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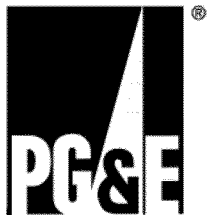
Exhibit No.: _____
Date: August 11, 2014
Witness(es): Bennie Barnes
Todd R. Hogenson
Louis T. Krannich
Terry White

PACIFIC GAS AND ELECTRIC COMPANY

2015 GAS TRANSMISSION AND STORAGE RATE CASE

SUPPLEMENTAL TESTIMONY
COMMENTS ON SED'S PRELIMINARY REPORT

VOLUME 1



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A. Introduction

Q 1 Please state your name and the purpose of this supplemental testimony.

A 1 My name is Terry White and the purpose of this supplemental testimony is to provide clarification and corrections to the California Public Utilities Commission (CPUC or Commission) Safety and Enforcement Division (SED) Preliminary Staff Report evaluating Pacific Gas and Electric Company's (PG&E) Proposal for Cost of Service and Rates for Gas Transmission and Storage (GT&S) for 2015-2017 (preliminary report). This testimony addresses portions of the preliminary report discussing Gas Operations risk identification, assessment, and management practices.

Q 2 Please state your name and the purpose of this supplemental testimony.

A 2 My name is Louis Krannich and I am co-sponsoring this testimony to provide clarification and corrections the SED's Preliminary Report evaluating PG&E's Gas Operations risk identification, assessment, and management practices.

B. Purpose of the SED Report

Q 3 What is PG&E's understanding of the purpose of the SED Report?

A 3 PG&E understands the purpose of the report is to evaluate PG&E's risk management process against the criteria set forth in the Cycla Report, which was issued in PG&E's 2014 General Rate Case (GRC). At the July 30, 2014 workshop, SED explained that where a particular area is found to be "insufficient," in its Preliminary Report, it is insufficient to fully satisfy the Cycla criteria; no judgment has been made as to sufficiency to meet PG&E's burden of proof in the 2015 GT&S case.

Q 4 The SED states that the scope of its preliminary report is the 2015 GT&S Rate Case Scoping memo issue number five, asking whether PG&E's proposed risk management and asset family approach is reasonable. What was SED's conclusion and how did SED answer the scoping memo question?

A 4 The report does not explicitly answer the scoping memo question. However, given the preliminary assessment, i.e., the report issues five grade "B"s and three grade "C"s, it appears that SED concluded that PG&E's proposed risk management and asset family approach is reasonable.

Q 5 Should anything in SED's report be read by the Commission as suggesting that the Commission should not authorize the revenue requirement increase PG&E has requested in this case?

A 5 No, it should not. At the workshop, SED clearly stated that it made no judgment that PG&E's application was deficient and acknowledged that we are embarking on a new, multi-year journey, not just for PG&E, but for the Commission. SED further acknowledged that there has been no order or mandate that PG&E satisfy the Cycla criteria or another risk-based decision-making standard, that it is not surprising that PG&E has not fully satisfied the Cycla criteria and that PG&E should be commended for the progress it has made since the 2014 GRC. Moreover, SED acknowledged that risk-based prioritization is only one way of identifying the right work.

Q 6 Does PG&E agree with SED's characterization and evaluation of the risk management and asset family methodology used by PG&E in preparing this Application?

A 6 PG&E agrees with some, but not all, of SED's factual characterizations and conclusions. SED's overall conclusion that PG&E should continue to develop more detailed data and information to better understand and articulate asset risk and, to the extent possible, measure risk reduction aligns with PG&E's approach. PG&E also agrees that the current risk profile of PG&E's natural gas transmission and storage system is significantly above a risk tolerance threshold on which PG&E and stakeholders could agree today. There are, however, areas where the preliminary report mischaracterizes PG&E's practices and reaches conclusions without substantive support.[1]

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[1] See Attachment 1 to this testimony for a summarized list of the information PG&E discussed and/or provided to SED in connection with SED's assessment.

C. PG&E Clarifies the Definitions Used in the SED's Preliminary Report

Q 7 On page 3 of its Preliminary Report, SED states: "Risk assessment involves the analysis of data to identify which hazards/threats present the greatest risk in the system. Risk management is the process by which the organization responds to the identified risk." Are these definitions of "risk assessment" and "risk management" how PG&E uses these terms?

A 7 No. PG&E uses the term "risk management" to refer to an overarching function for which risk identification and risk assessment are subsets, and not just the process of responding to an identified risk. PG&E's definition of risk management from the Publicly Available Specification (PAS) 55 standard, "coordinated activities to direct and control an organization with respect to risk"[2] is very similar to the Cycla Report definition of risk management.[3]

The SED's definition of risk assessment[4] is limited to the analysis of data to identify threats that pose the greatest risk. PG&E's practices are much more aligned with the Cycla definition of risk assessment, "The overall process of risk identification, risk analysis, and risk evaluation."[5]

Q 8 The SED preliminary report states "overall, the process PG&E used to arrive at the final portfolio lacks some transparency" and that PG&E should consider integrating techniques that "[p]rovide additional transparency about its enterprise risk tolerance."[6] Does PG&E agree?

A 8 No. PG&E has undertaken substantial effort to provide transparency in this proceeding including the following steps:

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2 See Attachment 2 to this testimony, for PG&E's Data Response to Indicated Shippers 005, Question 03, which elaborates on the definition of risk management as it relates to PG&E's Gas Operations risk management activities.

3 See Attachment 3 to this testimony for a copy of the Cycla Report. Refer to Cycla Report, Attachment 1, page 2, for a definition of risk management, "Coordinated activities, beginning with risk assessment, to inform and implement decisions designed to direct and control an organization with respect to risk (Definition derived from ISO Guide 73:2009)."

4 SED Preliminary Report, page 3, "Risk assessment involves the analysis of data to identify which hazards/threats present the greatest risk in the system."

5 See Attachment 3 to this testimony, (referenced in fn. 3) for a copy of the Cycla Report. Refer to Cycla Report, Attachment 1, page 2, definition of risk assessment, derived from ISO Guide 73:2009.

6 SED Preliminary Report, p. 15.

- Providing the basis for PG&E's asset and risk management process which is set forth in the international standards, PAS 55 and ISO 55001, and in the Code of Federal Regulations Section 49 Part 192 requirements to follow ASME B31.8S, Managing System Integrity of Gas Pipelines, for risk management at the covered pipe segment level.
- Providing copies of its standards, procedures, and plans applicable to asset management, risk management and investment planning to all parties.
- PG&E's Application, testimony, and work papers submitted on December 19, 2013, contained thousands of pages explaining PG&E's forecast and the basis for the forecast.
- At the outset of its review, PG&E provided SED approximately 250 "scoring sheets" and presentations from decision-making meetings tracking decreases or increases to scope and pace of programs and the rationale for scope and pace changes over a multi-month integrated planning period.[7]
- In recently served supplemental testimony, PG&E provided more than 4,000 pages of information describing its best practice, risk and asset management activities.[8] The testimony describes and provides documentation of risk and asset management practices and decisions as well as the process and outcomes used to identify best practice programs.
- PG&E met with various parties on six separate occasions, specifically to discuss its approach to asset management, risk management, and integrated planning.
- SED met with PG&E 10 times over a 2-week period. In these meetings, SED met with more than twenty of PG&E's subject matter experts in risk

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7 Samples of scoring sheets were also provided in PG&E's July 15, 2014 Supplemental Testimony, Chapter 2A, Attachment B, Attachment 15. See the second example set, Vintage Pipe, "forecast developments" section where the preliminary program forecasts walk to a lower final program forecast, with the rationale for each reduction written to the right of the forecast. PG&E's July 15, 2014 Supplemental Testimony, Chapter 2A, Attachment B, Attachments 15 through 27, include meeting materials from all forecast decision-making meetings.

8 See PG&E's Supplemental Testimony submitted July 15, 2014. Almost all of this information had been provided in response to discovery starting in February 2014.

management, investment planning, and in the day-to-day management of assets and risk.

Q 9 Does PG&E agree with the way SED characterizes, on page 7 of the preliminary report, calibration of threats and how scoring is adjusted to calibrate a risk?

A 9 Partially. As the SED preliminary report states, calibration is an iterative process. However, at PG&E it occurs at multiple levels of Risk Register development beginning with: (1) individual asset families assessing and calibrating risks within each asset family; (2) all Gas Operations asset families calibrating the high and medium risks across asset families; and (3) PG&E's senior management team calibrating the highest risks across each line of business at the enterprise level. Risks, not threats, are calibrated through changes in scores. The weightings of the consequence categories are not adjusted.[9]

Q 10 The preliminary report mentions on page 7 PG&E's use of the term "strategic" to classify discretionary programs and projects when developing the forecast portfolio. Does the report use the correct definition of "strategic" in this context?

