

Docket	:	<u>A.17-11-009</u>
Exhibit Number	:	<u>ORA-05</u>
Commissioner	:	<u>C. Rechtschaffen</u>
ALJ	:	<u>S. Roscow</u>
Witnesses	:	<u>N. Molla</u>
		<u>D. Phan</u>
		<u>A. Bach</u>



**OFFICE OF RATEPAYER ADVOCATES
CALIFORNIA PUBLIC UTILITIES COMMISSION**

**The Office of Ratepayer Advocates'
Report on
Pacific Gas and Electric Company's
Cost of Service and Rates for Gas
Transmission and Storage
Services for the Period 2019 - 2021**

Chapter 5: Asset Family – Transmission Pipe

San Francisco, California
June 29, 2018

TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	SUMMARY OF RECOMMENDATIONS.....	2
III.	DISCUSSION/ANALYSIS.....	7
	A. Hydrostatic Testing.....	7
	i. Hydrostatic Testing per D.11-06-017 – Pipeline Replacements in Lieu of Hydrostatic Testing.....	7
	ii. Hydrostatically Tested Pipe (D.11-06-017) and TIMP Pressure Tests.....	9
	iii. PG&E’s Request for a Two-Way Balancing Account for TIMP	11
	B. Pipe Replacements	12
	C. Geo-Hazard Threat Identification and Mitigation	13
	D. Shallow/Exposed Pipe.....	14
	E. Gas Gathering	16
	F. Work Required by Others (WRO).....	17
	G. In-Line Inspection (ILI).....	19
	i. ILI Pipeline Upgrades	22
	ii. Traditional ILI Runs.....	27
	iii. Non-Traditional ILI Runs.....	29
	iv. ILI DE&R.....	30
	H. Direct Assessment (DA)	32
	i. Capital Expenditures.....	32
	ii. Operations and Maintenance (O&M) Expenses.....	33
	iii. External Corrosion Direct Assessment (ECDA).....	35
	iv. Internal Corrosion Direct Assessment (ICDA).....	41
IV.	CONCLUSION.....	42
V.	WITNESS QUALIFICATIONS OF N. MOLLA.....	43
VI.	WITNESS QUALIFICATIONS OF A. BACH	44
VII.	WITNESS QUALIFICATIONS OF D. PHAN.....	45

1 **I. INTRODUCTION**

2 This exhibit presents the analyses and recommendations of the Office
3 of Ratepayer Advocates (ORA) regarding the Transmission Pipe proposals of
4 Pacific Gas and Electric Company (PG&E) in its Test Year (TY) 2019 Gas
5 Transmission and Storage Proceeding (GT&S). Specifically, this testimony
6 addresses PG&E’s forecast of approximately \$358 million¹ in Transmission
7 Pipe expenses for 2019, and \$446 million, \$466 million, and \$464 million in
8 capital for 2019, 2020, and 2021, respectively.²

9 PG&E’s Gas Transmission Pipeline expenses include the following 12
10 programs, as well as associated Standard Pacific Gas Line, Inc. (StanPac)
11 costs:^{3,4}

- 12 • Hydrostatic Testing
- 13 • Pipe Replacements
- 14 • Earthquake Fault Crossings
- 15 • Geo-Hazard Threat Identification and Mitigation
- 16 • Programs to Support Transmission Integrity Management
- 17 Program (TIMP)
- 18 • Emergency Response
- 19 • Class Location Changes
- 20 • Shallow/Exposed Pipe (Including water and levee crossings)
- 21 • Work Required by Others (WRO)

¹ PG&E Prepared Testimony, p. 5-4.

² PG&E Prepared Testimony, p. 5-4.

³ PG&E Prepared Testimony, pp. 9-1 to 9-2.

⁴ PG&E has a six-sevenths ownership interest in Standard Pacific Gas Line, Inc. (StanPac), but operates and maintains the StanPac transmission pipeline as part of PG&E’s Transmission Pipe asset family.

- 1 • Pipe Investigations and Field Engineering
- 2 • In-Line Inspection (ILI)
- 3 • Direct Assessment (DA)

4 PG&E's Gas Transmission Pipeline Capital expenditures include the
5 following 11 programs, as well as associated StanPac costs:⁵

- 6 • Hydrostatic Testing
- 7 • Pipe Replacements
- 8 • Earthquake Fault Crossings
- 9 • Geo-Hazard Threat Identification and Mitigation
- 10 • Emergency Response
- 11 • Class Location Changes
- 12 • Shallow/Exposed Pipe (Including water and levee crossings)
- 13 • Gas Gathering Divestiture
- 14 • WRO
- 15 • ILI
- 16 • DA

17 **II. SUMMARY OF RECOMMENDATIONS**

18 ORA does not oppose PG&E's forecasts for Earthquake Fault
19 Crossings, Geo-Hazard Threat Identification Expense, Emergency Response,
20 Class Location Changes, Pipe Investigation and Field Engineering, and Gas
21 Gathering.

22 ORA recommends cost adjustments to PG&E's forecasts for
23 Hydrostatic Testing, Replacement, Geo-Hazard Threat Identification Capital,
24 Programs to Support TIMP, Shallow/Exposed Pipe, WRO, ILI, and Direct

⁵ PG&E Prepared Testimony, p. 5-19.

1 Assessment (DA),. ORA’s recommended forecasted 2019 costs are shown in
 2 Table 5-1.

3
 4
 5

**Table 5-1:
 Gas Transmission Pipe Expenses for 2019
 (in Thousands of 2019 Dollars)**

Description (a)	ORA Recommended (b)	PG&E Proposed⁶ (c)	Amount PG&E>ORA (d=c-b)
Hydrostatic Testing	145,519	155,702	10,183
Pipe Replacements	4,111	4,111	0
Earthquake Fault Crossings	1,372	1,372	0
Geo-Hazard Threat Identification and Mitigation	2,841	2,841	0
Programs to Support TIMP	14,248	14,248	0
Emergency Response	5,281	5,281	0
Class Location Changes	3,305	3,305	0
Shallow/Exposed Pipe (Including Water and Levee Crossings)	1,061	1,061	0
Work Required by Others	628	715	87
Pipe Investigation and Field Engineering	8,743	8,743	0
ILI	87,411	125,491	38,080
DA	17,553	35,107	17,554
Total	334,375	358,307	23,932

6 The basis for ORA’s expense recommendations are summarized as
 7 follows:

- 8 • ORA recommends an adjustment to PG&E’s cost forecast for
 9 Hydrostatic Testing based on the use of ORA’s linear regression
 10 model to estimate the costs of hydrotest projects based on project-
 11 specific characteristics. In addition, ORA used an alternative method

⁶ PG&E Prepared Testimony, Table 5-2.

1 of calculating the average cost per project for expense replacement
2 in lieu of hydrostatic testing.

3 • ORA's recommendation for WRO is based on an updated 3-year
4 average of recorded net costs.

5 • A reduction of PG&E's traditional ILI runs, from an annual 708.72
6 miles to 478.72 miles.

7 • A reduction of PG&E's non-traditional ILI runs, from an annual
8 11.75 miles to 9.46 miles.

9 • A pro rata reduction of PG&E's ILI direct examination and repair
10 (DE&R), from an annual 155 digs to 116 digs.

11 • ORA's recommendation for DA is based on PG&E performing 17
12 percent fewer External Corrosion assessments (ECDA) than the
13 2017 level and a revised estimate of the "Minimum Required Digs."

14 The basis for ORA's recommendations shown in Table 5-2 regarding
15 PG&E's proposed capital expenditures in this chapter are summarized as
16 follows:

17 • ORA's recommended cost forecast adjustment for Hydrostatic
18 Testing is based on the use of linear regression model to estimate the
19 costs of replacement in lieu of hydrotest projects based on project-
20 specific characteristics.

21 • ORA's cost recommendation for Replacement Projects is based on
22 the use of the cost model mentioned above to predict the costs of the
23 projects included in the Vintage Pipe Replacement Program.

24 • ORA's recommended cost forecast adjustment for Geo-Hazard
25 Threat Identification is based on an alternative method of calculating
26 the average unit cost of a landslide remediation project.

- 1 • ORA’s recommendation regarding the Shallow and Exposed Pipe
2 program is based on the use of the replacement cost model mentioned
3 above to predict the cost of mitigation projects.
- 4 • ORA recommends PG&E file an annual Tier 1 advice letter
5 regarding their progress in retiring meters as part of the Gas Gathering
6 Divestiture program
- 7 • ORA’s recommendation for WRO is based on an updated 3-year
8 average of recorded net costs.
- 9 • Decrease the forecast rate of “make piggable” upgrades from 374
10 miles a year to 280 miles a year. ORA’s forecast is still 100 miles a
11 year greater than PG&E has been able to complete in the 2010s.
- 12 • An average annual cost cap of \$142,350,689 per year in 2019
13 dollars, for make piggable pipeline upgrades. PG&E has requested
14 \$213,526,033 per year in 2019 dollars for such capital expenditures.
15 The difference in cost reflects the partial decrease in work.
- 16

1
2
3

**Table 5-2:
Summary of Gas Transmission Capital Expenditures Recommendations
(in Thousands of Nominal Dollars)**

<i>Description</i>	<i>ORA Recommended</i>			<i>PG&E Proposed^z</i>			<i>Total Reduction</i>
	2019	2020	2021	2019	2020	2021	
Hydrostatic Testing	39,423	40,941	42,145	49,897	51,465	52,987	31,840
Pipe Replacements	44,254	44,116	36,218	47,914	51,828	42,857	18,011
Earthquake Fault Crossings	12,231	12,616	12,986	12,231	12,616	12,986	0
Geo-Hazard Threat Identification and Mitigation	174	180	185	4,487	4,628	4,764	13,340
Emergency Response	55,410	60,233	57,584	55,410	60,233	57,584	0
Class Location Changes	5,499	5,636	5,773	5,499	5,636	5,773	0
Shallow/Exposed Pipe (Including Water and Levee Crossings)	21,324	21,994	22,641	25,446	26,246	27,017	12,750
Gas Gathering	3,971	4,096	4,216	3,971	4,096	4,216	0
Work Required by Others	19,148	19,749	20,330	27,866	28,742	29,587	26,288
ILI	142,351	146,823	151,139	213,526	220,235	226,708	195,695
Total	341,799	354,335	351,108	446,249	465,725	464,470	329,202

4
5

^z PG&E Prepared Testimony, Table 5-3.

