that the joint factor should be lowered to 0.60, which has the effect of lowering the MAOP, per the design calculation.

[129] The GIS data for Segment 180 is summarized on page 65 of CPSD-1.

These are not examples of "hindsight" being 20/20. PG&E should have realized that its GIS was missing data such as leak history and past pressure tests for Line 132, but it did not. It ignored warnings by its engineers and management that Line 132 was missing records such as pressure tests. (CPSD-5, pp. 63-64 and CPSD-167, p. 885.) PG&E inaccurately identified the cause of a longitudinal seam leak on Line 132, identified on October 27, 1988. (CPSD-9, p. 109.)[130] Furnishing and maintaining safe natural gas transmission equipment and facilities requires that a natural gas transmission system operator know the location and essential features of all such installed equipment and facilities. (D.12-12-030, p.91.)

If PG&E had used an assumed yield strength of 24,000 psi for Segment 180 it would have calculated the MAOP at 300 psi. (CPSD-5, p.18.) Segment 180 failed at 386 psi. (CPSD-1, p. 8.) Thus, had PG&E lowered the MAOP on Line 132 in recognition that it had unknown or missing values for yield strength on some segments, it could have prevented the catastrophe. PG&E's failure to comply with the law had calamitous consequences.

(ii) The Existence Of So Many GIS Errors Proves That PG&E Did Not Review Its GIS Data For Accuracy

PG&E argues that two examples of deficiencies in the accuracy of its data are not sufficient to establish a violation of the law.[131] However, the law requires "*any* data applied in a risk assessment process" to be verified and checked for accuracy. (ASME B31.8S-2004, Section 5.7(e), incorporated by reference into Part 192.917(c).) Thus, any data that was not verified and checked for accuracy establishes a violation. CPSD is not

[130] In a clear example of how PG&E fails to ensure accurate data, when questioned about the leak data, PG&E stated that when it transitioned to its GIS in the late 1990s, only open (that is, unresolved) leak information was transferred. Closed leak information—such as the October 27, 1988, leak, which had been repaired—was not transferred to the GIS. (CPSD-9, p. 109.)

[131] PG&E OB, p. 68.

required to prove that PG&E's procedure always failed to verify and check the data for accuracy, as PG&E suggests.

The authors of ASME B31.8S apparently knew that in some circumstances, it is preferable to prescribe an approach or a method, in which case compliance would require that the overall procedures are examined. For example, the risk assessment approach "shall contain a defined logic and a structure to provide a complete, accurate and objective analysis of risk."[132] A risk assessment method "should be able to identify pipeline integrity threats previously not considered."[133] But with regards to certain things such as leak history, it states: "Any risk assessment shall consider the frequency and consequences of past events."[134] Likewise, with regards to the data used for the risk assessment process, it requires "any" data to be checked and verified for accuracy.

Thus, each GIS deficiency noted by CPSD (the erroneous 30 inch seamless designation on Segment 180 and other segments, the missing pup sections, etc.) establishes a violation.

In response to this, PG&E claims that considering each infraction to be a separate violation means that any single data error (among millions of data entries) could conceivably constitute a violation.[135] Apparently, PG&E believes that the law does not require full compliance, but perhaps something less. PG&E does not specify how much non-compliance is permissible, in their view. However, this objection has been raised to the Commission before.

In *In Re: Investigation into Southern California Edison Company's Electric Line Construction, Operation, and Maintenance Practices*, the "fundamental underlying dispute" between CPSD and Edison was the issue of whether failure to comply with any provision of any of the Commission's GOs is a violation that could subject Edison to

[132] Section 5.7 of ASME B31.8S-2004.

[133] *Ibid.*

[134] *Ibid.*

[135] PG&E OB, p. 70.

penalties. (D.04-04-065, 2004 Cal. PUC LEXIS 207, *5.) CPSD alleged that Edison violated GO 95 on 4,044 occasions. Edison argued that holding it responsible for each violation was "unprecedented and counterproductive", and would lead to exorbitant costs. Instead, Edison argued, failure to comply with the GOs in the first instance should be considered only a "nonconformance" or "variance" with the GOs. The Commission rejected that argument, finding that utilities are required to comply with relevant safety statutes, Commission GOs, and decisions. (D.04-04-065, Conclusion of Law #3.) The Commission bluntly stated: "If a utility fails to comply with a GO, it is violating that GO." (*Id.*, Conclusion of Law #4.) However, the Commission recognized that the cost of such a policy could be astronomical, and thus held that a utilities' limited resources "may be a factor in assessing penalties." But the fact that a utility may not be able to correct every violation instantly does not eliminate the existence of a violation. (*Id.*, Conclusion of Law #6.)

Thus, each and every data entry that is inaccurate establishes a violation. The fact that it might be exorbitant to fix every data entry mistake does eliminate the existence of a violation. The Commission may use its discretion in assessing a penalty for each violation, in light of the fact that it might be difficult to eliminate every mistake from PG&E's GIS. However, if the Commission adopts PG&E's view that maintaining a system that contains inaccurate data is not illegal, it would have no enforcement tool to ensure PG&E uses accurate data in its risk assessments, which would undercut the plain intent of the ASME standards, which state: "Inaccurate data will produce a less accurate risk result." (ASME B31.8S-2004, Section 5.7(e).) When there is "missing or questionable data" the ASME guidelines require an operator to proceed cautiously: "the operator should determine and document the default values that will be used and why they were chosen." (*Ibid.*) There is no evidence that PG&E documented why it chose to use default values for missing data. The existence of so many GIS errors clearly establishes a systematic violation with regards to inaccurate data, and calls into question whether PG&E ever attempted to "check" and "verify" the accuracy of its data in compliance with Section 5.7(e).

2. PG&E Illegally Disregarded The Real Threat To Its Pipelines From Cyclic Fatigue

CPSD alleges that PG&E illegally disregarded the very real threat of cyclic fatigue on its pipelines. (CPSD-1, p. 38.) It is undisputed that PG&E did not incorporate cyclic fatigue or other loading conditions into their segment specific threat assessments and risk ranking algorithm. (*Id.*, p. 50.) Essentially, PG&E dismissed cyclic fatigue as a threat. However, PG&E argues that this was consistent with industry practice, which "understood the threat of fatigue…to be negligible."[136]

However, Part 192.917(e)(2) unequivocally calls for cyclic fatigue to be evaluated as a threat, which PG&E did not do on Segment 180 or any of its lines. In addition, the incident in San Bruno proves that cyclic fatigue was a very real threat.

a) Industry Practice Is Irrelevant

In light of the clear language of Part 192.917(e)(2), industry practice is irrelevant. It states:

> *Cyclic fatigue*. An operator *must evaluate* whether cyclic fatigue or other loading condition (including ground movement, suspension bridge condition) could lead to a failure of a deformation, including a dent or gouge, or other defect in the covered segment. An evaluation *must assume* the presence of threats in the covered segment that could be exacerbated by cyclic fatigue. An operator *must use* the results from the evaluation together with the criteria used to evaluate the significance of this threat to the covered segment to prioritize the integrity baseline assessment or reassessment. [Emphasis added.]

PG&E argues that "cyclic fatigue was not considered a threat to natural gas pipelines before September 9, 2010" by operators in general.[137] However, the "consensus view" that cyclic fatigue did not pose an "appreciable risk" is irrelevant. Industry consensus does not excuse a violation.

CPSD's Report does not attempt to quantify the appropriate weight or risk score for cyclic fatigue, which cannot be done on a system-wide basis. However, CPSD

[136] PG&E OB, p. 74.

[137] *Ibid*.

alleges that it must be done for *each* "covered segment", assuming the presence of threats applicable to that segment. (CPSD-1, p. 28.) PG&E determined on a system-wide basis that cyclic fatigue was *never* a threat to *any* segment, based solely on industry practice.

The Commission should give no weight to industry practice, regardless of whether it conflicts the plain meaning of Part 192.917(e)(2).

b) There Is No Evidence That PG&E Evaluated Cyclic Fatigue As A Threat

After stating that it was the "consensus view" that cyclic fatigue was not a threat, PG&E goes on to state that its evaluation of the threat of cyclic fatigue was "legally adequate".[138] PG&E's evaluation that cyclic fatigue was never a threat to any of its pipelines was based solely on a report by Dr. Kiefner in 2007.[139]

PG&E's Integrity Management protocol matrix applicable in 2010 confirms that PG&E excluded the threat of cyclic fatigue by citing Dr. Kiefner's report on evaluating the stability of manufacturing defects. (CPSD-1, p. 51.) As a result, PG&E did not incorporate cyclic fatigue or other loading conditions into their segment specific threat assessments and risk ranking algorithm. (*Id.*, p. 50.) In other words, they dismissed cyclic fatigue for any pipeline, no matter when it was constructed.

PG&E claims that this was "legally adequate" because it was not required to "conduct a segment-by-segment fatigue calculation in order to properly evaluate the threat posed by cyclic fatigue."[140]

However, PG&E's conclusion that Dr. Kiefner's study establishes that cyclic fatigue is *never* a concern on *any* pipe segments is not supported by Dr. Kiefner's report. Dr. Kiefner's report says no such thing. In fact, the Kiefner report states that the risk of failure from cyclic fatigue on the segment being analyzed rises exponentially as the

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[138] *Id.*, p. 76.

[139] CPSD-1, p. 38. Kiefner, John F., "Evaluation of the Stability of Manufacturing and Construction Defects on Natural Gas Pipelines", USDOT final report 05-12R, April 2007.

[140] PG&E OB, p. 76.

pressure test level decreases toward 1.00. (CPSD-5, p. 32.) In the absence of documented pressure test records, PG&E should have assumed that there was no pressure test and analyzed the segment for the threat of cyclic fatigue per Part 192.917(e), and where the threat existed, PG&E should have further analyzed the segment as required by Part 192.917(e)(2). (*Ibid.*) This is especially true for Segment 180, which was shown in GIS as having no pressure test information. (CPSD-1, p. 65.)

In the conclusion section of Dr. Kiefner's report, it states:

> While the risk of a failure in a gas pipeline from pressure-cycle-induced fatigue is expected to be insignificant in most cases, it is relatively easy for an operator to assess the risk for a given segment. In this respect, it is a good idea for an operator to consider the **test-pressure-to-operating-pressure ratio** and the pressure-cycle spectrum of HCA-affected segments as part of the risk-assessment process. If the risk is insignificant, the operator needs only to reassess the pressure cycles from time to time to make sure the situation does not change. [Emphasis added.]

Thus, not only does Dr. Kiefner believe that each covered segment should be analyzed, but that *it is relatively easy for an operator to do so*. Further evidence that Dr. Kiefner's report does not support the conclusion that cyclic fatigue can be dismissed as a threat in all instances is Table 6 from Kiefner's report, which is reproduced on page 52 of CPSD's Report. For example, the table shows that if one assumes a pressure test to MOP ratio of 1.1, and a 6.53 inch defect, the predicted time to failure is 45 years. If one assumes a pressure test to MOP ratio of 1.04, and a 7.59 inch defect, the predicted time to failure is 24 years. Yet at page 4-30 of PGE-1, PG&E states: "the predicted times to failure due to cyclic fatigue in most gas pipelines were from 170 to 400 years, and therefore that gas pipelines were not at significant risk of failure from the pressure-cycle-induced growth of seam defects." This is only true if one ignores any variables, which Dr. Kiefner's report does not do. Using different variables as shown above, the predicted time to failure could be as little as 24 years. The time to failure calculation depends on the level of the test pressure, as well as the size of the defect. PG&E cannot assume that all of its pipelines have been pressure tested to the same pressure (or at all), nor can PG&E assume that there are no defects (or only tiny ones). (CPSD-5, p. 33.) The facts demonstrate that in many cases there were no pressure test records at all; for example, there were none for Segment 180.

Thus, Dr. Kiefner's report does not establish that cyclic fatigue is always a negligible threat. In fact, the opposite is true – Dr. Kiefner's report shows that an operator must know the pipeline characteristics and use that data in the calculation of the expected life of the pipeline, on a case-by-case basis.

c) PG&E Did Not Document Its Evaluation Of Cyclic Fatigue On Any Of Its Lines

At page 78 of its Opening Brief, PG&E appears to be claiming that CPSD agreed in 2010 that PG&E's evaluation of cyclic fatigue was appropriate. PG&E claims that it "explicitly informed PHMSA and the CPUC how PG&E had evaluated the threat of cyclic fatigue"; however, there is no citation to any evidence in the record that CPSD actually endorsed PG&E's cyclic fatigue policy.[141] PG&E goes on to state that "PHMSA and the CPUC identified no issues relating to PG&E's identification and evaluation of cyclic fatigue." Failure to notice the violations is not the same as an endorsement.

As discussed above, there are several reasons why CPSD's past audits of PG&E are irrelevant. Even if CPSD was aware that PG&E did not consider cyclic fatigue to be a threat (and there is no evidence CPSD was aware), this does not excuse a violation. But there is no evidence in the audits that CPSD endorsed PG&E's position that cyclic fatigue was not a threat. The audits merely show that CPSD did not find any violations based on the PG&E records it reviewed. The audits reprinted by PG&E in its Opening Brief do not show evidence that CPSD was aware that cyclic fatigue was not being considered by PG&E.

A review of Part 192.917(e)(2) reprinted above shows that an operator must do several things before dismissing cyclic fatigue threats – discover deformations, including dents or gouges, or other defects in the covered segment; evaluate whether cyclic fatigue

[141] PG&E OB, p. 78.

could lead to a failure of those defects; assume the presence of particular threats; develop criteria used to evaluate the significance of these threats; and apply the result of the evaluation together with the criteria to prioritize the covered segment for assessment.

To identify if a threat exists an operator must first do the analysis. PG&E could not produce any documentation to prove that the analysis was done.[142] It is clear that PG&E performed no analysis on a segment-by-segment basis.

d) Segment 180 Did Not Suffer From Cyclic Fatigue?

Next, PG&E makes the argument that Segment 180 "would not be expected to experience cyclic fatigue during its useful life" according to Dr. Kiefner, and therefore it was appropriate to determine there was no risk to Segment 180.[143] Here, PG&E demonstrates its disdain for the law and for safety. PG&E can only arrive at the conclusion that cyclic fatigue was not an issue by making the least conservative, worst assumptions.

Apparently, PG&E views regulations as obstacles to be avoided, rather than as good utility practices that ensure safety, for it is only by avoiding every requirement of Part 192.917 that it can arrive at the upside-down conclusion that cyclic fatigue was not an issue on Segment 180. Regulations are not design objectives around which some tolerance is acceptable, they are absolute limits. Systems should be engineered so that those limits are never exceeded.

A bit of explanation is in order. The older guidelines (ASME B31.1.8-1955) required post-installation hydrotesting on new pipelines. The new IM regulations (Part 192, Subpart O, Section 921(a)) allowed operators to "select the method or methods best suited to address the threats identified to the covered segment"; which was not necessarily hydrotesting. However, before selecting the assessment method, Part 192.921(c) requires that operators make a thorough assessment of the particular

[142] CPSD-5, p. 31.

[143] PG&E OB, p. 80.

threats to the covered segment pursuant to Part 192.917. In other words, the rules permit operators to avoid performing expensive hydrotesting, but only if they conduct an extensive gathering of data and analyze it carefully to ensure that it is appropriate to select a different assessment tool.