A 10 Not precisely. PG&E defines strategic in its investment planning procedure. Strategic means, "Work that does not meet the definitions of Compliance, Customer Driven, or Fixed Costs. Note: this could include multi-year compliance programs".[10] The distinction is that Strategic can include programs that address multi-year compliance work, like completing in-line inspections.

D. PG&E Has Made Substantial Progress in Identifying, Assessing and Managing Risk

Q 11 Does PG&E agree with SED's statements on page 1 that "the proposals in this Application are more focused and refined" than PG&E's gas distribution

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[9] See Attachment 4 to this testimony, for a copy of the Data Response to ORA_110, Questions 01 and 02, provided by PG&E at the August 5, 2014 meeting with SED Staff, which explains the calibration process across asset families.

[10] See PG&E's July 15, 2014 Supplemental Testimony 2A, Attachment B, Attachment 13, for the investment planning procedure that defines strategic, page 1, "Step 1: Classification, Item 4."

forecast in the 2014 GRC and that "PG&E's proposal views its system more holistically"?

A 11 Yes, PG&E has made progress in its approach to integrated planning, asset management and risk management. PG&E's 2015 GT&S forecast is based on the next step of a maturing process for how to build a risk-based portfolio of work. For example:

- PG&E has expanded its use of the best practice ASME B31.8S, Managing System Integrity of Gas Pipelines, in applying the threat identification and classification framework to all of its natural gas assets.
- PG&E Gas Operations created its Risk Register, a standard and procedure for its use, and a consistent consequence of failure and likelihood of failure scoring method of risks.
- PG&E Gas Operations documented and began an investment prioritization process to develop a risk-based executable portfolio of programs and projects, given system and resource constraints.[11]
- PG&E formalized and expanded its asset management approach with the creation of asset families, Asset Family Owners and Asset Management Plans.[12]

Q 12 Would you characterize program and project risk scores the way the SED preliminary report does on page 8 as providing "obviously very rough" information about the relative effectiveness of the risk mitigation each provides?

A 12 No. The program and project risk scores are based on the same methodologies and framework utilized in the Risk Register risk-scoring process and involve likelihood and consequence scores across safety, reliability and environmental dimensions for each program. These scores are used in the risk-based prioritization process to adjust the scope and pace of programs based on risk and constraints.

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[11] See Attachment 3 to this testimony (referenced in fn. 3), for a copy of the Cycla Report, also provided to SED Staff on August 5, 2014, in which PG&E lists the Cycla Report general evaluation criteria and related PG&E processes.

[12] See Chapter 2 of the 2015 GT&S Rate Case Testimony at pages 2-12 to 2-14.

E. PG&E Disagrees With SED on Risk Scoring Method Assessment

Q 13 Does PG&E agree with the SED's position beginning on page 17 through page 18 that index scoring as used by PG&E has many known limitations?

A 13 PG&E does not agree with the assertions made in the SED's preliminary report as drawn from the Hubbard report cited. That report addresses linear scoring rated on an ordinal scale irrelevant to the methods PG&E uses for its risk register.[13] Some specific differences between the article and PG&E scoring methods are provided below:

- The Hubbard report addresses how cognitive bias can skew results and suggests on page 8 that calibration training to experts can significantly reduce the bias. PG&E calibrates risk at several different levels, within an asset family, across families, with the senior leadership team, and across the enterprise.
- The Hubbard report discusses variances in qualitative descriptions such as "very likely" and "very unlikely". PG&E's scores the consequence and likelihood category using specific numbers with each value tied to a definition. Data is used where possible to support conclusions, and the calibration process is designed to provide an extra layer of review to assure the results are consistent across the range of PG&E assets.
- The Hubbard report introduces the phenomena of "range compression" and "clustering." PG&E attempts to avoid these phenomena by using a log-based instead of linear scale to score risks and further tests results with debate, and challenge sessions during calibration. In fact, the article explores an ordinal scaling method on page 5 as a way to achieve what PG&E accomplishes in its risk register calculations, "each scale increment is an extremely wide range of values".
- The Hubbard report discusses scaling and assumptions regarding direct proportionality within the scale, (e.g., a "2" is twice as large as a "1"). PG&E uses a log-based scale where an easy to understand comparison is the Richter scale, a magnitude of 5 earthquake is exponentially

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[13] The article cited in the preliminary report is "Problems with scoring methods and ordinal scales in risk assessment" by Douglas Hubbard and Dylan Evans, IBM Journal of Research and Development, Vol. 54 No. 3 Paper 2 May/June 2010.

greater than a magnitude of 4 earthquake. This enables PG&E during calibration sessions to overlay subject matter expertise to the results.

- Finally, the Hubbard report states that scoring techniques often presume that factors scored are independent of each other. PG&E recognizes the complex, interactive nature of its natural gas system in the way risks are scored. The six categories of consequence used by PG&E work together to consider multiple concurrent outcomes. For example, reliability is one of the six consequence categories[14] considered for each risk.

F. A Grade-by-Grade Review of How PG&E Is Working to Generate Reliable, Credible and Useable Results

1. Grade B – Identifying the Threats Having the Potential to Lead to Safety Risk

Q 14 Does PG&E agree with the assignment of the grade "B"?

A 14 Yes.

Q 15 The SED report on page 10 states that PG&E's Risk Register "is comprised of fairly high level entries that in many cases do not show sufficient granularity." Does PG&E agree with this characterization?

A 15 No. The risk register has a sufficient level of granularity for the function it serves, which is to provide a relative ranking of risks that have a low probability of occurrence, but high consequence when they do occur. The risk register is not intended to rank or prioritize projects.[15] PG&E has other processes in place for project prioritization that do rely on analysis performed at a more granular level.

The example cited in the preliminary report to support the need for more granularity, on pages 10 and 11, is that grouping vintage construction methods such as pre-1962 girth welds and wrinkle bends into the

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[14] PG&E's six consequence categories are listed in PG&E's July 15, 2014 Supplemental Testimony, Chapter 2A, Attachment B, page 2A-B-10. They are: Health and Safety, Regulatory Compliance, Environmental Impact, Reliability, Reputation, Direct Financial Damage.

[15] See Attachment 5 to this testimony, for PG&E's Data Response to IndicatedShippers_007, Question 08, which states, "The risk register captures risks at the Gas Operations asset level, whereas the TIMP risk management process assesses the risk related to different segments of pipe."

"vintage construction methods" risk is not sufficiently granular. However, all of the vintage construction methods associated with the vintage construction methods risk, when combined with outside forces such as land movement, have the same potential failure mode, pipeline rupture. For purposes of the risk register, therefore, there is no need to perform a more granular assessment.

The individual projects associated with the program are prioritized using total relative risk calculation which requires a number of detailed inputs that go far beyond the risk register entries. In summary, the purpose of the risk register is to identify high consequence risk, not to detail a risk at a project level.

Q 16 Will you please elaborate on the other processes outside of PG&E's risk register development to prioritize projects?

A 16 Ongoing processes to prioritize projects within programs rely on a variety of inputs, including in some cases, relative risk scoring, asset health scores, raw data, failure data, and subject matter expertise.

Q 17 PG&E states that the purpose of the risk register is to characterize threats that lead to high consequence low probability risk. Does this mean that PG&E does not consider less catastrophic higher probability risks?

A 17 No. The risk register does not displace ongoing reliability, capacity, compliance, and other programs which generally mitigate lower consequence, but higher probability risks.

Q 18 On pages 10 to 11 of SED's Preliminary Report, SED states: "To the extent that more granular data can be obtained, it would be beneficial to have more granular data drive more specific mitigation measures." Does PG&E agree?

A 18 Yes. As discussed above, PG&E uses more granular data when it is available. In other cases, such as storage well integrity management and facilities, PG&E is developing programs to obtain more data and systems to analyze that data.[16]

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[16] See, e.g., 2015 GT&S Rate Case Testimony at Chapter 5, Storage, page 5-12, lines 5 through 27, describing the gas storage database and Testimony at Chapter 6, Facilities, page 33 describing data acquisition and metric development program for Measurement and Control and Compression and Processing asset families.

Q 19 Can PG&E explain how it addressed interactive threats as requested by SED on page 11 of the preliminary report?

A 19 See Question and Answer nine in the PSEP portion of this testimony for how PG&E is managing interactive threats.

2. Grade B – Characterizing the Sources of Risk

Q 20 Does PG&E agree with the grade provided?

A 20 Yes.

Q 21 On page 11 the SED Preliminary Report states that there "is an insufficient showing that PG&E has translated data on historic failure rate of equipment into probabilities of consequential events and/or accidents" and that "PG&E could have provided more information on how the data has been validated or the level of uncertainty with the data." Does PG&E agree?

A 21 Partially. The evidence and analysis PG&E provided is sufficient to explain and justify the risk mitigation measures PG&E has forecast. ASME B31.8S provides clear guidance that expert opinion of subject matter experts, one of four risk assessment methodologies,[17] is sufficient to meet its requirement. PG&E agrees that using more detailed data and information to learn more about the condition of its assets and the threats they face will improve its analysis over time.