1 **III. DISCUSSION/ANALYSIS**

2 **A. Hydrostatic Testing**

3 The Hydrostatic Testing Program consists of three subprograms:

4 1) Testing per California Public Utilities Commission (CPUC) Decision
5 (D.)11-06-017 and NTSB Safety Recommendation P-10-4.29;

6 2) Integrity Management compliance per 49 CFR, Part 192, Subpart O;
7 and

8 3) Liquefied Natural Gas/Compressed Natural Gas (LNG/CNG) to
9 support the Hydrostatic Testing Program.

10 The Commission does not specify a timeframe in which strength testing per
11 D.11-06-017 must be completed, so PG&E chose to prioritize pressure testing
12 all remaining NTSB pipe by the end of 2022, with completion of testing pipe
13 sections that lack TVC records of a test by the end of 2026.⁸ The pacing of the
14 Transmission Integrity Management Plan (TIMP) Pressure Tests, on the other
15 hand, is driven by the High Consequence Area assessment due dates and
16 therefore is less flexible.

17 **i. Hydrostatic Testing per D.11-06-017 – Pipeline Replacements in**
18 **Lieu of Hydrostatic Testing**

19 PG&E’s hydrotesting per D.11-06-017 and NTSB Safety
20 Recommendation P-10-4 program includes pipe replacements in lieu of
21 hydrotests for short segments of pipe where a replacement is more efficient
22 and avoids the environmental impacts of hydrotesting. PG&E’s forecast for
23 this sub-program includes an expense component and capital component, for
24 both of which ORA recommends forecast adjustments. PG&E’s forecast for
25 the expense component is based on an average of historical project costs,
26 and calculates an average of approximately \$0.498 million per projects before

⁸ PG&E Prepared Testimony, p. 5-49 lines 6-8.

1 escalation. This average cost, however, is highly influenced by the presence
2 of two particularly expensive projects,⁹ ¹⁰ and is higher than 11 out of the 16
3 projects that PG&E used in its analysis. For comparison, the median of the
4 projects is approximately \$0.27 million, and the average excluding those two
5 projects is approximately \$0.296 million.¹¹ Therefore, the average is not
6 representative of project costs based on the historical data that PG&E has
7 provided, and ORA used a unit cost of about \$0.296 million per project to
8 forecast expenses for the replacement in lieu of hydrotest sub-program, a
9 \$0.2 million reduction on a per-project basis from PG&E’s estimate.

10 PG&E’s forecast for the capital component of the Replacements in Lieu
11 of hydrotest is based on a regression cost curves. Regression is a useful tool
12 for understanding how cost is influenced by various factors based on historical
13 data, and produces an equation that can be used to calculate how much a
14 project should cost, on average, based on its characteristics. PG&E uses the
15 variable Length (in miles) multiplied by Diameter (in inches) to predict costs,
16 and has one regression curve for Length×Diameter values below 65.9
17 miles×Diameter inches, and another for values of Length×Diameter greater
18 than 65.9 miles×Diameter inches.¹² ORA has developed its own regression
19 model for predicting replacement project costs.¹³ ORA’s model has several

⁹ PG&E Workpapers Table 5-13 (WP page 5-49). The two projects are “RT-709 L-147 MP 3.39 ILI Elbow Replacement” and “RT-704 L-132 MP 4.36 ILI Offset Replacement”.

¹⁰ These two projects were determined to be outliers based on using the Interquartile Range Method, in which points that are greater than 1.5 times the Interquartile Range above third quartile or lower than 1.5 times the Interquartile Range below the first quartile are generally considered outliers. PG&E fails to provide specific factors of projects forecasted for this rate case period to demonstrate that these two projects are indeed representative. See ORA-05-SA-Molla-01, p.312 (ORA-DR-073, Q02).

¹¹ ORA Workpapers, “ORA-05-WP-Molla-Calcs.xlsx”, tab “Rep in Lieu of Hydro – Exp (JT6)”

¹² PG&E Workpapers Table 5-42.

¹³ ORA used earlier versions of this model in SCG/SDG&E’s PSEP Forecast (A.17-03-021) and most recently in SCG/SDG&E’s 2019 GRC (A.17-10-007). The model used in this proceeding is very similar, though updated with more recent data, to the one used in SCG/SDG&E’s 2019 GRC. See ORA-05-SA-Molla-01, pp. 328-338 for the code and outputs

1 notable differences from PG&E's: it draws on a larger database of 180
2 replacement projects completed over approximately six years by PG&E,
3 SoCalGas/SDG&E, and Southwest Gas (compared to PG&E's 80 projects);
4 uses multiple variables (Length, Diameter, and Duration) to predict project
5 costs; and has an R² value of 0.7¹⁴ (compared to PG&E's 0.6).¹⁵ ORA applied
6 this model to the forecasted projects to derive its forecast for the capital
7 component of the Replacement in Lieu of Hydrotest sub-program. ORA's
8 method produces a cost forecast of about \$50.1 million over the 2019-2021
9 rate case period, compared to PG&E's \$81.6 million, a reduction of about
10 38%.¹⁶

11 **ii. Hydrostatically Tested Pipe (D.11-06-017) and TIMP Pressure Tests**

12 PG&E bases its expense forecast for hydrostatically tested pipe and
13 TIMP pressure tests on two linear regression curves: one for projects that are
14 less than 0.262 miles and one for projects that are longer than 0.262 miles. As
15 with replacement projects, ORA has developed its own regression model for
16 predicting hydrotest project costs.¹⁷ ORA's model offers a number of
17 advantages over PG&E's model by drawing on a dataset of 378 projects
18 completed by PG&E, SoCalGas/SDG&E, and Southwest Gas (compared to
19 PG&E's dataset of 121), including three predictor variables instead of just

of the various models considered in developing the model used in SCG/SDG&E's 2019 GRC.

¹⁴ R², or the coefficient of determination, is an indication of how well a regression model fits the data on which regression was run. It ranges from 0-1, with an R² of 0 indicating that the model is no better a fit than the mean of the data, and an R² of 1 indicating a perfect fit (the line would pass through every point).

¹⁵ This value is based on the R² for the lower of PG&E's cost curves since, as noted by PG&E, most of its forecasted projects are in this range. See ORA Supporting Attachments ORA-05-SA-Molla-01, p. 318 (Attachment 01 to IS_DR-002, Question 46).

¹⁶ ORA Workpapers, "ORA-05-WP-Molla-Calcs.xlsx", tab "Rep in Lieu of Hydro – Cap (75R)"

¹⁷ ORA used an earlier version of the hydrotest model in SCG/SDG&E's 2019 GRC. See ORA-05-SA-Molla-01, pp. 338-359 for the code and outputs of the various models considered in developing the model used in SCG/SDG&E's 2019 GRC.

1 one, and producing an R² of about 0.28 compared to PG&E's 0.08.¹⁸ ORA
 2 applied this model to the forecasted projects for hydrostatically tested pipe
 3 under D.11-06-017 and TIMP pressure tests. ORA's method produces an
 4 expense cost forecast of about \$67.9 million for Hydrostatic Testing per D.11-
 5 06-017,¹⁹ a reduction of about \$8.5 million, and a forecast of about \$67 million
 6 for TIMP pressure tests, an increase of about \$2.7 million.²⁰

7

8 **Table 5-3: Summary of ORA Recommended Expenses (Thousands of Nominal \$)**

<i>Description (a)</i>	<i>ORA Recommended (b)</i>	<i>PG&E Proposed²¹ (c)</i>	<i>Amount PG&E>ORA (d=c-b)</i>	<i>Percentage PG&E>ORA (e=d/b)</i>
Hydrostatic Testing (D.11-06-017)	67,922	75,199	7,277	11.3%
Replace in Lieu of Hydrotest	7,927	13,446	5,519	41%
TIMP Pressure Tests	66,895	64,282	-2,613	-4.2%
LNG/CNG	2,775	2,775	0	0
Total	145,519	155,702	10,183	7%

9

10

¹⁸ See ORA Workpapers, "ORA-05-WP-Molla-Calcs.xlsx", tab "PG&E Hydrotest Model" for the calculation of the R².

¹⁹ ORA Workpapers, "ORA-05-WP-Molla-Calcs.xlsx", tab "Hydrotest (JTC,34A)"

²⁰ ORA Workpapers, "ORA-05-WP-Molla-Calcs.xlsx", tab "TIMP Hydrotest (HPF, 34A)"

²¹ PG&E Prepared Testimony, Table 5-16.