In order to select the best assessment tool, Part 192.917 states that operators must:

- identify and evaluate all potential threats to each covered pipeline segment;
- consider threats such as internal corrosion, external corrosion, and stress corrosion cracking;
- consider human error, third party damage and outside force damage;
- gather and integrate existing data;
- gather and evaluate the set of data specified in Appendix A to ASME/ANSI B31.8S;
- consider both on the covered segment and similar non-covered segments, past incident history, corrosion control records, continuing surveillance records, patrolling records, maintenance history, internal inspection records and all other conditions specific to each pipeline;
- analyze the covered segment to determine the risk of failure from manufacturing and construction defects (including seam defects);
- assess inspect seams if the covered pipeline segment contains low frequency electric resistance welded pipe (ERW); and
- *evaluate whether cyclic fatigue could lead to a failure.*

Rather than comply with all of these requirements and make an honest determination, PG&E attempted to minimize each requirement so that PG&E could do as little as possible. This is especially true with evaluation of cyclic fatigue. PG&E took the narrowest, worst view of Part 192.917(e)(2), which allowed it to completely avoid expending any real time or effort on evaluating individual segments.

PG&E did this not only with cyclic fatigue, but with every requirement of Part 192.917. For example, PG&E ignored potential seam issues on DSAW pipe from Consolidated Western. PG&E ignored seam issues known to exist on pre-1970s ERW pipe. PG&E ignored maintenance history, internal inspection records, leak histories, and all other conditions specific to each pipeline.

In its Opening Brief, PG&E's true identity leaks out. By claiming that there was no cyclic fatigue threat on Segment 180, PG&E shows its disdain for the legal requirements of Part 192.917. PG&E did the absolute minimum it thought it could get away with, and now attempts to make the insulting claim that Segment 180 never had any cyclic threat, based on a delusional view that it can only be held accountable for what it claims it knew, even if that knowledge is based on missing records, inaccurate data, and reckless disregard of the abundant evidence of potential threats. However, once again, the evidence demonstrates that PG&E's view is self-delusional. Both the NTSB and CPSD conclusively found that fatigue was a major factor in the failure of Segment 180 and was a threat on Line 132. (CPSD-1, p. 50; CPSD-9, pp. 43-45.) *Even PG&E's witness found that Segment 180 suffered from cyclic fatigue.*[144]

PG&E missed every opportunity to detect and rectify the flaws in Segment 180. Now, having violated every law that required it to gather existing data, use conservative values for unknown data, assume the presence of threats if data was missing, etc., PG&E claims that Segment 180 was perfectly fine the way it was, and was at no risk of cyclic fatigue cracking, even though fatigue cracking is one of the root causes of the explosion.

3. PG&E's Threat Identification Was Inadequate

Another way that PG&E could have caught the mistakes before the explosion occurred is in its identification of potential threats involving seam defects. This is not merely "hindsight" because PG&E had in its possession reports that demonstrated that there were potential issues with the DSAW pipe used by PG&E (as described below).

Yet PG&E claims that there were no known potential manufacturing defects on Line 132, and that its threat identification process satisfied regulatory requirements.[145] Part 192.917(a) states: "An operator must identify and evaluate all potential threats to

[144] Dr. Caliguiri stated: "Two additional factors were also necessary to cause the pipeline failure in San Bruno: (i) ductile tearing at the root of the exterior longitudinal seam weld on Pup 1; and (ii) fatigue cracking that initiated and grew from the ductile tear slowly over time by the action of normal operational pressure fluctuations in the pipeline." (Emphasis added. PGE-1, p. 3-6.)

[145] PG&E OB, p. 81.

each covered pipeline segment." CPSD's testimony documents that PG&E failed to identify cyclic fatigue, DSAW pipe, and ERW pipe, as potential threats to its pipelines. A detailed discussion of these three failures is in CPSD's Opening Brief, at pages 44-47.

a) The Leak Records In PG&E's Possession Were Significant, But Ignored

The investigation documented a number of defects that were not incorporated into PG&E's initial analysis of the condition of Line 132 for its 2004 BAP. (CPSD-1, pp.33-35; CPSD-9, p.39.) These defects, all related to seam weld issues, are summarized at pages 43-44 of CPSD's Opening Brief. CPSD alleges that the failure to analyze these seam weld issues resulted in an incomplete understanding of this manufacturing threat as it applied to Line 132. (CPSD-1, p. 33.) CPSD's Report notes that "of particular importance… are the longitudinal seam weld defects discovered during radiography of girth welds during the 1948 construction." (CPSD-1, p. 33.) The seam weld defects noted in the 1948 radiography were on 30 inch diameter pipeline in Line 132 built in 1948. Segment 180 was 30 inch diameter pipeline in Line 132, first built in 1948 (and later moved). (*Id.*, p. 15.) In other words, Segment 180 was constructed with 1948 DSAW pipe on which there were known seam weld defects.

(i) The Regulations Specifically Call For "Leak History" To Be Considered

PG&E also claims that "leak histories" were irrelevant except for corrosion, and thus no cause for concern.[146] PG&E thus argues that it was "not required to review leak records for purposes of determining the potential for a manufacturing threat." Again, PG&E takes the narrowest view of the law in order to avoid having to comply with it. Table 1 of Section 4.3, ASME B31.8S-2004, specifically calls for PG&E to consider "leak/failure history". Yet PG&E focuses narrowly on "nonmandatory" Appendix A of ASME B31.8S-2004, Section A1.2, which calls for consideration of "leak history", as it relates to external corrosion threats. PG&E interprets this to mean that Section A1.2

[146] PG&E OB, pp. 81-82.

somehow prevented PG&E from considering the leak history for purposes of determining the existence of manufacturing threats. However, both CPSD and the NTSB consider the requirement to consider leak history to be relevant more broadly, because leaks can demonstrate problems with welds, not just corrosion. (CPSD-1, p. 26; CPSD-9, p. 39.) In addition, the NTSB specifically noted that PG&E's risk management procedures, RMP-01, calls for it to "develop and maintain an inventory of all pipeline design attributes, operating conditions, environment (structure, faults, etc.), threats to structural integrity, <u>leak experience</u>, and inspection findings." (Emphasis added. CPSD-9, p. 59.) This catalogue of "leak experience" is supposed to be maintained in the PG&E GIS database, and used to calculate risk for each pipeline segment. (*Ibid.*)

In addition, the NTSB noted:

> [PG&E's] RMP-05 contains the algorithm for *design/material threats* and also addresses construction threats. It includes weighted factors for pipe seam design, girth weld condition, material flaws or unique joints (such as pre-1950 miter bends), pipe age, MOP versus pipe strength, *leak history*, and test pressure.

(Emphasis added. CPSD-9, p. 62.)

Thus, PG&E's own Risk Management Procedures viewed the requirement to analyze leak data more broadly; prior to the San Bruno explosion, PG&E *itself* knew leak data is important and should be considered. It is not plausible for PG&E to *now* claim that leak histories for its pipelines were relevant *only* to corrosion threats. PG&E's internal procedures, RMP-01 and RMP-05, which contained algorithms for calculating material threats (not just corrosion threats), demonstrate that a pipeline's leak history is important. Leak histories are not, as claimed by PG&E, only important for external corrosion threats, and of little or "marginal value" to material threats.

(ii) PG&E Should Not Have Discounted The 1988 Leak Incident On Line 132

In yet another example of PG&E missing an opportunity to catch the flaws in its system, PG&E did not record anything about the seam weld leak on a segment of Line 132 that was close to Segment 180. PG&E notes that the 1988 leak on Line 132 was repaired, and thus the remaining pipe was "fully operational" and nothing further was required.[147] PG&E therefore concludes that it was appropriate to disregard (that is, PG&E did not include any reference to the 1988 leak in GIS) because it was no longer a threat. Apparently, PG&E repaired the leak on Line 132 and never considered that it might be important to analyze whether the leak indicated the possibility of defects.

Furthermore, PG&E ignores CPSD's legal argument that the failure to include and analyze the 1988 leak data is another example PG&E's failure to realize and evaluate potential threats. As noted by the NTSB, failure to consider the 1988 leak on Line 132 is "another defect not considered in the integrity management plan". (CPSD-9, p. 111.) CPSD's Report concludes that "the 1988 leak … at the very least identifies probable defects on Segment 181's long seam weld, and potentially unstable defects." (CPSD-5, p. 24.) Instead of addressing CPSD's and the NTSB's findings, PG&E merely asserts that "leaks of this type" do not "lead to pipeline ruptures".[148] Thus, without any support, PG&E concludes that the 1988 leak was "not relevant".

Nor is the 1988 leak insignificant, as suggested by PG&E, and thus deserving of little attention. A PG&E internal memorandum indicates that there were significant concerns regarding the weld defects on that section of pipeline. The PG&E "Technical and Ecological Services" memo of March 1, 1989, that examined the 1988 leak incident, identifies significant defects with the longitudinal weld, stating:

> The X-ray and subsequent metallographic examination Identified several weld shnnkage [sic] cracks, but they did not extend through wall. The cracks are pre-service defects, i e , they are from the onginal [sic] manufacturing of the pipe joint….overall, the x-ray inspection showed the weld to be of low quality, containing shrinkage cracks and voids, lack of fusion, and inclusions. Although the actual leak could not be found, it is likely that it was related to one of the weld defects. (Mistakes are in the original. CPSD-5, p. 22.)

[147] PG&E OB, p. 83. Line 132 had experienced a longitudinal seam leak in October 1988 at MP 30.44, about 8.78 miles south of the San Bruno rupture. Until May 6, 2011, the PG&E GIS had listed the cause of the leak as "unknown." However, as a result of records discovered during a PG&E post accident records search, information was added to indicate that 12 feet of Line 132 had been replaced "due to a longitudinal defect." (CPSD-9, p. 38.)

[148] PG&E OB, p. 83.

A leak survey inspection and repair report dated October 27, 1988, classified the cause of the leak as a "material failure" and indicated that a material failure report was prepared, but PG&E could not locate any such report. (CPSD-9, p. 38.) Apparently, in 1988 PG&E completely discounted the leak on Line 132, even though the records (at the time) indicated that the leak was related to a "longitudinal defect" and very close in proximity to Segment 180. (*Ibid.*)

(iii) The 1948 Construction Records And The Known Seam Issues With 1950's Consolidated Western DSAW Pipe Should Have Caused PG&E To Prioritize Segment 180 For Assessment

CPSD alleges PG&E violated Part 192.917(e) and (e)(3)(i), by not determining the risk of failure from manufacturing and construction defects of Line 132, and also by not prioritizing the covered segments as high risk after operating pressure increased above the maximum operating pressure experienced during the preceding five years. (CPSD OB, Appendix B, p. 3; CPSD-1, p. 26, p. 42.) Part 192.917(e) applies "If an operator identifies any of the following threats…" including cyclic fatigue, corrosion, and ERW pipe.

PG&E attempts to avoid its obligation to determine the risk of failure from such defects, by claiming that the defects simply do not exist. That is why PG&E argues that "long seam imperfections identified during the 1948 radiography do not constitute unstable manufacturing threats."[149] Again, PG&E very narrowly defines manufacturing threats for the purpose of finding that none exist, instead of taking a more conservative approach that considers safety first.

One of PG&E's rationales for not taking a broad view of threats is that PG&E was concerned that "artificially inflated risk scores" could detract needed resources from truly

[149] PG&E OB, p. 84.

high risk segments.[150] The supreme irony, of course, is that this narrow view resulted in Segment 180 being overlooked for design/construction threats, when in fact it *was* high risk and should have been prioritized for assessment using an appropriate tool External Corrosion Detection Assessment (not ECDA). Had PG&E taken a more expansive view of the existing threats, PG&E would likely have prioritized Segment 180 for assessment for more than just corrosion. PG&E's flawed safety culture caused it to minimize certain threats in order to maximize profits.

If Segment 180 had been properly assessed, PG&E may have noticed the missing test pressure records, the inaccurate GIS entries for 30 inch seamless pipe, or the existence of 1950's era Consolidated Western DSAW pipe in similar segments, which was noted in the "Integrity Characteristics of Vintage Pipelines" report, referenced by PG&E in its first revision of RMP-06, as having manufacturing defects, including seam and pipe body defects. (CPSD-1, p. 41.)

PG&E's RMP-06 considered potential manufacturing defects to exist for pipeline segments that were installed more than 50 years ago. Again, had PG&E realized that Segment 180 was originally constructed in 1948 and later moved, it would have seen that it was over 50 years old, and considered it to have manufacturing defect threats. PG&E's policy was to consider pipeline over 50 years old to have manufacturing defects. For example, according to PG&E, Segment 181 was identified in its 2004 BAP as subject to a potential manufacturing threat, due *solely* to the fact that the pipe in Segment 181 was *over 50 years old*. (PGE-1, p. 4-16.) In yet another example of PG&E missing an opportunity to catch its mistakes, PG&E's records did not show that Segment 180 was also over 50 years old by 1998.

However, the essence of the alleged violation of Part 192.917(e) is not that PG&E failed to recognize the existence of a threat; it is that PG&E *never even considered the possibility*. PG&E appears to believe that the risk of failure must be 100% before it will take action. In fact, Part 192.917(e) requires an operator to perform an analysis to

[150] PG&E OB, p. 68, Footnote 348.

determine the risk of failure. Identifying a potential threat is merely the first step to determining the risk, and may not necessarily lead to hydrotesting or replacement. By ignoring potential threats, PG&E avoided doing the analysis.

(iv) Other Seam Issues Noted By CPSD

PG&E argues that the other miscellaneous seam weld issues noted by CPSD and the NTSB are not informative.[151] PG&E states that these other seam issues "would not meaningfully inform integrity assessment of that pipeline." PG&E makes this bald assertion without ever explaining why these other seam weld issues would not be informative. Apparently, PG&E does not dispute that these other defects were not incorporated into PG&E's baseline assessment.

PG&E refers to them as "miscellaneous seam weld issues", but both CPSD and the NTSB refer to them as "seam defects". In another attempt to minimize and narrowly define its obligations, PG&E dismisses these as mere "issues" and argues that it was inappropriate to incorporate and evaluate them. However, both CPSD's engineers and the NTSB's engineers considered these defects to be serious enough to be noted in their reports. Examining the underlying causes of each seam defect listed in CPSD's Report would require more resources and time than we have here, and it is unnecessary.[152] The investigating engineers have culled through thousands of documents and determined that these incidents are serious and relevant. This conclusion led CPSD and NTSB investigators to believe that the defects should have been included in PG&E's baseline assessment for IM.

The 2002 Pipeline Safety and Improvement Act required operators to establish a baseline assessment that identified threats to each covered pipeline segment. Part 192.911(c) required operators to use the threat identification and risk assessment described in Part 192.917 to prioritize covered segments for assessment. CPSD's

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[151] PG&E OB, p. 85.

[152] The other seam weld issues are summarized on pages 43-44 of CPSD's Opening Brief, from CPSD-1, pp. 33-35 and CPSD-9, p. 39.

allegation is that PG&E failed to include serious and relevant seam defects in its baseline assessment of threats to its pipelines, and then failed to perform testing using a method capable of detecting seam issues. (*See* CPSD's Opening Brief, Appendix B, p. 3.) PG&E does not dispute that it did not include these defects in its assessment of threats.

Instead, PG&E defines the threats narrowly in order to avoid its obligations under law. PG&E dismisses each seam defect by finding a reason, any reason, to minimize the risk from the defect. Minimizing and ignoring seam defects on its pipelines resulted in lower risk scores, which resulted in fewer or less rigorous tests for PG&E to perform.

However, a review of the seam defects shows that they do in fact appear serious and relevant. PG&E argues that some of them are on pipelines with a different diameter; some of them have been misinterpreted; and some of them were only found later.[153] Yet how can PG&E explain that a seam leak in DSAW pipe in Line 300B in 1958 is so irrelevant that it should not have been considered in the baseline assessment?[154] That is a mere two years after the construction of Segment 180, and both are DSAW pipe. What about the cracking of the seam weld in DSAW pipe in Line 109 in 1996, which tied in to Line 132?[155] How can PG&E explain why it *never even considered* the following defects for Line 132:

- 1948, *Line 132*: Multiple longitudinal seam cracks found during radiography of girth welds during construction.
- 1964, *Line 132*: A leak was found on a "wedding band" weld; the leak was the result of construction defect.
- 1988, *Line 132*: Longitudinal seam defect in DSAW pipe.
- 1992, *Line 132*: Longitudinal seam defect in DSAW weld when a tie-in girth weld was radiographed.
- 2002, *Line 132*: During a 2002 ECDA assessment, miter joints with construction defects were found.