Section 3 of each of PG&E's asset management plans addresses data quality and gaps.[18]

Q 22 When is it useful to choose one or another of the ASME B31.8S risk assessment methodologies?

A 22 There are different approaches to assessing risk for different situations. For example, when data is limited or access to data is limited, it may be much more practical to use subject matter expertise. Scenarios, generally represented in decision trees, can be very useful when multiple outcomes

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[17] See ASME B31.8S:2004, Section 5.5, Risk Assessment Approaches which discusses the following approaches: (1) Subject matter experts; (2) relative assessments; (3) scenario assessments; and (4) probabilistic assessments. A copy of this copyrighted document can be viewed online at https://law.resource.org/pub/us/cfr/regulations.gov.docket.03/asme.b31.8s.commentary.pdf.

[18] See PG&E's July 15, 2014 Supplemental Testimony, Chapter 2A, Attachment B, Attachments 06 through 11, Section 3 of each attachment.

are likely. Relative risk assessment modeling works well when there is sufficient data available for comparison. Additionally, the Cycla Report provides an analysis of the challenges of using probabilistic models in the natural gas industry.[19]

3. Grade B – Identifying Candidate Risk Control Measures

Q 23 Does PG&E agree with SED's grade?

A 23 Yes.

Q 24 Does PG&E agree with the statement on page 12 of the SED's report that "[t]here could also be a higher level of detail as to whether the risk control measures PG&E proposes are broadly used in the industry or employed by operators in the top quartile of performance"?

A 24 No. PG&E's opening testimony defines industry best practices as those that are widely recognized in the industry as driving safety excellence and identifies specific industry best practices throughout the testimony. PG&E's July 15, 2014, Supplemental Testimony identifies 41 industry best practices relevant to PG&E's forecast risk control measures (RCM) and describes the industry benchmarking PG&E used to identify these industry best practices.[20]

With regard to information on practices employed by top quartile performers, as PG&E explained in its testimony, much of the industry benchmarking available to PG&E is subject to third-party confidentiality and non-disclosure agreements that prohibit PG&E from sharing it with the Commission or parties to this proceeding.

Q 25 Does PG&E agree with the statement on pages 11 and 12 of the preliminary report that "[t]here should be more analysis about how PG&E analyzed and examined these risk control measures and their effectiveness in mitigating risks similar to those confronted by PG&E?

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19 See Attachment 3 to this testimony (referenced in fn. 3), for a copy of the Cycla Report. Reference Cycla Report, Attachment 4, page 3, "Difficulties in Characterizing Pipeline Risk."

20 See PG&E's July 15, 2014 Supplemental Testimony, Chapter 2B, Appendix 1 and Appendix 2 as well as PG&E's July 15, 2014 Supplemental Testimony, Chapter 2B, Attachment B.

A 25 Partially. The report lacks specific examples that illustrate the point SED is making, but PG&E does believe that over time the data available to perform analysis will improve, yielding an even better understanding of mitigation effectiveness. However, as discussed in the answer above, if the mitigation is a best practice, by definition it must be effective. For example, to prevent corrosion, cathodic protection is a well-known industry practice and industry standards provide guidance on best methods to apply cathodic protection. Additionally, in-line inspection is a widely regarded practice in the natural gas industry to assess pipeline conditions and PG&E is required by the CPUC to make all lines capable of in-line inspection where warranted, further validating its usefulness. In some instances, mitigation activities are also prescribed by code as in strength testing pipe and valve automation.[21] It is not clear how additional analysis would be beneficial.

4. Grade C – Characterizing the Effectiveness of the Candidate RCMs

Q 26 Does PG&E agree with the "C" grade, that PG&E partially meets the criteria but needs substantial improvement?

A 26 No, PG&E strongly disagrees that substantially meeting the criteria is dependent on a definitive method to calculate absolute risk reduction across all asset families, which to PG&E's knowledge has not been done in the natural gas industry. While PG&E continues to improve its ability to measure the effectiveness of risk control measures, PG&E has made substantial progress at the program level. For example, PG&E's integrity management programs, described in Chapter 4A of testimony, set specific and measurable safety goals for percentages of populations living and working near pipelines. For example, PG&E has set a goal over a 10-year period to reduce the risks posed by the threats that in-line inspection, a widely recognized condition assessment tool, identifies for approximately 80 percent of population living within the potential impact radius of PG&E pipelines.[22]

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21 See Attachment 6 to this testimony, PG&E's Data Response to TURN 010, Question 11, Attachment 01 for a list of state and federal compliance obligations and NTSB commitments by program.

22 See 2015 GT&S Rate Case Testimony on page 4A-12, lines 12 through 20.

PG&E understands that a "C" grade implies that PG&E is performing poorly in this area relative to other operators and needs substantial improvement. SED does not, however, identify any operators that perform better in this category than PG&E and SED staff further elaborated on August 5, 2014 that incremental risk reduction per dollar spent is currently theoretical and likely a journey of multiple years.

Q 27 Does PG&E agree with the SED's perspective on page 12 of the preliminary report that PG&E "has not made a showing of the incremental risk reduction achieved by the RCMs to justify the proposed scope and pace of implementation", and that, "the current risk scoring methods reflect that the programs are either fully adopted or not adopted at all"?

A 27 No. In discussion with SED staff on August 5, 2014, staff clarified that a "showing of incremental risk reduction" equated to incremental risk reduction for dollar spent and suggested that while this is the expectation, it is at this point, a theoretical concept.

PG&E did not decide on programs by either fully adopting programs as initially proposed or not adopting programs at all, an "on/off switch approach." Through the portfolio prioritization process, PG&E used the program and project risk scores to modify the pace and scope of most programs included in the rate case based on risk and constraints.

Q 28 Does PG&E agree with SED's statement on page 12 of the preliminary report that, "PG&E has not identified its approach to considering uncertainty in assessing the effectiveness of selected risk control measures"?

A 28 No. PG&E understands that SED's preliminary report is saying given uncertainty in data relied on to identify and rank risks, there is resulting uncertainty as to whether PG&E has identified the right risk ranking, and thus resulting uncertainty as to whether PG&E has identified the right RCMs. PG&E believes that its risk and asset management processes adequately accounts for such uncertainty. One way that PG&E addresses uncertainty in ranking risks is by its scaling of frequency scores. The frequency scale separates likelihood of occurrences on a quantitative continuum from 10-100 times per year (frequent) to 1 in 100,000 times per year (very rare), allowing asset family owners and subject matter experts to better examine ranking during the challenge and debate of calibration sessions.

Outcomes are evaluated in key performance indicators on an ongoing basis including at the Risk and Compliance Committee and, for the highest Gas Operations risks, at the Session D.

5. Grade B – Determine Resource Requirements for Identified RCMs

Q 29 Does PG&E agree with the "B" grade, that PG&E substantially meets the criteria?

A 29 Yes.

Q 30 Does PG&E agree with SED's statement on page 12 that "PG&E should provide more analysis and documentation to support its basis for determining resources required to implement selected risk control measures"?

A 30 Partially. PG&E provided a substantial volume of presentations outlining the basis and results of analysis on resources required to implement the risk control measures. In a follow up meeting requested by SED staff on August 5, PG&E reviewed the excel tool used to quantify the resources required. PG&E provided the Excel tool used to quantify the resources required at the August 5, 2014 meeting with SED staff.[23]

Q 31 Section 5 of the SED preliminary report beginning on page 12 through page 13 and then again on page 17 states that PG&E's approach to identifying resource and system constraints is not documented, very subjective and qualitative in nature. Does PG&E agree?

A 31 No. PG&E quantified the resources required and on August 5, reviewed with SED staff the tool used to perform this analysis. PG&E also provided its investment planning procedure and multiple presentations outlining the basis and results of analysis on resources required and system constraints. Furthermore, the resource and system constraints for each program were documented in approximately 250 scoring sheets.[24]

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[23] See Attachment 7 to this testimony, for the resource analysis tool PG&E reviewed and provided to SED at the meeting with SED staff on August 5, 2014.

[24] PG&E's July 15, 2014 Supplemental Testimony, Chapter 2A, Attachment B, Attachments 13-25, detail the meetings and considerations including resource and system constraints.

Q 32 Does PG&E agree with the following statement from SED's preliminary report on page 17, "Additional quantification of the risks subject to constraints would help in deciding the best pace and best mix of strategies"?

A 32 PG&E did not understand this sentence and sought clarification. SED staff clarified during the August 5, 2014 meeting that its intention was that PG&E should, "continue to strive to quantify risk with more sophistication." PG&E agrees that quantifying risk, where appropriate, with more sophistication could be helpful.

Q 33 Do the examples provided in the preliminary report of where PG&E could seek economies of scale to reduce resource requirements listed on page 13 in Section 5 of SED's Preliminary Report make sense?