1
2

Table 5-4: Summary of ORA Recommended Capital Expenditures for Hydrostatic Testing (Thousands of Nominal \$)

<i>Description</i>	<i>ORA Recommended</i>			<i>PG&E Proposed²²</i>		
	2019	2020	2021	2019	2020	2021
Hydrostatic Testing (D.11-06-017)	19,583	20,477	21,079	19,583	20,477	21,079
Replace in Lieu of Hydrotest	16,189	16,698	17,189	26,393	27,223	28,023
LNG/CNG	3,651	3,766	3,877	3,651	3,766	3,877
Total	39,423	40,941	42,145	49,897	51,465	52,978

3

4 **iii. PG&E's Request for a Two-Way Balancing Account for TIMP**

5 ORA does not recommend the modification of PG&E's TIMP Balancing
6 Account (BA) to allow for two-way balancing account treatment for PG&E's
7 TIMP expenses. Regarding PG&E's concerns about the uncertainty
8 surrounding PHMSA's final rule and GO 112-F's new High Consequence Area
9 (HCA) definition, PG&E's existing TIMP Memorandum Account (TIMPMA)
10 should be sufficient to ensure that PG&E can recover any additional costs
11 posed by these new regulatory requirements. These costs can be reviewed in
12 PG&E's next Gas Transmission and Storage rate case. In addition, it is
13 unclear why PG&E has been unable to assess the effect of and incorporate
14 into their forecast GO 112-F's new HCA definition since GO 112-F was issued
15 in June 2015. Finally, as noted above, ORA's recommended forecast for
16 TIMP pressure tests is higher than PG&E's forecast. These additional funds
17 should help mitigate any additional costs incurred by the new regulations.

²² PG&E Prepared Testimony, Table 5-17.

1 **B. Pipe Replacements**

2 The Pipe Replacement program consists of two sub-programs: Vintage
3 Pipe replacements, which involves the replacement of pipe manufactured or
4 constructed and fabricated using historic practices that are no longer being
5 used today; and Other Safety and Reliability Pipe Replacements, which
6 consists of expense or capital pipe replacements due to reasons such as
7 damage through a third party dig-in, leaking, corrosion, overbuilds or
8 encroachments, and other reliability-based issues.²³ ORA does not
9 recommend any adjustments to the cost forecast for the Other Safety and
10 Reliability pipe replacements sub-program.

11 The Vintage Pipe Replacement prioritizes pipe based on the risk
12 associated with them. During this rate case period, PG&E is focusing primarily
13 on Tier 1 risks – risks that have greater than 90% TIMP risk,²⁴ an Impacted
14 Occupancy Count (IOC) greater than 0, and High Land Movement threat.²⁵
15 PG&E’s cost forecasts are based on replacement cost regression curves
16 described in Section A. ORA does not offer an alternative prioritization of
17 replacement projects. However, as with the replacements in lieu of
18 hydrotesting sub-program in Section A of this testimony, ORA applied its cost
19 model to predict the cost of vintage replacement projects. This produces a
20 cost forecast of approximately \$117 million over the 2019-2021 rate case
21 period, compared to PG&E’s \$120 million, a reduction of about 2%²⁶. Table 5-
22 5 shows ORA’s forecast cost adjustments for the Pipe Replacement program.
23

²³ PG&E Prepared Testimony, p. 5-54 lines 17-25.

²⁴ TIMP Risk is a relative risk score calculated as described in PG&E’s Risk Management Procedure, Utility Procedure: TD-4810P-01, Rev. 0a.

²⁵ PG&E Prepared Testimony, p. 5-54 lines 12-16.

²⁶ ORA Workpapers, “ORA-05-WP-Molla-Calcs.xlsx”, tab “Vintage Replacement (75E)”.

1 **Table 5-5: Summary of ORA Recommended Capital Expenditures for Pipe**
 2 **Replacement (Thousands of Nominal \$)**

<i>Description</i>	<i>ORA Recommended</i>			<i>PG&E Proposed²⁷</i>		
	2019	2020	2021	2019	2020	2021
Vintage Pipe Replacement	36,897	44,109	36,211	40,557	44,240	35,046
Other Pipeline Safety and Reliability Replacements	7,357	7,588	7,811	7,357	7,588	7,811
Total	44,254	44,116	36,218	47,914	51,828	42,857

3

4 **C. Geo-Hazard Threat Identification and Mitigation**

5 The Geo-hazard threat identification involves data collection and
 6 monitoring of land movement threats and mitigation of higher risk sites. In this
 7 rate case, PG&E prioritizes sites where there is high land movement risk, and
 8 that are in HCAs, Class 3 or 4 non-HCA locations, or Class 1 or 2 locations
 9 with Impacted Occupancy Counts (IOCs) greater than 0. PG&E’s forecast
 10 allows for expense mitigations of six sites per year and ten capital mitigation
 11 sites during the rate case period.

12 PG&E’s forecast for the capital component of the Geo-hazard threat
 13 mitigation is based on an average of historical remediation projects to derive
 14 an average unit cost of approximately \$1.4 million. This average, however, is
 15 based on five historical projects, four of which range from about \$19,000 to
 16 \$116,000, and one project that cost about \$6.7 million. The large disparity
 17 between the \$6.7 million project and the other four warrant its consideration
 18 as an outlier.²⁸ ORA therefore calculates an average unit cost excluding that

²⁷ PG&E Prepared Testimony, Table 5-20.

²⁸ PG&E has not conducted sufficient review to determine whether this project is representative of those forecasted in this rate case. See ORA Supporting Attachments, ORA-DR-070, Q01.

1 project, which produces an average unit cost of approximately \$53,000. ORA
 2 then calculates its forecast for the capital component of Geo-Hazard threat by
 3 applying this average unit cost to the number of capital mitigations projects
 4 forecasted for the rate case period. Table 5-6 shows ORA’s forecast for
 5 capital expenditures for the Geo-Hazard Threat Identification program.

6

7 **Table 5-6: Summary of ORA Recommended Capital Expenditures for Geo-Hazard**
 8 **Threat Identification and Mitigation (Thousands of Nominal \$)**

<i>Year</i>	<i>ORA Recommended²⁹</i>	<i>PG&E Proposed³⁰</i>
2019	174	4,487
2020	180	4,628
2021	185	4,764
Total	539	13,879

9

10 **D. Shallow/Exposed Pipe**

11 The Shallow and Exposed Pipe program includes a land-based portion
 12 which identifies, prioritizes, and mitigates locations where pipeline has
 13 insufficient cover, is vulnerable to exposure from third parties and has become
 14 exposed due to natural forces,³¹ and a levee- and water-crossing portion that
 15 assesses and monitors pipeline installations in waterways and levees.³² In this
 16 rate case period, PG&E prioritizes locations with a high Likelihood of Failure
 17 (LOF) and that are in HCAs, and plans to mitigate 4.3 miles out of the 32.3
 18 miles identified as requiring mitigation. ORA does not oppose the pace and
 19 prioritization of projects for this rate case period.

²⁹ ORA Workpapers, “ORA-05-WP-Molla-Calcs.xlsx”, tab “Geo-Haz Threat ID – Cap (75J)”.

³⁰ PG&E Prepared Testimony, Table 5-34.

³¹ PG&E Prepared Testimony, p. 5-97 lines 5-8.

³² PG&E Prepared Testimony, p. 5-98 lines 7-15.

1 This program is subject to the 2017 GRC Settlement agreement. While
2 PG&E claims that they “performed the highest priority work, and the work that
3 PG&E did not perform did not create a safety hazard”, they do not explain
4 what metric they used to determine what the highest priority work should be or
5 what constitutes a safety hazard. Thus, it is difficult for parties to evaluate the
6 reasonableness of PG&E’s actions in reprioritizing this work.

7 This program includes both capital and expense mitigation projects.
8 PG&E forecasts the costs of capital mitigation projects using the pipe
9 replacement cost model described in section A. As before, ORA recommends
10 the use of its cost model instead of PG&E’s to forecast replacement costs due
11 to its basis in a larger dataset, and its improved model fit compared to PG&E’s
12 model. Table 5-7 shows ORA’s forecasted capital expenditures for the
13 Shallow/Exposed Pipe program.

1 **Table 5-7: Summary of ORA Recommended Capital Expenditures for**
 2 **Shallow/Exposed Pipe (Thousands of Nominal \$)**

3

<i>Year</i>	<i>ORA Recommended</i> ³³	<i>PG&E Proposed</i> ³⁴
2019	21,324	25,446
2020	21,994	26,246
2021	22,641	27,017
Total	65,960	78,710

4

5 **E. Gas Gathering**

6 PG&E’s Gas Gathering divestiture program is aimed at retiring natural
 7 gas gathering facilities per CPUC recommendation in D.89-12-016.

8 Retirement of these facilities reduces costs of operations and maintenance
 9 and enhances public safety by reducing the presence of pressurized, idle
 10 pipe. The Gas Gathering divestiture program consists only of capital
 11 expenditures.

12 PG&E determined which idle meters to retire in this rate case period
 13 through a risk scoring system based on factors like strength test history,
 14 potential impact radius, and leak history. Those included in this rate case
 15 period are those that scored greater than a 5 (the score ranges from 0 to 7,
 16 with 7 being the highest risk tier), resulting in 18 meters, or six meters per year.
 17 While this is a slower pace than what was forecasted in the last rate case,
 18 which forecasted nine meters per year,³⁵ it is significantly higher than what
 19 was actually completed, which was only 3 meters in 2014-2016.³⁶ While

³³ ORA Workpapers, “ORA-05-WP-Molla-Calcs.xlsx”, tab “ShallowExposed – Cap 75MTK,44A”.

³⁴PG&E Prepared Testimony, Table 5-34.

³⁵PG&E Prepared Testimony, p. 5-110 lines 17-19.

³⁶ PG&E Workpaper Table 5-51 (WP p. 5-183).

1 PG&E notes that it will rely less on asset sales as a means of divestiture in
2 the future than it historically has,³⁷ the disparity between what was forecasted
3 and completed in the last rate case period still raises uncertainty about what
4 can realistically be completed in this rate case period. Thus, ORA
5 recommends that PG&E file an annual Tier 1 advice letter describing their
6 progress for this program, including how many meters were retired and their
7 cost.³⁸ This allows for greater accountability in the case that PG&E continues
8 to underspend in their Gas Gathering program.