[153] PG&E OB, p. 85.

[154] CPSD-9, p. 39.

[155] *Ibid.*

- 2009, *Line 132*: A leak was found on Segment 189 that was caused by a field girth weld defect. Segment 189 was originally fabricated by Consolidated Western using DSAW and installed in 1948.
- 2009, *Line 132*: During the ECDA process, a defective SAW repair weld was found on Segment 186. As indicated in PG&E's pipeline survey sheet, the segment was originally fabricated by Consolidated Western using DSAW and installed in 1948.

(CPSD-1, pp.33-35; CPSD-9, p.39)

Simply put, PG&E should have *at least* considered these defects in determining the presence of threats, which it did not do.

b) Assessment Of Segment 181 Would Have Led To Discovery Of The Misidentification Of Segment 180

Another way in which PG&E could have prevented this accident is that PG&E's records showed the existence of 30 inch DSAW pipe in Segment 181, the adjoining segment to Segment 180. CPSD's (rather straightforward) argument with regards to Segment 181 is that when PG&E identified Segment 181 as DSAW pipe over 50 years old, this should have led to a discovery that Segment 180 was also DSAW over 50 years old, and should have been tested.

CPSD's Report states that PG&E identified Segment 180 as *not* having a manufacturing threat from DSAW pipe (because its records inaccurately showed 30 inch seamless), but Segment 181 *was* identified by PG&E as having the DSAW manufacturing threat (because the records were accurate for Segment 181). (CPSD-1, p. 46.) There were two overpressurization[156] events – December 2003 and December 2008. (*Id.*, p. 44.) Because of these two pressure increases, PG&E should have conducted testing using a method capable of detecting seam defects on Segment 181 in compliance with Part 192.917. If PG&E had tested Segment 181, it would have either tested the adjoining segment, 180, or cut into Segment 181 at the joining with

[156] As discussed immediately below, PG&E did not consider either of these overpressurizations to be such, despite PHMSA's guidelines which state that any increase in the MOP, regardless of how small, makes a non-pressure tested pipeline or segment unstable.

Segment 180, and would have either failed the pressure test at one or more of the pups in Segment 180, or noted that Segment 180 was seamed pipe and the information in the GIS was in error. (CPSD-5, p. 23.) This is a logical outcome based on what PG&E's records actually showed.

PG&E expends several pages attempting to refute this logic, but it fails. PG&E attempts to disprove this allegation are as follows.

(i) Segment 181 Was Constructed With DSAW Pipe That Was Known To Have Manufacturing Threats

First, PG&E argues that Segment 181 was constructed with DSAW pipe, which was not known to have any manufacturing threats.[157] PG&E concludes that it was appropriate that PG&E did not consider there to be any threats from DSAW pipe. PG&E states: "Threats that are not related to the long seam do not require the operator to conduct a seam assessment." However, PG&E misses the point entirely. It is *undisputed* that Segment 181 was identified in 2004 as subject to a potential manufacturing threat, due to the age of the pipe.[158] Under Part 192.917(e), if there is an overpressurization on a covered segment the operator must consider *any* threats to be unstable, and must assess the threat using some form of appropriate testing. Thus, testing should have occurred *regardless* of whether the threat was due to the age of the pipe or because of known seam issues.

On a side note, PG&E incorrectly characterizes CPSD's position with regards to DSAW pipe. CPSD has never stated that all DSAW pipe, regardless of the year it was made or the manufacturer, is suspect. CPSD cites the "Integrity Characteristics of Vintage Pipelines" report, a report referenced by PG&E in the first revision of RMP-06, which identifies some DSAW as having manufacturing defects, including seam and pipe body defects. (CPSD-1, p. 41.) Table E-6 of that report identifies seam leak incidents

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[157] PG&E OB, p. 87.

[158] PG&E OB, p. 87.

associated with certain manufacturers during certain years related to pipe body and seam weld defects for DSAW pipe, including DSAW pipe manufactured by Consolidated Western in the 1940's from which Segment 180 was constructed. (*Ibid.*)

In addition, CPSD notes that in the 1949 Moody Engineering Report on a subsequent pipe purchase, it was noted that some of the steel used by Consolidated Western, at that time owned by US Steel, was supplied steel plate by Kaiser and Columbia (also owned by US Steel). (CPSD-5, p. 24.) Both Kaiser and US Steel are identified in Table E-6 as having incidents associated with the pipe body during certain years of manufacture. (*Ibid.*)

Taken together, the INGAA report and the Moody report, both of which PG&E had in its possession and were mentioned in RMP-06, demonstrate that CPSD is correct to allege that certain DSAW pipe was suspect. CPSD never claimed that all DSAW pipe is suspect.

(ii) Any Pressure Increase, No Matter How Small, Renders A Defect "Unstable"

Second, PG&E claims that the overpressurizations in 2003 and 2008 were not violations, for two reasons: 1) the December 2003 overpressurization occurred prior to the IM rules becoming applicable; and 2) the December 2008 was too insignificant to consider.[159] Pursuant to Part 192.917(e)(3)(i), if the pressure increases above the maximum pressure reached in the 5 years preceding identification of HCAs, any defects must be considered unstable and must prioritize the covered segment as a high risk segment for the baseline assessment or a subsequent reassessment. (CPSD-1, p. 42.)

PG&E points out that it filed its HCA identification in its Baseline Assessment Plan (BAP) in December 2004. In the 5 years preceding 2004, the pressure on Line 132 of 402.60 psi was the highest pressure (in December 2003). Thus, PG&E argues, it did

[159] PG&E OB, p. 89.

not have any pressure excursions after December 2004 that exceeded 402.60 psi, and thus it did not violate Part 192.917(e)(3)(i).

However, the date PG&E filed its HCA identification report *is not the same as the date it actually identified* the HCAs in its system. The plain language of the law indicates that it is the date the HCAs are *identified* that is controlling, not the date PG&E filed a form showing that it had conducted its HCA identification.

On a document obtained from PG&E and entered into evidence as a separate exhibit (Joint-40, "Year 2004 Line 132 ECDA Survey"), it shows that Segment 180 had already been assessed for an ECDA survey, which was part of PG&E's efforts to comply with the new IM regulations. The IM regulations apply to HCAs; therefore, Part 192.911 states that an operator must first identify its HCAs. Thus, PG&E would only have conducted ECDA on Segment 180 if it had already identified Segment 180 as being in an HCA. The date for the ECDA survey on Segment 180 was December 9, 2003. (Joint-40; CPSD-1, p. 43; CPSD-5, p. 30.) Thus, PG&E had *actually identified* Segment 180 as an HCA prior to December 9, 2003, which means that the overpressurization of 402.60 psi[160] was higher than any previously recorded pressure in the 5 years preceding that date.

PG&E further argues that it could not have identified HCAs in 2003 "because the definition of an HCA had not been finalized or codified in the integrity management regulations."[161] However, PG&E is wrong. The 2002 Pipeline Safety and Improvement Act was signed into law on December 17, 2002. (CPSD-1, p. 25.) PHMSA noticed the new regulations on December 15, 2003. (*Ibid.*) Operators were to have IM plans developed and to have identified all HCAs "no later than December 17, 2004." (*Ibid.*) Thus, the definition of an HCA was already signed into law prior to when the evidence shows PG&E actually identified its HCAs. The operators were supposed to identify all

[160] On December 11, 2003. (CPSD-1, p. 44.)

[161] PG&E OB, p. 90.

HCAs no later than December 17, 2004; but PG&E misreads the law to mean that it cannot designate any HCAs prior to December 17, 2004, which is plainly wrong.

Therefore, not only was it theoretically possible for PG&E to know the definition of an HCA, but PG&E had actually identified HCAs, including Segment 180, by December 9, 2003, as proven by Joint-40. It is difficult to understand how PG&E can claim that it did not know what "HCA" meant in 2003, if it had already identified some HCAs and conducted ECDA surveys.

PG&E also argues that Part 192.917(e)(3) "was intended to address changed operating conditions, not transient excursions like that on Line 132 in 2008."[162] In order to reach this conclusion, PG&E must give Part 192.917(e)(3) the most narrow and illogical reading, and must do the same with PHMSA FAQ 221. FAQ 221 states:

> Relative to the requirement in 192.917(e)(3)(i), how much pressure increase (above the maximum experienced in the preceding five years of operation) will trigger the requirement to treat the segment as high risk for purposes of integrity assessments.
>
> The rule specifies that any pressure increase, regardless of amount, will require that the segment be prioritized as high risk for integrity assessment.

PG&E attempts to read into this rule the provision that this applies to "changes in operating conditions"[163]; however, those words do not appear and there is no logical reason to include them. In any event, it is not clear what that phrase means, or how it would change the meaning of FAQ 221.

Even though small, pursuant to Part 192.917(e)(3) and FAQ 221 the December 2008 pressure increase was above MAOP, and thus should have been considered by PG&E as causing any threats to have become unstable.

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[162] PG&E OB, p. 91.

[163] PG&E OB, p. 92.

4. PG&E Had Foreknowledge That Choosing ECDA As Its Primary Assessment Tool Was Insufficient; It Is Not Merely "Hindsight"

PG&E argues that only "based on hindsight rather than information available to PG&E prior to the San Bruno accident" can CPSD conclude that PG&E should have used better assessment tools.[164] PG&E states that it identified external corrosion as the primary threat to Segment 180 and concluded that ECDA was the appropriate assessment methodology to use. PG&E's argument is belied by the fact that PG&E's own engineers warned against choosing ECDA over other methods, discussed below.

Also, it is not acceptable that PG&E only knew of the potential seam defects in hindsight. PG&E should have known that there were other threats besides external corrosion. Only through a series of egregious oversights did PG&E maintain ignorance about threats from seam defects. For example, PG&E did not maintain the records showing the existence of the pups, which had severely compromised seams. (CPSD-1, p. 66.) PG&E ignored the 30 inch seamless designation, even though no such pipeline ever existed. (*Ibid.*) PG&E ignored the "Integrity Characteristics of Vintage Pipelines" report that identifies some DSAW from some manufacturers as having manufacturing defects, including seam and pipe body defects on the type and year of pipeline purchased for Segment 180. (*Id.*, p. 42.) PG&E failed to perform hydrotesting on Segment 180, even though the industry guidelines called for it. (*Id.*, p. 65.) PG&E did not record the leak history for Line 132 in its GIS, which could have alerted PG&E to potential seam defects, even though ASME B31.8S-2004, Section 4, "Data Elements for Prescriptive Pipeline Integrity Program", call for "leak/failure history" to be gathered and analyzed. (*Id.*, p. 26.) PG&E failed to consider cyclic fatigue in its risk algorithms, failed to evaluate cyclic fatigue on a segment-by-segment basis, and disregarded cyclic fatigue for any of it pipelines ever. (*Id.*, p. 38.) PG&E's risk-ranking weighted "design/materials"

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[164] *Ibid.*

only 10%, when its real-world experience from 2004-2010 showed that 24% of incidents were due to "desing/materials" defects. (*Id.*, at pp. 55-56.)

All of the threats above involve potential seam issues, and none of them were knowable only in "hindsight". PG&E could have noticed that Segment 180 was over 50 years old, and thus conducted an analysis of the threats on that Segment. PG&E could have noticed the missing leak history in GIS. PG&E could have evaluated cyclic fatigue threats on each segment. And on and on.

Pursuant to Part 192.921(a), an operator must select the method best suited to address the threats identified. Assessment technologies proven to detect seam issues include In Line Inspection (ILI) and hydrostatic pressure testing, but not ECDA. (CPSD-1, p.47.) Had PG&E noticed any of the potential seam defects, it should have chosen an assessment tool capable of detecting them, not ECDA.

PG&E's emphasis on cheaper, but less thorough, integrity management assessment methods and reduction of such assessments is discussed at length on pages 86 – 88 of CPSD's Opening Brief. But it is worth repeating that PG&E knew in February 2004 that Southern California Gas Company "made a business decision to primarily utilize ILI as their integrity assessment method" and was "proposing to pig approximately six times the mileage under the Pipeline Safety Rule than PG&E."[165]

And further, that PG&E's 2008 Gas Transmission Expense Program Review stated: "*Gas Engineering would strongly prefer to smart pig PG&E's higher stress pipelines to obtain a much better initial evaluation of the line, but that is not financially viable at current funding rates.*"[166] Thus, PG&E's own engineers warned PG&E that ILI was strongly preferable to ECDA. It was only due to self-imposed budget constraints that PG&E chose ECDA.

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[165] CPSD-168 (Harpster), p. 6-12, CPSD-232 (OC-268, Att. 5).

[166] CPSD-168 (Harpster), p.7-8, CPSD-186 (OC-68, Att. 3, p. 2) (emphasis added); CPSD-230, (OC-264 and OC-264, Supplemental, Att. 6, p. 9).

C. Recordkeeping

As discussed in CPSD's Opening Brief, PG&E's recordkeeping violations are being addressed in I.11-02-016, to avoid redundant allegations.

D. SCADA and The Milpitas Terminal

PG&E claims that 1) it did not have multiple deficiencies in its Control System at the Milpitas Terminal that led to a loss of pressure; and 2) the response by its Gas Operators was not delayed by deficiencies in the SCADA system.[167] PG&E claims the evidence does not support these allegations. However, the facts are indisputable that the control system at Milpitas failed for a time on September 9, 2010, which caused the pressure to rise and Segment 180 to rupture. (CPSD-1, p. 70.) Also, the facts overwhelming show that PG&E did not have adequate procedures in place for recognizing abnormal operating conditions, which led to delay and confusion. (*Ibid.*) Each of PG&E's arguments are disputed below.

1. PG&E Lost Control Of The Pressure On Pipelines Leaving The Milpitas Terminal

PG&E argues that its "redundant pressure limiting system operated as designed and kept pressure on the outgoing pipelines below the MAOP and well below regulatory limits."[168] However, this is like arguing that the brakes in your car did not fail because you used the emergency brake to stop to the car. PG&E appears to believe that it is perfectly normal that its pressure controls failed and the emergency system activated, and that there was no risk to anything or anyone. The results of September 9, 2010, show this to be wrong.

The facts show that the work to replace the UPS at the Milpitas Terminal on September 9, 2010, did not go as planned, and PG&E was unprepared for the chain of events begun by poorly planned and executed work on aging and obsolete equipment. At 5:21 p.m., about 20 minutes after PG&E workers completed installing mini-UPS units at

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[167] PG&E OB, p. 97.

[168] PG&E OB, p. 98.

Milpitas Terminal, PG&E's automatic pressure control of its pipelines was lost. (CPSD-1, p. 95.) This was caused by a short circuit on a piece of wire in the pressure feedback circuit in the Control System equipment enclosure. (*Ibid.*) The short circuit started a cascade of failures in the gas pressure sensors and pressure controls which lasted for over 3 hours. (*Ibid.*) The pressure feedback value received by the controllers was zero or low which caused the automatic pressure controllers to drive the regulating valves to 100% open. (*Ibid.*) This caused the outgoing gas pressures in the pipelines from Milpitas Terminal to rise. (*Ibid.*) As a result, the pressure on Segment 180 rose to 386 psi, above any level it had seen in the past 7 years, because the functional MAOP on Line 132 was 375 psi due to a cross-tie with Line 109.[169] (CPSD-1, p. 7.)

Because of the malfunctions at Milpitas, the Gas Operators in San Francisco lost the ability to monitor and control the valves at Milpitas Terminal, because the SCADA system was displaying inaccurate information. (CPSD-1, p. 95.) A PG&E worker had to manually apply valve pressure gauges to verify and report pressure readings and positions of regulating and monitoring valves to Gas Operators at PG&E's Control Center. (*Ibid.*) The worker was instructed to manually close certain valves and lower monitor valve set points. (*Ibid.*) About 40 minutes after pressures began rising in the gas discharge header at Milpitas Terminal, Line 132 ruptured.