A 33 No, the projects require different skillsets. The Vintage Pipe Replacement Program will mostly utilize pipeline engineers[25] while the Geo-Hazard Threat Identification and Mitigation Program is work completed first by risk engineers[26] and then secondarily, specialized work using contract experts. In response to PG&E's written comments, SED staff commented at the August 5, 2014 meeting that they would consider using a different example, to be determined, to support the economies of scale recommendation.

Q 34 The SED report on page 13, in the last sentence of Section 5 appears to question PG&E's ability to scale up some of the most significant forecast items, Hydrostatic Testing and Vintage Pipe Replacement. Will PG&E have enough trained and competent resources to perform the work included in the forecast?

A 34 Yes. PG&E will perform hydrostatic testing and pipeline replacement at a slower pace than the pace leading up to the 2015 forecast. The forecast need for critical resources is flat between 2013 and 2015, moving up 15 percent from 2015 to 2017, giving PG&E ample time to implement its hiring strategy and to build on the technical competence of its newly hired

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25 PG&E pipeline engineers are assigned a specific territory and provide day-to-day support to operations and maintenance functions as well as to construction projects. Pipeline engineers also provide emergency response support.

26 PG&E risk engineers identify and calculate the risk of failure for pipelines based on the threats system-wide. Risk Engineers will also identify either assessment methods or preventive and mitigation techniques to reduce identified risks.

employees. PG&E provided additional information to the SED staff on August 5, 2014 demonstrating how resource adequacy was addressed.[27]

6. Grade C – Select the RCMs the Operator Wishes to Implement (Based on Anticipated Effectiveness and Costs Associated With Candidate RCMs)

Q 35 Does PG&E agree with the "C" grade, that PG&E partially satisfies the criteria but needs to make substantial improvement?

A 35 No. While the examples the SED uses in its preliminary report do not support its findings, PG&E continues to refine its goals for either: (1) a pre-defined acceptable risk threshold; or (2) movement toward a desired end state, consistent with the Cycla criteria. For the pipeline assets, the risk control measures PG&E adopted correspond directly with the pre-defined, best practice risk threshold to apply integrity management principles to all populations living along pipelines by 2030. For other asset families, the goals vary, such as desired age of fleet or thickness of well casing, and will evolve as PG&E obtains more information about asset condition. PG&E disagrees with the SED perspective, discussed in the response to Criteria 4, that substantial fulfillment of the criteria should be based on the ability of the utility to calculate risk reduction per dollar spent, a theoretical and distant prospect and not a part of the Cycla criteria.

Q 36 On page 13 of the preliminary report, SED states that PG&E "has not always provided enough analysis and documentation supporting its decisions." Do you agree with this statement?

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27 See Attachment 7 to this testimony, (referenced in fn. 23) for the resource analysis tool and PG&E's July 15, 2014 Supplemental Testimony Chapter 2A, Attachment B, Attachment 20, which summarizes the resource analysis, the conclusions, and the strategies needed to resource the work portfolio.

A 36 No. PG&E has provided substantial documentation in testimony and workpapers to support its selection of risk control measures and has provided additional information through discovery.[28]

Q 37 On page 14 of the report, SED criticized PG&E for explaining why upgrading its In-Line Inspection capabilities over a ten-year period rather than a 12-year period was appropriate, but not discussing "how [PG&E] plans to use this data or justify why the same delay in data collection between the 8-year and 10-year plan is tolerable." Does PG&E agree with this criticism?

A 37 No. PG&E refers to two locations in testimony where alternatives considered were reviewed, including the rationale for the timeline.[29]

Q 38 On page 14 of the preliminary report, the Hydrostatic Testing program is criticized for not providing, "detail or quantification of said risk reduction." Does PG&E agree with statement?

A 38 No. PG&E's hydrostatic testing program is based on a criteria-driven, risk-based prioritization process to rank each project by risk. While PG&E is not able to quantify the risk reduction per dollar spent for this program, it does address the highest risk segments first, consistent with Cycla criteria to select RCMs to move toward a desired end-state, consistent with the NTSB recommendation to strength test Class 3, 4 and High Consequence Area pipe, and consistent with the Commission's Decision 11-06-017 to test previously untested pipe as soon as practicable.

Q 39 Discussing PG&E's Earthquake Fault Crossing Program on page 14 of its report, SED states that "PG&E has not provided sufficient detail or quantification as to why the selected program provides "the right amount of

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28 On August 5, 2014, PG&E referenced to SED staff supporting information, including: (1) PG&E's July 15, 2014 Supplemental Testimony, Chapter 2A, explaining the risk and asset management processes; (2) PG&E's July 15, 2014 Supplemental Testimony, Chapter 2B, Attachment B providing details about PG&E's identification of best practices; and (3) evaluation Criteria 6 in the Cycla Report , Attachment 3, page 10, stating that risk control measures should be guided by current information on industry best practices and risks and costs of applicable control measures.

29 See 2015 GT&S Rate Case Testimony at pages 4A-16 to 4A-19 explaining the use of population as the risk basis for the make piggable program and system constraints affecting pace, and pages 4A-17, lines 13 through 4A-18, line 13 explaining the alternatives considered and stating that an 8-year plan was not feasible due to system constraints.

work" or what "too many outages means." Does PG&E agree with this criticism?

A 39 No. In testimony PG&E describes the program, rationale for the approach and constraints for project completion. For example, on page 4A-46, lines 4 through 7, say, "PG&E plans to complete the studies in order of proximity to population. Resources prohibit the completion of all of the remaining 127 earthquake fault crossings by 2017, but the goal is to complete them in the order of highest risk with the focus on population protected. . . ." Further, in the alternatives section, PG&E discusses the scope and pace of work. For example on page 4A-49, lines 4 and 5, "This alternative was found to be a significantly higher cost without much overall risk reduction." It is only after this analysis is complete that PG&E concludes on page 4A-59, lines 18 through 21, "It is the right amount of work because it does not constrain the system with too many outages and it is supported by the limited engineering resources available for this type of specialized work."

Q 40 On pages 15, discussing PG&E's Vintage Pipe Replacement Program, SED states that "there is no basis by which to compare PG&E's determination of the right pace or sufficient surrounding analysis to support its conclusion"? Does PG&E agree with this criticism?

A 40 No. Similar to the example cited above for earthquake fault crossing, PG&E's testimony, over nine pages, provides support for its programs based on the subject matter expertise of its witnesses coupled with available data, benchmarking to identify industry best practices, scope and pace that reduces risk cost effectively, and constraints.

Q 41 Does PG&E agree with the SED's statement on page 15 of the preliminary report that PG&E has not explained its desired risk reduction level in the context of PG&E's Programs to Enhance Integrity Management?

A 41 No. Similar to the vintage pipe and earthquake fault crossing examples cited in the preliminary report, PG&E provides support for its programs based on the subject matter expertise of its witnesses coupled with available data, benchmarking to identify industry best practices, scope and pace that reduces risk cost effectively, and constraints. In this instance, PG&E has made a best practice commitment to apply integrity management principles beyond high consequence areas to all of its pipeline assets. In testimony,

PG&E explains the commitment and concept in Chapter 2, further elaborates in Chapter 4 and then demonstrates with specific projects in Chapter 4A.[30] Meeting this commitment, combined with field-based root cause analysis will result in the detailed information that PG&E needs to understand not just the direct cause, but what drives the ability for a particular component to leak or rupture. Ultimately, the combination of these efforts will lead to an increased risk reduction quantification capability, an end state highly recommended in the preliminary report.

Q 42 Does PG&E agree with SED's summary of Section 6, that "In general, there is a lack of detailed analysis surrounding the proposed risk-mitigation activity and its cost as compared to the alternatives that were rejected"?

A 42 No, the examples cited in the preliminary report to support the conclusion are areas where PG&E performed analysis to develop a portfolio of work. The SED, in the course of preparing its preliminary report, did not ask PG&E to demonstrate any of the analysis methods used to determine risk control measures for the earthquake fault crossing, hydro test, vintage pipe, and programs to enhance integrity management programs cited as lacking analysis.

7. Grade B – Determine the Total Resource Requirements for Selected RCMs

Q 43 Does PG&E agree with "B" grade that PG&E substantially satisfies the criteria?

A 43 Yes.

Q 44 SED states that PG&E does not provide "the precise methodology and guiding criteria behind the evolution of the different estimates." Does PG&E agree with this statement?

A 44 No. As discussed, PG&E does provide the methodology and guiding criteria. In addition to a documented process, PG&E created approximately

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[30] See 2015 GT&S Rate Case Testimony at page 2-9, line 23 through page 2-10, line 15 introducing PG&E's commitment to extend integrity management principles to 90 percent of the population living along its pipelines by 2020 and to 100 percent of the population by 2030. See page 4-13, lines 7 through 19. See Chapter 4A programs In-Line Inspections, Direct Assessment, Hydrostatic Testing, Earthquake Fault Crossings, Vintage Pipe Replacement, Geo-Hazard Threat Identification, and Programs to Enhance Integrity Management.