9 **F. Work Required by Others (WRO)**

10 The WRO program involves transmission pipeline or related facility
11 removals and relocations performed by PG&E at the request of third parties.
12 PG&E has several master agreements with agencies such as Cal Trans, Bay
13 Area Rapid Transit (BART), and others, that provide recovery of a percentage
14 of the costs incurred in relocating pipeline facilities.³⁹

15 PG&E forecasts the costs of both capital and expense components of
16 WRO by taking the three-year average cost, net of reimbursements. PG&E
17 used 2013 to 2015 costs because the 2016 net cost was not yet available.⁴⁰
18 However, PG&E has since provided the net 2016 and 2017 costs, so ORA
19 used an updated three-year average of 2015 to 2017 costs to forecast capital
20 and expense costs.⁴¹ Table 5-8 and 5.9 shows ORA's recommended expense
21 and capital forecasts, respectively.

22

³⁷ ORA Supporting Attachments ORA-05-SA-Molla-01, p. 309 (PG&E Response to ORA-DR-060, Q06).

³⁸ Alternatively, PG&E could include this information within their Annual Risk Spending Accountability Reports.

³⁹ PG&E Prepared Testimony, page 5-112.

⁴⁰ PG&E Prepared Testimony, page 5-114.

⁴¹ ORA Supporting Attachments ORA-05-SA-Molla-01, p. 310 (ORA-DR-60, Q07).

1 **Table 5-8: Summary of ORA Recommended Expenses (Thousands of Nominal \$)**

<i>Description (a)</i>	<i>ORA Recommended⁴² (b)</i>	<i>PG&E Proposed (c)</i>	<i>Amount PG&E>DRA (d=c-b)</i>	<i>Percentage PG&E>DRA (e=d/b)</i>
WRO	628	715	87	12.2%

2

3 **Table 5-9: Summary of ORA Recommended Capital Expenditures (Thousands of**
4 **Nominal \$)**

<i>Year</i>	<i>ORA Recommended⁴³</i>	<i>PG&E Proposed⁴⁴</i>
2019	19,148	27,866
2020	19,749	28,742
2021	20,330	29,857
Total	59,227	86,465

5

6 PG&E also requests discontinuation of the one-way balancing account
7 for WRO based on the fact that WRO is difficult to forecast in advance
8 because it arises from requirements imposed on PG&E by another agency,
9 and because PG&E is using a historical annual average for developing its
10 WRO forecast rather than forecasting specifically for High Speed Rail.⁴⁵ ORA
11 supports the discontinuation of the balancing account, provided that ORA’s
12 recommended forecast, or a similar forecast, is adopted. ORA’s annual
13 forecast is based on the most up-to-date three-year average, and therefore
14 represents the current best forecast of average costs in the 2019-2021 rate
15 case period. Thus, if ORA’s forecast is adopted in conjunction with the
16 discontinuation of the balancing account, there is an opportunity for PG&E’s
17 annual costs to balance out over several years to approximately match the
18 forecast. However, as shown in Table 5-10, the recorded costs in 2013

⁴² ORA Workpapers, “ORA-05-WP-Molla-Calcs.xlsx”, tab “WRO – Exp (JTA)”.

⁴³ ORA Workpapers, “ORA-05-WP-Molla-Calcs.xlsx”, tab “WRO – Cap (83A)”.

⁴⁴ PG&E Prepared Testimony, Table 5-34.

⁴⁵ PG&E Prepared Testimony, p. 5-113.

1 through 2015 on which PG&E bases its forecast represent relatively high cost
2 years compared to 2011, 2012, 2016, or 2017. PG&E’s forecast, therefore, is
3 likely too high, and if it is adopted rather than ORA's recommendation, ORA
4 recommends the retention of the one-way balancing account. The use of a
5 balancing account would protect ratepayers in case the amount of work
6 required by others falls short of PG&E’s forecast.

7 **Table 5-10: PG&E’s WRO Recorded Costs (in Thousands of 2016 \$, NCM)**

2011	2012	2013	2014	2015	2016	2017
6,106	9,387	20,830	32,318	23,653	10,415	19,311

8

9 **G. In-Line Inspection (ILI)**

10 In-Line Inspection (ILI) is one of three possible methods⁴⁶ of
11 examination of transmission pipelines to ensure pipe integrity. In ILI, a device
12 called a “pig” is outfitted with sensing equipment, and then inserted into a
13 pipe. As the pig moves down the pipe’s length, its sensors may detect
14 anomalies that could warrant pipeline repair.

15

16 There are two forms of ILI:

- 17 a. In Traditional ILI, the pig is moved along the pipe’s length by the
18 pipe’s own gas flow. Because ILI measurements are most accurate
19 when the pig is moving at constant velocity, traditional ILI
20 necessitates near-constant gas flow of 1-5 mph. The gas generally
21 must be pressurized to at least 300 pounds per square inch gauge
22 (psig) in order for the gas to apply enough pressure to the pig to
23 overcome frictional forces.

⁴⁶ The other methods being Hydrostatic Pressure Testing, and Direct Assessment.

1 b. Non-Traditional ILI uses pigs that can overcome the limitations of
2 traditional ILI of needing high pressure, constant gas flow for
3 constant velocity, by using alternative means of locomotion. Such
4 means of constant velocity locomotion include cable-pulled and
5 robotic leg pigs. Non-traditional ILI's fewer limitations allows for
6 inspection of pipes unreachable with traditional ILI, but non-
7 traditional ILI is often more expensive to perform.

8
9 ILI expenditures are split into three categories:

- 10 a. Pipeline Upgrades, i.e. "Make Piggable": Pipes must have pig
11 launching and receiving points installed, and sections of pipe that
12 inhibit pig movement and measurement (such as sections with non-
13 uniform diameter) must be replaced.
- 14 b. Actual ILI Run: Besides the inspection pig that performs the
15 necessary measurements, cleaning pigs must also precede the
16 measuring pig performing the inspection, to remove debris that could
17 inhibit accurate measurement.
- 18 c. Direct Examination & Repair (DE&R): Anomalies found by the pig
19 are flagged, and the section of pipe with the anomaly is excavated
20 and examined to assess if it needs repair.

21
22 PG&E's ILI proposals for the rate case are:

- 23 a. 18 ILI pipeline upgrade projects per year for a total of 54 projects
24 over the rate case period, increasing PG&E's piggable mileage by
25 1,122 miles. These upgrades between 2019 and 2021 would cost
26 \$588 million.
- 27 b. To perform 2,126 miles of traditional and 35.24 miles of non-
28 traditional ILI runs, evenly split over the 3 years, with a 2019
29 expense, in 2019 dollars, of nearly \$87 million.

1 c. 465 ILI DE&R, evenly split over the 3 years, with a 2019 expense, in
2 2019 dollars, of \$38,958,879.

3 Table 5-11 compares ORA's and PG&E's forecasts for 2019-2021 ILI capital
4 scope of work:

5 **Table 5-11**
6 **ILI Capital Scope of Work for 2019-2021**

Description	PG&E 2019-2021	ORA 2019-2021	Adjustments
Miles Upgraded	1,122.00	841.08	(280.92)
Projects Completed	54	36	(18)

7
8 Table 5-12 compares ORA's and PG&E's forecasts for 2019-2021 ILI
9 capital expenditures, after escalation:

10 **Table 5-12**
11 **ILI Capital Expenditures for 2019 - 2021 (escalated dollars)**

Year	PG&E	ORA	Adjustments
2019	213,526,033	142,350,689	(71,175,344)
2020	220,234,890	146,823,260	(73,411,630)
2021	226,708,346	151,138,898	(75,569,448)

12
13

1 Table 5-13 compares ORA's and PG&E's forecasts for 2019 expense-
2 based scope of work:

3 **Table 5-13**
4 **ILI Expenses Scope of Work for 2019**

Description	PG&E 2019	ORA 2019	Adjustments
Miles of Traditional ILI Runs	708.72	478.72	(230.00)
Miles of Non-Traditional ILI Runs	11.75	9.46	(2.29)
Number of ILI DE&R Digs	155	116	(39)

5
6 Table 5-14 compares ORA's and PG&E's forecasts for 2019 expenses,
7 after escalation:

8 **Table 5-14**
9 **ILI Expenses 2019 (escalated dollars)**

Description	PG&E 2019	ORA 2019	Adjustments
Traditional ILI	66,717,837	42,151,953	(24,565,884)
Non-Traditional ILI	19,815,068	16,100,990	(3,714,079)
ILI DE&R	38,958,879	29,157,901	(9,800,978)
PSEP Pipeline ILI	0	0	0
Total ILI Expenses	125,491,784	87,327,056	(38,164,728)

10
11 **i. ILI Pipeline Upgrades**

12 This section covers PG&E's proposed expenditures regarding
13 upgrading pipelines to be capable of traditional in-line inspection, i.e. "make
14 piggable". PG&E proposes an even amount of work of 18 upgrade projects for
15 each year within the rate case period, with a capital expenditure per year, in
16 2016 dollars, of \$196,165,396.⁴⁷ After escalation, PG&E's proposed
17 expenditures for these upgrades are:⁴⁸

⁴⁷ PG&E's Response to ORA-DR-002 Q01, Atch 3 WP 5-157.