Thus, for a time, PG&E had literally no idea of the pressures in its lines, and the pressure was rising uncontrollably. Only because the "monitor valves" which are basically a safety feature, operated, did PG&E control the pressure from exceeding the maximum allowable pressure. Even so, the loss of control and rise in pressure caused pressure at Segment 180 to rise to 386 psi. This was the *highest recorded pressure*[170] on Segment 180, and directly contributed to the rupture. (CPSD-1, p. 91.)

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[169] Although 386 psi was the highest recorded pressure on at the nearest measurement point to Segment 180, the actual pressure on Segment 180 would likely have been higher than that. (CPSD-5, p. 12.) CPSD engineers stated that because of differences in elevation, certain points on the pipe that are at a lower elevation will see higher pressures. Based on CPSD staff's field investigation, the pups in Segment 180 were located at a lower elevation than the rest of the segment between the tie-ins. (*Ibid.*)

[170] Because Line 132 intersected with Line 109, which had an MAOP of 375 psi, the effective MAOP on
(continued on next page)

A review of the work clearance procedures demonstrates that PG&E did not anticipate a loss of control of pressure, and was not prepared for it. By failing to follow the work clearance procedures requirements, PG&E violated Part 192.13(c). By failing to maintain adequate written procedures for maintenance and operations activities under abnormal conditions, PG&E violated Part 192.605(c). While CPSD concedes that the MAOP on Line 132 may not have exceeded 400 psi, CPSD does not concede that the unplanned outage and loss of pressure control at Milpitas was not dangerous, in violation of Section 451.

PG&E's Opening Brief does not address CPSD's important finding that Milpitas was kept in a dangerously unsafe condition, in violation of Section 451, because of defective electrical connections, improperly labeled circuits, missing wire identification labels, aging and obsolete equipment such as the failed power supplies, and inaccurate documentation. PG&E's defective equipment is documented in both CPSD's opening and reply testimony. (CPSD-1, p. 98; CPSD-5, pp. 42 – 49.) CPSD's testimony documented the following aging and obsolete equipment at Milpitas Terminal: aging and obsolete UPS equipment; loose wires and poorly made electrical connections; improperly labeled circuits; missing and inaccurate identification labels; inaccurate documentation and equipment identification; errors in the Milpitas operations and maintenance document; and reliability problems with the pressure controllers. (*Ibid.*)

The evidence overwhelming shows that events were out of control for over 3 hours at the Milpitas Terminal, due to poorly planned and executed work, involving dangerously aging and obsolete equipment. Events at Milpitas did not go as planned and the system did not operate normally on September 9, 2010.

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Line 132 was 375 psi. (CPSD-1, p. 7.) Thus, the only time Line 132 exceeded 375 psi was when PG&E performed its 5-year pressure spiking exercise. (CPSD-1, p. 40.)

2. PG&E's Gas Control

PG&E claims that its gas control operators "responded appropriately", and that their "actions did not violate any law" on the day of the explosion.[171] However, PG&E acknowledges that its gas control operators had for approximately 50 minutes been receiving and attempting to integrate and analyze a mixture of valid and invalid SCADA data and alarms.[172] CPSD described the multiple confusing and poorly designed SCADA alarms at pages 60 – 61 of its Opening Brief, and pages 94 – 98 of CPSD's Report.

Without repeating the entirety of CPSD's Report, it is worth noting that the SCADA center alarm console displayed over 60 alarms within a few seconds, including controller error alarms and high differential pressure and backflow alarms from the Milpitas Terminal. (CPSD-1, p.11.) PG&E confirmed that they were unable to determine the cause of controller errors from 5:01 p.m. to 5:09 p.m., or why the controller errors generated no alarms from the time pressure control was lost at 5:23 p.m. until after 8:40 p.m., which failed to alert the workers that they had lost control of the pressure. (CPSD-1, p. 91.)

While many of the pressure data were not being displayed to the Gas Operators in San Francisco or the Gas Technician at Milpitas, some of those values were measured by redundant sensors and were actually available and being captured in the SCADA database. (CPSD-1, p. 97.) The data from those redundant pressure sensors within Milpitas Terminal that had not failed were accurately sensing and recording pressure data, but the data was not used by the computers to calculate the flow values and was not displayed on the SCADA screens or on the mimic panel at Milpitas Terminal. (*Ibid.*) Had the control system been designed in compliance with modern design standards the Gas Operators would likely have been able to view the pressures at Milpitas throughout the incident. (CPSD-1, p. 98.) Additionally, the equipment at Milpitas did not appear to have been programmed to recognize the negative pressure values as a failure in the

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[171] PG&E OB, p. 100.

[172] PG&E OB, p. 101.

pressure feedback circuit, and then override the pressure controller outputs. (*Ibid.*) That would have prevented or minimized loss of pressure control.

PG&E's Gas Control operators were in a difficult position because of the lack of good, reliable information. Unfortunately, PG&E's Gas Operators have become conditioned to experiencing "gremlins" and anomalies in the SCADA data so they tend to be suspicious of any large abrupt changes in the data until it can be verified. (CPSD-1, p. 96.) Alarm messages flood in every minute, most of which are insignificant. (*Ibid.*) Some of the SCADA "gremlins" and anomalies are generated by aging, defective SCADA equipment that has been installed at some remote sites. (*Ibid.*) In other words, the SCADA system gave too many unnecessary alarm messages to its Operators, and was generally poorly designed, which increased the risk of an important alarm being mishandled.

CPSD made the following findings, which demonstrate that PG&E's system at Milpitas Terminal was maintained in an unreasonably unsafe manner, in violation of Section 451:

- Over decades of updates and revisions to the controls and SCADA at Milpitas, the integrity of documentation, wiring connections, identification of electrical components, and the equipment itself had deteriorated and increased the chance of an incident.
- A pattern emerged from the interviews conducted after the event that some PG&E personnel have little recognition that they were working with a very critical system that demands a high level of care in planning and execution of their work.
- The "glitches" and anomalies that the Gas Operators' encounter in their SCADA data have caused them to be extra cautious when observing unusual data in order to give themselves time to assess whether that data is "real."
- The electrical, pressure control, and SCADA problems at Milpitas contributed to Line 132 pipe rupture, even though the recorded pressure at Line 132 did not exceed its established MAOP.
- The Gas Operators are burdened with too many unnecessary alarm messages that increase the risk of an important alarm not being correctly handled.

- The design of the controls at Milpitas and of the SCADA system did not take advantage of redundant pressure data available in the system to increase reliability and safety.
- The SCADA system does not incorporate a leak or rupture recognition algorithms. Such a system would require more and closely spaced pressure sensors.
- The PLC can be programmed to recognize that negative pressure values are erroneous and then intervene to prevent the valves from opening 100%. Those safety considerations had not been programmed into the PLC.
- The three pressure controllers which malfunctioned on September 9, 2010 are still in service and have not been replaced despite the fact that the reason for their malfunction has not been identified. Given the risks from uncontrolled pressures at Milpitas and the relatively insignificant cost of these controllers, a prudent measure would have been to remove them from service and replace them with new units.
- There was no "Method of Procedures" established for transfer and commissioning of the electrical loads from the old UPS to the temporary UPS devices and inadequate planning to anticipate "what if scenarios" and how to proper contingency plan to mitigate any abnormal operating condition that may arise.

(CPSD-1, p. 99.)

PG&E created an unreasonably unsafe system in violation of Section 451, by poorly designing a SCADA system that gave too many unnecessary alarm messages to its Operators, thereby increasing the risk of an important alarm being mishandled. By poorly maintaining a system at Milpitas that had defective electrical connections, improperly labeled circuits, missing wire identification labels, aging and obsolete equipment, and inaccurate documentation, PG&E created an unreasonably unsafe system in violation of Public Utilities Code Section 451.

3. PG&E Acknowledges The Work Clearance Violation

PG&E acknowledges that the "shortcomings" in its work clearance application constitute a violation of Part 192.13(c).[173]

[173] PG&E OB, p. 103. The details of the missing information on the work clearance application form are

(continued on next page)

PG&E argues that nevertheless, its workers in Milpitas engaged in "good communication practices" and "focused on safety".[174] However, the work clearance violations were not merely "paperwork" violations that did not jeopardize safety. Due to the lack of detail on the work clearance form for UPS replacement, the SCADA operators would not have been aware of the scope and magnitude of the work being performed at the Milpitas Terminal. (CPSD-9, p. 90.) If the form had included the necessary information, the SCADA operators would have at least been aware that power interruptions were planned to specific instrumentation at the Milpitas Terminal and might have taken steps to mitigate the risk. (CPSD-9, p. 90.) PG&E personnel at Milpitas had little recognition that they were working with a very critical system that demands a high level of care in planning and execution of their work. (CPSD-1, p. 98.)

PG&E did not anticipate the extent of any abnormal conditions that may be encountered during the UPS clearance work and did not prepare for how to address these abnormal conditions prior to performing the UPS work in Milpitas. (CPSD-1, p. 85.) Furthermore, Gas Control approved the clearance without specific details on what was to be done to complete the UPS replacement work, bringing into question PG&E Gas Control's knowledge of the extent of the UPS replacement work in Milpitas and how it could affect their operations. (*Ibid.*) Without this knowledge, PG&E's Gas Control and local Milpitas personnel could not have prepared for unexpected events that might be encountered during the clearance work. (*Ibid.*)

The failure to follow work clearance procedures is not merely a technical violation of Part 192.13(c). By failing to follow its work procedures, PG&E also created an unreasonably dangerous condition in violation of Section 451.

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on page 83 of CPSD-1, and summarized on pages 54-55 of CPSD's Opening Brief.

[174] *Ibid.*

4. Alcohol Testing

PG&E agrees that by not testing the workers involved in the incident for alcohol within 8 hours, and by not providing a reason for the delay, it violated Part 192.225.[175]

Thus, the use of alcohol as a factor in the San Bruno accident cannot be excluded. (CPSD-9, p. 104.) In addition, PG&E failed to test any of the PG&E Gas Control staff for either alcohol or drugs, although those employees may have contributed to the incident. (*Id.*, p. 105.) PG&E's failure to drug and alcohol test all personnel whose performance cannot be completely discounted as a contributing factor is a violation of Part 199.225(a) and Part 199.105(b).

E. Emergency Response

PG&E denies that any aspect of its emergency plans or emergency preparedness violated any of the technical provisions of Part 192.605 and 615.[176] PG&E also appears to argue that the allegations of a violation were too general.[177] However, CPSD could not have stated the violations more clearly. In Chapter VIII of the CPSD Report, CPSD explained how PG&E's emergency response and emergency plans violated those sections. CPSD also cited Parts 192.605 and 615 in the Executive Summary of the CPSD Report; and also in the brief summary at page 163 of the CPSD Report. In its Opening Brief, CPSD explains in detail how PG&E's actions/inactions described in CPSD's direct testimony (CPSD's Report, but also including all of CPSD's case-in-chief) amount to violations of the provisions Parts 192.605 and 615. (CPSD OB, Section V(E).)

PG&E's Opening Brief ignores the detailed requirements for written emergency plans that are contained in Parts 192.605 and 615.[178] Part 192.605(a) requires that

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[175] PG&E OB, p. 105.

[176] PG&E OB, p. 106.

[177] *Ibid*. See also, p. 111.

[178] However, PG&E's testimony shows that it was well aware of the detailed emergency plan requirements, because it reprinted the entirety of Part 192.605 and 615. At pages 3 – 5 of Chapter 11 of its testimony, PG&E reprinted the entirety of Part 192.615; PG&E reprinted Part 192.605(a) on page 9 of Chapter 11. PG&E's testimony, unlike its Opening Brief, discusses the technical requirements of these provisions.

operators prepare and follow a manual of written emergency procedures. Part 192.605(c) requires that the emergency manual must include procedures to provide safety when operating design limits have been exceeded that respond to and correct the cause of: increase or decrease in pressure outside normal operating limits; loss of communications; operation of any safety device; and any other foreseeable malfunction of a component, deviation from normal operation, or personnel error, which may result in a hazard to persons or property.

Part 192.615(a) contains technical requirements in addition to Part 192.605, including that the emergency plans provide for the following:

1. Receiving, identifying, and classifying notices of emergencies.
2. Establishing and maintaining adequate means of communication with appropriate fire, police, and other public officials.
3. Prompt and effective response to a notice of a fire or an explosion.
4. The availability of necessary emergency personnel, equipment, tools, and materials.
5. Protection of people first and then property.
6. Emergency shutdown and pressure reduction in an emergency.
7. Minimizing hazards to people and property.
8. Notifying and coordinating with appropriate fire, police, and other public officials of gas pipeline emergencies.

The confusing, slow, and uncoordinated response by PG&E to the explosion on September 9, 2010, overwhelmingly demonstrates that PG&E failed to adequately prepare and train for emergencies. CPSD's Opening Brief summarizes the evidence regarding PG&E inadequacies[179], which shows PG&E had:

- inconsistent and conflicting corporate and divisional level Emergency Plans;
- no assistance agreement for notifying and coordinating with appropriate fire, police, and other public officials;

[179] CPSD Opening Brief, pp. 61- 77.

- no liaisons with appropriate fire, police, and other public officials to plan how the PG&E and the officials can engage in mutual assistance to minimize hazards to life of property;
- inadequate procedures to receive, identify, and classify notices of an emergency;
- inadequate procedures to provide for the proper personnel, equipment, tools and materials at the scene of an emergency;
- inadequate procedures to perform an emergency shutdown of its pipeline after a rupture;
- failed to focus on hazards to life or property rather than on gas operations;
- failed to notify the appropriate first responders of an emergency and coordinate with them;
- inadequate procedures to respond to and correct the cause of a line's decrease in pressure, which resulted in hazards to persons and property, and to notify the responsible personnel when notice of an abnormal operation is received;
- inadequate procedures to establish and maintain adequate means of communication with the appropriate fire, police and other public officials;
- failed to focus on protection of "people first" before focusing on its own property;
- inadequate training in accident recognition;
- failed to examine past incidents to determine whether emergency procedures were effectively followed in emergencies;
- failed to review its emergency response by its personnel to determine the effectiveness of the procedures; and
- inadequate education of the public and governmental organizations as to hazards associated with unintended releases on a gas pipeline and steps that should be taken for public safety in the event of a gas pipeline release.

1. PG&E's Response Time

Under the circumstances, the time it took to identify the source of the explosion and shut off the valves leading to the rupture site on September 9, 2010, was unconscionable. The evidence overwhelming demonstrates that PG&E's confusion during the 95 minutes it took to completely shut off the gas feeding the rupture is directly related to its failure to maintain and follow good emergency planning.

PG&E, however, argues that no specific law was violated by the slow response time.[180] CPSD concedes that the law does not provide for a specific amount of minutes to respond to a rupture in an operator's lines. The law does, however, clearly call for a prompt and effective response by the operator. This includes promptly receiving, identifying, and classifying, notices of an emergency; notifying and coordinating with fire and police departments; ensuring the proper emergency personnel are at the accident site with the equipment and tools necessary; ensuring the personnel are properly trained in how to handle an emergency; planning for shutdown and pressure reduction; and educating the public to be aware of hazards associated with unintended gas releases and steps that should be taken for public safety in the event of an accident.

PG&E's slow and ineffective response actions are described at pages 108 – 112 of CPSD's Report, and at pages 12 – 18 of the NTSB Report (CPSD-9), and summarized in CPSD's Opening Brief at pages 66 – 77. The timeline will not be repeated here, but it is clear that PG&E employees appeared confused and unprepared on the day of the incident, failing to follow the emergency plan PG&E did have in place. PG&E employees did not communicate internally in a proper and timely way, which contributed to its inability to get a meaningful and timely situational awareness and adequately marshal its resource to respond to the emergency. PG&E failed to properly and timely communicate with external agencies, such as fire departments and police. PG&E's employees exhibited a lack of training and preparedness on the day of the incident. PG&E failed to properly ensure public awareness of its facilities and their inherent potential for harm. PG&E failed to properly use the tools of remote control valves and automatic shut-off valves. PG&E administered alcohol testing too late to be effective.