250 program and project scoring sheets for each risk control measure. These sheets record cost, identify critical resources and constraints on those resources. These scoring sheets are a key product of the documented investment planning process.[31] Further, PG&E provided key integrated planning management presentations that led to the final forecast.[32]

By "precise" methodology, it appears that SED is suggesting that PG&E provide sufficient detail, in its testimony, to replicate the process. PG&E does not believe this level of detail is required by Cycla's evaluation criteria.

8. Grade C – Adjust the Set of RCMs to Be Presented in the Rate Case Considering Resource Constraints

Q 45 Does PG&E agree with the "C" grade in this category?

A 45 No. PG&E has a defined, risk-based process for determining the final proposed scope and pace of the portfolio of programs, based on risk and constraints.[33] PG&E utilized this process, documented decisions made and provided this documentation in program scoring sheets, presentations used during the prioritization process, the resource tool, testimony and workpapers. PG&E is not currently able to quantify the absolute risk reduction per dollar spent across all programs in a consistent metric and disagrees with the SED perspective, discussed in the response to Criteria 4, that substantial fulfillment of the criteria should be based on the ability of the utility to calculate risk reduction per dollar spent. PG&E began the investment planning process with an approximately $1.9-billion forecast.[34] Over a 5-month period of review, risk, execution and optimization revisions yielded approximately a $1.4-billion portfolio.

Q 46 Do you agree that the decision-making process incorporating resource constraints is "highly subjective"?

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31 See PG&E's July 15, 2014 Supplemental Testimony, Chapter 2A, Attachment B – Attachments 13 and 15.

32 See PG&E's July 15, 2014 Supplemental Testimony, Chapter 2A, Attachment B – Attachments 16 through 26.

33 See PG&E's July 15, 2014 Supplemental Testimony, Chapter 2A, Attachment B – Attachment 13.

34 See PG&E's July 15, 2014 Supplemental Testimony, Chapter 2A, Attachment B – Attachment 16.

A 46 No, while expert judgment is involved, PG&E follows a documented process that, as previously explained includes the following steps:

- Classifies programs and projects;
- Risk-scores programs and projects;
- Analyzes and applies resource, system and execution constraints;
- Includes calibration sessions to validate risk scores; and
- Includes investment decisions meetings with Asset Family Owners, subject matter experts and senior leadership to adjust the scope and pace of programs based on risk and constraints.

All of these elements are used in concert to arrive at a risk-based executable investment plan.

Q 47 Do you agree with SED's statement on page 16 that "[g]enerally PG&E does not discuss potential resource constraints associated with the selected risk control measures"?

A 47 No. PG&E identifies where resource constraints were considered in the program and project scoring sheets and in management presentations.

G. PG&E Disagrees With the Suggestion as Low as Reasonably Practicable Is Appropriate for Natural Gas Pipelines

Q 48 Finding six recommends that PG&E should quantify risk tolerance using the As Low As Reasonably Practicable (ALARP) framework. Do you agree with this finding?

A 48 No. PG&E does not believe ALARP is appropriate for a natural gas transmission pipeline system. This position is supported by Cycla's report, which concluded, "analyses based purely on the monetization of past public safety and economic consequences often seriously underestimate the social and economic consequence of pipeline accidents, and therefore lead to a grossly inadequate safety budget".[35] SED's preliminary report on page 20 presents no new information to support a different conclusion about ALARP.

H. SED's Report Confirms PG&E's Risk Methodology Has Value, Has Made Significant Progress and Has Room to Continue to Improve

Q 49 What is the take away from SED's preliminary report?

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[35] See Attachment 3 to this testimony (referenced in fn. 3), for a copy of the Cycla Report. Refer to Cycla Report, Attachment 4, page 5.

A 49 PG&E's threat identification capabilities are on target. Continuing to seek opportunities to pool frequency data with other operators and, generally, continuing the focus on increased ability to rely on data and information to quantify risk is the right direction.

While much progress has been made, there remains opportunity for continuous improvement of the process and maturation of its application.

Q 50 What improvement does PG&E envision for its asset and risk management and integrated planning activities?

A 50 PG&E's forecast was developed based asset management principles, on integrated planning methods, and on natural gas industry best practices to better understand asset condition, asset risk and to reduce the higher known risks. However, there are opportunities for improvement. Foremost is continuing to improve the understanding and knowledge about asset condition and the threats they face. PG&E should continue to develop better and more detailed data about the assets to enable a more sophisticated assessment on an asset by asset, segment by segment basis. As the process matures, PG&E will better articulate how the condition of an asset has improved through the work performed. Too, as more knowledge is gained, better understanding of what is known and what is unknown will enhance the overall relative risk ranking process. PG&E recognizes that the journey to quantify risk and risk reduction is a multi-year endeavor.

Q 51 Does PG&E envision developing a methodology to measure the absolute risk reduction achieved by a mitigation measure or on a risk reduced per dollar spent basis?

A 51 Not at this time. PG&E is unaware at this time of any operators in the natural gas industry measuring risk on a natural gas pipeline system in terms of "absolute" risk" nor measuring the risk-reduced on a "per dollar spent" basis.

Q 52 Does PG&E foresee similar improvements in the Integrated Planning Process?

A 52 Yes. The improvements discussed above will enhance the output of the integrated planning process. Moreover, as the process matures, PG&E anticipates the process will become more effective and efficient.

Q 53 Does this conclude your supplemental testimony?

A 53 Yes, it does.

PACIFIC GAS AND ELEC TRIC COMPANY

CHAPTER 21

RELATIONSHIP BETWEEN THE 2015 GT&S RATE C ASE INTEGRITY MANAGEMENT PROGRAMS AND THE PIP ELINE SAFETY ENHANCEMENT PLAN (PS EP)

PACIFIC GAS AND ELECTRIC COMPANY
CHAPTER 21
RELATIONSHIP BETWEEN THE 2015 GT&S RATE CASE INTEGRITY MANAGEMENT PROGRAMS AND THE PIPELINE SAFETY ENHANCEMENT PLAN (PSEP)

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A. Introduction

Q 1 Please state your name and the purpose of this supplemental testimony.

A 1 My name is Bennie Barnes. The purpose of this supplemental testimony is to respond to certain issues raised by the California Public Utilities Commission's (CPUC or Commission) Safety and Enforcement Division (SED) in its Preliminary Staff Report on Pacific Gas and Electric Company's (PG&E) Proposal for Cost of Service and Rates for Gas Transmission and Storage (GT&S) for 2015 through 2017 issued in draft form on July 18, 2014.

Q 2 What areas are you covering in this testimony relating to the SED Report?

A 2 I am covering the following areas:

- The relationship between the 2015 GT&S Rate Case and the Pipeline Safety Enhancement Plan (PSEP)
- The integration of PSEP and PG&E's base work planning
- PG&E's Hydrostatic Testing Program
- PG&E's Vintage Pipeline Replacement Program

B. Relationship Between GT&S and PSEP

Q 3 Did SED's report accurately capture the relationship between GT&S and PSEP?

A 3 While the SED report addressed two PSEP Programs related to GT&S—the Hydrostatic Testing and Vintage Pipe Replacement Programs—there are 11 integrity related programs within Chapter 4A that are just as integral to reducing risk on PG&E's pipeline system. Collectively, these programs are crucial to allow PG&E to holistically address the threats that drive risk on PG&E's transmission pipeline system. The percent Total Occupancy Count (TOC) goals that are set forth in testimony for many of the programs show PG&E's focus on putting people first in its effort to measure risk reduction on the transmission pipe Asset Family. These goals are in alignment with

those established by the industry through participation in the Interstate Natural Gas Association of America.

Q 4 Explain how the scope of PG&E's work as a part of the 2015 GT&S Rate Case differs from that in PG&E's PSEP.

A 4 PSEP Phase 1 (2011 through 2014) focused on pressure testing and replacing untested pipeline segments based on the type of pipe, year of installation, percent Specified Minimum Yield Strength (SMYS) at Maximum Allowable Operating Pressure (MAOP) and proximity to people considering High Consequence Area (HCA) or Class 2, 3 and 4 locations. The Pipeline Modernization Decision Tree in the PSEP approved in Decision 12-12-030 identified specific Phase 1 actions and priorities. The GT&S Rate Case adds to these decision trees to show what would be a natural transition from Phase 1 into Phase 2. Notably, this means that the GT&S Hydrostatic Testing Program has created a decision tree with the same primary focus—to test previously untested pipe to address the manufacturing threat—but also includes room to address transmission lines on which the manufacturing threat may be deemed unstable as a result of the Integrity Management threat assessments and, therefore, require a hydrostatic test to establish threat stability. The GT&S Vintage Pipe Replacement Program addresses similar fabrication and construction threats as PSEP, but the program is specifically targeting locations where the interaction with land movement places these vintage fabrication and construction threats at elevated risk.