⁴⁸ *Id.*

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16

Table 5-15
Traditional ILI Capital Forecast MAT 98C
Cost Summary Table

Cost Summary Table			
YEAR	Forecast (2016 \$, NCM)	Escalation Factor	Forecast ^(a) (\$, NCM)
2019	\$196,165,396	1.089	\$213,526,033
2020	\$196,165,396	1.123	\$220,234,890
2021	\$196,165,396	1.156	\$226,708,348

The Commission should defer 18 projects in PG&E’s proposal, reducing the scope of work during this rate case period from 18 to 12 upgrade projects per year, and adjust PG&E’s budget accordingly. ORA does not contest the overall 12-year through 2026 scope of work of PG&E’s ILI pipeline upgrade program. The 12-year scope of work was already authorized by the Commission in PG&E’s 2015 GT&S Rate Case.⁴⁹

ORA is concerned with the scope from 2019-2021, where the proposed 18 projects per year will require 1122 miles of upgrades over this period. As seen in Table 5-16, this scope of 374 miles of upgrades per year is over 50% the pace of work over any other interval in the 12-year program.

⁴⁹ Commission Decision D.16-06-056.

1
2

Table 5-16

PG&E's Proposed Pipe Upgrade Scope of Work

ILI Upgrade Period	Approximate Pipe Miles	Average Miles Upgraded per Year
2015-2016 Upgraded	252 ⁵⁰	126
2017-2018 Planned	462 ⁵¹	231
2017 Actual	180 ⁵²	180 ²
2019-2021 Planned	1122 ⁶	374
2022-2026 Planned	885 ⁶	177

3
4
5
6
7
8
9
10

ORA is concerned whether PG&E can successfully complete this accelerated scope of upgrades during this time period. PG&E has not successfully upgraded more than 180 miles of pipeline during this decade.⁵³ That PG&E intends to have an average workload over twice their previous maximum calls into question whether PG&E has the manpower or equipment necessary to safely perform the work with a pace that has doubled from previous years.

11
12
13
14
15
16

Furthermore, PG&E does not demonstrate in its prepared testimony what benefits arise from accelerating work on specific pipelines in the 2019-2021 rate case, rather than spreading the workload more evenly between 2019-2026. If PG&E's proposed ILI pipe upgrade expenditures are approved as is, PG&E should at minimum justify the need for a heightened pace of upgrades for this rate case.⁵⁴

⁵⁰ *Id.*, where 1,545 miles were upgraded through 2014. In PG&E Prepared Testimony Table 5-9, 1,797 miles were upgraded through 2016. The difference in the 1,545 and 1,797 miles upgraded between 2014 and 2016 represents 252 miles of upgrades.

⁵¹ PG&E Prepared Testimony Table 5-9.

⁵² From PG&E's response to ORA-DR-059 Q01, "The calendar year from 2010 through 2017 that PG&E performed the greatest mileage of traditional in-line inspection pipeline upgrades was 2017 with a total upgrade mileage of approximately 180 miles."

⁵³ *Id.*

⁵⁴ From the 2015 PG&E GT&S Rate Case D. 1606056 Conclusion of Law #1: "PG&E has the burden to affirmatively establish the reasonableness of all aspects of its application."

1 Table 5-17 shows ORA’s adjusted scope of work for the rate case. The
2 841.08-mile total under ORA’s adjustment amounts to an average of 280.36
3 miles per year. This still significantly exceeds the upgrade workload of PG&E
4 at any other time period during PG&E’s 12-year ILI upgrade program.

5 ORA calculated this adjustment by trying to evenly spread the
6 remaining needed upgrades over the 2019-2026 time period.⁵⁵ An even
7 spread was achieved on a per project basis, but not by mileage. This is due to
8 many of the upgrades having integrity reassessments that are due during the
9 rate case period.⁵⁶ The adjustment did not remove upgrade projects that have
10 integrity assessments that are due. Instead, ORA’s adjustment only defers
11 upgrade projects whose related pipe segments do not have a required
12 reassessment from 2019-2021,⁵⁷ or pipes that are not required to have an
13 integrity assessment.⁵⁸

⁵⁵ Based on PG&E’s planned upgrade mileage shown in Table 5-17, the 2,007 miles that still need upgrades would amount to 250.88 miles per year over the 8 years between 2019 and 2026.

⁵⁶ PG&E is required by Title 49 Code of Federal Regulations (CFR) § 192.939 to perform periodic integrity assessments of its transmission pipelines that are deemed to create high consequence areas (HCAs). For a list of the reassessment due dates pertaining to PG&E’s planned ILI runs, see PG&E’s response to ORA-DR-059 Q03 Atch 1.

⁵⁷ If the reassessment is due following 2021, a PG&E reassessment during the 2019-2021 time period is potentially unnecessary. If the reassessment is due *before* 2019, i.e. in 2017 or 2018, PG&E would need to assess the pipe through an alternative method by the corresponding year. Because none of the provided reassessment intervals (see PG&E responses to ORA DR 059 Q03 and ORA DR 071 Q01) are less than 5 years, the following reassessment after 2017-2018 would be 2022 or later, again making a reassessment between 2019-2021 potentially unnecessary.

⁵⁸ From PG&E’s response to ORA’s Oral DR 008 Q01, the “N/A” reassessment intervals in PG&E’s response to ORA-DR-059 Q03 constitute either newly identified high consequence areas (HCAs) that must now have integrity assessments, or non-HCA pipe segments where “an integrity assessment was not required”. Integrity assessments must be performed in HCAs to satisfy the integrity management program requirements of CFR § 192.905. ORA’s adjustments leaves the newly identified HCA mileage untouched, but takes a different approach to the ILI upgrade projects and associated ILI runs for pipe segments with no HCA mileage, where integrity assessment is not required.

1 ORA realizes PG&E’s reassessment intervals constitute a maximum
 2 rather than a definitive reassessment interval,⁵⁹ but PG&E should be held
 3 responsible in justifying any additional or expedited reassessments.⁶⁰

4
 5 **Table 5-17**
 6 **ORA Recommended Adjusted Scope of Work**

Description	PG&E 2019-2021	ORA 2019-2021
Miles Upgraded	1,122.00	841.08
Projects Completed	54	36
Miles Upgraded per Year	374.00	280.36

7
 8 PG&E ties its proposed ILI pipeline upgrade costs solely to the number
 9 of projects performed rather than the number of miles of work. Therefore, it is
 10 appropriate to linearly scale PG&E’s ILI pipe upgrade budget based on the
 11 adjusted number of projects to be completed. This linear scaling is also used
 12 by PG&E in PG&E’s workpapers.⁶¹ The recommended adjusted budget is
 13 shown in Table 5-18:

14 **Table 5-18**
 15 **PG&E vs ORA Forecasts**

Year	PG&E	ORA	Adjustments
2019	213,526,033	142,350,689	(71,175,344)
2020	220,234,890	146,823,260	(73,411,630)
2021	226,708,346	151,138,898	(75,569,448)

17

⁵⁹ From PG&E’s response to ORA DR 059 Q03, "Please note that for the purpose of this response, PG&E is providing the minimum reassessment interval that is allowed by 49 CFR Part 192, Subpart O, for the previously assessed segments within each planned ILI section. The earliest due date drives the scheduling of future assessments."

⁶⁰ From the 2015 PG&E GT&S Rate Case D. 1606056 Conclusion of Law #1: "PG&E has the burden to affirmatively establish the reasonableness of all aspects of its application."

⁶¹ As can be derived from PG&E’s Response to ORA-DR-002 Q01, Atch 3 WP 5-157.

1 The deferment of 18 of PG&E’s projects into the 2022-2026 time period
2 should not negatively impact PG&E’s ability to complete its 12-year program,
3 whether for pipe upgrade, ILI runs, or DE&R. As previously mentioned, the
4 adjusted pipe upgrade mileage during this rate case period is still significantly
5 more than any other during PG&E’s 12-year ILI upgrade program. By
6 definition, the upgrade workload is thus less and thus more reasonable in
7 2022-2026 than during this rate case period.

8 **ii. Traditional ILI Runs**

9 PG&E proposes 1,126 miles of first time traditional ILI runs and 1,000
10 miles of traditional ILI re-inspections over the rate case period, evenly divided
11 over the rate case period’s three years, for a total of 2,126 miles, or
12 approximately 710 miles per year. PG&E projects such traditional ILI runs will
13 accrue an annual expense, in 2019 dollars, of \$66,717,837.

14 While PG&E has never completed more than 423 miles of traditional ILI
15 in a given calendar year for this decade,⁶² added ILI miles does not
16 necessarily constitute an overall increase in workload for PG&E. The added
17 ILI miles can instead replace on a mile per mile basis integrity assessment
18 workload associated with pressure testing and external corrosion direct
19 assessment.⁶³

20 ORA’s adjustments to PG&E’s proposed traditional ILI runs instead
21 stem from ILI runs that PG&E propose that are not due during the rate case

⁶² From PG&E’s response to ORA-DR-059 Q02: “The calendar year from 2010 through 2017 that PG&E performed the greatest mileage of traditional in-line inspection runs was 2014 with a total inspection run mileage of approximately 423 miles.”

⁶³ Per Title 49 CFR CFR § 192.937(c), PG&E has three options in order to meet compliance of the integrity assessments of transmission pipelines required by Title 49 CFR § 192.939: Internal inspection tools, pressure tests, and direct assessment. Therefore, if PG&E performs ILI on a line that integrity assessment is required, it thus does not have to perform pressure tests or external corrosion direct assessments.

1 period, or are not required by law.⁶⁴ These adjustments incorporate all of the
 2 ILI run miles on ORA’s deferred upgrade projects, as well as additional
 3 mileage from ILI runs on previously upgraded pipe. The results of ORA’s line-
 4 by-line reduction of PG&E’s proposed ILI runs is shown in Table 5-19 below.⁶⁵

5 **Table 5-19**
 6 **ORA Recommended Adjusted Traditional ILI Run Miles**

	PG&E Proposed Miles	ORA Miles
Total	2126	1436
Per Year	709	479

7
 8 PG&E’s traditional ILI run budget on lines upgraded in 2019-2021 is
 9 adjusted accordingly. Table 5-20 shows the subtotal adjusted expenses. In
 10 addition, PG&E has indicated in its work papers that one ILI run on an existing
 11 line has a portion of its costs instead billed to StanPac.⁶⁶ The total expense
 12 takes this adjustment into account. The adjusted recommended expense
 13 shown is \$42,151,953, compared to PG&E’s proposed \$67,046,160. Because
 14 PG&E anticipates a uniform traditional ILI expenditure for each year, ORA
 15 recommends a total forecast of \$126,455,858 in 2019 dollars, over the 2019-
 16 2021 period.