PG&E's assertion that its response time was "prompt and effective" is simply not supported by the evidence of what occurred on September 9, 2010. CPSD's engineers and the NTSB's engineers all agree that PG&E's lack of preparedness resulted in a response time that was "excessively long and contributed to the extent and severity of

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[180] PG&E OB, p. 106.

property damage and increased the life-threatening risks to the residents and emergency responders." (CPSD-9, Exec. Summary, p. x.) While the response time of 95 minutes by itself does not establish a violation, the facts demonstrate that PG&E failed to be prepared and to react promptly and effectively, in violation of many of the technical requirements of Parts 192.605 and 615, as explained in CPSD's Opening Brief.

2. Failure To Coordinate With External Agencies

PG&E argues that failing to call 911 on September 9, 2010, was not a violation.[181] PG&E points out that police and fire were on the scene rapidly, and thus it was not necessary to call 911.[182] However, CPSD, the IRP[183] and the NTSB performed an analysis of PG&E's actions after the explosion, and unanimously found that both PG&E's internal and external coordination was inadequate and contributed to the severity of the incident.

PG&E apparently believes that because some fire fighters and police officers were at the scene quickly, there was no need for further communication. This is not the case. In fact, San Bruno Police called PG&E at 6:54 p.m., San Mateo County Sheriff called PG&E at 7:02, and San Mateo County Fire Department called PG&E at 7:59. (CPSD-1, p. 118.)

PG&E was not on site until 30 minutes after the explosion. (RT 406:15-19.) First responders were on site one minute after the explosion. (PGE-40, p. 5.) For 29 minutes important conversations between PG&E and first responders did not happen. PG&E acknowledged that PG&E personnel were not present on site to give emergency responders the benefit of PG&E's insight into the potential gas transmission ruptures. (RT 405:28 – 406:5.) PG&E acknowledged that knowledge that the possibility a fire is being fed by a high pressure line is relevant and necessary to first responders.

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[181] PG&E OB, p. 109.

[182] *Ibid.*

[183] See, for example, CPSD-10, pp. 14-15. The Independent Review Panel (IRP) found that PG&E's workers acted on their own initiative without guidance from PG&E's Dispatch.

(RT 355:12-16.) At times PG&E employees thought it might have been a jet airplane crash (PGE-40, p.10; CPSD-1, p.116), or a gas station explosion (PG&E-40, p. 7.), or a break in their distribution lines (CPSD-9, p.101). Almost an hour after the rupture, at 7:07 p.m., a PG&E gas operator responded to a dispatch employee who reported the rumor that there had been a plane crash by saying, "It's easy to believe it's a plane crash. We still have indication that it is a gas line break. We're staying with that. If you talk to the fire department I would inform them of that." There was no indication that the dispatch center passed this information to the fire department. (CPSD-9, p. 15.) Twenty minutes after the explosion some PG&E employees had reason to believe PG&E's line may be involved but they did not call 911 and on-site personnel did not arrive until 30 minutes after the explosion. (RT 353:21 to 354:1.) Describing his attempts to call PG&E Dispatch one first responder stated that "It was very difficult to place a call. Multiple attempts on the cell phone were system busy, call failed." (CPSD-1, p. 118.) San Bruno first responders were not aware of the location or specifications of PG&E's pipelines. (CPSD-01, p. 124; see also RT Vol.5 345:16-21.)

PG&E's Dispatch, not just on-site personnel, are directed to contact police, fire and other emergency responders, under section 3.3.2 of the Company Plan. (PGE-39, p. 1-28.) While PG&E Dispatch did send PG&E's employees to the site, they did not simultaneously call the local fire department as required under various sections of their own emergency plan. (RT 359:26-360:5, RT 360:15-27, and PGE-39, pp.1-40, sec.4.4.1. and 1-47, sec.5.8.2.) Nor did PG&E call the California Highway Patrol as is required under its emergency response plan. (RT 421:23 – 422:8.)

At the time of the San Bruno rupture PG&E's Gas Control did not have a policy to call 911. (RT 121:8-19.) Yet, PG&E's Transmission and Distribution (T&D) Emergency Plan did have 911 listed as emergency contact information for incidents involving the Milpitas Station. (PGE-42, p.85-86; see also RT 19:1 – 420:11.)

The lack of liaisons with appropriate fire, police, and other public officials to plan how the operator and the officials can assist each other, violated Part 192.615(c)(4), which requires operators to establish and maintain such contacts. The failure to establish and maintain adequate means of communication with the appropriate fire, police and other public officials violated 192.615(a)(2). PG&E's failure to notify the appropriate first responders of an emergency and coordinate with them violated Part 192.615(a)(8). The apparent lack of any agreement for notifying and coordinating with appropriate fire, police, and other public officials of gas pipeline emergencies, also violated Part 192.615(a)(8).

3. CPSD's Report Does Not Merely Recommend Improvements

With regards to certain areas, PG&E claims that CPSD not allege violations, but merely noted that there are areas for improvement.[184] This is not true. At page 103 of its Report, CPSD alleged: "PG&E violated Parts 192.605 and 192.615 pertaining to emergency response and the Public Utilities Code Section 451 for inadequately responding to a major incident and jeopardizing public safety." With regards to training, geographical monitoring, internal coordination, and internal decisions to shut off the valves to isolate the rupture, PG&E disputes whether any violations have been alleged, which is rebutted below.

a) Training

PG&E argues that CPSD did not allege any violations with regards to PG&E's training of its emergency personnel.[185] However, CPSD did allege that PG&E's training in many respects was insufficient, and that PG&E's training was in violation of Part 192.615. (CPSD-1, pp. 102-103.)

There are many examples of PG&E's lack of training described throughout CPSD's Report. For example, at page 102 of CPSD's Report, CPSD states: "PG&E first responders at the scene of the incident could not identify the cause of the fire. PG&E offered no specific training for its first responders on how to recognize the differences

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[184] PG&E OB, p. 111.

[185] *Id.*, at p. 112.

between fires of low-pressure natural gas, high-pressure natural gas, gasoline fuel, or jet fuel."

In another example, at page 114 of CPSD's Report, it describes how PG&E's Company Gas Emergency Plan (GAS_0911WBT_1st_Resp_Sup, Version 1, January 2010) is supposed to provide training to PG&E's first responders to assess the situation on-site when they arrive at the incident scene.

CPSD's Opening Brief at pages 76 – 78 summarizes dozens of facts from CPSD's Report pertaining to PG&E's inadequate training, and then provides its legal arguments as to how PG&E's inadequate training violated Part 192.615, which includes:

- PG&E's inadequate training resulted in a slow and ineffective recognition of the incident, in violation of Part 192.615(a)(3).
- PG&E failed to train the appropriate operating personnel to assure they are knowledgeable about procedures and verify that the training is effective, in violation of Part 192.615(b)(2).
- PG&E failed to train its employees and determine whether procedures were effectively followed in emergencies, in violation of Part 192.615(b)(3).
- PG&E failed to periodically review its emergency response by its personnel to determine the effectiveness of the procedures, in violation of Part 192.605(c)(4).
- PG&E did not educate the public and governmental organizations as to hazards associated with unintended releases on a gas pipeline and steps that should be taken for public safety in the event of a gas pipeline release, in violation of Part 192.616(d).

The facts summarized in CPSD's Opening Brief demonstrate how PG&E violated each of part of the emergency response requirements. Thus, PG&E is wrong that CPSD alleged no violations with regards to inadequate training.

b) Geographical Monitoring

PG&E claims that it has made improvements to its geographical monitoring.[186] Apparently, PG&E does not dispute that its geographical monitoring was flawed and is in need of improvement. However, CPSD did not merely criticize PG&E's geographical

[186] PG&E OB, p. 112.

monitoring as "arbitrary". CPSD further found that PG&E's "Staff decided which regions they preferred to observe at any particular time, potentially leaving gaps in coverage while other areas received redundant coverage." (CPSD-1, p. 118.) CPSD also stated:

> Such arbitrary tracking can leave an operator out of the loop and parts of the system may not be monitored. For example, Gas Operator 3 answered a call from Dispatch asking about a pressure drop but could not supply the dispatcher with information because he was not aware that Gas Operator 1 and Gas Operator 2 were responding to the low-low alarms around the peninsula. (*Ibid.*)

In any event, geographical monitoring is only one small part of CPSD's overall criticism of PG&E's flawed emergency plans discussed in the section on "Internal Communication" in CPSD's Report. (*Id.*, p. 117.) The violations relating to PG&E's flawed internal communications procedures are described in detail at pages 68 – 75 of CPSD's Opening Brief.

c) Coordination With Internal Personnel

PG&E argues that CPSD does not allege that PG&E's internal communications procedures during its emergency response violated the law.[187] However, CPSD clearly stated that PG&E's internal communications were deficient with regards to the requirements for "Emergency Plans" in federal law. CPSD stated that "PG&E's procedures for describing job duties and internal communication were deficient" in a section entitled "49 CFR Part 192.615 – Emergency Plans". (CPSD-1, pp. 116-118.) CPSD has provided a careful, detailed analysis of how PG&E's procedures did not provide for good internal communications in an emergency, as demonstrated by its many failures on September 9, 2010. (CPSD OB, pp. 68-75.)

In addition, the NTSB conducted a lengthy analysis of PG&E internal coordination procedures, and also concluded that PG&E's procedures were deficient. (CPSD-9, pp. 98-100.) The NTSB found that PG&E's response to the Line 132 break

[187] PG&E OB, p. 113.

lacked a command structure with defined leadership and support responsibilities within the SCADA center; execution of the PG&E emergency plan resulted in delays that could have been avoided by better utilizing the SCADA center's capability; PG&E lacked detailed and comprehensive procedures for responding to a large-scale emergency such as a transmission line break, including a defined command structure that clearly assigns a single point of leadership and allocates specific duties to SCADA staff and other involved employees. (*Ibid.*)

CPSD's Report found that the deficiencies noted by both the NTSB and CPSD amounted to violations of Parts 192.605 and 615 pertaining to emergency response. (CPSD-1, p. 103.) In its Opening Brief, CPSD provided a detailed explanation of the technical requirements of Parts 192.605 and 615, with an explanation of how each deficiency violated the regulations contained in those parts. (CPSD OB, pp. 68-75.) Thus, it is simply incorrect to say that CPSD made no allegations of violations with regards to internal coordination and communication.

d) Emergency Response Decisions

PG&E argues that there was no lack of supervision or direction regarding the shut down of valves on September 9, 2010.[188] However, the overwhelming evidence demonstrates that there was a great deal of confusion and delay with regards to the decision to shut down the valves, which greatly contributed to the amount of damage done.

CPSD summarized the relevant evidence regarding the confusion and delay in the shut down of Segment 180 in its Opening Brief. (CPSD OB, pp. 66-75.) First, at approximately 7:00 p.m., while watching the news of the San Bruno explosion on a television at the Yard, Mechanic 1 identified the location of the incident and the nearest valves to be shut to cut off fuel to the fire. (CPSD-1, p. 111.) At 7:02, Mechanic 1 at the Colma yard calls Dispatch and states they are going to shut off the valves and isolate the

[188] *Ibid.*

rupture. (*Ibid.*) At 7:06 p.m., Mechanic 1 called the Peninsula Division T&R Supervisor for authorization to shut the valves. The Peninsula Division T&R Supervisor approved. Mechanics 1 and 2 proceeded to the first valve location above Segment 180. (*Ibid.*)

Meanwhile, Dispatch did learn of the explosion at 6:18 p.m., but they did not send anyone to check it out till 6:23 p.m. (CPSD-9, p. 99.) The dispatch center initially dispatched only a single service representative (at 6:23) to assess the scene and did not immediately dispatch a qualified crew to shut off valves. (*Ibid.*) Despite numerous calls between Dispatch, Gas Control, and various PG&E employees, Dispatch never sent any employee out to expressly shut off the valves. (CPSD-9, p. 99.)

In responding to the incident, the Peninsula On-Call Supervisor claimed that he did his duty by telling mechanics to head in the direction of the valves because someone else would tell the mechanics which valves to shut and if it was okay to shut the valves. (CPSD-1, p. 121.) In fact, Mechanic 1 stated that after the Peninsula On-Call Supervisor told him to go the Colma Yard to begin staging, the Mechanic himself came up with a plan as to what valves to shut. (*Ibid.*) He formulated this plan with information from TV news, not with information provided by Gas Control or Dispatch. (*Ibid.*) He called not the Peninsula On-Call Supervisor but the Peninsula T&R Supervisor and got sign-off on his plan – almost an hour after the initial fire and explosion. (*Ibid.*) After shutting off the valves nearest to the south of the break, the mechanic took it upon himself to head to the valves north of the break and shut them off. (*Ibid.*)

The M&C Superintendent stated that when the battalion chief told him to shut off the gas because it was hampering rescue and firefighting efforts, he was told by the Senior Distribution Specialist that his transmission supervisor for San Francisco was on it. (CPSD-1, p.122.) That person was "very confident that they were going to have the transmission valves for that area secured shortly … I fully trusted [the SF Division T&R Supervisor] to do the right thing [and make the decision to ask someone to send personnel to close the valves]." (*Ibid.*) Yet the SF T&R Supervisor claims that no one directed the crew to shut off the valves, and they acted on their own. (*Ibid.*) The battalion chief's request was approximately 6:30-6:35 p.m. (*Ibid.*) At that time the mechanics were either at or driving to the Colma Yard, where they would wait until their plan to shut off the valves was approved by the Peninsula Division T&R Supervisor about thirty minutes after the battalion chief requested the valves be closed.

As described in CPSD's Report and summarized in its Opening Brief, the facts above demonstrate that PG&E did not provide for the proper personnel, equipment, tools and materials at the scene of an emergency, in that the PG&E employees who were immediately on the scene were not able to shut down the line, in violation of Part 192.615(a)(4). PG&E's efforts to perform an emergency shutdown of its pipeline were inadequate to minimize hazards to life or property, in that the efforts were slow, uncoordinated, and lacked any supervision or command, in violation of Part 192.615(a)(6). Rather than make safe any actual or potential hazards to life or property, PG&E's slow decisions made the hazards worse, in violation of Part 192.615(a)(7). PG&E also violated Part 192.605(c)(1) and (3) by failing to have an emergency manual that properly directed its employees to respond to and correct the cause of Line 132's decrease in pressure, and its rupture which resulted in hazards to persons and property, and notify the responsible personnel when notice of an abnormal operation is received. These failures created an unreasonably unsafe situation on September 9, 2010, in violation of Section 451.

F. PG&E's Safety Culture and Financial Priorities

1. PG&E Has Consistently Ignored the Most Significant Evidence Concerning Its Management's Poor Safety Culture Preceding the San Bruno Explosion

From 1997 through September 9, 2010, the date of the San Bruno explosion, PG&E created an unreasonably unsafe system in violation of California Public Utilities Code Section 451, by continuously cutting its safety-related budgets for its gas transmission and storage (GT&S) line of business, and, therefore, causing the following: (1) a reduction in the replacement of PG&E's aging transmission pipeline through its Gas Pipeline Replacement Program (GPRP), and in essence, the suspension of the transmission replacement part of its GPRP prematurely well before its original goal;

(2) not seeking sufficient funds for its operations and maintenance (O&M), and then spending less than the amount it sought from the Commission, including using less effective and lower cost integrity management methods, such as ECDA over ILI, and (3) reducing its safety-related workforce.