Q 5 Explain why the pace of the work in the GT&S Rate Case differs from that in PSEP.

A 5 First, the pace of work in PSEP was slightly higher than in GT&S because PG&E was primarily focused on addressing pipe operating above 30 percent SMYS in Class 3 and 4 areas where there is a high population density. Second, in the GT&S Rate Case PG&E weighed PSEP-type work against other work designed to address other risks across the pipeline and other Asset Families to determine the right volume of work to address the most risk and still be responsive to the CPUC mandate to complete testing of previously untested pipe, "as soon as practicable."

Q 6 Explain why the Decision Tree in the GT&S Rate Case differs from that used in PSEP, approved by the Commission in Decision 12-12-030.

A 6 The PSEP Pipeline Modernization Decision Tree approved by the Commission in Decision 12-12-030 was primarily focused on identifying and prioritizing work during Phase 1 (2011 through 2014). If a pipeline segment made it all the way through the Decision Tree without being slated for work in Phase 1, it simply terminated in a box pointing to a Phase 2. The PSEP Decision Tree did not prioritize work to be performed in Phase 2. The GT&S Rate Case expands these decision trees to show a prioritization for Phase 2 actions.

Q 7 On page 37 of SED's report, SED states, "PG&E should also be mindful of how prioritization takes into account regulatory compliance and non-compliance integrity management drivers in its work prioritization process." Please clarify how PG&E considers regulatory compliance and other non-compliance integrity management drivers in its work prioritization process.

A 7 PG&E performs its integrity management work in accordance with 49 CFR Part 192, Subpart O and General Order 112E requirements. In addition, it uses a relative risk algorithm to prioritize work. For the development of the volumes of work in the GT&S Rate Case, we were focused on the use of TOC and AOC (Average Occupancy Count) as a consequence measure to prioritize integrity work toward locations with the most people near our pipelines.

Q 8 How are interactive threats managed in PSEP?

A 8 The PSEP Decision Tree did not specifically address interactive threats. The PSEP Decision Tree used a deterministic model, which used the logic, "If this, then that." Pipeline segments were not processed through every Threat Decision Tree. However, PG&E engineers did take into consideration additional threats on individual pipeline segments and projects on a case-by-case basis, through the use of, "Decision Tree Deviations due to Engineering Judgment," as outlined in the PSEP Update Application Chapter 2 Testimony.

Q 9 How are interactive threats managed in the GT&S Rate Case?

A 9 As part of its Integrity Management program outlined in the GT&S Rate Case, PG&E documents its use of a matrix that shows the various components of interactive threats that it considers to be interacting. Specifically, PG&E's Risk Management Procedure (RMP) – 016 identifies the 19 interactive threat conditions it monitors and evaluates to determine if additional mitigation measures should be applied. Furthermore, within the various RMPs that address the risk through its specific risk algorithms for specific threats, there is scoring built in that accounts for threat interactions. For example, one interactive threat, vintage fabrication and construction threats interacting with land movement, was determined to be a high risk for the transmission pipeline, and as such a targeted mitigation program—the Vintage Pipe Replacement Program—was developed in GT&S to specifically address it. An overview of PG&E's research and development related to risk is described in Attachment 1.[1] A specific report that outlines PG&E's work to further research into a development of a methodology for incorporating interacting threats into relative risk ranking models is provided in Attachment 2.[2]

Q 10 Do any of the changes in how PG&E manages interactive threats materially impact the safety of PG&E's transmission system?

A 10 The Vintage Pipe Replacement Program will directly improve the risk profile of the PG&E transmission pipeline system.

Q 11 The report states that PG&E is relying on pressure testing to meet the mandates set forth in Decision 11-06-017. Is this correct?

A 11 Yes. Hydrotesting meets the Commission's mandate in Decision 11-06-017 to pressure test or replace pipelines that have previously not been strength tested as soon as practicable.

C. Integrated PSEP and Base Work Planning

Q 12 On page 36 of SED's Testimony, SED states, "The testimony emphasized use of the AOC/TOC concept to prioritize the work. However, use of

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1 See Attachment 1 to this testimony for PG&E's Data Response to SED 012, Question 01, Attachment 05, for the PowerPoint presentation, "PG&E Deployment of Kiefner Interacting Threats Tool."

2 See Attachment 2 to this testimony for the final report, "The Development of a Methodology for Incorporating Interacting Threats into Relative Risk Ranking Models."

AOC/TOCs concept by itself is an insufficient means of prioritizing absent a complementary risk evaluation. Actual implementation requires further prioritization that should be based, if possible, on a full-scale risk analysis." Did PG&E prioritize further based on a complementary risk evaluation?

A 12 Yes. The AOC/TOC was used to determine what volume of work to do in the beginning years as described in Chapter 4A Programs contained in PG&E GT&S Rate Case. It allows PG&E to focus efforts on this elevated enterprise risk at locations that have the highest population first. For actual implementation, PG&E is performing full segment risk analysis using its risk analysis process in RMP-01.

Q 13 How will PG&E prioritize between replacement work to address fabrication and construction/land movement threat interaction, and replacement based on infeasibility of a pressure test?

A 13 PG&E will prioritize between these two different drivers for replacement by applying RMP-01 risk analysis. All things being equal (HCA/TOC/AOC, permitting, site access, etc.), PG&E would typically replace an untested pipeline segment before a previously tested segment with a land movement threat.

Q 14 On page 37 of SED's report, SED states that PG&E should address questions such as, "Does one type of fitting or type of land movement present a higher risk than others"? Has PG&E addressed this question?

A 14 Yes. The fabrication/construction threats that have been identified are of equal threat if they interact with land movement because they all create stress concentrations or are prone to failure if moved.

The "land movement" that is referenced represents all land movement possibilities, so the type of land movement is not as important as the magnitude of the land movement. The Geo-Hazard Threat Identification program will also better classify site specific land movement risk based on the degree and speed of the land movement.

Q 15 On page 37 of SED's preliminary report, SED states that PG&E should address questions such as, "Will there be sufficient information available to adequately evaluate the severity of the threat at a particular location and determine the risk"? Has PG&E addressed this question?

A 15 Yes. PG&E anticipates information will improve with the Geo-Hazard Threat Identification Program and the increased In-Line Inspection (ILI) to further locate fabrication/construction threats.

Q 16 On page 34 of SED's Report, SED suggests that, although it agrees with maintaining the ability to replace certain segments instead of testing, that all analyses and rationales should follow a robust management of change controls. Please describe PG&E's change control process.

A 16 PG&E will develop this management of change process upon implementation of programs. We anticipate it will be very similar to the existing PSEP Change Control Process.

D. PG&E's Hydrostatic Testing Program

Q 17 On page 28 of SED's Report, SED states that, "The decision tree [GT&S Decision Tree, Figure 4A-9] contains new prioritization criteria that will be used to not only comply with the State's pressure testing mandate, as was done in PSEP, but also to assess the integrity of its already pressure tested transmission pipeline." Do you agree with this statement?

A 17 Not entirely. To clarify, this program will also perform HCA baseline assessment requirements for the newly identified HCA miles. Where the pipe does not have a documented pressure test, the manufacturing threat will be considered unstable and will require a pressure test to assess the integrity.

Q 18 On page 27 of SED's Report, SED states that PG&E will prioritize pressure testing of segments based on whether a valid pressure test exists that met code at the time the test was performed. Why is it appropriate to rely on whether a prior pressure test met the requirements in place at the time, and not require a Subpart J pressure test?

A 18 PG&E does intend to eventually pressure test all pipe segments that do not yet have a Subpart J pressure test. PG&E is simply using the prior test as a prioritization tool to determine which segments to include in the early populations of hydrostatic testing; those without any test are prioritized before a segment with a previous test that does meet Subpart J requirements.

E. PG&E Vintage Pipeline Replacement Program

Q 19 On page 27 of SED's report, SED asserts that PG&E is reducing the scope of its replacement activities to address the state's pressure testing requirements by primarily relying on hydrotesting activities. Do you agree?

A 19 I partially agree. To clarify, PG&E is relying on Hydrostatic Testing Program as the primary means of satisfying Decision 11-06-017 in the 2015 GT&S Rate Case. The Vintage Pipeline Replacement Program is not designed to address the Commission's pressure testing requirements. Projects that cannot be hydrotested (for any of a variety of reasons) will be included in the Vintage Pipe Replacement program, thereby addressing the state mandate through replacement.

Q 20 On page 32 of SED's Report, SED states, "By considering land movement, the proposed Vintage Pipeline Replacement program is targeting pipeline locations where potential longitudinal stress can result in circumferential pipeline failure." Do you agree with this statement?

A 20 Partially. What the SED referred to as longitudinal stress should be more accurately referred to as strain. To be clear, for high longitudinal strain, there needs to be little stress imparted to cause sudden fracture. This Program is intended to address cumulative strains from slow soil movement imparting enough plastic strain at an existing flaw to initiate cracking.