17 **Table 5-20**
 18 **ORA Recommended Adjusted Traditional ILI Expenses**

PG&E Subtotal	ORA Adjustments	1/7 StanPac Portion	ORA Subtotal
187,421,423	68,911,223	267,248	118,242,951

ORA Subtotal Annual	Escalation Factor	ORA Annual
39,414,317	1.069	\$42,151,953

19
⁶⁴ i.e. there are no associated HCA miles.

⁶⁵ Data to perform this line-by-line reduction can be found in PG&E’s response to ORA-DR-059 Q03 Atch 01.

⁶⁶ PG&E’s Response to ORA-DR-002 Q01, Atch 3 WP 5-38.

1 **iii. Non-Traditional ILI Runs**

2 PG&E proposes performing non-traditional ILI runs on 47 projects totaling
3 35.24 miles of pipe over the rate case period, or 11.75 miles per year.⁶⁷

4 PG&E's proposes \$19,815,068 in 2019 expenses for these non-traditional ILI
5 runs.⁶⁸ PG&E has historically conducted up to 6.5 miles of non-traditional ILI
6 runs in a calendar year.⁶⁹

7 Similar to traditional ILI runs, ORA only adjusted PG&E's proposed non-
8 traditional ILI runs to remove those that are not due during the rate case
9 period, or are not required by law. The results of ORA's line-by-line reduction
10 of PG&E's proposed ILI runs is shown in Table 5-21 below.⁷⁰

11 **Table 5-21**

12 **ORA Recommended Adjusted Non-Traditional ILI Run Miles**

	PG&E Proposed Miles	ORA Miles
Total	35.24	28.37
Per Year	11.75	9.46

13

14 PG&E's traditional ILI run budget on lines upgraded in 2019-2021 is
15 adjusted accordingly. Table 5-22 shows the subtotal adjusted expenses.
16 ORA's adjusted recommended expense shown is \$16,100,990, compared to
17 PG&E's proposed \$19,815,068. Because PG&E anticipates a uniform non-
18 traditional ILI expenditure for each year, ORA recommends a total forecast of
19 \$48,302,969 in 2019 dollars, over the 2019-2021 period.

20

⁶⁷ PG&E's Response to ORA-DR-002 Q01, Atch 3 WP 5-42.

⁶⁸ *Id.*

⁶⁹ PG&E's Response to ORA-DR-059 Q02.

⁷⁰ Data to perform this line-by-line reduction can be found in PG&E's response to ORA-DR-071 Q01 Atch 01.

1

Table 5-22

2

ORA Recommended Adjusted Non-Traditional ILI Expenses

PG&E Subtotal	ORA Adjustments	ORA Subtotal	ORA Subtotal Annual	Escalation Factor	ORA Annual
55,587,437	10,421,593	45,165,844	15,055,281	1.069	16,100,990

3

4 **iv. ILI DE&R**

5 PG&E proposes performing 465 ILI DE&R digs (155 per year) on
6 1819.80 miles of traditional ILI, and 27.11 miles of non-traditional ILI over the
7 rate case period.⁷¹ These mileage numbers are different from the miles used
8 in forecasting the scope of work for traditional and non-traditional ILI runs
9 because ILI DE&R is generally performed the year following the ILI run.⁷²
10 Therefore, the DE&R performed from 2019-2021 would cover runs performed
11 from 2018-2020, rather than 2019-2021. PG&E proposes \$38,958,879 in
12 2019 expenses for these DE&Rs.

13 ORA adjusts PG&E’s proposed ILI DE&R to reflect ORA’s
14 recommendation for reduced ILI runs. In Table 5-19, ORA adjusts PG&E’s
15 traditional ILI runs over the rate case period from 2126.16 miles to 1436.15
16 miles, or a reduction of 690.01 miles. Similarly, in Table 5-21, ORA adjusts
17 PG&E’s non-traditional ILI runs over the rate case period from 35.24 to 28.37
18 miles, or a reduction of 6.87 miles. However, these reductions were for runs
19 from 2019-2021, rather than 2018-2020.

20 Accordingly, ORA has scaled its mileage adjustments for DE&R only for
21 2019-2020. The anticipated mileage of traditional ILI runs for 2019-2021 is
22 approximately uniform for each year from 2019-2021. Therefore, the
23 recommended reduction of both traditional and non-traditional miles of 696.88

⁷¹ PG&E’s Response to ORA-DR-002 Q01, Atch 3 WP 5-44.

⁷² *Id.*

1 over the three years of 2019-2021 is multiplied by two-thirds to get the
 2 reduction from 2019-2020.

3 ORA does not contest PG&E’s 2019 DE&R forecast in 2019, on ILI runs
 4 conducted in 2018. The ILI runs these DE&R pertain to either have already
 5 been performed or authorized in the 2015 rate case.⁷³ ORA’s overall adjusted
 6 ILI DE&R mileage calculation is shown in Table 5-23 below.

7
 8
 9

Table 5-23
ORA Forecast ILI DE&R Mileage

PG&E Proposed ILI DE&R Miles 2019-2021	ORA Reduction of Traditional ILI Miles 2019-2021	ORA Reduction of Traditional ILI Miles 2019-2020	ORA ILI DE&R Miles 2019-2021
1847	697	465	1382

10
 11
 12
 13
 14
 15
 16
 17
 18
 19
 20

PG&E calculates the number of ILI DE&R digs linearly, based on the mileage. PG&E further calculates the ILI DE&R cost linearly based on the number of digs. ORA takes the same approach to calculate PG&E’s adjusted ILI DE&R budget. ORA’s forecast expense for 2019, as shown in Table 5-24 is \$29,157,901 for 348 digs (116 per year), compared to PG&E’s proposed \$38,958,879 for 465 digs. Because PG&E anticipates a uniform traditional ILI expenditure for each year, ORA recommends a total amortized budget of \$ 87,473,703 in 2019 dollars, over the rate case period.

Table 5-24
ORA Recommended Adjusted ILI DE&R Expenses

ORA ILI DE&R Miles 2019-2021	Digs per Mile	Total Number of Digs 2019-2021	Cost Per Dig (2019 \$)	Total ORA 2019-2021 (2019 \$)	ORA 2019 (2019 \$)	PG&E Proposal 2019 (2019 \$)
1382.326	0.25	348	251,361	87,473,703	29,157,901	38,958,879

⁷³ D. 1606056 Order #56.

1 **H. Direct Assessment (DA)**

2 Direct Assessment (DA) is a method used to proactively detect external
3 and internal corrosion to maintain structural integrity of pipelines. PG&E
4 explains that DA is a 4-step process, designed to integrate knowledge of the
5 physical characteristics and operating history of a pipeline with the results of
6 diagnostic testing performed on the pipeline.⁷⁴ It is also used to assess stress
7 corrosion cracking of pipelines. The external corrosion detection is called
8 External Corrosion Direct Assessment, or ECDA. The internal corrosion
9 assessment is called Internal Corrosion Direct Assessment, or ICDA. The
10 Stress Corrosion Cracking Direct Assessment, or SCCDA, is performed to
11 identify and assess the presence of a corrosive environment and pipe stress
12 that could lead to stress corrosion cracks.⁷⁵

13 The 2017 General Rate Case (GRC) Settlement Agreement between
14 PG&E and the Settling Parties⁷⁶ required PG&E to justify the funding requests
15 in this GT&S Rate Case for work that was previously-authorized and funded
16 under certain conditions.⁷⁷ Upon review, ORA concludes that PG&E has
17 satisfied the requirements of the 2017 GRC Settlement Agreement regarding
18 its forecasts for DA expenses and capital expenditures.

19 **i. Capital Expenditures**

20 PG&E requests \$950,000 for 2017, \$1.7 million for 2018, and zero
21 funding for 2019.⁷⁸ In 2016, PG&E recorded \$5.2 million in capital
22 expenditures for DA.⁷⁹

⁷⁴ PG&E Prepared Testimony, Chapter 5, pp. 5-32 to 5-33.

⁷⁵ PG&E Prepared Testimony, p. 5-32.

⁷⁶ The Settling Parties are ORA, TURN, A4NR, Center for Accessible Technology, CUE, CAUSE, CFC, EDF, MCE, Merced ID, Modesto ID, NDC, SBUA, and SSJID.

⁷⁷ PG&E Prepared Testimony, Chapter 5, p. 4-17.

⁷⁸ PG&E Prepared Testimony, p. 5-5.

1 PG&E’s forecast method was based on PG&E performing work on six
2 units at a total cost of \$1.7 million.⁸⁰

3 After reviewing PG&E’s testimony, workpapers, and discovery
4 responses, ORA does not take issue with PG&E’s request of \$950,000 for
5 2017 and \$1.7 million for 2018, and zero funding for 2019 for Direct
6 Assessment, which includes both ECDA and ICDA.

7 **ii. Operations and Maintenance (O&M) Expenses**

8 PG&E has forecast \$35.1 million in O&M expenses for DA in 2019.⁸¹
9 This request comprises \$31.4 million for ECDA and \$3.7 million for ICDA.
10 PG&E’s 2019 request for ECDA is \$3.7 million lower than its 2016 recorded
11 expense amount of \$34.8 million. ORA recommends a total of \$17.6 million
12 for 2019 for ECDA and zero funding for ICDA.