Before responding to what PG&E stated in its Opening Brief about its safety culture (or lack thereof) prior to the San Bruno explosion, it is important to note the evidence which PG&E has never addressed in its Opening Brief or its testimony with anything other than mere conclusory statements. The most significant evidence is PG&E's own documents during the 13 years leading up to the San Bruno explosion on September 9, 2010. This evidence includes documents stating that PG&E's own engineers were complaining about budget cuts affecting the safety of PG&E's GT&S services, which CPSD witness Harpster provided as exhibits to Chapters 6 to 9 in his focused audit, dated December 30, 2011 (i.e., CPSD-168 (Harpster)) and exhibits cited therein.) (CPSD OB, pp. 82-91.) Just some of these excerpts are listed in a very concise way to show how specific they are, but there are many more than these examples spelled out and crossed referenced in the CPSD OB, pp. 84-91 (and cites therein) and, for the 2008-2010 exhibits in particular, at the end of this brief:

- From 1998 to 2010, PG&E reduced its GT&S maintenance workforce by nearly 25%.
- For leaks reported for its backbone transmission system, in contrast to 2001-2006 when PG&E repaired nearly 100% of these leaks, from 2007 through 2010 PG&E repaired at most 60% of them.
- The days in corrective work request backlog increased by 54 days between 2004 and 2010, reflecting a 33% increase in the backlog – despite a 46% <u>decrease</u> in corrective work orders issued.
- PG&E used its risk management program to justify less expensive and less effective alternative methods to "verify" pipe integrity in lieu of the ILI method (e.g., smart pigs.) This saved PG&E approximately $150 million over the 10-year period.
- During 2005-2008, ILI accounted for 54% of total miles of pipeline assessed by PG&E. But in 2009 and 2010, ILI only accounted for

13% of the total miles assessed. PG&E instead used ECDA for its integrity management assessment method.

- In 2008, PG&E reduced integrity management expenses by changing some projects from ILI to ECDA and deferring some projects to 2009, ignoring the advice of its own engineers: "*Gas Engineering would strongly prefer to smart pig PG&E's higher stress pipelines to obtain a much better initial evaluation of the line, but that is not financially viable at current funding rates*." (Emphasis added.)
- The 2008 budget for maintenance projects was 47% below the initial GT&S request. PG&E bluntly acknowledged that its "long-term reliable operation is jeopardized at the current level of funding," that reduced spending "will perpetuate significant underfunding of the gas transmission maintenance program," and the backlog of corrective maintenance would grow;
- PG&E recognized that since 2007 "many high priority reliability projects were underfunded/postponed." PG&E also tragically predicted: "While the effects of deferred maintenance can immediately impact operations and reliability, effects are most impactive when maintenance is deferred over a multiple year period as will likely be the case in 2008 to 2010."
- According to a PG&E internal email, in 2009 – the year before the San Bruno explosion – GT&S was "saddled" by its management with an Integrity Management expense budget set 32% below GT&S's initial budget request. And PG&E actually spent even less – $1.9 million less than the final approved budget amount.
- PG&E's 2009 budget cuts for maintenance were, in GT&S's own words, "very deep," leaving GT&S unable to fund all Priority I work.
- PG&E's Spring 2009 Expense Program Review notes that $6.4 million of Priority I and II maintenance projects remained unfunded. PG&E acknowledged the risks of not funding these projects: deferral of critical maintenance, reliability impacts and reduced efficiency.
- GT&S was under significant pressure to reduce expenses for a third straight year in 2010. In October 2009, PG&E Vice Presidents requested an analysis of how to further reduce the GT&S 2010 budget to $89.8 million (the original projected need was $111.1 million).

- The 2010 Integrity Management budget was 11% below the initial request, and the maintenance budget was 24% below the initial request.
- In 2010, PG&E again cut its Integrity Management budget by deferring projects, and developed 21 formal cost reduction initiatives to bridge the gap between the expense funding requested by GT&S and management's budget target.
- In 2010, PG&E adopted what it called the "Reduce Pipeline Project Work" initiative, the stated purpose of which was to defer all project work that was not required by code or contractual obligation to "2011 or beyond."

PG&E never filed any responding testimony addressing Mr. Harpster's exhibits in his Chapters 6 to 9. PG&E also did not cross-examine Mr. Harpster about these exhibits. PG&E's Opening Brief, like its testimony, continues to pretend the evidence does not exist. However, as demonstrated in the CPSD Opening Brief, pp. 84-91, there is significant and specific evidence demonstrating a lack of PG&E's concern about the safety to the general public posed by its aging, high-pressure natural gas transmission pipelines. PG&E's failure to respond to, refute or cross-examine Mr. Harpster about these exhibits makes the exhibits unrefuted and uncontradicted evidence. (CPSD OB, p. 91.)

In addition, PG&E's Opening Brief does not address CPSD's rebuttal testimony and CPSD's accompanying exhibits, which established that contrary to PG&E's claims in its responding testimony, PG&E was well aware of the fact that portions of Line 132 included pre-1950 pipeline, and contained questionable welding. This is because Charles J. Tateosian, PG&E's head of Gas Design and Vice President of Gas Operations in the 1980s, presented material to PG&E, and made a presentation to PG&E's Board which included this information when PG&E was preparing its GPRP. (CPSD-5, pp. 63-64, CPSD-162 (Tateosian Deposition), Vol. I, pp. 82-85, 92, 152, 161-162, 168-189, CPSD-163 through CPSD-166.) PG&E was also warned about its missing records of transmission pipelines and the need to replace those pipelines unless they could find the missing records. (CPSD-5, p. 65, and the Bechtel Report referenced in Ex. CPSD-164 (Tateosian Deposition) pp. 750 and 921 and provided in its attachment "Exhibit 118.")

Although PG&E had an opportunity to cross-examine CPSD witness Stepanian in the hearing room and present any contrary evidence to his exhibits from the Tateosian Deposition exhibits, PG&E waived any cross-examination of CPSD witness Stepanian on his testimony or about these exhibits. Instead, after the hearing, PG&E moved to strike these portions of CPSD witness Stepanian's rebuttal testimony and exhibits, but PG&E's motion was denied on this issue. (*See* ALJ Wetzell's February 13, 2013 Ruling.)

This is also significant evidence because, as CPSD pointed out in its Opening Brief, pp. 80-82, numerous Commission decisions approved PG&E's requests for full funding for the Tateosian-developed GPRP from 1985 and the rate cases which followed. However, PG&E did not always spend the money authorized by the Commission. Moreover, under the GPRP, PG&E committed to replacing 15 miles of transmission pipeline a year. However, in 2000, PG&E replaced the transmission portion of the GPRP with its Pipeline Risk Management Program (PRMP). If the GPRP had remained in place, PG&E would have been required to replace 165 miles of transmission pipeline during 2000-2010. Instead, PG&E replaced only *25 total miles* of transmission pipeline under the PRMP. (CPSD OB, p. 84 and n.34 (and cites therein).)

What PG&E has never explained is how it could conduct the risk management analysis without understanding the nature of its underground transmission pipelines (i.e., due to missing records), and why it did not take into account Mr. Tateosian's inclusion of Line 132 as part of the GPRP in early 1980s, because he knew back then that it included pre-1950 transmission pipeline. (*See* CPSD-5, pp. 63-65, CPSD-162 (Tateosian Deposition), Vol. I, pp. 82-85, 92, 152, 161-162, 168-189, CPSD-164 (Tateosian Deposition) pp. 750 and 921 and Bechtel Report provided in its attachment "Exhibit 118.")

Despite all this evidence, PG&E claims that CPSD failed to give any concrete evidence to back up its assertions that PG&E prioritized financial performance over safety.[189] Yet, it was PG&E's management who kept insisting on arbitrary budget cuts over the objections of its own engineering staff. In addition, as the CPSD OB, p. 131 demonstrated: on February 16, 2005, the Chairman of the Board, Chief Executive Officer and President of PG&E presented the idea of "Transformation" to the boards of directors, a company-wide business and cultural transformation campaign to reduce operating costs and instill a change in its corporate culture. As stated in the 2006 Annual Report, the reason for the investment in Transformation was, "If the actual cost savings are greater than anticipated, such benefits would accrue to shareholders." (CPSD-1, p. 135.) Moreover, this program was occurring approximately at the same time PG&E was repurchasing $2.3 billion of its own stock. (CPSD-1, p. 141.) In addition, PG&E also authorized cash dividends of: $476 million in 2005; $494 million in 2006; $547 million in 2007; $589 million in 2007; and $624 million in 2009. (CPSD-1, p. 140.)

In view of the above, CPSD offered plenty of concrete evidence demonstrating PG&E's emphasis of profits over safety: the 2000 change in PG&E's GPRP significantly reducing by 140 miles the transmission pipeline which would have been otherwise replaced in PG&E's GPRP; cuts curtailing safety-related budgets and workforce for maintenance and integrity management (*see* Chapter 6-9 of CPSD-168 (Harpster testimony) and accompanying exhibits); PG&E's knowledge about the need to replace Line 132 in its GPRP (CPSD-5, pp. 63-65 (CPSD witness Stepanian's rebuttal testimony) and accompanying exhibits); and the profits so that "cost savings … benefits would accrue to shareholders," $2.3 billion in PG&E's repurchases of PG&E stock, and as well as hundreds of millions of dollars in annual dividends. (CPSD-1, pp. 131-141, and referenced exhibits).

So what is PG&E's response to all of this concrete evidence? In its Opening Brief, p. 145, Footnote 807, PG&E cites only to Ms. Yura's conclusory testimony during TURN's cross-examination concerning PG&E's lack of a safety culture in RT 974, 978. Contrary to the clear acknowledgement stated by PG&E's Chairman of the Board and

[189] PG&E OB, p. 144.

CEO Earley in PG&E's multi-million dollar media campaign that PG&E "had lost its way," Ms. Yura stated her belief that PG&E had not lost its focus on safety, but had only failed to keep up with "the changes in the industry and improving [PG&E's] practices and processes." (RT 974). PG&E's reference to Ms. Yura's other statement (RT 978) was that PG&E as a whole accepts the Independent Review Panel's report and recommendations going forward. But as to the Independent Review Panel's perception that top management of the company was overly focused on financial performance, Ms. Yura stated that she does not "believe that the company has a formal position in terms of whether they agree with this or disagree with this." (RT 978). Ms. Yura's vague and general disavowals stand in stark contrast to PG&E's advertising campaign. This is yet another example of how PG&E disavows any wrongdoing, although it claims to have accepted "moral and ethical" responsibility.

2. PG&E Did Not Adequately Address Its Failure To Replace Its Line 132 And Other Older Pipelines, Or Why It Refused To Use Its ILI As Its Integrity Management Method

In its Opening Brief, p. 136, PG&E emphasizes that from 2003 to 2010, according to CPSD witness Harpster, PG&E spent $35 million more than the Commission's imputed adopted amounts for safety-related capital expenditures (capex), and according to PG&E witness O'Loughlin, PG&E spent $63 million more the Commission's imputed adopted amounts for safety-related capex. It is noteworthy that PG&E selectively chose to refer to Mr. Harpster's analysis on page 4-3 of his report (CPSD-168), but ignores Mr. Harpster's findings on the next three pages of his report. On page 4-4, CPSD witness Harpster reported that PG&E had canceled, or delayed by more than six months, 37% of its safety-related projects. (CPSD-168, p. 4-4. One of the delayed projects involved PG&E's Line 132. CPSD-168, pp. 4-5, 4-6.)

Mr. Harpster documented PG&E's knowledge of manufacturing and workmanship defects on Line 132.[190] In 2008, PG&E suspected that sections of Line 132 had "manufacturing threats" at maximum operating pressure.[191] In 2008 and 2010, PG&E also considered upgrading Line 132 for ILI from MP 0.00 to MP 32.93, but the project was delayed due to lack of resources to perform engineering work and PG&E's changing criteria for choosing ILI/ECDA.[192] On February 2, 2010 – seven months before the explosion – PG&E repaired a circumferential weld leak on Line 132 caused by a "workmanship problem" with the original construction.[193] The NTSB also has confirmed several other girth weld defects in very close proximity to Segment 180 at MP 39.28, the pipeline segment that exploded.[194]

Notwithstanding all of these red flags reflecting problems with Line 132, PG&E refers only to PG&E witness Martinelli's one-page testimony, where he asserted that the budget constraints in 2008 to 2010 did not affect Line 132 and that PG&E deferred a project to replace a part of Line 132 based upon "engineering evaluation and investigation that the project was not as high a priority as originally thought."[195] In addition to the fact Mr. Martinelli is an outside consultant, who did not identify or attach the documents he reviewed, his testimony was not based upon "engineering evaluation and investigation that the project was not as high a priority as originally thought." Indeed, his testimony was even more vague than that; Mr. Martinelli merely alleged that the timing of the project to replace Line 132 from Milepost 42.13 to 43.55 was driven by unidentified "engineering and risk management considerations."[196] In other words,

[190] CPSD-168 (Harpster), pp. 4-5, 4-6, CPSD-240 (OC-303, Atts. 10, 26, 27, 42).

[191] CPSD-168 (Harpster), p. 4-5, CPSD-240 (OC-303, Att. 37).

[192] CPSD-168 (Harpster), p. 4-5, CPSD-240 (OC-303, Att. 26).

[193] CPSD-168 (Harpster), p. 4-6, CPSD-240 (OC-303, Att. 4).

[194] CPSD-168 (Harpster), p. 4-6, CPSD-9, NTSB Accident Report, p. 43.

[195] PG&E OB, p. 146.

[196] PG&E-1 (Martinelli), p. 12-3:10 through p. 12-4:2.

PG&E's position is that we should simply trust Mr. Martinelli's one-sentence conclusion, without any reasoning or documents supporting it.

PG&E ignores the fact that the safety of Line 132, and in particular Segment 180, was *never* a high priority to PG&E. That is precisely why it exploded on September 9, 2010, killed 8 people, injured more than 50 others and destroyed so many homes. This is not "hindsight" by CPSD or the CPUC. In the early 1980s, PG&E's then Head of Gas Design and Vice President of Gas Operations, Charles J. Tateosian, identified Line 132 as needing to be replaced because it contained pre-1950 pipeline, when he made his presentation to PG&E's Board in conjunction with the development of PG&E's gas pipeline replacement program.[197] As discussed above, the Commission always allowed full funding of PG&E's GPRP. It was *PG&E* who chose not to spend the money on the GPRP, and in 2000, PG&E virtually suspended the program. (CPSD OB, p. 84 and n.34 (and cites therein).) In addition, PG&E's refusal to use the ILI integrity management method to discover defects within the pipelines underground, and PG&E management-driven cuts in its integrity management budgets against PG&E's own gas engineering staffs' advice showed, at the minimum, that PG&E did not seem to care about discovering if there were defects inside its transmission pipelines. (CPSD OB, pp. 86-88 (and cites therein).) PG&E cared more about achieving higher savings so that the benefits accrued to the shareholders. (CPSD-1, pp. 131-141, and the referenced exhibits on pp. 131-134.)

3. PG&E's Priority Of Placing Its Profits Ahead Of Its Safety Obligations Resulted In PG&E's GT&S Service Earning $435 Million Above And Beyond Its Authorized Return On Equity

During the 12 years prior to the San Bruno explosion, PG&E's GT&S line of business earned an ROE of 14.3%. (CPSD-170 (Harpster), p. 5.) Mr. Harpster and PG&E witness O'Loughlin agree that during 1999 through 2010, PG&E's GT&S's actual

[197] CPSD-5 (Stepanian), pp. 63-64, CPSD-162 (Tateosian Deposition), Vol. I, pp. 82-85, 92, 152, 161-162, 168-189, CPSD-163 through CPSD-166.

revenues exceeded its actual revenue requirements (needed to earn PG&E's authorized ROE of 11.2%) by at least $400 million.[198] The methodology by how each expert derived these surplus revenues and the total amount of the surplus revenues are different, but there is no disagreement that GT&S was enormously profitable during the 12 years leading up to the San Bruno explosion.