Q 21 On page 32 of SED's report, SED states, "PG&E should incorporate the findings from the NDE [Non-Destructive Examination] program evaluation into the Vintage Pipeline Replacement program, as practical." Does PG&E agree that including NDE program evaluation in the Vintage Pipeline Replacement program meets the program's objectives and is responsive to Technologies Consulting International's weld extent of condition findings?

A 21 No. The purpose of PG&E's Vintage Pipeline Replacement program is not to address girth weld inspection quality issues which are focused on post-1962 pipe.

Q 22 What programs does PG&E recommend to address NDE program evaluations, in lieu of the Vintage Pipeline Replacement Program?

A 22 PG&E proposes to incorporate inspection quality assessment for these post-1962 girth welds into the In-Line Inspection program dig criteria, and

incorporate into the External Corrosion Direct Assessment and hydrostatic testing digs. These procedures are still being developed.

Q 23 On page 35 of SED's Report, SED states, "PG&E's proposal fails to provide sufficient detail on the safety and efficiency criteria that would be considered in the engineering analyses that could result in a replacement instead of testing determination. On page 4A-34 of testimony, PG&E provides engineering analysis for when a pipe replacement would be a better option." Could PG&E eliminate the use of engineering judgment?

A 23 No. Each project has unique characteristics and an engineering analysis must be done in order to make the best decision regarding each project. Designing a mechanical and one-size fits all decision making process in this case will tend to result in the replacement of pipe that otherwise would have been prudent and more cost-effective to hydrotest. PG&E has provided a list of these considerations on page 4A-34 of PG&E's GT&S Rate Case Testimony.

Q 24 On page 35 of SED's report, SED states, "Pipeline conditions with excessive pups do not appear to be considered for mitigation under fabrication/construction threats for the [Vintage Pipeline Replacement] program, unlike the approved PSEP decision tree." Do you agree?

A 24 Yes. In PSEP, PG&E addressed short pups in following ways:

- Strength testing untested lines to verify the MAOP of every pressure carrying component.
- Reviewing past ILI Magnetic Flux Leakage run data looking for the presence of short pipeline segments.
- Replacing and retiring untested pipelines with manufacturing and fabrication threats.

Q 25 Please clarify which program in PG&E's GT&S Rate Case addresses excessive pups.

A 25 Locating excessive pups is performed through the Traditional ILI program. PG&E believes this is the best means to identify this construction feature. Verifying the MAOP is addressed in the Hydrostatic Testing program.

Q 26 On page 37 of SED's report, SED states, "It does not appear that PG&E is proposing or building any flexibility into the program for circumstances where pipeline that meets the decision tree conditions for replacement may

not actually be replaced but instead hydrotested or mitigated otherwise." Please address this comment.

A 26 PG&E does not view hydrotesting as an appropriate mitigation option for vintage fabrication and construction threats. As explained in testimony, on page 4A-52, "Hydrostatic pressure testing is effective at revealing the presence of manufacturing threats (such as a potentially defective long seam weld), but is not as effective at identifying threats introduced by vintage fabrication and construction because internal pressure induces the maximum stress in the axial orientation rather than the circumferential orientation. The amount of stress imparted circumferentially by hydrostatic testing is only about half of that created in the axial direction and does very little to prove the integrity of vintage fabrication and construction threats that have been acted on by an outside force." The only exception to this would be if a fabrication/construction threat is determined not to be present during pipe replacement project engineering analysis and the segment is also a planned hydrostatic test segment or a required Transmission Integrity Management Program hydrotest. In that case, PG&E would proceed with a hydrotest.

Q 27 On page 38 of SED's report, SED states, "PG&E should clarify if this means that every pipeline with a wrinkle bend or miter bend in an area susceptible to any land movement will be replaced." Is this understanding correct?

A 27 No, during the rate case period the plan is to replace pipe with these interactive threats that affect more than 90 percent of the TOC.

Q 28 On page 38 of SED's report, SED states, "SED recommends that implementation details for this program must be further developed and shared." Please provide a timeline when and how implementation details could be shared.

A 28 PG&E proposes sharing implementation details with SED towards the end of 2014 or beginning of 2015, in order to give PG&E time to develop more specific engineering details for the program.

Q 29 On page 37 of SED's Report, SED states, "PG&E will focus the [Vintage Pipe Replacement] program on wrinkle bends, miter bends, and mechanical/compression couplings." Does this include all features that PG&E will focus on?

A 29 In addition to wrinkle bends, miter bends, and mechanical/compression couplings, PG&E will also focus on bell/bell chill rings and orange peel fittings in its features included in WP 4A-711 through WP 4A-721.

Q 30 On page 37 of SED's report, SED states, "Although the [Vintage Pipe Replacement] program's infancy and possible lack of data could be responsible for the absence of adequate implementation prioritization criteria, this deficiency must be properly addressed before the program can be adequately implemented." Do you agree that PG&E has not developed adequate prioritization criteria?

A 30 No. PG&E's prioritization is not deficient. The use of AOC/TOC prioritization will enable PG&E to effectively "put people first" by mitigating those risks that are most likely to have the highest impacts on public safety. The Total Risk, Likelihood of Failure times Consequence of Failure, will be further used as we further prioritize the work list.

Q 31 Does this conclude your supplemental testimony?

A 31 Yes, it does.

PACIFIC GAS AND ELEC TRIC COMPANY

CHAPTER 22

PIPELINE SAFETY ENHA NCEMENT PLAN (PSEP) PROGRAM

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A. Introduction

Q 1 Please state your name and the purpose of this supplemental testimony.

A 1 My name is Todd R. Hogenson. The purpose of this supplemental testimony is to respond to certain issues raised by the California Public Utilities Commission's (CPUC or Commission) Safety and Enforcement Division (SED) in its Preliminary Staff Report on Pacific Gas and Electric Company's (PG&E) Proposal for Cost of Service and Rates for Gas Transmission and Storage (GT&S) for 2015-2017 issued in draft form on July 18, 2014.

Q 2 What areas are you covering in this testimony relating to the SED Preliminary Report?

A 2 I am covering the response to the portions of SED's Preliminary Report that address PG&E's Pipeline Safety Enhancement Plan (PSEP) Program.

B. Pipeline Segments Meeting PSEP Phase 1 Criteria That Are Being Addressed in the 2015 GT&S Rate Case

Q 3 On page 25 of SED's Report, SED states, "There still exists pipeline segments that meet the criteria for Phase 1 mitigation which were not and will not be addressed by Phase 1. These have been deferred beyond Phase 1." Please describe the PSEP Phase 1 pipeline segments that are included in PG&E's 2015 GT&S Rate Case.

A 3 There are three types of pipeline segments meeting the PSEP Phase 1 criteria for action (strength testing or replacement) that were not included within the PSEP Phase 1 work scope:

1) Untested gas transmission pipeline segments located within an urban area (Class 2, 3 and 4) with a fabrication and construction threat operating below 30 percent Specified Minimum Yield Strength (SMYS).
2) Pipeline segments not identified for PSEP Phase 1 action in the August 2011 PSEP that now meet a PSEP Phase 1 action as a result of the Maximum Allowable Operating Pressure (MAOP) records validation that was completed in mid-2013.

3) There are some pipeline segments that met the criteria for Phase 1 strength testing that are being deferred into the GT&S rate case due to third party construction conflicts, permitting, and limitation in our ability to serve customers downstream from these planed tests. PG&E accelerated other priority pipeline segments and projects into 2014 to ensure the highest priority work that was feasible to complete was accomplished.

Q 4 Please describe further why work in the first category listed above was not included in PSEP Phase 1?

A 4 In PG&E's August 26, 2011 PSEP testimony in Rulemaking 11-02-019, Chapter 3, page 3-37, PG&E stated that it would not complete strength testing of all untested Class 3, Class 4 and High Consequence Area (HCA) pipeline segments within Phase 1:

> Despite Decision 11-06-017 stating that each Implementation Plan "should start with pipeline segments located in Class 3 and Class 4 locations and Class 1 and Class 2 high consequence areas," this represents far too large of a work scope for PG&E to accomplish in a 4-year period (2011-2014) in Phase 1. Therefore, PG&E chose to prioritize a subset of that broader scope into Phase 1, consisting of the pipe segments in urban areas (Class 2, 3 and 4 and Class 1 HCA) operating at or greater than 30 percent SMYS without strength tests and those segments characterized with a manufacturing threat at or greater than 20 percent SMYS. This subset represents pipe segments that pose the biggest threat for a pipeline rupture. **The remaining urban pipe (Class 2, 3 and 4 and Class 1 HCA) operating between 20 percent SMYS and 30 percent SMYS characterized with a Fabrication and Construction (F&C) threat construction threat and/or a corrosion and latent mechanical damage threat, will be addressed at the beginning of Phase 2 commencing in 2015.** (Emphasis added.)