13 PG&E’s forecasts for both ECDA and ICDA are inadequately
14 supported. PG&E proposes in testimony to decrease pipeline assessments
15 using ECDA, and forecasts fewer miles to be assessed using ECDA in the
16 Test Year.⁸² However, PG&E’s request to perform ECDA on 96 miles of
17 pipelines is 7 miles more than the 2017 recorded number of miles assessed.
18 As for ICDA, PG&E has not adequately demonstrated that it will perform the
19 assessments proposed for 2019.

20 In the 2015 GT&S Rate Case, the Commission authorized
21 approximately \$113 million in expenses for PG&E to perform ECDA on 504
22 miles and ICDA on 81 miles, for a total of 585 miles during the 2015-2018

⁷⁹ Id.

⁸⁰ PG&E’s response to data request ORA-38-Q. 3 (b).

⁸¹ PG&E Prepared Testimony, p. 5-39.

⁸² PG&E Prepared Testimony, Chapter 5, pp. 5-35 to 5-38.

1 period.⁸³ The average number of miles PG&E planned to assess was 146
2 miles per year by performing ECDA on 126 miles and ICDA on 20 miles.

3 During the 2015 GT&S timeframe, PG&E recorded a total of \$101.2
4 million in expenses and performed assessments of 257.1 miles in total, or an
5 average of 86 miles per year.⁸⁴ Compared to the PG&E forecast of 146 miles
6 per year, PG&E annually assessed 60 miles, or 41 percent fewer miles than it
7 had planned. However, the recorded data shows PG&E spent approximately
8 90 percent of the amount authorized. PG&E primarily used ECDA to perform
9 assessments of the 257 miles. PG&E used ICDA to assess 15 miles in total
10 from 2012-2015. PG&E did not use ICDA to assess any pipelines in 2016 or
11 2017.⁸⁵

12 The recorded number of miles assessed and expenses incurred each
13 year are shown in Table 5-25 below.

14

⁸³ D.16-06-056, at p. 52.

⁸⁴ PG&E's response to data request ORA-38, Q. 1 (b).

⁸⁵ Id.

1
2
3

Table 5-25
PG&E's ECDA Miles Assessed and Expenses Recorded for 2013-2017 and
2019 Forecast⁸⁶

	2013	2014	2015	2016	2017	2019
ECDA MILES	114.5	138.8	54.8	107.1	88.9	96
ICDA MILES	6.9	2.0	6.3	0.0	0.0	0.7
TOTAL MILES OF DIRECT ASSESSMENT (ECDA+ICDA)	121.4	140.8	61.1	107.1	88.9	96.7
TOTAL O&M EXPENSES (IN MILLIONS NOMINAL \$)	(\$48.77)	\$5.30	\$30.96	\$39.38	\$30.91	\$35.11

4
5
6
7

Table 5-26
Direct Assessment Expenses for 2019
(in Thousands of 2016 Dollars)

Description (a)	ORA Recommended (b)	PG&E Proposed ⁸⁷ (c)	Amount PG&E>ORA (d=c-b)
Direct Assessment			
External Corrosion DA	17,553	31,387	13,834
Internal Corrosion DA	0	3,720	3,720
Total	17,553	35,107	17,554

8
9

iii. External Corrosion Direct Assessment (ECDA)

In 2016, PG&E recorded \$34.8 million in O&M expenses for ECDA.⁸⁸
For 2019, PG&E requests \$31.4 million to perform ECDA on its transmission pipes.⁸⁹

⁸⁶ 2013-2017 recorded miles from PG&E's response to ORA data request 38, Q. 1(b). 2019 forecast from PG&E's response to ORA data request 38, Q. 2(b).

2013-2016 recorded expenses from PG&E workpapers, Chapter 5, p. WP 5-1. 2017 recorded expenses from PG&E's response to ORA data request 35, Q. 1, Attachment 2019 expense forecast PG&E Prepared Testimony, Chapter 5, p. 5-39.

⁸⁷ PG&E Prepared Testimony, Chapter 5, Workpapers, pp. 5-45 to 5-47.

1 PG&E's 2019 request for ECDA expenses is based on the following
2 three components: (1) average cost per mile to complete above ground
3 surveys, (2) historical digs rate per mile assessed, using recorded data from
4 2014 and 2016, and minimum numbers of digs for first time assessment and
5 re-assessment, and (3) average ECDA cost per dig using 2014 to 2016
6 projects.⁹⁰

7 ORA recommends \$17.6 million for 2019 ECDA, which is \$13.8 million
8 lower than PG&E's forecast of \$31.4 million for 2019.

9 ORA takes issue with PG&E's 2019 request for ECDA expenses for
10 several reasons. First, more of PG&E's transmission system is being made
11 piggable to accommodate in-line inspections. PG&E states that the Pipeline
12 and Hazardous Materials and Safety Administration (PHMSA) recommends
13 developing and implementing a plan for eliminating the use of direct
14 assessment as the sole integrity assessment method for gas transmission
15 pipelines.⁹¹ In-line inspections are more preferable as an assessment method
16 compared to ECDA if the system is piggable.⁹² Since more of its system can
17 be assessed by ILI, fewer miles of transmission pipelines will need to be
18 assessed using ECDA. Given this direction for the future of ECDA, PG&E's
19 aggressive forecast for ECDA is not warranted.

20 Second, PG&E states that it will shift focus away from using Direct
21 Examination to assess pipelines in the 2019 rate case period.⁹³ As such, the

⁸⁸ Id.

⁸⁹ PG&E Prepared Testimony, p. 5-39.

⁹⁰ PG&E Prepared Testimony, p. 5-39.

⁹¹ PG&E Prepared Testimony, Chapter 5, p. 5-34.

⁹² PG&E Prepared Testimony, Chapter 5, pp. 5-34 to 5-35.

⁹³ PG&E Prepared Testimony, Chapter 5, p. 5-35.

1 Commission can expect fewer miles to be assessed by ECDA in 2019 and
2 beyond.

3 In 2017, PG&E assessed 89 miles using ECDA and recorded \$30.9
4 million in expenses. PG&E performed 17% fewer assessments using ECDA
5 in 2017 than the 2016 recorded number of 107 miles. Further, the inference
6 in PG&E's testimony regarding the elimination of DA under PHMSA is that the
7 utility will continue to perform fewer assessments using ECDA in 2019
8 compared to the 2017 level.

9 PG&E's 2019 ECDA request seeks to assess 7.8 miles more than the
10 recorded 89 miles it assessed in 2017.⁹⁴ PG&E's recorded data shows that in
11 2017, PG&E assessed fewer miles compared to 2016. PG&E assessed 18.2
12 miles, or 17%, less in 2017 compared to the 2016.⁹⁵ PG&E has not provided
13 any explanation for why it expects an upward trend in 2019

14 As PG&E's use of ECDA will be decreasing, the number of miles to be
15 assessed in 2019 should be less than the 2017 recorded level. ORA
16 recommends applying the 17% decrease to the 2017 recorded number of 89
17 miles surveyed, as the 2019 forecast. ORA's recommendation captures the
18 latest recorded level of ECDA work activities and reflects a realistic decrease
19 in the forecast.

20 Therefore, ORA's 2019 recommends 74 miles for ECDA, rather than 96
21 miles PG&E requested. The ORA recommendation for 2019 is 15 miles, or
22 17 %, less than the 2017 recorded miles assessed.

23 ORA does not oppose PG&E's method of using 0.958 digs per mile
24 assessed or the unit cost per dig. However, ORA opposes PG&E's estimate
25 of 4 digs as the "Minimum Required Digs" to perform a baseline assessment

⁹⁴ PG&E's response to data request ORA-38, Question 1 (b).

⁹⁵ PG&E's response to ORA-38, Q. 1(b).

1 and 2 digs as the “Minimum Required Digs” for a re-assessment.⁹⁶ PG&E has
2 not adequately justified the application of the minimum number of digs for
3 2019 ECDA projects because more than half of its projects do not require the
4 4 digs that PG&E claims.

5 In PG&E’s workpapers, the company identifies 28 projects planned for
6 ECDA assessments in 2019.⁹⁷ Only seven projects are to be re-assessed
7 and 21 projects are assessed for the first time for the baseline. However, 16
8 projects, or 57%, of the 28 projects planned for ECDA require approximately 1
9 dig per mile assessed. These 16 projects include both first time baseline
10 assessments and re-assessments. The remaining 12 projects are estimated
11 to require 2 or more digs.⁹⁸ The table below provides a summary of the
12 ECDA projects and the planned digs PG&E planned for 2019.

13

⁹⁶ PG&E Prepared Testimony, Chapter 5, Workpapers, p. 5-46.

⁹⁷ PG&E Prepared Testimony, Chapter 5, Workpapers, p. 5-45.

⁹⁸ Id.

1

Table 5-27

PG&E's 2019 Planned ECDA Projects						
	Project ID	Miles Assessed	# Digs	Avg. Digs/Mile	Baseline	Re-Assess
1	EC19-0402-01	10.59	10	0.9	x	
2	EC19-0405-01	8.35	8	1.0	x	
3	EC19-050A	3.28	4	1.2	x	
4	EC 19-0617	3.66	4	1.1	x	
5	EC19-0807	5.29	5	0.9	x	
6	EC19-109	9.73	9	0.9	x	
7	EC19-123	6.4	6	0.9	x	
8	EC 19-132	1.85	2	1.1		x
9	EC19-1606	7.81	7	0.9	x	
10	EC19-1614	5.35	5	0.9	x	
11	EC19-162A	9.22	9	1.0	x	
12	EC19-172A	5.56	5	0.9	x	
13	EC19-2403-12	2.97	3	1.0		x
14	EC19-400	1.79	2	1.1		x
15	EC19-402	5.54	5	0.9	x	
16	EC19-7224	4.34	4	0.9	x	
	Subtotal	91.73	88	1.0	x	x
	Remaining 12 Projects	4.27	40	9.4	x	x
	TOTAL 28 PROJECTS	96.00	128	1.3	x	x

2

3

4 PG&E's workpapers do not support a dig rate of more than 1 dig per
5 mile for 96 percent of the miles to be assessed, regardless of the type of
6 assessment. Taken in total the number of average digs per mile assessed is
7 1.3. PG&E has not presented adequate support to justify a dig rate of more
8 than 1 dig per mile assessed for all ECDA projects planned for 2019.