In its Opening Brief, pp. 138-142, PG&E argues that its profits were the result of its non-core services being "at risk" as if a substantial portion of the profits had not been from its underspending on its GPRP or on its integrity management program. In contrast to PG&E's implausible assertion is the empirical evidence of a 25% reduction in GT&S's maintenance workers over a 10-year time period, integrity management budget cuts, including an increasing use of it ECDA method in lieu of the more effective ILI method for integrity management, maintenance budget cuts and deferrals, and the virtual termination of the gas pipeline replacement program, which were all documented as exhibits in Chapters 6 to 9 of CPSD-168 (Harpster). The evidence demonstrates that PG&E's high earned return on equity was due to 10 years of safety-related budget cuts prior to the San Bruno explosion, not some vague allegation of being "at risk".

In addition, PG&E's reference to being "at risk" for certain GT&S revenues is a red herring and is a distraction from its safety budget cuts.[199] PG&E has a gas monopoly in Northern California; its customers, such as the wineries in Napa Valley, could not take their business elsewhere. Moreover, a significant quantification of the risk of its transmission lines was tied to the PG&E expansion service on its Line 401, which was allegedly at risk until 2004, when the Line 401 and Line 400 services were fully rolled into one rate for non-core services as of 2004. Mr. O'Loughlin quantified the impact of this partially rolled-in rate from 1997-2003 as $232.6 million, which he excluded from

[198] RT 540:17 - 541:17. In Mr. Harpster's rebuttal testimony (CPSD-170, p. 5), Mr. Harpster stated that GT&S had earned an ROE of 14.3%, which was $435 million in revenues beyond PG&E's Commission-authorized ROE of 11.2% over this 12-year period. Mr. O'Loughlin maintained that PG&E earned an ROE of 14.6%, which was $479.5 million more than the Commission's authorized revenue requirements based upon a 11.2% ROE during this 12-year period. (PG&E-10 (MPO-1), p. 82.)

[199] PG&E OB, p. 138.

his "imputed adopted revenue amounts,"[200] because the Commission purportedly had not provided rates to recover this amount.

Although Mr. O'Loughlin's prepared direct testimony was based upon the theory that the Gas Accord I decision[201] put PG&E's transmission service at risk, because the Commission purportedly only approved partially rolled-in rates for the cost recovery of Line 401 until 2004, this issue was not discussed at all in the PG&E OB. This is because during the hearing, it had become obvious that there were numerous other incremental rates in the Gas Accord I decision and that the Commission had imposed a crossover ban, which allowed PG&E's full recovery of the costs of its Line 401 (*i.e.,* PG&E's expansion of its transmission system in the early 1990s) prior to 2004. (CPSD OB, pp. 101-103.) In addition, during the hearing, Mr. O'Loughlin could not avoid questions regarding his contradiction of his own testimony in 2001 before the FERC in *California Public Utilities Commission v. El Paso Natural Gas Company, et al.*, FERC Docket No. RP00-241 (i.e., that PG&E's Lines 400 and 401 were operating at full capacity).[202]

In its Opening Brief, PG&E downplays its previous arguments about its "at risk" storage services or transmission services, and now resorts to arguing that the vast majority of its purportedly "at risk" revenues were generated from PG&E's parking and lending services. (PG&E OB, p. 140.) PG&E states that the fact that PG&E earned such high rates of return from its parking and lending services does not provide a basis for the Commission to conclude that PG&E acted improperly in any way. (PG&E OB, p. 140.) However, during the hearing and upon closer scrutiny of PG&E's exhibits, it became apparent how PG&E's parking and lending services were subsidized by its customers, who already paid for transmission services (through incremental, partially rolled-in and subsequently fully rolled-in rates), and PG&E's customers paid for 88% of PG&E's storage costs. (CPSD-170, p. 133.) PG&E used these transmission and storage services

[200] PG&E-10 (MPO-7), p. 24.

[201] D.97-08-054 reproduced in its entirety CPSD-300.

[202] CPSD-301, pp. II-1 through II-2; RT 597:15- 609:6.

to make money for its purportedly "at risk" parking and lending services.[203] In addition, PG&E, as the operator of its storage system, had the capability and, in fact, did make use of its core customers' natural gas, in order to increase its profits during February and March each year. (PG&E-11 (MPO-33), p. A5-6, lines 14-20.)

Finally, it is important to note that as soon as the market actually created a risk for PG&E, PG&E quickly shifted all of the costs back to its ratepayers and proposed a new mechanism for profits. So, the utility was never, in reality, at risk. In fact, PG&E witness O'Loughlin was cross-examined on an excerpt in PG&E's testimony in its 2011 GT&S rate case wherein PG&E stated:

> In addition, in the Gas Accord IV settlement, PG&E agreed to an authorized 2010 revenue requirement that was well below its true cost of service principally because it expected Market Storage revenues to exceed allocated Market Storage costs. In contrast, the revenue requirements proposed in this Application represent PG&E's full costs. PG&E is also proposing a separate mechanism to address potential revenue over-performance. [204]

Mr. O'Loughlin confirmed that "Market Storage costs" meant the same thing as what he referred to as "at-risk storage."[205] This also confirms that when PG&E sees a potentially large revenue source, such as market storage, it is willing to be "at risk," because there is not much of a risk. However, when the market changes, it wants all of its costs to be recovered from its firm transmission and storage customers, and PG&E has offered to share the excess revenues, if any, with them.

In all of these Gas Accord settlements, therefore, it is obvious that PG&E's interest was the overall profits produced by the settlement, not the component parts of the

[203] See CPSD-170 (Harpster), pp. 134-139. Mr. O'Loughlin admitted during cross-examination that there are pipelines without storage facilities, which provide parking and lending services for their customers, such as through use of line pack on their pipeline systems. Although Mr. O'Loughlin claimed that PG&E's parking and lending service is dependent upon its storage facilities, he has never provided any explanation as to how parking and lending services could be available without transmission facilities. RT 626:19-630:23

[204] CPSD-302, p. 1-2.

[205] RT 636:3-20.

settlement revenue requirement. These were completely fungible. PG&E was willing to take a "risk" on something only so long as the risk was purely upside for PG&E. With PG&E abandoning the $232 million that PG&E had previously claimed was profits from being at risk for its Line 401, it becomes obvious that PG&E's claims of all of its excess profits coming from its "at risk" market structure cannot possibly explain why PG&E made more than $435 million above and beyond its authorized return on equity during the 12 years at issue.

4. A Substantial Portion Of PG&E's Profits Were From Its Budget Cuts Involving Safety-Related Matters

a) CPSD Witness Harpster Established Cuts In PG&E's Safety Budgets

CPSD expert witness Gary Harpster conducted a focused audit of PG&E's GT&S costs and rates from 1996 through 2010. Consistent with the Commission's and the Independent Review Panel's prior findings, Mr. Harpster's prepared testimony (CPSD-168), Chapters 6 to 9, documents in detail how PG&E significantly decreased funding and the corresponding priority for the safety of PG&E's gas pipeline system, particularly in the three years leading up to the San Bruno explosion. Mr. Harpster further demonstrates how, during this same period, PG&E underspent CPUC-authorized amounts for safety, while making more than $400 million in surplus revenues in excess of PG&E's authorized return on equity (ROE) of 11.2%. Among other findings, Mr. Harpster's conclusion that PG&E's budgeting practices were "well outside of industry practice" was not disputed or rebutted by PG&E.

In its Opening Brief, pp. 120-137, PG&E claimed that CPSD witness Harpster's imputation of what the Commission had adopted as approved amounts in Gas Accord settlements was incorrect, and that PG&E witness O'Loughlin's imputation of what the Commission had adopted was correct. However, four of the five GT&S rate cases were settlements, which did not include detailed cost-of-service information. That is why Mr. Harpster relied upon the detailed forecasts that PG&E submitted in its GT&S rate cases, for purposes of his imputation studies. On the other hand, Mr. O'Loughlin utilized "implicit" assumptions derived from the amount of revenue requirements, which were adopted under the settlement agreements.

Mr. Harpster's approach is consistent with Commission precedent, whereas Mr. O'Loughlin's approach is contrary to Commission precedent. In D.04-05-055, under the heading "9.3 In the Public Interest," the Commission made clear that Commission approval of a settlement is based on the fundamental premise that PG&E will spend sufficient revenues to meet its safety obligations:

> In adopting the Settlements, we make it abundantly clear that PG&E is expected to continue to meet all of its service obligations and maintain and upgrade its system in a manner consistent with its TY 2003 forecast. By providing PG&E with the discretion to spend the authorized revenue requirement as it sees fit, we are not authorizing PG&E to defer maintenance, cancel proposed upgrades or service improvements, or reduce staffing in a manner inconsistent with the objectives identified in its request. In future GRCs, we will not entertain claims that the adopted revenue requirement somehow forced PG&E to do otherwise.

(D.04-05-055, 2004 Cal. PUC LEXIS 254 at *116-118.)

What PG&E also fails to acknowledge is that for the year 2004, which was the only GT&S litigated rate case prior to the San Bruno explosion and which resulted in a Commission decision (i.e., D.03-12-031), the expert witnesses on both sides agreed that PG&E had *underspent by approximately $70 million* the amount of O&M and capex compared to what the Commission had explicitly adopted as O&M and capex forecasts. (CPSD-170 (Harpster), p. 8, 14-15 Table 3-9 (year 2004) and Table 3-19 (year 2004).) This indisputable amount of underspending in 2004 supports Mr. Harpster's view that during the 13 years in question, PG&E had underspent money which the Commission had authorized it to spend.

Moreover, PG&E's suggestion that Mr. Harpster was picking and choosing the highest forecast for the imputed adopted amounts by the Commission is totally false.[206]

[206] PG&E OB, p. 133.

As described in the CPSD Opening Brief, pp. 95-96, Mr. Harpster justifiably relied upon PG&E's forecast for 2003, because the Gas Accord settlement had expired, the forecast underlying that settlement was 7 years old, and new developments, such as a 218 MMcf/d expansion of PG&E system had already become operational. Similarly, Mr. Harpster relied upon the detailed cost of service analysis under the Gas Accord III settlement to derive the amounts of O&M and capex for 2005, but there was no detailed analysis for 2007 in the Gas Accord III settlement. However, in March, 2007, PG&E filed as part of its Gas Accord IV settlement, its detailed litigation forecast for 2007 for capex. Indeed, prior to the time that Mr. Harpster conducted his audit, PG&E's own Rate Department had submitted the same forecasted 2007 capex to the Commission's Energy Division for the Commission's imputed adopted 2007 capex amounts, as Mr. Harpster has provided.[207]

Mr. Harpster also used PG&E's March 2007 litigation forecast as the best available basis for determining adopted O&M and capex for 2008 and 2009. (CPSD OB, p. 100.) However, the forecasted amount for 2010 capex was unusually low (i.e., less than 50% than previous years), so Mr. Harpster justifiably relied upon the 2010 forecast in PG&E's March 2010 filing in its 2011 GT&S general rate case filing. (CPSD OB, p. 100.) PG&E has contradictorily claimed that in no event may a party impute an adopted amount for the Commission after settlement rates have gone into effect. Not only did PG&E itself do this when it used the same 2007 forecast (as Mr. Harpster used) in PG&E's presentation to the Commission's Energy Division, PG&E's expert witness O'Loughlin also referred to the 2011 GT&S general rate case filing in his determination of capex. (PG&E-11 (MPO-45)).

In view of the above, PG&E's criticism of Mr. Harpster's approach is unwarranted. Although PG&E claims that Mr. Harpster used *ex post* data for imputed adopted amounts, that is simply not true.[208] In no event, did Mr. Harpster use any data

[207] RT 135:3-14.

[208] PG&E OB, p. 121.

that was not available during the applicable year. He used the only available detailed forecast for the applicable year contained in the records of PG&E's GT&S rate cases. As discussed above, even if parties entered settlements for lower amounts of money, the Commission expects utilities to ensure the safety and reliability of their systems as they have forecast to the Commission. (D.04-05-055, 2004 Cal. PUC LEXIS 254 at *116-118.) Mr. O'Loughlin's approach to rely solely upon the revenues under the settlement and escalations thereafter (with no breakdown of the costs) is contrary to Commission precedent. Indeed, Mr. O'Loughlin admitted that except for the year 2005, the Gas Accord III and Gas Accord IV settlements did not provide any specific amounts for O&M and capital expenditures. Therefore, he had to infer what the imputed adopted O&M and capex were for 2006 through 2010 based upon the settlement revenues. (RT 621:24-622:10.)

Finally, it is unreasonable for PG&E to retain an expert witness and instruct him to derive from settled revenue requirements, imputed Commission-approved amounts for O&M and capex, which are different from PG&E's litigation forecasts or internal budgeted forecasts. But that is precisely what PG&E did in this case. (RT 622:11-623:5; CPSD OB, p. 94.)

Indeed, a review of 2008-2010 emphatically demonstrates why Mr. O'Loughlin's overspending theory is wrong. PG&E did not agree to a revenue requirement in the Gas Accord IV Settlement that was lower than its litigation forecast because it believed the O&M and capex expenditures included in the litigation forecast were overstated. PG&E agreed to the lower revenue requirement because "it expected Market Storage revenues to exceed Market Storage costs." Contrary to the evidence, Mr. O'Loughlin assumed that the Gas Accord IV Settlement adopted O&M and capital expenditures that were much lower than PG&E's litigation forecast. The record in the Gas Accord IV case does not contain any support for that assumption. (RT 161:27-164:7.)

Based on his imputed adopted amounts, Mr. O'Loughlin concluded that the total imputed adopted amount in 2008-2010 for capex was $335.3 million. Because the actual total amount PG&E spent on capex was $610.1 million, Mr. O'Loughlin's position is that

PG&E's capex spending was 82% more than his imputed adopted amounts based on settlement revenue requirements.[209] Not only is there no basis for his imputed adopted amount in the Gas Accord IV Settlement, but Mr. O'Loughlin could not show any internal PG&E documentation showing that PG&E had overspent for capex by $275 million.[210] Considering that Mr. O'Loughlin submitted 63 exhibits accompanying his testimony (PG&E-10 and PG&E-11), the lack of any supporting internal documents from PG&E discredits his theory that PG&E overspent for capex by $275 million. Indeed, Mr. Harpster requested that PG&E provide any documents demonstrating that PG&E had spent significantly more on capex in 2008-2010 as indicated by Mr. O'Loughlin's imputed adopted amounts implied from the Gas Accord IV Settlement. PG&E stated that it was not aware that any such internal documents existed. (CPSD-170 (Harpster), pp. 83-84.)

In terms of O&M, under Mr. O'Loughlin's approach, PG&E spent $5.9 million more in 2008 and 2009 than Mr. O'Loughlin's imputed adopted amounts based on settlement revenues. In contrast, Mr. Harpster determined that, utilizing PG&E's 2007 forecast, PG&E had spent $3.7 million less for O&M during this period than what Mr. Harpster had imputed. (*Compare* PG&E-10 (O'Loughlin) (MPO-1), p. 24, Figure 5 (years 2008 and 2009) with CPSD-170 (Harpster), pp. 7, Table 3-2 (years 2008 and 2009) and 60-61.)

For 2010, Mr. O'Loughlin concluded that PG&E spent $111 million on O&M, which was $19.9 million more than his imputed adopted amount. (PG&E-10 (O'Loughlin) (MPO-1), p. 24, Figure 5 (year 2010).) Of course, that was the year the San Bruno explosion occurred. Mr. Harpster quantified $21.8 of O&M expenses related to the explosion which he excluded from actual costs because these costs should not be (and in fact were not) recoverable from ratepayers. (CPSD-170 (Harpster), pp. 107-109.)

[209] CPSD-170 (Harpster), p. 82; PG&E 10 (MPO-1), p. 48, Figure 12 (Years 2008-2010).