Q 5 How many segment/feature miles fall into this first category of work described above?

A 5 After MAOP records validation was completed, PG&E estimated that approximately 17 segment/feature[1] miles of pipeline fall into the first category of work that will not be addressed during Phase 1 of PSEP.

Q 6 How and when does PG&E plan to address these approximately 17 segment/feature miles?

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1 MAOP terminology identifies pipeline in terms of features, Geographic Information System (GIS) terminology identifies pipeline in terms of segments. For clarity, PG&E is referring to this length in terms of segment/feature.

A 6 These pipeline segments/features will be strength tested within the 2015 GT&S rate case period.

Q 7 Please describe further why work in the second category listed above was not included in PSEP Phase 1?

A 7 PG&E completed MAOP validation in July 2013. The PSEP Engineering Team developed and implemented a procedure to align the MAOP generated Pipeline Features Lists (PFL) with the PSEP GIS pipeline segment database. Since PG&E was under a tight deadline to submit and update the PSEP filing under Decision 12-12-030, it was not feasible to query every MAOP PFL for additional untested pipeline segments meeting PSEP Phase 1 criteria, identify project scopes, and develop workpapers and cost estimates, and schedule actual project execution before December 2014.

Q 8 How many segment/features miles fall into this second category of work described above?

A 8 As of early 2014, MAOP Validation and Class Location Change verification had identified 62.11 segment/feature miles of untested Class 3 and 4 and HCA Class 1and 2 pipe (17 miles falling into Category 1 and 45 miles falling into Category 2) that will not be addressed within PSEP Phase 1.

Q 9 How and when does PG&E plan to address these additional 62.11 segment/feature miles?

A 9 These untested pipeline segments are proposed to be addressed/strength tested within the 2015 GT&S Rate Case period. Figure 4A-9 within Chapter 4 of PG&E's December 19, 2013 testimony contains the proposed Hydrostatic Testing Decision Tree. The untested pipeline miles proposed for strength testing are based on the following priorities listed in order of importance: (1) HCA; (2) Integrity Management Threats; (3) Class 3 non-HCA segments; (4) Class 1 and 2 non-HCA segments; and (5) short segments.

C. PSEP Tests Met Code at the Time of a Test

Q 10 On page 29 of SED's Report, SED suggests that PG&E should clearly define what criteria it will apply to determine if test met code, especially considering Ordering Paragraph 3 of Decision 11-06-013. Has PG&E developed such a criteria?

A 10 Yes. The pressure testing criteria were provided in the PSEP Update Application (A.13-10-017), Chapter 2, Appendix 2B, page 22, Section 1.4, "Pressure Testing Requirements." This table contains the testing and documentation requirements for various time periods. PG&E used this table as a guide to determine if a pipeline test record met requirements at the time of the test when validating PSEP segments through the PSEP Decision Tree. A copy of this table is provided as Attachment 1.[2]

D. The Reliance on Traceable, Verifiable and Complete Records

Q 11 On page 30 of SED's Report, SED states, "PSEP pressure test record evaluation also failed to consider whether the record was traceable, verifiable, and complete (TVC), and validated records that did not meet these documentation criteria." Do you agree with this finding?

A 11 No. PG&E's entire MAOP records validation process was designed to ensure pressure testing records were TVC per regulations in effect at the time of the test. PSEP used the results from the MAOP validation effort to define the scope of Phase 1 projects.

Q 12 On page 30 of SED's Report, SED states, "In no circumstances should a pipeline with a record of intent to conduct a test, such as design documents, be considered for de-prioritization." Do you agree with this comment?

A 12 Yes. PG&E did not consider a record with an intent to conduct a test to be a TVC record of a Hydrotest.

Q 13 Please describe PG&E's criteria for a TVC record?

A 13 A strength test pressure report that is TVC must meet several criteria. The pressure test information must be traceable to source documents of sufficient quality, verifiable with complementary records, and contain complete information about the test. A quality rating is assigned based on evaluation of the document; with the highest quality documents associated with first person witness and certified (signed or as-built) documents. The pressure test records must contain complementary information. This typically involves design and actual test information, recorded pressures and charts. Complete strength test data must contain at least the required elements defined in 49 Code of Federal Regulations (CFR), and additional

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[2] See Attachment 1 to this testimony for the table, "Pressure Test Requirements."

information if applicable. Given this explanation, a quality code of Q1-Q7 is considered TVC. Any quality code greater than Q7 does not meet PG&E documentation requirements and therefore is not considered a valid test.

Q 14 Please explain PG&E's use of TVC records during PSEP.

A 14 PG&E acknowledges that it did not use the Strength Test Pressure Report (STPR) quality codes from the PFL to validate pressure tests for purposes of prioritizing work done under PSEP. This is due to the differing purposes for the use of STPRs between MAOP Validation, and the PSEP Update. PG&E agrees that a strength test must meet the TVC criteria adopted for validation of MAOP. However, for purposes of prioritizing work under the PSEP, pipeline segments with no documented strength test were prioritized before pipeline segments with at least some documentation of a strength test, even if the documentation did not meet the TVC standard required for MAOP Validation.

E. PG&E Will Track GT&S Projects by Workstream

Q 15 On page 26 of SED's Report, when discussing the integration of PSEP and Base Work Planning in the 2015 GT&S Rate Case, SED states, "SED believes it is important that PG&E be able to track and readily identify the specific drivers for any given project within a workstream." Do you agree with this comment?

A 15 Yes, and PG&E has tracked specific drivers for any given project within a workstream. For example, within the 2015 GT&S strength testing program PG&E proposes to include strength testing for: (1) compliance with the CPUC pressure testing mandate; (2) compliance with 49 CFR Part 192 Subpart O Integrity Management; and (3) testing due to cyclic fatigue analysis results. PG&E will record and track the segment miles tested under each category. In 2015, PG&E estimates the amount of strength testing mileage for each testing category will be:

Line No.	Testing Category	Percent of Total Strength Testing Mileage
1	Testing of untested pipelines	90.0
2	Testing for Integrity Management	7.5
3	Testing for fatigue analysis	2.5

Q 16 Does this conclude your supplemental testimony?

A 16 Yes, it does.

PACIFIC GAS AND ELEC TRIC COMPANY

APPENDIX A

STATEMENT OF QUALIFICATIONS

PACIFIC GAS AND ELECTRIC COMPANY
STATEMENT OF QUALIFICATIONS OF TODD R. HOGENSON

Q 1 Please state your name and business address.

A 1 My name is Todd R. Hogenson, and my business address is Pacific Gas and Electric Company, 6121 Bollinger Canyon Road, San Ramon, California.

Q 2 Briefly describe your responsibilities at Pacific Gas and Electric Company (PG&E).

A 2 As the senior manager of Pipeline Engineering and Design and former director of the Pipeline Safety Enhancement Plan (PSEP) Engineering Department, I am responsible for providing leadership, and technical direction over gas transmission pipeline projects which includes project scope development, project cost forecasting, detailed engineering design and technical support through project construction.

Q 3 Please summarize your educational and professional background.

A 3 I received a bachelor of science degree in mechanical engineering from the University of Minnesota, in 1984. I began my career with PG&E, in 1984, as an environmental engineer within the gas transmission Pipeline Maintenance and Operations organization, responsible for implementing environmental compliance and training programs. From 1987 through 1994, I was a gas facilities engineer responsible for providing maintenance and operations engineering support for the Line 400 gas turbine compressor stations and underground gas storage facilities. In 1995, I became the director of Maintenance Optimization where I was responsible for managing the technical training, maintenance management and condition-based maintenance programs within the Gas System Maintenance organization. From 1998 through 2008, I was manager of gas transmission Pipeline Engineering. As manager, I was responsible for project engineering, estimating, and project management on gas transmission pipeline projects, and program management of the pipeline capital budget. In August 2008, I was promoted to director of Gas Design and Planning, reporting to me were managers responsible for Pipeline Engineering, Station Engineering, Transmission System Planning and Operations Support, Gas Distribution

Engineering and Planning. From December 2010 through March 2014, I was assigned the director of the PSEP Engineering Department. Responsible for leading the development of the PSEP pipeline modernization decision trees, project scopes, engineering designs and PSEP Chapter 3 testimony. In April 2014, I was reassigned to my current position as senior manager of Gas Transmission Pipeline Engineering and Design, responsible for the remaining PSEP pipeline strength testing and replacement projects and all future gas transmission pipeline projects including strength testing, In-Line Inspection upgrades, pipeline replacements, betterments and new pipeline engineering designs.

Q 4 What is the purpose of your testimony?

A 4 I am sponsoring the following supplemental testimony supporting PG&E's 2015 Gas Transmission and Storage Rate Case:

- Chapter 22, "Pipeline Safety Enhancement Plan (PSEP) Program."

Q 5 Does this conclude your statement of qualifications?

A 5 Yes, it does.