9 Additionally, PG&E does not provide a breakdown of its historical ECDA
10 data of digs per mile assessed for years 2014-2016 by baseline or re-
11 assessment. PG&E also claims that it does not track the costs of a baseline
12 assessment or a reassessment separately.⁹⁹ ORA recommends the
13 Commission require PG&E to track this information beginning with the Test
14 Year, and to include this data with PG&E's future GT&S applications. The

⁹⁹ PG&E's response to data request ORA-38, Q. 1(d) and (e).

1 only recorded data PG&E provides is the average number of digs per mile
2 assessed, which is 0.958 digs per mile for years 2014-2016.¹⁰⁰

3 ORA recommends the Commission reject PG&E's 2019 forecast
4 because PG&E does not have adequate support to justify it. Instead, ORA's
5 forecast relies on the average 0.958 digs per mile, regardless of type of
6 assessment, as the recommended methodology that should be used to
7 develop the 2019 forecast.

8 PG&E's forecast also includes a survey cost per mile in developing the
9 total DA expense. ORA does not oppose PG&E's survey cost per mile. The
10 main differences in the ECDA expense forecast between ORA and PG&E are
11 the number of miles to be assessed, 74 versus 96 miles, and the number of
12 digs per mile assessed. ORA's forecasts fewer miles to be assessed at
13 approximately 1 dig per mile.

14 ORA's 2019 ECDA expense recommendation using the 74 miles and
15 PG&E's cost break down (dig per mile, unit cost per dig, and survey cost per
16 mile) is \$17.6 million. The ORA forecast is based on applying 0.958 digs per
17 mile to 74 miles at a unit cost of \$173,645 per dig, plus applying a survey cost
18 of \$70,591 per mile. This results in an ORA recommendation of \$17.5 million
19 compared to PG&E's request of \$31.4 million. The table below provides a
20 summary of ORA's and PG&E's ECDA expense forecasts.

21

¹⁰⁰ PG&E Prepared Testimony, Chapter 5 workpapers, p. 5-46.

1

Table 5-28

2

ORA vs. PG&E's 2019 Breakdown of ECDA Expense Forecast

	ECDA Miles	# digs/mile	# miles surveyed	2019 Expense (\$ Million)
ORA	74	71	74	17.553
PG&E	96	130	96	31.387
PG&E>ORA	22	59	22	13.834

3

iv. Internal Corrosion Direct Assessment (ICDA)

5 ORA opposes PG&E's request of \$3.7 million to assess 0.7 miles of
6 transmission pipelines using ICDA.¹⁰¹ PG&E's request is inadequately
7 supported based on the utility's seemingly lack of ICDA assessments. PG&E
8 has not provided adequate support to justify its request for ICDA funding.
9 ORA recommends the Commission reject PG&E's 2019 expense request for
10 ICDA.

11 In the 2015 GT&S case, PG&E told the Commission that it would
12 assess 81 miles of transmission pipelines using ICDA from 2015 to 2018.¹⁰²
13 The last time PG&E used ICDA to assess its transmission pipelines was
14 2015. In 2018, PG&E assessed 6.3 miles of pipelines using ICDA.¹⁰³

15 ORA's discussion on ECDA above and ICDA herein details PG&E's
16 decreasing use of DA in general, as a result of PHMSA's recommendation to
17 eliminate DA and PG&E's shift in approach to use more ILI where possible. It
18 does not follow that PG&E will be performing more assessments using ICDA
19 in 2019 or beyond.

20 ORA recommends no funding for ICDA for 2019 compared to PG&E's
21 request of \$3.7 million. Given PG&E's past authorizations and slow pace of
22 work. PG&E should be authorized to record any ICDA work, up to its \$3.7
23 million forecast, in a memorandum account for review in the next GT&S.

¹⁰¹ PG&E Prepared Testimony, Chapter 5, Workpapers, p. 5-47.

¹⁰² PG&E Prepared Testimony, Chapter 5, p. 5-37.

¹⁰³ PG&E's response to data request ORA-38, Q. 1(b).

1 **IV. CONCLUSION**

2 ORA does not oppose PG&E's forecasts for Earthquake Fault
3 Crossings, Geo-Hazard Threat Identification Expense, Emergency Response,
4 Class Location Changes, Pipe Investigation and Field Engineering, and Gas
5 Gathering.

6 ORA recommends the Commission adopt ORA's 2019 expense
7 forecasts of:

- 8 • \$39,423,000 for Hydrostatic Testing;
- 9 • \$14,248,000 for Programs to Support TIMP, but to deny PG&E's
10 request for a two-way balancing account;
- 11 • \$628,000 for WRO;
- 12 • \$87,411,000 1 for In-Line Inspection; and
- 13 • \$17,553,000 for Direct Assessment.

14 ORA recommends the Commission adopt ORA's 2019 capital
15 expenditure forecasts of:

- 16 • \$39,423,000 for Hydrostatic Testing;
- 17 • \$44,254,000 for Pipe Replacements;
- 18 • \$174,000 for Geo-Hazard Threat Identification;
- 19 • \$21,324,000 for Shallow/Exposed Pipe;
- 20 • \$19,148,000 for WRO; and
- 21 • \$142,351,000 for ILI.

22 ORA recommends cost adjustments to PG&E's forecasts for
23 Hydrostatic Testing, Pipe Replacement, Geo-Hazard Threat Identification
24 Capital, Programs to Support TIMP, Shallow/Exposed Pipe, WRO, ILI, and
25 Direct Assessment (DA).

26

1 V. WITNESS QUALIFICATIONS OF N. MOLLA

2 My name is Nusrat Molla. My business address is 505 Van Ness
3 Avenue, San Francisco, California, 94102. I am employed as a Utilities
4 Engineer in the Office of Ratepayer Advocates' Energy Safety and
5 Infrastructure Branch. I am responsible for ORA's testimony regarding the
6 recommended 2019 forecasts for PG&E's Operations and Maintenance
7 Program.

8 I have a Bachelor of Science in Civil and Environmental Engineering
9 from University of California, Berkeley. I am a California-registered Engineer
10 in Training (EIT), number 162397.

11 Prior to joining ORA, I have conducted research in water quality and
12 energy efficiency at the National Institute of Standards and Technology,
13 University of California, Berkeley, and Lawrence Berkeley National
14 Laboratory. I am a co-author on a paper that has been published in
15 Development Engineering, a peer reviewed journal. Since joining ORA in
16 2017, I have worked on, or am currently working on proceedings and projects
17 related to pipeline safety, gas and gas safety, wildfires, utility pole safety and
18 reliability, and risk assessment, including SoCalGas/SDG&E's Pipeline Safety
19 Enhancement Plan (PSEP) Reasonableness Review (Application (A.) 16-09-
20 005), SoCalGas/SDG&E's PSEP Forecast (A.17-03-021), PG&E's Wildfire
21 Expense Memorandum Account application (A. 17-07-011), and PG&E's Risk
22 Assessment Mitigation Phase (A. 17-11-003).

23 This completes my prepared testimony.

24

1 **VI. WITNESS QUALIFICATIONS OF A. BACH**

2 My name is Alan Bach. My business address is 505 Van Ness Avenue,
3 San Francisco, California, 94102. I am employed as a Utilities Engineer in the
4 Office of Ratepayer Advocates' Energy Safety and Infrastructure Branch. I am
5 responsible for ORA's testimony regarding the recommended 2019 forecasts
6 for PG&E's In-Line Inspection (ILI) Program.

7 I have a Master of Science in Civil and Environmental Engineering and
8 a Bachelor of Science in Engineering Science from University of California,
9 Berkeley.

10 Prior to joining ORA, I was a Utilities Engineer in the Commission's
11 Safety Enforcement Division, where I conducted inspections on utility gas
12 infrastructure, and completed all of the web-based training and two of the six
13 in-person training courses towards becoming a PHMSA-certified pipeline
14 inspector. Since joining ORA in 2018, I have worked on, or am currently
15 working on proceedings and projects related to transportation electrification,
16 pipeline safety, gas and gas safety, and risk assessment, including the
17 Transportation Electrification Standard Review Projects (A. 17-01-020 et al.),
18 SDG&E's Medium and Heavy Duty EV Charging Infrastructure Program
19 (A. 18-01-012), and PG&E's Risk Assessment Mitigation Phase
20 (A. 17-11-003).

21 This completes my prepared testimony.

22

1 VII. WITNESS QUALIFICATIONS OF D. PHAN

2 My name is Dao Phan. My business address is 505 Van Ness Avenue,
3 San Francisco, California. I am employed by the Office of Ratepayer
4 Advocates (ORA) as a senior Public Utilities Regulatory Analyst in the Energy
5 Cost of Service and Natural Gas Branch.

6 I received a Master of Arts degree in Political Science from San
7 Francisco State University and a Bachelor of Arts degree in Political Science
8 from California State University, Hayward. I have testified before the
9 Commission as an expert witness in numerous Commission enforcement and
10 regulatory proceedings.

11 This completes my prepared testimony.

12