[210] RT 631:2-635:11.

b) The Reality Of PG&E's Severe Budget Cuts To GT&S From 2008-2010

PG&E sponsored the testimony of its expert witness O'Loughlin and continued to rely upon it, knowing full well that Mr. O'Loughlin's testimony was contrary to PG&E's internal records.[211] Mr. O'Loughlin's testimony was specifically contrary to PG&E's internal records showing management's continuous pressure to cut GT&S's safety budgets for the 2008 to 2010 time period. In reviewing the internal documents and data responses of PG&E, which are admissions and unrefuted by PG&E, Mr. Harpster concluded that "the low priority that PG&E gave to safety and reliability requirements in the 2008 through 2010 budget processes was well outside of standard industry practice – even during times of corporate austerity programs. Managing a gas system to the brink of regulatory noncompliance and accepting an elevated risk of system failures, is not industry practice." (CPSD-168 (Harpster), pp. 1-1, 1-2.)

Yet, PG&E refused to have Mr. O'Loughlin review or address the most pertinent documents on the budget cut issues during the time period at issue. This was revealed during cross-examination at the hearing. CPSD's counsel asked Mr. O'Loughlin "Can you respond to any of the points that he [Mr. Harpster] makes in Chapters 6, 7, 8 or 9?" Mr. O'Loughlin answered "No. My testimony report does not address Chapters 6 through 9. I did not respond to those in any way and I did not analyze these issues in any way." (RT 618: 8-14.) When CPSD's counsel followed up with the question, "And why didn't you?" Mr. O'Loughlin replied "I was not asked to do that." (RT 618:15-16.)

Therefore, it is important to review the documents that Mr. O'Loughlin was limited by PG&E from reviewing, especially the ones affecting the 2008- 2010 time period:

- From 2001-2006, PG&E repaired most, if not all, of the leaks reported for its backbone transmission system. From 2007-2010,

[211] PG&E OB, p. 120.

with the exception of 2008 when approximately 60% were repaired, PG&E only repaired 50% or less of the leaks reported.[212]

- During 2005-2008, ILI accounted for 54% of the total miles of pipeline assessed by PG&E.[213] But in 2009 and 2010, ILI only accounted for 13% of the total miles assessed.[214]
- Total ILI miles assessed by PG&E averaged 125 miles a year between 2005 and 2008. In 2009 and 2010, the annual average fell nearly 100 miles, to 26 miles per year.[215]
- GT&S was under significant pressure to reduce expenses in 2008. The combined Maintenance and Integrity Management budgets were $23.2 million below the GT&S's budget request.[216]
- Actual 2008 Integrity Management spending was 30% below the initial GT&S request.[217]
- The 2008 approved budget only funded 76% of the GT&S Maintenance budget request.[218]
- The 2008 budget request for maintenance projects was $25.2 million. The approved maintenance project budget was 47% below the initial GT&S request.[219] PG&E bluntly acknowledged in its Fall 2007 Program Review that its "long-term reliable operation is jeopardized at the current level of funding," that reduced spending "will perpetuate significant underfunding of the gas transmission maintenance program," and the backlog of correction maintenance would grow.[220]
- In 2008, PG&E reduced Integrity Management expense by changing assessment methods for some projects from ILI to ECDA and

[212] CPSD-168 (Harpster), p. 6-16, Table 6-18, CPSD-216 (OC-237).

[213] CPSD-168 (Harpster), p. 6-8, Table 6-7, CPSD-258 (OC-343).

[214] *Ibid*.

[215] CPSD-168 (Harpster), p. 6-9, Table 6-8, CPSD-207 (OC-211).

[216] CPSD-168 (Harpster), p. 7-6, Table 7-1, CPSD-244 (OC-314) and CPSD-184 (OC-66, Att. 23).

[217] CPSD-168 (Harpster), pp. 7-6, 7-7, Table 7-1, CPSD-244 (OC-314), CPSD-184 (OC-66, Att. 23), and Table 7-3, CPSD-244 (OC-314) and CPSD-175 (OC-23).

[218] CPSD-168 (Harpster), p. 7-10, p. 7-6, Table 7-1, CPSD-244 (OC-314) and CPSD-184 (OC-66, Att. 23).

[219] CPSD-168 (Harpster), p. 7-10, CPSD-231 (OC-267).

[220] CPSD-168 (Harpster), p. 7-11, CPSD-186 (OC-68, Att. 4, p. 18).

deferring some projects to 2009. The 2008 Gas Transmission Expense Program Review documents that PG&E ignored the advice of its own engineers: "*Gas Engineering would strongly prefer to smart pig PG&E's higher stress pipelines to obtain a much better initial evaluation of the line, but that is not financially viable at current funding rates*."[221]

- PG&E's 2008 Gas Transmission Program Review documents PG&E's recognition that since 2007 "many high priority reliability projects were underfunded/postponed." PG&E also tragically predicted: "While the effects of deferred maintenance can immediately impact operations and reliability, effects are most impactive when maintenance is deferred over a multiple year period as will likely be the case in 2008 to 2010."[222]
- PG&E's Spring 2009 Expense Program Review notes that $6.4 million of Priority I and II maintenance projects remained unfunded. PG&E acknowledged the risks of not funding these projects: deferral of critical maintenance, reliability impacts and reduced efficiency.[223]
- PG&E's 2009 budget cuts for maintenance were, in GT&S's own words, "very deep," leaving GT&S unable to fund all Priority I work.[224]
- PG&E's approved budget in 2009 for pipeline maintenance was $7.1 million less than the amount requested.[225]
- According to a PG&E internal email, in 2009 – the year before the San Bruno explosion – GT&S was "saddled" by its management with an Integrity Management expense budget set 32% below

[221] CPSD-168 (Harpster), p. 7-8, CPSD-186 (OC-68, Att. 3, p. 2) (emphasis added); CPSD-230, (OC-264 and OC-264, Supplemental, Att. 6, p. 9).

[222] CPSD-168 (Harpster), p. 7-11, CPSD-186 (OC-68, Att. 3, p.2).

[223] CPSD-168 (Harpster), p. 8-7, CPSD-186 (OC-68, Att.2, p.18).

[224] CPSD-168 (Harpster), p. 8-6, CPSD-230 (OC-264, Att. 9). PG&E defines Priority I corrective work as "*high risk* work due to safety, reliability, customer or stakeholder issues." (CPSD-168 (Harpster), p. 9-4 and CPSD-186 (OC-67, p. 28) (emphasis added).)

[225] CPSD-168 (Harpster), p. 8-1 Table 8-1, CPSD-244 (OC-314) and CPSD-184 (OC-66, Att. 24).

GT&S's initial budget request.[226] And PG&E actually spent even less – $1.9 million less than the final approved budget amount.[227]

- In 2009, PG&E actually spent $60.3 million on pipeline maintenance – $6.3 million over budget – but only because of significant unplanned emergent repair work.[228] PG&E then implemented cost reduction measures to close the "budget gap" caused by the unplanned expenditures, including strict hiring controls.[229]

- Like 2008, PG&E reduced Integrity Management spending in 2009 by changing assessment methods for projects from ILI to ECDA to reduce costs by $6 million and by deferring 41 miles of assessments until 2010.[230] The 2009 budget was considered to be the minimum funding, combined with increases in 2010-2012, to maintain the feasibility to comply with the United States Department of Transportation 2012 inspection deadline.[231]

- In October 2009, PG&E suspended the performance of corrosion maintenance work for the remainder of the year, deferring it to 2010 so that crews could repair the large number of leaks discovered in leak re-surveys.[232]

- In 2009-2010, there was a large increase of leaks reported as the result of special leak surveys implemented by PG&E in response to the discovery of serious systematic deficiencies in its leak survey program and the San Bruno explosion.[233]

- GT&S was under significant pressure to reduce expenses for a third straight year in 2010. In October 2009, PG&E Vice Presidents requested an analysis of how to further reduce the GT&S 2010 budget to $89.8 million (the original projected need was $111.1 million).[234]

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[226] CPSD-168 (Harpster), p. 8-3, CPSD-229 (OC-262, Att. 5); p. 8-2, CPSD-184 (OC-66, Att. 23), Table 8-3, CPSD-244 (OC-314) and CPSD-175 (OC-23).

[227] CPSD-168 (Harpster), Table 8-3, CPSD-176 (OC-314) and CPSD-244 (OC-23).

[228] CPSD-168 (Harpster), pp. 8-1, 8-2 & n.1, Table 8-2, CPSD-224 (OC-257, Att. 2).

[229] CPSD-168 (Harpster), p. 8-2, CPSD-185 (OC-67, p. 16).

[230] CPSD-168 (Harpster), pp. 8-3, 8-5, CPSD-186 (OC-68, Att.2, pp. 11, 14, 28), CPSD-229 (OC-262).

[231] CPSD-168 (Harpster), p. 8-5, CPSD-224 (OC-257, Att. 5a).

[232] CPSD-168 (Harpster), p. 8-9 and CPSD-224 (OC-257, Att.9).

[233] CPSD-168 (Harpster), pp. 6-17, Table 6-19, CPSD-216 (OC-237)

[234] CPSD-168 (Harpster), pp. 9-1 Table 9-1, 9-5, CPSD-226 (OC-259, Att. 5, October 7, 2009 email),
(continued on next page)

- The 2010 Integrity Management budget was 11% below the initial request, and the maintenance budget was 24% below the initial request.[235]
- The 2010 budget was set $6.7 million below the already constrained 2009 actual expense level.[236]
- In 2010, PG&E adopted a cost-saving initiative to change integrity management assessment methods from ILI to ECDA to create, in its own words, "headroom" in 2011 and 2012 in order to allow PG&E to "push more work" to those years.[237]
- In 2010, PG&E again cut its Integrity Management budget by deferring projects, and developed 21 formal cost reduction initiatives to bridge the gap between the expense funding requested by GT&S and management's budget target.[238]
- In 2010, PG&E adopted what it called the "Reduce Pipeline Project Work" initiative, the stated purpose of which was to defer all project work that was not required by code or contractual obligation to "2011 or beyond."[239]

In addition, Mr. O'Loughlin was not able to analyze or review PG&E's documents on the key measures which PG&E put in place starting in 2000:

- From 1998 to 2010, PG&E reduced the GT&S union headcount from a peak of 302 to 220.[240]
- Under the GPRP, PG&E was committed to replacing 15 miles of transmission pipeline a year. The GPRP was replaced by PG&E's Risk Management Program in 2000. If the GPRP had remained in place, PG&E would have been required to replace 165 miles of transmission pipeline during 2000-2010. Instead, PG&E replaced only 25 miles of pipeline.[241]

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p. 9-3, Table 9-5, CPSD-186 (OC-68, Supplemental, Att. 3, p. 15).

[235] CPSD-168 (Harpster), p. 9-1 and Table 9-1, CPSD-244 (OC-314) and CPSD-186 (OC-68, Att. 2, p. 4).

[236] CPSD-168 (Harpster), p. 9-1, CPSD-230 (OC-264, Att. 3b).

[237] CPSD-168 (Harpster), p. 9-10, CPSD-230 (OC-264, Att.1) and CPSD-226 (OC-259, Att. 4, p. 8).

[238] CPSD-168 (Harpster), p. 9-5, CPSD-226 (OC-259, Atts. 5 and 9), p. 9-7, Table 9-7, CPSD-247 (OC-323, Att.1).

[239] CPSD-168 (Harpster), p. 9-16, Table 9-17, CPSD-226 (OC-259, Att. 4, p. 21).

[240] CPSD-168, p.6-1, Table 6-1, OC-35, CPSD-176.

[241] CPSD-168, p. 6-13; OC-68, Att. 12, p. 60, CPSD-186; Table 6-14, OC-214, CPSD-235. CPSD
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- According to PG&E's Fall 2000 California Gas Transmission (CGT) Capital Program Review, PG&E's Risk Management Program was specifically designed to attempt to justify inexpensive alternative methods to "verify" pipe integrity in lieu of ILI (e.g., smart pigging) or hydrotesting in class location change areas.[242]
- PG&E's Spring 2001 CGT Capital Program Review referred to then current federal legislation language as potentially requiring pipeline verification as requiring smart pigging or hydrotesting, which could cost "in excess of $200 million over a 10-year period" whereas with the alternative cheap methods to verify integrity management, PG&E could reduce its compliance cost to approximately $50 million over the 10-year period.[243]

Overall, for PG&E to sponsor a witness to come up with a theory about these significant amounts of GT&S's overspending for capex and O&M from 2008 through 2010 prior to the San Bruno explosion, when PG&E would not let him look at the real documents showing how aggressively PG&E was cutting GT&S's budgets during that time frame, shows how PG&E is not interested in the truth or in changing its ways. Under PG&E's approach, the outside witness is spared from committing perjury, because he does not know the truth. PG&E tries to bury the reality, by ignoring it and hope it goes away. But PG&E's documents do not lie, and the truth has come out. Notwithstanding some change in PG&E's management, PG&E is still more interested in concealing the truth from the Commission than admitting it had put profits ahead of safety and put the public in harm's way. That is why this terrible tragedy in San Bruno occurred and other tragedies may still occur.

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recognizes that the previous GPRP was centered on miles of transmission *and distribution* pipeline replacements and that because of the unbundling that took place with the Gas Accord decision, the GT&S audit of Mr. Harpster focuses on the miles of transmission pipelines alone. However, to reduce the transmission replacement commitment to only 15 miles annually was just the beginning of the demise of PG&E's GPRP.

[242] CPSD-168, p. 7-2, OC-68, Att. 11, pp. 67-68, CPSD-186.

[243] *See* CPSD-168, p. 7-2, OC-68, Att. 10, p. 55.

VI. CONCLUSION

PG&E's Opening Brief attempts to defend the indefensible. However, there is no excuse for using scrap pipe in Segment 180. There is no excuse for not examining and discovering the missing interior welds. There is no excuse for failing to hydro-test Segment 180. It is inexcusable that PG&E set the maximum operating pressure without regards to the flawed pup sections. It is inexcusable that PG&E listed Segment 180 as "seamless", when such pipe did not exist, ever. There is no excuse for ignoring obvious threats like cyclic fatigue and DSAW pipe in certain years. It is inexcusable that PG&E overpressurized Line 132 without considering that it was causing dangerous flaws to become unstable. It is inexcusable, and morally reprehensible, that PG&E failed to keep track of what it was doing. It is inexcusable that PG&E made significant cuts to its safety related personnel and tasks, while at the same time paying large dividends. PG&E cannot defend its mistakes because those mistakes were both illegal and unreasonably unsafe.

It is not acceptable for PG&E to claim ignorance. PG&E had a duty to know. It violates the core principles of good public utility practice to operate a system that contains pipe that was not suitable to be used as a natural gas pipeline. Moreover, it is highly unlikely that no one at PG&E ever knew about the problems in its system. The PG&E workers that welded the pups and installed them in the ground likely knew what they were doing. PG&E's employees that transferred the pipeline data from the PLSS sheets to the GIS system likely knew that 30 inch seamless pipe did not exist, and could see that the test history was missing. In the 1980s, PG&E employees warned about missing data and aging pipelines, and recommended a pipeline replacement program be initiated. Not only did PG&E not implement the testing and replacement program, but PG&E cut back on safety expenditures at a time when the Commission granted every PG&E request for such costs. PG&E reduced its work force, chose a cheaper testing method, increased bonuses and dividends, and cut back on safety related items. PG&E placed its system at risk in order to "earn" a few extra percentage points in profits.

PG&E should be made to accept moral and legal responsibility for maintaining a corporate culture that created an unsafe system by repeatedly and continuously making decisions that compromised safety, in order to make a few extra dollars. PG&E's poor decisions had catastrophic consequences for the people of San Bruno, and have caused the rest of us to question the safety of our own neighborhoods. The Commission should restore that trust by holding PG&E liable for its many transgressions.

Respectfully submitted,

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